

and done a final evidence as to the identity of these doubtful stones is the ureterogram. I have never yet seen a ureterogram fail if properly interpreted. I recognize the value of the method that Dr. Lewis has suggested in these particular cases.

Dr. H. L. KRETSCHMER, Chicago: A contribution such as Dr. Lewis' is responsible, in part at least, for the fact that the entire treatment of stone in the ureter, for instance, has come back to the urologist, and that we have more cases referred to us for treatment for intravesical manipulation

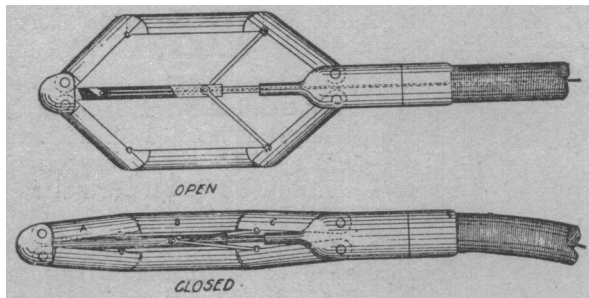


Fig. 7.—Latest model of ureteral dilator, with detail of parts.

instead of having them operated on by the open method. Surely I believe that all of us, if we had a ureteral stone, would want to be operated on by the intravesical rather than by the open operation. Any improvement in the technic or in the instruments is always a step in the right direction. In reference to localizing shadows in the ureter, I think his method is very novel and very good; but it means that Dr. Lewis passed a shadowgraph catheter first, subjecting the patient to a second cystoscopic to accomplish his object. It required a second cystoscopy. Recently we have been doing that in another way. We make a double exposure with one plate. After the shadowgraph catheter has been passed an exposure is made. Then, without changing either the position of the patient or without changing the position of the plate, a

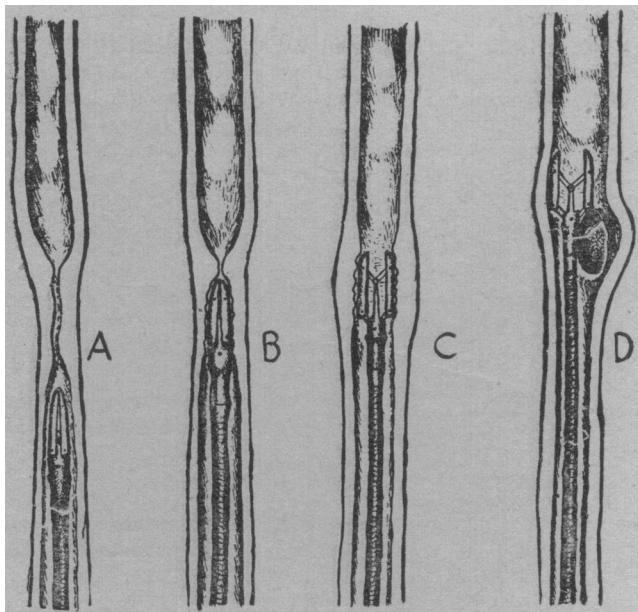


Fig. 8.—Use of dilator: A, in strictured ureter; B, entering stricture; C, dilating stricture; D, making traction on a stone in the ureter.

second exposure is made on the same plate by changing the position of the tube. In cases of ureteral stone two shadowgraph catheters are seen and two ureteral calculi, both in exactly the same relationship to the catheter. In cases in which we suspect a stone, but the suspected stone shadow is produced by an extra ureteral shadow-producing body, we then obtain a double exposure, one of which shows a distinct interval between the suspicious shadow and the ureteral catheter. It seems to me in that way we can avoid two cystoscopic examinations.

FAMILIAL MACULAR DEGENERATION WITH AND WITHOUT DEMENTIA

WITH A REPORT OF TWO NEW CASES OF THE TYPE
WITH DEMENTIA *

HOWARD S. CLARK, B.S., M.D.

Assistant Professor of Ophthalmology and Otolaryngology, University
of Minnesota Medical School

MINNEAPOLIS

Since 1897, when R. D. Batten¹ reported two cases in brothers, each of whom showed symmetrical affections in the two eyes consisting of dark spots in the macula and pallor of the optic nerve heads, a small number of cases in families have been reported.

These cases belong in the classification of familial degenerative diseases, among which those affecting the eye are the amaurotic family idiocy of Tay and Sachs; the juvenile type of amaurotic family idiocy of Spielmeier,² Vogt, F. E. Batten³ and others, and familial macular degeneration with and without dementia.

