

but seldom seen. the affection occasions them no pain. Colloid degeneration, therefore, seldom comes under our notice until a late period; but even if this were not the case, it would be out of our power to trace with the ophthalmoscope the changes taking place in the elastic lamina in its early stages, among dark-skinned races; so soon, however, as the disease has advanced a little, we might possibly recognise the uneven condition of the elastic lamina.

Terminates in calcareous degeneration,

In the last stage of this affection, the projections on the elastic lamina become calcified, and ultimately earthy matter is deposited in them, so that they effervesce on the application of a strong acid, and when cut, the edge of the knife grates against them in an unmistakable manner. As these changes advance, the lamina of course becomes opaque, and the vessels of the choroid, which in the early stages of the disease were exposed by the destruction of the hexagonal cells, gradually become indistinct, and are ultimately entirely hidden from view. Earthy matter is deposited in the walls of the vessels, as well as in the elastic lamina, so that atrophy of the choroid ensues.

and atrophy of choroid.

DISEASES OF THE OPTIC NERVE.

VENOUS CONGESTION.

VENOUS CONGESTION of the vessels of the papilla. This condition of the vessels of the papilla is often well marked in certain affections of the heart (disease of the aortic valves); it also arises from other causes which interfere with the circulation, as, for instance, tumours situated at the base of the brain. Under these circumstances we notice a marked pulsation of the central vein of the retina, which is generally tortuous and much engorged, and the papilla presents a deep venous tint. Long-continued hyperæmia of this kind, by interfering with the nutrition of the nervous matter of the papilla, may lead to fatty degeneration and atrophy, as already described in the case of similar affections of the retina. The hyperæmia, on the other hand, may be of a transient nature, depending on sympathetic irritation, or some such cause, and may pass away without inflicting any injury on the nervous tissue of the optic disc.

May cause fatty degeneration.

Transient congestion.

Probably the most frequent causes of venous hyperæmia of the papilla are the various affections of the

eye which induce increased intra-ocular tension, and thereby abnormal pressure upon the veins in their exit from the eye; as, for instance, glaucoma. The venous hyperæmia in these instances, as in most other cases, being due to mechanical causes, it is to these we must turn our attention with a view to their correction or removal; in some instances, it may be, by controlling the action of the heart by appropriate means, and in others by relieving the tension of the eye by iridectomy, we shall effect our object.

Congestion from intra-ocular tension.

Treatment.

HYPERÆMIA OF THE OPTIC PAPILLA.*—The state of the vessels of the optic nerve is often an index of the condition of the cerebral circulation in consequence of their intra-cranial origin; but they may be only slightly congested, or, on the other hand, white atrophy may have commenced, without our being able to appreciate these changes, in consequence of our having no absolute standard of health with which to compare the appearances presented, and so to estimate the amount of disorder which is present in the circulation of the papilla at any particular period. We may, however, rest assured that, so long as the patient has no symptoms of cerebral disease, haziness of vision, or other defects of sight—in fact, as long as his eyes are emmetropic and his brain free of all suspicion of disease, any supposed changes we observe in the papilla are of small importance. On the other hand, if defect of sight is complained of, and we can discover no fault in the accommodation of the eye, or in the dioptric media, but the optic papilla appears to be congested, or paler than usual, we shall have to inquire carefully into the concomitant circumstances of the case, and the alteration in the state of the papilla will probably give us a valuable clue as to the cause of the imperfection of vision. We should further compare the state of one eye with that of the other; differences in this respect may materially assist us in forming a diagnosis.†

Difficult to appreciate.

Unimportant if vision is perfect.

Otherwise examine carefully.

Symptoms.—In cases of well-marked hyperæmia of the vessels of the optic papilla, the disc assumes a deep rose colour, and its circumference is no longer

Disc of a rose colour.

* "Altérations du Nerf Optique," par X. Galezowski, p. 54.

