Prognosis bad.

Prognosis is generally unfavourable, but we must not give up all cases as hopelessly bad, for instances are recorded in which, although symptoms of advanced atrophy were present, the patient has regained a fair amount of sight. We may have considerable difficulty in determining the nature of the disease in its early stages, as the disc gradually becomes atrophied, and until it is decidedly whiter than in health, we shall hardly be able to assure ourselves that the loss of colour, noticeable in the early stages of the affection, is not the result of a temporary cause; but our diagnosis will be aided if the patient complaining of gradual loss of sight, which is not improved by either convex or concave glasses, and by the absence of any other symptoms or appearances, accounting for the impairment of vision. If in addition flashes of light are noticed before the eyes, and we can detect a gradual whitening of the papilla, we must necessarily be very anxious as to the result of the case—in fact, in spite of all we can do, the patient will probably become amaurotic.

Early diagnosis difficult.

Treatment.

Treatment.—This will of course vary with the nature of the case; but as progressive atrophy of the papilla is generally associated with disease of the nervous centre, our remedial measures must be mainly directed to that important part. Unfortunately the treatment of cerebral diseases is at present unsatisfactory in the extreme; it would seem, however, that we may hope to influence some obscure affections of the brain by the electro-magnetic current, and we may reasonably expect that more extended researches will throw fresh light on this subject as time rolls on. In the meantime we should endeavour to counteract or remove the more remote causes of these affections: thus if our patient is the subject of a gouty or rheumatic diathesis, we may look to these conditions as connected with the changes going on in the brain. Syphilis, again, and malarious influences, no doubt often play an important part in producing disease of the nervous centre, and should always enter into our consideration in the treatment of this class of cases. By carefully investigating all these points in the history of the disease, we may be able to do something to stay its progress; and although our task may be almost a hopeless one,

Unsatisfactory.

Must be directed to remote causes.

yet we are bound to do all in our power to save our patient from blindness.

Amblyopia and Amaurosis.

Amblyopia and Amaurosis, or partial and total loss of sight. I am bound to say a few words on this subject, before leaving the consideration of the diseases of the nervous apparatus of the eye; but I trust the foregoing part of this work has rendered the use of these terms almost unnecessary; that is to say, that we need seldom employ expressions so inclusive and vague at the present day, but be able, in almost every case, to assign a definite cause for the impairment or loss of vision, from which our patients may be suffering.

Terms almost obsolete.

Modern distribution of cases.

Dr. Bader classifies the causes of amblyopia and amaurosis under the following divisions:*—

I. Ocular (retinal, choroidal, or in the optic nerve).

II. Extra-ocular (orbital).

III. Cerebral or spinal.

This classification certainly seems to meet all the circumstances of these cases.

Ocular cases.

Blindness, whether partial or complete, arising from any of the causes first mentioned, will be found discussed under the heads of disease of the retina, choroid, and optic nerve.

Orbital.

As an instance of the second class, I may refer to the remarks made upon inflammation of the cellular tissue of the orbit inducing atrophy of the optic nerve. Another instance of the kind is amaurosis following wounds and injuries of the supra-orbital nerve. Exophthalmos and its causes all come under this heading, as being either directly or indirectly the cause of amaurosis. Lastly, absolute or total blindness may be induced by intra-cranial tumours pressing on the optic tracts and vessels of the optic nerve, or from apoplexy, softening, or tubercular disease of the brain or its membranes, as well as by injuries involving the base of the brain.

Intra-cranial.

Symptomatic of various dyscrasiæ.

Amaurosis, or amblyopia, may occur, among other symptoms, in albuminuria, syphilis, diabetes, and embolism, and "during irregular menstruation, preg-

* *Guy's Hospital Reports* vol. xii. p. 578.

nancy, parturition, or lactation." In the latter group of cases the affection is usually functional, and disappears after its exciting cause has been removed. After prolonged lactation, for instance, dimness of vision is often induced by anæmia of the retina, and can only be cured by giving up nursing and resorting to a tonic plan of treatment.

General considerations regarding amaurosis.

Without, however, entering at length into subjects already treated of in previous sections of this work, it seems desirable to make a few further remarks on partial loss of sight (amblyopia), and complete loss of sight (amaurosis).

