THE BRITISH JOURNAL

OF

OPHTHALMOLOGY

SEPTEMBER, 1925

COMMUNICATIONS

ACUTE RETROBULBAR NEURITIS AFFECTING THE OPTIC CHIASMA AND TRACT

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THAT the condition with which ophthalmologists are familiar as acute retrobulbar neuritis may have its site in the chiasma or tract has been established by Roenne[1,2], but up to the present little notice has been taken in this country of this form of an otherwise common disease. Its recognition is of value in connection with the diagnosis of affections of the subgeniculate visual pathway and the cases which follow are therefore recorded in some detail.

According to Roenne's description the onset and course of the disease is the same as when the site is in the optic nerve itself. Preliminary headache is common. The field changes are characterized by the association of hemianopic defects with central scotoma and many combinations and variations may be present. An important feature, regarded by Roenne as very characteristic and almost diagnostic, is the wandering character of the defects which move from one part of the field to another while the previously involved portions recover their function. This wandering is not present in every case but may be represented by irregular changes in the shape of the fields.

These conditions are explained by the presence of disseminated foci in the optic nerve, chiasma, and tract which arise and subside in different parts of the cross section of the nerve path.

Ophthalmoscopically choked disc (*stauungspapille*) is often present, but, Roenne believes, neither directly anatomically connected with the diseased area nor concerned with the functional defect.

Roenne tabulates ten cases, five of which he has personally observed. In five cases, the onset of the visual defect was

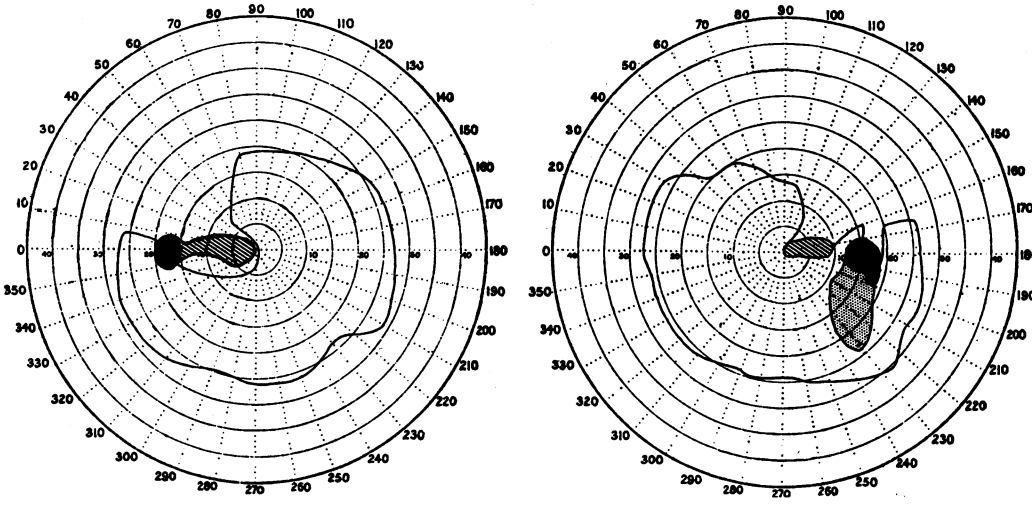

FIG. 1.

accompanied by headache with or without orbital pain or pain on moving the eyeball. In six cases, evidence of nervous disturbance in other parts was present or developed subsequently.

Case I

Mrs. T., aged 30 years. Seen August 6, 1912. Married seven years, no family, menses regular. Has been subject to "bilious headaches" occasionally, but considers her health excellent.

Two weeks ago, she awoke with a bad headache which continued for a day or two. There was pain behind the left eye which remained for about a fortnight and then moved to the back of the right eye. The pain extended to the root of the nose and to the ala nasi on the same side. Dimness of vision began on the first day of the headache.

R.V. 6/36 $\bar{c}$ $\frac{+2.0}{+2.0\ 70°}$ = 6/24. L.V. 6/60 $\bar{c}$ $\frac{+2.0}{+1.5\ 80°}$ = 6/36.

Centrocaecal scotoma in each field. Optic discs normal.

August 7, 1912.—Central fields show evidence of bitemporal hemianopia (Fig. 1). Below the blind spot in the right field is a relative scotoma for 3/2,000, suggesting the uncinate type. This

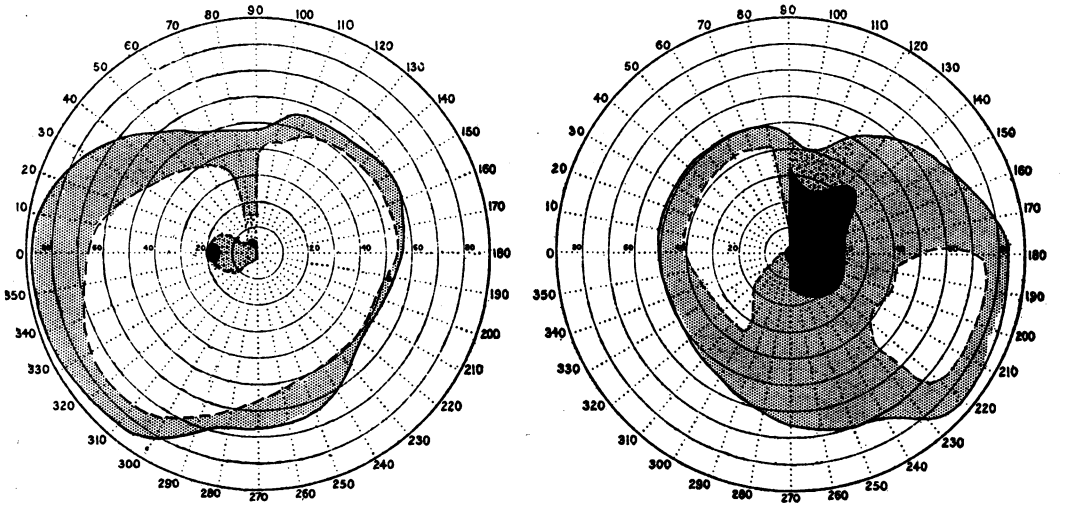

FIG. 2.