† "On the Use of the Ophthalmoscope in Diseases of the Nervous System." By T. C. Allbutt, M.D., London, 1871, p. 47

clearly defined as in health, the vessels of the retina being more or less congested; in fact, we may be able to discern nothing of the papilla beyond its centre, the rest of the fundus of the eye being of a uniform scarlet or brick-red colour. In some instances of capillary hyperæmia, one or more of the vessels of the disc give way, and minute spots of ecchymosis are then observed over the surface of the congested papilla.

A patient suffering from capillary hyperæmia of the papilla usually complains of a sense of weight and weariness in the eyes; this feeling is increased after work. He generally also suffers from headaches, especially if he over-exerts his sight; and at these times he notices flashes of light, and bright balls or sparks of fire before his eyes. If the disease is allowed to advance unchecked, the functions of the eye become more impaired; the patient can no longer see to read small type, and ultimately atrophy may occur, and the sight be hopelessly destroyed. So severe a termination as this, however, is not likely to follow, unless the congestion is absolute and long continued, and probably depending upon some affection of the brain or its membranes.

Causes.—In many cases the hyperæmia may be functional, and due to causes of a sympathetic nature; and the congestion of the vessels of the papilla may be overcome by attacking the remote cause of the disease, whether it exists in the alimentary canal or other part of the body. I need hardly remark that engorgement of the vessels of the optic nerve, serous affusion into its substance, and in fact hyperæmia of the structures involved, may exist and lead to loss of sight, without any inflammation having occurred in the parts concerned.

Among the more direct but temporary causes of hyperæmia of the papilla, I may mention alcohol and quinine;* both of these substances, if used in excess, produce a very marked degree of hyperæmia of the papilla, and if swallowed in too large and too frequent doses, may actually induce serious changes in the

* Case in point, reported by Dr. P. Franks: "Army Medical Department, Statistical Sanitary and Medical Report for 1860," p. 417.

Margin not defined.

Ecchymosis.

Sense of weight.

Headache.

Flashes of light.

Atrophy may follow.

Causes.
Sympathetic irritation.

Alcohol and quinine.

nervous substance of the part: in the majority of cases these changes take place slowly: loss of sight, and the other symptoms above described, creep on gradually, and warn the patient and the surgeon of the impending danger; and if the cause of the hyperæmia is then removed, the papilla usually regains its normal functions and the sight is restored.

In these and similar affections in which the entire circulation of the brain is disturbed, both papillæ are involved; in fact we seldom meet with unilateral hyperæmia of the papilla unless the cause of the congestion is intra-ocular. In some rare cases of orbital tumours, embolism of the central vessels of the retina, and the like, the circulation in one eye only may be impaired; but these are exceptions to the rule that unilateral affections of the papilla are due to intra-ocular causes. Such causes we find in glaucoma, irido-choroiditis, choroido-retinitis, inflammation of the retina, and so on; but in all these instances we shall have other indications of the presence or pre-existence of these affections, and unequivocal evidence as to the cause of the alterations in the circulation of the papilla.

It is not an uncommon thing to meet with people in India, suffering from headaches induced by over-exposure to the sun; the papilla will often be found intensely congested under these circumstances, the capillaries of the retina being somewhat hyperæmic also. The glare of the tropical sun appears to over-stimulate the retina, and it becomes congested and swollen; if the exciting cause continues in operation, the irritation is propagated to the brain, and headache and irritative fever ensue. It seems to me that irritation, under these circumstances, commences in the retina, because I have frequently found in my own case, that a pair of coloured glasses has saved me when exposed to a tropical sun, from the distress produced by the glare, and subsequent headache, which one so frequently experiences unless the eyes are thus guarded. There can be little doubt as to the necessity of protecting one's head from the rays of the sun, but it is almost as important to shade the eyes from its glare. Nature appears to some extent to have made a provision of the kind for the natives; the colouring matter contained in the pigment cells of the iris,

Both papillæ involved,

unless the cause be intra-ocular.