Between Tay-Sachs' disease on the one hand and macular degeneration without dementia on the other there are, of course, great differences; but analysis of many cases of familial disease seems to show a gradual transition from one to the other. In fact, when one attempts to put together syndromes and to give them definite names, one is at once confronted by numbers of atypical cases that might belong to one of any two groups.

For example, the juvenile type of amaurotic family idiocy seems to merge on the one hand into the infantile type, and on the other into familial macular degeneration with dementia.

Of the form known as familial macular degeneration, we may say that, combined with symmetrical degeneration of the macular region of the two eyes, there is in some cases a cerebral degeneration causing dementia.

Oatman⁴ divides this form of degenerative disease into two types: the macular type in which the retina alone is affected, and the maculocerebral type in which both retina and brain are attacked. In this discussion, when the term "macular type" is used, it refers to the type without dementia. The term "maculocerebral type" is used to convey the idea of the disease combined with dementia. In the macular type we have simply an affection of the eyes and no cerebral symptoms whatever. This begins during the period of puberty, between the ages of 12 and 14 years, though Stargardt⁵ reports one case beginning as early as the eighth year. This is in marked distinction to the maculocerebral type, the form with dementia, which begins between the fifth and seventh years, the period of second dentition.

The condition in the two eyes is symmetrical, and the objective and subjective symptoms develop very gradually, though we find exceptions to this rule in Lutz⁶ and Sterling.⁷ The first symptom is diminution of central vision of both eyes and central scotoma for

* Read before the Section on Ophthalmology at the Sixty-Ninth Annual Session of the American Medical Association, Chicago, June, 1918.

1. Batten, R. D.: Tr. Ophth. Soc. U. Kingdom, 1897, **17**, 48.
2. Spielmeier: Neurol. Centralbl., **225**, 51.
3. Batten, F. E.: Quart. Jour. Med., 1913, **14**, 444.
4. Oatman, E. L.: Am. Jour. Med. Sc., 1911, **142**, 221.
5. Stargardt: Arch. f. Ophth., 1909, **71**, 534; Ztschr. f. Augenh., **30**, 95.
6. Lutz: Klin. Monatsbl. f. Augenh., 1911, **49**, 699.
7. Sterling: Neurol. Centralbl., **225**, 55.

red and green, which goes on gradually until, after some years, there may be complete loss of central vision. The periphery of the field of vision is unaffected and shows normal boundaries. Because of disease of the macular region while the periphery of the retina remains fairly normal, the patient develops, first, excentric fixation, and finally, nystagmus.

In addition to the cases that may be definitely designated as of the macular type and of maculocerebral type, we have some cases reported which, while conforming in many details to the accepted syndrome of the disease, present variations that prompt us to classify them as irregular cases. As examples, we have Stock's⁸ three cases and Hirschberg's⁹ one case.

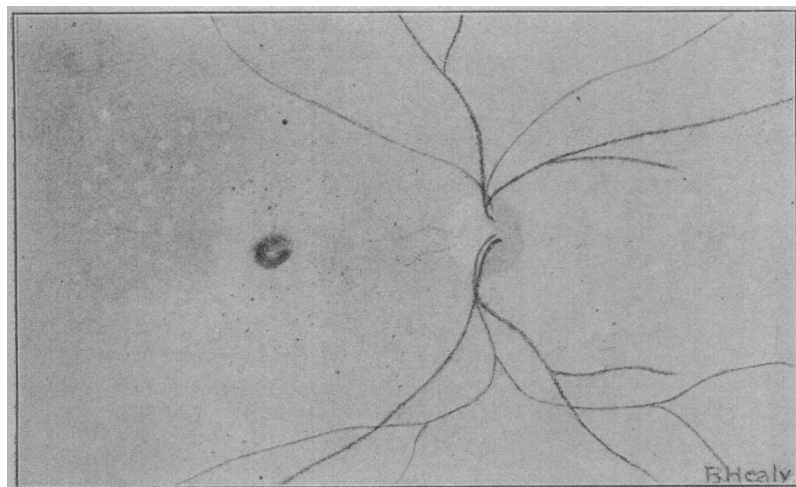


Fig. 1 (Case 1).—Right fundus, April, 1918. Left fundus practically the same. No optic nerve atrophy; vessels narrowed.

Ophthalmoscopically we find atrophy and degeneration of the retina almost always confined to the macular region, somewhat resembling the conditions produced by a senile macula. At first, the macular region shows delicate yellowish gray spots apparently not raised above the level of the surrounding fundus. These spots gradually coalesce and we have a dirty grayish yellow spot about the macula with a diameter equal to that of one or two disks. Covering the spot is a sprinkling of fine pigment granules. For a short distance around the grayish yellow spot the fundus may be dotted with a fine pigment, resembling black pepper. The retinal vessels are normal in the macular type. As to the general condition, we find in the macular type that there are no mental symptoms nor, in fact, any symptoms at all excepting failure of vision, excentric fixation and nystagmus. The general health is good in all reported cases.

