

to Amsterdam, 5 miles N.E. of Cleves. It has a considerable shipping trade, and manufactories of tobacco, chocolate, leather, liquors, ink, and perfumery. Its old minster church, built in the middle of the 11th century, contains some fine specimens of choir stalls. Emmerich was an important place at an early period, and seems in the middle of the 15th century to have contained 40,000 inhabitants. In 1794 it was bombarded by the French, and in 1806 it took the oath of allegiance to Murat. It passed into the possession of Prussia in 1815. The population in 1875 was 8117.

EMMET, ROBERT (1778–1803), brother of the subject of the next article, was born in Dublin in 1778. He was a school-fellow of the poet Thomas Moore, and his senior by a year at Trinity College, Dublin. Both were members of the Historical Society, and the great champions of the popular side. In 1798 Emmet was expelled from the university, on the ground of being connected with the association of United Irishmen. He shortly afterwards went to the Continent, and remained there till 1802, when he returned secretly to Dublin, and endeavoured to plan a general Irish revolution. On 23d July 1803, deeming that the time had come to execute his scheme, he made an attempt to seize the arsenal and castle of Dublin; but the mob which he headed scarcely achieved so much as a serious riot, for they dispersed at the first military volley. Emmet fled to the Wicklow mountains, and perceiving that success was now impossible, resolved to escape to the Continent; but, contrary to the advice of his friends, he determined to have a last interview with the lady to whom he was attached, a daughter of Curran, the celebrated barrister. The delay proved fatal to him. He was apprehended, and committed for trial on the charge of high treason. He defended himself in a speech of remarkable eloquence, but was condemned to death, and on September 20, 1803, was executed in St Thomas Street, Dublin. Moore, in one of the most pathetic of his Irish melodies, "O breathe not his name," commemorates Emmet's fate; and that of Miss Curran, who died in Sicily soon after him, is the subject of another, "She is far from the land where her young hero sleeps." Although it must be allowed that the conduct of Emmet in his revolutionary attempt was rash and mistaken, the high purity and unselfishness of his intentions have never been questioned.

A life of Emmet was written by the Countess of Haussonville, and was translated into English by John P. Leonard. See also *Life of Curran*, London, 1819; *Curran and his Contemporaries*, by C. Phillips, 1818; *Life of Robert Emmet*, by R. Madden, 1847; and *Robert Emmet, Cause of his Rebellion*, London, 1871.

EMMET, THOMAS ADDIS (1764–1827), a lawyer and politician, was born in Cork the 24th April 1764. He was the second son of Dr Robert Emmet, who latterly was state-physician in Dublin. After attending the school of Mr Kerr in Cork, Thomas in 1778 entered Trinity College, Dublin. In 1783 he went to study medicine at the university of Edinburgh, where he continued four years. He then visited the chief medical schools of the Continent, and after travelling through Germany, France, and Italy, returned in 1788 to Ireland. Owing, he himself says, to the advice of Sir James Mackintosh, he now resolved to forsake medicine for law; and with the view of preparing himself for the Irish bar, he studied two years at the Temple, London. He was admitted a member of the Dublin bar in 1790. In the earlier years of his practice he was often engaged as counsel for those of the United Irishmen who were accused of political offences: but after he became more closely connected with the association, it was deemed prudent that, while privately acting as their legal adviser in all matters, he should no longer be engaged in the public defence of any of their number. In 1797 he became one of the directory of the association, and on the

arrest of O'Connor about the middle of the same year, he succeeded him as chief leader. On the 12th March 1798 he and other leaders were arrested, and after being examined at the castle were committed to Newgate. He was examined before a secret committee of the House of Lords, and afterwards before a secret committee of the House of Commons; and on the 9th April 1799 he was conveyed as a prisoner to Fort-George, Scotland, where he remained till June 1802. He then received his liberty, but only on condition that he spent the remainder of his life on a foreign soil, his return to British territory being forbidden by severe penalties. After being conveyed to Cuxhaven, he proceeded to Hamburg, and finally to Brussels, where he passed the winter. In the beginning of 1803 he went to France, and had an interview with Napoleon; but having little faith in Napoleon's designs of invading England, he in the end of the year embarked for America. Here he rose to considerable eminence at the New York bar, and in 1812 held for a short time the office of attorney-general of the State of New York. He died suddenly, 14th November 1827, while conducting a case in the United States circuit court.

See *Biography*, by C. S. Haynes, London, 1829; and memoir in Madden's *Lives of United Irishmen*, 2d vol. 2d ser., London, 1848.

EMMIUS, UBBO (1547–1626), a celebrated Dutch historian and geographer, was born at Gretha in East Friesland. He was chosen rector of the college of Norden in 1579, but was ejected in 1587 for refusing to subscribe the confession of Augsburg. He was subsequently rector of the colleges of Leer and Groningen, and when in 1614 the college in the latter city obtained a university charter, he was chosen as its principal and its professor of history and Greek, and by his wise guidance and his learning raised it speedily to a position of great eminence. He had correspondence with the principal learned men of his time, who all held him in high esteem. He died 9th December 1626.