Hyperæmia from sun-glare.

choroid, and cells of the elastic lamina, absorbing the excess of light which enters the eye.

Treatment

The *Treatment* of capillary hyperæmia of the optic nerve must depend entirely upon the cause of the congestion. I have endeavoured to describe the principal circumstances which give rise to this affection of the papilla, and it would entail a repetition of much that has been said, were I to attempt to discuss the treatment appropriate to each class of cases. Provided we can arrive at a definite conclusion as to the cause of the disease, we must then direct our treatment mainly upon general principles, adopting in certain instances such special measures as have been indicated in the foregoing pages, and which the particular circumstances of the case may seem to require. Among these I cannot but hope that a more systematic use of the electro-magnetic current may yet prove to be a valuable method of controlling the capillary circulation in this situation.

to be carried out on general principles.

Anæmia of the Disc and Retina.—This condition of the optic nerve, as Dr. Allbutt justly remarks, is generally accompanied with anæmia of the retina and choroid, so that the anæmic eye lights up badly; while in atrophy of the disc the choroid may be of healthy brightness. In anæmia as a rule the disc appears soft if not œdematous, however small the amount of blood flowing through the vessels we can distinguish the arteries from the veins, "which distinction in atrophy is most commonly lost."* In anæmia the symptoms complained of by the patient, his appearance and so on, lead us in addition to the state of the disc, as observed with the ophthalmoscope, to diagnose the nature of the disease from which he is suffering: and to prescribe treatment necessary for his recovery.

APoplexy OF THE PAPILLA.
From mechanical causes.

APoplexy OF THE OPTIC NERVE is seldom met with unless the retina is also implicated, and in many of these cases the origin of the affection is in the brain, or else in the heart. We also meet with apoplexy of the retina and optic disc, in various forms of disease entailing changes in the constituents of the blood—as for instance in Bright's disease, and from the effects of

* Dr. C. T. Allbutt, "On the Use of the Ophthalmoscope," p. 51.

malaria; but in these cases the pathological changes in the retina are peculiar, and have been already described (p. 402). We shall observe the characteristic patches of fatty degeneration in the fundus in addition to the hæmorrhagic spots. In other cases, of which the following is an instance, it is most difficult to assign a cause for the extravasation of blood:—

In Bright's and other blood diseases.

Case.—Brohmo, aged twenty-five. This woman's sight was perfectly good up to within twenty days of her coming under observation, when, on arising in the morning, she felt heaviness of the head and slight pain in the temple and forehead, which has continued; her sight, from the commencement of this attack, has been growing dim. She has never had syphilis; her general health is good, and the menstrual functions regular.

Case.

No obvious cause.

At present the patient can only distinguish light from darkness; the tension and external appearance of the eyes are healthy; she has no disease of the heart. With the ophthalmoscope both eyes present much the same appearance: the arteries of the retina are contracted, its veins much distended, and the optic papilla almost completely covered with clots of blood.

Five days after admission the blood was gradually becoming absorbed, and in fifteen days no evidence of it existed. With the absorption of the clots the patient's sight returned, and she left the hospital within three weeks; she could then count No. II. dots at ordinary distance.

Quick recovery.

In the majority of instances of apoplexy of the papilla, as already stated, we shall have evidence of disease either of the kidneys, liver, or some of the secreting organs, affecting the composition of the blood; or else of organic disease of the heart or brain. In the case of heart affections the stethoscope will be our guide; and in diseases of the brain, in addition to the general derangement of the system accompanying lesions of this organ, we shall commonly find that the hæmorrhage has occurred suddenly, and in both eyes, and that the effused blood is confined to the optic disc or its immediate neighbourhood. Successive ruptures of the vessels are likely to occur in these cases, from the persistent and increasing obstruction to the circulation of blood through the retinal vessels.

Usually depends on blood disease;

Or of the brain or heart;

Then persistent.