This type is much more common than is the type combined with dementia. I was able to find reports of thirty-seven cases of the macular type and ten undoubted cases of the maculocerebral type. Of the latter, four additional cases have been reported which, however, we should class as atypical, because of some variations in history and symptoms.

The maculocerebral type, that is, the type which is characterized by the addition of cerebral symptoms, or dementia, to the eye symptoms already described, is distinguished from the macular type by the fact that the onset occurs at about the time of second dentition, instead of at puberty, and that cerebral changes begin at the same time as those in the macula. There is a gradual loss of intelligence leading to dementia. Ophthalmoscopically the changes are identical, except that optic nerve atrophy is more common in the type combined with dementia. The general health in practically all cases of both types reported has been remarkably good, and the patients have been well nourished, free from constitutional diseases and paralyses, and of good family history.

REPORT OF TWO NEW CASES OF FAMILIAL MACULAR DEGENERATION WITH DEMENTIA

The patients in these cases are two of a family of five children. The other children of the family, one brother aged 7 years and two sisters aged 11 and 4, respectively, are in good health and are normal in every particular.

The two children who are affected present typical cases of the maculocerebral form, showing distinct cerebral symptoms as previously reported by F. E. Batten¹⁰ and Oatman,⁴ Nettleship,¹¹ and others.

The parents are persons of ordinary intelligence and in good health. There is no history of consanguinity, hereditary diseases, or mental diseases known in any branch of the family. There is no Jewish blood. The eyes of the parents are normal. There is no history of eye trouble

in the grandparents or in the brothers or sisters of the parents or their descendants. The parents are farmers and give no history of venereal disease, and in both the Wassermann test was negative. In brief, there is absolutely nothing in the family history that has a bearing on this condition.

CASE 1.—R. L., boy, aged 9 years, referred by Dr. C. L. Scofield, Benson, Minn., to Dr. J. P. Sedgwick, July 3, 1916, complained of poor vision and was of lowered intelligence.

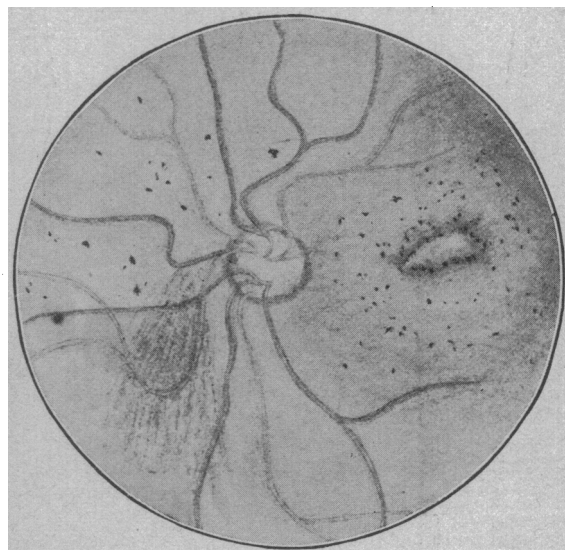


Fig. 2 (Case 2).—Left fundus, June, 1916. The retinal vessels, two years later, have almost disappeared, reaching only slightly beyond the disk margin, and the optic nerve has become atrophic.

He was well nourished and strong, and showed no paralyses. In earlier years he had been a normal child, as far as was known, with apparently normal vision. He had played about as other children, had started school when about 6 years of age,

8. Stock: *Klin. Monatsbl. f. Augenh.*, **46**, 1, 225.

9. Hirschberg, J.: *Centralbl. f. Augenh.*, January, 1904, p. 12.

10. Batten, F. E.: *Tr. Ophth. Soc. U. Kingdom*, 1903, **23**, 386.

11. Nettleship: *Tr. Ophth. Soc. U. Kingdom*, 1909, **29**.

and had learned the alphabet. At this time he had no difficulty with vision and was said to be mentally as alert as other children. Previous diseases were mild measles and whooping cough. After he had passed the age of 7 years, his vision began to fail and the parents noticed that he looked sidewise in order to see.