His principal works are—*Opus Chronologicum*, Gronin., 1619, fol.; *Vetus Græcia Illustrata*, Leyd., 1626, 8vo; *Rerum Frisicarum Historia*, Leyd., 1616, fol.; *Historia Temporis Nostræ*, Gronin., 1732, 4to.

EMPEDOCLES, one of the most imposing and enigmatic figures in early Greek philosophy, was a native of Agrigentum in Sicily, and lived in the 5th century, probably from 490 to 430 B.C. The details of his life are full of fable and contradictions. The most probable accounts represent him as belonging to an honourable family in the palmy days of his city, as a champion of free institutions, like his father Meton, detecting the aims of incipient tyrants, and crushing the opponents of popular rights, but as finally forced, through the change of parties that occurred during his visit to Olympia, to forego his native city, and to return to Peloponnesus to die. Of his poem on nature (*φύσις*) there are left about 400 lines in unequal fragments out of the original 5000; of the hymns of purification (*καθαρμοί*) less than 100 verses remain; of the other works, improbably assigned to him, nothing is known. His grand but obscure hexameters, after the example of Parmenides, delighted Lucretius. Aristotle, it is said, called him the father of rhetoric. But it was as at once statesman, prophet, physicist, physician, and reformer that he most impressed the popular imagination. To his contemporaries, as to himself, he seemed more than a mere man. The Sicilians honoured his august aspect as he moved amongst them with purple robes and golden girdle, with long hair bound by a Delphic garland, and brazen sandals on his feet, and with a retinue of slaves behind him. Stories were told of the ingenuity and generosity by which he had made the marshes round Selinus salubrious, of the grotesque device by which he laid the winds that ruined the harvests of

Agrigentum, and of the almost miraculous restoration to life of a woman who had long lain in a death-like trance. Legends stranger still told of his disappearance from among men. Empedocles, according to one story, was one midnight, after a feast held in his honour, called away in a blaze of glory to the gods; according to another, he had only thrown himself into the crater of Etna, in the hope that men, finding no traces of his end, would suppose him translated to heaven. But his hopes were cheated by the volcano, which cast forth his brazen sandals, and betrayed his secret.

As his history is uncertain, so his doctrines are hard to put together. He does not belong to any one definite school. While, on one hand, he combines much that had been suggested by Parmenides, Pythagoras, and the Ionic school, he has germs of truth that Plato and Aristotle afterwards developed. There are, according to Empedocles, four ultimate kinds of things, four primal divinities, of which are made all structures in the world—fire, air, water, earth. These four elements are eternally brought into union, and eternally parted from each other, by two divine beings or powers, love and hatred—an attractive and a repulsive force which the ordinary eye can see working amongst men, but which really pervade the whole world. According to the different proportions in which these four indestructible and unchangeable matters are combined with each other is the difference of the organic structure produced; e.g., flesh and blood are made of equal parts of all four elements, whereas bones are one-half fire, one-fourth earth, and one-fourth water. It is in the aggregation and segregation of elements thus arising that Empedocles, like the atomists, finds the real process which corresponds to what is popularly termed growth, increase, or decrease. Nothing new comes or can come into being; the only change that can occur is a change in the juxtaposition of element with element.

Empedocles apparently regarded love and discord as alternately holding the empire over things,—neither, however, being ever quite absent. As the best and original state, he seems to have conceived a period when love was predominant, and all the elements formed one great sphere or globe. Since that period discord had gained more sway; and the actual world was full of contrasts and oppositions, due to the combined action of both principles. His theory attempted to explain the separation of elements, the formation of earth and sea, of sun and moon, of atmosphere. But the most interesting and most matured part of his views dealt with the first origin of plants and animals, and with the physiology of man. As the elements (his deities) entered into combinations, there appeared quaint results—heads without necks, arms without shoulders. Then as these fragmentary structures met, there were seen horned heads on human bodies, bodies of oxen with men's heads, and figures of double sex. But most of these products of natural forces disappeared as suddenly as they arose; only in those rare cases where the several parts were found adapted to each other, and casual member fitted into casual member, did the complex structures thus formed last. Thus from spontaneous aggregations of casual aggregates, which suited each other as if this had been intended, did the organic universe originally spring. Soon various influences reduced the creatures of double sex to a male and a female, and the world was replenished with organic life.

As man, animal, and plant are composed of the same elements in different proportions, there is an identity of nature in them all. They all have sense and understanding; in man, however, and especially in the blood at his heart, mind has its peculiar seat. But mind is always dependent upon the body, and varies with its changing

constitution. Hence the precepts of morality are with Empedocles largely dietetic.

