

under the great seal for various purposes of extortion. One of the most notorious of these was Sir Giles Mompesson, who fled the country to avoid trial in 1621. After the introduction of several bills, and several attempts by James to compromise the matter by orders in council and promises, the Statute of Monopolies was passed in 1623. This made all monopolies illegal, except such as might be granted by parliament, or were in respect of new manufactures or inventions. Upon this excepting clause is built up the entire English system of letters patent for inventions, the statute itself (amended by later Acts) being still in force. The Act was strictly enforced, and by its aid the evil system of monopolies was eventually abolished. This result was not indeed immediately achieved, for even during the Protectorate cases of monopoly patents were brought up, and the patents cancelled as grievances. Parliament has, of course, never exercised its power of granting to any individual exclusive privileges of dealing in any articles of trade, such as the privileges of the Elizabethan monopolists; but the licences required to be taken out by dealers in wine, spirits, tobacco, &c., are lineal descendants of the old monopoly grants, while the quasi-monopolies enjoyed by railways, canals, gas and water companies, &c., under Acts of Parliament, are also representative of the ancient practice.

MONOTHELITES (*μονοθελίται, monothelites*) was the name given to those who, in the 7th century, while otherwise orthodox, fell into the heresy of maintaining that Christ had only one will. The monothelite controversy had its origin in the efforts of the emperor Heraclius to win back for the church and the empire the excommunicated and persecuted Monophysites or Eutychians of Egypt and Syria. It seems to have been while in Armenia in 622 that, in an interview with Paul, the head of the Severians (Monophysites) there, he first broached the doctrine of the *μία ἐνέργεια* of Christ, i.e., the doctrine that the divine and human natures, while quite distinct in His one person, had but one activity and operation.<sup>1</sup> At a somewhat later date he wrote to Arcadius of Cyprus, commanding that "two energies" should not be spoken of; and in 626, while in Lazistan (Colchis), he had a meeting with the metropolitan, Cyrus of Phasis, during which this command was discussed, and Cyrus was at last bidden seek further instruction on the subject from Sergius, patriarch of Constantinople, a strong upholder of the *μία ἐνέργεια*, and the emperor's counsellor with regard to it. So well did he profit by the teaching he received in this quarter that, in 630 or 631, Cyrus was appointed to the vacant patriarchate of Alexandria, and in 633 succeeded in reconciling the Severians of his province on the basis of *μία θεανδρική ἐνέργεια* (one divine-human energy). He was, however, opposed by Sophronius, a monk from Palestine, who, after vainly appealing to Cyrus, actually went to Constantinople to remonstrate with Sergius himself. Shortly afterwards Sergius wrote to Pope Honorius, and received a friendly reply. Sophronius, however, who meanwhile had been made patriarch of Jerusalem (634), refused to be silenced, and in his *Epistola Synodica* strongly insisted on the "two energies." So intense did the controversy now become that at last, towards the end of 638, Heraclius published his *Ecthesis*, or Exposition of the Faith, which prohibited the use of the phrase "one energy," because of its disquieting effects on some minds, as seeming to militate against the doctrine of the two natures; while, on the other hand, the expression "two energies" was interdicted because

<sup>1</sup> According to some church historians, it was Paul who introduced the doctrine; but this statement seems to rest on a misinterpretation of the authorities. See Hefele, *Conciliengesch.*, iii. p. 124 sq. (1877), who also traces the previous history of the expressions *μία ἐνέργεια*, *θεανδρική ἐνέργεια*, especially as found in the writings of the Pseudo-Dionysius Areopagita.

it seemed to imply that Christ had two wills. That Christ had but one will was declared to be the only orthodox doctrine, and all the faithful were enjoined to hold and teach it without addition or deduction. The document was not acceptable, however, to Popes Severinus and John IV., the immediate successors of Honorius; and Maximus, the confessor, succeeded in stirring up such violent opposition in North Africa and Italy that, in 648, Constant II. judged it expedient to withdraw his grandfather's offensive edict, and to substitute for it his own *Typus* (*τύπος περὶ πίστεως*), forbidding all discussion of the questions of the duality or singleness of either the energy or the will of Christ. The scheme of doctrine of the first four general councils, in all its vagueness as to these points, was to be maintained; so far as the controversy had gone, the disputants on either side were to be held free from censure, but to resume it would involve penal consequences. The reply of the Western Church was promptly given in the unambiguously dyothelite decrees of the Lateran synod held by Martin I. in 649; but the cruel persecutions to which both Martin and Maximus were exposed, and finally succumbed, secured for the imperial *Typus* the assent at least of silence. With the accession of Constantine Pogonatus in 668 the controversy once more revived, and the new emperor resolved to summon a general council. It met at Constantinople in 680, having been preceded in 679 by a brilliant synod under Pope Agatho at Rome, where it had been agreed to depart in nothing from the decrees of the Lateran synod. At Constantinople the condemnation of the monothelite heresy was explicit and complete, Pope Honorius being anathematized by name along with the others who had supported it. Beyond the limits of the empire, monothelism survived for some centuries in Lebanon among the MARONITES (*q.v.*), who did not abjure their heresies until 1182.