Prognosis affected by extent of hæmorrhage.

Position of clot,

and the remote cause.

OPTIC NEURITIS.

Often complicated with brain symptoms;

And choro-roido-retinitis.

In extensive hæmorrhage from the vessels of the retina, our diagnosis may be embarrassed by the effused blood having found its way into the vitreous and so preventing us from observing the changes going on in the fundus of the eye. In such instances we shall have too much reason to expect that detachment of the retina, to a greater or less extent, has also taken place. In less severe hæmorrhage our opinion of the case will be much influenced by the position of the effused blood: if at or near the macula lutea, the sight will in all probability be considerably affected, whereas hæmorrhage confined to the optic papilla may occur, and the blood become absorbed, without being followed by any bad effects. In forming a prognosis we must carefully consider all the bearings of the case, and the concomitant symptoms: if they should lead us to the opinion that irrecoverable lesion of the heart, brain, or kidneys is the cause of hæmorrhage, we can hardly expect amelioration of the symptoms as regards the organ of vision, or if amendment does take place that it will amount to more than temporary improvement.

INFLAMMATION OF THE OPTIC NERVE.—OPTIC NEURITIS.—The phenomena of optic neuritis vary with the origin and progress of the disease. For instance, if the inflammation of the nerve should depend upon irritation set up in the chiasma (descending neuritis), by the pressure of a tumour growing from the base of the brain, we should expect to meet with symptoms pointing to disease of the brain in addition to those characteristic of optic neuritis: but on the other hand, if the inflammation is confined to the optic nerve, no marked symptoms referrible to the brain will be present. Lastly, optic neuritis occurring as a complication of choro-roido-retinitis (ascending neuritis), will be characterized by appearances in those structures such as I have already described. In instances of this description one eye only may be involved, whereas in brain affections the neuritis, as a general rule, will be present in both papillæ. But it matters not if the neuritis is an ascending or descending one, the changes that take place in the optic disc and nerves are the same,—neo-plastic formations occur in, and around, the walls of the vessels, and the sheath and neuro-

lemma of the nerve; from these combined causes, the nutrition of the nerve elements are impeded, and run a very great risk of being destroyed, hence atrophy of the optic disc is a common result of neglected neuritis of the optic nerve.

Symptoms.—In optic neuritis the symptoms complained of usually come on suddenly; a man may have had perfect sight in the affected eye, and in twelve or thirty-six hours his vision becomes dim, and in a few days sight may be hopelessly destroyed. During this period, and subsequently, the patient often complains of flashes of light and sparks of fire before his eyes, and frequently suffers severe pain in the head and some intolerance of light. The eye looks healthy, and the conjunctiva and sclerotic are normal, the pupil is usually somewhat dilated, and responds but slowly, if at all, to the stimulus of light. In other cases of a more obscure nature, especially if depending on malaria, or blood poisoning, the neuritis runs a very insidious course, gradual loss of sight being the only symptom complained of: cases of this description have probably been the cause of amaurosis, described as atrophy of the disc, arising from excessive tobacco smoking.

Ophthalmoscopic Appearances.—On examining the eye with the ophthalmoscope during the early stages of neuritis, the optic papilla appears to be larger than in health, and in place of being concave, is distinctly convex, being swollen and œdematous from the effusion of serum that has taken place into it. In addition to this enlarged and convex state of the papilla, the disc can no longer be clearly defined; the infiltration structure throws a veil over the disc, particularly at its circumference, which presents an appearance as if covered over with a thin layer of cotton wool. This hazy state of the papilla extends only a short distance beyond its margin. (*Vide* Fig. 1, Plate VI.) The retinal vessels may be traced from their periphery towards the inflamed papilla, but on reaching the swollen disc they are lost in its substance, and cannot therefore be followed up to their exit from the eye. The retinal veins are engorged and the arteries contracted, and often hardly recognizable; these changes being due to the pressure exerted on the vessels by the swollen condition of the optic

Sudden failure of sight.

