

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, portant, et prædicunt.*" Luther¹ 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.

¹ 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.² 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

² 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.¹ Other redundancies of the skeleton are extra vertebrae (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.² 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

¹ See Förster's *Atlas*, Taf. viii., figs. 18 and 14.

² 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 vertebrae 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 vertebrae 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

premature union of the bones of the skull along their sutures or lines of growth.

Returning to the ventral middle line, there may be defects of closure below the lips and palate, as in the breast-bone (fissure of the sternum), at the navel (the last point to close in any case), and along the middle line of the abdomen generally. The commonest point for a gap in the middle line of the belly is at its lower part, an inch or two above the pubes. At that point in the embryo there issues the allantois, a balloon-like expansion from the ventral cavity, which carries on its outer surface blood-vessels from the embryo to interdigitate with those of the mother on the uterine surface. Having served its temporary purpose of carrying the blood-vessels across a space, the balloon-like allantois collapses, and rolls up into the rounded stem-like umbilical cord through most of its extent; but a portion of the sac within the body of the fetus is retained as the permanent urinary bladder. That economical adaptation of a portion of a vesicular organ, originally formed for purposes of communication between the embryo and the mother, appears to entail sometimes a defect in the wall of the abdomen just above the pubes, and a defect in the anterior wall of the bladder itself. This is the distressing congenital condition of fissure of the urinary bladder, in which its interior is exposed through an opening in the skin; the pubic bones are separated by an interval, and the reproductive organs are ill formed; the urachus is wanting, and the umbilicus is always placed exactly at the upper end of the gap in the skin. A monstrosity recalling the cloacal arrangement of the bird is met with as a more extreme defect in the same parts.

Hermaphroditism.—Although this anomalous condition does not fall under defective closure in the middle line, it may be said to be due to a similar failure of purpose, or to an uncertainty in the *nisus formativus* at a corresponding stage of development. There is a point of time, falling about the eighth week, up to which the embryo may develop either the reproductive organs of the male or the reproductive organs of the female; in the vast majority of cases the future development and growth are carried out on one line or the other, but in a small number there is an ambiguous development leading to various degrees of hermaphroditism or doubtful sex. The primary indecision, so to speak, affects only the ovary or testis respectively, or rather the common germinal ridge out of which either may develop; the uncertainty in this embryonic sexual ridge sometimes leads actually to the formation of a pair of ovaries and a pair of small testes, or to an ovary on one side and a testis on the other; but even when there is no such double sex in the essential organs (as in the majority of hermaphrodites) there is a great deal of doubling and ambiguity entailed in the secondary or external organs and parts of generation. Those parts which are rudimentary or obsolete in the male but highly developed in the female, and those parts which are rudimentary in the female but highly developed in the male tend in the hermaphrodite to be developed equally, and all of them badly. In some cases the external organs of one sex go with the internal organs of the opposite sex. It has been observed that when middle life is reached or passed the predominance in features, voice, and disposition leans distinctly towards the masculine side. The mythological or classical notions of hermaphroditism, like so much else in the traditions of teratology, are exaggerated.

Cyclops, Siren, &c.—The same feebleness of the formative energy (the *Bildungstrieb* of Blumenbach) which gives rise to some at least of the cases of defective closure in the middle line, and to the cases of undecided sex, leads also to imperfect separation of symmetrical parts. The most

remarkable case of the kind is the cyclops monster. At a point corresponding to the root of the nose there is found a single orbital cavity, sometimes of small size and with no eyeball in it, at other times of the usual size of the orbit and containing an eyeball more or less complete. In still other cases, which indicate the nature of the anomaly, the orbital cavity extends for some distance on each side of the middle line, and contains two eyeballs lying close together. The usual nose is wanting, but above the single orbital cavity there is often a nasal process on the forehead, with which nasal bones may be articulated, and cartilages joined to the latter; these form the framework of a short fleshy protuberance like a small proboscis. The lower jaw is sometimes wanting in cyclopeans; the cheek-bones are apt to be small, and the mouth a small round hole, or altogether absent; the rest of the body may be well developed. The key to the cyclopean condition is found in the state of the brain. The olfactory nerves or lobes are usually described as absent, although Vrolik has found them in some instances; the brain is very imperfectly divided into hemispheres, and appears as a somewhat pear-shaped sac with thick walls, the longitudinal partition of dura mater (falx cerebri) being wanting, the surface almost unconvoluted, the corpus callosum deficient, the basal ganglia rudimentary or fused. The optic chiasma and nerves are usually replaced by a single mesial nerve, but sometimes the chiasma and pair of nerves are present. The origin of this monstrosity dates back to an early period of development, to the time when the future hemispheres were being formed as protrusions from the anterior cerebral vesicle or fore-brain; it may be conceived that, instead of two distinct buds from that vesicle, there was only a single outgrowth with imperfect traces of cleavage. That initial defect would carry with it naturally the undivided state of the cerebrum, and with the latter there would be the absence of olfactory lobes and of a nose, and a single eyeball placed where the nose should have been. A cyclops has been known to live for several days. The monstrosity is not uncommon among the domestic animals, and is especially frequent in the pig. There is another congenital malformation, in which an eyeball is wanting from one of the sockets; but in that case there is no defect of development in the bones, and the brain and nose are normal.