See the church historians, and especially Hefele (*op. cit.*), whose obvious partisanship can only slightly affect the reader's appreciation of his full and accurate learning.

MONREALE, a contraction of "monte-reale," was so called from a palace built there by the Norman Roger I., king of Sicily. It is now a town of about 16,300 inhabitants, situated 5 miles inland from Palermo, on the slope of Mount Caputo overlooking the beautiful and very fertile valley called "La Concha d'Oro" (the Golden Shell), famed for its orange, olive, and almond trees, the produce of which is exported in large quantities. The town, which for long was a mere village, owed its origin to the founding of a large Benedictine monastery, with its church, the seat of the metropolitan archbishop of Sicily.<sup>1</sup> This, the greatest of all the monuments of the wealth and artistic taste of the Norman kings in northern Sicily, who in 1072 expelled the Mohammedans and established themselves there with Palermo as their capital, was begun about 1170 by William II., and in 1182 the church, dedicated to the Assumption of the Virgin Mary, was, by a bull of Pope Lucius III., elevated to the rank of a metropolitan cathedral. It was, and is even now, one of the most magnificent buildings in the world, and Pope Lucius in no way exaggerated its splendour when he said in his bull, "ut simile opus per alicuem regem factum non fuerit a diebus antiquis."

The archiepiscopal palace and monastic buildings on the south side were of great size and magnificence, and were surrounded by a massive precinct wall, crowned at intervals by twelve towers. This has been mostly rebuilt, and but little now remains except ruins of some of the towers, a great part of the monks' dormitory and frater, and the very splendid cloister, completed about 1200. This latter is well

<sup>1</sup> An earlier church appears to have existed at Monreale since the 6th century, but no traces of it now remain.

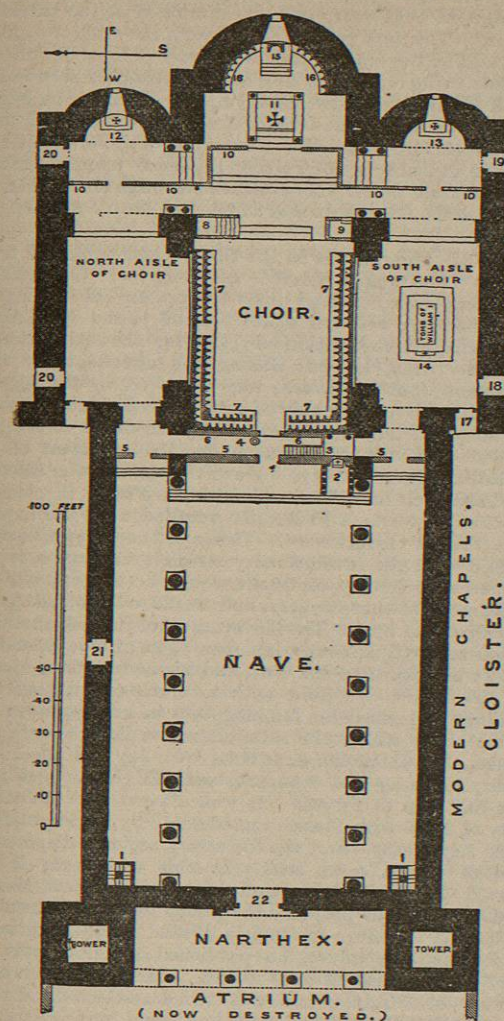
preserved, and is one of the finest cloisters both for size and beauty of detail that now exists anywhere. It is about 170 feet square, with pointed arches covered with marble inlay, supported on pairs of columns in white marble, 216

contains the marble fountain or monks' lavatory, evidently the work of Moslem sculptors.

The chief feature of the place—the church—like the main cloister, is fortunately well preserved. In plan it is a curious mixture of Eastern and Western arrangement (see fig.). The nave is like an Italian basilica, while the large triple-apsed choir is like one of the early three-apsed churches, of which so many examples still exist in Syria and other Eastern countries (see De Vogüé, *Syrie Centrale*). It is, in fact, like two quite different churches put together endwise. The basilican nave is wide, with narrow aisles. Monolithic columns of Oriental granite (except one, which is of cipollino), evidently the spoils of older buildings, on each side support eight pointed arches much stilted. There is no triforium, but a high clerestory with wide two-light windows, with simple tracery like those in the nave-aisles and throughout the church. The other half, Eastern in two senses, is both wider and higher than the nave. It also is divided into a central space with two aisles, each of the divisions ending at the east with an apse. The roofs throughout are of open woodwork very low in pitch, constructionally plain, but richly decorated with colour, now mostly restored. At the west end of the nave are two projecting towers, with narthex-entrance between them. A large open atrium, which once existed at the west, is now completely destroyed. The outside of the church is plain, except the aisle walls and three eastern apses, which are decorated with intersecting pointed arches and other ornaments inlaid in marble. The outsides of the principal doorways and their pointed arches are magnificently enriched with carving and inlay, a curious combination of three styles—Norman-French, Byzantine, and Arab.