Flashes of light. Pain.

Pupils dilated.

Papilla swollen.

Margin woolly.

Veins engorged. Arteries contracted.

nerve, through which they have to pass in entering and leaving the eye.

Optic neuritis from tumours.

In some instances of optic neuritis (descending neuritis), depending on a tumour compressing the vessels at the base of the brain, the smaller vessels of the papilla become so deeply engorged, that they can be distinctly seen in the substance of the woolly-like papilla, radiating from the centre towards the circumference of the disc. I have seen this appearance well marked in cases of insolation.

From insolation.

Extravasation of blood from the distended vessels of the papilla is by no means an uncommon complication of optic neuritis.

Vision not always affected in proportion to the optic disc.

The above are the symptoms generally present in cases of optic neuritis; but it must be distinctly understood that the impairment of vision does not always correspond with the apparent alterations noticed in the disc, and on the other hand the sight may remain good, although with the ophthalmoscope well marked symptoms of optic neuritis are present. Cases of this latter kind, as Dr. Hughlings Jackson has remarked, seldom come under the care of the surgeon, but rather of the physician, in his treatment of cerebral affections.

Varieties of optic neuritis; Malarial.

We occasionally meet with cases of optic neuritis following constitutional diseases, especially malarious fevers, in which, with gradual cloudiness of the field of vision lasting for a few days, followed by total loss of sight, the optic disc is apparently only slightly affected: it is hazy from œdema, but the cloud seems a very fine one. In these cases the pupil is widely dilated, probably from irritation of the fibres of the sympathetic, and in several cases that have come under my observation the patient has evidently been under the influence of malarial poison, the neuritis clearing away under the influence of quinine.*

Plumbic neuritis.

Mr. Jonathan Hutchinson has drawn special attention to the fact that patients labouring under the influence of lead poisoning, occasionally suffer from optic neuritis. He remarks that, "Amongst the peculiar ophthalmoscopic features of plumbic neuritis we may mention (a) the small amount of lymph usually present; (b) the absence of colour in the lymph; (c) the absence (not invariable) of extravasation of blood; and

* *Indian Medical Gazette*, 1870.

(d) the early and great diminution in size of the arteria and vena centralis. The choroid does not appear to be in the least implicated." These cases of plumbic neuritis would appear generally to lead to complete blindness.*

In another class of cases the optic neuritis commences with hyperæmia of the disc and retina, followed by partial haziness of the disc, extending some little distance over the retina, and in this hazy portion of the disc and retina minute extravasations of blood will be seen, with fine grey striæ. The disc, or rather the outer part of it, as a general rule, becomes pale and atrophied, the inner half retaining its normal appearance.

In these cases the appreciation of colours is always more or less impaired; the disease usually advances slowly, and sight is seldom destroyed.

Causes.—The causes of optic neuritis are numerous; among them may be mentioned tumours of various kinds, or inflammatory products pressing upon and interfering with the circulation of blood in the optic nerve or tracts. These obstructions, by mechanically inducing congestion of the vessels (veins) of the papilla, bring about serous effusion and optic neuritis. From experiments made by Dr. Schmidt, of Berlin, it appears that fluid can be injected from the arachnoid cavity between the inner and outer sheath of the optic nerve, and so to the lamina cribrosa, so that a direct communication exists, according to this author, between the arachnoid cavity and the network of the lamina cribrosa by which pressure of fluid may be conveyed, and in consequence the head of the nerve suffer strangulation, while the rest of the nerve trunk may be unaffected. An affection of the papilla of the nature above described may in fact be produced by "coarse" disease of almost any part of the cerebrum or cerebellum; it has been observed in meningitis and arachnitis, also complicating various forms of malarious fever, lead-poisoning, syphilis, and in cases of insolation, and over-exposure to the glare of a tropical sun. Lastly, it not unfrequently occurs in cases of retinitis and choroido-retinitis.

