

tive, and sufficient stimulus elicits a much more normal response than would be expected from the appearance of the patient. At last dulness and apathy become so pronounced that they cease to appreciate or care for their condition, show little or no emotion, are unable to make any exertion, and become practically helpless.

In addition to these symptoms, which are fundamental and underlie all other mental states exhibited by these patients, a large proportion develop delusions of persecution. Sensitive about their personal appearance, they are liable to seclude themselves, which way of living in time reacts unhealthfully upon them; conscious of their good intentions, and the effort required on their part to meet the ordinary demands of life, they feel themselves misjudged by their family and friends, who, at first not recognizing disease, may think them inefficient from indolence, and they at last become suspicious of the good intentions of others toward them.

Other important elements in the development of delusions are a profound anemia, impairment of the special senses, hallucinations and illusions which may in part result therefrom, and various subjective sensations such as headaches, noises in the ears, vertigo, pricking and tingling, numbness, etc., which are often misinterpreted as evidence of attempts by some one to injure them. These delusions are more or less firmly held, but may be merely temporary and troublesome only at night, when the patients are not always well oriented in their relations to those about them, whose attitude toward them they misunderstand and whose identity they often mistake.

The various paræsthesiæ, impairments, hallucinations and illusions of the special senses, delusions of persecution, and partial disorientation as to persons are the most common of the more transitory symptoms. A smaller proportion of cases are depressed in spirits. This depression arises in part perhaps from an appreciation of their condition and is sometimes accompanied by anxiety, all sorts of worries, apprehension, fears, self-depreciation, and a tendency to suicide. While in this state they may be sleepless and show marked restlessness and agitation with moaning, senseless resistance, and refusal of food. In others the euphoria which is so constant a symptom appears to be exaggerated, and there result short periods of mild exhilaration. If more pronounced they amount to excitement, and are often accompanied by confusion, various hallucinations, and delusions. These acute attacks are always preceded by the less obtrusive but more characteristic symptoms, and after the subsidence of the depression or excitement the more essential symptoms remain. These emotional states are no more characteristic of myxœdematous insanity than of other psychoses, in many of which they occur, and instead of aiding the diagnosis they serve to obscure the picture. It is interesting to note, in passing, that with a definite etiology, a single underlying cause, the same patient at different times may show such variety in emotional tone. This, however, is true of other psychoses.

While the character of the mental symptoms above mentioned would lead one to suspect their origin, the pre-existence and coexistence of other symptoms of myxœdema are necessary for an absolute diagnosis.

The signs of an advanced case are unmistakable. There is a deposition of mucin in the subcutaneous tissue, causing a swelling resembling ordinary œdema, but which does not pit on pressure. There is an increase in weight and a characteristic change in the appearance of the patients who at first seem to their relatives to be growing stout in an ordinary way, perhaps to the physician to have renal disease. This solid œdema appears at first in the face or ankles, and in time becomes general, although there are instances of localized myxœdematous swellings. The hands and feet become large and clumsy, being stiff and sometimes numb. Movements are slow and difficult, being limited by swelling at the joints; the gait is ponderous and unsteady, and the patient sometimes falls. The eyelids are puffy and pendulous, the brows are elevated to correct the drooping of the lids, the nose is broad, and the lips are thick. The skin of the face

is yellowish and translucent, especially of the eyelids, and there is often a red spot on either cheek. The face shows little change of expression to emotion. The skin generally is downless, dry, scaly, non-perspiring, and has a tendency to crack. The nails are brittle, the hair becomes dry and finally thin all over the body, perhaps disappearing in places. The teeth are carious, the breath is foul, the tongue, soft palate and gums are pale in color, swollen, and there is often a discharge of bloody mucus from the mouth, and a tendency to the formation of polyipi and hemorrhoids, and to hemorrhages from the mucous membranes generally. The voice is husky; speech is deliberate and monotonous. The special senses are often impaired, though this varies with the condition of the patient, since sometimes they see and hear with difficulty and again perfectly. Sensation varies from an almost normal condition to marked anæsthesia and analgesia. Conduction of sensation appears to be slow, although it is difficult to determine how much of the slowness is due to the mental condition. The eyes water in cold weather, especially in a wind. The body-temperature may be subnormal. These patients are very sensitive to cold, wearing an abundance of heavy clothing, and living in warm rooms. The bodily condition is one of anemia,—the percentage of hæmoglobin is reduced, there is a moderate leucocytosis. The heart is often enlarged, the beat slow and weak, while the rate is markedly increased by moderate exercise. The urine is diminished in quantity (500 to 700 c.c.), in specific gravity, and in total amount of urea excreted; and in a case of long standing it often contains a trace of albumin and casts. These advanced cases also show watery œdema due to the renal change. They have attacks of palpitation and dyspnœa, and sometimes short periods of unconsciousness or epileptiform seizures. The slow onset, the frequent sense of well-being and occasional delusions of grandeur, the mental stupidity simulating dementia, the peculiar speech, the clumsy gait, the general inability to make precise movements, and the attacks of unconsciousness might suggest general paralysis, but the presence of other symptoms of myxœdema, notably the solid œdema, should prevent this mistake.