It is, however, the enormous extent (80,630 square feet) and glittering splendour of the glass mosaics covering the interior, which make this church so marvellously splendid (see MOSAIC). With the exception of a high dado, itself very beautiful, made of marble slabs enriched with bands of mosaic, the whole interior surface of the walls, including soffits and jambs of all the arches, is covered with minute mosaic-pictures in brilliant colours on a gold ground. This gorgeous method of decoration takes the place of all purely architectural detail, such as mouldings and panelling. The mosaic covers even the edges of the arches and jambs, which are slightly rounded off, so as to allow them to be covered by the glass tesserae. This device gives apparent softness to all the edges, and greatly enhances the richness of effect produced by the gleaming gold grounds. The only carving inside is on the sculptured caps of the nave arcade, mostly Corinthian in style. The mosaic pictures are arranged in tiers, divided by horizontal and vertical bands of elaborate flowing mosaic ornament. In parts of the choir there are five of these tiers of subjects or single figures one above another. The half dome of the central apse has a colossal half-length figure of Christ, with a seated Virgin and Child below; the other apses have full-length colossal figures of St Peter and St Paul. Inscriptions on each picture explain the subject or saint represented; these are in Latin, except some few which are in Greek. The subjects are partly from the Old Testament types of Christ and His scheme of redemption, with figures of those who prophesied and prepared for His coming. Towards the east are subjects from the New Testament, chiefly representing Christ's miracles and suffering, with apostles, evangelists, and other saints. The design, execution, and choice of subjects all appear to be of Byzantine origin, the subjects being selected from the *Menologium* drawn up by the emperor Basilus Porphyrogenitus in the 10th century.

No other mosaics perhaps so closely resemble the Mon-



Plan of the cathedral of Monreale, as built in the 12th century, omitting later additions.

- |   |                                 |
|---|---------------------------------|
| 1. Stairs to towers, now altered.             | 11. High altar and baldacchino  |
| 2. Chapel under the south ambo.               | 12. Altar in northern apse.     |
| 3. Stairs to ambo.                            | 13. Altar in southern apse.     |
| 4. Holy-water stoup.                          | 14. Altar at tomb of William I. |
| 5. "Pulpitum" or choir-screen, now destroyed. | 15. Archbishop's throne.        |
| 6. 6. Screens behind stalls, now destroyed.   | 16. Seats for clergy.           |
| 7. 7. Stalls, now destroyed.                  | 17. Door to great cloister.     |
| 8. King's throne.                             | 18. Door to chapter house.      |
| 9. Archbishop's throne.                       | 19. Door to sacristy.           |
| 10. 10. Sanctuary screen.                     | 20. 20. Doors to royal palace.  |
|   | 21. Bronze door by Barisanos.   |
|   | 22. Bronze door by Bonannus.    |

in all, which are sumptuously decorated either by rich surface carving or by bands of patterns in gold, silver, and colours, made of glass tesserae, arranged either spirally or vertically from end to end of each shaft. The marble caps are each richly carved with figures and foliage executed with great skill and wonderful fertility of invention—no two being alike. At one angle, a square pillared projection

reale ones as those over the nave columns in the Church of the Nativity at Bethlehem. They are alike, not only in design and treatment, but also in the curious mixture of Latin and Greek in the inscriptions (see De Vogüé, *Eglises de la Terre Sainte*, 1860). This similarity is easily accounted for by the fact that these two sets of mosaics, though so far apart, were executed about the same date and under the same conditions, viz., by the hands of Byzantine artists, working for Norman-French kings.

In the central apse at Monreale, behind the high altar, is a fine marble throne for the archbishop. This position of the throne is a survival of the early basilican arrangement, when the apse and altar were at the west end. In that case the celebrant stood behind the altar at mass, and looked over it eastwards towards the people. This position of the throne was frequently reproduced in churches which, like this, have the apse at the east. On the north side, in front of the high altar, is another somewhat similar throne for the use of the king. The tomb of William I, the founder's father—a magnificent porphyry sarcophagus contemporary with the church, under a marble pillared canopy—and the founder William II's tomb, erected in 1575, were both shattered by a fire, which in 1811 broke out in the choir, injuring some of the mosaics, and destroying all the fine walnut choir-fittings, the organs, and most of the choir roof. The tombs were rebuilt, and the whole of the injured part of the church restored, mostly very clumsily, a few years after the fire. On the north of the choir are the tombs of Margaret, wife of William I, and her two sons Roger and Henry, together with an urn containing the viscera of St Louis of France, who died in 1270. The pavement of the triple choir, though much restored, is a very magnificent specimen of marble and porphyry mosaic in "opus Alexandrinum," with signs of Arab influence in its main lines.

