SACHS (B.)

A FAMILY FORM OF IDIOCY,

Generally Fatal, and Associated with Early Blindness (Amaurotic Family Idiocy).

BY

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A FAMILY FORM OF IDIOCY,

GENERALLY FATAL, AND ASSOCIATED WITH EARLY BLINDNESS (AMAUROTIC FAMILY IDIOCY).

BEING PART OF A PRESIDENTIAL ADDRESS
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May 5, 1896.

By B. SACHS, M. D.,
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IN THE NEW YORK POLYCLINIC, ETC.

In July, 1887, at a meeting of the American Neurological Association, I described, under the title of Arrested Cerebral Development, with Special Reference to its Cortical Pathology,* the clinical history and the morbid changes in the brain of a child that appeared to be normal at birth, that began to develop mentally and physically in the usual manner, until at about the age of three months cessation in its mental progress was noticed. The limbs became weak, then paralyzed; vision grew dim, and after a while was totally lost. By degrees this child passed into a condition of marasmus, and died at the age of two years. At first the case appeared to be an isolated instance of a fatal form of idiocy, associated with amaurosis; the family character of the affection was not recognized and could not then have

* *Journal of Nervous and Mental Disease*, 1887, p. 541.

dawned upon me. Four years later another similar case * occurred in this same family. This second child passed through exactly the same conditions, and at death its brain presented changes identical with those found in the brain of the first child. The occurrence of this same disease in two children of one family was an unusual one, to say the least; but it might well have been a mere coincidence. During the past few years the importance of this disease as a family affection has grown upon me. In various writings published both here and abroad, notably in a lecture in the Volkmann series, † and in my book on *The Nervous Diseases of Children*, ‡ attention was directed to this special form of idiocy, but to my knowledge the subject has not to this day attracted the attention of neurologists.

In August, 1891, a child of thirteen months was brought to my department at the Polyclinic. This child came of healthy parents, and had been developed normally up to the age of six months; at that age the parents noticed a cessation, or rather a retrogression, in its mental and physical development. When first examined the condition consisted of a marked idiocy, spastic paraplegia, visual defect amounting to a mere perception of light, and a decided tendency to marasmus. The mother had reared this child with special care, as she recognized the resemblance between the symptoms of this child and those of three others who appeared entirely normal up to the age of five or six months. These exhibited mental defect and blindness, and all three died before the age of two years.

My attention was also directed to this form by the following experiences: We have at present in the Montefiore Home a child of four years (Koller's first case) that is completely idiotic and absolutely blind. The only history that

* *Journal of Nervous and Mental Diseases*, 1892, p. 603.

† *Die Hirnlähmungen der Kinder*, No. 46, 47, 1892, p. 467.

‡ Sachs. *The Nervous Diseases of Children*, 1895, p. 396.

could be elicited was that the disease had developed early in childhood, and that blindness was one of the first symptoms. I suspected the condition might be the result of a meningitis in the first years of life, but there was no history of such an acute disease, and for a long time it was puzzling to know in which category to place this case; nor did I suspect its true nature until I had the privilege of seeing the sister of this child, whom Dr. Koller presented at another society as an instance of an unusual form of early or congenital blindness.

The ocular manifestations of the disease have been well described by a number of ophthalmologists. At least I hope to prove that the rare condition noticed by the oculists constitutes an integral symptom of the disease in question. Through the courtesy of Dr. Knapp, I have had access to the ophthalmological literature on the subject with which I had remained unfamiliar until long after my first article on the subject had appeared. In 1881, Warren Tay described (in the *Transactions of the Ophthalmological Society of the United Kingdom*, vol. i) a case presenting "symmetrical changes in the region of the yellow spot in each eye of an infant." Briefly, the case was this:

An infant, aged twelve months. Child was deficient in holding up its head or in moving its limbs. There was weakness, but no absolute paralysis of any part. Its cerebral development was probably deficient. At the first examination, March 7, 1881, the optic discs were apparently healthy, but in the region of the yellow spot of each eye there was a "conspicuous, tolerably diffuse, large white spot, more or less circular in outline, and showing at its centre a brownish-red, fairly circular spot, contrasting strongly with the white patch surrounding it. This central spot did not look at all like a hæmorrhage, nor as if due to pigment, but seemed a gap in the white patch through which one saw healthy structures. In fact, the appearance may most suitably be compared with

those we are familiar with in cases of the embolism of the central artery of the retina." The author adds that he can not arrive at any conclusion as to the exact nature of the disease. He believed the changes to be situated in the retina and possibly congenital. Five months later another examination was made, showing that the discs had become atrophic, but that the changes in the macula lutea were the same as before.

