

Spectacles.

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.

## CHAPTER XII.

## DISEASES OF THE VITREOUS.

*Hyalitis—Muscae—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.

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 reclinacion 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. Wecker, "Maladies des Yeux," vol. ii. p. 282.

matory changes under these circumstances. Doubtless we meet with instances in which the vitreous becomes clouded, rendering the details of the fundus of the eye indistinct, or it may be invisible: but these conditions without question are due to previously existing alterations in the choroid. I do not in fact believe in the existence of "simple idiopathic hyalitis."

MUSCÆ  
VOLITANTES:

MUSCÆ VOLITANTES.—Muscæ volitantes appear to the patient under various forms, floating about in the field of vision; they are often very annoying, but unlike scotoma they do not interfere with the perfection of vision.

Notes in  
the field  
of vision.

They appear to the patient to consist at times of slender rings, which seem to ascend from the lower part of the field of vision and then to fall down again. In other cases they take the form of pearly strings, which twist and twine about in all directions, or they may be seen as fine bands hovering about in the visual field. They are most distinctly seen when the patient looks at some clear bright object, as, for instance, at the sky or a white wall; in a dim light they are probably not visible. After overworking the eye they are very apparent, and also if the digestive organs are out of order.

Shadows  
of cells and  
films in  
vitreous.

These various appearances are due to the presence of minute pale cells, or of granular fibres or shreds in the vitreous humour,\* and the shadows which these cast on the retina are the direct cause of the muscæ volitantes noticed by the patient in the field of vision. In some few instances it appears that opaque globular spots, situated among the fibres of the lens, may, by intercepting the rays of light falling on the retina, produce the appearance of muscæ volitantes.

Of small  
conse-  
quence.

Muscæ, therefore, are by no means a symptom of any great consequence, and are often observed in persons whose eyes are perfectly healthy. The cells and fila-

\* "Accommodation and Refraction of the Eye," by F. C. Donders, p. 199: Translated by Dr. Moore: New Sydenham Society.

ments of muscæ volitantes are too minute to be seen with the ophthalmoscope, and are thus distinguished from opaque membranes floating about in a fluid vitreous, which may be detected without any difficulty with the ophthalmoscope, and which are invariably pathological products, and therefore a matter of serious consideration. Short-sighted persons are very apt to suffer from muscæ, in consequence of the increased circles of diffusion cast by the minute bodies on the retina; we may comfort such patients with the assurance that the muscæ are not a symptom of serious disease.

Muscæ differ from scotomata in that the latter follow the movements of the eye, as dark spots along the lines of a page in reading and writing, and do not float about as ill-defined shadows, an appearance characteristic of muscæ volitantes. Moreover, in the case of scotomata, the ophthalmoscope usually enables us to detect abnormalities in the retina, which account for the "dark spot" noticed by the patient.

How differ-  
ing from  
scotoma.

*Treatment.*—It will often be found that cases of muscæ depend on gastric derangement, or at any rate occur when the stomach or liver is out of order; and a little attention bestowed on these organs will do much towards removing the muscæ. In other cases, rest and a tonic plan of treatment are of service. Lastly, it should be remembered that muscæ sometimes remain stationary for years, and then disappear of themselves. Tinted glasses often prove useful to patients suffering from muscæ.

*Treatment.*

Correct  
gastric  
disorder.

OPACITIES OF THE VITREOUS.—Opacity of the vitreous varies in its degree from a cloudiness, to that of opacity, so dense, that we cannot see the optic disc through it: this condition of the vitreous is present to a slight degree in many cases of glaucoma depending on hypersection of serous fluid into the vitreous chambers. Opacity of the vitreous is most commonly met with, however, as a sequence of disease of the choroid, often the result of either inherited or acquired syphilis. Excluding this class of cases, opacity of the vitreous is most commonly seen among patients suffering from sclero-choroiditis posterior. Another cause of opacity of the vitreous is extrava-

OPACITY OF  
VITREOUS.

Generally  
syphilitic.

sation of blood from rupture of one or more of the choroidal vessels.

Changes in vitreous slow.

