

scarcity of phenomena, the lack of muscular relaxation, and the great tendency to the production of asphyxial states. The narcosis of ether is characterized by phenomena of irritation and stimulation, by a moderate tendency to the production of asphyxial states, and by the marked absence of phenomena of depression as compared with chloroform. The narcosis of chloroform, as compared with that of ether, is characterized by the absence of irritation and stimulation, by a tendency to the production of mechanical asphyxia, and by the occurrence of phenomena of depression.

(For details of the administration of the general anæsthetics for surgical purposes, the reader is referred to the author's article on *Chloroform, Ether, and Other Anæsthetic Agents, Administration of.*)

Thomas L. Bennett.

ANÆSTHOL.—This is an anæsthetic recently introduced by Willy Meyer, of New York, to replace the A.C.E. mixture. He mixes chloroform and ether in molecular proportions, *i.e.*, 43.25 per cent. of chloroform and 56.75 per cent. of ether by volume, and calls the mixture "M. S." Of this he takes 83 volumes, and adds to it 17 volumes of ethyl chloride. The mixture has a boiling point of 40° C. (104° F.), and would seem to be open to the objection urged against the A. C. E. mixture, that constituents of different volatilities do not volatilize equally. We might expect the ethyl chloride to vaporize more rapidly than the ether, and this more rapidly than the chloroform.

W. A. Bastedo.

ANAKHRE. See *Goundou*.

ANAPHRODISIACS.—This is a term applied to agents which are used to lessen an immoderate or morbid sexual desire, but the treatment must be of wide scope and include the moral, dietetic, and hygienic management of the case, while not infrequently surgery must be called upon. The causes of aphrodisia are many, and not the least important is reflex irritation of the genitalia, caused by physical peculiarities or deformities, phimoses, strictures of the urethra, diseases of the prostate, chronic constipation, fissures or hemorrhoids of the anus, eczema, highly concentrated urine, etc. In other cases the reflex irritation may be caused by the presence of worms in the rectum or in the vagina, in the case of female children, and by excessive exercise causing friction of the thighs in young children (horseback riding, bicycle riding). These conditions will each call for its own special treatment in addition to the general measures which should be adopted; for the detection and relief of the exciting cause are difficult problems and far more important than the exhibition of drugs. For another class of patients, those suffering from diseases of the nervous system or those with psychical perversion, the essential of treatment is confidence in the physician, on the part of the patient, and suggestion, hypnotic or otherwise. Many authenticated cases have been recorded of permanent cures based upon the treatment by suggestion, and it is invaluable in cases of neurasthenia.

In general, for the treatment of aphrodisia nothing will be found better than physical and particularly mental work to the point of fatigue. The latter accomplishes its results in two ways: first, by exhausting the brain where the sexual impulse (if not reflex) has its origin; and secondly, by so absorbing the patient's interest as to preclude the occupation of his mind by lascivious thoughts, pictures, and mental impressions. The anaphrodisiac effect of mental activity is easily explained when we consider the large amount of nervous energy which accompanies each conjugal act.

In the general management of a case the physician should advise a non-sedentary life, as much as possible in the open air, light diet, with an absence of meats, coffee, highly seasoned foods, and alcoholic stimulants; the kidneys should be kept well flushed, the bowels well open, and the patient should sleep on a hair mattress, with light covering, in a cool, well-ventilated room. As

a full bladder is frequently a cause of irritation, it should be emptied upon going to bed and the first thing in the morning. The patient should arise early and take a cold douche or sponge bath. The only mechanical contrivance which seems to be of much benefit is one that will prevent the patient from sleeping on his back, and for this purpose a towel knotted at the back may be used. The insertion of rings in the prepuce or labia and the local application of caustics are to be condemned. Drugs which may be used are the bromides, gr. x. to xx. three times a day, and antimony, chloral, salicin, conium, and other depressants; nauseants may be used with care, and are effective sometimes.

Charles Adams Holder.

ANAPLASIA.—This word is used by some writers synonymously with anaplasty, having the meaning of a repair of injured parts by means of plastic operation. In 1893 its use in an entirely different sense was introduced by Hansemann, who wished to designate by some specific term the morphological and physiological differences which exist between the cells of malignant tumors and those of the normal parent tissue.