The treatment is that for myxœdema. It consists in supplying the deficiency of something necessary to normal metabolism by the cautious administration of the desiccated thyroid of the sheep. It is expedient to give smaller doses and for a longer period of time than was formerly the practice in order to avoid certain unpleasant and even dangerous effects. The symptoms of overdose are anorexia, coated tongue, foul breath, nausea, vomiting, and diarrhœa; headaches, pains in the limbs and in the chest, simulating angina; a moderate rise of temperature, restlessness, mental irritability or even excitement; a reduction in the percentage of hæmoglobin, an increased leucocytosis; a rapid pulse especially on exertion, vertigo, palpitation, dyspnœa, and syncope. Especial care is to be taken in cases of mental excitement with a tendency to exhaustion, and in those with great anæmia and a weak heart. It is well to remember that the effects of the remedy on cases of myxœdema are more pronounced than on healthy people, that it is better borne by the young than by those in whom atheromatous changes have begun, that it is said to light up a latent tuberculosis, that deaths in syncope have been reported following very moderate exertion, and that it is cumulative in its effects, the danger existing for some time after cessation of administration. It is interesting to note that from large doses symptoms are developed, the antithesis of those characteristic of myxœdema, viz.: tachycardia, restlessness, irritability or mental excitement,—in other words the mental state of exophthalmic goitre.

During active treatment the patient should be kept in bed to avoid exertion, which is dangerous; massage should be given to aid elimination of mucin, and an iron tonic administered to correct the anemia already existing and to prevent an additional reduction of hæmoglobin. One should begin with gr. i. or ij. doses of desiccated thyroids (equivalent to gr. iiss. to v. of the fresh gland)

twice daily. The remedy causes at first an increase in the quantity of urine and of the urea eliminated. When the patient is in a normal condition so far as the myxœdema is concerned the dose which will maintain this state must be determined and taken regularly throughout the life of the individual. The quantity varies with the person and season, a larger dose being required in winter, but usually gr. ss. to i. daily, perhaps each second day, is sufficient. Notwithstanding the brilliant results of treatment it is a question if these patients are not left with some slight mental defect.

B. CRETINISM.*

Cretinism, or myxœdema in the child, presents a variation of symptoms according to the age at the time of onset, the rapidity and the completeness of the loss of function of the thyroid. The gland may not have developed, in which case the child shows marked symptoms at birth and dies; an atrophy may have begun before birth, the child at that time showing symptoms, but the disease may progress slowly and life may be prolonged for years; or the condition may be normal at birth and the disease appear early, usually before the fifth year. In this latter class are included most of the sporadic cases. The endemic form, usually with goitre, may begin to show symptoms at any age. When the gland is congenitally absent or the loss of function progresses rapidly, the child dies early. If the atrophy or degeneration begins later in childhood or in adolescence, and especially if it proceeds slowly, there is the usual arrest of development of body and mind, but the individual may live to the age of forty years or more.

The mental state varies, according to the bodily condition, from an anentia of the congenital form to a slight degree of enfeeblement in the cretinoid state; but allowing for modification because of infantile lack of development there is a striking similarity between the mental symptoms which manifest themselves in a case in which the disease began in childhood and those which are observed in one of later development—viz., in adult life.† Cretins have a marked psychomotor retardation,—they are exceedingly slow in their mental operations and in their movements. They lack the interest, the inquisitiveness, of normal children, have little power of attention and will sit for hours without noticing their surroundings. Because of their lack of ability normally to receive impressions, to remember, to form ideas, and to reason to conclusions, they gain little experience and remain children in mind as well as in body throughout their lives. Only the most intelligent are capable of any occupation. Many do not learn to talk or even to communicate by signs, are filthy in their habits, cannot walk or stand without assistance, and have an inordinate appetite with apparent absence of the sense of taste. They show slight capacity for exertion; some are entirely helpless. This torpor is due partly to the mental condition and partly to muscular weakness.