Two bronze doors, those on the north and west of the church, are of great interest in the history of art. They are both divided into a number of square panels with subjects and single figures, chiefly from Bible history, cast in relief. That on the north is by Barisanos of Trani in southern Italy, an artist probably of Greek origin. It is inscribed BARISANUS TRAN. ME FECIT. The cathedrals at Trani and Ravello also have bronze doors by the same sculptor. The western door at Monreale, inferior to the northern one both in richness of design and in workmanship, is by Bonannus of Pisa, for the cathedral of which place he cast the still existing bronze door on the south, opposite the leaning tower. The one at Monreale is inscribed A.D. MCLXXXVI IND. III. BONANNUS CIVIS PISANVS ME FECIT. It is superior in execution to the Pisan one. The door by Barisanos is probably of about the same time, as other examples of his work with inscribed dates show that he was a contemporary of Bonannus. (See METAL-WORK.) The monastic library contains some valuable MSS., especially a number of bilingual documents in Greek and Arabic, the earliest being dated 1144. The archbishop now occupies the eastern part of the monastic buildings, the original palace being destroyed.

See Serradifalco, *Duomo di Monreale*, &c., 1883; Gravina, *Duomo di Monreale*, the best work on the subject, 1859 sq.; Testa, *Vita del Re Guglielmo II.*, 1765; Tarallo, *I Reali Sepolcri di Monreale*, 1826; Hittorf et Zanth, *Architectur de la Sicile*, 1835; Gally Knight, *Saracenic and Norman Remains in Sicily*, London, 1840; W. Burges, *Notes on Medieval Mosaic*, 1863; M. D. Wyatt, *Mosaics of Middle Ages*, London, 1849; Hessemer, *Arabische und Alt-Italienische Bau-Verzierungen*, 1853; Garrucci, *Arte Cristiana*, 1882. (J. H. M.)

MONROE, JAMES (1758-1831), fifth president of the United States, was born 28th April 1758, in the county of Westmoreland, Virginia. According to the family tradition, their ancestors are traced back to a family of

Scottish cavaliers descended from Hector Monroe, an officer of Charles I. At the outbreak of the Revolutionary war, James Monroe was a student at the College of William and Mary, but left his studies in 1776 to join the continental army. He took part as lieutenant in the New Jersey campaign of that year, and was wounded at the battle of Trenton. The next year he served with the rank of captain on the staff of General William Alexander ("Lord Stirling"), but, thus being out of the line of promotion, he soon found himself without military employment. In 1780 he began the study of the law under the direction of Jefferson, then governor of Virginia. His intimacy with Jefferson at this time had probably a controlling influence upon his subsequent political career. He continued through all vicissitudes to possess the friendship and support of both Jefferson and Madison.

In 1782 Monroe was in the State legislature, and from 1783 to 1786 was a member of Congress. On retiring from Congress he entered upon the practice of the law at Fredericksburg, and was again elected to the legislature. In the Virginia convention of 1788 for the ratification of the constitution, he was among the opponents of that instrument; but his course was approved by the legislature of his State, who elected him United States senator in 1790 to fill the vacancy caused by the death of William Grayson. As senator he was a decided opponent of the Federalist administration. Nevertheless he was selected by Washington in 1794 as minister to France in place of Gouverneur Morris, a Federalist, recalled upon the request of the French Government. Being of the party who sympathized with the revolutionary struggle in France, it was expected that his appointment would be flattering to the Government of that country, and would also conciliate the French party at home. The Government of the National Convention received Monroe with open signs of favour, and on his part he expressed his own and his country's sympathy with the French Republic with so much enthusiasm that Washington deemed his language not in keeping with the neutral policy which the administration had recently proclaimed. At about the same time John Jay had negotiated a treaty of amity and commerce with England which gave great umbrage to France. It was alleged that the earlier treaty of 1778 with France was violated by the stipulations of the Jay treaty; and the Directory seemed disposed to make of this a *casus belli*. In this emergency it was believed by Washington and his advisers that Monroe failed to represent properly the policy of the Government, and he was therefore recalled in 1796. In justification of his diplomatic conduct, he published the next year his *Views*, a pamphlet of 500 pages. In 1799 he became governor of Virginia, and was twice re-elected. In the meantime the Republican party had come into power, with Jefferson as president, and Monroe was again called upon to fill an important diplomatic station. He was commissioned on 10th January 1803 to act with Livingston, resident minister at Paris, in negotiating the purchase of New Orleans and the territory embracing the mouth of the Mississippi, which formed a part of the province of Louisiana, recently ceded by Spain to France. In view of the anticipated renewal of hostilities between England and France in 1803, Napoleon was anxious, for a consideration, to part with his new acquisition, which in the event of a war with England he would probably lose by conquest. The American commissioners met therefore with little difficulty in the accomplishment of their object. But, in the absence of instructions, they assumed the responsibility of negotiating the purchase not only of New Orleans but of the entire territory of Louisiana—an event that is hardly second in importance to any in the history of the country. Monroe was next commissioned as minister to England,