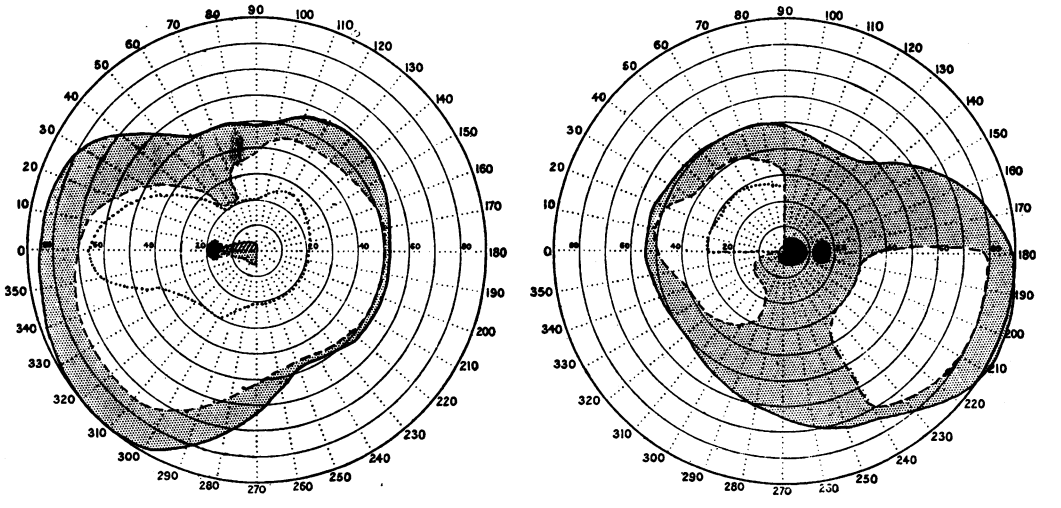

FIG. 3.

is similar in the left field but not so pronounced. Test objects: Fields, 3/2,000; scotoma, L.E. 7.5/2,000.

August 9.—R.V.=counting fingers at 3 m.; L.V.=6/60. Objects, 5,1/330. Typical bitemporal hemianopia in both fields more advanced in the right in which the scotoma has developed

rapidly (Fig. 2). The right field for 1/330 is vertically split showing a characteristic temporal island and commencing loss of the lower nasal quadrant. Very slight indentation up out in each field for 5/330.

The patient was examined by Dr. Fraser who found pus between the septum and the right middle turbinate and pus in the right antrum which was washed out.

August 10.—R.V., fingers at 3 m.; L.V., 6/60. Fields (Fig. 3), 5,1/330 white, 10/330 red. Little change except that the large scotoma in the right field is much smaller again and shows pronounced variation in intensity in its four quadrants. The fields

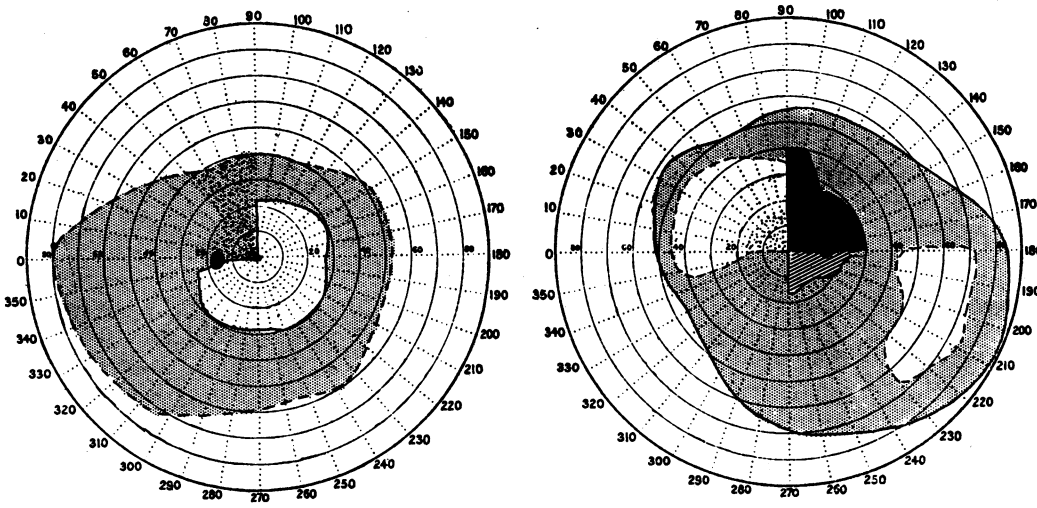

FIG. 4.

for red taken at this time showed definite quadrant variation in intensity, clockwise in the right, counter-clockwise in the left with temporal island in the right field (see ref. No. 3, Plate I, Figs. 3 and 4).

August 11.—R.V.=fingers at 4 m. below horizontal level only; L.V.=6/60 and nasal letter of 6/36. State of fields practically as on 10th.

August 12.—Vision as on 11th. Right field (Fig. 4) now shows great increase in the scotoma again and the whole central field is more depressed. Objects, 5.1/330; scotoma, 15/330. Left field shows relative defect for 1/330.

August 13.—R.V.=fingers at 1.5 m.; L.V.=6/36 nasal letter. Patient thinks her vision is improving. Radiogram of sinuses, sella turcica, negative. Slight pallor of optic discs apparent, more definite in right.

