or, more exactly, that embryonic tissue which becomes neuroglia from the brain cavity in the coming together of the two lateral halves of the frontal bone. In both cases, as far as the histories go, the tumor appears to be absolutely benign. In the first case the tumor had not changed in size from birth up to two years of age, according to the mother's observation. It was removed six months ago, nearly, and there is no sign of recurrence. It is about a year since the other case was first seen. During this time the growth has shown no apparent increase. The writer will endeavor to keep in touch with these cases, and if there are any new developments he will report them. A thorough search of medical literature for a period of more than ten years past reveals no other reported case of glioma of the nose.

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A CASE OF CEREBROSPINAL RHINORRHŒA, WITH RETINAL CHANGES.

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A REPORT of this case is important as a contribution to the collected cases of a very rare affection and likewise as an additional evidence of the importance of the eye-ground changes in obscure conditions affecting the central nervous system. In 1899 Dr. St. Clair Thomson published an elaborate and altogether admirable monograph which contains the fruits of a painstaking search through medical literature for instances of a curious affection of which the most conspicuous symptom is the spontaneous escape from the nose of cerebrospinal fluid. He succeeded in unearthing the clinical records of 20 cases in which a watery flow from the nostril could with reasonable certainty be regarded as originating from the cranial cavity. Many cases in which the predominance of evidence spoke for other possible sources of the watery flow—*e. g.*, nasal hydrorrhœa, dropsy of the antrum, serous accumulation in the maxillary sinus, vasomotor neuritis, and ruptured lymph tubes —were carefully differentiated and excluded.

These 20 cases, then, or 21 including the case investigated by Thomson, may properly be regarded as instances of this curious affection. In commenting upon his monograph the *British Medical Journal* has this to say, and in no better way than by quoting from its editorial can the debt which medicine owes to Dr. Thomson for his careful study of this little-understood disease be expressed: "From the dust-heaps of medical literature he has been able to unearth the details of no fewer than 8 undoubted cases similar to his own and 12 others which were probably of the same character. These cases were, as a rule, described and indexed under different titles. In addition, in the works of Willis and Morgagni, there are records of others which are suggestive of this condition; so that cerebrospinal rhinorrhœa is no new disease, but one which, though undoubtedly rare, may not be so uncommon as would at first be thought."

That the disease is indeed rare can be seen from the few reported cases and also from the fact that, in a personal letter to the authors, St. Clair Thomson states that, though constantly on the lookout for similar cases, his published case remains the only one in his experience. His large clinic at Kings College Hospital and the Throat Hospital has in over five years yielded no additional example of this affection.

At the time of Dr. Thomson's report such a case had an interest that at present does not exist. The escape of cerebrospinal fluid from the nose in quantities sufficient for purposes of examination gave an opportunity for the study of this fluid which up to that time did not often present itself. At the present time it is always an easy matter to obtain a sufficient amount by lumbar puncture for all purposes of laboratory study. It is scarcely to be wondered at that such men as Halliburton, Hill, and others should have made elaborate studies of the fluid from Thomson's case in regard to the chemical, bacteriological, and morphological contents of the collected specimens. Their work has made it possible to determine in a given case whether the fluid so obtained is cerebrospinal or simply a secretion from the nose due to other causes.

A certain number of the cases which have been reported and those contained in the original monograph have been accompanied by optic neuritis and optic atrophy. Of the 20 cases discussed by Dr. Thomson, 8 presented more or less severe affections of the nerve-head and retina adjacent. These 8 cases, which are probably all the cases in literature of cerebrospinal rhinorrhœa with ocular complications up to 1899, together with Freudenthal's and the present case, have been tabulated by us with reference to vision, the state of the pupils, the condition of the fundus oculi, the visual and color fields, the time relation of the ocular symptoms and the nasal flow, the nostril from which the fluid escaped, and miscellaneous ocular symptoms:

Auther.	Vision.	Pupils.	Fundus oculi.	Visual fields.	Time relation of ocular symptoms and nasal flow.	Flow from right or left nostril.	Other ocular symptoms.
Leber. Von Graefe's Arch f. Ophthalm., 1883, vol. xxix., Heft 1, p. 278.	O. D. V., fingers. O. S. V., hand motion. 4 yrs. later, O. D. V., 0. O. S. V., fingers.	React promptly.	Right disk blanched, papillary and retinal vessels narrowed. L. disk blanched, nasal border indistinct, smaller veins tortuous.	Greatly contracted except in upper vertical meridian.	Flow 5 years after failure of vision.	Left.	Color blindness.
Mackenzie. Trans. Intercolonial Med. Congress of Australasia, Third Sess. Sydney, 1892, p. 500.	V., p. l., both.	Partly dilated, equal, react slightly to light.	Optic neuritis, both; three years later, optic atrophy.	....	Flow 1 year after failure of vision.	Left.	
Kürner. Zeitschr. f. Ohrenheilk., July, 1897, Bd. xxxiii., Heft 1.	O. D. V., $^{5}/_{9}$. O. S. V., fingers.	R. normal, good light reaction. L. dilated, no reaction to light; reaction to accommodation present.	Optic atrophy, both.	.....	Flow several years after failure of vision	Left.	Slight prominence of globe; rotatory nystagmus; insufficiency of internal.
Baxter. Brain, January, 1882, vol. iv. p. 525.	O. D. V., $^{12}/_{60}$. O. S. V., $^{12}/_{60}$. Later vision failed nearly to blindness.	Equal, react well.	Optic neuritis, both.	Incomplete hemiopia, upper and outer quadrant of each visual field defective.	Flow 2 years before failure of vision.	Right.	Color perception normal.
Nettleship. Ophthalmic Review, 1883, vol. ii. p. 1.	O. D. V., $^{20}/_{100}$. O. D. V., $^{20}/_{70}$ with -1 sph. ○ -1.25 cyl. O. S. V., $^{20}/_{0}$, not improved.	Large and sluggish.	Postpapillitic atrophy, veins tortuous, vessels shrunken.	Greatly contracted, green field very small; in better eye field for red about equal to white field.	Flow 1 year after failure of vision.	Left.	Color perception normal.
Priestley Smith. Ophthalmic Review, 1885, vol. ii. p. 4.	O. D. V., faint p. l. O. S. V., 0.	.....	Disks atrophied.	.....	Flow 4 years after failure of vision.	Left, later right.	Horizontal nystagmus; R. eye making larger excursion than L. Nystagmus.
Priestley Smith. Ibid., p. 7.	V. both, 0.	Dilated.	Double optic neuritis, later atrophy.	.....	Flow 2 years after failure of vision.	Right, later left; right nostril occluded by polyp.	
Emrys-Jones. Ibid., 1888, vol. vii. p. 97.	O. D. V., $^{5}/_{0}$. O. S. V., fingers to outer side.	.....	R. Disk pale, atrophic L. well-marked atrophy.	Marked concentric contraction.	Flow 10 years before failure of vision.	More discharge from left than right.	Color perception normal.
Freudenthal. Virchow's Archiv, Bd. cixi. Heft 2, p. 328.	O. D. V., $^{20}/_{30}$. O. S. V., $^{20}/_{100}$.	React well.	R. mild grade of papillitis. L. neuroretinitis.	.....	Flow 6 months before failure of vision.	Left.	
Authers' Case.	O. D. H. 1.25, V. $^{16}/_{16}$. O. S. H. 1.25, Alt. 0.75, Me. 90, V. $^{16}/_{24}$.	Equal 4 mm. diameter, react sharply to light and accommodation.	Partial postpapillitic atrophy, both.	Moderate concentric contraction for white, more marked concentric contraction for blue, red, and green.	Flow 4 years after slight failure of vision.	Right.	Color perception normal.

In all cases the ophthalmoscopic pictures were strikingly similar: either a full-blown optic neuritis passing into atrophy, or typical postpapillitic atrophy. The pupils were usually dilated, reacting feebly to light stimulation. In 5 cases the visual fields were examined and found contracted. The only instance of examination of the color fields was in a case reported by Nettleship, who found the field for green very much contracted, while that for red almost equalled the white field. Central color perception was found normal in 4 cases; color blindness in 1. The severity of the inflammatory process and its destructive effect on the fibres of the optic nerve may be judged from the fact that the visual outcome in 5 cases was bare perception of light or total blindness. In the remainder, one eye, although presenting indubitable ophthalmoscopic evidence of participation in the inflammatory process, still retained a fair measure of vision. In the case reported by Emrys-Jones the better eye attained a vision of 6/6 after correction of its ametropia. Nystagmus was observed in 3 cases. Slight prominence of the globe and insufficiency of the interni were noted in 1 case (Körner).

In 4 cases it will be observed that the greater visual defect obtained in the eye on the same side as the nasal flow. Failure of vision preceded the establishment of the flow in 7 cases, the interval being from one to five years. In 3 cases the flow began several years before the onset of ocular symptoms.