It is of some interest to note that this child was seen by Hughlings Jackson, who could only say that the "baby seemed very weak." In this same family, according to Warren Tay's later reports,* three similar cases had occurred, each one of the children presenting exactly the same ocular symptoms, and exhibiting the same physical condition, and all three dying before the age of two years.

The ocular condition attracted some notice, and cases of this character were described by Magnus, † Goldzieher, ‡ Wadsworth,# of Boston, and Hirschberg, ‖ of Berlin, between the years 1885 and 1887. In 1885 Knapp reported upon the ocular condition of the child which I had occasion to see after him; and a few years later E. C. Kingdon,△ of Nottingham, published a case under the title of A Rare Fatal Disease of Infancy, with Symmetrical Changes at the Macula Lutea, and in this paper called attention to the resemblance between the cases observed by the oculists and those described by me. In 1894, Dr. Curtis B. Carter ◊ re-

* *Transactions of the Ophthalmological Society of the United Kingdom*, vol. iv, 1884.

† Magnus, in Zehender's *Klin. Monatsblätter*, 1885, vol. xxiii, p. 357.

‡ Goldzieher, in Hirschberg's *Centralblatt* 1885, p. 219.

Wadsworth, *Transactions of the American Ophthalmological Society*, 1887, vol. iv.

‖ Hirschberg, in his *Centralblatt*, 1888.

△ *Ophthalmological Society Transactions*, vol. xii.

◊ Knapp's *Archives of Ophthalmology and Otology*, January–April, 1894, p. 126.

ported upon a similar case and collected the cases that were then known. To the list of cases recorded in his article I am able to add another one published by Kingdon* only a year ago; the patient was a sister of the first child he described a few years previously.

So far as I am able to see at the present time, nineteen cases of this disease are known, and they are distributed about as follows:

Author or Observer.	Boys.	Girls.	Sex not stated.
Tay	3*	..	1*
Sachs and Knapp	..	2*	..
Koller	..	2*	..
Kingdon	1*	1*	..
Sachs	1*	3*	..
Carter	..	1	..
Magnus	..	1	..
Wadsworth	..	1	..
Goldzieher	..	..	1
Hirschberg	..	..	1
Summary	5	11	3

* The asterisks indicate that the children in the same line so marked belonged to one family.

Eight of these nineteen cases have been brought to my own notice, including those of the two children examined by Dr. Koller.

Let me give a few detailed histories of this rare disease:

My first patient, seen in the practice of Dr. I. Adler, was a little girl, the firstborn of young, healthy parents. The parents were not related to each other, but in the family of each mental derangement was not unknown. The mother sustained a slight accident during the fifth month of preg-

* *Transactions of the Ophthalmological Society*, etc., vol. xiv, p. 126, 1895.

nancy, having been thrown out of her carriage, but no serious injury appeared to have been done. The child was born at full term, and was healthy in every respect. Its body and head were well proportioned, its features regular. The child was doing well apparently until at the age of two or three months, when the parents observed that it was much more listless than other children of the same age, that it took no notice of anything, and that its eyes rolled about curiously. There was evident nystagmus. The child would ordinarily lie upon its back and was not able to change its position spontaneously. It was neither able to hold its head straight nor to sit upright. It never attempted any voluntary movements. All the muscles in this case were flaccid, but all reacted perfectly to both forms of current. The child would close its hand upon the finger of the examining persons, but objects placed in its hands were quickly dropped. As it grew older it gave no signs of increasing mental vigor. It could not be made to play with any toy, did not recognize people's voices, and showed no preference for any person around it. During the first year of its life the child was attracted by the light and would move its eyes, following objects thrown across its field of vision, but later on absolute blindness set in.