They show little emotion, are placid or stupid, often sleeping more than healthy children, but while they are dependent, shy, affectionate, mild, and even-tempered, if annoyed they may be for short periods of time sulky, obstinate, irritable, or they may exhibit violent fits of temper.

The special senses are often imperfect, particularly those of hearing and smell, though it is difficult to ascertain this because of the stupid condition of the patient. Cutaneous sensation is usually diminished. The deep reflexes are active.

Less frequently than in myxœdema of the adult a few of the more intelligent develop delusions; they are also liable to periods of depression and excitement. These mental states are not characteristic of cretinism, they are no doubt due largely to the intense anæmia, to various perversions of ordinary sensation, and to the imperfection of the special senses.

* See *Goitre and Cretinism*.
† See "Myxœdematous Insanity," in the first section of this article.
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While the mental condition is quite characteristic it is even more true than in the adult form that the diagnosis of cretinism must be made chiefly from physical signs. The dwarfed stature, perhaps not over three feet at the age of twenty-one years, and the childish appearance; the solid œdema which is most conspicuous in the face, hands, and feet; the broad head with the anterior fontanel still open; the eyes apparently far apart and partially covered by swollen lids; the broad, flat nose; the large mouth with thick lips, large, protruding tongue, and carious teeth; the lack of intelligence in the face, the skin of which is sallow and waxy in appearance; the rough, dry skin over the body generally, on which the hair is coarse and thin, or wholly absent; the short, thick neck with swellings above the clavicle; the prominent abdomen, perhaps with herniæ; the poorly developed, crooked limbs; the slow, awkward gait, if the patient is able to walk; the lack of sexual development; the harsh or shrill voice; a subnormal temperature, great sensitiveness to cold, a slow pulse and respiration—all make a picture not easily mistaken. In making the diagnosis cases should be excluded which do not show the most characteristic signs of myxœdema, viz., the solid œdema, and the changes in the skin and its appendages.

The treatment is that for myxœdema beginning at any age, and, although children bear proportionately larger doses than the adult, death has occurred and desiccated thyroid should be administered with care.* The patient should be kept in bed, or exercise should be greatly limited, during the stage of most active treatment, not only because of the slight danger of syncope, but also to avoid the bending of the bones of the legs which then grow rapidly. Splints are sometimes applied.

The effect of treatment is immediate and most pronounced in removing the physical signs of myxœdema. A change in the mental condition is not so prompt, but in a general way it may be said to keep pace with the subsequent bodily growth. The removal of the myxœdematous swelling, the softening of the skin, the growth of hair and of teeth make a striking change in the appearance of the patient; at the same time there is more activity of body and mind; the characteristic torpor disappears; the power of attention increases, and the child begins to gain experience. Notwithstanding the wonderful improvement which is quickly made by removal of the physical signs, there still remains, in the cretin who has passed the period of puberty without treatment, an undeveloped mind in a stunted body. The amount of development that can be expected in any case depends on the capacity of the individual for growth, which varies inversely with the age. Hence the importance of an early diagnosis. With sufficiently early and judicious treatment there is no reason why a cretin should not develop into a normal individual. When treatment is delayed several years, or till after puberty, improvement only can be attained. As in all cases of myxœdema the patient must take regularly throughout life a sufficient amount of desiccated thyroid to prevent a recurrence of symptoms.
George T. Tuttle.

XXV. INSANITY FROM ARREST OF DEVELOPMENT: IDIOCY, IMBECILITY.—Idiocy, imbecility, and feeble-mindedness are varying grades of the same condition. They represent checked cerebral development. As such they cannot, strictly, be classed with the insanities since insanity indicates a perversion of function of cerebral structures which are present. In idiocy, these structures have never fully developed or have remained altogether absent. Idiocy, therefore, implies defect, while insanity implies perversion. Before the age of puberty, true insanity is rare. It is true that general paresis has been reported in children of twelve; that paranoia may begin to show itself, as shyness, suspiciousness, and egoism still earlier, and be fairly well developed by fourteen or even younger. Similarly, mania and melancholia are reported as having occurred in children. In the larger number of

* For symptoms of overdose see "Myxœdematous Insanity."

cases such mental disturbances are the developments or manifestations of idiocy and imbecility. They are usually severe and brief. After them, the mental clouding seems deeper.