to succeed Rufus King, who had resigned. In 1804 he undertook a mission to Madrid, with the object of negotiating the purchase of the Floridas; but in this he was unsuccessful, and returned to London in 1805. The next year he was joined in a commission with William Pinkney to negotiate a treaty with England to take the place of the Jay treaty, which expired in that year. Lords Auckland and Howick having been appointed on the part of England, a treaty was concluded on the last day of the year, which was perhaps more favourable to the United States than the Jay treaty; but, like the latter, it contained no provision against the impressment of American-seamen. For this reason President Jefferson refused to submit it to the Senate for ratification, but sent it back for revision. In the meantime Canning had become foreign secretary in place of Fox, and refused to reopen the negotiation. Monroe returned to the United States in 1807, and, as in the case of his first French mission, he drew up a defence of his diplomatic conduct in England. In 1808 certain disaffected Republicans attempted to put Monroe forward as the candidate for the presidency, but as Virginia declared in favour of Madison Monroe withdrew his name. In 1810 he was again in the legislature of his native State, and the next year its governor. But in this year he was called from the state to the national councils, superseding Robert Smith as secretary of state in Madison's cabinet, and took an active part in precipitating the war against England in 1812. On the retirement of Armstrong, after the capture of Washington in 1814, Monroe assumed the duties of the war department in addition to those of the state department, and by his energy and decision infused something of vigour into the conduct of the war. He was elected president in 1816, and was re-elected in 1820 without opposition. The period of his administration (1817-25) has been called "the era of good feeling," for the reason that the party issues of the past were mostly dead, and new issues had not yet arisen. In the formation of his cabinet Monroe showed the soundness of his judgment, selecting for the leading positions J. Q. Adams, J. C. Calhoun, W. H. Crawford, and William Wirt. With these able advisers he devoted himself to the economic development of the country, which had been so long retarded by foreign complications. As president, moreover, he was able to accomplish in 1819 the acquisition of the Floridas, which as minister to Spain he had failed to do in 1804, and to define the boundary of Louisiana, which he had been the agent in purchasing in 1803. But Monroe is best known to later generations as the author of the so-called "Monroe doctrine," a declaration inserted in his seventh annual message, 2d December 1823. It was the formulation of the sentiment, then beginning to prevail, that America was for Americans. One of the principles of the neutral policy of the country, which had been established with much difficulty, had been that the United States would not interfere in European politics; and now this policy was held to include the converse as a necessary corollary—that is, that Europe should not interfere in American politics, whether in North America or South America. The occasion of proclaiming this doctrine was the rumoured intervention of the Holy Alliance to aid Spain in the reconquest of her American colonies. President Monroe believed that such a policy entered upon by the allied continental powers of Europe would be dangerous to the peace and safety of the United States; he therefore declared that "we would not view any intervention for the purpose of oppressing them (the Spanish American states) or controlling in any manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition towards the United

States." This declaration, together with the known hostility of England to such a project, was sufficient to prevent further action on the part of the Alliance.

On the expiration of his presidential term Monroe retired to Oak Hill, his residence in London county, Virginia; but at the time of his death, 4th July 1831, he was residing in New York. He was married about 1786, and left two daughters. He was a man of spotless character; and, though not possessing ability of the first order, he ranks high as a wise and prudent statesman. His *Life* has been written by D. C. Gilman. (F. SN.)

MONROE, a city of the United States, county seat of Monroe county, Michigan, lies 32 miles south-south-west of Detroit, on both banks of the Raisin river, 3 miles inland from Lake Erie, with which it has been connected by a ship-canal since 1843. It is a station on the Canada Southern, the Flint and Pèrre Marquette, and the Detroit division of the Lake Shore and Michigan Southern Railways. Agricultural implement factories, a spoke and hub factory, foundries and engineering-works, carriage-works, grist-mills, paper-mills, and fruit-drying establishments are in operation. From 400 to 500 tons of grapes are shipped yearly from the neighbouring vineyards, and over 100,000 gallons of wine are made here. The population in 1880 was 4928. Settled as Frenchtown by a body of Canadians in 1784, Monroe received its present name, in honour of President Monroe, in 1817. Its city charter dates from 1837. It was the scene of the battle of the river Raisin, 22d January 1813.

MONROVIA. See LIBERIA, vol. xiv. p. 508.