At the same time he had suffered a gradual loss of mental alertness, which had made him unable to continue in school. These symptoms had become gradually more marked until at the age of 9, he was quite dull mentally and had no central vision. He could see large objects with the periphery of the retina by turning the head—eccentric fixation. Horizontal ocular nystagmus was present to a moderate extent. Examination of the visual fields was found impossible because of the patient's limited intelligence, poor vision and nystagmus. The Wassermann reaction was negative, as was also the roentgenogram of the skull. The urine and the blood were negative. Externally, the eyes were normal, and the cornea and aqueous were clear. The iris was of normal appearance with no evidence of previous inflammation. The pupils were dilated and reacted little, if at all, to light, but did react to accommodation.

The ophthalmoscope showed that mediums were clear and the optic nerve and retinal vessels normal. At the macula was a horizontally oval spot resembling those in some cases of senile macula, about 1 D. in long diameter, of a dirty dark gray yellowish color, and with very fine pigment spots. The spot at the macula was quite distinctly marked off from the adjacent area, but the retina had a grayish cast for about 1 D. surrounding it. The remainder of the fundus was apparently normal. The appearance of the two eyes seemed almost identical. There were no edema, exudates, coarse pigment deposits nor any results of previous inflammation seen in the fundi. In March, 1918, nearly two years later, all conditions were practically unchanged.

CASE 2.—P. L., girl, aged 13 years, a sister of the patient in Case 1, had always had good general health, though she had complained of headache. There were no paralyses. She was very well nourished and the urine, blood and Wassermann reaction were negative. The roentgenogram of the skull was negative. The only previous disease had been measles. Vision had fallen so that she could not go about alone. She had been a bright child and at about 6 years of age, had begun school, where she had learned to read and to write her name. She was about 7 years old and in the second grade when her vision and mind had begun to fail. One year after discontinuing school she had begun to have what her parents called "fits." Mentally, the child was demented until her intelligence was about that of an imbecile. Because of the nystagmus and mental condition, visual fields could not be taken. The pupils were dilated and reacted little, if at all, to light. She had eccentric fixation and the staring appearance of one almost blind.

Externally, the eyes showed no disease. Ophthalmoscopic examination showed clear media and no evidence of previous inflammation. The fundi showed a condition similar to that of the brother's, but seemingly more advanced. The optic nerve was distinctly atrophic and the retinal vessels were small. At the maculae was the same dirty grayish yellow area as seen in the brother's eyes. This area was about 1 D. in its horizontal diameter. Around this macular area, for a width of about $1\frac{1}{2}$ D., the retina had an atrophic appearance, was of slightly lighter color than the rest of the fundus, and looked as though it had been sprinkled with fine black pepper. The fundi of the two eyes were alike, except that one showed in the nasal inferior quadrant some flat, pale, grayish splotches of pigment which were almost transparent, and which were traversed by the retinal vessels without modification.

In March, 1918, the condition was the same, except that considerable pigment deposits appeared in other parts of the fundi than the maculae, and the retinal vessels atrophied so that they extended only a short distance beyond the disk.

The two cases reported in the foregoing are of the type of familial macular degeneration with dementia, eight cases of which were reviewed. The eight do

not include Hirschberg's one case or Stock's three, which may be classed as atypical.

Oatman⁴ reported the cases of two children in a family of three, which are remarkably like the two new cases that I have just reported. The eldest and the youngest were affected with macular degeneration with dementia, while the intermediate child, aged 10, was normal in all respects.

Summarizing the findings in the cases of macular degeneration with dementia which are so far reported, we are able to form a definite syndrome. It is true that some cases vary in details, but this is true in summarizing the symptoms of any disease. Of this type we find reported five families, consisting of thirty-two persons, ten of whom were affected. In all the cases the two eyes were symmetrically affected.

The age at which patients were examined varies from 8 to 13 years, except in Nettleship's patient, who was 48 years old at the time of examination. The age of onset in the maculocerebral type varies from 5 to 7 years, approximately the period of second dentition. At this time, we have failure of vision and intellect, sometimes accompanied by headache and convulsions, though convulsions may not set in until later in the course of the disease, and have not always been reported present.

As stated before, judging by our knowledge of this condition at the present time, I am inclined to regard macular degeneration with and macular degeneration without dementia as the same disease. Why the onset of one type occurs at the time of the second dentition and is accompanied by cerebral degeneration, while the onset of the purely macular type occurs at puberty, and is not accompanied by cerebral change, remains to be explained.

Of the other type of the disease, that is, macular degeneration without dementia, I find thirty-seven undoubted cases. Stargardt⁵ has reported to date ten cases in three families, which is the largest number reported by any observer.

ETIOLOGY

No positive statement of the cause of this disease can be made in the present state of our knowledge. There are no deformities, nor ocular anomalies reported, nor any chronic general disorders with which the disease can be brought into relation.