Another curious result of defective separation of symmetrical parts is the siren form of fetus, in which the lower limbs occur as a single tapering prolongation of the trunk like the hinder part of a dolphin, at the end of which a foot (or both feet) may or may not be visible. The defects in the bones underlying this siren form are very various: in some cases there is only one limb (thigh and leg-bones) in the middle line; in others all the bones of each limb are present in more or less rudimentary condition, but adhering at prominent points of the adjacent surfaces. The pelvis and pelvic viscera share in the abnormality. A much more common and harmless case of unseparated symmetrical parts is where the hand or foot has two, three, or more digits fused together. This syndactylous anomaly runs in families.

Limbs Absent or Stunted.—Allied to these fused or unseparated states of the extremities, or of parts of them, are the class of deformities in which whole limbs are absent, or represented only by stumps. The trunk (and head) may be well formed, and the individual healthy; all four extremities may be reduced to short stumps either wanting hands and feet entirely, or with the latter fairly well developed; or the legs only may be rudimentary or wanting, or the arms only, or one extremity only. Although some of these cases doubtless depend upon aberrant or deficient formative power in the particular direc-

tions, there are others of them referable to the effects of mechanical pressure, and even to direct amputation of parts within the uterus.

Acardiac and Acranial Monsters.—It sometimes happens in a twin pregnancy that one of the embryos fails to develop a heart and a complete vascular system of its own, depending for its nourishment upon blood derived from the placenta of its well-formed twin by means of its umbilical vessels. It grows into a more or less shapeless mass, in which all traces of the human form may be lost. Other viscera besides the heart will be wanting, and no head distinguishable; the most likely parts to keep the line of development are the lumbar region (with the kidneys), the pelvis, and the lower limbs. The twin of this monster may be a healthy infant.

Reversed Position of the Viscera.—This is a developmental error depending on the retention of the right aortic arch as in birds, instead of the left as is usual in mammals. The position of all the unsymmetrical viscera is transposed, the spleen and cardiac end of the stomach going to the right side, the liver to the left, the cæcum resting on the left iliac fossa, and the sigmoid flexure of the colon being attached to the right. This condition of *situs inversus viscerum* need cause no inconvenience; and it will probably remain undetected until the occasion should arise for a physical diagnosis or *post-mortem* inspection. There are numerous other anomalies in the development of the great vessels. In the heart itself there may be an imperfect septum ventriculorum, and there is more frequently a patency of the fetal communication between the auricles, permitting the venous blood to pass into the arterial system, and producing the livid appearance of the face known as cyanosis.

The causes of congenital anomalies are difficult to specify. There is no doubt that, in some cases, they are present in the sperm or germ of the parent; the same anomalies recur in several children of a family, and it has been found possible, through a variation of the circumstances, to trace the influence in some cases to the father alone, and in other cases to the mother alone. The remarkable thing in this parental influence is that the malformation in the child may not have been manifested in the body of either parent, or in the grandparents. More often the malformation is acquired by the embryo and fetus in the course of development and growth: either through the mother or in itself independently. Maternal impressions during pregnancy have often been alleged as a cause, and this causation has been discussed at great length by the best authorities. The general opinion seems to be that it is impossible to set aside the influence of subjective states of the mother altogether. The doctrine of maternal impressions has often been resorted to when any other explanation was either difficult or inconvenient; thus, Hippocrates is said to have saved the virtue of a woman who gave birth to a black child by pointing out that there was a picture of a negro on the wall of her chamber. Injuries to the mother during pregnancy have been unquestionably the cause of certain malformations, especially of congenital hydrocephalus. The embryo itself and its membranes may become the subject of inflammations, atrophies, hypertrophies, and the like; this causation, to which Otto traced all malformations of the fetus, is doubtless accountable for a good many of them. But a very large residue of malformations must still be referred to no more definite cause than the erratic spontaneity of the embryonic cells and cell-groups. The *nisus formativus* of the fertilized ovum is always made subject to morphological laws, but, just as in extra-uterine life, there may be deviations from the beaten track; and even a slight deviation at an early stage will carry with it far-reaching

consequences. This is particularly noticeable in double monsters.