Knowledge is explained by the principle that the several elements in the things outside us are perceived by the corresponding elements in ourselves. We know only in so far as we have a cognate nature within us to the object of knowledge. Like is known by like. The whole body is full of pores, and hence respiration takes place over the whole frame. But in the organs of sense these pores are specially adapted to receive the effluxes which are continually rising from bodies around us; and in this way perception is somewhat obscurely explained.

It is not easy to harmonize these quasi-scientific theories with the theory of transmigration of souls which Empedocles seems to expound. Probably the doctrine that the divinity (*δαίμων*) passes from element to element, nowhere finding a home, is a mystical way of teaching the continued identity of the principles which are at the bottom of every phase of development from inorganic nature to man. At the top of the scale are the prophet and the physician, those who have best learned the secret of life; they are next to the divine. One law, an identity of elements, pervades all nature; existence is one from end to end; the plant and the animal are links in a chain where man is a link too; and even the distinction between male and female is transcended. The beasts are kindred with man; he who eats their flesh is not much better than a cannibal.

Looking at the opposition between these and the ordinary opinions, we are not surprised that Empedocles notes the limitation and narrowness of human perceptions. We see, he says, but a part, and fancy that we have grasped the whole. But the senses cannot lead to truth; thought and reflection must look at the thing on every side. It is the business of a philosopher, while he lays bare the fundamental difference of elements, to display the identity that subsists between what seem unconnected parts of the universe.

See Mullach, *Fragmenta Philosophorum Græcorum*, vol. i.; Zeller, *Phil. der Griechen*, Bd. i. (W. W.)

EMPEROR (*imperator*, *αὐτοκράτωρ*, *Kaiser*), a title formerly borne by the sovereigns of the Roman empire (see EMPIRE), and since their time by a variety of other potentates. The term *imperator* seems to have originally belonged to every Roman magistrate who received from the *comitia curiata* the *imperium* (i.e., the power of the sword and authority to command in war). It was, therefore, in strictness not a title but a descriptive epithet. Towards the end of the Roman republic, however, it had become rather a special title of honour bestowed by the acclamations of a victorious army on their general, or by a vote of the senate as a reward for distinguished services (see Tac., *Ann.*, iii. 74; Cic., *Philipp.*, xiv. 4), and in this sense it continued to be used during the earlier period of the empire. Julius Cæsar, however, assumed it (under a vote of the senate) in a different sense, viz., as a permanent title, or rather as a part of his name (*prænomen*), denoting the absolute military power which had come into his hands; and it was given by the senate, in like manner and with a like significance, to Augustus (see Dion Cassius, lii. 41, liii. 17.) Tiberius and Claudius refused it; but under their successors it soon became established as the regular official title of the monarch of the Roman world, ultimately superseding the name of *princeps*. When Greek became the sole language of the Eastern Roman empire, *imperator* was rendered sometimes by *βασιλεύς* and sometimes by *αὐτοκράτωρ*, the former word being the usual designation of a sovereign, the latter specially denoting that despotic power which the *imperator* held, and being in fact the official translation of *imperator*.

Justinian uses *αυτοκράτωρ* as his formal title, and *βασιλεύς* as the popular term. On the revival of the Roman empire in the West by Charles the Great in 800 A.D., the title (at first in the form *imperator*, or *imperator Augustus*, afterwards *Romanorum imperator Augustus*) was taken by him and by his Frankish, Italian, and German successors, heads of the Holy Roman Empire, down till the abdication of the emperor Francis II. in 1806. The doctrine had, however, grown up in the earlier Middle Ages (about the time of the emperor Henry II., 1002-1024) that although the emperor was chosen in Germany (at first by the nation, afterwards by a small body of electors), and entitled from the moment of his election to be crowned in Rome by the pope, he could not use the title of emperor until that coronation had actually taken place. The German sovereign, therefore, though he exercised, as soon as chosen, full imperial powers both in Germany and Italy, called himself merely "King of the Romans" (*Romanorum rex semper Augustus*) until he had received the sacred crown in the sacred city. In 1508 Maximilian I., being refused a passage to Rome by the Venetians, obtained from Pope Julius II. a bull permitting him to style himself emperor elect (*imperator electus*, erwählter Kaiser). This title was taken by Ferdinand I. (1558) and all succeeding emperors, immediately upon their coronation in Germany; and it was until 1806 their strict legal designation, and was always employed by them in proclamations and other official documents. The term "elect" was, however, omitted even in formal documents when the sovereign was addressed, or was spoken of in the third person.