The type and character of the parent cells are usually preserved to some extent in the tumor cells which arise from them; as, for example, the cells of a squamous-cell carcinoma of the skin may undergo a horny change; those of an adeno-carcinoma arising from cylindrical cells are more or less cylindrical in shape; the cells of an adeno-carcinoma of the thyroid may produce a colloid-like substance; metastases of an adeno-carcinoma of the liver may secrete a bile-like fluid; and the sarcomata arising from the chromatophores of the skin produce melanin. These resemblances of tumor cells to their parent cells are not so marked as the differences which exist between them, both in morphological and physiological characteristics. The latter are shown by striking variations in size and form; by changes in the finer structure of the nucleus and cell body as shown by staining reactions (hyperchromatosis, hypochromatosis, etc.); by abnormal cell-division forms; by the changed chemical character or total absence of cell function; and by the tendency to undergo degeneration. To all of these alterations in cell character which constitute malignancy Hansemann would apply the term anaplasia, as opposed to heteroplasia and metaplasia. According to his view, the significance of these changes must be that the cells of malignant tumors have lost in differentiation and so have acquired the power of individual existence. The manner in which the cells have undergone this change or the etiology of malignant tumors is not included in the meaning of the term. There can be no doubt that the use of the term anaplasia in this application is of great service; and though Hansemann's views have met with much opposition, it has gained a wide acceptance in modern pathology.

Aldred Scott Warthin.

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ANASARCA. See *Circulation, Disorders of.*

ANATOMY, HISTORY OF.—Considering the necessity of the anatomical sciences as a basis for the proper study of the healing art, and the high position assigned them in modern times, it may seem strange that their early development was slow, and the knowledge of the ancients concerning the structure of the human body crude and superficial. The principal cause of this was the prevalence of animistic ideas, it being thought that spirits inhabited or controlled the body in some mysterious way. Involuntary movements, such as the pulsation of the heart and arteries, the twitching of muscles, the phenomena of respiration and bodily heat, were all considered indubitable signs of the presence of such spirits, to which were ascribed most cases of disease and disordered action. After leaving the body the spirit was thought to main-

tain some occult relation to it. Hence the corporeal remains were either preserved with pious care, or burned or entombed to prevent their suffering insult or injury that might affect the career of the spirit in the other world. Mingled with these superstitious ideas were others derived from horror of death and repulsion from corrupting flesh. Contact with a dead body was usually held to be a defilement requiring long purification, and to attempt to inspect its internal structure was a sacrilege meriting the severest punishment. Dissection was, under such circumstances, practically impossible. It is certain that but few writers of antiquity were able to avail themselves of this method of research.

The sources of information were therefore indirect. Animals killed either for food or sacrifice, the occasional examination of persons severely wounded or suffering from eroding diseases, the noting of the effects of putrefaction which displayed the deeper structures, especially the bones, were the usual means employed for the investigation of the human body. In Egypt, it is true, bodies were eviscerated for the purpose of preserving them as mummies; but this appears to have been done by a low class of servants under the direction of priests who regarded the interests of the spirit in the other world as the only essential, and who therefore gave no thought to exact anatomical knowledge.

Yet among the ancient Egyptians are found some of the earliest attempts at recording anatomical data. The Ebers papyrus, of about 1550 B.C., and said to be the oldest complete book extant, relates to the healing art and contains incidental allusion to the structure of the body. Vessels and nerves are together designated as "metu"; of which four are distributed to the nostrils, four to the temples, four to the head, two in each hand and foot, etc. The heart is regarded as the centre of the vascular system, and vessels containing blood, air, water and other fluids pass from it to all parts of the body. Vital spirits are said to enter one nostril and penetrate to the heart; an idea which was to have a great effect upon anatomy and physiology as far down as the seventeenth century. Similar determinations, of no greater value, are found in papyri of a somewhat later date.

Contemporary with the Egyptian culture, or possibly anterior to it, was that of Chaldea and Assyria from which the Phœnicians and Hebrews derived much. One of the contributors to the Ebers papyrus is stated to be from Byblus, a town of Phœnicia. Certain cuneiform inscriptions indicate that the situation of the vessels of the neck was known, as they describe the compression of these structures to relieve the pains of circumcision.