In his first report to the Ophthalmological Society at Heidelberg, Dr. Knapp had dilated upon this child's condition as he found it at the age of two to three months; his findings included "nystagmus vibratorius; pupils contracted, as is usual with children at this age; fovea centralis of a cherry-red color, surrounded by an intense grayish-white opacity. This opacity was most distinct in the vicinity of the fovea centralis and for some little distance around it, but faded away gradually into normal retinal field." At a later examination of this same child in June, 1886, Dr. Knapp found that the child was totally blind, optic nerves completely atrophied, discs as white as paper, with scarcely a trace of blood-vessels (from discs to blood-vessels); macula lutea essentially as before."

This child's hearing was very acute; there was marked hyperexcitability to auditory and tactile impressions; the

slightest touch and every sound were sufficient to startle the child. It never had convulsions, nor did it exhibit any marked rigidities at any time. Otherwise the bodily functions were normal, excepting the frequent occurrence of bronchial troubles and feebleness of digestion, which made the proper feeding of the child a very delicate matter. The child passed through a severe attack of diphtheria at the age of one year, from which it rallied in the course of a few weeks. It may also be stated that this infant presented no evidences either of inherited or acquired syphilis and none of rhachitis. During the summer of 1886 the child grew steadily weaker, ceased to take its food properly, and finally it died in August of that year.

In the same family to which this first child belonged a healthy boy was born who has now developed into a bright and vigorous child, but a third child of this same family, whom I had occasion to see (first in consultation with Dr. Jones and later with Dr. Kimball), presented exactly the same symptoms as the first, and by way of anticipation I may state that the morbid findings were exactly the same in the brains of both children. I quote from my report in 1892 of this second patient: "The experience with the first child led the parents to exercise unusual care in raising this infant, which was born at full term and was of entirely normal physical development. It was given the bottle at first, later it was nursed at the breast. It did fairly well and appeared to be as far advanced as any other child until the age of eight months. Since that time there has been retrogression (the child was examined by me first at the age of thirteen months). On closer inspection it was found that the child could not hold up its head or sit up unless supported. It had no perception of light; the pupillary light reflex was entirely gone. It had slight sense of hearing, but could not distinguish between sounds. There was a slight spastic condition of the upper and lower extremities. No spontaneous movement of any sort. The knee-jerks of both sides were distinctly exaggerated, but no ankle-clonus was obtained. The plantar reflexes were also increased. At this time one tooth was breaking through

and the fontanelle was not entirely closed. I entered upon my notes at the time: "The resemblance to first child very close in every respect except that the paresis is more spastic in character than in its sister." Six months later I saw the child again, but at this time sight and hearing were completely lost; the mind was a blank. The child grew weaker and weaker, and at the age of twenty months (four months earlier than the first child) it died in a condition of extreme marasmus. A week before its death it had considerable fever and severe convulsive seizures, but these were the only ones that had occurred during the entire course of the disease.

In August, 1891, a woman brought to my clinic her boy, R. H., aged thirteen months. This was her tenth child, five children having died. Of these, three girls were exactly like the child brought to me, and all died before the age of two years, of general marasmus. The mother had had no miscarriages, and there was no reason to suspect either syphilis or any neurotic taint. She was an exceptionally healthy woman, and all her children were born after easy confinements. The child in question was said to have weighed twelve pounds at birth, was nursed at the breast, and did well until six or seven months old; then it began to droop its head, and since the age of seven months had been steadily deteriorating both mentally and physically. When examined at the age of thirteen months the fontanelles were still open, the head was moderate in size, there was a slight spastic condition of both legs, and the child was unable either to sit up, stand, or walk. It had only the merest perception of light, but was excessively startled by every sound. The eyes diverged, but there was no nystagmus; it had occasional slight spasms, but no complete convulsive seizures.

The other patients observed by me presented entirely similar symptoms, so that it is unnecessary to go into further details. But it will not be amiss to quote in this connection the chief features of several other cases, as I am particularly anxious to bring out the resemblance between

those observed by ophthalmologists and those described by myself.