Dr. Schmidt's experiments.

Prognosis.—The prognosis in cases of inflammation

* *Ophthalmic Hospital Reports*, vol. vii. p. 6.

Prognosis
unsatisfac-
tory.

of the optic nerve is on the whole unsatisfactory, especially if we have reason to suppose that the disease is complicated with some affection of the brain. Galezowski states that as many as twenty cases in one hundred recover, but my experience leads me to form a less favourable idea of the results of the disease than this, unless among the class of cases depending on malarious and syphilitic poisoning: in the former, we see many patients suffering from extensive optic neuritis, who nevertheless perfectly recover their sight. Excluding instances of this description, and those traceable to syphilis, my opinion leads me to form an unfavourable prognosis, for the majority of instances of optic neuritis terminate in atrophy of the papilla: the woolly appearance of the disc gradually clears away, but it is left with a jagged irregular circumference, generally with patches of black pigment adhering to it (Fig. 2, Plate VI.); and the papilla itself becomes white and flat, though it seldom has the pearly whiteness of primary or progressive atrophy. The central arteries and veins of the retina are much contracted, and in many cases dwindle away to fine streaks, extending only a short distance beyond the circumference of the disc. After death, the papilla and optic nerve have been found extensively degenerated, and, in some cases, in a fluid or pulpy state; this condition seldom passes beyond the chiasma.*

Often ter-
minates in
atrophy.

Treatment

Treatment.—The treatment of optic neuritis, if arising from syphilis, resolves itself into the ordinary specific and general treatment of that disease; the mercurial vapour bath, cod-liver oil, iodide of iron, and so on. In certain cases depending on malarious influences, quinine in moderate doses, or arsenic and iron with strychnine, will be required. Rest and counter-irritation are always useful in cases of neuritis. I fear, however, that in many instances that come under our care, we shall fail to stop the progress of the disease, and that in spite of all our efforts atrophy of the papilla will result.

CASE.

CASE.—The following history affords a good illustration of that variety of the disease to which I have referred, as occurring in the subjects of malarious poisoning:—

* "Augenheilkunde," von K. Stellwag von Carion, p. 263.

Thako, aged thirteen, a resident of Chandernagore, was admitted into the Calcutta Ophthalmic Hospital January 24th. On November 9th she was attacked with quotidian intermittent fever, to which she had been subject for some years past, as well as to enlargement of the spleen. The ague continued for a week, and then disappeared under the influence of such simple remedies as she had been accustomed to employ under similar circumstances. Immediately after the fever had left her, numbness and inability to move the right arm and leg came on: the left leg on the following day was affected in the same way, so that she entirely lost the use of the lower extremities, without the existence of tingling pain or other abnormal sensations in the limbs to mark the advent or progress of the disease. As the paralysis increased she experienced advancing dimness of vision. The patient has never suffered from either hysterical or other fits. There is no evidence of her having been affected by inherited or acquired syphilis. She has never been salivated.

History of
Ague.

Paralysis
and loss of
sight.

At the time of her admission into Hospital, on January 24th, she had completely lost voluntary power over the lower extremities and the right arm. The sensation in these limbs, though blunted, was not destroyed; marked reflex action existed in the legs; the muscles of the affected limbs were flaccid, and hung down precisely as though they had belonged to a dead body. The patient possessed feeble though decided voluntary power over the left arm. Her pupils were dilated and insensible to light, and she was almost completely blind, being only able to recognise the existence of a bright light held before her face in a dark room.

State on
admission.

On examining the eyes with the ophthalmoscope we found the optic papilla swollen and hazy (woolly); evidently a considerable amount of serous effusion had taken place into its nervous structure, and also into that of the retina immediately surrounding the papilla; but with the exception of this oedematous state of the parts, the fundus of each eye was perfectly healthy. There was an entire absence of all other symptoms of optic neuritis or inflammation of the retina. Her voice and mental faculties were unimpaired. There was no paralysis of the muscles of the face, of respi-

Ophthalmic
appearance.

ration, or, in fact, of any part of the body, with the exception of those above indicated, nor was there evidence of disease of the heart or kidneys; the spleen was enlarged; the catamenia had appeared, and, though scanty, were regular.