Syphilis is strikingly absent. Only Mayou,¹² in his family of three cases out of the ten reported cases of the type with dementia, mentions it as a possibility, and he simply states that "doubtful syphilitic history was given by the mother." Batten in three cases and Nettleship in one case ignore this point. Oatman, in his family of two cases, and the family of two new cases that I have reported, give definitely a history of the absence of syphilis.

We thus have four cases of the type with dementia reported with definite absence of syphilis, three in which syphilis is not mentioned and three with doubtful syphilitic history in the mother. Since it is very probable that syphilis would have been mentioned by Batten and Nettleship had it been present in their cases, we may assume that they did not find it. Concerning the incidence of syphilis in the type without dementia, of the thirty-four cases reported twenty-two are definitely nonsyphilitic. In ten cases the point is not mentioned, and in two cases of R. D. Batten

12. Mayou, M. S.: *Tr. Ophth. Soc. U. Kingdom*, 1904, **24**, 142.

syphilis is mentioned in the parents, but the children showed no signs of hereditary syphilis.

Thus out of forty-four reported cases in both types of the disease, twenty-six are reported definitely non-syphilitic, the point is not mentioned in thirteen cases, and five cases give a doubtful syphilitic history. We should seem justified in excluding syphilis as an etiologic factor until such time as undoubted syphilis is demonstrated in a fair number of cases. At present the evidence is against it.

Against the theory that macular degeneration is congenital stands the fact that, in the type without dementia, vision remains good until the period from the tenth to the thirteenth year or about puberty, while in the type with dementia, the patient is normal until about the time of second dentition, at the age of 6 or 7 years.

In all analyzed cases, except Feingold's¹³ three cases, the patients were Gentiles, in marked distinction to the Tay-Sachs type of amaurotic family idiocy, which attacks Jews almost exclusively.

Consanguinity cannot be totally excluded as an etiologic factor, as there was blood relationship in some reported cases, but those in which there was no blood relationship preponderate. As consanguinity has appeared, however, in four out of ten cases of the type with dementia, we must bear it in mind as a possible cause. In the cases of macular degeneration without dementia, it has appeared in only three out of thirty-four cases reported. Stargardt,⁵ who in 1913 evidently had not seen the Jennings¹⁴ report of 1909, describing three cases of the macular type in which the patients were children of first cousins, advances the theory that since consanguinity had not, to his knowledge, been reported in the macular type, it might possibly be a factor in determining whether the disease should assume the macular or maculocerebral type. His idea was that where there was consanguinity the form with dementia was more liable to appear than in those cases in which there was no blood relationship.

In the light of analysis of reported cases, I cannot at this time accept this theory, because I have reviewed cases enough of the type with dementia in which consanguinity is precluded to make the theory untenable. Besides, Jennings' three cases of the type without dementia in which there was consanguinity, make it even less probable that blood relation determines what form the disease shall assume.

Among forty-four cases of both types reported, seven cases give a definite history of consanguinity, twenty-two of no consanguinity, and in fourteen the point is not made clear. Thus, it may be seen that until we have an opportunity of analyzing many more carefully reported cases, the question of consanguinity as an etiologic factor must remain unsettled. At present I may say that, while consanguinity may be a contributing factor, it is not a necessary element of the etiology.

Heredity must also be considered as a cause. Direct heredity, as in congenital cataract, etc., has not been observed. Rather this disease should be classed under collateral heredity, as defined by Bollinger, "when children of the same family suffer from the same disease, no cause for which can be found among parents or grandparents." No cases of the disease have been reported, except among brothers and sisters.

We should bear heredity in mind as a possible etiologic factor, though the disease itself has not appeared in succeeding generations.

As to the nature of the disease, we are absolutely in the dark. Stargardt says, "The question of the nature of the inherited *Krankheitsanlage* and of the direct cause of the disease process remains completely unsettled." He suggests that in the retinal disease, as also in the cerebral disease, which appears in the type with dementia, we have a certain autocytoxin that has an affinity for the neuro-epithelium of the retina and, in some cases, for certain brain cells. He further suggests that when this purely hypothetical toxin attacks not only the retina, but also the brain cells, we have the type with dementia. Stock also assumes the presence of a toxin as a cause of his cases, which he reports under the name of *Familiäre amaurotische Demenz*.

Pusey¹⁵ reports a family of five patients affected with the macular type, who showed arteriosclerosis of the terminal branches of the vessels in the macular region. He suggests that this arterial condition may have something to do with the macular disease.

Recorded cases reveal no previous illnesses that help us in regard to etiology. Only the common infectious diseases of childhood are mentioned.

The health and general condition of all patients of both types reported are strikingly good.