2. *Double Monsters.*—Twins are the physiological analogy of double monsters, and some of the latter have come very near to being two separate individuals. Triple monsters are too rare to dwell upon, but their analogy would be triplets. The Siamese twins, who died in 1874 at the age of sixty, were joined only by a thick fleshy ligament from the lower end of the breast-bone (xiphoid cartilage), having the common navel on its lower border; the anatomical examination showed, however, that a process of peritoneum extended through the ligament from one abdominal cavity to the other, and that the blood-vessels of the two livers were in free communication across the same bridge. There are one or two cases on record in which such a ligament has been cut at birth, one, at least, of the twins surviving. From the most intelligible form of double monstrosity, like the Siamese twins, there are all grades of fantastic fusion of two individuals into one down to the truly marvellous condition of a small body or fragment parasitic upon a well-grown infant,—the condition known as *foetus in fetu*. These monstrosities are deviations, not from the usual kind of twin gestation, but from a certain rarer physiological type of dual development. In by far the majority of cases twins have separate uterine appendages, and have probably been developed from distinct ova; but in a small proportion of (recorded) cases there is evidence, in the placental and enclosing structures, that the twins had been developed from two rudiments arising side by side on a single blastoderm. It is to the latter physiological category that double monsters almost certainly belong, and there is some direct embryological evidence for this opinion. Allen Thomson observed in the blastoderm of a hen's egg at the sixteenth or eighteenth hour of incubation two "primitive traces" or rudiments of the backbone forming side by side; and in a goose's egg incubated five days he found on one blastoderm two embryos, each with the rudiments of upper and lower extremities, crossing or cohering in the region of the future neck, and with only one heart between them. Somewhat similar observations had been previously published (four cases in all) by Wolff, Von Baer, and Reichert. Malformations in the earliest stages of the blastoderm have been more frequently observed of late, especially in the ova of the pike; and these point not so much to a symmetrical doubling of the primitive trace as to irregular budding from the margin of the germinal disc. In any case, the perfect physiological type appears to be two rudiments on one blastoderm, whose entirely separate development produces twins (under their rarer circumstances), whose nearly separate development produces such double monsters as the Siamese twins, and whose less separate development produces the various grotesque forms of two individuals in one body. There can be no question of a literal fusion of two embryos; either the individuality of each was at no time complete, or, if there were two distinct primitive traces, the uni-axial type was approximately reverted to in the process of development, as in the formation of the abdominal and thoracic viscera, limbs, pelvis, or head. Double monsters are divided in the first instance into those in which the doubling is symmetrical and equal on the two sides, and those in which a small or fragmentary fetus is attached to or enclosed in a fetus of average development,—the latter class being the so-called cases of "parasitism."

Symmetrical Double Monsters are subdivided according to the part or region of the body where the union or fusion exists—head, thorax, umbilicus, or pelvis. One of the simplest cases is a Janus head upon a single body, or there may be two pairs of arms with the two faces. Again, there may be one head with two necks and two complete trunks