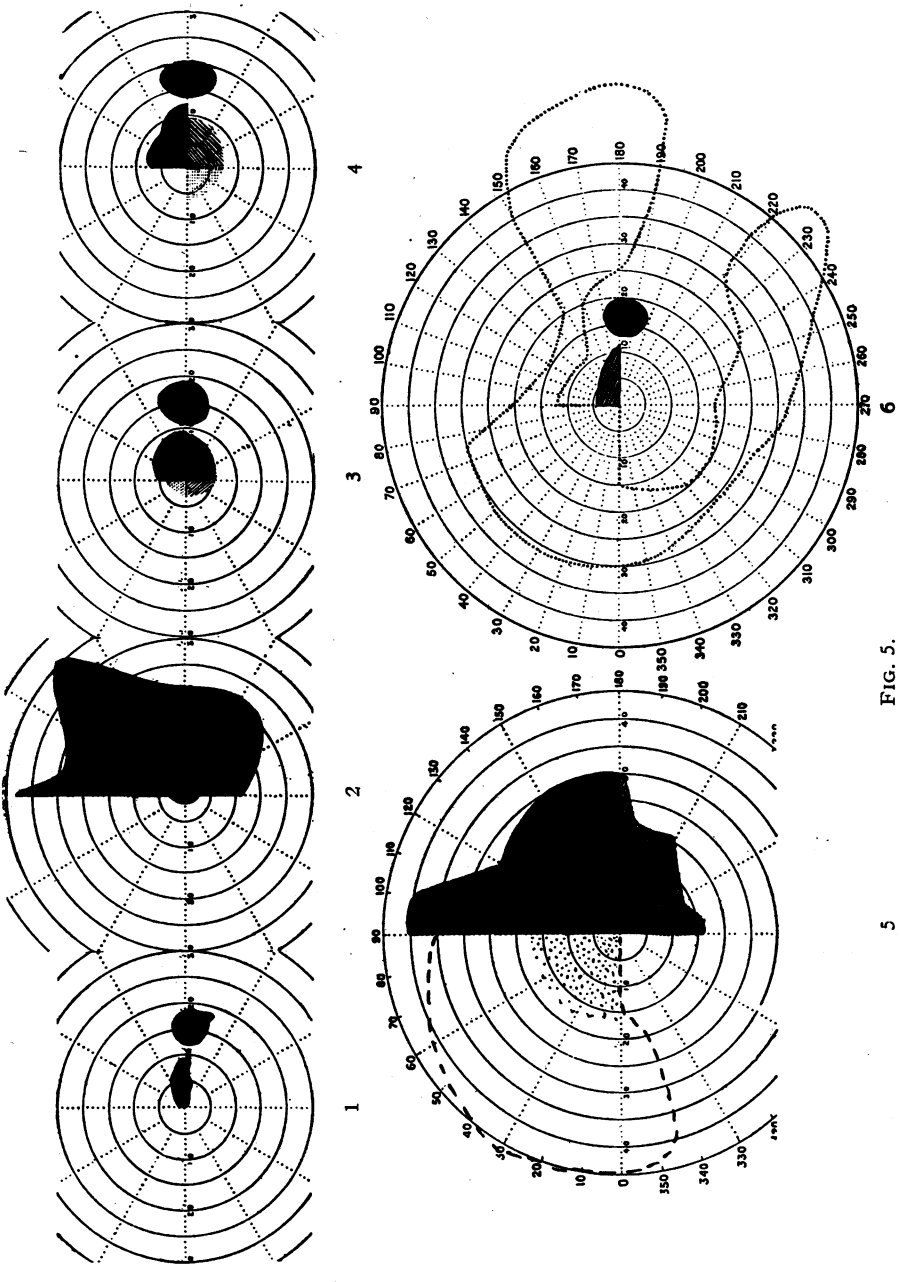

FIG. 5.

August 14.—Patient refused operation on nose, returned home where she had "an hysterical attack."

August 24.—R.V. = 6/60 excentrically; L.V. = nasal letter of 6/24. The fields for white, 1 and 5/330 are now practically normal, those for 1/330 showing only very slight upper outer indentation and relative scotomata in the apices of the upper outer quadrants. For red, 10 and 3/330 definite scotomata of bitemporal hemianopic character were present in both fields showing, as previously, the typical quadrant variation in intensity. Both optic discs now show definite pallor.

Fig. 5 shows on a larger scale the variations of the scotoma in the right field up to this date: 1, August 7; 2, August 9; 3

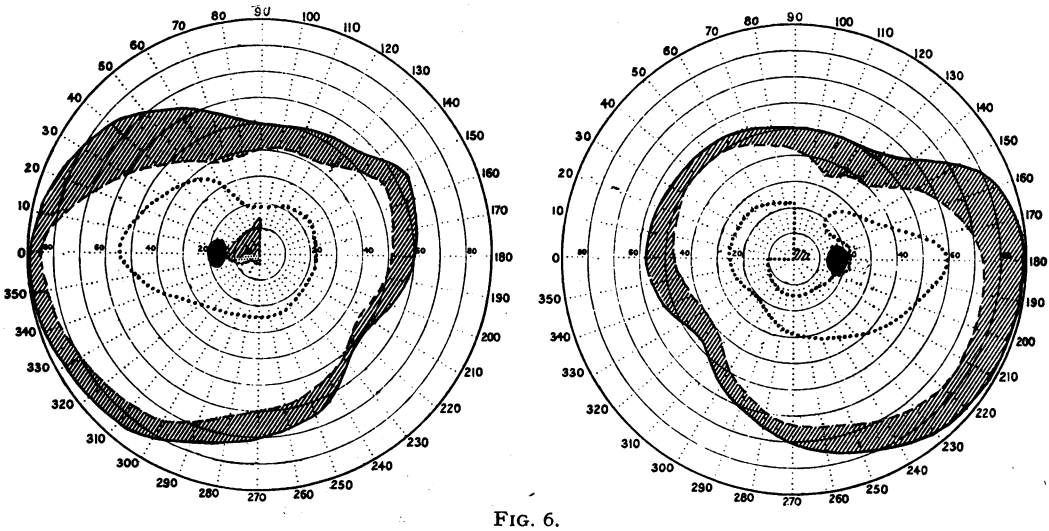

FIG. 6.

August 10; 4, August 11; 5, August 12; 6, August 24; field for red, 10/330 (dotted line), scotoma 1/330 white.

September 11.—R.V. and L.V. (corrected) 6/18. Fields (Fig. 6) shows features similar to those of August 24. Objects, 5.1/330; 10/330 red (dotted line). There have been several more "bilious attacks" with each of which she thinks her vision is temporarily depressed; she feels nervous and easily upset.

November 10, 1912.—Still occasional "bilious attacks" but not so frequent or severe. Two bits of bone have been removed from the upper alveolar margin by dentist. Still some post-nasal discharge. R.V., 6/18; L.V., 6/12 part. Discs show pathological pallor.

The fields showed almost normal conditions, such as would readily pass for normal by ordinary methods of testing. Only by using very small objects at 2,000 mm. could changes be elicited

representing vestigial remnants of the previous bitemporal hemianopia.

Fig. 7 shows the central fields: L.E., 1/2,000; R.E., 1,2/2,000. There was a relative dimness in the centrocaecal area but no actual

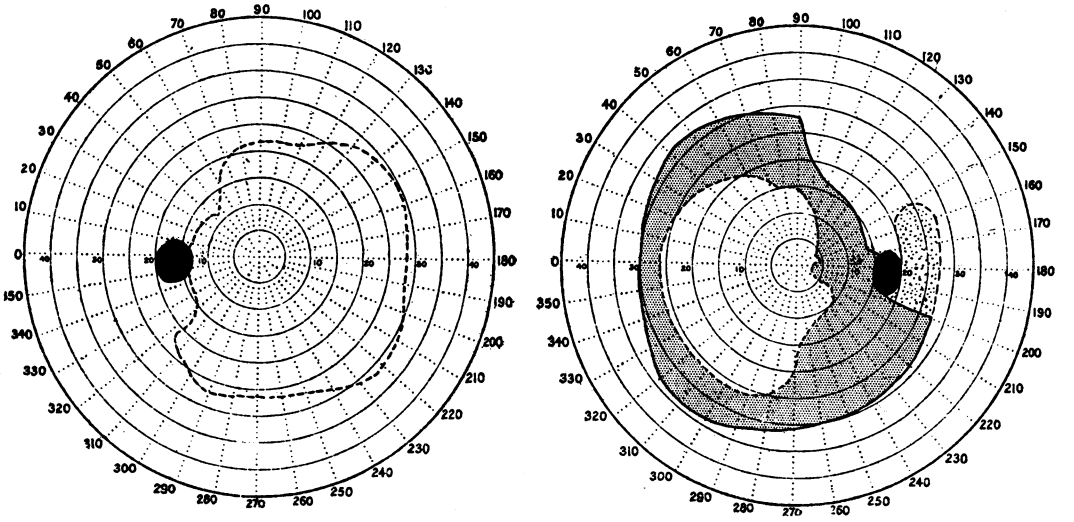

FIG. 7.