The brain of the child does not attain its full structural development until the fifteenth year of life. Consequently the pathology of idiocy is no less a chapter than the pathology of the brain in infancy and childhood; and among the causes of idiocy must be reckoned all injurious influences which act upon the brain before the fifteenth year. Mental defect resulting from injuries to brain structure after that period is dementia. There has been a somewhat reactionary tendency in the interest centering about idiocy. Thirty or forty years ago, the investigators of this subject were chiefly pathologists and com-



FIG. 2845.—Case of Sporadic Cretinism, Dwarfism. Patient aged twenty-two years; height, forty and one-half inches; weight, fifty-seven pounds. (From collection of Walter E. Fernald.)

parative anatomists. To-day the trend of study is clinical, psychological, and pedagogical. The causes, the early recognition, and above all the education of backward children are now the chief objects of inquiry. The present article only essays to give a sketch of the whole subject. For more detailed descriptions the reader is referred to the special literature, which is voluminous.

PATHOLOGY.—The lesions in idiocy are gross and microscopic. The gross lesions consist of tumors, areas of sclerosis, meningeal thickenings, and of defects and malformations. Thus the cortical convolutions are absent or imperfectly developed; or the basal ganglia are absent; the corpus callosum is sometimes totally deficient, as are also both lobes of the cerebellum. These defects may be the results of agenesis, or they may have been caused by intracranial hemorrhage. In the latter event, large cysts are often present. Porencephaly and hypertrophy and true microcephaly of the brain are comparatively rare conditions. Hydrocephalus, on the other hand, is common. It may exist as an independent lesion

or may complicate any of the others. Contrasted with these gross defects are those in which the brain as a whole is within normal limits as to architecture and size, but in which microscopical examination shows defects in the ganglion cells of the cortex. The cells are fewer in number and imperfectly developed. In general, the greater the gross anatomical defect, the greater is the intellectual failure. This rule is not absolute, however. Cases are on record in which gross lesions were associated with considerable intelligence. On the other hand, some profound idiots have brains of fairly normal outlines.

ETIOLOGY.—The causes of idiocy, imbecility, and feeble-mindedness may best be considered as they occur before, at, and after birth. The prenatal causes are the most important. In over fifty per cent. of feeble-minded children the cause can be shown to be congenital. In most, the causes are directly traceable to defective nervous systems on the part of the forebears. From families with distinct neurotic taint, viz., the insane, the epileptic, the alcoholic, hysterical, and the like, idiotic or feeble-minded children are pretty sure to issue. The chances are greater in consanguineous marriages when neither side of the family has a clear record. They are especially great when feeble-mindedness is a parental stigma. Direct inheritance, with perpetuation of type, is more frequent in idiocy than in any other degenerative condition. This question is of extreme practical importance, as feeble-minded women are easy prey to the lusts of men, and when lacking proper protectors are a menace to the state through increasing its dependents. Alcohol stands in prominent relationship to idiocy and feeble-mindedness. Of 2,554 admissions to the Bicêtre for idiocy, imbecility, epilepsy, and hysteria, in forty-five per cent. one or both parents drank to excess (Bourneville, "Recherches," etc., Paris, 1901). Active syphilis and tuberculosis in the parents, aside from giving rise to gross lesions, may also be responsible for failure in development. The other prenatal causes of idiocy and feeble-mindedness are related to diseases and injuries affecting the mother during the period of her pregnancy. The causes acting at birth are chiefly traumatic. During or just preceding delivery, the child's brain sustains injury. First children and boys are chiefly exposed to such dangers. Into the rubric of causes acting after birth all pathogenic agencies, traumatic, toxic, or nutritional, fall. In considering these causes, it must be borne in mind that the brain of the infant and child is an extremely delicate organ, undergoing rapid development. At the end of the second year it weighs three times as much as it did at birth. In the essentially reflex character of its function and in its quick response to stimuli, it resembles a primitive nervous ganglion more than it does the adult encephalon. Apparently trivial causes may therefore arrest its development; and any arrest, in so rapidly growing an organ, may have far-reaching results. It differs in another respect from the adult brain in that focal diseases affect the whole brain. Thus the chief symptom of cerebral tumors in infants is stupidity, whereas in adults they may cause no mental symptoms. It is thus readily apparent that the younger the child the greater is the chance of a brain affection having far-reaching effects on the intelligence. Of the most important causes acting in infancy and early childhood may be mentioned: cerebral and meningeal hemorrhage; meningitis, especially the cerebro-spinal form; the infectious diseases, notably scarlet fever and typhoid fever; and convulsions from any cause, but particularly the convulsions of epilepsy. Malnutrition is doubtless a cause of feeble-mindedness and idiocy, as is also rickets. General malnutrition is also possibly responsible for amaurotic family idiocy. Cretinism illustrates the importance of the internal secretions for brain development. Of external poisons, alcohol, and possibly some drugs given for therapeutic purposes, have checked mental development. Trauma is regularly mentioned as a cause, but it is rarely possible satisfactorily to prove such a relation. The loss of one or more of the special senses as causes will be mentioned under sensorial idiocy.