Dr. Carter reported upon the condition of a little girl aged nineteen months, séen in December, 1893. The patient was healthy up to the third month; since then a gradually increasing general weakness without paralysis. Child is apathetic, hearing good, eyes externally normal, mobility and pupillary reflexes normal; eyes do not follow light. The ophthalmoscopic examination showed both discs pale, sharply outlined; retinal vessels normal. At the macula lutea of both eyes were found changes resembling those following embolism—a cherry-red spot, sharply defined, surrounded by a grayish-white halo, the latter not sharply outlined, a little larger than the disc and apparently horizontally oval in form. Parents are second cousins; both previously healthy; no specific history. The discs of both eyes had undergone total atrophy. The child died January 21, 1894, at the age of twenty-one months.

Dr. Kingdon's patient deserves special attention, as it is the only other case in addition to my own in which a post mortem examination was made. The history was in substance as follows:

A boy, aged eight months, the son of Jewish parents, was admitted to the Children's Hospital, Nottingham, June 26, 1891, having been brought to the hospital on account of general and increasing weakness of the back and limbs. The patient was born at full term and was then well nourished. Until the third month he appeared to be about as strong as other children of that age; cut incisor tooth at seventh month; on convulsions. From the age of three months onward there has been increasing impairment of power in the muscles of the trunk and limbs; inability to hold up the head was the most obvious symptom. In July, 1891, child weighed seventeen pounds and a half; height, twenty-six inches and a half; even features; good complexion. There were no external congenital defects. A thick layer of fat covered the body;

muscles flabby. The child lay quietly in bed, was apathetic, rarely cried, not even for food, occasionally laughing without obvious cause. The mouth was generally open and the face bore an expression of mental enfeeblement. Patellar reflexes were present; there was no reaction of degeneration. Hearing was acute; he was very sensitive to sudden noises which made him visibly jump. (In all these features this patient bears a remarkable resemblance to my [S.'s] first case.)

The author's report continues: The child pays little attention to objects held before it, though it can see them. The pupils are equal, five millimetres in diameter, and react readily to light; media clear; optic discs pale, yellowish-white color; but few small vessels visible in it; retinal arteries are diminished to rather more than one third of the diameter of the veins; no venous engorgement; no hæmorrhages. At the yellow spot, covering a space nearly twice the size of the optic papilla, is a whitish-gray patch, somewhat oval in shape (the axis being horizontal), with softened edges; a few retinal vessels are visible on it at the periphery. In the centre of the patch the fovea centralis is of a dark cherry-red color, reminding one of the appearances seen in retinal embolism. The alterations are identical in the two eyes.

The further history of this case is the recital of a gradual mental and physical deterioration; the child grew blind, and ophthalmoscopically there was no alteration in the appearance of the macula, but the optic discs grew paler. The child died at the age of twelve months.

In this family a boy born six years previously was well developed at birth, but subsequently became weak and apathetic; he wasted and died when two years of age. Whether he was blind is not stated. The second child (five years and a half old at the time of Kingdon's report) is healthy. The third child was the one upon whose history we have dilated, and the fourth child, born about one year and a half after this one, was afflicted with the same disease, according to Kingdon's latest report.

Dr. Koller has been good enough to furnish me with brief notes of the two children he has observed. His notes read:

On June 18, 1894, Mary L., then two years old, was brought to me for examination by her mother. When the child was three months old, it was noticed that she did not use her eyes as other children of that age do. There was lateral nystagmus present, which, according to the history given, had been developed in the first few months of the child's life. The ophthalmoscopic examination, difficult on account of the floating image, showed the discs to be in a congested state; besides, I find in my record the entry that apparently there is perception of light. I did not see the child again until two years later, when an almost identical condition in an infant sister came under my observation, excited my interest, and caused me to re-examine the first child. The general condition of muscular debility and dementia had meanwhile been developed as described by Dr. Sachs. At this examination I entered: Apparently perception of light, as child turns toward gas flame. Lateral nystagmus, not constant. Pupils of medium width, sluggish contraction to light (turning toward window); no prompt reaction. Both discs yellowish, discolored, present the condition of atrophy as observed in retinitis pigmentosa. Veins dilated, arteries thinner. Dilated condition of veins may be due to screaming and struggling of the child.