CASE.—Miss Z., servant, aged thirty-two years, was referred to Dr. Schwab by Dr. H. W. Loeb, the laryngologist, for examination of her nervous system. Her chief symptom was a continuous watery discharge from the right nostril in the presence of an absolutely negative nasal and throat condition. Her family history indicates a definite neuropathic stock. One sister died in an insane asylum. Two brothers are living, of whom one shows many of the symptoms of the patient other than the nasal ones. One sister died of tuberculosis. The patient has always been considered of a nervous temperament, and she herself has been aware of this condition. Her history shows several attacks of illness of a vague nature, from which she recovered slowly under a more or less systematic rest. None of these attacks show any trace of an infectious or organic origin. Seven or eight years ago there was a period of a year or more during which she was not able to work for any length of time, yet with no definite symptoms other than fatigue. She was easily tired, had headaches frequently, and was unable to sleep. Rest and a vacation afforded relief. About four years ago she was suddenly attacked by a paralysis of the left leg, which compelled her to remain in bed for some weeks. The leg was not painful, but was stiff and weak. From this she recovered fully, no trace remaining. The present trouble began about two years ago, following a cold, or at any rate the patient first noticed at this time the discharge from the nostril. The fluid dropped continuously

from the nostril day and night. The amount varied from time to time from a few drops to 3 or 4 c.c. in an hour. When the patient is worried or fatigued the flow increases. The fluid is clear, tasteless, and does not stiffen or stain the handkerchief. If the patient reads or inclines the head to the right the amount of the escaping fluid is increased. There is no pain or any discomfort other than the necessity of always taking care of the discharge. Occasional headaches, of which the patient complains, are not in any way influenced by the amount of discharge. Six years ago the patient had an attack of "pink eye," recovering promptly under treatment. In 1899 she noticed some haziness of vision, accompanied by symptoms of asthenopia. The report obtained from the oculist who treated her at that time is as follows: "Neuroretinitis; swelling of 3 D. in the right disk; left disk, beginning atrophy."

The physical examination of the internal organs shows no abnormality. The nervous system gives evidence of a neurasthenic-hysteric group of symptoms, not particularly well marked. The knee-jerks are increased, as are the plantar and Achilles reflexes. The Babinski reflex is not present. The sensory system shows some anomalies. The conjunctiva and the pharyngeal mucosa are anæsthetic. There is a marked hyperæsthetic area in the small of the back, which is very tender to the slightest pressure. The fingers and hand show a very marked tremor, coarse and slow, not affected by rest or motion. The urine is normal with the exception of a rather high specific gravity. As all the specimens examined showed this high specific gravity, it is probable that the continual leakage of fluid from the nostril accounts for it. The patient is distinctly hypochondriacal, much interested in her condition, for which she is convinced a disease of the spinal cord is responsible.

Many specimens of the fluid were examined, collected under different conditions, and in varying amounts from a few drops to several cubic centimetres. There was little difference in the specimens so studied. The fluid is clear, odorless, and tasteless. Specific gravity about 1010. No albumin and no mucin were found. In one specimen there was obtained a reduction by Fehling's test. Centrifugalized specimens showed, beyond a few leukocytes, nothing abnormal and no other formed elements.

Ocular Examination. Pupils equal 4 mm. in diameter. Direct light reaction sharp. Consensual a little sluggish. Reaction to accommodation present. Ocular movements unrestricted in all directions. No tendency to outward deviation of either eye during strong convergence. With Maddox rod, esophoria 2°, no hyperphoria. Nystagmus absent. The accommodative power is normal for the age of the patient. The refraction, estimated under homatropine cycloplegia, proved to be: O. D.—H. 1.25 D.; V = 16/15. O. S.—H. 1.25; Ah. 75; Mc. 90; V = 16/24. Color perception normal. No central scotomata.

Ophthalmoscope. Right eye: Disk generally pale; outer margin clearly outlined, inner a little blurred. Veins moderately full and slightly tortuous. Arteries distinctly narrowed and "corkscrewy." Grayish stippling of retina around disk. Macula and periphery of fundus normal. Left eye: Disk blanched, the outer quadrant occupied hy a glistening white, semicircular area. Veins narrowed; arteries much contracted and "corkscrewy." Extensive grayish stippling of retina surrounding disk. Macula and periphery of fundus normal.

The charts show a moderate concentric contraction of the visual field for white and a more marked concentric contraction of the color fields. It will be noted that the degree of peripheral defect is greater in the left eye, which, visually and ophthalmoscopically, has evidently sustained the hrunt of the inflammatory mischief.

The dropping from the nose first observed in April, 1903, has always been from the right nostril. It did not appear, therefore, until four years after the onset of the neuroretinitis. The greater degree of atrophy is found in the nerve on the side opposite the dripping nostril. In hoth respects the case offers a contrast to the majority of the cases in the table.

The feature in which the present case differs conspicuously from the clinical picture of hitherto recorded cases of cerebrospinal rhinorrhœa consists in the preservation of a high and almost equal degree of visual acuity in both eyes, despite indubitable evidence of inflammatory and atrophic changes in both optic disks. It should he borne in mind, therefore, that while the type of optic neuritis in this disease is usually severe and greatly destructive of sight, a much milder form (Baxter, Nettleship, and the present case), running a typical inflammatory course without seriously impairing the fihres of the nerve, is occasionally encountered. Wholly unimpaired central visual acuity cannot justify the assumption that there is no disease of the optic nerve. A rigorous ocular examination, with especial reference to the visual and color fields, may disclose the presence of optic-nerve mischief in a majority if not in all cases of cerebrospinal rhinorrhœa. This phenomenon should then properly be regarded as an integral part of the symptom complex and not merely as a complication.