MONS, a town of Belgium, the capital of the province of Hainault, on the rivers Haine and Trouille, and 31 miles south-west of Brussels. The population in 1880 was 25,600. Mons is divided by the river Trouille into an upper and lower town, the first built on rising ground in the shape of an amphitheatre, the second extending into the plain; four bridges connect the two. The place is pleasing and cheerful of aspect, having broad well-paved streets and handsome squares. The fortifications, once among the strongest of the Continent, have quite recently been razed, their site being now occupied by an extensive avenue or boulevard. Among the monuments worthy of mention are—the church of St Waudru, one of the best types of original architecture to be found in Belgium; the church of St Elizabeth, a combination of the Gothic style and the Corinthian; the town-hall, erected in 1458; and the belfry tower, next to which formerly rose the old castle of the counts of Hainault, the demolition of which led, a few years ago, to the discovery of some curious mural paintings belonging to the 12th century. Mons possesses a military arsenal, a school of engineering, and a public library of importance; the administration of law and government for the province is concentrated there. It contains manufactures of cotton, velvet, cloth, muslin, soap, and clay pipes; also brass-foundries, tan-yards, and breweries, and a market of some note for agricultural produce, cattle, horses, and tobacco. The main source of the wealth and prosperity of Mons is derived from the collieries which exist in its vicinity, and yield annually between two and three million tons of first-class coal, the greater part of which is carried into France; in the immediate neighbourhood of the town are the large and important villages of Jemmapes, Quaregnon, Frameries, Paturages, Wasmes, and Dour, each with a population of from ten to twelve thousand inhabitants; these localities, together with many others somewhat less peopled, form an agglomeration called the Borinage, rich in coal-mines, in iron-foundries, in stone and marble quarries, and may be considered as one of the busiest centres in the world.

Mons is built on the site of a Roman camp erected by Julius

Cæsar, and afterwards occupied by a brother of Cicero, who was besieged there by Ambiorix, chief of the Eburones. In the 8th century a lady of the name of Waudru or Waltrud, countess of Hainault, founded a convent, which became the centre of the town. In 804 Charlemagne made it the capital of the county of Hainault; it was fortified in 1148. Baldwin VI., afterwards Latin emperor of Constantinople, was very active in promoting the interests of Mons, and efflowed it with a celebrated charter in the year 1200. After being reduced by nearly one half by the plague, Mons received within its walls the Jews whom Philip the Long had expelled from France. The city attained its highest degree of prosperity under Charles V., but its greatness was arrested during the government of the duke of Alva by civic disturbances, which lasted until the reign of Albert and Isabella. In more recent times Mons has had to pay tribute to the warlike spirit of its neighbours; it was taken by Louis XIV. in 1691, given back in 1697, and retaken in 1701 and again in 1709. In 1748 it fell into the hands of Austria; the Belgian insurgents stormed it in 1789; the French in 1792, when Dumouriez won the battle of Jemmapes under its walls; in 1814 it belonged to the Netherlands, and has formed part of the Belgian kingdom since 1830.

**MONSOON.** See METEOROLOGY, *supra*, p. 148 *sq.*, and INDIAN OCEAN.

**MONSTER.** Monsters or monstrous births are the subject of Animal Teratology, a department of morphological science treating of deviations from the normal development of the embryo. The term "embryo" is conventionally limited, in human anatomy, to the ovum in the first three months of its intra-uterine existence, while it is still developing or acquiring the rudiments of its form, the term "fœtus" being applied to it in the subsequent months during which the organism grows on the lines of development already laid down. It is mostly in the first or embryonic period that those deviations from the normal occur which present themselves as monstrosities at the time of birth; these early traces of deviation within the embryo may be slight, but they "grow with its growth and strengthen with its strength," until they amount to irreparable defects or accretions, often incompatible with extra-uterine life. The name of "teratology," introduced by Etienne Geoffroy St-Hilaire (1822), is derived from *τέρας*, the equivalent of *monstrum*; teratology is a term new enough to have none but scientific associations, while the Latin word has a long record of superstitions identified with it. The myths of siren, satyr, Janus, cyclops, and the like, with the corresponding figures in Northern mythology, find a remote anatomical basis in monstrosities which have, for the most part, no life except in the fœtal state. The mythology of giants and dwarfs is, of course, better founded. The term monster was originally used in the same sense as portent: Cicero (*De Div.*, i.) says, "*Monstra, ostenta, portenta, prodigia appellantur, quoniam monstrant, ostendunt, portendunt, et prædicunt.*" Luther<sup>1</sup> speaks of the birth of a monstrous calf, evidently the subject of contemporary talk, as pointing to some great impending change, and he expresses the hope that the catastrophe might be the Last Day itself. The rise of more scientific views will be sketched at the close of the article.

Although monstrosities, both in the human species and in other animals, tend to repeat certain definite types of erroneous development, they do not fall readily into classes. It is remarked by Vrolik that a scientific classification is impracticable from being too cumbrous, and that a convenient grouping is all that need be attempted. The most usual grouping (originally suggested by Buffon, 1800) is into *monstra per excessum*, *monstra per defectum*, and *monstra per fabricam alienam*. It seems useful, however, to place the more simple cases of excess and of defect side by side; and it is necessary, above all, to separate the double monsters from the single, the theory of the former being a distinct chapter in teratology.