and pairs of extremities. Two distinct heads (with more or less of neck) may surmount a single trunk, broad at the shoulders but with only one pair of arms. The fusion, again, may be from the middle of the thorax downwards, giving two heads and two pairs of shoulders and arms, but only one trunk and one pair of legs. In another variety, the body may be double down to the waist, but the pelvis and lower limbs single. The degree of union in the region of the head, abdomen, or pelvis may be so slight as to permit of two distinct organs or sets of organs in the respective cavities, or so great as to have the viscera in common; and there is hardly ever an intermediate condition between those extremes. Thus, in the Janus head there may be two brains, or only one brain. The Siamese twins are an instance of union at the umbilical region, with the viscera distinct in every respect except a slight vascular anastomosis and a common process of peritoneum; but it is more usual for union in that region to be more extensive, and to entail a single set of abdominal and thoracic viscera. The pelvis is one of the commonest regions for double monsters to be joined at, and, as in the head and abdomen, the junction may be slight or total. The Hungarian sisters Helena and Judith (1701-1723) were joined at the sacrum, but had the pelvic cavity and pelvic organs separate; the same condition obtained in the South Carolina negroes Millie and Christina, known as the "two-headed nightingale," and in the other recent case of the Bohemian sisters Rosalie and Josepha. More usually the union in the pelvic region is complete, and produces the most fantastic shapes of two trunks (each with head and arms) joining below at various angles, and with three or four lower limbs extending from the region of fusion, sometimes in a lateral direction, sometimes downwards. A very curious kind of double monster is produced by two otherwise distinct fetuses joining at the crown of the head and keeping the axis of their bodies in a line. It is only in rare instances that double monsters survive their birth, and the preserved specimens of them are mostly of foetal size.

Unequal Double Monsters, Fetus in Fetu.—There are some well-authenticated instances of this most curious of all anomalies. The most celebrated of these parasite-bearing monsters was a Genoese, Lazarus Johannes Baptista Colloredo, born in 1716, who was figured as a child by Licetus, and again by Bartholinus at the age of twenty-eight as a young man of average stature. The parasite adhered to the lower end of his breast-bone, and was a tolerably well-formed child, wanting only one leg; it breathed, slept at intervals, and moved its body, but it had no separate nutritive functions. The parasite is more apt to be a miniature acardiac and acephalous fragment, as in the case of the one born in front of the abdomen of a Chinaman figured by I. Geoffroy St-Hilaire. Sometimes the parasite is contained in a pouch under the skin of the abdominal wall, and in another class (of which there is a specimen in the Hunterian Museum) it has actually been included, by the closure of the ventral laminae, within the abdominal cavity of the fetus,—a true *fetus in fetu*. Shapeless parasitic fragments containing masses of bone, cartilage, and other tissue are found also in the space behind the breast-bone (mediastinal teratoma), or growing from the base of the skull and protruding through the mouth ("epignathous teratoma," appearing to be seated on the jaw), and, most frequently of all, attached to the sacrum. These last pass by a most interesting transition into common forms of congenital sacral tumours (which may be of enormous size), consisting mainly of one kind of tissue having its physiological type in the curious gland-like body (coccygeal gland) in which the middle sacral artery comes to an end. The congenital sacral tumours have a tendency to become cystic, and they are probably related to

the more perfect congenital cysts of the neck region, where there is another minute gland-like body of the same nature as the coccygeal at the point of bifurcation of the common carotid artery. Other tumours of the body, especially certain of the sarcomatous class, may be regarded from the point of view of *monstra per excessum*; but such cases suggest not so much a question of aberrant development within the blastoderm as of the indwelling spontaneity of a single post-embryonic tissue; and they fall to be considered more properly, along with tumours in general, in the article PATHOLOGY (*q.v.*).

