DR. JAMES BORDLEY, Baltimore: Dr. Holden makes the suggestion in the summary of his case that an edema of the anterior lobes of the brain, but more likely of the meninges and of the periosteum of the optic foramina which is continuous with the dura mater, brought about pressure on each optic nerve, and that these changes possibly resulted in central scotoma and paralysis of the sixth nerve. Dr. Holden points to the field-changes in frontal-lobe tumors in support of his hypothesis. In the service of Dr. Cushing such a case came to necropsy. We sent the optic nerves to Dr. Verhoeff for examination. He could find no special evidence of change in the central bundle, but did find marked peripheral changes. The central blindness in this patient was of over a month's duration. In other words, the pressure exerted on the nerve had damaged the peripheral fibers, but could hardly be held accountable for the loss of central vision.

In a case of optic-nerve atrophy following a basilar fracture necropsy revealed the optic nerve markedly compressed in the optic foramen. This case I watched. There was general loss of vision, though it never especially involved the center of sight. Nor can we overlook the tremendous pressure exerted on the nerve by the subdural fluid in high grades of choked disk; nevertheless, central scotomata are among the rarest of all visual field-changes in these cases.

Only a comparatively short time ago, in association with Dr. Follis, we opened the orbit of a patient having an acute hydrops of the optic nerve. The fluid was under great tension and the patient had never experienced loss of central vision.

One other point, suggestive but not conclusive, is that the atrophy taking place in the optic nerve of a dog from pressure of a ligature was in direct proportion to the distance from the ligature. I have seen eight of these cases of central scotomas in eclamptic women. The impairment of vision lasted from a few seconds to four days. One woman had sixteen distinct attacks in one day. Now can we conceive such a transitory edema in the tissues of the optic foramen? If we are willing to concede that eclampsia is dependent on a toxin, we shall certainly have a hard time eliminating that organ of the body which shows the most profound reaction to a long list of poisons. Dr. Holden believes the retinal pigment-changes are probably dependent on a toxin; then why absolve the same toxin from the damage to the papillomacular bundle of fibers? Dr. Holden's case impresses me as one of nephritis, probably a nephritis antedating the pregnancy, complicated by the toxin of eclampsia. In 250 cases of paralysis of the sixth nerve analyzed by Koellner, nephritis as a cause stood next to syphilis and traumatism. I have seen several such cases myself. I have, however, never seen a sixth-nerve palsy in eclampsia uncomplicated by nephritis, nor have I been able to find such a case in literature, although I may have overlooked some.

One other interesting symptom is night blindness. Experience leads me to believe that this, too, is but an acute manifestation of the nephritis. To quote from Parsons: "Acute night blindness is associated with defective nutrition, such, for instance, as we find in nephritis. . . ." We must not overlook the fact that the only invariable changes in eclampsia are those of the liver. In many post-mortems no evidence of edema of the brain has been found, and in at least one such case there was central blindness.

DR. ALLEN GREENWOOD, Boston: The lesson to be learned from Dr. Holden's paper and Dr. Randolph's discussion is: early delivery of these patients. One must be careful, however, not to give too grave a prognosis as to sight and the future of the patient if there is massive exudate in the retina. Some years ago I saw a woman, aged 40, pregnant, with a very marked neuroretinitis with a high-grade albuminuria. The eye condition recovered entirely after delivery, leaving little signs of trouble. A subsequent pregnancy brought back the kidney and eye condition with almost blindness at the time of delivery and a subsequent recovery and the patient as yet has not succumbed to any kidney disease. I also saw a case similar to the one Dr. Holden reports in which a woman of 25 had homonymous hemianopsia as an accompaniment of an albuminuric neuroretinitis of pregnancy.

DR. WARD A. HOLDEN, New York: It seems to me these cases are of a good deal of interest and importance, and careful study of individual cases with the possibility occasionally of a necropsy will certainly clear up some of the questions which now are obscure.

