

Other causes of atrophy.

ocular pressure as in glaucoma; atheromatous disease of the blood-vessels, and embolism, are also causes of atrophy of the retina, and lastly the nervous tissue may become atrophied from long-continued disuse, or from disease of the brain and optic nerve.

GLIOMA.

TUMOURS OF THE RETINA. GLIOMA.—There is only one form of tumour which it will be necessary to notice under this heading—viz., Glioma (Virchow). This morbid growth originates in the *neuroglia*, or delicate interstitial matrix of the brain, retina, and other nervous structures.*

Origin in the neuroglia.

Gliomata of two kinds.

The gliomata are of two kinds, soft and hard. The soft variety are composed of a finely granulated intercellular substance and cells, the latter in size and appearance resembling pus cells. In the harder form the intercellular substance is fibrillated, and the cells, though small, are fusiform, containing fine shining nuclei. The nervous elements are not involved in the morbid process, but frequently undergo fatty degeneration; it is the *neuroglia* however which is affected by the localized hyperplasia, its cells being excessively increased in number.

Slow growth, non-malignant.

Microscopic characters.

These tumours are of slow growth, and it is doubtful if they are malignant. Gliomata, however, infect neighbouring structures, and have a tendency to fungate, so that they may be mistaken for cancer unless carefully examined under the microscope. It is by the size of the cells that we shall be chiefly guided; so long as they do not exceed those of the connective tissue they may be considered as gliomatous, although the mass may have formed a fungous excrescence; but if the cells exceed this size, the tumour must be referred to the sarcomatous group.

The prognosis to be formed in glioma is unfavourable, although less so than in cancer. It is of course necessary to remove the entire morbid growth, or it will in all probability recur.

Case.

Case.—The following case illustrates the course and treatment of glioma of the retina:—

Ashruf, aged six, was brought to me at the Ophthal-

* "Die Krankhaften Geschwülsten." V. R. Virchow, b. ii. p. 159.

mic Hospital, and presented the following conditions:— General health good: the pupil of the right eye was widely dilated, and a yellow reflection from the fundus could be seen, evidently proceeding from a morbid growth which projected into the vitreous chamber.

Early appearances.

I advised the removal of the eye, but as the parents would not consent, the child was removed from the hospital. Twelve months afterwards they again brought him, and the right eye then presented the appearance delineated in Fig. 34. The child's health had fallen

Advanced growth.

FIG. 34.



From a Photograph.

off, but the glands of the neck were not enlarged. The eyelids were greatly distended, and a fungating tumour was seen growing from the eyeball and protruding between the eyelids. Its surface was ulcerated, and bled when touched, but was usually covered with a crust of dried blood and matter.

I at once determined to remove the morbid growth, and there was little difficulty in accomplishing this, the child having been placed under the influence of chloroform. On passing my finger behind the tumour, I felt

Removal.

that the optic nerve was very much enlarged. I divided the nerve, therefore, as near the optic foramen as possible, and then applied the solid chloride of zinc to the bottom and sides of the wound. The child made a rapid recovery, and appears up to the present time to be perfectly free from the disease.

Examina-
tion of the
tumour.

Remains of
nerve-
fibres.

Cells small
and simple.

Result
favourable.

On examining the tumour, I found that the optic nerve was embedded in a morbid product, having all the characters above noticed as characteristic of the soft variety of glioma; the remains of the nerve fibres could be readily traced through the tumour. The globe of the eye was lined with a similar abnormal structure, which projected forwards through the sclerotic, giving rise to the fungoid mass which appeared externally; but the vitreous space was empty, or rather, unoccupied by the morbid growth. I carefully examined every part of this specimen, and in not a single instance did I find cells exceeding those of a pus globule in size, nor were there any fusiform cells among them.

It remains of course to be seen if any of the tumour has been left in the orbit. From its history, I believe it commenced in the retina, as there was no protrusion of the eye when I first saw the child, and he has never shown any symptoms of disease of the brain. I cannot, however, but fear that the glioma may have passed along the neuroglia of the optic nerve to the chiasma, and that ultimately the brain will be involved; but at present no such complication has occurred. The sight of the left eye is perfect, and the child's general health has improved remarkably since the operation.