Since the puhlication of Dr. St. Clair Thomson's monograph, only one case of this condition associated with optic neuritis has, so far as we can ascertain, been recorded. Freudenthal describes a case of watery flow from the left nostril in which an optic neuritis developed eight months later. Vision reduced to O. D. 20/30; O. S. 20/100. The ophthalmoscope showed a mild grade of papillitis in the right eye and a frank neuroretinitis in the left.

The diagnosis of the case as one which properly belongs to that class of cases which St. Clair Thomson reports cannot be in much doubt. The chief question at issue is the decision in regard to the

CHART I.
White.

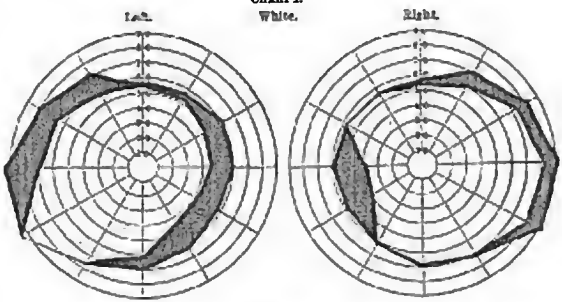


CHART II.
Blue.

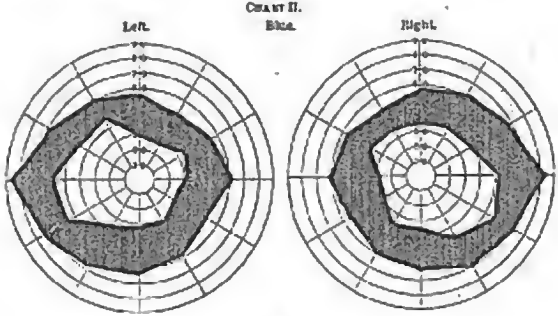
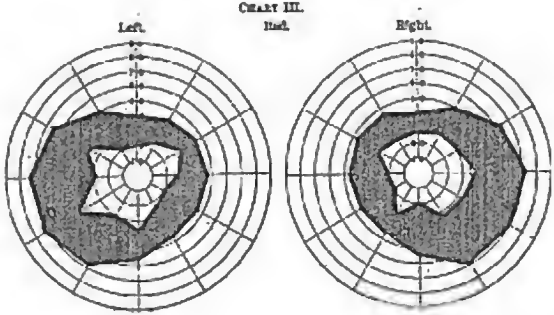
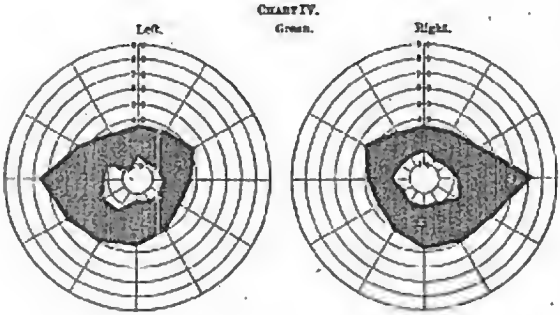


CHART III.
Red.





fluid. If it can be said to be cerebrospinal in character, then the diagnostic problem is solved. That it is possible to determine this with absolute certainty is due to the work of Halliburton and Hill, as was previously pointed out. Halliburton distinctly says that this fluid stands apart from all other similar fluids. "The diagnosis of cerebrospinal fluid from other forms of watery flux from the nose need not in future present any difficulty. The constant and long-continued escape from the nostril of a perfectly clear watery fluid should always arouse a suspicion as to its subarachnoid origin. When this fluid is found to be free from taste, smell, and sediment; when albumin and mucin are found to be practically absent from it, and when Fehling's solution is reduced by it, the suspicion becomes a certainty."[1]

In regard to the etiology of this strange affection we can add nothing of importance. Whether it is due to some inflammatory process or whether it is in part due to certain anatomical defects in the skull are at present open questions. The presence of the ocular changes are, therefore, of great importance because they seem to point to the fact that there must have been some general process of perhaps an inflammatory or circulatory character which first made itself evident in the optic nerve and then afterward gave rise to the other symptom, namely, the release of cerebrospinal fluid from the skull through the nose. The assumption that there is in some of these cases, particularly the one reported by Freudenthal, a cerebral tumor which is the causative agent we believe to be unfounded.

The point which we especially desire to emphasize is that the ocular changes in these cases are probably not accidental, but are an integral part of the disease of which they form one part and the escape of the cerebrospinal fluid forms the other.

[1] British Medical Journal editorial,