abundantly supplied with minute bloodvessels; the cornea was transparent, and until the mass covered the pupil the man could see perfectly.* Mr. Dixon removed the eyeball, and the patient made a rapid recovery; and up to the time of the publication of the report no return of the disease had occurred.

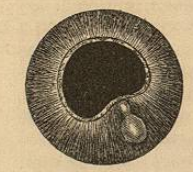
Successful removal.

Another case of a very similar nature, is detailed in the same number of the Ophthalmic Reports, by Mr. Cowell. But cancer commencing in the iris is a comparatively rare affection; and malignant disease of the internal tunics of the eye usually finds its nidus in the choroid, and gradually invades the other structures contained within the eyeball.

Cysticercus of Iris.

Cysticerci of the Iris are occasionally met with; Fig. 29 is a copy of a drawing from one made by Mr. Teale, jun., showing the position of a cysticercus attached to the iris, which he removed, together with a portion of the iris, by an iridectomy. The eye, prior to the operation, presented the following appearances:—On the surface of the lower part of the iris was seen an opaque body, constricted in the middle, and rather larger than a hemp-seed, which was evidently causing some distress to the eye. The conjunctiva was slightly injected; the cornea was bright, but dotted on its posterior surface with minute spots, as in corneo-iritis; the iris was active, except at the situation of the white body, near which it was adherent to the capsule of the lens; tension normal. Reading No. 16, Jaeger.†

Fig. 29.



Appearance.

Removal by iridectomy.

In instances of this kind the plan of treatment adopted by Mr. Teale possesses considerable advantages over any other, the cysticercus being removed from the eye, together with the portion of the iris to which it was attached, by an iridectomy.

Leprous affections of the Iris are extremely common among persons suffering from leprosy—in fact, in cases of this disease of long standing, it is rare to

* *Ophthalmic Hospital Reports*, vol. v. p. 230.
† *Idem*, vol. v. p. 320.

find the iris and cornea healthy. I have observed that as a general rule the cornea is affected before the iris in these cases, and that plastic iritis is more common than the parenchymatous form of disease. Leprous tubers form on the iris as they do on the cornea, and especially on the conjunctiva, *vide* page 293.

FUNCTIONAL DISEASES OF THE IRIS.

Mydriasis.

Mydriasis is an abnormal dilatation of the pupil, occurring independently of disease of the deeper structures of the eye; so that, although the pupil does not contract on exposure to light, and the patient suffers from impairment of vision, in consequence of the excess of light admitted into the eye, still this defect is remedied by placing a diaphragm, with a small hole drilled through it, in front of the eye. The outer rays of the cone of light impinging on the retina being cut off, the defective vision is in great part corrected; and the patient, while looking through the hole in the diaphragm, sees well. This contrivance will not, of course, overcome defects due to loss of accommodation, depending on causes similar to those which induce the mydriasis. The same result may be attained by causing the pupil to contract by the application of Calabar bean to the eye. The above definition of *mydriasis*, therefore, excludes all cases of dilatation of the pupil depending on deep-seated disease of the eye.

Simple dilatation of pupil.

Causes: paralysis of third nerve.

Irritation of sympathetic.

Mydriasis may be confined to one eye, or both eyes may be affected. The cause of the dilatation of the pupil may be the suspension of the functions of the third nerve, the circular fibres of the iris being thus paralysed, for when this nerve is divided the pupil remains dilated. The same effect may be induced by irritation of the cervical branches of the sympathetic, which are distributed to the dilatator pupillæ: this muscle being thrown into action, the pupil dilates.*

Treatment.

The Treatment must evidently depend on the nature of the disease. In some few instances it appears to arise from reflex action, excited by the presence of a foreign body on the cornea or conjunctiva; or it may be that some more distant branch of the sentient nerve

* J. Bell on the Pathology of Certain Forms of Dilated Pupil. *Edin. Med. Journal*, No. X., p. 917.

is in the first instance affected, the irritation being conveyed by reflex action through the oculo-motor nerve, and thereby destroying the contractile power of the circular fibres of the iris. In these cases our first care should obviously be to remove, if possible, the cause of the irritation.

Remove the cause of irritation.

If the mydriasis appears to depend on defective action of the third nerve, Faradization may be useful; the action of the galvanic current, however, should never be continued for more than a few seconds at a time,* and if the pupil does not contract speedily under its influence, we can expect but little benefit from continuing this treatment. Should the patient have suffered from syphilis, the case must be treated upon the principles generally applicable under such circumstances.

Faradization.