According to mediæval theory, there was and could be only one emperor in the world, the direct vicegerent of God, who represented the unity of mankind and of the Christian people on its temporal side as the pope did on its spiritual. Hence during those ages the Western monarch and Western writers did not admit in principle, though they sometimes recognized in fact, the title of the emperor who reigned at Constantinople; and the Easterns in like manner denied the existence of an emperor in the West, and maintained that the heads of the Holy Roman Empire were merely German intruders. In spite, however, of the universal acceptance of the theory above mentioned, the title of emperor was one which other princes seem to have hankered after. In 1053 Ferdinand the Great of Castile, in the pride of his victories over the Moors, assumed the style of *Hispanie imperator*, but was forced by the remonstrances of the emperor Henry III. to abandon it. In the 12th century it was again assumed by Alphonso VII. of Castile, but not by any of his successors. In England the Anglo-Saxon kings frequently used the term *basileus*, and sometimes also *imperator*, partly from a desire to imitate the pomp of the Byzantine court, partly in order to claim a sovereignty over the minor kingdoms and races of the British isles corresponding to that which the emperor was held to have over Europe generally (see Freeman, *Norman Conquest*, vol. I., Appendix, who however attaches too much importance to this English use).

In comparatively modern times, the title of emperor has been taken by the monarchs of Russia (Vassili, about 1520, his predecessors at Moscow having been called Great Dukes of Muscovy, and the title of Czar or Tsar being apparently a Slavonic word for prince, not related to Cæsar), France (Napoleon Bonaparte in 1804, Louis Napoleon Bonaparte in 1853), Austria (1805), Brazil (1822), Germany (December 31, 1870), Great Britain and Ireland in respect of the Indian dominions of the crown (1876). Usurpers who have reigned in Hayti, a certain Augustin Iturbide who (in 1822) became ruler of Mexico after the revolt against

Spain, and the archduke Maximilian of Austria during his short tenure of power in Mexico, also called themselves emperors; and modern usage applies the term to various semi-civilized potentates, such as the sovereigns of China and Morocco. It can, therefore, hardly be said that the name has at present any definite descriptive force, such as it had in the Middle Ages, although its associations are chiefly with arbitrary military power, and it is vaguely supposed to imply a sort of precedence over kings. In the cases of Germany, Austria, and Britain in respect of India, it may perhaps be taken to denote that general overlordship which their sovereigns exercise over minor princes and over their various territories, and which is distinct from their position as sovereigns of one or more particular kingdom or kingdoms, the German emperor being also king of Prussia, as the emperor of Austria is king of Hungary, and the empress of India queen of Great Britain and Ireland.

See Selden, *Titles of Honour*; Bryce, *Holy Roman Empire*; Sir E. Colebrooke, "On Imperial and other Titles," in the *Journal of the Royal Asiatic Society*, 1877. (J. BR.)

EMPHYSEMA (from *εμφυσάω*, to inflate), in medicine, means an abnormal presence of air in certain parts of the body. In its restricted sense, however, it is generally employed to designate a peculiar affection of the lungs, of which there are two forms. In one of these there is overdistension of the air-cells of these organs (see **ANATOMY**), and in parts destruction of their walls, giving rise to the formation of large sacs, from the rupture and running together of a number of contiguous air-vesicles. This is termed *vesicular emphysema*. In the other form the air is infiltrated into the connective tissue beneath the pleura and between the pulmonary air-cells, constituting what is known as *interlobular emphysema*.

The former variety is by far the more common, and appears to be capable of being produced by various causes, the chief of which are the following:—

1. Where a portion of the lung has become wasted, or its vesicular structure permanently obliterated by disease, without corresponding falling in of the chest wall, the neighbouring air vesicles or some of them undergo dilatation to fill the vacuum.

2. In some cases of bronchitis, where numbers of the smaller bronchial tubes become obstructed, the air in the pulmonary vesicles remains imprisoned, the force of expiration being insufficient to expel it; while, on the other hand, the stronger force of inspiration being adequate to overcome the resistance, the air-cells tend to become more and more distended, and permanent alterations in their structure, including emphysema, are the result.

3. Emphysema also arises from exertion involving violent expiratory efforts, during which the glottis is constricted, as in paroxysms of coughing, in straining, and in lifting heavy weights. Hooping cough is well known as the exciting cause of emphysema in many persons.

In whatever manner produced, this disease gives rise to important morbid changes in the affected portions of the lungs, especially the loss of the natural elasticity of the air-cells, and likewise the destruction of many of the pulmonary capillary blood-vessels, and the diminution of aerating surface for the blood. As a consequence of these, other changes are apt to arise affecting related organs, more particularly the heart and the venous system generally, one of the most frequent results of which is the occurrence of dropsy. The chief symptom in this complaint is shortness of breathing, more or less constant but greatly aggravated by exertion, and by attacks of bronchitis, to which persons suffering from emphysema appear to be specially liable. The respiration is of similar character to that already described in the case of asthma. In severe forms of the disease the patient comes to acquire a peculiar

puffy or bloated appearance, and the configuration of the chest is altered, assuming the character known as the *barrel-shaped* or *emphysematous thorax*.

