ter. If the reflex is not obtained, we must assume a lesion of the optic tract of the corresponding side. Light perception and pupillary reflex go in this case hand in hand. In a recent article Heddaeus himself expresses the opinion that for the present it is not justifiable to base the differential diagnosis between lesions of the optic tract and lesions of the fibres in their central course exclusively upon the absence or presence of this symptom (Deutsch. med. Wochenschr., 1893, No. 3).

In diseases of the chiasm hemianopia has been repeatedly met with, but in this case we have not a homonymous but a bitemporal hemianopia, as in the case of Oppenheim, where gummatous disease of the chiasm was responsible for the disturbance (cf. Virch. Arch., 1886, Bd. civ, 2, p. 306). Quite lately the same author has described an "oscillating" bitemporal hemianopia in diseases of the chiasm, which he considers as pathognomonic of basal cerebral syphilis (cf. lit.).

If the tissue injured by the lesion which has caused the hemianopia is capable of regeneration, as may be the case where we have a hæmorrhagé or an inflammation, the defect will pass off completely; whereas if this is not the case the trouble remains stationary, without, however, any additional disturbance of sight. Such a condition, which often develops as the consequence of an apoplexy, may persist for years, but no second attack, by which the centers of the other tract also may be disturbed, is to be feared, as such a thing has never been observed.

The examination in a case of hemianopia may (roughly) be conducted in the following manner: The patient is to be placed at a distance of about two feet from the examiner, and, if the right eye is to be examined, asked to cover his left eye with his hand, while with the right eye he fixes the left of the examiner who covers his own right eye. The examiner then holds up his finger between the patient and himself, and moves it in different directions as far as the border of his own field of vision, the patient at the same time being asked how far out he is able to see the finger. The examiner is thus enabled to notice every motion of the patient's eye toward the object, and, judging from his answers, can compare the patient's field of vision with his own. Instead of the finger, a small piece of white paper fastened on a dark penholder may be used in a similar way. These tests should be made in a good light (Donders, Gowers).

The more extensive defects can always be found out by this method; for slight ones a perimetric examination is indispensable. An accurate determination of the field of vision

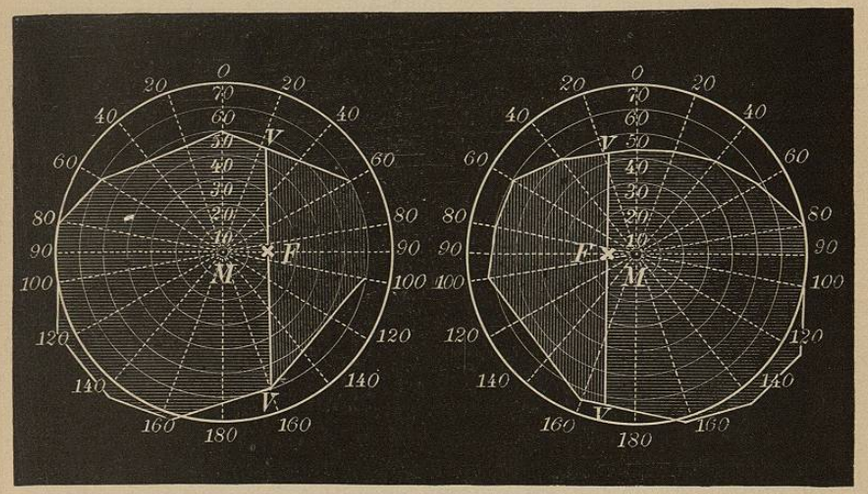

Fig. 4.—Field of Vision of the Left and Right Eye. (After Förster.)

with the help of the perimeter can only be attained by practice. A description of the instrument and its use is here

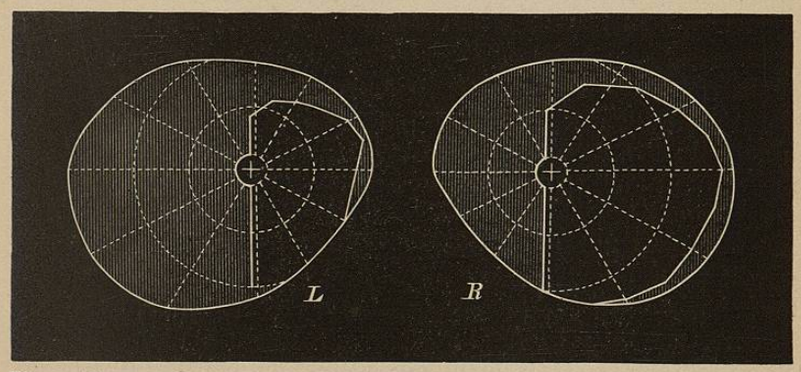

Fig. 5.—Field of Vision of the Left and Right Eye in Left-sided Hemianopia. (After Gowers.)