If the dilatation of the pupil results from irritation going on in the intestinal canal, whether excited by worms, or any other cause, and propagated through the sympathetic to the radiating fibres of the iris, we must endeavour to remove the source of irritation by anthelmintics in one case, and by a blue pill and black draught in another. From my own experience, I am inclined to believe that some such source of irritation is the most frequent cause of mydriasis; and these remote remedies may do more to overcome the dilatation of the pupil than anything else. The affection may be relieved by the instillation of a solution of Calabar bean, but can hardly be cured unless by appropriate treatment directed towards the restoration of the functions of the stomach, liver, or any other organ which may appear to be at fault.

Anthelmintics and purgatives.

We might class among these cases instances of excessive anæmia, following disease of the spleen, in which dilatation of the pupil is accompanied by accommodatory asthenopia. The cause of the impairment of vision in these instances is obvious enough, and the old prescription of "plenty of water, air, and iron," or "washing, airing, and ironing" your patient, is the only rational plan of treatment.

Tonics in anæmia.

MYOSIS is precisely the opposite condition to mydriasis; the pupil being abnormally contracted, and failing to dilate as it should do when the patient is

MYOSIS.

* *Vide* page 100.

placed in a dark room, or after sunset. The pupil will, however, expand under the influence of mydriatics; and it may then be noticed that it is perfectly regular, and hence its inability to dilate is clearly not dependent on synechia.

Pupil contracted,

The contraction of the pupil under ordinary circumstances is a reflex action, excited by the stimulus of light falling on the retina, and being propagated to the oculo-motor nerve, so that the circular fibres of the iris contract and close the pupil (see p. 8). If only a small quantity of light enters the eye, as is the case after sunset, its action on the retina is slight; and, consequently, the excitation of the third nerve is proportionably less than in daylight, the pupil remaining semi-dilated. Division of the sympathetic in the neck is likewise followed by contraction of the pupil, the *dilatator pupillæ* being paralysed: lesions of the spinal cord affecting the sympathetic may thus produce myosis; so that, in instances of myosis, we must consider all the circumstances of the case by the light of our knowledge of the physiology and pathology of the third and sympathetic nerves. This condition is occasionally caused by long-continued work upon minute objects, as for instance in watchmakers the sphincter muscle of the iris acquiring a preponderating power over the dilatator.

From excitation of the third nerve.

Or paralysis of sympathetic.

Cases of myosis are sometimes mistaken for hemeralopia (night blindness), in that the patient complains principally of impairment of vision coming on after sunset, which evidently depends on an insufficiency of light reaching the retina, through the contracted pupil, to produce distinct vision. The patient has no pain in the eye, and his sight is good during the day. The case very much resembles one of hemeralopia, with this difference, however: that in hemeralopia the pupil acts freely, the disease essentially consisting in a temporary loss of power in the retina, arising from over-stimulation, or from anæmia of its nervous elements; the latter being by far the most common cause of night blindness.

Mistaken for night blindness.

We know at present so little about the functions of the sympathetic, that it is impossible to understand why, in some cases of habitual constipation, or of dyspepsia, myosis occurs. We suppose that it arises from some disturbance of the sympathetic, propagated to the branches supplying the iris—a very vague ex-

Dyspepsia a cause of myosis.

planation, it is true, but the best we can give of the matter. In cases of this kind, our wisest plan of treatment is to correct and improve the state of the digestive organs as far as we can.

Affection of the brain.

Irritation of the oculo-motor nerve, arising from meningitis, or a clot of blood, or other affection of the brain substance from which the nerve originates, may induce contraction of the pupil; but under these circumstances, the myosis is a very unimportant matter in comparison with the primary disease.

Artificial mydriasis, and myosis, may be induced respectively, by the action of atropine and Calabar bean, as well as by some other drugs.

Tremulous Iris from loss of lens.

Tremulous Iris (iridodonesis) is very seldom seen unless the lens has been removed. As the iris rests on the crystalline, we can readily understand that when the lens is taken away, having lost its support, it hangs like a loose curtain in the anterior chamber, and consequently has a tremulous movement imparted to it when the eye is turned from one side to the other. The same result may occur from an excess of aqueous in the posterior chamber, forcing the lens backwards and the iris forwards (hydro-ophthalmia) —a condition but rarely met with. If the vitreous is in a fluid condition, the lens may sink deeply into it, receding from the iris, and iridodonesis result. Under these circumstances, the ophthalmoscope will reveal the nature of the disease, and the cause of the tremulous movement of the iris.

Excess of aqueous.

Fluid vitreous.