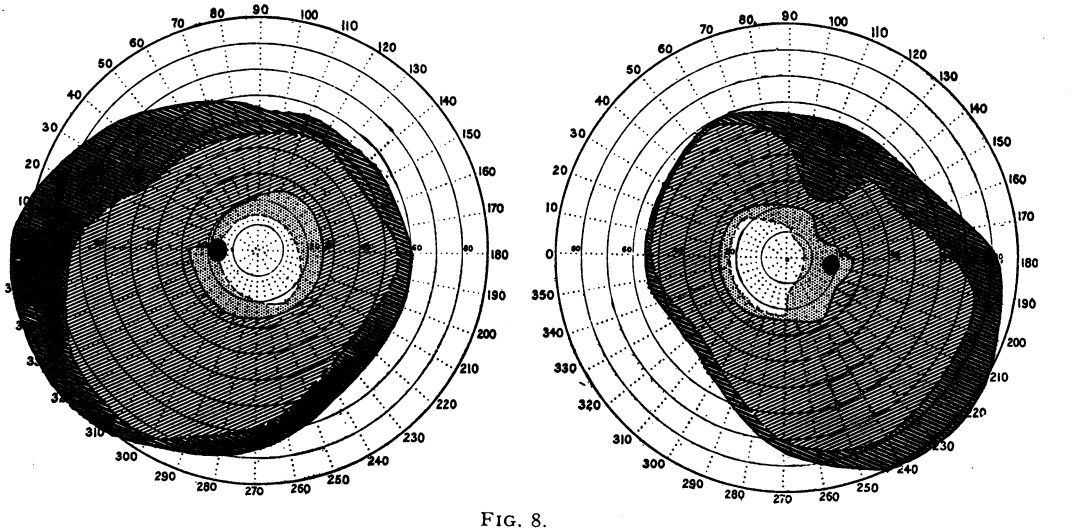

FIG. 8.

scotoma could be defined. Colours were better seen on the nasal side in both. The condition remained practically unchanged after this date. When last seen on May 20, 1921, R.V.=6/12 with difficulty; L.V.=6/12 nearly complete. Both discs pale. Fields, Fig. 8. A minute scotoma for 1/2,000 was found in the right field.

In January, 1925, thirteen years after the onset of the eye symptoms, the patient's health was good, and her sight "much the same," while the "bilious attacks" had practically ceased.

Comment

This case was included in a previous paper[3] as an example of chiasmal retrobulbar neuritis possibly due to sinus disease on account of the presence of pus in one antrum. The appearance of other similar cases has raised grave doubt in my mind as to any direct relationship to the antral condition and I now regard it as belonging to the common type of acute retrobulbar neuritis. We note the fairly rapid onset and somewhat slower resolution; the condition became worse for about three weeks and after another three or four weeks recovery was almost complete; although definitely a bitemporal hemianopia, the peripheral field changes were very slight while the central changes were pronounced; the age and sex of the patient and the apparently isolated nature of the symptoms; lastly, the practically complete local recovery and continued good health of the patient.

Case II

Miss B. H., aged 21 years, student.

March 15, 1921.—Two weeks ago the sight of the left eye became dim and at the same time the eye was painful on movement. It has occasionally felt sore since then. She has suffered from headaches twice or thrice weekly for the past two or three years but not since Christmas, 1920. The headaches were in the forehead and temples, without sickness, and occurred when she was excited or in a badly ventilated room. For four or five years there has been some enlargement of the thyroid, but she has had no trouble in connection with it.

R.V. $\bar{c}$ + 0.5 D.Sph. = 6/6. L.V. $\bar{c}$ +0.5 D.Sph. = 6/9 part.

Both discs seem rather paler than normal but not decidedly pathological.

March 16.—L.V. now 6/12 part. No peripheral defects of any kind could be elicited and the central fields only were charted (Fig. 9). The right field is very suggestive of chiasmal interference but by itself not conclusive. Sella turcica normal in appearance.

March 21.—Patient was examined by Professor Bramwell who found "no indications of organic disease apart from the condition of the eye."

March 28.—R.V.=6/6; L.V.=6/9. The scotoma has almost disappeared leaving only a slight temporal dimness. Right central field still much as in Fig. 9.

November 28.—R.V.=6/4.5 all but one letter; L.V.=6/4.5 complete. Fields, Fig. 10. Both peripheral fields normal, the

right central field (1/2,000) now almost surrounds the blind-spot; the left field for 2/2,000 shows a slight upper outer defect, that for 1/2,000 is contracted especially temporally, while the field for

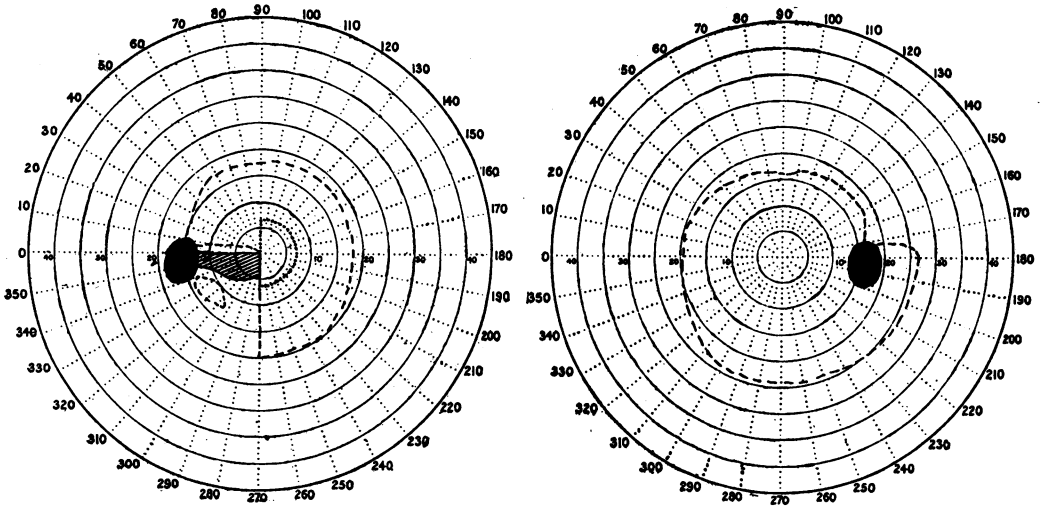

FIG. 9.