If depending on inherited syphilis the changes in the vitreous usually take place very slowly, and the structure may at any time gradually clear and become transparent; or, on the other hand, if the degenerative process continues, it may lose its consistency, and pass into a fluid state. Flocculent masses will then be seen floating about in it; while, from the loss of the support which, under ordinary circumstances, the vitreous affords the retinal vessels, they may give way, and blood become effused in the retina. These abnormal changes, under the circumstances, generally commence when the patient is about eighteen years of age. The disease is accompanied with no pain in the eye, and the patient complains of no inconvenience beyond the gradually increasing loss of sight, which is most marked after sunset. At first, therefore, the symptoms are apt to be neglected. On making an ophthalmoscopic examination, the real nature of the disease will be discovered.

When from hereditary syphilis, sets in about age of eighteen.

May be overlooked.

Examine by direct process.

and lateral illumination.

Changes in these structures are most readily detected by the direct process of examination; in fact, we should always make a point of examining an eye by this means before using the indirect method; a fluid or hazy vitreous may be overlooked for want of this precaution. If, however, there is any doubt in our mind as to the condition of the lens, we should invariably employ lateral illumination; by this means it is almost always possible accurately to define structural changes in that situation, and should there be any opaque lines or dots in it, they may be distinctly seen, and the nature of the disease determined without any further trouble.\* In the majority of cases of incipient cataract we shall discover one or two landmarks of this description.

Patchy opacity of the fundus.

In examining cases of syphilitic opacity of the vitreous, we may frequently notice that the fundus of the eye appears to be deeply opaque in patches, situated apparently behind the vitreous; this condition of the parts is generally caused by disease of the retina

\* "Handybook of Ophthalmic Surgery," p. 97, by J. Z. Lawrence and R. C. Moon.

and choroid. It is very rare to find the vitreous itself so densely opaque as entirely to obscure the reflection of light from the fundus of the eye: a dull, foggy glimmer from the retina may almost always be noticed through the diseased humour. But when, in addition to this, the reflections from definite portions of the fundus are particularly dull, we must be guarded in our prognosis; it is more than probable that in such cases, if the vitreous clears, we shall discover further mischief to have taken place behind it, in the retina or choroid.

The following instance illustrates the ordinary course of opacity of the vitreous when occurring in a patient affected with secondary syphilis, and no doubt, as in all these cases, depended on disease of the choroid in the first instance, affecting the nutrition and transparency of the vitreous:—

*Case.*—Sreenath Sing, aged thirty-three, contracted venereal disease some four years ago; this was followed by secondary symptoms, from which he has suffered more or less up to the present time; he was salivated three months since without deriving the slightest benefit from the treatment. A year after the chancre had healed he noticed that his eyesight began to fail, and from that time the dimness of vision has steadily but slowly increased, without his having suffered the slightest pain in the eyes, nor do they appear to have been congested or irritable.

When he first came to the hospital, his general health was evidently very much impaired; he had a small weak pulse, and was very emaciated; he complained also of severe rheumatic pains in his limbs; he was almost completely blind with the left eye, and could barely discern fingers held up before the right one. The tension of both eyeballs was normal, and though the irides acted sluggishly, still no abnormal appearance could be detected in either cornea, lens, or iris. With the ophthalmoscope, I found the vitreous humour of the left eye so densely opaque, that it was impossible to see the optic disc; in the right eye the vitreous was of a hazy, whitish-grey colour, but I could just distinguish the retinal vessels through it. The treatment upon which he was put consisted of a liberal diet, cod-liver oil, and iodide of iron. Under this his general health certainly im-

*Case.*

Opacity of vitreous in secondary syphilis.

Health impaired.

Dense opacity of the vitreous.

Liberal diet and tonics.

proved, but at the end of a month, there being no perceptible change in the condition of his eyes, I ordered him to commence a course of mercurial baths, and an issue was opened in the skin of either temple.

It would be useless my following out the details of this case from day to day: our patient continued the use of the vapour baths for two months, and at the end of that time he could see to read No. 4 type, and so transact his business without inconvenience. On examining his eyes with the ophthalmoscope, I found that the left vitreous, though still hazy, had so far cleared as to allow of my seeing the optic disc. The right eye was perfectly healthy, as far as I could discover.

I have already stated that we frequently meet with instances of this form of disease among the natives of India, syphilis being very prevalent among them; and unfortunately they commonly fall into the hands of ignorant quacks who starve, and at the same time salivate them most profusely for the cure of venereal disease.