TWO CASES OF ACUTE RETROBULBAR NEURITIS, ASSOCIATED WITH MARKED ACETONURIA*

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BUFFALO

The two cases of acute retrobulbar neuritis presented in this report are of interest because a thorough physical examination by competent observers revealed no definite findings except the presence of a pronounced reaction for acetone in the urine. Both patients were young, one a girl of 8½ and the other a man of 31. The girl had been an exceptionally healthy child, while the man gave a history of a previous attack of colitis coincident with marked acetonuria. Both lived under ideal hygienic conditions, being members of families in more than comfortable circumstances. In both cases, hysteria, disease of the nose and accessory air-passages, alcohol, tobacco and drugs could be eliminated with certainty, nor were there any grounds on which the likelihood of chemical or ptomain poisoning might be entertained.

While blindness from retrobulbar neuritis occurs in diabetes, as a rule the patients are past middle life, very much broken down, or well advanced in the disease. I have not been able to find cases reported occurring in young persons associated with a decided acetonuria and with no other likely etiologic factor.

CASE 1.—A. A., aged 8½, the daughter of well-to-do parents, consulted me Feb. 12, 1910. The family history was good. The child had always been exceptionally well and healthy and had lived under ideal conditions. There was no history of gastric disturbances, no coryza, injuries or illnesses of any sort. No visual disturbances had been observed by patient, parents or teachers, until a few days ago the girl complained that she could not see the blackboard in school and that the print in her books was not clear. At about the same time she complained of dull frontal headaches, and her mother remembers that she was somewhat nauseated when riding on the street-cars.

Examination.—The patient is a well-nourished, healthy appearing girl of normal size and weight, of good color and presence. The pupils are of normal size, equal and respond readily to all reflexes.

O. D. V. = 6/15
O. S. V. = 6/15

Muscles: 1° exophoria with Maddox rod. The fundus examination without mydriasis showed the disks to be of normal appearance, retinal vessels normal. Not suspecting the nature of the case, I ordered a 1 per cent. atropin solution to be instilled three times daily, and the patient was requested to return three days later for refractive examination under cycloplegia.

February 15, the patient returned, the atropin having been used as ordered.

The retinoscope showed:

O. D. + 1.00 cy. ax. 105°
O. S. + 1.00 cy. ax. 75°

Vision (under atropin):

O. D. V. = 6/22.3 + 1
O. S. V. = 6/22.3 + 1

* Read before the Section on Ophthalmology at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

A careful test with trial lenses showed that while the cylinders indicated by the retinoscope made the test-letters more distinct, they did not improve her ability to read. A test was then made of her visual fields by means of colored disks on the end of a rod. The fields for white appeared normal, but there was a total lack of recognition of the red disk in the fields of fixation. The blue field appeared normal; green and yellow were not tested.

The eyeballs were not tender on pressure. The fundus examination revealed no change in the appearance of the nerve-head or retinal vessels.

Fig. 1.—Absolute scotoma for red, white and blue fields normal.

The patient was then referred to Dr. F. W. Hinkel for examination of the nose and air-passages and to Dr. N. G. Russell for a thorough physical examination.

The examination of the nose and air-passages was reported as absolutely negative.

Dr. Russell's report is as follows: I have examined A. A. carefully and have found her normal in every way except possibly somewhat nervous. The blood is fully up to standard except that hemoglobin is a little low. The urine is perfectly normal except a decided reaction for acetone and a slight reaction for diacetic acid. This is rather unusual in a full diet such as she has been on.

Feb. 21, 1910, the patient returned to me, the effects of the atropin having thoroughly passed away. At that time:

O. D. V. = 6/12 + 1
O. S. V. = 6/12 + 2

Plus cylinders, while improving the above letters do not add to capacity to read smaller letters. The fields were then charted on the perimeter (Fig. 1.).