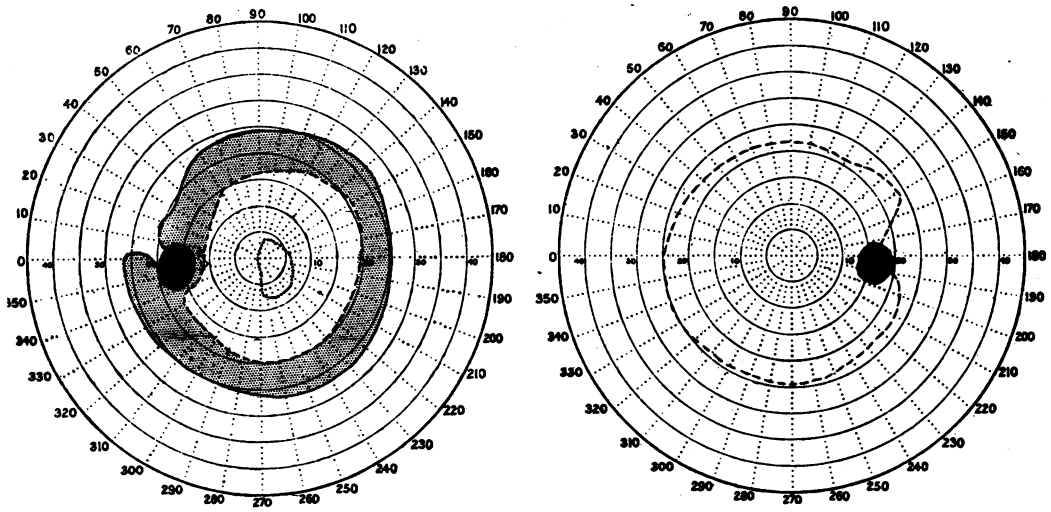

FIG. 10.

3/2,000 red is almost entirely nasal. Red objects above 3 mm. and below 10 mm. gave a relative temporal colour defect at this distance, those of 10 mm. and over showed no defect.

June 28, 1922.—R.V. 6/4; L.V. 6/4 all but one letter. Discs practically normal, physiological cupping well marked; left

slightly paler temporally than right but nothing definitely pathological.

Fields, Fig. 11. Complete restoration of right central field;

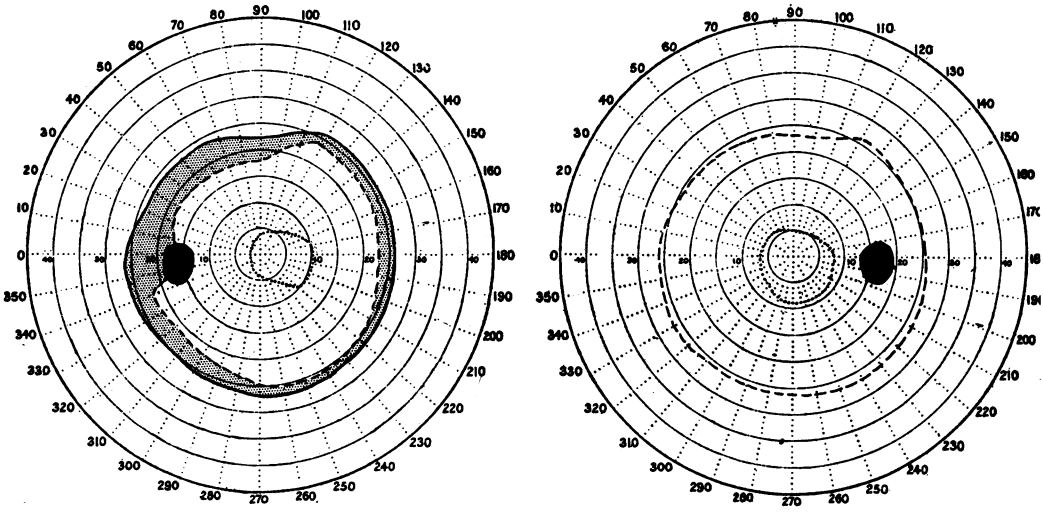

FIG. 11.

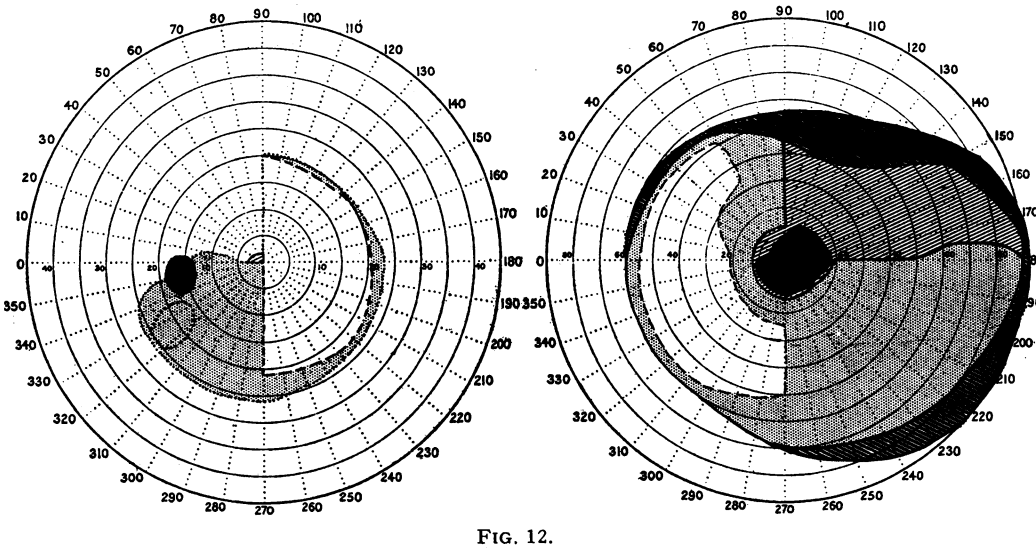

FIG. 12.

left shows restoration of the 2/2,000 isopter but still slight contraction temporally of the 1/2,000 isopter and hemianopia for 3/2,000 red.

January 17, 1925.—Patient writes to say that she has had no trouble with her eyes but had "one or two slight bilious attacks"

in the winter of 1923-24. Since then she has had appendicitis and more recently cystitis, but is now "fairly well."

Comment

This case ran its course practically within a month. The very slight changes in the right field suggest that the focus was in the left anterior angle of the chiasma near its junction with the optic nerve, where one crossed bundle might be affected with but little implication of the other. Note here also the sex and age of the patient and the absence of peripheral changes in the fields; also the headaches and "bilious attacks."

Case III

Mrs. X, aged 24 years.

May 16, 1923.—Two weeks ago, patient noticed that she was unable to read. She was already aware that the sight of the right eye was not good but did not know when it began to fail, she thought within the last four years. Married six months, no conception, no menstrual difficulties. Nasal haemorrhage eighteen months ago. Feels very well apart from her eyesight. R.V.=1/60 excentrically. Disc pale, partially atrophic in appearance especially on the temporal side. L.V=6/6. Disc slightly swollen, physiological cup filled up, veins engorged, outline hazy. Sella turcica normal in size. Wassermann reaction negative.