*Anæmic and Malarious Opacity.*—It by no means follows, however, that opacity of the vitreous is always a consequence of syphilis. The following is a case in point, the changes in the vitreous depending upon general impairment of nutrition and poverty of blood:—

*Case.*—Omesh Chunder Roy, aged thirty-two, an anæmic individual, by occupation a writer, states that, about five years ago, he discovered his eyesight was gradually becoming defective; dimness of vision, more particularly after sunset, was first noticed, but latterly he has constantly seen opaque spots floating about before his eyes. He cannot see to read the largest sized type with his left eye; with difficulty he can decipher No. 4 with the right. I found the cornea, iris, and lens, in both eyes, healthy, the tension of the left being about (T—1.), that of the right (T. N.). In the former, the vitreous was in a fluid condition, and a number of flocculent bodies were seen floating about in it; the optic disc and vessels of the retina were indistinctly seen, as through a dense fog. The right vitreous was slightly hazy, but in other respects the eye appeared normal.

The patient was ordered to take five grains of iodide

Improved  
by treat-  
ment.

Common in  
India.

Opacity of  
vitreous  
from  
anæmia.

*Case.*  
Anæmia.

Gradual  
impairment  
of vision.

Vitreous  
hazy and  
fluid.

of potassium, three times a day, and he continued this medicine for some time without any apparent improvement; I then gave him cod-liver oil and bichloride of mercury, for two months, with marked advantage. At present, the fundus in either eye appears healthy; in the left, the vitreous has so far improved that the tension is normal, and the optic disc and vessels of the retina can be distinctly seen, although a few flocculent bodies are still to be noticed in it. The patient can see to read No. 1 type with either eye, the right being perfectly healthy.

Non-syphilitic opacity of the vitreous commonly arises (excluding cases depending on disease of the choroid) from an impoverished state of the blood induced by malarious influences. I need hardly remark that, among the lower classes of natives, anæmia is very prevalent; and under these circumstances, an attack of fever is likely to cause further deterioration of the blood, and also local congestions of the choroid and other structures; and the vitreous, like the cornea, is prone to degenerate and become opaque.

If the opacity of the vitreous is thus due to an impoverished state of the blood, it is evident that good food, quinine, and cod-liver oil are imperatively called for. I place great faith in cod-liver oil, arsenic, and strychnia, in such cases.

In instances of sclero-choroiditis posterior, the vitreous, as a general rule, commences to grow cloudy towards the back of the eye; at the same time this portion of the vitreous is apt to become fluid, and opaque patches are then seen floating about in it.

*FILMS IN THE VITREOUS.*—Occasionally colourless flocculent bodies or films are seen stretched across the vitreous chamber, like a thin veil in front of the retina. These consist, probably, of the cellular structure of the vitreous, rendered opaque by degenerative changes. Professor von Graefe has removed opacities of this kind by passing two needles into them, and breaking them down, in the same way as Mr. Bowman directs for the removal of an opaque capsule from behind the pupil.\*

\* Carter's Translation of Zander "On the Ophthalmoscope," p. 224.

Greatly  
improved  
by treat-  
ment.

Malaria a  
frequent  
cause.

Treatment.

FILMS IN  
VITREOUS.

May be  
broken  
down.

Another cause of opacity of the vitreous is the effusion of blood into this chamber, as I shall presently explain more fully.

**FLUID VITREOUS.**

Associated with muscae.

**FLUID VITREOUS.**—The vitreous may pass into a fluid condition, but still keep transparent; and if it happens that opaque membranes or neoplasms are formed in it, their shadows are seen by the patient as objects floating in the field of vision, as I have already explained in the previous sections on opacities of the vitreous.

In cases of increased tension.

This fluid state of the vitreous may exist without any diminution in the tension of the eyeball, for it is met with in cases of glaucoma, and sometimes in connexion with tumours of the choroid; in fact, pressure exercised on the vitreous appears directly to favour its passage into a fluid condition. On the other hand, in atrophy of the globe following choroiditis, the vitreous also very commonly becomes fluid, and the same result sometimes supervenes on senile changes in the eye, especially if the vessels of the choroid are involved.

In staphyloma.

In advancing posterior or anterior staphyloma, we sometimes find the vitreous becoming fluid, the patient complaining of dark objects floating about in the field of vision. Not only does the disease of the choroid in these cases affect the integrity of the vitreous, but, from the bulging outwards of a portion of the vitreous chamber, the lens is apt to recede from the iris, augmenting the defects in the refracting media of the eye, and rendering the pupil somewhat tremulous.

Ophthalmoscopic appearances.