Treatment. The patient was ordered a generous dietary, and a mixture containing strychnine, arsenic, and iodide of potassium. She continued this treatment throughout her stay in Hospital.

Recovery. A week after admission some improvement had taken place in her condition, and, without going into details, it may be mentioned that she gradually regained the use of her limbs, her eyesight was restored, and she left the Hospital absolutely cured. Within five weeks of her admission she was able to run about the ward, and count No. 1 dots at ordinary distances; the haziness of the optic papilla had entirely cleared away, and the fundus of the eye was perfectly healthy.

Remarks.—This is an example of a class of cases by no means of uncommon occurrence among the natives of India, and depending apparently upon miasmatic influences affecting alterations in the blood, and thereby inducing local hyperæmia and serous effusion into various organs. I repeatedly meet with cases of impaired vision arising from this cause, the hyperæmia being confined to the retina; its nervous structure becomes hazy and infiltrated with serum, and in some instances is detached from the choroid. The complete paralysis of the lower extremities and of the right arm, the left being unaffected, pointed to the existence of that rather anomalous group of symptoms described by Dr. Todd as hysterical paralysis, but the state of the eyes cleared up any doubt on this point. The symptoms presented by our patient at the time of her admission into Hospital pointed to serous effusion into the optic thalami and corpora striata similar to that noticed in the optic papilla, the pressure thus caused on these important nervous centres interfering with the volition of the patient over the affected limbs. The reflex action was only slightly impaired, and the patient had complete control over the bladder; the functions of respiration and deglutition were perfect, so that, as far as the trunk was concerned, she simply suffered from ina-

Such cases common in India.

Pathology.

Serous effusion in the Brain and optic papilla.

bility to move some of her limbs, the centres of volition, but not the will, evidently being affected. The patient, however, was absolutely blind; the pupils were widely dilated, the functions of the retina being destroyed for the time being. The ophthalmoscope showed the cause of the loss of vision by revealing to us the existence of extensive serous effusion into the optic papilla and nervous matter of the retina immediately surrounding it, but there was no evidence whatever of hyperaction in the part; the circulation through the central artery and vein of the retina was unaffected; there was no hæmorrhage or indication of structure change in the part; so that one was able to form a favourable prognosis, not only as regards the recovery of vision, but also of the paralysis—the condition of the optic papilla, and the history of the case, leading us to conclude that the loss of voluntary power over the affected limbs must depend upon a similar cause to that which induced the loss of power in the retina, and hence to arrive at the conclusion above indicated as to the seat of the effusion in the brain.

The ophthalmoscope an aid to diagnosis.

ATROPHY OF THE OPTIC PAPILLA.—Cases of atrophy of the papilla may, for the sake of description, be conveniently divided into two classes—First, those in which the degeneration follows some inflammatory or other disease of the eye or optic nerve, and which may be called Consecutive Atrophy; and secondly, those in which the disease appears to be a primary affection—a degeneration beginning from within, not preceded by any active stage, and which may therefore be distinguished as Primary or Progressive Atrophy; in practice we shall meet with these forms of atrophy, often running one into the other.

1. *Consecutive Atrophy.*—This may follow various affections of the eye, optic nerve, or brain; most of these we have already considered.

In the course of my remarks on optic neuritis, I observed that when atrophy of the papilla is a result of inflammation of the nerve, that the circumference of the papilla becomes irregular, and is often marked with patches of black pigment; that the disc itself assumes a white colour, and that the central artery and vein of the retina are usually very contracted in size: the vein may however be dilated and tortuous.

ATROPHY OF THE PAPILLA.