State of visual field.

In attempting to appreciate the circumstances of the class of cases under consideration, we cannot place too much stress upon the importance of carefully ascertaining the condition of the field of vision; its periphery may be comparatively perfect, while the central portion of the visual field is incapable of appreciating the stimulus of light, or *vice versâ*. In either case, the retina and optic disc may appear, when examined by means of the ophthalmoscope, to be healthy, the impairment of vision being the main and prominent feature in the case. We should note with reference to the conditions of the visual field if this fault be simply an interruption only, as in scotoma; or if the impairment of vision extends from the periphery towards the axis of vision. Scotoma is far more likely to attract the patient's attention than the more insidious and dangerously progressive loss of sight, not unfrequently the precursor of amaurosis, due to loss of the sensitive power of the retina, and advancing from without towards the axis of vision.

Centripetal contraction.

Fault begins on outer side of retina.

As a general rule, amblyopic contractions of the field of vision commence on the temporal side of the retina, sometimes on the nasal side, but never above or below the axis of vision; the contraction of the field advances from without inwards, so that ultimately the visual field is slit-shaped, the whole of its outer and inner parts being dark, that is, incapable of visual impressions. Hemiopic contractions of the visual field sometimes affect one-half of each retina only, either simultaneously or within a short time of each other, indicating disease of one root of the optic nerve; but in cases of this kind the lines of the visual field are so sharply defined in either eye, that they lead us at

once to a probably accurate diagnosis of the nature of the defect complained of, and nature of the lesion upon which these symptoms depend.

State of pupil.

The condition of the pupil will naturally attract our attention in cases of amblyopia and amaurosis; immobility of the pupil is only found in complete amaurosis, or when paralysis of the ciliary system, or mechanical hindrances, render the movements of the iris impracticable.

Unsteady movement of affected eye.

The unsteady and generally excessive movement of the amaurotic eye is also very characteristic.

Causes and Prognosis.

Causes and Prognosis.—Amaurosis or amblyopia may arise from mechanical causes, as for instance from a blow on the eye separating the retina from its attachments, and rupturing one or more of the vessels, the hæmorrhagic effusion breaking down the delicate nervous structure of the retina. Similar results may of course follow hæmorrhage proceeding from the rupture of a diseased vessel. Loss of sight thus produced may improve, especially if the case is a recent one, and the optic disc appears healthy; but if the papilla indicates advancing atrophy, the prognosis is most unfavourable. Under this class of cases we may also place instances of embolia of the central artery of the retina.

Mechanical causes.

From loss of blood.

Impairment and loss of sight occurring after profuse hæmorrhage, whether from the uterus, stomach, or other organs of the body, if it comes on rapidly and is complete, is generally incurable. This form of amaurosis may sometimes, however, commence in a gradual failure of the acuteness of vision in the whole visual field, generally with lateral limitations, at first, perhaps, disappearing for a time, returning, however, too surely, and terminating as above indicated. It may happen that we can discover nothing abnormal with the ophthalmoscope; nevertheless we cannot hold out hopes of recovery to the patient, as some would suppose, with a return of the normal blood supply.

Prognosis.

The same remarks are applicable to instances of complete loss of sight following over-suckling. In these instances it is more than probable that the nutrition of the nerve elements of the retina having been impaired, these delicate structures have undergone irreparable changes leading to loss of vision.

In pregnancy.

I have seen two cases of amblyopia coming on during pregnancy, without any appreciable cause, and

very similar to the instance related by Mr. Lawson.* In these cases, however, I detected slight effusion over the optic disc; the loss of sight was gradual from the seventh month to the time of delivery, and did not subsequently improve. In cases of amblyopia coming on during gestation, although the ophthalmoscope may not demonstrate any marked disease, I should be inclined to give a very cautious prognosis.

In diabetes.

In this class of cases we must also place amaurosis met with from time to time among diabetic patients, although it is very probable the impairment of sight is in the first instance due to paralysis of the accommodation.

From lead.

Amaurosis in cases of severe lead poisoning is attributable to a like cause. (P. 442.) In all these affections improvement of sight may from time to time occur; atrophy of the papilla, however, too surely follows, sooner or later, and with it total blindness.