A more recent examination by Dr. Koller revealed the following condition:

Discs atrophic; yellowish discoloration similar to appearances in retinitis pigmentosa. Retina atrophic; very thin chorioidal vessels visible through retina. In the region of the yellow spot a slight veil-like milky-blue opacity, gradually fading into the surrounding retina. In the centre of this opacity, at the site of the fovea centralis, a cherry-red patch, not very dark, a little smaller than the papilla, with ill-defined outlines.

On January 8, 1896, the infant sister, Hattie L., was presented for examination. The child was two months old, had lateral nystagmus. The mother thought the child was blind but agreed with me that perception of light was present. The pupils, of medium width, became slowly narrower when exposed to strong light.

The ophthalmoscopic examination of the eyes of this second child is not yet complete.

Dr. Koller has made repeated and careful examinations of the children's eyes, and authorizes me to state that the condition of the fundus is entirely analogous to that described by Tay, Knapp, and others. Dr. Koller intends to publish these two cases in full shortly.

Taking all these histories into account as they have been reported by a number of different observers, there can be no doubt that the cases described by the oculists are identical with those seen by me, and that they constitute a very definite family affection. The chief symptoms of this affection are—

1. Mental impairment, observed during the first few months of life, and leading to absolute idiocy.

2. A paresis or paralysis of the greater part of the body, and this paralysis may be either flaccid or spastic.

3. The reflexes may be deficient or increased.

4. A diminution of vision, terminating in absolute blindness (changes in the macula lutea, and later an optic-nerve atrophy).

5. Marasmus and a fatal termination, as a rule, about the age of two years.

6. The occurrence of the affection in several members of the same family.

As symptoms observed in some but not in all of the cases, we may add nystagmus, strabismus, and hyperacuity of hearing. Variations will naturally occur in different

cases and at different stages of the disease. In some instances there may be a marked form of imbecility instead of idiocy; in some the paralysis will be very much more complete than in others, and the rigidities and contractures will naturally vary also according to the period at which the child is examined, the intensity of the morbid process, and the part of the brain most directly involved.

The changes in the macula lutea are so striking that they constitute a most valuable sign of the disease. Of the nineteen cases here reported, the same ophthalmoscopic appearances have been noted in fourteen, in four the eyes were not examined, and in one (a case of Koller's) the report is not final.

But no one symptom, however constant, is of such importance that we are warranted in ruling out the disease if all other signs are present and this one is wanting. Even normal light reflex does not preclude tabes if all other cardinal symptoms are present. Furthermore, it is well to remember that the cases in which the examination has been reported have been those in which the oculists have been specially consulted. May not also a different developmental defect of the retina or of some other ocular structure be conceivable in this same group of cases? For this reason it is important that both neurologists and ophthalmologists should watch and study this special disease.

That all these symptoms are due to defective cerebral development, together with disease of the retina, might have been inferred from the symptoms. Fortunately, it has been possible to determine somewhat accurately the morbid changes underlying this disease. Autopsies were made in two of my own cases, and several years later by Kingdon in the first case which he described. As the latter author emphasizes the correctness of my own findings, it will be

best to give a short statement of the result of the autopsies in my own cases.

These two autopsies were performed on the children of the first family in whom I had occasion to see the disease. In the first child the skull was thick, and the skullcap unusually heavy; the outer and inner surfaces were smooth and showed no unusual impressions. The skull was symmetrical, the left frontal fossa a trifle deeper than the right. Each fontanelle was very nearly ossified (at the age of two years). A large clot was found in the superior longitudinal sinus. There were some slight adhesions over the upper portion of the precentral and the left temporal convolution, but the pia could be removed easily from every part of the hemispheres without injuring the cortical tissue. There was unusual pallor of the convolutions and œdema of the entire convexity, but no marked increase of fluid in the lateral ventricles. Freed of its dura, the brain weighed exactly two pounds. The blood-vessels appeared normal, and were normal in distribution. On superficial inspection a great breadth of the fissures with a corresponding narrowness of the convolutions and the unusual exposure of the left island of Reil were very apparent. At the time of the first report upon this brain * I gave a rather detailed description, to which I now refer, of the abnormities of fissuration, such as the confluence of the central fissure with the fissure of Sylvius and the unusual prolongation of the first temporal. Under the influence of the teachings of Wilder and Mills these features were described rather minutely, but to-day it is sufficient to state that the abnormities of fissuration revealed changes which are generally associated with brains of low development. The most important changes were those found on microscopical examination of sections taken from the frontal