SYMPTOMS.—The symptoms of mental arrest naturally vary with the time when the arrest occurs, and in some ways with the causes of it. In congenital cases the child is usually several months old before the mother notices that it is different from other children. In acquired cases, such, for example, as those caused by meningitis, the mental arrest is noticed consecutively to the cause. Between profound idiots, whose life is purely automatic and vegetative, and feeble-minded or backward children, there is too wide a gap to permit a satisfactory description of symptoms which shall hold good for both classes. Consequently I shall first give a description of the symptoms of the profounder grades of mental arrest, and later shall describe the symptoms as they are observed in children who are feeble-minded or backward. Between these two extremes will be found many cases, some of which incline to one end of the scale, others to the other.

Symptoms of Profound Idiocy.—These are physical and mental. The physical symptoms due to paralysis, etc., will be described under Diagnosis as to Clinical Type. Of other physical symptoms cranial anomalies are the most constant. The skull is too large or too small or asymmetrical. The nose and ears frequently have degenerative stigmata. The lips are thick and the teeth defective. In short, it is profound idiots that give the best opportunity for the study of the anatomical stigmata of degeneration. Nearly all the patients are undersized, ill-proportioned, and clumsy. All are homely and most are repulsive in appearance. The mental state of profound idiots shuts them off completely from society and makes them automata or worse. They talk, either not at all or indistinctly; they lie in bed motionless, or performing rhythmical movements and uttering meaningless sounds; the saliva runs from the mouth; the urine and feces are passed involuntarily; their attention can be attracted either very imperfectly or not at all by sights and sounds. The pain sense is greatly diminished. The severe wounds and mutilations which idiots are apt to receive accidentally often pass uncomplained of. Also in pneumonia, to which they are very liable, they give no evidence of pain. Such are the main characteristics of profound idiots. By reason of them the patients are entirely helpless, requiring to be fed and cared for in every way. In idiocy of less degree, but in which the mental defects are still profound, some of the above symptoms are less pronounced or altogether wanting. Thus some can talk fairly intelligibly. Many hopeless idiots are not bedridden, and care for their persons to a certain extent. Some run about, laughing and chattering to themselves, looking and acting like large-sized monkeys. They understand much of what is said to them and can be made subservient to a certain degree of discipline.

Symptoms of Feeble-mindedness.—Such patients as correspond to the description just given are usually the inmates of asylums and homes, or, if they are kept at home, are rarely or never seen by visitors. They are pariahs and are susceptible of little or no improvement. In strong contrast to them are the children who are backward and mentally deficient, but not profoundly idiotic. This latter class is a large one, and in it pedagogical efforts have been crowned with no little success. A fairly typical history in a case from this class is as follows. Some of the degenerative stigmata are present in the parents, or there was a difficult labor when the child was born, or severe convulsions occurred in childhood. At birth the baby seemed normal, took its nourishment well and increased in weight. The mother may have noticed about the sixth or eighth month that the baby was less playful than other babies, that it did not follow objects with its eyes, that its attention was difficult to attract. Failing to notice these things, she may have allowed the child to pass its second year without learning to say any words. In some cases slowness in learning to walk is the first thing to attract parental attention. This symptom is of less value than are some of the others, as there is considerable physiological variation in the age at which children learn to walk, and also because deficient children often learn to walk early. In other cases the child passes