Hippus. Irregular movement of iris.

Hippus.—In this affection of the iris, the pupil dilates and contracts rapidly, involuntarily, and independently of the stimulus of light. It is usually met with in cases of retinal disorder, and still more often in affections involving the membranes of the brain. It has been noticed as occurring in instances of

Nystagmus.

Nystagmus.—This latter condition of the eye is described by Dr. Mackenzie as being an involuntary motion of the eyeball from side to side, due to clonic spasm of the recti, and symptomatic of various nervous diseases: as hysteria, epilepsy, chorea, and so on.

ARTIFICIAL PUPIL.

Artificial Pupil.

The operations usually employed for the formation of an artificial pupil are three in number. 1st. Excision of a portion of the iris; 2nd. The operation

known as iridesis, or displacement of the pupil; 3rd. Iridectomy.

Various operations.

Before describing the method of performing these operations, I would observe that the chief danger we have to avoid in practising them is, not to wound the lens, and thereby cause a traumatic cataract. Ordinary caution, especially if our patient is under the influence of chloroform, will enable us to steer clear of this danger; and it is almost impossible to lay down any rules which would be of assistance in the matter. A gentle hand and steady eye, with a thorough knowledge of the anatomy of the parts, are the principal requirements in these as in other operations on the eye.

Caution as to the lens.

1. Excision of the Iris.—Chloroform having been administered, the patient being laid on his back upon a couch in front of a good light, and a stop-speculum adjusted, the surgeon stands in the position most convenient to effect the work he has to perform, and secures the eyeball by seizing a fold of the conjunctiva, near the margin of the cornea, with a pair of toothed forceps. He then passes a broad needle through the margin of the cornea, at a spot nearest to the point at which he proposes excising the iris. A Tyrrell's blunt hook is to be inserted sideways through the opening in the cornea, and passed onwards until its hooked extremity reaches the margin of the pupil, when it is to be turned downwards, so as to hook over the pupillary margin of the iris. The instrument is then to be carefully withdrawn from the eye, being again partly rotated, and dragging with it a small fold of the iris. Immediately this fold is drawn out beyond the wound in the cornea, an assistant should snip it off, close to the edges of the wound, with a pair of curved scissors; the speculum is then to be removed, and the eye kept closed with a pad and bandage for a few days.

1. Excision of Iris.

Operation with Tyrrell's hook.

Withdraw and excise a fold of iris.

If an extensive and deep opacity of the cornea exists immediately in the axis of vision, preventing our seeing the edge of the pupil, although it may have been dilated with atropine, it is evident that we cannot perform the operation above described. It would be a dangerous proceeding to grope about with the blunt hook in the anterior chamber, in the hope of seizing the pupillary margin of the iris, which we cannot see through the opaque cornea. Under these

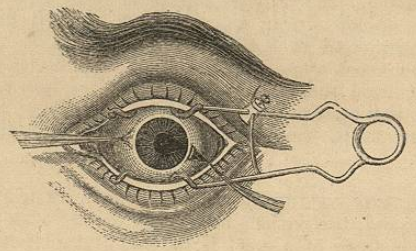
Modification in corneal opacity.

circumstances a modification of Tyrrell's operation is rendered necessary.

Operation with forceps.

In place of passing a hook into the anterior chamber, it will be requisite to make the opening in the cornea sufficiently large to allow of a pair of cannula or iridectomy forceps being introduced into the eye. A fold of the iris, as near as possible to its pupillary margin, is to be seized, and having been withdrawn through the wound, is to be snipped off close to the cornea by an assistant (Fig. 30). Care must be taken that the iris is, if practicable, excised from its pupillary margin outwards.

FIG. 30.



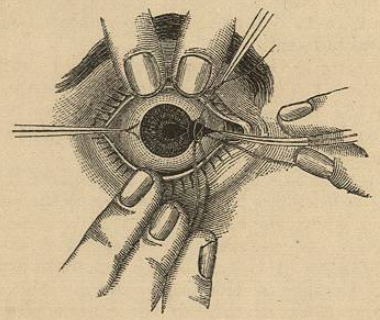
2. IRIDODESIS, OR IRIDESIS. Operation.