It so generally happens that the fluid vitreous contains dark-coloured specks and shreds floating about in it, that there is no difficulty in detecting the nature of the disease with the ophthalmoscope. (*Vide Opacities of the Vitreous.*)

**SPARKLING SYNCHYSIS.**

**SPARKLING SYNCHYSIS.**—A remarkable condition of the vitreous, called sparkling synchysis, is occasionally seen, depending upon the presence of innumerable particles of cholesterine floating about in it. With the ophthalmoscope, they appear like a multitude of grains of gold-leaf, whisking about in all directions when the eye is turned quickly from one side to the other.

This material generally arises from degenerative changes taking place in a dislocated lens; a great part of the lenticular matter becoming absorbed, the insoluble cholesterine is left in the vitreous chamber. From degenerate lens.

Among the natives of India these appearances are sometimes seen, in consequence of the lens having been thrust down into the vitreous, in the operation of depression or reclination for the cure of cataract. We not unfrequently have patients applying for relief at the Ophthalmic Hospital under these circumstances, suffering from atrophy of the retina and choroid, together with sparkling synchysis.

**HÆMORRHAGE INTO THE VITREOUS.**—It is by no means uncommon to meet with cases in which an effusion of blood into the vitreous has taken place, in consequence of a blow, or else from rupture of diseased vessels in the choroid or retina. For instance, a person is struck on the eye, and independently of chemosis, he finds that he cannot see clearly, the field of vision being obscured by a reddish haze. From blows or diseased vessels. With the ophthalmoscope, the vitreous will appear of a diffused, bright scarlet colour, the optic disc being dimly seen through it; spots of ecchymosis will probably also be observed in the retina. Appearances.

The effused blood may be rapidly absorbed, and the vitreous return to its normal state of transparency; but if the hæmorrhage has been at all profuse, a clot may be formed in the axis of vision, rendering the patient more or less blind. The fibrine of a clot of this kind usually undergoes fatty degeneration, and gradually becomes absorbed; but hæmorrhage into the vitreous may lead to opacity and further degeneration, and consequent fluidity of that structure; on this account we should be guarded in giving a favourable prognosis in such a case: moreover, the clot may remain *in situ*; and should it even disappear, we may subsequently discover that considerable injury has been done to the retina, and that its functions have become permanently impaired. Quickly absorbed.

There can seldom be any difficulty in forming a correct opinion with respect to the nature of a lesion of this kind; for if the hæmorrhage has occurred in consequence of an injury, the impairment of vision will A central clot may impair sight. Diagnosis.

have originated at the time the blow was inflicted; but if from the effects of disease, the history and symptoms, together with the ophthalmoscopic appearances of the part, will sufficiently determine the diagnosis. It is possible that a malignant growth in its earliest stages, or a separation of the retina from the choroid, might be mistaken for a clot of blood in the vitreous chamber; a little care, however, bestowed, on the inspection of the part, will speedily remove any doubt there may have been on the subject. If the case should be one of malignant tumour, the aspect of the excrescence can hardly be mistaken, the pain and tension of the eyeball, combined with the ophthalmoscopic appearances, indicating the serious nature of the mischief going on in the eye. By means of the lateral method of examination, the tumour may generally be clearly defined, as soon as it projects slightly beyond the plane of the fundus of the eye.

A malignant growth mistaken for a clot.

Distinguished by its history and form.

#### ENTOZOA.

Hydatid cysts.

Cause little trouble for a time.

Liebreich's case.

Successful removal.

ENTOZOA IN THE VITREOUS.—Cysticerci are occasionally found in the vitreous chamber, the cyst in which they grow being attached to the retina or choroid. Dr. Liebreich states that the entozoon is first developed behind the retina, and having perforated it, enters the vitreous chamber. A contracting and elongating movement of the cyst may be clearly observed, though the parasite itself cannot be distinctly seen, on account of the opaque sheath in which it is contained. After a time the cyst bursts, and the head and neck of the creature may then be defined. It is, however, remarkable that, up to this stage of the disease, the parasite appears to cause no inconvenience beyond the shadow cast by the wavy motion of the cyst in front of the patient's retina; there is no pain or irritation in the eye.

Dr. Liebreich relates a case of a cysticercus in the vitreous, which he not only diagnosed, but removed: passing a pair of canula forceps into the vitreous, he seized the parasite and withdrew it from the eye. During the operation, he contrived to illuminate the vitreous with an ophthalmoscope which he fixed to his forehead, enabling him to use both his hands, and thus accomplish the necessary manipulation.\* Cases of a

\* "Atlas d'Ophthalmoscopie," par le Dr. R. Liebreich, p. 18.

similar kind have from time to time been recorded; \* in some the lens was first extracted, and subsequently the parasite removed; these operations, however, have not been very successful.