not necessary. Figs. 4 and 5 illustrate (1) the normal fields of the left and right side; (2) the fields in a case of left-sided hemianopia.

LITERATURE.

Oppenheim. Die oscillirende Hemiopia bitemporalis als Kriterium der basalen Hirnsyphilis. Berliner klin. Wochenschr., 1887, No. 36.
Freud. Ueber Hemiopie im frühesten Kindesalter. Wiener med. Wochenschr., 1888, No. 32.
Silex. Vorübergehende Hemiopie nach Keuchhusten. Berliner klin. Wochenschr., 1888, No. 42.
Wilbrand. Die hemiopischen Gesichtsfeldformen und das optische Wahrnehmungscentrum. Atlas hemiopischer Defecte, Wiesbaden, 1890.
Uthoff. Deutsche Med. Ztg., 1890, No. 10.
Wollenberg. Hemiopie als Folge von Tumoren in der hinteren Schädelgrube. Arch. f. Psych., 1890, xxi, No. 3.
Leyden. Ueber die hemiopische Pupillenstarre Wernicke's. Deutsche med. Wochenschr., 1892, No. 1.
Wilbrand. Ein Fall von Seelenblindheit und Hemiopie mit Sectionsbefund. Deutsche Zeitschr. f. Nervenhk., 1892, ii, No. 5 u. 6.

The so-called flitting scotoma (amaurosis partialis fugax, or temporary hemianopia) has in all probability also to be regarded as an affection of the center for vision. The disturbance comes on in paroxysms. At first a dark spot appears in the field of both eyes, which increases in a crescentic or horseshoe form. It begins to scintillate and becomes bounded by a bright zigzag line of brilliant colors. If this has after fifteen or twenty minutes reached the border of the field of vision, it disappears from the center toward the periphery and the field clears up again. Most probably in all cases the affection is bilateral. The attacks, which last from a half to three quarters of an hour, occur with variable frequency, sometimes only once during the whole life, and it is interesting to note that they are almost always associated with attacks of migraine. Of the causes nothing is known, although the belief that hard mental workers are especially prone to it is not without foundation; but there are numerous cases in which we are reduced to regarding sexual and alcoholic excesses, cold, etc., as ætiological factors. As we are not acquainted with any remedies for the disease, we have to be satisfied with prescribing tonics and strengthening diet, quinine, and, above all, mental as well as bodily rest. The so-called night terrors of children are probably to be regarded as due to irritation in the optic center (Soltmann).

The nature and the seat of those forms of amblyopia which develop under the influence of hysteria and of certain toxic substances are still obscure.

To this class of substances belong more especially alcohol, tobacco, and lead.

The alcoholic amblyopia is the most frequent form. In the mildest cases it manifests itself as a simple central amblyopia without distinct scotomata, without disturbances in color vision, and without contraction of the visual field; whereas in the most serious forms, which may occur after excessive indulgence in spirits, especially in persons of previously moderate habits, there may be an acute, almost total blindness. After the recurrence of such attacks a more severe form of atrophic disease of the optic nerve may develop, with which is associated discoloration of the whole disk. Central colored scotomata and simple scotomata, disturbances in color sense in the whole visual field, are then not rare. The ophthalmoscopic examination does not reveal anything very characteristic. Vision rarely becomes less than $\frac{1}{10}$ to $\frac{1}{20}$, and complete recovery even in the most marked cases is possible. The few examinations of the optic nerve which have been made after death seem to indicate that alcohol exerts a directly injurious action upon the nerve itself. The latter has several times been found in a state of fatty degeneration with or without compound granular corpuscles and thickening of the interstitial tissue which contains the vessels (Erismann, Leber, cf. lit.). Since it has recently also been shown that alcohol can act in a similar way upon the peripheral nerves this pathological condition is more easily understood.