A urinalysis made by Dr. Russell, February 25, showed a mild acetone reaction but no diacetic acid. Having been under a regulated diet, ordered by Dr. Russell, the patient returned to me, April 25, 1910, at which time O. D. V. = 6/6, and O. S. V. = 6/6. The urine has been free from acetone about two weeks. A test with a red disk showed no color defects. The patient again came under my observation in December, 1910, when she was brought to me complaining of asthenopia and headache dependent on eye use. Her visual tests at that time were as follows:

O. D. V. = 6/9 — Exophoria 1½, fields negative.
O. S. V. = 6/9 + Fundus negative.

These lenses were ordered and worn during school hours and for near use with a complete relief of the symptoms.

May 28, 1913, the patient again returned, saying that the lenses had not been worn during the past year. For the past two weeks her headaches and asthenopia had returned. Visual examination revealed:

O. D. V. = 6/9 — Exophoria 1½, fields negative.
O. S. V. = 6/9 + Fundus negative.

Under atropin:

O. D. V. = 6/75 — 0.25 sp. = + 0.50 cy. ax. 90° V. = 6/5
O. S. V. = 6/6 + 0.50 cy. ax. 75° V. = 6/5

A full correction was ordered for school use, which has been worn with comfort.

CASE 2.—History.—A. G., aged 31, married, department manager of a business firm, consulted me, Jan. 22, 1911. Family history is without incident. He uses neither tobacco nor alcohol, denies venereal disease and describes himself as of "nervous disposition" and as having a "sensitive stomach" and "somewhat run down" from overwork. He says that for many years he has had occasional attacks of what he describes as "intestinal catarrh," for which his physician has prescribed exercise and diet, with relief of symptoms. He has worn lenses for many years, having been examined by Dr. Julius Pohlman of Buffalo. He is wearing:

O. D. + 0.75 sp. = — 2.00 cy. ax. 180°
O. S. + 0.50 sp. = — 1.00 cy. ax. 180°

The glasses have always been comfortable and have given him good vision.

Present History.—He has been in his usual good health so far as he knows, except that he remembers having had a slight attack of indigestion a few days ago which he ascribes to a corned-beef sandwich which he ate at noon. January 19, he noticed that the vision of his left eye was blurred and the sight noticeably impaired. The vision has remained about the same as at first, so far as he can determine. There have been no headaches or dizziness or "colds in the head." His work is not that which would expose him to any poisons in its performance, and he has been taking no medicines of any kind.

Examination.—The patient is somewhat pale, is fairly well nourished and of apparently high-strung disposition. Pupils are of normal size and equal, and respond readily to light, convergence and consensually. There is no tenderness on firm pressure on the globes.

O. D. V. (tested with his lenses) = 6/6
O. S. V. (tested with his lenses) = 6/15

Muscles: 2° exophoria (Maddox rod).

The ophthalmoscopic examination shows the disks to be sharply outlined, of normal color and appearance. The retinal veins and arteries are normal. The circulatory balance is good. There are no abnormal appearances to be noted.

The fields were then tested by means of disks on a rod. While the visual field of the right eye appeared normal for white, blue and red, on the left side white and blue were normal. The patient fails to recognize the red disk in the center of the field. The perimetric chart was then made (Fig. 2).

Fig. 2.—Absolute scotoma for red, relative for blue, white normal.

A diagnosis of left retrobulbar neuritis was made. Dr. W. Scott Renner, Buffalo, who made the rhinologic examination, reported that the nose and sinuses were free from disease. Dr. Herbert M. Hill reported a twenty-four-hour sample of urine negative, both chemically and microscopically, but no test for acetone was made. A competent internist, to whom the patient was referred in the temporary absence of his regular medical adviser, reported to me within a few days that he had been unable to discover evidences of hysteria or anything abnormal about the patient. The differential blood-count was negative. Hemoglobin esti-

mate was 75 per cent. At my suggestion the patient was given small doses of calomel, sodium salicylate and sweat-baths. The following days were without incident, beyond the fact that the patient was very apprehensive concerning his condition and became very nervous. I suggested a rest and change of scene. The patient decided that he wanted to go to Lakewood, N. J., so I gave him a letter to Dr. Arnold Knapp of New York, instructing him to consult him during his absence. A few hours before leaving for Lakewood, however, his regular physician, Dr. John Mesmer, having returned to the city, I suggested that he submit a sample of urine to him, and seek his advice.