From toxhæmia in general.

Another form of amaurosis is that which depends on blood poisoning, as it is called, but which we may in the present state of our knowledge better describe as Stellwag does, as originating from the action on the brain of certain morbid or foreign materials in the blood. It is by no means clear if these foreign materials affect the optic nerve and retina directly, as atropine does the ciliary nerves, or if the loss of vision is due to secondary conditions, brought about by organic changes, chiefly of a proliferative kind, and terminating in white atrophy of the optic disc.† Among the most important of this class of cases may be mentioned uræmic amaurosis, that from lead poisoning, from opium, tobacco, the over-use of mydriatics, nux vomica, and quinine, and alcohol.

Alcoholic amblyopia.

With reference to the influence of alcoholism on the sight, M. Galezowski remarks, that amblyopia from this cause is only met with among men. I agree with him that the following are the characteristic symptoms of this form of blindness:—1. The patients perceive that their sight has become somewhat suddenly enfeebled, but it then remains in a stationary condition for several weeks.

Sight impaired.

2. The acuteness of vision is sensibly diminished, the patients being scarcely able to read the characters 8 or 10 of the author's typographical scale; while in some cases they cannot distinguish even the largest, as No. 50. 3. Distant vision is much diminished, the face of a person not being recognisable at some paces distance. A sort of white haze seems to envelope every object. 4. A kind of nyctalopia accompanies this form of amblyopia, the patients seeing more distinctly as the evening approaches; the haze then being less apparent. 5. The perversion of the chromatic faculty is not less characteristic. Carmine, red, and green are often confounded with each other; violet is taken for red, and yellow for red. . . . . 6. These patients frequently see double or triple, probably on account of spasmodic contractions of the muscles of the eye. A waiter at a *café* lost his situation because as he saw every cup double, he poured the coffee on the outside of it. . . . . 7. The amblyopia is very frequently accompanied by visual hallucinations, which are, however, rather due to a cerebral than an ocular affection. 8. The pupils are not alike in the two eyes, one being generally larger than the other, and often irregular. No other alteration is observed in the exterior of the eyes. Ophthalmoscopic examination, as a general rule, only furnishes negative results, the papilla of the optic nerve remaining of its normal colour. In some cases, however, there may be observed a kind of serous suffusion, especially in the vicinity of the vessels. The arteries in some places exhibit spasmodic contractions, while the veins are tortuous and gorged. This disposition is observed to be more marked as the disease becomes prolonged, and then the papilla of the optic nerve is pale and whitened, without, however, exhibiting that pearly whiteness which is met with in progressive atrophy of the papilla.

Day and colour blindness.

Double vision.

Ocular spectra.

Ophthalmoscopic signs.

The differential diagnosis of the disease need not be insisted upon after the above statement of symptoms, which proves that alcoholic amblyopia is an affection of the eye apart, which can only be simulated by commencing atrophy of the papilla. But any doubts that may be entertained become dissipated in the subsequent course of the affection; for, while the atrophy advances progressively, the amblyopia remains stationary for weeks or months. It may even be com-

Diagnosis

* *Ophthalmic Hospital Reports*, vol. iv. p. 66.

† Stellwag von Carion, "Diseases of the Eye." By Hackley and Roosa, p. 668.

pletely cured, to return again after renewed excesses in drinking.

Pathology. With respect to the pathology of this form of amblyopia, M. Galezowski says that "it is due to a kind of paresis of the longitudinal muscular fibres of the arteries, which act in dilating them, and to a spasmodic contraction of the circular fibres of these same vessels. The blood does not arrive in a sufficient quantity for the arteries, while the veins undergo a kind of passive stasis." In conformity with this view,

Treatment. a collyrium of éserine or calabarine has been employed as a means of inducing relaxation of the spasmodic contraction of the arteries. The efficacy of this agent is incontestable, for the patients are immediately relieved, seeing better during the whole period that its action continues, while its daily use leads to a sensible amelioration. In many of the cases large doses of bromide of potassium have produced sensible amelioration, confirming M. Gübler's good opinion of that medicine in the treatment of alcoholism in general.*

Summary. To sum up:—1. The disease appears as a consequence of prolonged indulgence in alcoholic drinks, and especially when these are taken fasting or before dinner. 2. Bad food and a wretched condition of existence predispose to its development. 3. Complete abstinence from alcoholic drinks during several weeks or months is an indispensable condition for recovery. 4. The bromide of potassium is a very efficacious remedy: and the éserine collyrium is one of the best means of combating the visual disturbance. 5. This amblyopia is tractable when combated at an early period; but later it becomes a serious affection, which is very difficult of cure.