through the period of infancy without being remarked as noticeably backward, and it is not until the school teacher reports slow progress and a mental calibre inferior to its age, that it is finally brought to the physician for advice. In other cases the mental deficiency is established in direct sequence to an infectious disease, and comes as an abrupt interruption of previously normal progress. In such cases the child may lose much of the intelligence it had gained. When the little patient is finally brought under the observation of the physician, some or all of the following symptoms are referred to by the parents. In all grades of feeble-mindedness, and at all ages, the fundamental defect noticed is lack of attention. In young children this is shown by their failing to be attracted by sights and sounds at an age when they should be so attracted; in older children, by the inability to keep their minds on their work. Even in play they fall behind the others by failure of attention. Some imbeciles, while failing in attention in most matters, can give good attention to others. This is especially shown in mischievous acts. Consecutive thinking and reflection are not compatible with great feeble-mindedness. In mild grades of feeble-mindedness the instincts are not greatly different from what they are in health. Hunger is felt by all, and is often indulged to the point of gluttony. As genius is independence and originality, so feeble-mindedness, which is far removed from genius, is the other extreme. Thus the imitative instinct is strongly developed in the feeble-minded. Some feeble-minded children are docile and polite, but a larger number are rude and uncivil and are often difficult to train in this direction. Destructiveness, a special attribute of infancy, is continued in idiocy and feeble-mindedness beyond the age at which normal children learn the value of property and the rights of others. Profound idiots are destructive at all times. In lesser grades this tendency may appear only during fits of anger. Again, it may appear as an impulse coming without apparent cause, like the impulses in some forms of chronic degenerative insanity. Imbeciles and the feeble-minded are thus sometimes incited to dangerous and unprovoked assaults or to the setting fire to buildings. As a rule the patients are timid in the extreme, but in their fits of excitement and anger they lose all appreciation of consequences and seem fearless. At such times they are probably irresponsible and may be very dangerous. They attempt, under such circumstances, to do injury to anything in their vicinity, animate or inanimate, and are very difficult to restrain. An excited imbecile is usually a very dangerous person. The feeble-minded are acutely sensitive to pleasure and pain. As a rule, also, they are affectionate, although their affection does not reach the plane of self-sacrifice. All appreciate kindness and are repelled by rough treatment. Most feeble-minded children are mischievous. They are usually untruthful, and will often steal. As regards the higher intellectual faculties, there is naturally a great variation in the feeble-minded. In the milder grades all these faculties are present, though generally less acute than in normal people. As a rule judgment, will, memory, and self-control are all impaired. In some, however, the judgment in regard to simple matters is good; the will may be well developed though it manifests itself as stubbornness rather than as tenacity of reasonable purpose. In certain cases the memory is developed to an extraordinary degree. Credulity and instability of the emotions are common characteristics of a weak intellect generally. Manifestations of these traits are seen even, in adults who pass as normal, in the following of fads, faith cures, and bizarre creeds. The vast majority of the followers of such movements are distinctly feeble-minded. In profound idiocy, of course, credulity cannot enter. But in the unequal intellectual development of feeble-minded children, credulity and instability of the emotions are prominent features. Such children delight and believe in fairy stories, or are terrorized by ghost stories, beyond the usual age when such fictions cease to interest. Sleep is usually impaired. Masturbation is common.

The disposition of feeble-minded children is subject

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to wide variations, as has been indicated above. Some are docile, quiet, affectionate little creatures, very timid, incapable of harming others, but capable of running away or even of committing suicide if harshly censured. Others are the direct antithesis to this. Moody and sullen; they exhibit little affection for those around them. They fly into violent passions, either when, at home, they are not given their own way, or in their play with other children. When aroused, they are often very violent, destroying anything they can lay their hands on, attacking those near them, biting, scratching, or hurling loose objects, with total disregard to consequences. Representatives of this latter class are naturally very hard to educate. All require more or less supervision and some are entirely incapable of taking any care of themselves.

Speech, with its correlates—the ability to read and to write—is present in feeble-minded children. If speech is absent (with the exception of certain paralytic conditions and of deaf-mutism) the mental condition is worse than feeble-mindedness. Learning to speak is, however, often late in appearing and the articulation is commonly impaired. Lispering and jerking utterances are common symptoms. The vocabulary also is apt to be more limited than in normal children, though many feeble-minded children are very loquacious. The same is true with regard to reading and writing. These accomplishments can be acquired by feeble-minded children. But they are late in point of time, and imperfect, usually, in



FIG. 2846.—Idiocy with Hydrocephalus. (Fernald.)

point of development. The patients can often read, write, or draw without really understanding what they do. Desire for movement is a characteristic in all degrees of intellectual retardation. In profound idiots it is manifested in the rhythmical movements, the habit spasms, the ties, the contortions of the features. In the feeble-minded it is present either as an extreme restlessness, or

as a purposeless moving to and fro. Many of these children are also afflicted with a kind of chronic chorea, consisting of involuntary twitchings of different groups of muscles. These movements are rendered more pronounced by excitement and observation.