Within a few days Dr. Mesmer reported to me that the examination of the single sample of urine submitted to him had shown "a very heavy acetone reaction." He also reported that the patient in past years had had several severe attacks of "mucous colitis with crises" and in each instance there had been decided acetone reactions. Each attack had yielded readily to a proper diet and outdoor life with plenty of exercise. During the intervals between the attacks the urine had been free from acetone bodies. Dr. Mesmer had advised the patient to return to his dietary regulations, and to take plenty of exercise during his sojourn at Lakewood.

Following are the clinical records of the case tested with lenses:

Feb. 16, 1911: O. S. V. = $6/7.5 + 3$ Scotoma for red tested roughly appears smaller.
Feb. 27, 1911: O. S. V. = $6/6 - 3$ Urine is free from acetone.
Mar. 29, 1911: O. S. V. = $6/6 + 2$
Apr. 22, 1911: O. S. V. = $6/6 + 2$ No scotoma for red.

April 22, 1911, the patient's refraction was gone over under homatropin with the following result:

O. D. -0.62 sp. = + 2.25 cy. ax. 90° V = $6/5$
O. S. + 0.62 cy. ax. 90° V = $6/5$

The urine gives no acetone reaction. During the past three years the patient has been seen at frequent intervals. During this time visual acuity has remained the same. There have been no attacks of lowered vision in the right eye.

According to von Noorden,¹ "the primary acetone bodies are beta-oxybutyric acid and aceto acid, from which acetone is probably derived as a secondary product . . . by far the most important sources of acetone are the lower fatty acids." Whatever be the source or whether the virulence of the toxin in cases of faulty metabolism be acetone or some antecedent product or products, clinicians recognize that the excretion of acetone is a fair index of a toxemia. While acetonuria is not at all infrequent in children, and to a less extent in adults with gastro-intestinal disturbances, and invariably accompanies starvation, it may be fairly stated that acetone is not found in appreciable quantities in the urine of normal persons, and that its presence is an index of some toxemia of enough virulence to attack nervous tissue.

While it is quite obvious that acetone, beta-oxybutyric acid or aceto-acetic acid exercise no decided selective action on the papillomacular bundle of the optic nerve, yet it appears reasonable that in certain cases it may produce a retrobulbar neuritis, and that these factors should be taken into consideration in the search for possible etiologic factors in cases of retrobulbar neuritis of otherwise obscure origin.

575 Delaware Avenue.

ABSTRACT OF DISCUSSION

DR. G. E. DE SCHWEINITZ, Philadelphia: It would seem to me, in agreement with Dr. Richard's observation, that acetonuria in cases such as Dr. Francis has reported, must be

1. Von Noorden: *New Aspects of Diabetes*, E. B. Treat & Co., New York, 1913, p. 127.

regarded as an accompanying symptom, without direct etiologic relationship to the blindness, and this, I take it, is Dr. Francis's own view.

With regard to the classification of these types of central amblyopia: Certainly the symptoms in no way correspond to those of acute retrobulbar neuritis of the classical type, that is to say, obscuration of vision, beginning always in the center of the visual field and rapidly progressing in from one to eight days to complete or nearly complete blindness; at first, negative ophthalmoscopic appearances, later, blurring of the margins of the disk, hyperemia of its surface, and sometimes, in severe cases, diminished caliber of the retinal arteries and fulness and pulsation of the retinal veins; distinct pain on movement of the eyeball or when the globe is pressed backward into the orbit. If such a condition of affairs as Dr. Francis has described is to be regarded as an expression of retrobulbar neuritis, then it must belong to the so-called attenuated types, but even in these types the scotoma includes the fixing-point, although the depreciation of vision is not nearly so great as in the acute or fulminating varieties, and the subsidence of the amblyopia is always much more prompt.