The main element in the treatment of emphysema consists in attention to the general condition of the health, and in the avoidance of all causes likely to aggravate the disease or induce its complications. The same general plan of treatment as that recommended in asthma and bronchitis is applicable in emphysema. During attacks of urgent breathlessness antispasmodic remedies should be had recourse to, while the employment of dry cupping over the lungs, and even of moderate wet cupping over the precordium, will often afford marked and speedy relief.

Interlobular emphysema, arising from the rupture of air-cells in the immediate neighbourhood of the pleura, may occur as a complication of the vesicular form, or separately as the result of some sudden expulsive effort, such as a fit of coughing, or, as has frequently happened, in parturition. Occasionally the air infiltrates the cellular tissue of the mediastinum, and thence comes to distend the integument of the whole surface of the body. When occurring suddenly and extensively, this has been known to produce death by asphyxia.

EMPIRE, a term used to denote either the territories governed by a person bearing the title of emperor (see **EMPEROR**), or, more generally, any extensive dominion. The historians of a former age were accustomed to enumerate a succession of great empires, and especially the Babylonian and Assyrian, the Medo-Persian, and the Macedonian, which had embraced the greater part of the civilized world before the rise of Roman power, but that system has now been abandoned. In its strict sense, "the Empire" meant during the Middle Ages, and indeed almost till the present century, the Romano-Germanic or so-called Holy Roman Empire, of which this is therefore the proper place to give a short account. The old Roman empire, founded by Julius Cæsar and Augustus, was finally divided in 395 A.D. between Arcadius and Honorius, the two sons of Theodosius the Great,—that is to say, one part of it, the Western, was ruled from Rome or Ravenna by one sovereign, and the other or Eastern half from Constantinople by another,—although the whole was still held to constitute, in theory, a single Roman state which had been divided merely for administrative purposes. In 476 the Western throne was overturned by Odoacer, the leader of an army of barbarian mercenaries in the imperial service; and the provinces which had obeyed it, so far as they were not then already occupied by invading German tribes, reverted to the emperor reigning at Constantinople, who thereby became again sole titular monarch of the Roman world. Justinian reconquered Italy in the following century, and his successors retained Rome, though Constantinople was their capital, for two centuries. This state of things lasted till 800, when Charles king of the Franks (Charlemagne) was crowned Roman emperor in Rome by Pope Leo III. All the Western provinces, except a part of Italy, had long since ceased to obey the emperor, and that part of Italy had rebelled about seventy years before. The object of the elevation of the Frankish king was to make Rome again the capital of an undivided Roman empire, rather than to effect a severance by creating a separate Western empire; but as the Eastern empire continued to subsist, the effect of the step really was to establish two mutually hostile lines of emperors, each claiming to be the one rightful successor of Augustus and Constantine, but neither able to dispossess its rival. The imperial title, which had fallen very low under the successors of Charles, was again revived in the West by Otto the Great, king of the East Franks, in 962; and from his time on there was an unbroken suc-

cession of German kings who took the name and enjoyed the titular rank and rights of Roman emperors, being acknowledged in the Western countries and by the Latin Church as the heads of the whole Christian community. Their power was, however, practically confined to Germany and Northern Italy, and after the death of Frederick II. (1250), it became comparatively weak even in those countries. In 1453 Constantinople was taken by the Turks, and the Eastern Roman empire came to an end. The Western, however, though now so feeble that it could only be kept on foot by choosing as emperor some prince powerful by his hereditary dominions, lasted on till the year 1806, when Francis II. of Hapsburg, archduke of Austria and king of Hungary and Bohemia, resigned his imperial title, and withdrew to the government of his hereditary kingdoms and principalities under the name (assumed the year before) of emperor of Austria. With him the Holy Roman Empire ended.

The territorial extent of the Romano-Germanic empire varied greatly at different periods of its history. In the time of Charles the Great it included the northern half of Italy (except the district about Venice), Gaul, Western and Southern Germany, and Spain between the Pyrenees and the Ebro. Under Otto the Great and his first successors it extended over the whole of Germany (including Holland and Belgium), as it then stood (modern Germany stretches further towards the north-east), and the south-east part of modern France, being what was then called the kingdom of Burgundy, and had claims of superiority, more or less definite in different cases, over the adjacent kingdoms of Hungary, Poland, and Denmark. Its further pretensions over the greater kingdoms of France, England, Spain, and Naples can hardly be said to have been admitted, though in a speculative sense the Holy Empire was held to include these states and indeed the whole Christian world. At the era of the Reformation all claims over districts outside Germany had become obsolete, nor were they ever revived. From the 15th century onwards it was practically continuous with modern Germany, except that it did not include East Prussia.