* *Journal of Nervous and Mental Disease*, 1887.

lobes, from the motor area, from the base of the third frontal convolution, from the first temporal, and from part of the occipital apex of each hemisphere. The changes to be described were found in every part of the brain examined. It is a special satisfaction to me to know that these specimens were examined and the drawings made by Dr. Van Gieson, and that he corroborated the following findings:

In the sections it was possible to distinguish the external barren layer, the layer of small pyramidal cells, the layer of the large pyramids, and perhaps a trace of Meynert's fourth layer. In a thorough search of hundreds of sections there were not more than half a dozen, if as many, pyramid cells of anything like normal appearance. The fewest cells showed well-defined processes. The contours were rounded, and the cell substance exhibited every possible change of its protoplasmodic substance. In some cells there were a distinct nucleus and nucleolus surrounded by a detrituslike mass. In many the nucleus and nucleolus were wanting entirely. These changes were determined by the acid-fuchsin method. In the neuroglia there were no evident changes, nor was there any distinct sclerosis in any part of the brain examined. In Weigert specimens it appeared to us that the white fibres could not be traced as far toward the periphery as in the normal cortex. There was no evidence whatever of any previous encephalitic process, no proliferation in the walls of the blood-vessels, and no infiltration of the tissues surrounding them. A careful count was made of the development of the blood-vessels, and there appeared to be no change in the number of them or in their calibre as compared with sections of other children's brains.

As a result of this examination we were able to conclude that the chief changes were restricted to the cells and possibly the white fibres, and there was every reason to believe that the absence of inflammatory changes with the abnormities of cell structure were due to an arrest of development. The

condition as found in this first brain was defined as an agenesis corticalis, pure and simple.

A second autopsy, performed upon the sister of the first child four years later, revealed exactly the same order of changes, except that the abnormities of fissuration noted in the first case were not present here, but of this difference in the two findings we can not make much. In this second case careful sections were made of all parts of the cortex, of the ganglia, of the optic chiasm, of the pons, and of the medulla. No changes were found in any part of the brain except in the cortex, and these tallied altogether with those previously described. In some mysterious way the upper cervical and dorsal portions of the cord were unfortunately lost. The lower portion, that was carefully examined, revealed no changes in the gray matter, but there were large areas laterally including the pyramidal tract, and extending to the periphery, which were degenerated. It was very different in character and extent from an ordinary secondary degeneration. A section from the lower dorsal region exhibited changes in the pyramidal and cerebellar tracts, but I wish to be careful in interpreting these findings. The retinæ were not examined in either case, but the optic nerves of the second child were carefully examined and no changes were found by the methods then in vogue. The further examination of the other organs in my own cases convinced me of an important negative fact—viz., that there were no lesions that would lead one to suspect syphilis.

In the autopsy performed by Kingdon he states distinctly that there were marked changes in the pyramidal cells of the cortex, and he indorses the interpretation I have given to this as a result of arrested development, and not of any inflammatory process. Mr. Treacher Collins cut sections of the eyes, but the result was unsatisfactory, as there was a fold of the retina in each eye at the macular region. Sections of the second and third cervical segments of the cord were said to have revealed well-marked descending degeneration. Further investigations will have to be made to show whether this was an actual degeneration or a defect in de-

velopment of the white strands—a question not easy to decide.

While it is some satisfaction to have had three autopsies in so rare a disease as this one, I am well aware that the records are incomplete. Above all, it is important that the eyes shall be thoroughly examined post mortem, and I have no doubt that with the newer methods now in vogue (it is four years since my last autopsy) a much more thoroughgoing study of the cell changes will be possible, and I also suspect that a more careful examination of the cord will reveal developmental defects in various tracts of the spinal cord.

The ætiology of this affection calls for a few remarks. The family predisposition is evident enough from the fact that the nineteen cases here reported belong to ten families, as many as four cases having been observed in one family.