CHARACTERISTICS OF THE TWO TYPES

In the type with dementia the loss of vision and intelligence is gradual; no cases are reported in this type in which it has been rapid. The majority of cases have been examined from one to six years after onset, when mental and visual deterioration was well advanced. The vision of one of the patients whose case is reported in this paper was so poor six years after onset that she was practically blind. Two years after onset, her brother could see large objects fairly well. Of Mayou's patients, one examined four years after onset could count fingers. Mental deterioration seems to follow with about the same rapidity as that of vision. We may safely state that from three to six years is sufficient time in the maculocerebral type to change bright children with good vision to patients in a condition approaching amaurotic dementia.

In the type without dementia, in which the retina alone is involved, the loss of vision has been gradual, except in Lutz's⁶ four cases and Stirling's¹⁶ three cases, in which it was rapid at first. After the primary deterioration, the vision in this type may remain stationary for years and then fall again, but it does not go on to complete blindness.

In the two cases of the type without dementia in Batten's family, one child had "fits." One of the two patients whose cases I have reported (Patient 2) had convulsions, starting one year from the date of onset of the disease. One of Oatman's patients developed epileptiform seizures two years after the onset of the disease, which continued for a period of four years to the time of his last report, at which time they were less frequent. In the maculocerebral type of the disease, we find that convulsions are reported in four out of ten cases, and that they appeared from one to two years after the onset of the disease. Convulsions do not occur in the macular type of this disease, but only in the maculocerebral type.

13. Feingold, Marcus: Tr. Sect. Ophth. A. M. A., 1916, p. 312.
14. Jennings: Am. Jour. Ophth., St. Louis, 1909, 24, 296.

15. Pusey: Tr. Am. Ophth. Soc., 1915, 14, 364.
16. Stirling, A. W.: Ophthalmoscope, London, 1912, 10, 141.

No paralyses are reported in either type of macular degeneration. The eyes externally appear normal. There are no signs of inflammation and the refractive media are clear. In both types the reported cases showed eccentric fixation. There were also nystagmus and searching movements of the eyes.

The visual acuity depends on the stage of the disease at which the examination is made. It varies from slight deterioration to almost complete blindness, though the latter condition is more common in the maculocerebral type, in which the vision passes through all stages between these two extremes in from three to six years. The periphery of the fields is not contracted, and there is, at first, a central scotoma for red and green, and later an absolute central scotoma.

The macular region has been described in detail. As to the optic nerve, four out of ten cases of the type with dementia are reported as showing optic nerve atrophy, while in two cases there was paleness of the nerve. In the two cases that I have reported, one of the patients showed distinct optic nerve atrophy, while in the other case, the nerves were normal. Optic nerve atrophy is more commonly seen in the maculocerebral type than in the macular type. Outside the macular region, the fundus has been normal in a majority of reported cases, but enough atypical cases have been reported to make mention of these variations necessary. Examples of the latter may be found in Stargardt's⁵ family S., which were of the type without dementia. The cases herein presented show some irregular pigmentation in other parts of the fundi.

DIFFERENTIATION

In the differentiation of familial macular degeneration with or without dementia, we have to consider amaurotic family idiocy and retinitis pigmentosa.

There are two types of amaurotic family idiocy: first, the typical cases (Tay-Sachs form) in which the onset occurs in infancy and, second, the so-called atypical cases in which the onset is delayed until childhood and which may be termed juvenile amaurotic idiocy.

Any attempt to construct a definite syndrome and to separate sharply the juvenile type of amaurotic family idiocy from maculocerebral degeneration lands the investigator in a wilderness of atypical cases, which is most disconcerting. The more cases he analyzes, the more is he convinced that the two types merge into one another in the same manner that the infantile and juvenile types of amaurotic family idiocy seem to merge. For example, Spielmeyer's² cases of juvenile type resembled maculocerebral degeneration with dementia in the matter of age of onset, course, mental and visual symptoms, and absence of paralyses.

Vogt's cases showed yet another juvenile type of amaurotic family idiocy, in which paralyses were present with loss of vision, which condition seems to link them, on the other hand, to the infantile type. The onset of Vogt's cases covered a period of from six to fourteen years; loss of vision led to complete blindness, and the paralyses to complete helplessness.

In discussing the cases of the juvenile type described by Spielmeyer and also those of Vogt, Jendrassik¹⁷ says, "From the description, it is apparent that the two types stand in close relation and can hardly be classed as separate diseases. They are only members of the great family of heredodegenerations." He explains the intensity and rapidity with which the

infantile type develops as depending on a lack of resistance due to the extreme youth of the patients.