While Dr. Francis' careful examination and observations have excluded hysteria or any other pronounced psychosis, it does not seem to me impossible that scotomas of this character may represent and interpret fatigue of the macular region; indeed, it is well known that temporary central scotomas may have such an interpretation. Usually they exist as small central color scotomas, best detected with a 1 mm. red or green object, and not infrequently the patients have been the subjects of long-standing eye-strain. The peripheral field may be normal, or repeated investigations will sometimes elaborate one of the various fatigue contractions. Sometimes these central scotomas closely simulate the variety produced by toxic amblyopia.

Finally, as has also been suggested by Mr. Gunn, some of the slighter forms of so-called retrobulbar neuritis may depend on an edema which is analogous to the acute swelling of the eyelids, with headaches, occasionally encountered as the result of errors in diet or of intestinal auto-intoxication. It is perfectly conceivable that an edema may arise in the optic nerve which would bring about a condition of elevated pressure in the optic fibers, especially in the neighborhood of the optic foramen. It will be the duty of all of us to see that careful urine examination is made in all forms of central amblyopia, whether they belong to the functional varieties or not, but I suspect, to repeat a former sentence, that the acetone may indicate that some form of toxemia is the responsible agent, which in one instance might produce a fugitive edema of the eyelids, and in another a fugitive edema of the optic nerve-fibers. Indeed, as we all know, one observer is of the opinion that the functional central scotomas, the so-called hysteric manifestations, depend on edemas in the neighborhood of the optic chiasm, analogous to the edemas which this psychosis can call into existence elsewhere in the body.

DR. WENDEL REBER, Philadelphia: About six years ago a young woman, aged 33, came under my observation, a case which I reported before the American Academy of Ophthalmology. Tobacco as a factor could be easily excluded. This has been a complicating factor in many cases of central scotoma in cases in which diabetes was excluded. The patient was neurasthenic, corresponding somewhat to the type to which Dr. de Schweinitz alluded, in that she viciously overworked her accommodative apparatus. She had a central scotoma involving the fixation point. At times sugar appeared abundant in the urine, ranging from 0.5 to 1.5 per cent. for the six years. At times she will show a low acetone reaction; at other times she will be entirely free of it. Her vision at no time has fallen below $6/10$. Once it rose to $6/7\frac{1}{2}$. She has continued at her occupation as a secretary. At no time that I have examined her during the six years has she been free from her central scotoma. It is practically the size of the blind spots in Dr. Francis' first case. The case has been one of great interest to me because of the persistence of the scotoma. I have taken the fields at least twenty times. They remain about the same. Accessory-sinus disease was excluded by repeated examination, skiagraphically and otherwise. I saw

the patient about three weeks ago. She has vision still about 6/9, the same scotomata, and about four weeks ago showed some acetone. At the last visit she showed none. The question in the case is the exact cause of this low-grade toxemia.

DR. LEE MASTEN FRANCIS, Buffalo: I want to emphasize the fact that the only thing we could find in these cases was the presence of acetone. Whether it or some parent body was the cause of the lowered vision, or whether it was a psychosis, I am sure I do not know. I thought at first it might be on a hysterical basis, possibly, especially in one case, but careful study by competent observers failed to reveal corroborative evidences of hysteria. I simply report the cases for what they are. Acetonuria was the only finding we could determine in both instances.