It does not often happen that we have the opportunity of watching the growth of a tumour of this kind; but the dilated pupil and glistening yellowish-white reflection from the back of the eye, were sufficient to lead to a correct diagnosis in the early stages of this case. The ophthalmoscope may afford us much assistance in instances of the kind, and if employed sufficiently early would usually demonstrate the fact of the morbid growth being limited to one part of the retina, giving it a thickened and mottled appearance. Subsequently, as the disease involves the whole of the retina, the eye assumes the appearance formerly known as the "amaurotic cat's-eye." The morbid growth advancing bursts through the globe of the eye, and ultimately assumes the fungoid appearance depicted in Fig. 34.

There can be no question as to the necessity of removing the eyeball, and with it the morbid growth in cases of this form of disease.

FUNCTIONAL DISORDERS OF THE RETINA.

NIGHT BLINDNESS OR HEMERALOPIA.—The following HEMERALOPIA. extract, taken from a work stamped with the authority of Government,* gives a good, though marvellous, account of hemeralopia. Capt. Smith, R.N., reports that in September, 1801, the *Merlin* captured a Spanish privateer, and having been sent with twenty men to cruise in her as tender, he thus describes their adventure:—

"In a few days, at least half the crew were affected with nyctalopia. We were chased one calm morning by a large Xebec, carrying from eighty to one hundred men, and towards evening she was fast pulling up to us, our people having been fagging at their oars many hours without any relief. Knowing that night would deprive half of our crew of sight, it was proposed to try our strength with the enemy while it was daylight; this was answered by three cheers. The oars were run across, and the enemy by this time being within gunshot, the action commenced. After a time, to our great relief, he sheered off and pulled away from us; we, in our turn, became the pursuers; but when night came on, we took special care to lay our head from the Xebec, and saw no more of her.

Captain
Smith's
narrative
of night
blindness.

"This circumstance put me on devising some means of curing the people affected with night blindness, and I could think of none better than excluding the rays of the sun from one eye during the day, by placing a handkerchief over it; and I was pleased to find, on the succeeding night, that it completely answered the desired purpose, and that the patients could see perfectly well with the eye which had been covered during the day; so that, in future, each person so affected had one eye for day, and the other for night. It was amusing enough to see Jack guarding, with tender care, his night eye from any the slightest communication with the sun's rays, and occasionally changing the bandage, that each eye in turn might take a spell of

His method
of treat-
ment.

By covering
one eye by
day.

* "Royal Naval Biography," 1835, vol. iv. Part II.

night duty, it being found that guarding the eye for one day was sufficient to restore the tone of the optic nerve, a torpor of which and of the retina is supposed to be the proximate cause of the disease. I much question whether any purely medical treatment would have had so complete, and, above all, so immediate an effect.

Referred to
retinal ex-
haustion,

"Persons affected with nyctalopia become perfectly blind as night approaches, and continue so till the approach of daylight; the medical treatment is bleeding and purging, blisters applied repeatedly to the temples, close to the external canthus of the eye, cinchona bark, joined with chalybeates, &c., all of which was impracticable by us, having no medicine on board our little vessel. I am aware that this disease frequently attends scurvy in tropical climates, and is sometimes occasioned by derangement of the digestive organs and hepatic system, in which cases our simple treatment would be useless; but in the above instance it was evidently caused only by the sun."

and scurvy.

Although bordering on the marvellous, this account is, I think, worth recording, more particularly as I quite agree with Captain Smith as to the causes of hemeralopia; I believe it does occur from scurvy and over-stimulation of the retina.

No lesion
apparent in
hemera-
lophia.

We must exclude from this group cases of pigmentary degeneration of the retina, and in fact all diseases of the eye accompanied with structural lesions, which in themselves account for the night blindness; as, for instance, opacities of the vitreous, lens, and cornea, myosis, and such-like affections, and simply confine our remarks to cases in which marked diminution in the acuteness of vision exists when the patient is removed from a bright light, and yet in which we can discover no lesions of the retina or of the dioptric media to account for the phenomena. Instances of the kind are common in the tropics.

Patient
cannot see
in a dim
light.

In hemeralopia the patient is not only blind at night, but at all times if taken into a room dimly lighted; he can see comparatively well in bright moonlight, or in a well-lit room. Hemeralopia evidently therefore arises from a state of torpor or exhaustion of the retina, which, under these circumstances, requires a greater number of luminous rays to produce a sensible impression than in the healthy eye.

The retina
torpid.