Among the causes to which we might attribute the disease are a marked neurotic taint; a blood relationship between the parents; and traumatism of the mother during pregnancy—a fact which has been mentioned in several of the cases. Carter (*loc. cit.*) was the first to state that the disease has been observed altogether among Hebrews, and this is true, so far as I know, of all the cases except the four reported by Tay, and of these it may also be true; yet I can hardly believe that the disease is purely a racial one, for the changes are such as might readily occur under any conditions of life, and, moreover, cases have been reported closely allied to this form in other races. The absence of syphilis has been distinctly noted in six of the ten families. This is important, for we may be tolerably certain that if a single case of this class should be observed with a clear specific history, the author so reporting would proclaim this disorder a form of hereditary syphilis.

The course of the disease is a rapidly fatal one. All

the cases reported upon have died before or at about the age of two years; the only exception to the rule is the child now in the Montefiore Home, yet I do not on that account hesitate to add it to the list of cases, for I think it is best not to draw the lines of any disease so closely that the variations in a single symptom or condition would take the case out of the given category where all the other symptoms would tend to place it. In this child just referred to the disease may have appeared in a somewhat limited form; the arrest of development may not be as complete as in the other children so affected. The fatal termination is the result of the condition of marasmus into which the child lapses, and this lowering of all the vegetative functions is, I believe, the result of the disturbances in the cerebral functions. In my first case, to be sure, there was also a very strong suspicion that there was maldevelopment, or at least arrested development, of other organs of the body, for the gastric mucosa refused, from an early period, to perform its functions in anything like proper fashion.

Before determining the exact relation of this family form of idiocy to other hereditary and family affections, it may be well to note that the disease may be confounded with conditions due to inherited syphilis.

Thus, on June 7, 1894, Dr. A. R. Robinson asked me to see a child one year of age, which had been previously examined by Dr. Knapp, and which the latter suspected at the time might possibly belong to the category of cases which I had described. There was no trouble at the time of this child's birth, but the parents soon noticed that the eyes had an unnatural look. The parents were first cousins. The mother was a very nervous woman; the father had been seen by me in August, 1891, before his marriage, for headaches, which were probably of specific origin. A previous specific infection was admitted. On examination of the child I found that the

horizontal circumference of the head was normal; the fontanelles were almost closed. The child was rather apathetic; seemed to move its left arm much more than the right; the right hand was slightly contractured. Both knee-jerks were much exaggerated, but there were no contractures. The ankle-clonus could be obtained on the right side, but not on the left. There was not the slightest sign of any mental development, the child passing its entire time in sleep unless it was startled by noises. Dr. Knapp was kind enough to give me an abstract of his notes, made May 25, 1894, in which he stated that there was nystagmus; corneæ were dull, irides discolored; pupils move, but do not sufficiently dilate under atropine; faint reflex from fundus. On June 15th he notes that the irides were swollen, corneæ dull, tension normal.

In view of the specific history of the father, and the especial findings of Dr. Knapp, this case does not belong to the category which we have described, and would have to be interpreted as a form of hereditary syphilis, although the psychic condition resembles very closely that of the children whose condition we have been studying.

With congenital idiocy of the ordinary type the disease which we are discussing might well be confounded, but the absence of visual symptoms and the proof of a normal fundus, and, above all, the fact that the subjects of the ordinary congenital idiocies live on for many years, will help to establish the differential diagnosis. The congenital idiocy with blindness bears a rather close resemblance to congenital spastic diplegias, and yet there are several points of difference. Freud * has included the first two cases of mine among the hereditary and family forms of cerebral diplegias, and has put them into the same category of cases described by Naef, † Gee, ‡ Schultze, # and others,

* *Zur Kenntniss der cerebralen Diplegien*, etc. Vienna, 1893, p. 138.

† Naef. *Dissertation.* Zurich, 1885.

‡ Gee. *St. Bartholomew's Hospital Reports*, xxv.

Schultze. *Deutsche med. Wochenschr.*, 1889, p. 287.

but it is well to note that the characteristic symptoms of cerebral diplegia were wanting in several of the cases described by others and by myself, and congenital blindness is surely a symptom which is not present in the ordinary cases of cerebral diplegia. I am confident, also, that if Freud had known of the association of special changes in the retina with this fatal form of idiocy, he would not have been so apt to classify my cases as he has done.