The government of the Holy Roman Empire was never an absolute monarchy in the sense in which that of the old pagan empire had been, or that of the Eastern empire at Constantinople was while it lasted. Down till the end of the Hohenstaufen time (1254) it was a strong feudal monarchy, in which, as in the other feudal kingdoms of Europe, the sovereign enjoyed powers which were considerable but by no means unlimited, as he was obliged to respect the rights of his vassals, and could obtain supplies and pass laws only with the consent of the Diet, or supreme national assembly. From the time of Rudolf of Hapsburg (who came to the throne in 1272), its strength, which had been broken in a long struggle against the pope and the Italian republics, was much less; its revenues had shrunk, and the greater nobles had become practically independent princes, sovereign in their own territories, and sometimes stronger than the emperor. The struggles which attended and followed the Reformation still further weakened the authority of the crown; to which, as Roman Catholic, the Protestant princes and cities became almost of necessity hostile; and after the Thirty Years' War, when the Peace of Westphalia (1648) had finally settled the constitution of the empire, it was really no longer an empire at all, but a federation of very numerous principalities, some large, many very small, united under the presidency of a head who bore the title of emperor, but enjoyed scarcely any actual power, and represented in a Diet which was now not so much a national parliament as a standing congress of envoys and officials.

The imperial crown was always in theory elective, but

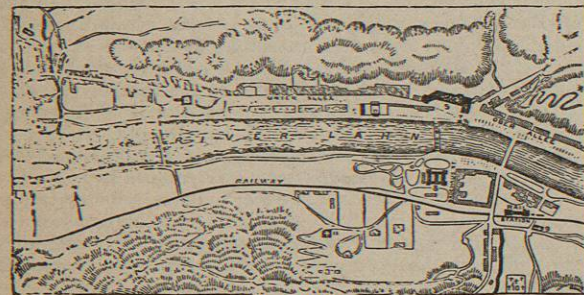
in the earlier Middle Ages it was elective in much the same sense as the crowns of other feudal kingdoms, that is to say, the consent of the nobles and people, latterly of the chief nobles only, was required to the elevation of a sovereign, while practically it was hereditary, that is to say, the son or other near relative of the last sovereign was usually chosen to succeed him. Partly, however, owing to the extinction of several families in succession which had held it, partly to the influence of the pope and the idea that the imperial office was of a more sacred nature than the regal, the elective gradually came to prevail over the hereditary principle; and from the 13th century onwards, the Romano-Germanic throne was in the gift of a small electoral college consisting first of seven, then of eight, and ultimately of nine princes (see Pfeffinger, *Vitriarius illustratus*; Moser, *Römische Kayser*; Bryce, *Holy Roman Empire*). Nevertheless, from the election of Frederick III. in 1440 down to 1806, all the emperors except two—Charles VII. (1742) and Francis I. (1745)—belonged to the house of Hapsburg.

The present German empire, which came into existence when the king of Prussia accepted the title of emperor (December 31, 1870), is not legally a continuation of the Romano-Germanic empire, though practically it occupies a somewhat similar European position. Technically speaking, it is a new creation, which has not succeeded to the rights of Rome any more than the Russian empire has to those of the Eastern or Byzantine empire, which the czars have sometimes claimed to represent. (J. BR.)

EMPOLI, a town of Italy, in the province of Florence and district of San Miniato, is situated in a fertile plain on the river Arno, 6 miles from Florence, with which it is connected by railway. Its principal industries are the manufacture of cotton cloth, tanning, straw-plaiting, and the manufacture of macaroni. It has a collegiate church, founded in 1093, and containing some fine statuary and paintings by Giotto and others. The population in 1871 was 5949.

EMPYEMA (from ἐν, within, and πύον, pus), a term in medicine applied to an accumulation of purulent fluid within the cavity of the pleura (see PLEURISY).

EMS, a watering place of Prussia, in the district of Wiesbaden, province of Hesse-Nassau, is situated on the Lahn, 7 miles S.E. of Coblenz, in a beautiful valley surrounded by wooded mountains and vine-clad hills.



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| 1. Evangelical Church | 7. Police Office |
| 2. Synagogue | 8. New Baths. |
| 3. Gas Works. | 9. Catholic Church |
| 4. Baths. | 10. Catholic Cemetery |
| 5. Carhaus | 11. English Church. |
| 6. Curial | |

It possesses alkaline hot springs, which are used both for drinking and for bathing, and are considered of great efficacy as a remedy for chronic nervous diseases and affections of the liver and respiratory organs. About 15,000 persons frequent them annually. In Ems, on July 13th, 1870, took place the famous interview between King William of

Prussia and the French ambassador Benedetti, which resulted in the French and German war of 1870-71. The population of Ems in 1875 was 6104.