Amaurosis in fevers. In another class of cases of amaurosis, arising apparently from alterations in the condition of the blood, the blindness may be only temporary, such for instance as partial or complete loss of sight after an attack of typhus fever, or scarlet fever. The blindness usually comes on suddenly, lasting for two or three days, and then returning. But it is remarkable

State of the pupil. that in many of these instances the pupil responds to the stimulus of light; and this is a significant point

* *Medical Times and Gazette*, 1871, vol. i. p. 520.

as a guide to prognosis, for if the pupil retains its activity, however great the blindness may be, we may, in the above mentioned cases, offer a favourable prognosis, for the facts indicate that whatever the cause of the loss of sight, it must be situated between the corpora quadrigemina and that portion of the brain in which the perception of light is localized.

Colour-blindness in relation to Amblyopia. The ability to discern colours is injured in various affections of the eye, and has been a matter of attention by many observers, but we yet do not possess exact information on its relation either to the healthy or morbid states of the organ of sight. The most common cases in which this defect appears are those of atrophy of the optic nerve. Dr. Leber has investi- Leber's Researches. gated thirty-six cases of this kind, all of which had amblyopia and limitation of the visual field, and in all but three there were anomalies in the perception of colour. This defect occurs under every form of nerve-atrophy, the simple, the inflammatory, and the glaucomatous, as well as in every degree of amblyopia. Even where sight is not much injured, colour-blindness may be very marked. The prognosis of the nerve-affection is not modified for better or for worse, by the loss of colour-perception. The colour to which patients are most frequently insensitive is red, while blue is best preserved: green appears yellowish or grey; rose and violet, bluish; yellow commonly appears yellow. In the later stages of the malady only the bluish shades are apt to be recognised, all others appearing whitish, grey, or dark. This corresponds closely with what is true of the normal eye during deep twilight.

In hemiopia. In three cases of *hemiopia* there was no defect of colour-perception in the sound half of the field. In one of these cases vision was nearly restored, but on the blinded side the colour-sense remained defective. Quaglino and Boys de Loury published each a case of hemiopia in which there was absolute colour-blindness for the remaining field.

Rare in amblyopia without central scotoma. An extremely interesting class of cases are those of amblyopia and central scotoma without ophthalmoscopic lesions. The amblyopia occurs without central scotoma; and in these cases there is little derangement of the perception of colour. Out of twenty-one cases of amblyopia without scotoma, only three were

unable to distinguish red. These patients acquire their amblyopia from abuse of alcohol, tobacco, and other toxic substances, a few from anæmia and malnutrition. This assertion appears to be supported by the fact that, out of eighty-one cases of amblyopia, in which there were no ophthalmoscopic lesions and no central scotoma, there were seventy-five men and six women.

Constant with central scotoma.

But cases of amblyopia without visible lesion, but with central scotoma, present marked impairment of sense of colour. At an early stage of these cases is to be found sometimes a faint, striated haziness of the border of the papilla and neighbouring retina, which resembles syphilitic retinitis, but, unlike the latter, extends only a little distance into the retina. Twice there were evidences of diffused retinitis; in several cases there were isolated hæmorrhages; but generally no changes could be seen by the ophthalmoscope. At a later period the papilla is apt to show alteration of tissue in pallor or slight bluishness of its outer half—a sign of partial atrophy at least in some of the cases. Of this class of cases fifty-six were seen, and in thirty-one the perception of colour tested; of which in all there was a discernible impairment. So uniform was this fact that it may be taken as a means of diagnosis of the existence of central scotoma.