The fields (Fig. 12) are of bitemporal hemianopic type. The right field shows a dense central scotoma breaking into the upper outer quadrant. The nasal field is best preserved. Objects 10, 5,1/330. The left field is normal peripherally; only the central area was charted and shows complete hemianopia for 1/2,000 white with a denser scotoma in the apex of the upper outer quadrant. For 60/2,000 red only the upper outer quadrant is completely defective, in the lower outer quadrant this object is fairly well seen, best in the small enclosed area, but not so well as on the nasal side.

May 23.—Patient has been examined by Professor Bramwell who found no evidence of nervous or other disease. The right field was not closely examined on this date but showed little change to grosser tests. The left field (Fig. 13) shows the development of a large relative temporal hemianopic scotoma around the smaller one previously present. Objects 1,3/330; R.V. 1/60 excentric; L.V. 6/6.

May 30.—R.V.=counting fingers excentrically at 1 m. best in upper inner quadrant. L.V.=6/9. Disc shows commencing oedema. Fields very much as on 23rd.

June 6.—Patient feels better and thinks the vision of the right eye is improving. R.V. still only equal to counting fingers at one

metre excentrically but block letters half an inch high can be read if held close enough. L.V. 6/6 with ease. Optic discs unchanged.

Fields. The right field was not carefully tested; it appeared to be unchanged in type though less defective. The left field shows no defect for 1/330 but an upper outer quadrant loss for 5/330 red (Fig. 14). With 1/2,000 white some faint recovery of the temporal field was found.

June 20.—R.E. Although distant vision remained as on June 6 near vision had improved to ability to read Cowell 4.8m.; L.V. 6/6. Left optic disc normal in colour but veins slightly turgid, right disc unchanged. Fields, Fig. 15. The defect in the right

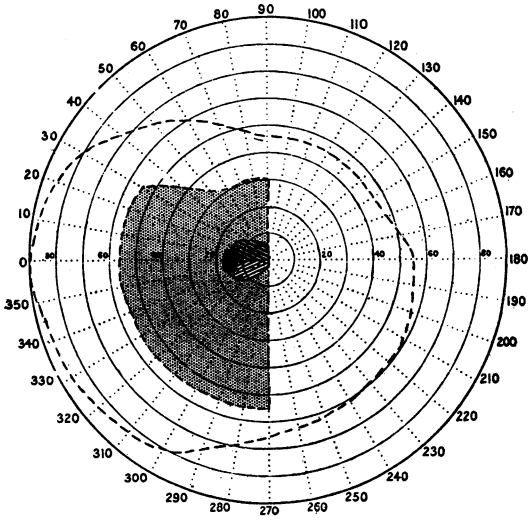

FIG. 13.

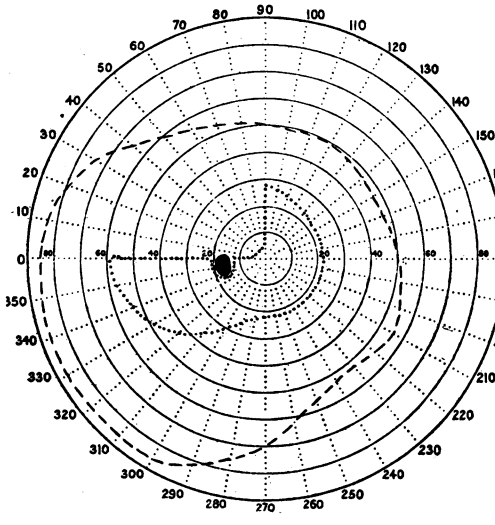

FIG 14.

field is smaller than before, temporal and hemianopic in type but extending centrally into the nasal side. In the left field the periphery is normal, the central part shows a quadrant defect for red 5/330 and for white 1/2,000, with a temporal hemianopic scotoma, denser in its upper quadrant, which spares the fixation point by about 0.25°. In the quadrant defect the visual loss for 1/2,000 white is only relative near the vertical meridian suggesting commencing recovery.

July 9.—Patient considers that during the last three weeks her eyes have been "well." On June 21 she had a peculiar "turn." She seemed to lose all power and this was followed by numbness lasting two or three hours. She has had three or four "weak turns" since then. Occasionally her hands get numb and cramp occurs in her legs and she sometimes feels tired.

R.V. 6/80 excentric; L.V. 6/6 all but two letters.

Both fields show further improvement (Fig. 16). The scotoma in the right field is smaller with a denser central part. In the left

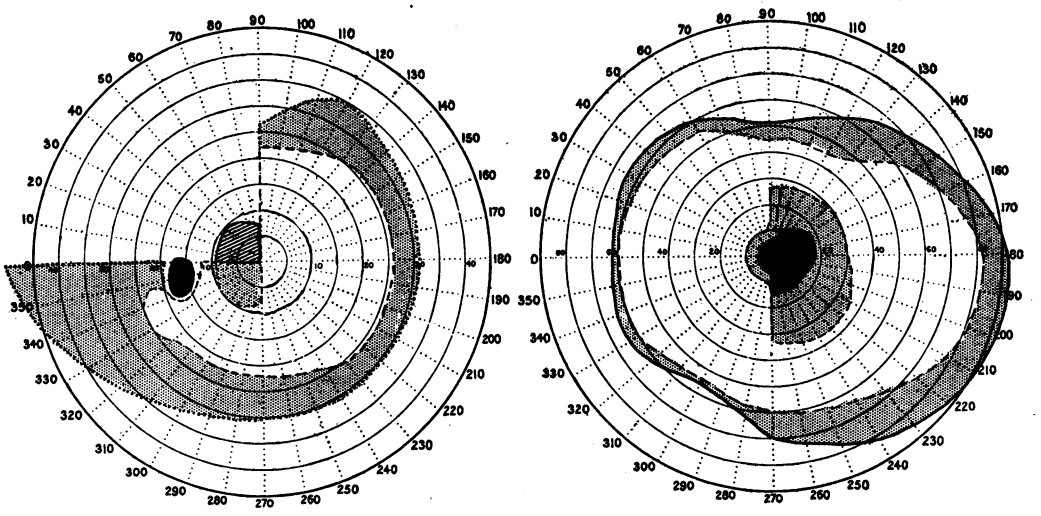

FIG. 15.