<sup>1</sup> In a passage quoted by Bischoff from the 19th volume of Luther's works, Halle ed., p. 2416.

1. *Monstrosities in a Single Body.*—The abnormality may extend to the body throughout, as in well-proportioned giants and dwarfs; or it may affect a certain region or member, as—to take the simplest case—when there is a finger or toe too many or too few. It is very common for one malformation to be correlated with several others, as in the extreme case of acardiac monsters, in which the non-development of the heart is associated with the non-development of the head, and with other radical defects.

*Giants* are conventionally limited to persons over 7 feet in height. The normal proportions of the frame are adhered to more or less closely, except in the skull, which is relatively small; but accurate measurements, even in the best-proportioned cases, prove, when reduced to a scale, that other parts besides the skull, notably the thigh-bone and the foot, may be undersized though overgrown.<sup>2</sup> In persons who are merely very tall, the great stature depends often on the inordinate length of the lower limbs; but in persons over 7 feet the lower limbs are not markedly disproportionate. In many cases the muscles and viscera are not sufficient for the overgrown frame, and the individuals are usually, but not always, of feeble intelligence and languid disposition, and short-lived. The brain-case especially is undersized—the Irish giant in the museum of Trinity College, Dublin, is the single exception to this rule—but the bones of the face, and especially the lower jaw, are on a large scale. Giants are never born of gigantic parents; in fact, sterility usually goes with this monstrosity. Their size is sometimes excessive at birth, but more often the indications of great stature do not appear till later, it may be as late as the ninth year; they attain their full height before the twenty-first year. They have been more frequently male than female; the German giantess lately exhibited (1882) was as tall as any authentic case in the male sex.

*Dwarfs* are conventionally limited to persons under 4 feet. They are more likely than giants to have the modulus of the body perfect. "In the true dwarf, as far as I have been able to ascertain, the proportions between the several parts of the frame are good, corresponding, or nearly corresponding, with those of the normal adult; and the diminutive stature depends, accordingly, not upon relatively imperfect growth of any particular segments, or even upon the permanence of a fœtal or childlike condition, but upon the whole frame being undersized" (Humphry). Where disproportion occurs in the true dwarf it takes the form of a large-sized head, broad shoulders and capacious chest, and undersized lower limbs. Dwarfs with rickets are perhaps to be distinguished from true dwarfs; these are cases in which the spine is curved, and sometimes the bones of the limbs bent and the pelvis deformed. As in the case of giants, dwarfs are seldom the progeny of dwarfs, who are, in fact, usually sterile; the unnatural smallness may be obvious at birth, but is more likely to make itself manifest in the years of growth. Dwarfs are much more easily brought up than giants, and are stronger and longer-lived; they have usually also strong passions and acute intelligence. The legends of the dwarfs and giants are on the whole well based on fact (see DWARF and GIANT).

*Redundancy and Defect in Single Parts.*—The simplest case of this redundancy is a sixth digit, well formed, and provided with muscles (or tendons), nerves, and blood-vessels like the others; it is usually a repetition of the little finger or toe, and it may be present on one or both hands, or on one or both feet, or in all four extremities, as in the giant of Gath. The want of one, two, or more digits on hand or foot, or on both, is another simple anomaly; and

<sup>2</sup> See the tables in Humphry's *Treatise on the Human Skeleton*, p. 1097.

like the redundancy, it is apt to repeat itself in the same family. Meckel saw a girl who had an extra digit on each extremity, while a sister wanted four of the fingers of one hand. Where the supernumerary digits are more than one on each extremity, the whole set are apt to be rudimentary or stunted; they look as if two or more of the embryonic buds had been subject to cleavage down the middle, and to arrest of longitudinal growth. There are two or three authentic instances of a whole lower limb appearing at birth as two withered halves, as if from embryonic cleavage.<sup>1</sup> Other redundancies of the skeleton are extra vertebræ (sometimes the coccygeal, giving the appearance of a rudimentary tail), or an extra rib. A double row of teeth is occasionally met with; the most interesting case of this anomaly is that in which the rudiments of a double row exist from the first, but the phenomenon is sometimes produced by the milk teeth persisting along with the second set. One or more extra teeth are occasionally met with in line with the rest. Among redundancies of the soft parts, by far the most frequent is an extra nipple, or pair of nipples. It is only the nipple, or the most external mechanical adjunct of the mammary apparatus, that is repeated, and very seldom, if ever, the breast structure itself. The nipple, although it is the latest addition to the mechanism of lactation, is in the individual mammal developed on the skin before the gland is formed underneath; and that facility, which applies to the development of external characters generally, appears to be the reason why there may be one or more extra nipples but no redundant gland. In the same connexion, it is interesting to observe that the supernumerary nipple has been shown by statistics on a large scale to be twice as common in men as in women, although in the male the mammary function never comes to maturity, and even the structure retrogrades after puberty. Traces of an additional nipple, or pair of them, in more or less symmetrical position below the normal ones, are not very uncommon when carefully looked for. Among the sense organs there is a remarkable instance recorded of doubling of the appendages of the left eye, but not of the eyeball itself; the left half of the frontal bone is double, making two eye-sockets on that side, and the extra orbit has an eyebrow and eyelid.<sup>2</sup> The external ear (*pinna*) has also been found double on one side. Doubling of any of the internal organs is extremely rare, and is probably always traceable to a more or less complete fissuring or lobation. The ducts or vessels connected with organs, and playing a purely mechanical part, are not unfrequently doubled; thus each kidney may have two ureters, and a similar variation may occur in veins and arteries.