ENAMEL. An enamel may be best defined as a vitreous glaze fused to a metallic surface. There is indeed no difference between an enamel and a glaze, save in the character of the surface to which it is applied. Both are vitrified substances, either with or without colour, and exhibiting every degree of translucency,—some varieties being perfectly transparent, while others are completely opaque. Chemically they consist of easily-fusible salts, such as the silicates and borates of sodium, potassium, and lead, to which various metallic oxides are added when it is desired to impart colour to the enamel. These varieties of glass are pulverized, and the powder is used either in a dry or, more commonly, in a moistened state. The powder or paste, having been spread over the surface to be incrustated, is exposed to a moderate temperature in a muffle heated in the enamel-furnace, when the vitreous substance soon becomes sufficiently fluid to spread itself over the metallic surface, to which it closely adheres. If the glass is merely cemented to the metal, without any trace of fusion, the process is not true enamelling. Although it is extremely convenient to restrict the term "enamel," as in the definition at the head of this article, to those glassy materials which are applied to the surface of metals, it should be remarked that some writers extend it to glazes which are employed on pottery and on other non-metallic materials; while popularly the term has a yet wider use, being applied in fact to almost any brilliant surface, whether produced by varnishing, by lacquering, or by other processes not involving fusion; hence we hear of enamelled leather, enamelled paper, enamelled slate, &c. Sometimes a coating of true enamel or of glaze is employed solely for utility, as in the case of vessels of enamelled iron or of glazed earthenware; but more commonly enamels are applied with a view to decorative effect, the decoration thus produced being extremely permanent, since the fused material is but little affected by atmospheric influences. When enamelling is thus artistically employed, it is usual to speak of the finished works of art themselves as "enamels;" and, as such usage has no practical inconvenience, it will be followed in this article.

According to some authorities, the oldest reference to enamelling is to be found in the book of Ezekiel (i. 4, 27; viii. 2). The original word *chashmal*, חַשְׁמַל, was translated by the LXX. ἤλεκτρον, and appears in the authorized version as *amber*. Genesis, however, believes that the Hebrew word signified polished metal rather than amber. Pliny tells us that the word *electron* was applied to two distinct substances, namely, to amber and to an alloy of $\frac{2}{3}$ gold and $\frac{1}{3}$ silver. It has been held, however, by M. Labarte, a great authority on the history of enamelling, that there are passages in Homer and in Hesiod in which the word *electron* will not bear either of Pliny's meanings, but must be taken to signify enamelled gold. Labarte has found a formidable opponent to this interpretation in the Count Ferdinand De Lasteyrie (*L'Électron des anciens était-il de l'émail?* Paris, 1857).

To whatever period the origin of enamelling may be assigned, it is certain that glazes having the composition of good enamels were manufactured at a very early date. Excellent glazes are still preserved on some of the bricks which have been found among the ruins of Babylonia and Assyria, and have been referred to the 8th or 7th century B.C. Nor should we forget the glazed slipper-shaped coffins which occur in great numbers at Warka, probably the ancient Ur of the Chaldees, and are referred to the Sassanian period. The glazes on the Babylonian bricks were examined by Dr Percy, who found that the base was

a soda-glass, or silicate of sodium, rendered opaque in some specimens by the presence of stannic oxide, or coloured blue in others by means of silicate of copper associated with the sodic silicate, or exhibiting in other specimens a fine yellow colour, due to the presence of antimony and lead, probably in the form of "Naples yellow." Glazes, of a similar character to some of these, were also manufactured by the Egyptians as early as the sixth dynasty. Sepulchral figures, and a variety of other objects familiar to students of Egyptian art, were produced in a substance which has been miscalled "porcelain," and which is, in fact, a frit coated with variously-coloured glazes, of which the most common is of a fine celestial blue colour. This colour is due to the presence of a double silicate of copper and sodium. Beautiful as these glazes unquestionably are, they are not true enamels, since they are not applied to metallic surfaces. It is true that the ancient Egyptians were able to produce an effect not unlike that of enamelling by inlaying bronze and gold with coloured pastes. But Dr Birch says of the Egyptians that "their real enamelling does not appear to be older than the time of the Ptolemaic and Roman dominion in Egypt."

There can be little doubt that the Greeks and Etruscans were acquainted with the art of enamelling. They seem, however, to have practised it to only a very limited extent, and it may be fairly doubted whether they had attained to such a mastery of its details as some writers have assumed. Thus M. Lenormant, writing in 1863, says—

"Les collections de l'Europe possèdent maintenant des pièces incontestables qui démontrent pour les Égyptiens, les Phéniciens, les Grecs, et les Etrusques, la connaissance des secrets les plus difficiles de l'émaillerie, ainsi que la pratique de toutes les formes et de toutes les applications dont ce procédé peut être susceptible."