I may briefly state that in differentiating the types of degenerations to which any particular cases may belong, one must consider the syndrome presented and then place the cases as nearly as possible where they belong after a thorough analysis of reported cases, bearing in mind the large percentage of atypical cases.

PATHOLOGY AND TREATMENT

Unfortunately, little is known of the pathologic conditions of macular degeneration with dementia. Stock's⁸ report, while of atypical cases, should be mentioned. He holds that the process of the primary disease, so far as the eye is concerned, is destruction of rods and cones, and finally, gradual destruction of the neuro-epithelium and of the outer nuclear layer.

The subject of the treatment of this disease may be dismissed with the statement that, to date, there is no known remedy for the condition.

CONCLUSIONS

We have a large class of cases showing a great variety of motor, sensory and mental symptoms, which may be called heredodegenerations.

Those in which we are particularly interested as affecting the eyes, are retinitis pigmentosa, infantile amaurotic family idiocy, juvenile amaurotic family idiocy, and maculocerebral degeneration.

While what have come to be known as typical cases of these conditions are easily distinguishable one from another, there are many atypical cases which are transitional forms and might be in one of any two classes.

The cause of these degenerations is unknown. If there is a common cause, we are totally in the dark as to why the disease assumes one form at one time and a different one at another.

Pathologically in amaurotic family idiocy, the ganglion cells of the retina and central nervous system are attacked. From our slight present knowledge, I think that the retinal condition in maculocerebral degeneration is due to degeneration of the neuro-epithelium.

The relationship, if any, among these different types of degenerative disease must be cleared by a study of atypical cases.¹⁸

ABSTRACT OF DISCUSSION

DR. PARK LEWIS, Buffalo: Two points are suggested in Dr. Clark's analysis of cases which apply equally to familial idiocy. The first is the fact that they are familial conditions, which would suggest heredity. But obviously they cannot be inherited conditions, because the children become degenerates before they reach the period in which they can propagate their kind. Perhaps, according to the mendelian system, this is what would be termed a unit character, and therein lies the possible explanation of the family relationship. The second point is that both these conditions occurred at critical periods in the life of the child, the first at the period of second dentition and the second at the period of adolescence. This fact suggests a relationship with other organic changes that are occurring at that time. The pineal gland and the thymus cease to function at this time. The ovaries, the testes and the pituitary begin to activate. Dr. Timme brought to my attention a most important fact connected with the glands of internal secretion. He has shown that the conditions which

18. In addition to the references already given, the following will prove of interest:
Batten, F. E., and Mayou, M. S.: *Ophth. Rev.*, London, 1915, **34**, 91.
Doyme: *Tr. Ophth. Soc. U. Kingdom*, 1899, 71.
Darier, A.: *Clin. ophth.*, January, 1914, **20**, 3.
Doyme: *Tr. Ophth. Soc. U. Kingdom*, 1909, p. 12.
Coriat: *Arch. Pediat.*, **30**, 404.
Harbitz: *Arch. f. Augenh.*, 1913, **73**, 140.
Wolfsohn, J. M.: *Amaurotic Idiocy*, *Arch. Int. Med.*, August, 1915, p. 257.

17. Jendrassik: *Handbuch der Neurol.*, **2**, *Spez. Neur.*, **1**, 420.

are perpetuated are not necessarily the individual conditions which appear in the child, but are due to a disparity in the relationship of the endocrine glands. That would be quite in accordance with the mendelian law.

These people do not inherit a distinct unit character, but, in all probability, a tendency toward an imbalance in the endocrine system. That would explain how apparently normal parents can have children showing these degenerative characteristics. And it is not unlikely that if the family tree were followed we would find not only atrophies and neural degeneracies, but other conditions of which this neural degeneracy is simply one manifestation. The crux of the whole problem lies in the fact that optic atrophy is a common condition and that it is not infrequently associated with low mentality.