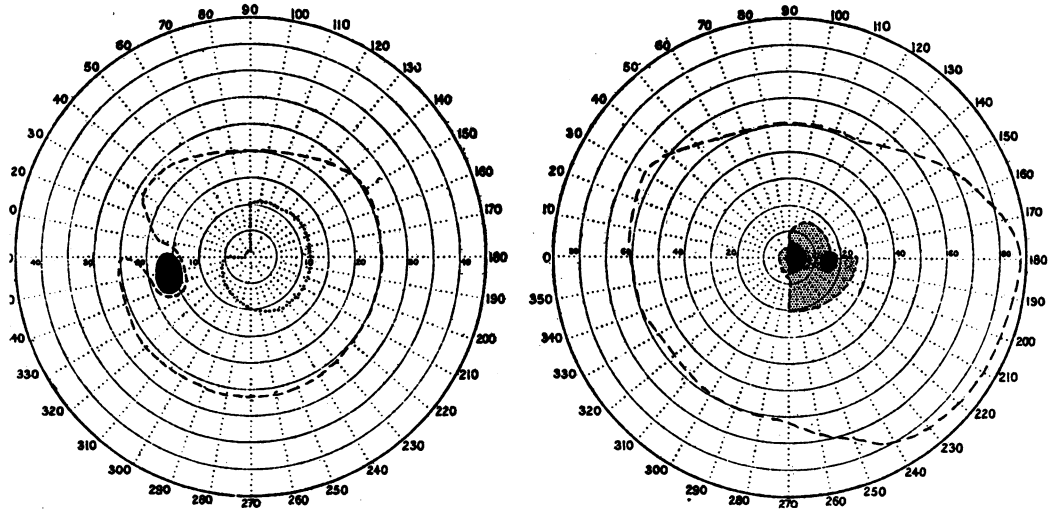

FIG. 16.

field (central area only shown) the isopter for 1/2,000 now nearly surrounds the blind-spot though the upper outer quadrant is still demonstrable by a red object if small enough.

August 8.—Improvement continues. R.V. 6/80; L.V. 6/6; optic discs as previously.

The most striking change is the rapid improvement in the right field. The periphery for 1/330 is normal; Fig. 17 gives the central field for 2/2,000 showing a hemianopic centrocaecal scotoma over-

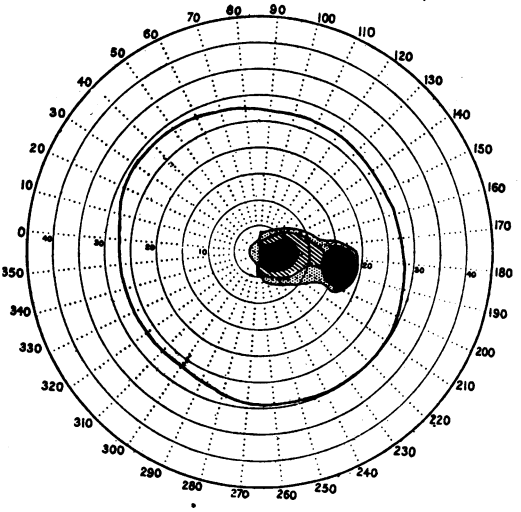

FIG. 17.

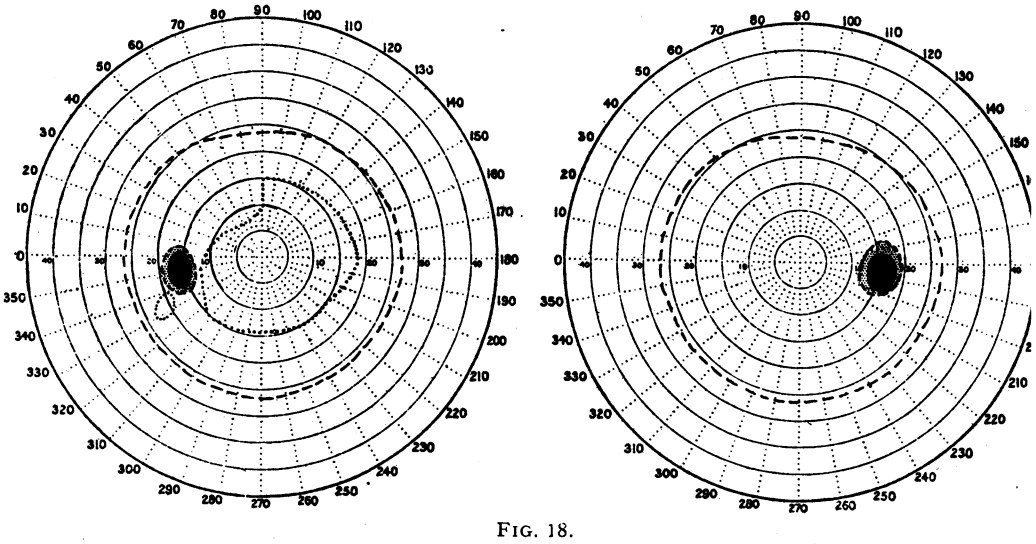

FIG. 18.

lapping the fixation point. The scotoma is smaller for 20, smaller still for 30/2,000. The central field was still too depressed for the use of a 1/2,000 test. The left field showed no defect at this date.

March 3, 1924.—Patient feels very well, has noticed no abnormal sensations or symptoms of any kind. R.V. = 6/6; optic disc greyish

and rather uniform in colour; L.V.=6/6; optic disc very nearly quite normal in appearance but shows a slight greyish tint throughout, which partly replaces or appears added to the normal healthy colour. Fields (central only) Fig. 18. Apart from a slight enlargement of the pericaecal amblyopic zone the right field shows no trace of any defect either at 330 mm. or 2,000 mm. Using a wide range of tests, the left field shows a temporal defect for 10/2,000 red, but complete restoration of the isopter for 1/2,000 white. This defect for red was evidently missed in August, 1923, and is not a recurrence. Note the little isolated patch for red, compare Fig. 12.

January 20, 1925.—Patient has a baby of four months and feels well in every way.

Comment

Although the patient could not date the failure of the right eye more closely than "within the last four years" it is probable that it was much more recent. By August, 1923, resolution was practically complete, at least as far as the left eye was concerned, so that the course of the disease lasted about three months. The complete recovery of the right field in the presence of a pathologically altered disc is unusual; as a rule in such cases evidence of conduction failure can be ascertained if the examination is sufficiently exhaustive. The light sense was not tested.

The fields indicate a lesion in the right optic nerve near its termination affecting both crossed and uncrossed central fibres and also the crossed peripheral fibres, especially the ventral bundle, and extending backwards into the chiasma far enough to catch some of the crossed fibres from the left retina, especially those from the lower inner retinal quadrant. If one assumes that this inference is correct these observations provide further clinical evidence that the ventral crossed fibres cross anteriorly in the chiasma. This view is opposed to that which was tentatively suggested in a previous paper[3] (and since abandoned by the writer), and is in accordance with the conclusions of Wilbrand and Saenger.

Case IV

Mrs. J., aged 36 years.

Seen June 1, 1921. Between two and three weeks ago she suddenly found that she could not see objects at a distance on her right hand side and could not see to read. No other symptoms were present. She is and has been quite healthy but suffers from headaches between the eyes which get easily tired.

R.V. 6/9; L.V. 6/9; letters to the right are missed occasionally.

With correcting lenses for myopic astigmatism vision R. and L. =6/6 part. Fundi normal. Fields, Fig. 19. There is some incongruity possibly partly due to the fields having been very rapidly done; the findings were not checked or confirmed in any way. The field changes consist of a homonymous hemianopic quadrant scotoma with a relative peripheral defect (objects 5, 1/330) and suggest a lesion in the upper part of the left tract rather than in the cortex or radiation.