DIAGNOSIS.—The early diagnosis of idiocy and feeble-mindedness is important chiefly from the point of view of education. It is very essential, for the attainment of practical results, that training begin early. The diagnosis as to the intellectual defect in the early months of infancy, if this defect is not profound, is practically impossible. There is so much physiological variation in normal development that slight irregularities, although they may excite the physician's suspicion, cannot be relied upon as diagnostic. The normal development of the infant at varying periods can be found in different works on child study, notably that of Preyer. When variations from a normal standard are combined with physical defects, such as paralysis, or with a bad parental or personal history, the diagnosis is easier.

The diagnosis as to cause can sometimes be made out. The questions involved have been discussed in the section on etiology. The greatest importance in causal diagnosis is the recognition of cretinism (*q. v.*). The diagnosis as to clinical type embraces the following forms, which are anatomical rather than clinical, for it can hardly be said that there is a mental defect characteristic of any one of them. Any one of them, also, may have defects of varying degrees.

Hydrocephalic Idiocy.—Hydrocephalic idiocy includes the cases in which the mental enfeeblement is due to pressure on the cortex brought about by overdistention of the ventricular cavities of the brain with fluid. It may complicate tumors, cysts, etc., or may be a sequel of meningitis. It frequently exists as an independent condition. It has been assumed that it owes its origin to closure of the foramen of Magendie, so that communication of the ventricles with the subarachnoid space is shut off. Operations undertaken with the object of artificially creating such communication have not proved successful. The most striking symptom of hydrocephalus is enlargement of the head. The degree of enlargement and the condition of the fontanels and sutures depend on the cause and the time of its operation. With closed fontanels, the increase in the size of the head is only moderate. When the distention begins before the fontanels have closed, the increase may be enormous. Under such conditions the rounded skull cap rises as a vault or dome above the small wizened face. Hydrocephalic children are generally feeble and puny, and this, in conjunction with the increased weight of the head, makes them quiet, often rendering it necessary for them to be in bed most of the time. Rachitis, paralyzes, and epilepsy are frequent complications or concomitants. These little patients are as a rule quiet, serious, and only of moderate mental deficiency. They are usually vain and fond of little "old-maid" ways. In the larger number of cases they die of pneumonia or general inanition. Some live to be harmless adult imbeciles.

Microcephalic Idiocy.—In many cases of idiocy the heads are small. The term microcephalic idiocy, however, is usually reserved for the cases in which both skull and brain are uniformly diminished in size, without there being paralysis or other evidence of focal lesion to account for it. As a cause of this condition, premature closure of the sutures is sometimes advanced. The question is of importance in its surgical relations. The fact that microcephalia can occur and the sutures remain open; the absence of much valuable evidence that, in cases of closure, surgical operations are of benefit; and the general law that early closure is an evidence of a degeneration which affects the development of the brain as well as that of the skull, have all led to the general conviction that early closure, *per se*, is not sufficient to explain the condition. The low slanting forehead, the high-set eyes, and the absence of cranial vault, give a peculiar bird- or animal-like appearance to microcephalic idiots.

The resemblance to the lower animals is further enhanced by the fact that the patients are usually very much undersized (often distinctly dwarfed), and further by their general behavior. When not profoundly idiotic, microcephalics are unusually active, energetic little creatures, running about constantly, and even when sitting down going through rhythmical movements. They chatter and laugh, but few can talk coherently. They are much more robust than hydrocephalics, and some attain advanced age. They are, however, not susceptible to much improvement through education.

Paralytic Idiocy.—Under this heading are grouped the cases in which gross cerebral lesions occurring in infancy and early childhood cause paralysis of the limbs. As has already been said, focal lesions during development are particularly prone to affect the brain in its entirety. In infancy and early childhood, therefore, any intracranial accident, even though it be slight, may seriously interfere with intellectual elaboration. The infantile cerebral palsies have three chief distributions, viz., hemiplegic, diplegic, and paraplegic. They nearly always result from circulatory disturbances, such as hemorrhage, particularly from the meninges, thrombosis, and, less frequently, embolism. They may also result from intracranial inflammations and sometimes from new growths.