1. Consecutive atrophy.

After neuritis,

or retinitis. Atrophy of the papilla resulting from pigmentary degeneration of the retina, or from affections of the retina due to syphilis, irido-choroiditis, and like affections, can with ease be diagnosed from atrophy such as that above described, for in addition to the appearances presented by atrophy of the disc, we shall have those indicating the nature of the affection, which has led to the degenerative changes in the optic nerve.

In glaucoma and post. staphyloma. Lastly, the atrophy which is noticed in cases of glaucoma, and posterior staphyloma, is generally marked by the cupped appearance of the disc, and an engorged state of the central vein of the retina.

2. Progressive atrophy. 2. *Primary Atrophy.*—But there is another form of atrophy of the papilla which we frequently meet with, and which is too often characteristic of affections producing intracranial irritation, “Progressive atrophy of the papilla,”* as it has been called. This form of atrophy may come on without head symptoms, but gradual loss of sight (amaurosis) occurs without any apparent cause. The patient may not suffer from pain or other head symptoms, but generally from flashes of light and sparks of fire before his eyes; the pupil is usually contracted and immovable, but in other respects the eye looks healthy. Colour-blindness is usually a well-marked symptom in these cases. Little by little the sight fades away, until vision is completely lost, and the unfortunate patient thus acquires the vacant gaze and wandering expression so characteristic of total blindness.

Both eyes affected. Disc flat, round and white. On examining such an eye, or rather eyes, with the ophthalmoscope—for both eyes are usually affected—we shall discover that the optic disc is of a pearly white, circular, and flat; its circumference well defined and regular, and the central artery and vein of the retina of their normal size and appearance (Fig. 3, Pl. VI.) Clearly, in these cases, it is the optic papilla that is affected, and on examination it is found, that if the active symptoms which have led to these changes have passed away, that the optic disc is occupied by a fibrous structure, its nervous elements having very probably entirely disappeared.

Causes.—It has been already observed that progressive atrophy of the papilla occurs principally in

* “Altérations du Nerf Optique,” par X. Galezowski, p. 84.

connexion with affections of the nervous centres, causing intracranial irritation; and when we remember that pathological changes in widely different parts of the hemispheres, and also of other portions of the nervous system, as the cerebellum and spinal cord, as well as tumours at the base of the skull, have all been demonstrated to give rise to progressive atrophy of the optic papilla, we may well look anxiously in these cases for symptoms of cerebral disease, or other grave nervous lesion. The causes of progressive atrophy of the papilla, with the exception of this fact of its association with disease affecting large portions of the nervous centre, are as yet ill defined, and it would be out of place to attempt to give more than a passing glance at the subject.

M. Galezowski states that progressive atrophy of the papilla, ending in amaurosis, is most common among men, as many as 70 per cent. of these cases occurring in males. He accounts for this by the excessive brain work which men have to undergo, and the free use they make of alcohol and tobacco. To mental labour and alcohol I am quite prepared to assign a place as causes of progressive atrophy, but I find it difficult to believe that tobacco-smoking alone can induce disease of the brain, or of the optic nerve, so as to cause progressive atrophy of the papilla;* in combination with alcohol, venereal excess, and free indulgence in other bad habits, it may lead to blindness; nevertheless, surgeons of great repute hold a different opinion on this subject, and consider that excessive smoking directly induces atrophy of the optic papilla.†

M. Galezowski further remarks, that the majority of instances of progressive atrophy of the disc are caused by atheromatous disease of the vessels of the base of the brain, and of the nerve itself. He observes, if the patient lose his sight from progressive atrophy, and we can trace the disease to no other cause, we may generally attribute it to atheromatous degeneration of the walls of the vessels.

* See “Lecture on the Theory and Practice of the Ophthalmoscope.” By H. Willson, F.R.C.S.; Dublin, 1868.

† Carter’s Translation of Zander “On the Ophthalmoscope,” p. 131.