The patient returned to her home in the country immediately after the consultation. The correction of the astigmatism relieved the headaches at once and the hemianopia disappeared in a week

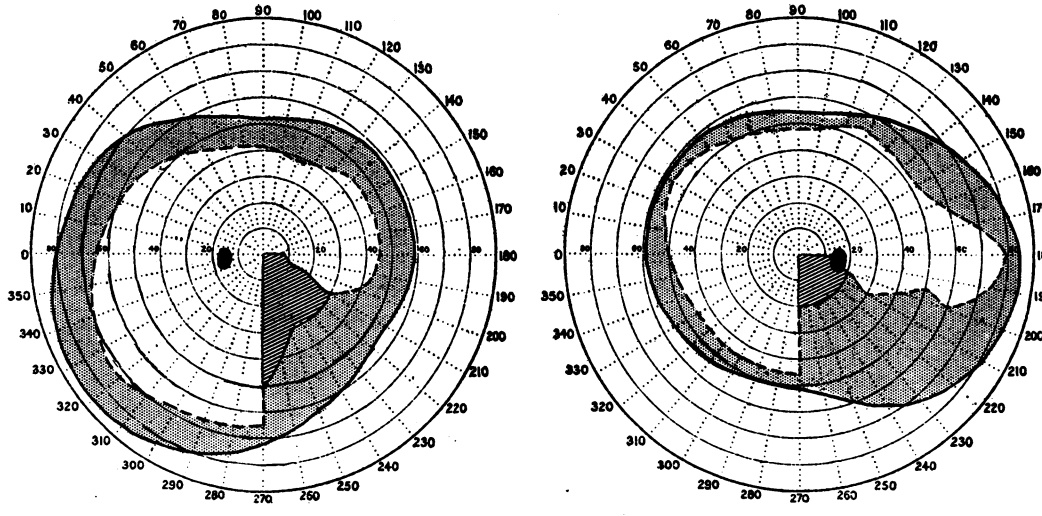

FIG. 19.

or two. When last heard from in March, 1924, her health had been uniformly good and her eyes had given no further trouble.

This appears to be an example of the same disease affecting a tract. Unfortunately owing to the patient's hurried visit further investigations were not possible, but the subsequent history and the information received from her own doctor suggest that, as in Cases 2 and 3, no abnormal conditions would have been found.

It will be seen that the features of these cases correspond closely to those recorded by Roenne and to those of the usual type of acute retrobulbar neuritis. All four cases occurred in women of ages varying from twenty-one to thirty-six years, the average being nearly twenty-eight. None showed at the time, or developed subsequently, any definite evidence of nervous diseases, the duration of observation having been two, three and a half, four, and thirteen years. Two of the cases complained of headaches and "bilious attacks," the others appeared to be in perfect health.

The field changes were characterized by pronounced central defects and relatively little peripheral disturbance. In the bitemporal cases the peculiar variation of the intensity in the apices of the different quadrants, typical of chiasmal scotomata, was well shown.

No marked swelling of the optic papilla was seen though this had evidently existed on the right, and was slightly present on the left side in Case III. Pallor of the discs was noted in two cases only (I and III). Practically complete visual recovery occurred in all, only the merest traces of previous disturbance being discoverable in the fields.

Pathology.—We may accept the view of Roenne[1] that these cases ". . . . are to be regarded as inflammatory or degenerative conditions, which have their starting-point in the chiasma or tract and form a group of certainly existing but little known primary lesions in this part of the visual path." The disease may be looked upon as related more or less closely to multiple sclerosis and to the optic neuritis which occurs in acute myelitis.

The occurrence of "bilious attacks" in two of my cases may have been a coincidence or may have some aetiological relationship, but on the basis of such a small material it would be unprofitable to indulge in speculation in this connection.

Diagnosis.—The recognition of the existence of this type of "retrobulbar neuritis" is essential in connection with diagnosis in the large group of conditions, which give rise to conduction interference in the subgeniculate visual path, and it is probable that, if exhaustive analysis of the field defects in cases of retrobulbar neuritis were more commonly practised, cases of this type would be more frequently found than they are at present. Since the changes in the less affected field may be minimal in degree and may not be betrayed by subjective disturbance appreciable by the patient, the apparently normal field in cases of retrobulbar neuritis, which seem to be unilateral, should be rigorously scrutinized by delicate tests. "Full vision" by Snellen's test with "normal field limits" may exist along with pathological field changes. Once the true character of the field changes is demonstrated the problem of diagnosis consists in the exclusion of other possible causes of interference in this part of the visual path. Of these local pressure —tumours or aneurysm—is one of the most important, and the diagnosis may be difficult if the case is only seen once and at an early stage. Only those tumours, which cause no symptoms other than visual loss and headache and no radiographic changes, are likely to cause confusion and in this small group the persistence and increase of the headaches and visual defects and the progressive involvement of the peripheral fields are of assistance. Although alterations in the field changes often occur in tumour cases, the

fleeting, rapidly variable, character of the defects typical of this disease is absent. Ophthalmoscopic evidence is of little determining value as the fundus may be normal or the disc may show various degrees of swelling or moderate pallor but neither complete whiteness nor persistent choked disc of intracranial pressure type occurs. In localized syphilitic basal meningitis bitemporal hemianopia with headache may be occasionally the only or almost the only symptom, but the field changes are grosser and other evidence is practically always forthcoming.

When the field defects are homonymous it is necessary to exclude a suprageniculate lesion. The presence of incongruity is of assistance here and also the character of the field defects; for suprageniculate lesions, apart from injuries and certain vascular conditions in the visual cortex, very rarely if ever cause central defects especially of a variable character. Apart from this the diagnosis from tumour and syphilis affecting the tract is based on the same considerations as in the case of the chiasma.

Prognosis and Treatment.—As in retrobulbar neuritis of the usual type the prognosis as regards recovery of sight appears to be excellent but should be guarded in respect of later development of nervous disease. Similarly, no special form of treatment is indicated.

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2. **Idem.**— *Ibid.*, II. S. 68, 1915.
3. **Traquair.**—*Brit. Jl. of Ophthal.*, April, June, 1917.
4. **Idem.**—*Trans. Ophthal. Soc. U.K.*, Vol. XLIII, p. 480, 1923.

TWO CASES OF NON-TRAUMATIC CYSTS OF THE ANTERIOR CHAMBER

BY

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ALTHOUGH I have found several records in the *Transactions of the Ophthalmological Society* of clear cysts of the anterior chamber, they are very uncommon, and until two years ago I had never seen a case. My excuse for describing these two cases is that I have been able to examine one of them with the slit-lamp, and am able to describe their appearance when magnified.

Both cases occurred in girls, both were in the right eye, and both in the same place, the lower inner quadrant. Any history of injury was definitely denied, and careful slit-lamp examination of the cornea and neighbourhood showed no trace of it. Both