2. IRIDODESIS, OR IRIDESIS.—Another operation employed for the formation of an artificial pupil, and named "Iridesis," is performed as follows. The position of patient and surgeon is precisely the same as in the operation above described: the eyelids are to be separated with a spring speculum, and the globe of the eye fixed by seizing a fold of the conjunctiva near the inner margin of the cornea. A narrow-bladed knife is then to be passed through the sclerotic, close to the margin of the cornea, the blade of the instrument penetrating the anterior chamber immediately in front of the iris; a pair of cannula forceps is to be introduced into the eye through the wound, and a fold of the iris is to be seized about midway between the ciliary and pupillary borders; the forceps are then to be withdrawn, together with the fold of iris, through the

A fold of iris withdrawn.

wound, so as to drag the pupil towards the sclerotic. In place of excising the extruded portion of the iris, A ligature applied.

FIG. 31.



as in the last operation, a fine silk ligature is to be tied round it close to the lips of the wound. The small knob of strangulated iris thus formed will be sufficiently large to prevent its slipping back into the anterior chamber (Fig. 31). Subsequently, the edges of the wound unite, and effectually entangle the iris in the cicatrix, thus keeping the pupil permanently displaced outwards.*

Preparation of the ligature.

As there is some little trouble in applying the ligature to the fold of the iris, after it is drawn through the wound in the sclerotic, it is well to be prepared beforehand for this difficulty. After the opening in the sclerotic has been completed, Mr. Critchett recommends that a loop of fine silk be passed over the end of the cannula forceps; as the instrument enters the eye the loop falls down, and comes to rest on the sclerotic over the edges of the wound. When the forceps are withdrawn, and the fold of iris pulled out through the wound, the loop of silk is to be drawn into a knot, an

Method of tightening it.

* Mr. Critchett on Iridesis, *Ophthalmic Hospital Reports*, vol. i. p. 220.

assistant seizing either end of the thread with a pair of cilia forceps (*vide* Fig. 31). The advantage of using forceps is, that it facilitates our taking hold of the ends of the silk and tightening them; it is difficult to manipulate under these circumstances with one's fingers, and we must carefully avoid dragging on the iris, otherwise we may detach it from its ciliary border and do irreparable harm.

Corneal wound must be small.

The opening in the cornea should only be sufficiently large to allow the introduction of the cannula forceps, otherwise the fold of the iris, after it has been tied, together with the ligature, may slip through the wound into the anterior chamber of the eye.

Advantages of iridesis.

The object of this operation is to displace the pupil, and bring it behind a healthy portion of the cornea, in those cases where the axis of vision is occluded by corneal opacity. Its assumed superiority over excision of the iris consists in this, that we can more accurately command the size of the pupil, and by not dividing the circular fibres of the iris the contractility of the aperture is retained, so that it responds to the stimulus of light.

3. Iridectomy. Operation.

3. Iridectomy.—The instruments required for this operation will be a stop-speculum, to keep the eyelids apart; a pair of fixing forceps, to steady the eyeball with; a broad lance-shaped knife, either straight or bent according to the direction in which we propose making the iridectomy; a pair of iris forceps; and lastly, curved scissors. Dr. Wecker's iris scissors are very useful in this operation. The patient having been placed in the recumbent position, it is, as a general rule, very advisable to get him fully under the effects of æther, so as to render him completely insensible; a stop-speculum is then to be adjusted. The surgeon, either in front or behind the patient, standing or sitting as he may find it most convenient to himself, seizes a fold of the conjunctiva, opposite the intended point of puncture, with a pair of fixing forceps, so as to steady the globe of the eye. He then thrusts the lance-shaped iridectomy knife through the sclero-corneal junction, at a point from $\frac{1}{2}$ to $1\frac{1}{2}$ lines behind the margin of the cornea, and thrusting the blade of the instrument steadily onwards, close in front of the iris,

Incision in sclerotic.

an opening about a quarter of an inch long is made in the sclerotic. The knife is then to be slowly withdrawn, so that there is no sudden rush of aqueous from the eye. If the anterior chamber is very shallow, the incision may best be made with a narrow-bladed cataract knife; there is less risk of wounding the lens than with a lance-shaped knife.

The surgeon, still fixing the globe of the eye with one hand, takes a pair of iridectomy forceps in the other; and if the iris does not protrude through the wound, he inserts the points of the forceps (closed) through the wound in the sclerotic, seizes a fold of the iris about midway between its ciliary and pupillary borders, and drawing the fold of iris out through the wound, an assistant cuts off the requisite amount of iris with a pair of scissors, quite close up to the edges of the wound in the cornea. In many cases of glaucoma after the opening has been made in the cornea, the iris protrudes through the edges of the wound: this is an advantage, for it enables us to seize a fold of the iris without inserting the forceps into the anterior chamber.

A fold of iris withdrawn and divided.