Causes.—This condition of the retina may be brought

about by general anæmia and imperfect nutrition, or by intense excitation of the nervous structures, and consequent exhaustion; probably a combination of these causes is the most prolific source of hemeralopia. A patient, whether from bad food, impure air, or disease, falls into a state of anæmia, and if he be then exposed to the intense glare of a tropical sun hemeralopia is the result. It is unnecessary for me to cite instances to prove that such influences are a cause of night blindness, it being well known that sailors returning from a long voyage in the tropics, and predisposed to scurvy from ship-diet, are not unfrequently affected with hemeralopia; but direct exposure to the glare of the sun has hardly been recognised as a sole cause of night blindness.

From bad
food and
sun-glare,

or exposure
to the sun
alone.

The Treatment of night blindness resolves itself, therefore, into endeavours to restore the nutritive functions by suitable diet, and such means as iron and strychnine, and, when required, by antiscorbutic remedies, giving the eye rest at the same time. If these objects are kept in view, I have never seen a case of hemeralopia that has failed to recover; provided, of course, that the patient has not been suffering from some incurable disease of the liver, kidneys, or other important organs of the body. In making this assertion, I restrict myself, in fact, to cases of hemeralopia in the limited sense above indicated, and not to cases in which the night blindness depends upon other and assignable causes.

Treatment.

Tonics,
food, and
rest.

SNOW-BLINDNESS would appear to arise from somewhat the same causes as hemeralopia, the glare from the snow causing over-excitation, and ultimately loss of sentient power in the retina. The affection, however, is only transient, and usually passes away after the removal of the cause of the disease.*

SNOW-
BLIND-
NESS.

Retinal
exhaustion.

Dr. H. Cayley gives the following account of snow blindness. He writes:—

"As I was crossing the 'Zoji La' pass from Cashmir to Ladak early in May, I had the opportunity of seeing many cases of snow-blindness, and a brief description of the affection may be of interest.

Dr. Cayley's
narrative.

"The day of crossing the pass, my party were on the

* Kane's "Arctic Exploration;" Dr. Hayes' Report of a Sledge Journey, Appendix, p. 489.

move for more than sixteen hours over fresh fallen snow the whole way, and soon after mid-day I noticed some of the servants and baggage coolies stumbling along with their eyes covered and protected as much as possible, and all complaining of intense burning and throbbing in the eyeballs, headache, and dimness of sight. I recommended what I had heard from natives of the mountains, and had myself found to give great relief—viz., the application of a handful of snow on the eyes for a few minutes, till the burning was removed, and repeating this at intervals. After the march was over, and during the night, all those whose eyes were affected, consisting of nearly half the party, suffered most acutely from deep-seated pain in the eyes and orbits, with more or less complete loss of sight; and many of the coolies, who were all hill-men, and accustomed to the snow, were sitting out in the cold night air, groaning with pain, but finding their sufferings less than in the smoky huts. The next morning two of the servants, and about twenty-five coolies, were suffering in a greater or less degree from the following symptoms: almost complete loss of sight; they could just see their way about, but some even were quite blind. The most intense intolerance of light; severe deep-seated pain and burning in the eyeballs and orbits, and generally bad headache. The other symptoms were profuse lachrymation, injection of the conjunctiva, and swelling and puffiness of the lids, and contracted and inactive pupils. Acute ophthalmia, in fact, with the symptom of nervous irritation especially prominent. In some only one eye was affected, but generally both, though not always in the same degree. In some the affection commenced after the day's march and exposure were over, but I think only in those who went into the huts, and were exposed to the irritating smoke of fires of wood and animal dung. The treatment I employed, and which gave great relief, was warm fomentations, and a lotion of equal parts of tincture of opium and water dropped into the eyes, and keeping the eyes covered with a wet bandage. The drops caused smarting for a few minutes, followed by great relief.*

Symptoms: severe pain. Sight almost lost. Intolerance of light. Ophthalmia. Treatment.

* *Indian Medical Gazette*, August 1st, 1868.

LIGHTNING BLINDNESS.—Momentary exposure to a very bright light may induce impairment of vision, by destroying the sensibility of the retina. The captain of one of our coasting steamers consulted me a short time since on account of impaired sight, particularly marked at night. His vision had been perfect until within a few months of the time I first saw him; he was then at sea, and one fearfully dark and stormy night suddenly a vivid flash of lightning burst over the vessel: my patient states that for a few minutes afterwards he was perfectly blind, and although he recovered his sight to a great extent, it has since remained impaired. No abnormal appearance could be detected with the ophthalmoscope.