The anatomy of the Hebrews was probably derived mainly from Chaldean, Assyrian, and Egyptian sources. The principle of life was believed to reside in the blood (Gen. ix. 4; Lev. xvii. 11), which was accordingly forbidden as food and used as a propitiatory offering. The heart was supposed to be the seat of the understanding, courage, and love; to dilate with joy, contract with sadness, harden or soften with the passions. These expressions, which have become wholly figurative in modern times, were formerly believed to be literally true. The later Talmudists had some anatomical knowledge of the female genitalia, the œsophagus, the lungs, the kidneys, the spinal cord, and the cauda equina. One of the rabbis, at the close of the first century, is said to have boiled a body for the purpose of obtaining the skeleton. A fabulous bone, "luz," was thought to become the seed of the body from which it is to be renewed at the resurrection.

The early writings of India contain no anatomical knowledge except names of a few parts of the body. Somewhat later (900-200 B.C.) there are rude attempts at the enumeration of structures. To what extent these enumerations are based upon actual examination and misinterpretation of anatomical facts it is impossible to say. In them the primitive elements of the body are air, bile, and phlegm, air having its seat below the navel, the bile between the navel and the heart, the phlegm above the heart. Seven organic products were believed to be

formed from these primitive elements: watery chyle which in the liver and spleen forms blood, from which arises flesh which forms cellular tissue, from whence comes bone which generates marrow, which gives origin to semen and menstrual blood. The ancient Hindoos are said to have practised dissection, it being held lawful to pursue such investigations for scientific purposes, though under many limitations and restrictions; but the sculptures of the rock-cut temples of Elephanta and Ellora show ignorance of the anatomy of muscles. Later authors appear to have had a vague idea of the circulation of the blood, as they state that the watery chyle circulates through the vessels and irrigates the system as water does a field.

The Chinese have not, even at the present day, any exact anatomical knowledge. The tracing of their crude notions back to the mists of the past is of purely archeologic interest, and it is difficult to say whether the allegations of great antiquity made for some of their medical writings are based upon authentic facts. They considered the elements of the body to be air, water, "metal," and "wood"; the liver to be the seat of the intelligence, the seat of life to be in the middle of the breast. Arteries and veins were not separately distinguished, but some notion of a circulation or translation of the blood appears to have been advanced, as it is stated that it completes a course throughout the body five times in twenty-four hours.

The Japanese in matters of anatomy copied from the Chinese. Their older writings are curious mixtures of fact and error. They teach that the heart contains blood, rules all the other viscera, and is connected with the liver, lungs, spleen, and kidneys; that blood is prepared in three "combustion organs" of rather mythical character, perhaps the thoracic duct, the pancreas, and the lacteals. They assert the structure of the lungs to be like that of a honeycomb, and state that they contain a nourishing gas which penetrates the whole body outside the vessels that carry the blood. The brain, the spinal cord, and the marrow are said to be of one nature, the brain having the highest rank. The seat of the soul is stated by most authors to be the heart, as it has been seen in some animals to beat after the severing of the head from the body. Others place it in the brain, the spleen, the lungs, the kidneys, or the liver. The nerves are often confounded with the tendons, often described as tubular canals. In the middle of the eighteenth century, a physician named Yamawaki obtained permission from his prince to dissect a body, an illegal act that could be done only under powerful protection. He published his observations and declared that the older teaching should no longer be thoughtlessly followed. Dissection was thereafter surreptitiously practised, and very accurate wooden models of the skeleton were made. After this anatomical works from the Dutch were translated into Japanese.

It is among the Greeks that we first meet with a knowledge of anatomy that can be called scientific. With keen and active intelligence they examined and speculated upon all things in the world around them. Prepossessed with the anthropocentric theory of the universe, they attained only a partial and distorted view of natural phenomena, but often showed astonishing powers of generalization in speculative theories. Among them arose the group of so-called "natural philosophers," at the head of whom we find Pythagoras (584-504 B.C.). He attempted to explain natural phenomena by means of harmonic numbers which he considered as actual entities having mysterious powers, the elements of the body being comprised in the number 10, each single number (1+2+3+4) having therein a counterpart. He was the first to deny the spontaneous generation of animals, holding that all life must spring from germs preexisting in the semen which, formed from the brain of the male, combines with moisture from the brain of the female, being the perfected foam of the blood. This idea is perhaps connected with that of the origin of the goddess of generation, Aphrodite (*ἀφρός*, foam), from the