The scientific appreciation of monsters hardly began before the 18th century; even so great a rationalist in surgical practice as Ambroise Paré (1517-1590), although he was attracted as a scholar in later life to the subject, did not advance in it materially beyond the fantastic and credulous standpoint of the time, which is exemplified in the elaborate treatise of Lycosthenes, *Prodigiorum ac ostentorum chronicon*, Basel, 1557. Throughout the 17th century fabulous monsters continued to be described along with actual specimens; the embryological studies of Harvey (1651) were doubtless calculated to help in the growth of rational opinion about monsters, though Harvey himself mentions them only casually. The first systematic discussion of them from a strictly objective or anatomical point of view occurs in various writings of Haller from 1735 to 1753, and the subject continued after that to engage a large amount of precise and philosophical thought on the part of Caspar Friedrich Wolff (1735-1794), who first stated the relation of monstrosities to embryonic deviations in words that even now hardly require to be altered, and of Blumenbach, Sömmering, Autenrieth, Tiedemann, and others. The engrossing interest of the subject in the early part of the 19th century is shown by the fact that J. F. Meckel's *Handbuch der pathologischen Anatomie* (1817) was largely occupied with congenital malformations. Geoffroy St-Hilaire, the father, gave them a prominent place in his *Philosophie Anatomique* (Paris, 1822), and his son Isidore made them the subject of a special and very elaborate treatise in 3 vols. (Paris, 1832-37), illustrated by a small and inadequate atlas of plates. Monstrosities were at this period a prominent part of all text-books of morbid anatomy. From 1840 to 1850 may be regarded as the period in which human teratology reached its highest point; in 1840-42 the special treatise of Vrolik was published (2 vols., Amsterdam), containing an introduction on the normal development, and his sumptuous and incomparable atlas to the same followed in 1849; in 1841 Otto published at Warsaw a description of 600 monsters with 30 folio plates; and in 1842 the embryologist Bischoff contributed to Wagner's *Handwörterbuch der Physiologie*, vol. i., an article on teratology as elucidated by the best information on mammalian development. An article by Allen Thomson in the *London and Edinburgh Monthly Journal of Medical Science*, July 1844, followed by a critical survey in the next number, is of the first importance for the theory of double monsters, and it is one of the few notable English contributions to animal teratology apart from museum catalogues,—the general article in Todd's *Cyclopædia of Anatomy and Physiology* having been written by Vrolik, while the special subject of Hermaphroditism is treated of in a long and learned article by J. Y. Simpson (reprinted in his collected works). One of the latest important works on monsters is that by Förster (Jena, 1861), *Die Missbildungen des Menschen systematisch dargestellt*, with an atlas of 26 4to plates containing 524 figures (on a small scale), of which 162 were drawn from original specimens, mostly in the Würzburg Museum; this work has a very great variety of illustrations from all sources, and most copious bibliographical references. The newest treatise is Ahlfeld's *Missbildungen des Menschen* (Leipzig, 1880-82), with an extensive atlas of folio plates, as comprehensive as Förster's and on a larger scale. Monsters have of late been assigned a comparatively subordinate position in pathological teaching, owing, doubtless, to the more immediate interest of microscopic and experimental pathology. Among recent pathological text-books that of Perls (Stuttgart, 1877-79) may be named as containing an adequate treatment of the subject. The two most considerable contributors to teratology recently have been Panum (Berlin, 1860), and Dareste (Paris, 1877), both of whom have occupied themselves mainly with producing monstrosities artificially in the bird's egg by varying the temperature in the hatching oven. See also L. Gerlach, *Die Entstehungsweise der Doppelmissbildungen bei den höheren Wirbeltieren*. Stuttgart, 1883. (C. C.)

MONSTRELET, ENGUERRAND DE (ob. 1453) (who, rather owing to accident than to merit, held, until within the present century, the same position as chronicler of French affairs during the early part of the 15th century as Froissart deservedly holds with regard to the last half of the 14th), was born at an uncertain date, apparently not later than 1400, and died in July 1453. He was of

a noble family in the district of Boulogne. He held in 1436, and later, the office of lieutenant-gavener (receiver of the *gave*, a kind of church rate) in the city of Cambrai, and seems to have usually resided there. Besides this he was for some time bailiff of the chapter of that city, and later provost. He was married, and left children. But this almost exhausts the amount of our knowledge respecting him, except that he was present, not at the capture of the Maid of Orleans, but at her subsequent interview with the duke of Burgundy. As a subject of this latter prince he naturally takes the Burgundian side in his history, which extends in the genuine part of it to two books, and covers the period from 1400 to 1444. At this time, as another chronicler Matthieu de Coucy informs us, Monstrelet ceased writing. But, according to a habit by no means uncommon in the Middle Ages, a clumsy sequel, extending to a period long subsequent to his death, was formed out of various other chronicles and tacked on to his work. The genuine part of this, dealing with the last half of the Hundred Years War, is valuable because it contains a large number of documents which are certainly, and reported speeches which are probably, authentic. It has, however, little colour or narrative merit, is dully, though clearly enough, written, and is strongly tinged with the pedantry of its century,—the most pedantic in French history. The best edition is that published for the Société de l'Histoire de France by M. Douet d'Arcq in 1856.