In many parts of India *filarie* are frequently found in the eye of the horse: the entozoon is seen in the anterior chamber, moving about like a thin white thread in the aqueous humour. In the early stages of the disease it excites no irritation or inconvenience, but ultimately inflammation and ulceration of the cornea occur, and the contents of the eye, together with the parasite, are evacuated. This may generally be averted by puncturing the cornea, and allowing the aqueous to gush out through the aperture, and with it the entozoon. † The filaria has also been found in the human vitreous. ‡

Filarie in horses.

FOREIGN BODIES.—The ophthalmoscope is of the greatest assistance in enabling us to estimate correctly the position of foreign bodies in the vitreous, and there is no class of cases that demand our more earnest consideration, for the sight of both eyes is frequently compromised, the one by direct injury, the other from sympathetic irritation. As an instance of the aid afforded by the ophthalmoscope, we may refer to a case in which a small particle of steel had penetrated the upper eyelid and sclerotic, and entered the vitreous chamber. The patient was under Mr. Dixon's care, and on examining the eye with the ophthalmoscope, he was enabled to detect the foreign body behind the lens. Mr. Dixon removed it by perforating the sclerotic at its lower and outer part, and passing a pair of canula forceps into the vitreous, with which he caught hold of the foreign substance and so withdrew it from the eye. The patient made a rapid recovery.

Detected with the ophthalmoscope.

Should be removed without delay.

It is impossible to lay down special rules in treating accidents of this kind; almost every instance we meet with will require some peculiar manipulation, and we must exercise our own judgment, ingenuity, and mechanical skill in contriving the most appropriate

\* Carter's Translation of Zander, p. 162.

† See *Indian Annals*, No. 26.

‡ Carter's "Zander," p. 191.

means for accomplishing our purpose. With the ophthalmoscope, a foreign body may usually be defined, if sought for soon after it has penetrated the vitreous chamber; but after remaining there for some time, it is likely to become hidden by a covering of false membrane. The following case is an instance in point:—

After a  
time  
become  
hidden.

Case.  
A shot left  
in the  
vitreous.

Retina  
detached  
and sight  
lost.

A dislo-  
cated lens  
in the  
vitreous.  
Excites  
severe  
inflamma-  
tion.

Should be  
extracted if  
recent.

*Case.*—Mr. —, last cold season, was struck in the eye by a No. 3 shot, which penetrated the lower part of the sclerotic. He gradually lost his sight, and I was consulted regarding the case, some two months after the accident had occurred. I found that he was quite blind with the right eye; the pupil was dilated, and the vitreous hazy, the sclerotic and conjunctiva were slightly congested (T.N.); the patient suffered no pain in the eye. On examining it with the ophthalmoscope, I found the retina detached from the choroid, and at the bottom of the vitreous chamber the shot could be seen encased in a whitish mass. As there was no possibility of restoring the sight, and as the foreign body did not appear to cause any irritation, I directed my patient merely to keep the eye closed with a pad and bandage, and after a short time the conjunctival congestion entirely disappeared.

Unfortunately, in India, we constantly meet with instances of a foreign body in the vitreous, in the shape of a dislocated lens, for the uneducated native practitioners usually operate for the cure of cataract by reclination. Suppose a patient is brought to us in great agony, with his eye violently inflamed from a recently performed operation for depression. On examination, we see the opaque lens bobbing about behind the iris, and it is necessary to decide at once as to the treatment to be pursued under the circumstances. If the lens has been depressed within a week or so, and the patient has still some perception of light, we should attempt to save the eye, removing the lens by linear extraction. We may experience some difficulty in accomplishing this, on account of the adhesions which will probably have formed between the iris and the lens. If the dislocation has existed for more than fourteen days, and the patient is suffering from considerable pain in the eye, and has lost all perception of light, it is better to cut through the

cornea at once, and turn out the contents of the eye-<sup>or the eye</sup>ball; any palliative treatment we may adopt must expose the patient to the risk of losing the other eye from sympathetic irritation; and there is no chance of the diseased one being, in future, anything but a source of annoyance and pain, so that the sooner it is destroyed the better. evacuated.