A METHOD OF CLOSING PERFORATIONS OF THE SEPTUM OF THE NOSE

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During the last two or three years, I have adopted the method of inserting a piece of cartilage or bone between the flaps of the mucous membrane after the submucous operation is made in cases in which it seemed to me that there might be a permanent perforation due to a tear in the mucous membrane on both sides of the septum. It occurred to me that in those cases in which there is a perforation of the septum that is not too large, a submucous operation with a transplantation of cartilage or bone or both to that part of the nose in which there is a perforation, together with the arranging and sewing of the flaps, could be carried out with good results. I have adopted this procedure in a few cases with very gratifying results. This cartilage or bone gives a support and a place for attachment for the flap of mucous membrane and this does away with retraction which is so liable to occur without some support. Before I tried this procedure my results in closure of perforations of the septum were almost invariably bad.

It seems to me that the primary incision should be at the anterior end of the cartilage of the septum so that as large a flap as possible anterior to the perforation can be obtained. Instead of cutting through the cartilage when beginning the elevation of the mucous membrane on the opposite side to the incision, it is better to begin the elevation just at the anterior end of the cartilage. One should be as careful as possible in elevating the mucous membrane around the edges of the perforation, as it is only with the greatest care that tears in the mucous membrane are prevented.

After the elevation of the mucous membrane is completed, the cartilage or bone, both anterior and posterior to the perforation, are resected and placed in a normal saline solution. As a general rule the large piece for transplanting would be taken posteriorly to the perforation. The larger the piece the better. If one thinks that a large suitable piece of cartilage or bone will be difficult or impossible to obtain, it is a good plan to transplant from another deflected septum on which a submucous operation is being made. If one uses such a method as Hazletine's, the anterior flap which is to be displaced posteriorly should be on the side of the primary incision, and the flap to be brought forward would be on the opposite side. Of course, the edges of the perforation should be pared. After the flaps have been arranged, the largest possible piece of cartilage or bone should be placed between the flaps, and the stitches applied.

One may find it better at times to insert the transplant before cutting and arranging the flaps.

After the stitches are applied, the packing of both sides of the nose is done with more care than is usually necessary after an ordinary submucous operation. The packing should be kept in two or three days. After the packing is left off a small amount of cotton may be applied over the flaps to keep them from being dried. Ointments also may be used with advantage to prevent drying of the flaps. Some variation at times in making the incision, flaps, etc., would be necessary, depending on the position, size, etc., of the perforation, but the all-important thing is to get a large piece of cartilage or bone or both anterior or posterior to the perforation and transplant this segment so that this whole area is filled in by the transplanted cartilage or bone; if possible, this transplant should be covered with mucous membrane on both sides. If only partially covered, of course, this transplant will become covered with granulations and later by epithelium and a good final result obtained; but of course this would prolong the after-treatments.

I present this procedure, thinking that it might be of assistance to some one in this obstinate class of cases.

930 Exchange Building.

SUPPOSED POISONOUS PROPERTIES OF CHESTNUTS GROWN ON TREES AFFECTED WITH CHEST- NUT BLIGHT

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In October, 1913, there were a large number of newspaper reports that chestnuts collected from trees affected with the blight had poisonous properties and were producing cases of disease and death. These cases were reported from the vicinity of Hartford, Conn., from both western and eastern Massachusetts, and one case each from New Hampshire and New Jersey. One news item was to the effect that in Framingham, Westboro and the surrounding towns of eastern Massachusetts there was an epidemic resulting from eating these chestnuts. A report from western Massachusetts stated that gray squirrels were dying, presumably from eating chestnuts from these blighted trees.

The matter was deemed of sufficient importance for at least a preliminary investigation, and Dr. T. C. Merrill, Assistant Forest Pathologist, was detailed to make an examination of the cases reported from Hartford and vicinity. Inasmuch as his report was not conclusive, I, accompanied by Dr. Merrill, made a careful examination of the reported cases in Massachusetts and New Hampshire. It was found that the cases in western Massachusetts were reduced to two. A conference with the attending physician in these cases made it clear that in one instance the illness was not connected in any way with chestnuts, and, in the opinion of the physician, there was no evidence that the illness in the second case was caused by chestnuts, although the patient had been eating nuts which came from an area in which some of the trees were affected with blight.