The hemiplegic variety constitutes a considerable proportion of all cases of idiocy. The cerebral palsies are an important chapter in pediatrics. If the palsy is prenatal, profound idiocy is almost always the result. There is also little chance that a normal mind will develop when the palsy occurs in the first few months of life. In older children, considerably more than half escape without mental defect. There is danger, however, in all such cases that epilepsy will result from the irritation of the cerebral lesion, and that mental defects will follow in the course of the epilepsy. The symptoms of hemiplegic idiocy are the symptoms of hemiplegia plus the symptoms of idiocy or feeble-mindedness. These latter are, as a rule, less constant and less pronounced than in other paralytic forms. Of 55 cases examined by Sachs and Peterson, the mental impairment was classified as feeble-mindedness in 16, imbecility in 31, idiocy in 7, and epileptic insanity in 1. The physical symptoms—namely, those of hemiplegia—have some peculiarities which distinguish it from that of adults. Thus there is almost always some flattening of the skull on the side of the brain lesion, the horizontal hemicircumference of the head being less on the affected side. There is apt to be shortening of the limbs on the paralyzed side, and the rigidity and contractures are frequently extreme. All these symptoms vary with the extent of the paralysis, which may be severe and extensive, or only slight. In the latter case it is likely to pass away, leaving only a slight rigidity, or an increased tendon reflex, or athetoid movements, on the affected side. Epilepsy, however, may complicate this condition, even when the initial paralysis has been slight and its late effects insignificant. (See Plate C.)

In diplegic idiocy the paralysis involves all four extremities. It is almost always congenital or is first observed shortly after delivery. The most plausible explanation of its occurrence is that during delivery the head is injured so that blood is extravasated in the great longitudinal fissure of the brain. The paralysis in these cases is usually extreme and the muscular rigidity severe and disabling. On account of the spasm of the adductors the thighs are drawn one over the other; the patients are thus totally disabled from walking, or else they can do so very imperfectly, making the "crossed-leg progression." The hands are also often much incapacitated. The percentage of mental defects in these patients is high (over seventy per cent.) and the degree of the defect is usually extreme.

Paraplegic idiocy probably originates in the same way as the diplegic variety, but the upper extremities escape. These cases were long misunderstood, as the paraplegic type suggested a spinal lesion. The lesion is, however, cerebral, and probably is due to hemorrhage which either did not affect the centres for the upper extremities or

else affected them so slightly that nearly perfect restitution occurred. What has been said regarding the clinical aspects of diplegic idiocy holds good for the paraplegic form.

Epileptic Idiocy.—As the mental defects resulting from epilepsy are often of secondary importance to the epi-



FIG. 2847.—Imbecility with Spastic Diplegia following Injury by Forceps at Birth; showing Choreiform Movements, Muscular Incoordination, Athetosis. Patient aged twenty-five years. (Fernald.)

lepsy itself, this section might be better handled in the article on epilepsy. But epilepsy is too important a cause of idiocy and feeble-mindedness to be altogether neglected here. It is a very common disease of infancy and childhood, and under the most favorable circumstances of environment and treatment, a large proportion of its victims undergo mental arrest or enfeeblement. Of the selected cases which are admitted to Craig Colony for Epileptics at Sonyea, about twenty per cent. become demented. Epilepsy stands in a causal relation to feeble-mindedness in two chief ways. First, both the convulsive phenomena and the stoppage of the intellectual growth may result from a common organic cause. Examples of such a cause are the various cerebral palsies, tumors, cysts, meningitic sequelae, hydrocephalus, etc. Under such circumstances the epilepsy may not appear for months or years after the mental trouble has developed. In some cases the epilepsy develops first, so that it seems as though the attacks themselves brought about the feeble-mindedness, rather than the gross intracranial lesion. Idiopathic epilepsy is also fertile in checking intellectual progress. In this variety of the disease there are no gross cerebral changes sufficient to explain it. In a large proportion of cases bad heredity is demonstrable. But also the number of cases of idiopathic epilepsy, in which no cause whatever is demonstrable, is not small. Whatever the origin, feeble-mindedness and epilepsy together render the prognosis

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