Central scotoma a disease of men;

Central scotoma generally affects both eyes, though to unequal degrees, and simultaneously. It is a disease of men almost exclusively. It affects those above twenty years of age, and increases in frequency to forty years. Abuse of alcoholic drink and of tobacco-smoking are often assigned as causes, while exposure to cold and wet also have a part. In some cases syphilis is the probable cause.

Mostly a form of optic neuritis.

There are reasons for believing that the seat of central scotoma is often not situated in the retina, nor the brain, but in the trunk of the optic nerve between the chiasm and the globe, and is the result of neuritis. There are anatomical and pathological reasons for the assertion that the fibres which go to the rods and cones at the macula lutea are situated on the superficial parts of the nerve-trunk, and those which belong to the periphery lie nearer to the centre of the nerve. A perineuritis would, there, explain the symptom of central scotoma.

Prognosis and Treatment.

The results of treatment are always much less favourable in amblyopia with central scotoma, than in amblyopia without scotoma. If the colour-blindness reach to the periphery of the field, and the nerve show manifest signs of atrophy, treatment will be almost fruitless. The therapeutics must be suited to the state of the individual, but in general they are blood-letting, sudorifics, purgatives, and tonics. In some cases iodide of potassium in small doses has proved of unexpected value after other things had been tried in vain.*

Amaurosis from local hyperæmia.

In considering the subject of diseases of the retina and optic nerves, I have mentioned my conviction as to hyperæmia of the vessels of these structures not unfrequently leading to degenerative changes in the nerve elements of the retina ending in amaurosis. It is probable that under these circumstances not only does increased proliferation take place in the connective corpuscles, but the serous exudation arising from blood stasis is apt to damage the delicate structures among which it is infiltrated. For similar reasons we may meet with an undoubted congestive form of amaurosis consequent on a too powerful action of the heart, and which may disappear when the disturbance in the circulation has subsided. Intracranial overloading of the blood-vessels may lead to a similar result, and will be accompanied by symptoms of cerebral hyperæmia; the loss of sight is often very sudden, and may as rapidly recede on the removal of the exciting cause; among such causes may be mentioned, interruption of the menses, mental excitement, excessive vomiting, or muscular exertion.

In heart disease.

Impairment of sight, depending on disease of the heart, is by no means of frequent occurrence; when it does take place it is attended by the following alterations:—

Ophthalmoscopic signs:

Congestion.

1. *Capillary congestions of the retina and venous varicosities.*— Sometimes there are venous stases in the retina, but their progress is slow and gradual, so that vision is in no way troubled. It is only in exceptional cases that the venous congestion occasions disorders of vision either constant or periodical; but then we have

* "Colour-blindness," by Dr. Leber; *vide* "Report on Progress of Ophthalmology for 1870," G. H. D. Noyes, M.D., *New York Medical Journal*, Feb. 1871, p. 209.

no longer simple varices in the principal branches, but capillary congestions of the retina more or less marked.

The venous stases of the retina are to be sought for especially in the capillary branches. An ophthalmoscopic examination with inverted images is not sufficient to make out this capillary stasis; we must have an erect image and a strong magnifying power.

Extravasation.

2. *Extravasation of blood into the retina and optic nerves.*—In heart disease effusions into the retina are the most common of all alterations. They take place both from the over-powerful impulse of a hypertrophied heart, or, what is more common, from the insufficient impulse of the same organ when enfeebled. The rupture of the capillaries is sometimes prepared for by an alteration in the coats of the vessels. Generally only one or two branches are ruptured, and a single eye affected. In effusions of blood into both eyeballs we ought to suspect the presence of albuminuria or diabetes, &c.

Exudation.

3. *Exudations from the retina.*—In these cases effusions of blood are observed in the course of the arteries. Often one or two principal branches are ruptured, and a considerable quantity of blood effused. Besides these extravasations we see white spots of exudation over different parts of the retina, especially round about the yellow spot. The affection is now no longer confined to a single eye.

Embolism.