Similar in its development and in its course is the so-called tobacco amblyopia, which, *cæteris paribus*, is, however, more rarely met with than the alcoholic form, and is more benign, inasmuch as it usually passes off after the cause is removed. The diagnosis is, as a rule, easy enough, as other signs of chronic nicotine poisoning (digestive disturbances, palpitation of the heart, insomnia) are rarely wanting. The disease seems only to occur among those who use tobacco in some form or other, in smokers or chewers, while the workers in tobacco, who are exposed to the inhalations of the tobacco dust and of a certain amount of nicotine, seem, so far as experience goes, not liable to the complaint.

The one form of amblyopia which has been more carefully studied than any other, but which nevertheless is not much better known or understood than the affections which we have just treated of, is lead amblyopia (amblyopia saturnina), in

which the field of vision may remain normal or in which there may have developed central scotomata or contraction of the visual field. Pronounced neuritis, with decided swelling of the disk and with peripapillary hæmorrhages, has been observed, and the termination in complete amaurosis is not rare.

Under certain still unknown conditions a sudden bilateral blindness may develop without previous decrease of vision—amaurosis saturnina. It is commonly preceded by lead colic. The affection, which bears a certain resemblance to the amaurosis of uræmia, may sometimes improve with remarkable readiness after the removal of the injurious cause.

In a given case we should, for the sake of confirming our diagnosis, never fail to search for other cerebral symptoms common to chronic lead poisoning, such as epileptiform attacks, hemiplegia, speech disturbances, and so forth.

About the relative frequency of the disease no definite statement is possible, nor do we know which particular occupation in the lead industry is the most dangerous, or after how long an exposure eye trouble develops in lead workers. The *rôle* which the so-called individual predisposition plays in this connection seems as important as it is obscure.

In the treatment of the alcoholic amblyopia, local bleeding with Heurteloup's cups, active purgation, diaphoretics, and later strychnine injections are of service. In tobacco amblyopia the treatment is the same, but bleeding may be dispensed with. In the saturnine form purgatives are indicated, also opium and subcutaneous injections of morphine. In all cases, however, the prompt and permanent removal of the injurious agent is a *sine qua non;* where this can not be done the outlook for recovery is always very doubtful.

Besides the substances mentioned, quinine, bisulphide of carbon (Becker, Centralblatt f. prakt. Augenheilk., 1889, p. 138), and mercury may lead to disturbances of sight, which in their course resemble those just described.

LITERATURE.

Graefe-Saemisch. Handbuch der gesammten Augenheilkunde., Bd. v, Theil v.
Leber. Die Krankheiten des Sehnerven, pp. 757 *et seq.* Leipzig, 1877.
Förster. Beziehungen der Allgemeinleiden u. Organerkrankungen zu Veränderungen u. Krankheiten des Sehorgans. Leipzig, Engelmann, 1877.
Plobin. Des troubles oculaires dans les maladies de l'encéphale. Paris, Baillière, 1880.
Magnus. Die Blindheit, ihre Entstehung und Verhütung. Breslau, Kern, 1883.

Schoeler und Uthoff. Beiträge zur Pathologie des Sehnerven und der Netzhaut bei Allgemeinerkrankungen. Berlin, Peters, 1884.
Jacobson. Beziehungen der Veränderungen u. Krankheiten des Sehorgans zu Allgemeinleiden u. Organ-Erkrankungen. Leipzig, Engelmann, 1885.
Peltesohn. Ursachen u. Verlauf der Sehnervenatrophie. Centralbl. f. prakt. Augenheilk., pp. 45, 75, 106. 1886.
Bergmeister. Die Intoxicationsamblyopien. Wien, 1886.
Nettleship. Lancet, July 16, 1887 (Quinine Amblyopia).
Uthoff. Untersuchungen über den Einfluss des chronischen Alkoholismus auf das menschl. Sehorgan. V. Graefe's Arch., Bd. xxxiii, Abthl. 1.
Deutschmann. Ueber Neuritis optica, bes. die sogen. Stauungspapille. Jena, Fischer, 1887.
Siemerling. Ein Fall von gummöser Erkrankung der Hirnbasis mit Betheiligung des Chiasma. Arch. f. Psych., xix, 2, pp. 401 *et seq.* 1888.