Whatever knowledge of enamelling the Greeks may at one time have possessed, they appear to have lost it before the 3d century of our era. This is inferred from a famous passage in Philostratus, which was probably written about 240 A.D. Philostratus was a Greek sophist who went from Athens to the court of Julia, the wife of Septimius Severus. The passage is found in the *Icones* (lib. i. cap. 28), and since attention was first called to it by Buonarroti, it has been quoted by all writers on enamelling; it is, in fact, the earliest distinct reference to the art. "It is said that the barbarians who inhabit the ocean pour these colours," alluding to the coloured decorations of some horse-trappings, "on to heated bronze, and that they adhere, become as hard as stone, and preserve the designs." On this passage the learned commentator Olearius remarks, "Celtas intelligit per barbaros in Oceano." It is a vexed question, however, whether the reference applies to the Celts of Britain or to those of Gaul. French writers naturally apply the allusion to the maritime Gauls; but Mr Franks and some other writers have pointed out that the expression used by Philostratus, ἐν ᾠκεανῷ, would refer more appropriately to an insular people, like the Britons. Large numbers of enamelled objects have indeed been found in various parts of England, Scotland, and Ireland. Among these ornamental objects are shields, fibulae, rings, and even bits and other horse-furniture, such as are probably referred to in the passage from the *Icones*. The ornamentation is mostly in that style which has been designated by Mr Franks as late Celtic. Excellent examples are furnished by the enamels which were found in the Victoria Cave near Settle in Yorkshire, and have been described by Professor Boyd Dawkins; these are referred to about the 5th century. (See article CAVE, vol. v. p. 270.) It is not improbable that the art of enamelling, after it ceased to be cultivated in Britain, may have lingered in Ireland,

¹ Ταυτὰ φασι τὰ χρώματα τοὺς ἐν ᾠκεανῷ βαρβάρους ἔχειν τῷ χαλκῷ διαπέφ, τὸ δὲ συνίστασθαι καὶ λιθοῦσθαι, καὶ σκεῖν ἄγράφῃ.

which is known to have been a great centre of arts and sciences during the 6th and 7th centuries.

Although such specimens as those just referred to seem to show that enamelling was practised at a very early period in Western Europe, it is nevertheless in the Eastern empire that we find the earliest historic evidence of the art having flourished as an important industry. Byzantium was indeed for centuries the great seat of this industry, which probably dated from at least the time of Justinian. The word *smaltum* is found for the first time in a life of Leo IV. written in the 9th century. Theophilus, the artist-monk, has left a minute description of the manner in which the Byzantine enamellers of the 10th century carried on their work. Most of the Byzantine enamels were executed on plates of gold, and large numbers have no doubt been destroyed on account of the intrinsic value of the metal. Such specimens as are extant furnish valuable examples of what is known as the *cloisonné* process.

In *cloisonné* work, the design is presented in coloured enamels which are separated one from another by means of ribs of metal bent so as to follow the outline of the subject. A plate of gold generally formed the basement of the work, and upon this plate the design was traced in slender fillets of gold. These threads were easily bent to the required form, and were fixed upright upon the plaque, so as to form a number of cells for reception of the enamel. The powdered glass, moistened into a paste was carefully introduced into these compartments, and the prepared plate was then fired. To retain the fused enamel, the edges of the plates were slightly turned up, thus forming a rim. After careful cooling, the irregular fused surface was ground down, and polished, when the design appeared in coloured enamels separated by gold partitions, or *cloisons*. In many cases the metal base forms part of the field, and the subject is then enamelled in a hollow which has been beaten out, while the gold forms a brilliant background. *Cloisonné* enamelling has been employed by the Chinese and Japanese, who, instead of restricting it to flat surfaces of the precious metals, have applied it to copper vases and other large hollow vessels. They also ingeniously attach the metal fillets to the surface of pottery, and thus produce cups, vases, and other objects in porcelain ornamented with *cloisonné* work. Many Chinese and Japanese enamels are, however, executed by other processes, such as the *champ-levé* and surface methods, to be afterwards described.

The most famous example of Byzantine *cloisonné* work is the Pala d'Ora at St Mark's, Venice. This magnificent altarpiece contains a number of enamelled panels and medallions, executed for the most part on gold, though some are on silver. It is believed that the Pala was brought from Constantinople to Venice about the year 1105, and that some of the enamels may be referred to this date; but probably they are not all of the same period. Among other interesting examples of ancient *cloisonné* enamelling, reference may be made to the well-known Alfred Jewel, which was found at Athelney in Somersetshire in 1693, and is preserved in the Ashmolean Museum at Oxford. The face of the jewel is of rock-crystal, beneath which is a figure-subject in semi-transparent enamels of blue, white, green, and brown. Around the edge is the legend, AELFRED MEC HEHT GEVVECAN (Alfred ordered me to be made). Possibly this jewel, or at least the enamelled part, was brought from the East, and is not an example of Saxon enamelling. *Cloisonné* work is also seen in the cross which was obtained from the tomb of Queen Dagmar who died in 1213, in a valuable pectoral cross belonging to Mr A. J. Beresford Hope, and in a small portrait of St Paul on gold, in the Museum of Practical Geology, London.