MONTAGU, LADY MARY WORTLEY (1690-1762), one of the most brilliant letter-writers of the 18th century, was the eldest daughter of Evelyn Pierrepont, duke of Kingston, and Lady Mary Fielding, daughter of the earl of Denbigh. Her near relationship with Fielding the novelist is worth remarking. She was born at Thoresby in Nottinghamshire in 1690. Her mother died when she was a child, and by some chance she received or gave herself an unusually wide literary education, had the run of her father's library, was encouraged in her studies by Bishop Burnet, and while still a girl translated the *Enchiridion* of Epictetus. After a courtship in which she showed a singular power of thinking for herself, she was married in 1712, against her father's wish, to Mr. E. Wortley Montagu, an accomplished and scholarly friend of the Queen Anne wits. At the new court of George I. her beauty and wit brought her much homage; Pope was among her most devoted worshippers, and she even gained and kept the friendship of the great duchess of Marlborough. Her husband being appointed ambassador to the Porte in 1716, she accompanied him to Constantinople, and wrote to her friends at home brilliant descriptions of Eastern life and scenery. These letters were not published till 1763, the year after her death; but, copies being handed about in fashionable circles, their lively, witty style, graphic pictures of unfamiliar life, and shrewd and daring judgments gave the writer instant celebrity. In one of them she described the practice of inoculation for the smallpox, and announced her intention of trying it on her own son, and of introducing it in spite of the doctors into England. The most memorable incident in her life after her return from the East was her quarrel with Pope, caused, according to her account, by her laughing at him when he made love to her in earnest. He satirized her under the name of Sappho, and she teased him with superior ingenuity and hardly inferior wit. From 1739 to 1761 Lady Mary lived abroad, apart from her husband, maintaining an affectionate correspondence with her daughter Lady Bute, in which she set forth views of life largely coloured by the asceticism of her master Epictetus, and wearing an appearance of oddity and eccentricity from their contrast with conventional thought. The character of coldness and unwomanliness which Pope contrived to fasten on his

enemy was far from being deserved; her letters show her to have been a very warm-hearted woman, though on principle she turned the hard side to the world. She died 21st August 1762. The best edition of her works is that of 1861, with a memoir by Moy Thomas.

MONTAIGNE, MICHEL DE (1533-1592), essayist, was born, as he himself tells us, between eleven o'clock and noon on 28th February 1533. The patronymic of the Montaigne family, who derived their title from the chateau at which the essayist was born and which had been bought by his grandfather, was Eyquem. It was believed to be of English origin, and the long tenure of Gascony and Guienne by the English certainly provided abundant opportunity for the introduction of English colonists. But the elaborate researches of M. Malvézin have proved the existence of a family of Eyquems or Ayquems before the marriage of Eleanor of Aquitaine to Henry II. of England, though no connexion between this family, who were Sieurs de Lesparre, and the essayist's ancestors can be made out. Montaigne is not far from Bordeaux, and in Montaigne's time was in the province of Perigord. It is now in the arrondissement of Bergerac and the department of Dordogne. The Eyquem family had for some time been connected with Bordeaux. Indeed, though they possessed more than one estate in the district, they were of doubtful and certainly very recent nobility. Pierre Eyquem, Montaigne's father, had been engaged in commerce (a herring-merchant Scaliger calls him), had filled many municipal offices in Bordeaux, and had served under Francis I. in Italy as a soldier. The essayist was not the eldest son, but the third. By the death of his elder brothers, however, he became head of the family. He had also six younger brothers and sisters. His father appears, like many other men of the time, to have made a hobby of education. Michel was not a strong boy, indeed he was all his life a valetudinarian, and this may have especially prompted his father to take pains with him. At a time when the rod was the universal instrument of teaching it was almost entirely spared to Montaigne. He was, according to the French fashion common at all times, put out to nurse with a peasant woman. But Pierre Eyquem added to this the unusual fancy of choosing his son's sponsors from the same class, and of accustoming him to associate with it. He was taught Latin orally by servants who could speak no French, and many curious fancies were tried on him, as, for instance, that of waking him every morning by soft music. But he was by no means allowed to be idle. A plan of teaching him Greek, still more out of the common way than his Latin course, by some kind of mechanical arrangement, is not very intelligible, and was quite unsuccessful. These details of his education (which, like most else that is known about him, come from his own mouth) are not only interesting in themselves, but remind the reader how, not far from the same time, the other greatest writer of French during the Renaissance was also exercising himself, though not being exercised, in plans of education almost as fantastic. At six years old (for the father's reforming views in education do not seem to have disgusted him with the extremely early age at which it was then usual to begin school training) Montaigne was sent to the Collège de Guienne at Bordeaux, then at the height of its reputation, having more than double the number of scholars (two thousand) that even the largest English public school has usually boasted. Among its masters were Buchanan, afterwards the teacher of James I., and Muretus, one of the first scholars of the age. These, with their colleague Guérente, composed Latin plays for their pupils to act, and are held to have given no small impulse to the production of the classical French tragedy