While the majority of cerebral diplegias are due to traumatism during labor, the hereditary and family diplegias are more likely to be due to defective development of a considerable portion of both motor tracts. From this point of view the family form of spastic diplegias may claim to be an allied disease. The relationship is brought out fairly well in the histories reported by Freud,* of two children of a physician who had married his own niece, eighteen years younger than himself.

The older of these two boys, aged six and half years at the time he was examined by Dr. Freud, was born after an easy labor; no convulsions. Did not notice light in the first months; the pupils did not react when examined with the ophthalmoscope. At three months nystagmus was observed. He learned to talk at the age of five years. Is not yet able, at six and a half years, to stand or walk alone. Latterly nystagmus with strabismus convergens, alternating according to the particular half of the retinal field engaged in the visual act has been observed. Dr. Koenigstein reported atrophy of the optic nerves, but expects a gradual improvement in vision; the reason for this is not stated. The child presented, in addition, moderate spastic rigidities with increase of the reflexes. The intelligence was said to be good.

The younger brother resembled the older one in most respects, except that he was bright up to the age of two years, and then developed nystagmus; speech became defective and the gait became spastic. In this boy, too, there was nystagmus

* *Loc. cit.*, p. 143.

with alternating strabismus convergens, and atrophy of the optic nerve.

The striking differences between these extreme cases and those related by me need not be insisted upon; but in this same family another child was born that lived but ten months; is said to have died of rickets, probably of marasmus, and was paralyzed, apathetic, and idiotic from birth on. No statement is made whether or not the child was blind. This third child resembled our patients much more closely, and in it the affection was evidently developed to an intense degree.

The congenital form of idiocy has other, even if remote relations. In my text-book on *The Nervous Diseases of Children* I have referred to this disease in connection with hereditary spinal affections. We speak of Friedreich's ataxia, of the hereditary cerebellar ataxia, as spinal forms of hereditary disease; yet it is more than probable that a developmental defect in the entire central nervous system is responsible for the special symptoms in each of these diseases.

In our classifications we are still hampered by the attempt to classify hereditary diseases according to the involvement of the brain or of the spinal cord; but if we drop this narrow though important line of classification and if we substitute a broader one, including those forms in which there is a defective development of some part of the cerebral or cerebro-spinal system, we can not deny the relation between the form that we have been describing and the cases of Friedreich's disease, or cerebellar ataxia, or hereditary spastic paralysis, as they have been reported by Struempell,* Erb,† Pelizaeus,‡ and others. The differ-

* *Deutsche Zeitschr. f. Nervenheilk.*, vol. iv.

† *Zeitschr. f. Nervenheilk.*, vol. vi, December, 1894.

‡ *Archiv f. Psychiatrie*, vol. xvi, p. 698.

ence in clinical symptoms is dependent after all upon the extent of developmental defect; whether that developmental defect be most marked in the brain or in the spinal cord, in the pyramidal tracts, in the posterior columns, or in the cerebellar strands, does not matter quite as much as one would at first sight suppose. The underlying causes leading to the development of these various forms of hereditary disease are still unknown, but the further study of all these forms may gradually lead to a better understanding of the ætiological factors. For the present a sharp clinical distinction, within lines that are not drawn too narrowly, is bound to be of value. The disease which I have described is characterized by such distinct clinical symptoms that it deserves special recognition.

This same affection may also have some interest as another and a special form of idiocy. A few years ago idiocy was a mere generic term for a number of diseases poorly differentiated from one another; but we now recognize, among others, not only those forms of idiocy which are associated with early epilepsy and with infantile cerebral palsies, but we also recognize a special form associated with cretinoid or myxœdematous conditions. The study of this congenital form of idiocy with blindness will add, we trust, still further interest to a class of cases that have received far less attention than they deserve. It would be desirable to designate this special form of idiocy in accordance with the pathological findings. Agenesis corticalis would seem to be a fitting term, but if we were to adopt this we might hamper the further studies of the morbid lesions underlying this disease. It will be better, therefore, to find a clinical designation, and I would propose the name *amaurotic family idiocy.*