The functions of the retina may become similarly injured from prolonged work on minute objects in a bright light, as in the instances of watchmakers and engravers, and yet the fundus of the eye may appear perfectly healthy.

COLOUR BLINDNESS, OR DALTONISM, in some instances comes under the class of diseases depending upon impairment of the functions of the retina, without any perceptible lesion in the nervous apparatus of the eye; on the other hand, colour blindness is frequently met with in the early stages of atrophy of the optic nerve. Excluding instances of this latter description one meets with cases from time to time, in which colour blindness appears to be a congenital and hereditary affection, and is incurable; the patient's sight may in other respects be perfect, but he is unable to distinguish between certain colours—red, orange, and yellow may not be distinguishable from blue, grey, or green, and in some few cases absolute colour blindness exists, black and white being alone recognised. In other instances the patient complains that all colours present a certain tint either of red, green, or some other colour; but this form of colour blindness is uncommon, except as a result of disease of the brain, or optic nerve, which we shall subsequently have to consider.

Dr. G. Wilson* states, that patients suffering from colour blindness can often distinguish colours by artificial light, better than by daylight; he points out

EFFECTS OF LIGHTNING.

Illustration.

Similar effects from over-work.

DALTONISM.

Hereditary and incurable.

Certain colours only recognised.

* "Researches on Colour Blindness," pp. 118-127. Edin., 1855.

Importance
in case of
signal-men.

As a result
of disease.

HEMIOPIA.

From dis-
ease or
compression
of
either optic
tract.

By a clot of
blood,
or tumour.

very forcibly the necessity of examining men employed as guards to railway trains, and in other similar situations, as to their power of distinguishing the various colours: a man may be affected with Daltonism without knowing it, and, if so, he is of course quite unfit for an employment in which the recognition of coloured signals is all-important. The ability, however, to discern colours, as I have above remarked, is impaired by various affections of the eye, for instance in some cases it follows commencing atrophy of the optic nerve. The colour to which such patients are most frequently insensitive is red, while blue is best preserved: green appears yellow or grey; rose and violet, bluish. The prognosis of the nerve affection is not modified by loss of colour perception. (*Vide* Amblyopia.)

HEMIOPIA, OR HALF-VISION, (p. 451).—The fibres of the optic tracts meet in the chiasma, those from the outer part of the right tract passing to the outer part of the right retina, and those from the inner part of the right tract supplying the inner half of the left retina; the left optic tract in like manner supplies the outer half of the left retina, and the inner half of the right retina. In consequence of this relation of the fibres of the optic tracts, mechanical causes, such as a clot of blood, or a tumour, interfering with the integrity of either optic tracts, may produce blindness confined to the inner half of one and the outer half of the other eye, while the remainder of both retinae may be healthy. The defect in the sight is clearly indicated and must be carefully mapped out by a close scrutiny of the visual field of both eyes; it is thus only that we can arrive at a correct diagnosis of the case. If the disease be confined to one side of the brain, the limitation of the field of vision is often clearly defined, and should the history of the case point to the formation of a clot as the cause of the affection, we need hardly fear that the impairment of vision will extend; but the majority of these cases depend on tumours involving the chiasma, in which case both tracts are gradually implicated, and the patient's sight hopelessly destroyed. If the hemiopic contractions occur simultaneously or at a short interval from each other, the corresponding sides of the two retinae being affected, we may ascribe the disease to one root of the optic nerve.

Homonymous or lateral hemiopia is, however, exceptional. The temporal halves, and, in rare cases, the nasal or upper and lower halves of each monocular visual field, are blinded. Temporal hemiopia is to be explained by hindrances to conduction in the optic fibres, which cross at the chiasma. We have no proof of the existence of other forms.*

In these cases of destruction of the nerve-fibres, occasioned by disease affecting the optic tracts or the brain, abnormal appearances are not often observed in the retina; it is this fact which distinguishes hemiopia resulting from paralysis, from that impairment of vision in which half of the retina has been detached or entirely destroyed from an effusion of serum or blood behind it.

Hemiopia sometimes appears as a transient affection, depending upon functional derangement of the retina. Dr. Wollaston's case is an instance of transient hemiopia; he remarks—"I suddenly found, after violent exercise two or three hours before, that I could see but half the face of a man whom I met; and it was the same with respect to any other object I looked at. In attempting to read the name Johnson over a door, I saw only . . . son, the commencement of the name was wholly obliterated to my view." In this case the affection passed off in about a quarter of an hour.