*Monstrosities from Defective Closure in the Middle Line.*—Under this head come some of the commonest congenital malformations, including slight deficiencies such as harelip, and serious defects such as a gap in the crown of the head with absence of the brain. The embryo is originally a circular flattened disc spread out on one pole of the yolk, and it is formed into a cylindrical body (with four appendages) by the free margins of the disc, or rather its ventral laminae, folding inwards to meet in the middle line and so close in the pelvic, abdominal, thoracic, pharyngeal, and oral cavities. Meanwhile, and indeed rather earlier, two longitudinal parallel ridges on the top or along the back of the disc have grown up and united in the middle line to form the second barrel of the body—the neural canal—of small and uniform width in the lower three-fourths or spinal region, but expanding into a wide chamber for the brain. This division into neural (dorsal) and hæmal (ventral) canals

<sup>1</sup> See Förster's *Atlas*, Taf. viii., figs. 18 and 14.

<sup>2</sup> See preparation in the Würzburg Museum, figured by Förster, Taf. viii., figs. 9-12.

underlies all vertebrate development. Imperfect closure along either of those embryonic lines of junction may produce various degrees of monstrosity. The simplest and commonest form, hardly to be reckoned in the present category, is harelip with or without cleft palate, which results from defective closure of the ventral laminae at their extreme upper end. Another simple form, but of much more serious import, is a gap left in the neural canal at its lower end; usually the arches of the lumbar vertebræ are deficient, and the fluid that surrounds the spinal cord bulges out in its membranes, producing a soft tumour under the skin at the lower part of the back. This is the condition known as *hydrohæchis*, depending on the osseous defect known as *spina bifida*. Children born with this defect are difficult to rear, and are very likely to die in a few days or weeks. More rarely the gap in the arches of the vertebræ is in the region of the neck. If it extend all along the back, it will probably involve the skull also. Deficiency of the crown of the head, and in the spine as well, may be not always traceable to want of formative power to close the canal in the middle line; an over-distended condition of the central water-canal and water-spaces of the cord and brain may prevent the closure of the bones, and ultimately lead to the disruption of the nervous organs themselves; and injuries to the mother, with inflammation set up in the fœtus and its appendages, may be the more remote cause. But it is by defect in the middle line that the mischief manifests itself, and it is in that anatomical category that the malformations are included. The osseous deficiency at the crown of the head is usually accompanied by want of the scalp, as well as of the brain and membranes. The bones of the face may be well developed and the features regular, except that the eyeballs bulge forward under the closed lids; but there is an abrupt horizontal line above the orbits where the bones cease, the skin of the brow joining on to a spongy kind of tissue that occupies the sides and floor of the cranium. This is the commonest form of an *anencephalous* or brainless monster. There are generally mere traces of the brain, although, in some rare and curious instances, the hemispheres are developed in an exposed position on the back of the neck. The cranial nerves are usually perfect, with the exception sometimes of the optic (and retina). Vegetative existence is not impossible, and a brainless monster has been known to survive sixty-five days. The child is usually a very large one.

Closely allied, as we have seen, to the anencephalous condition is the condition of congenital *hydrocephalus*. The nervous system at its beginning is a neural canal, not only as regards its bony covering, but in its interior; a wide space lined by ciliated epithelium and filled with water extends along the axis of the spinal cord, and expands into a series of water-chambers in the brain. As development proceeds, the walls thicken at the expense of the internal water-spaces, the original tubular or chambered plan of the central nervous system is departed from, and those organs assume the practically solid form in which we familiarly know them. If, however, the water-spaces persist in their embryonic proportions notwithstanding the thickening of the nervous substance forming their walls, there results an enormous brain which is more than half occupied inside with water, contained in spaces that correspond on the whole to the ventricles of the brain as normally bounded. A hydrocephalic fœtus may survive its birth, and will be more apt to be affected in its nutrition than in its intelligence. In many cases the hydrocephalic condition does not come on till after the child is born. The *microcephalous* condition, where it is not a part of cretinism, is not usually a congenital defect in the strict sense, but more often a consequence of the