DR. HAROLD GIFFORD, Omaha: These cases are not interesting until you have seen one or two of them. I have seen two of the Vogt type, which begin to show signs of defective vision and mentality at the age of the first dentition. In the Stargardt-Batten type, to which Dr. Clark refers, the patients develop macular degeneration at puberty, but not cerebral degeneration. In my experience those cases are the most common. Dr. Clark is right in laying down the proposition that it is impossible to draw a dividing line between the groups, and that the chances are that they all represent a series in which there is something defective in the nervous system. Or you may explain it by the exhaustion theory of Edinger, or it may be attributed to a defective "anlage." We do not know the reason why it is, but the fact remains that the retinal cells and the cerebral cells tend to degenerate at an early age. This Stargardt-Batten type is the one we must look for. These children live to the age of puberty, are perfectly normal, and then their vision begins to fade, and if you examine their retinas at this time you will find a little dusky pigmentation in the center of the macula. It looks as if there was a little soot spread over it and partly wiped off. This pigment then accumulates in larger clumps and you see little areas of whitish degeneration mixed with it. It extends out, perhaps, two disk breadths in diameter and then stops. The periphery remains normal, and they retain good mentality. Recently I saw cases with everything typical in the family, except that instead of beginning at the age of puberty, I am quite certain that their trouble began along about seven or eight years of age. In other words, the action of the sexual cells has nothing to do with it, and the fact that the Vogt type, which usually begins at the beginning of the second dentition, is also coincident with the time when the children have to use their eyes and their minds actively, may indicate that this is a mere coincidence. The child may be slightly defective, and it passes entirely unnoticed until the child goes to school, when it is found out that there is something wrong. This particular type goes on to idiocy or dementia and epileptiform convulsions, paralyses, etc.

To show how these types run into one another: A family is reported by Higien, in which one child had the typical Tay-Sachs degeneration, beginning in infancy, the child dying in a few years. The second child had the Vogt type, beginning with the second dentition and going on in the usual way; and the third had the Stargardt-Batten type. Dr. Brown Pusey has suggested that this Stargardt-Batten type of macular degeneration is nothing more or less than a familial tendency to arteriosclerosis of the central portion of the retina. I think that theory is worthy of consideration.

DR. E. J. BERNSTEIN, Detroit: I have had only one case of the Tay-Sachs type of amaurotic family idiocy. Looking up the etiology, I find that many men lay stress on consanguinity as a cause. That is simply a confession of ignorance. I cannot understand, in the face of the great number of married people who are related and who have perfectly healthy progeny, why consanguinity should be assigned as a cause of disease in the small number of cases in which some stigmata develop.

Amaurotic family idiocy usually occurs among Jewish children; marriage between relatives is very common among Jews, but no one accuses the Jews of degeneracy, as a rule. Very few of these cases usually occur among the Russian Jews. It seems to me that this form of degeneracy is due to the economic conditions under which the parents have lived for so many years and not to consanguinity.

PERICHOLECISTIC ADHESIONS

THEIR IMPORTANCE AND CLINICAL RECOGNITION *

FRANK SMITHIES, M.D.

Associate Professor of Medicine, University of Illinois, College of Medicine; Gastro-Enterologist, Augustana Hospital

CHICAGO

Experimentally by Rosenow,¹ pathologically by MacCarty² and clinically by Fowler,³ Cheney⁴ and myself,⁵ it has been satisfactorily demonstrated that affections of the gallbladder commonly represent progressing infection of the structures forming the gallbladder wall. The infecting bacteria are usually blood-borne. In a large degree, abnormal contents of the gallbladder are the by-products resulting from bacterially induced inflammation involving any or all of the four layers of tissue comprising the wall of the viscus.

In origin, pericholecystitic adhesions may be intrinsic, that is, occurring as a consequence of changes primary in the gallbladder, or extrinsic, that is, secondary involvement of the gallbladder, due to disease in neighboring structures.

The term "pericholecystitic adhesions" commonly signifies the complications resulting from inflammatory processes arising in the gallbladder wall and involving the serous layer. The extrinsic origin of gallbladder adhesions is comparatively infrequent. Such lesions include primary and secondary malignancy involving the gallbladder, contiguous invasion of gallbladder structure from disease in adjacent viscera (most commonly, ulcerative processes of the duodenum, stomach, bile ducts or colon), or inflammatory or malignant disease originating in the peritoneum.

The newer laboratory and clinical studies have clearly proved that since gallbladder disease is commonly initiated by bacterial growth, the manifestations of the inflammatory reaction on the part of the gallbladder wall may be continuous and progressive (acutely or chronically) or intermittent at variously separated intervals. Pathologically, two facts are consequently emphasized: First, very extensive pericholecystitic adhesions may arise within a short time, should there be actively progressive bacterial invasion, or similar lesions may represent years of disease, should the infecting organisms be of low virulence, the tissue defense strong or the extension of infection intermittent. Second, the clinical or histopathologic study of pericholecystitic adhesions furnishes no clue as to the time duration of the existing evidences of inflammatory tissue reaction. These facts are further commented on later.

MATERIAL STUDIED

The cases furnishing the basis of this report have been studied during the past eight years. On account of space, this paper must be limited to a consideration of pericholecystitic adhesions arising from disease intrinsic in the gallbladder. It may, however, be mentioned here that of 556 operatively demonstrated instances of benign gastric ulcer, gallbladder adhesions

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