We meet with instances of this kind from time to time in practice; they generally come on with indigestion or headache, and are of little or no consequence, but may cause the patient much unnecessary alarm. On examining the eye with the ophthalmoscope no abnormal appearance can be discovered, the affection probably depending upon temporary loss of power in the nerve-fibres, or nervous matter, supplying half the retina of either eye. In some instances of hemiopia there is a marked defect of colour perception in the sound half of the visual field. In one case of this kind vision was nearly restored, but on the blind side the colour sense remained defective.

Treatment.—In that form of disease last described, we must direct our attention towards the removal of

Retina
appears
healthy.

Functional
hemiopia.
Case.

Due to
gastric irri-
tation.

Treatment.

* C. Stellwag von Carion, "Diseases of the Eye." By Hackley and Roosa, New York, 1868, p. 663.

the source of irritation, which is usually gastric; but as I have before remarked, the affection is generally a very transient affair, and it will often be unnecessary to prescribe anything for it. In those far graver cases arising from actual destruction of tissue in the optic tracts, or nervous centres, we can seldom do much towards relieving the symptoms. We shall generally have sufficient evidence of the nature of the lesion from various concomitant symptoms, depending upon the disease of the brain, and it is to these our attention should be directed rather than to the state of the retina.

Unsatisfactory in brain cases.

SCOTOMA.

A portion of retina insensible to light.

Appears as a black spot.

Moves with the eye.

Its position important.

Causes :

SCOTOMA (constant) signifies a form of partial blindness, in which only a portion of the retina is insensible to light, and this part often appears as a black speck to the patient, particularly when he is engaged in reading or any similar work. In these cases the rays of light are not prevented from reaching the retina, but they fall on certain parts of the fundus of the eye incapable of appreciating the stimulus of light, which hence appear as dark spots in the field of vision.

One of the characteristic features of scotoma is, that the patient observes the dark spots to move exactly with his eyes, and not float about before them, as in *Muscae volitantes*; thus, for instance, it will appear to follow the eyes as these are cast along the lines of a book in reading or writing, as it were covering a part of the line; in fact, we may generally detect the presence of a scotoma, by making the patient look through a small aperture at a sheet of white paper, upon which he will generally perceive a black spot projected, if a part of his retina is insensible to light. Scotomata vary much in form and figure, being described as discs, lines, stars, and so on.

The position of the scotoma will very much influence its effect on the patient's sight: if at or near the yellow spot it will be most annoying, constantly interfering with the perfection of vision. On the other hand, if the scotoma be eccentric, it may cause but little inconvenience, and hardly any at all in reading or writing; but, when looking at a distant object, the patient will probably notice a hazy or misty appearance over a portion of the field of vision.

Scotoma may arise from congenital defect, a portion of the retina being imperfect or wanting; but these

dark spots are far more commonly the result of inflammation of the retina and choroid. In this case the ophthalmoscope may reveal to us the nature of the disease; it may be that a spot of atrophied retina, or one infiltrated with choroidal pigment, will thus be seen, and account satisfactorily for the symptoms of which the patient complains.

Congenital defect.

Retinitis.

In other cases scotoma may be induced by paralysis of some of the fibres of the optic nerve or tracts, or destruction of a very limited portion of the brain; in which case, although the portion of retina supplied by these fibres will be absolutely insensible to light, still we may be unable to perceive any alteration in the fundus of the eye by means of the ophthalmoscope. In cases of this description, the scotoma generally comes on suddenly, and the affected portion of the retina if not absolutely insensible to light, may be incapable of appreciating colours (see page 429): in fact, it often happens that a certain portion of the retina may be affected with colour blindness, in the first instance, and subsequently become dead to the stimulus of light without our being able to detect anything wrong with the eye by means of the ophthalmoscope.

Disease of the nerve or brain.