4. *Embolisms of the central artery of the retina.*—These are followed by weakness, or total loss of vision, coming on without any warning. The central arteries are contracted; the retina takes at first a white colour, the result of serous suffusion. There is a red spot more or less marked beside the macula lutea, and the vessels which supply it are congested.*

It is hardly necessary for me again to discuss the subject of optic neuritis and white atrophy of the optic disc, as leading to loss of sight; but I would refer the reader to the sections treating specially on these affections in reference to their being a cause of amaurosis. But we may with advantage glance at some of the principal affections of the brain, leading to progressive atrophy of the optic nerve and ultimate loss of sight.

Amaurosis in brain diseases.

* Dobell's report on Progress of Medicine, vol. ii. p. 24.

In basilar meningitis.

Basilar meningitis, especially in its chronic form, may induce amaurosis. The patient suffers probably from fever, and great pain in the head increased on tapping the side of the head; vomiting, and so on, may be present. As this disease extends, several of the large nerves springing from the base of the brain become paralysed, among them the optic nerve. The blindness occurs with the head symptoms, and often runs its course rapidly in the more acute cases; but in the chronic form of the disease, the characters of the phenomena vary, and the appearances noticed with the ophthalmoscope are less those of neuritis than of white atrophy. It occasionally happens that the amaurosis follows this attack of meningitis in place of accompanying it, and is explicable on the supposition that the neo-plastic growths consequent on the inflammation have grown on and around the vascular and nerve structures, leading to their gradual wasting and decay.

In Cranial Periostitis.

Periostitis of the base of the brain may produce amaurosis, either of one or both eyes, or only hemiopia, according to the situation of the new growth. The amaurosis under these circumstances is probably most frequently induced from an extension of the inflammatory process to the sheath of the nerve; and as this action may be acute or chronic, so, as a general rule, shall we notice symptoms of neuritis or simply white atrophy.

From cerebral tumours.

Tumours of the base of the brain are doubtless sometimes the cause of loss of sight; involving, as they necessarily must do at times, the optic nerve. In the greater number of such cases loss of vision is brought about by means of the pressure of the morbid growth on the optic nerve, leading to white atrophy of the disc. It may be that the tumour, by exciting irritation in the structures among which it grows, may, either directly, or by involving neighbouring parts, lead to optic neuritis and its ophthalmoscopic appearances.

In acute diseases of the brain.

Acute disease of the brain in its various forms may result in amaurosis, such, for instance, as abscesses, softening, tumours of various kinds, cerebral hæmorrhage, and so on. The uncertainty in the diagnosis of disease of this description renders it very difficult for us to trace out the exact train of causes which result in loss of sight, although we may easily under-

stand that any affection of the brain involving fibres continuous with those of the optic nerve, may compromise the integrity of the patient's sight. As the action on the nerve element is primary, or following upon irritation propagated from neighbouring structures, so will the disc, as a general rule, give evidence of white atrophy or of optic neuritis.

In spinal diseases.

Disease of the spinal cord is also a cause of partial, or complete amaurosis, the loss of sight being generally preceded by symptoms of spinal disease.* We must bear in mind the fact, that impairment of vision may occur in affections of the spine, from paralysis of the nerves which supply the ciliary muscle, causing loss of power of accommodation.

Prognosis.

Prognosis.—This is frequently rendered most doubtful, in consequence of the obscure nature of intracranial disease. But whatever the cause of the loss of sight, if the pupil responds to the stimulus of light, our prognosis will be a favourable one. As a general rule, our prognosis will be unfavourable if white atrophy of the optic disc exists. If it proceeds from deeply-lying parts it very probably will attack the root of the nerve, and so affect both eyes. In some few cases white atrophy of the disc has become stationary, and even recovery is said to have taken place from this condition; nevertheless, such cases are extremely rare. We should hardly judge of the condition of the patient's sight from the appearance of the disc; it may happen that the vision is better than the state of the optic disc would lead us to imagine.

Bad in white atrophy.

Better in optic neuritis.

Optic neuritis, though a formidable disease, presents a better hope of amendment than white atrophy. In these cases we rather dread the long-continued loss of sight than the more startling instances of rapid loss of vision, and the same remark applies to instances of white atrophy. If any sight remains we must, of course, carefully examine the state of visual field; and, as a rule, our prognosis must be unfavourable if we discover concentric limitation of the visual field—the more so, if the lateral limitation is irregular, as this condition generally depends on apoplectic destruction of tissue. Stellwag von Carion observes, if hemiopia

Condition of the visual field.