Should a scotoma have been observed by the patient for some considerable time, it is seldom that the black spot subsequently disappears, whether it arises from an affection of the brain or retina, especially if symptoms of commencing atrophy of the disc are present. But if the spot has only recently appeared the case will not be so hopeless, and our prognosis and treatment will be very much guided by the aid which the ophthalmoscope affords us. A central scotoma is always more serious than one, though it may be of large size, in the periphery of the retina. If no morbid changes are detected in the eye, probably the disease depends on some affection of the nerve; or we may suppose that a limited portion only of the optic tract is involved; and in these cases we may hope for some improvement. I need hardly say that no such favourable prognosis can be formed in a case of partial atrophy of the retina, or where its nervous structure has been invaded by pigmentary formations from the choroid. On the other hand, absence of atrophic symptoms in the optic nerve or retina does not exclude an unfavourable result.

Prognosis bad in old cases,

or if attended by structural changes.

Clots of blood may disappear.

Blood clots are sometimes a cause of scotoma, and may be detected with the ophthalmoscope; as they are absorbed, the part gradually recovers its functions. The same remark applies to limited serous effusions behind the retina, provided the nervous tissue does not appear to be atrophied, having lost its transparency over the seat of effusion.

DISEASES OF THE ELASTIC LAMINA OF THE CHOROID.

DISEASES OF ELASTIC LAMINA.

Epithelium hides choroid in Hindoos.

Vessels exposed in disease.

Epithelium not essential to sight.

Its probable function.

THE ELASTIC LAMINA is an homogeneous membrane, separated from the sclerotic by the vascular network of the choroid and ciliary processes, and internally it is lined by a layer of epithelial cells, which in the eye of the native of India are full of black pigment, so that the structures behind these pigment-cells cannot well be seen till they have been removed. Yet we frequently see the vessels of the choroid looking as if injected with vermilion, and placed on a black background. Under these circumstances, therefore, the hexagonal cells of the elastic lamina must have been destroyed, or in some way removed.

It is possible that, from congestion of the vessels, the epithelial cells may be pushed on one side, so as to expose the vascular network of the choroid behind them; but although it be admitted that these cells are elastic, and capable of separation from one another, still, I believe that in the eye of a native the vessels of the choroid are seldom thus brought into view, unless the cells are destroyed. It is by no means an uncommon thing to meet with instances in which the epithelium has been thus completely broken up, patches only of it being left scattered over the surface of the lamina.

ABSENCE OF EPITHELIUM.—These pigment-cells may be destroyed and the patient's vision remain but slightly impaired. No doubt the epithelium is placed there for some important purpose, though I am not aware of what its precise functions may be; but this much is certain, that the pigmented epithelium must absorb a number of the rays of light which enter the eye; and in a tropical climate, where the glare of the sun is excessive, they would perhaps be a protection to the retina.

M. Bravais observes that correct vision can only

exist with clear images on the retina; but that images formed by direct rays may retain their clearness even when reflected, if every reflected ray re-crosses the retina exactly where it has already traversed it. This condition is fulfilled wherever the reflecting surface is in contact with the sensitive screen. Every ray of light, according to this authority, which has traversed one of the cones or rods of the columnar layer of the retina being stopped and reflected by the choroid can only return by again permeating the same sensitive structure, thus increasing the impression without diminishing the clearness of the image. Thus in the normal eye the hexagonal cells lying behind the rods of Jacob, reflect back the light in a manner which may seem to render it useful. The confusion of vision of old people in whom the hexagonal cells are often destroyed, and also in albinos, may thus be accounted for.* But I have certainly seen instances in which the hexagonal cells alone have been almost completely destroyed, and yet the patient's vision has been remarkably good. It must not be supposed that the cases just referred to, of removal or distension of the epithelium of the elastic lamina without impairment of vision, are of common occurrence; they are, indeed, quite exceptional; for although this alteration does not appear directly to affect the functions of the retina, yet in the majority of instances it is the result of some pre-existing disease, which has also produced defective sight.

COLLOID DISEASE.—A very peculiar disease of this membrane has been described as colloid degeneration of the elastic lamina. The tissue becomes thickened in certain spots, small wart-like projections forming on its inner surface, which may be sufficiently numerous to render the elastic lamina rough and uneven, and cause absorption of the hexagonal epithelium. These changes are rarely met with except in very old people, a few instances only having been recorded in which younger persons have suffered from the disease; and as old people are apt to suppose the dimness of vision which they experience to be simply the result of advancing years, they do not think it necessary to consult a surgeon on the subject, more especially as

Views of M. Bravais.

Loss of epithelium with other disease.

COLLOID DISEASE.

Confined to old people

* "Dobell's Report on Progress of Medicine for 1870" p. 13.