* Dr. Argyll Robertson, *Edin. Med. Journal*, Feb. 1869.

occurs on the same side of both eyes, and is sharply bounded by the vertical line of separation of both visual fields, and also if it be accompanied by atrophy of the corresponding half of the optic papilla, it is to a certain extent favourable; that is, it is seldom followed by complete blindness, especially when it has existed for some time unchanged. But if the loss of vision advances with indistinct outlines over the centre of the retina, the worst is generally to be feared. In the remaining varieties of hemiopia the conditions are too unfavourable for the limitation of the original disease to enable us to hope for a pause in its progress. Such cases generally go on to complete blindness, with progressive atrophy of the optic nerve.

Sharp limits favourable.

Small lateral limitations act in about the same way. A further increase is not probable, whether the defect is monocular or symmetrical in both eyes, if it ends in a sharp line far from the centre, and if the relative sharpness of vision be normal in the other parts of the field of vision, and if, besides, the defect has not existed for a very long time. But limitations with very indistinct and irregular borders, with evident diminution of the relative acuteness of vision in the remaining parts of the field, cause us to give the worst prognosis. This is true even if the atrophy be not yet observed. The patient is in a particularly bad state when repeated examination shows a continuous loss of sight, and the appearance of similar defects in the other eye. Then we certainly have a progressive atrophy, which seldom ceases before complete amaurosis results.

Ill defined ones bad.

Limited interruptions.

Central and eccentric interruptions, when they occur in a visual field which is in other respects normal, are not apt to depend on progressive atrophy. We may exclude the idea of the latter, when the interruptions have been of the same extent for a long time. It is all the same, then, whether they exist in one eye or both; even a partial paleness of the optic papilla does not alter the case. But we generally have a progressive atrophy when they are combined with marked lessening of the relative acuteness of vision in the remaining portions of the visual field, especially when the loss of vision decreases very irregularly in different directions towards the periphery.

Treatment.

Treatment.—This must, of course, depend on the

cause of the amaurosis; in one case drugs, in another electricity, may be employed; and in all, as far as practicable, the state of the patient's general health should be carefully attended to. I may mention one point, and that is with reference to the use of spectacles; in all forms of amblyopia we may with advantage limit the patient to use the lowest convex glasses he can see with, and it may very possibly happen that subsequently he may be able to get on with a higher power, the sight improving under the use of convex glasses, which not only save a strain on the accommodation of the eye, but increase the clearness of letters and other small objects.

Spectacles.

CHAPTER XII.

DISEASES OF THE VITREOUS.

Hyalitis—Muscæ—Opacity: syphilitic and anæmic—Films—Fluid vitreous—Sparkling synchysis—Hæmorrhage—Entozoa—Foreign bodies.

Hyalitis, or Inflammation of the Vitreous, may be induced by the presence of a foreign body, purposely passed through the vitreous chamber.* In instances of this kind, Donders describes changes occurring around the foreign substance, similar to those noticed in other parts of the body during inflammation. Hyalitis. Simple form rare.

These pathological alterations may occasionally be traced when a foreign body, such as a piece of gun-cap, has accidentally passed into the vitreous. From proliferation of its cells the vitreous becomes hazy, the foreign body being enveloped in a greyish layer of opaque material, and branching out from this centre of irritation opaque streaks may be observed. Subsequently the connective tissue breaks down, and the vitreous having become fluid, thread-like fibres may be seen floating about in it. These instances, however, must be very rare, for in the majority of cases the choroid and retina become involved, and it is then impossible to determine how far the changes observed in the vitreous are due to extraneous sources. Mostly complicated.

Pus doubtless collects at times in the inferior part of the vitreous chamber, especially after the operation of reclination of the lens, forming what is called a posterior hypopion; but I am not disposed to admit the existence of such a disease as idiopathic suppurative hyalitis; in fact, with Dr. H. Pagenstecher, I doubt the correctness of those who describe inflam- Posterior hypopion.

* M. Weckér, "Maladies des Yeux," vol. ii. p. 282.