The fold of iris may be excised as above, or it may be cut off by either of the following modifications introduced by Mr. Bowman.* The iris is brought outside the chamber as above described, and divided with small scissors, on one side of the forceps, from the pupillary to the ciliary border, the forceps pulling it gently at the same time, so as to insure this complete division of it. The end held by the forceps is then torn from the ciliary attachment as far as the angle of the incision, and even dragged upon a little, so as to detach it beyond the angle, and then divided with the scissors quite close to the angle. The cut end then retreats within the chamber. The opposite side of the prolapsed part is then seized and dealt with exactly in the same manner. But however the iris is excised, great care must be taken that none of the iris is left between the lips of the wound, lest the healing process be imperfect, and subsequent irritation occur in the eye.

Bowman's method.

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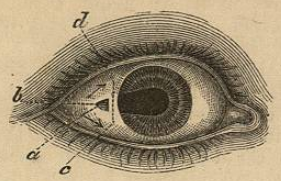
* *British Medical Journal*, 1862, vol. ii. p. 382.

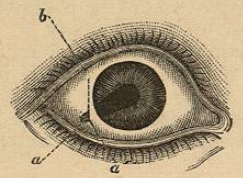
This proceeding is shown in Fig. 31* I.; *a* the prolapse, divided into two portions at *b*. The lower portion is to be drawn, in the direction of *c*, to the lower angle of the incision, and snipped off. The upper portion is then to be drawn in the direction of *d*, and also divided.

Fig. 31*, I.



A second method;

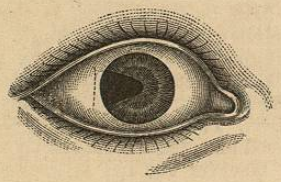
II.



Instead of dividing it into two portions, the prolapse may be drawn to one angle of the incision, and partly divided close up to the angle; the other portion, being then gently torn from its ciliary insertion (slight snips with the scissors aiding in the division), and drawn to the opposite angle, is there to be completely cut off. This is illustrated in Fig. II.; *a*, the prolapse drawn down to the lower angle *a'* of the incision, where the inferior portion is to be divided, and the other drawn up in the direction of *b*, to the upper angle of the incision.

III.

when preferable.



The latter proceeding is perhaps to be preferred if there is much bleeding, for then it is not always easy to find the uncut portion, more particularly if it has slipped back between the lips of the wound. Either method will yield an excellent artificial pupil. The iris will be torn away quite up to its ciliary attachment, and the pupil will consequently reach quite to the periphery (Fig. III.).

If there is any hæmorrhage into the anterior chamber, the fluid blood should be permitted to escape before

coagulation. To effect this object a small curette should be inserted between the lips of the wound, slight pressure being at the same time made upon the eyeball with the fixation forceps, so as to facilitate the escape of the blood. The curette should not be inserted into the anterior chamber. If the blood does not flow off readily, it should not be forced out, but be permitted to remain, for it will soon be absorbed, particularly if a compressive bandage is applied.*

After-treatment.

The excision of the iris having been completed, the stop-speculum is to be removed, and the eye kept closed with a pad and bandage. If the patient suffers much pain subsequently to the operation, a few doses of morphia may be administered, but this is seldom necessary.

Cautions.

In performing the operation of iridectomy, the chief points to attend to are,—1st, to make a free opening into the anterior chamber. With a wound less than a quarter of an inch long, it is almost impossible to complete the operation satisfactorily. A larger opening in the sclerotic can do no possible harm; the wound will heal in twenty-four hours; there is no fear of prolapse of the iris; and the more frequently I operate, the more convinced I am that a free opening is most essential to the success of iridectomy.

1. Let the opening in sclerotic be free.

2nd. Be careful to keep the point of the knife midway between the iris and cornea. By attending to this rule, both the lens and cornea will escape injury.

2. Be careful of lens and cornea.

3rd. It is necessary that the ciliary attachment of the iris should, if practicable, be divided. The edges of the wound must be carefully freed from any portion of the iris; if tags of it are left between them, a troublesome fistula of the sclerotic may form, or continued irritation of the iris may be established.

3. Detach the iris.

4th. Do not be over-anxious to remove the blood from the anterior chamber, after the operation, with a scoop; it is speedily absorbed, and in the meantime can do no great harm.

4. Let alone any blood.

An upper opening preferable.

With regard to the position of the opening to be made in this iris, other circumstances being favourable, the superior section of the iris should be removed, as the upper lid covers the part to a considerable extent,

* J. Soelberg Wells "On Glaucoma and its Cure by Iridectomy," p. 79. London, 1864.

and in this way lessens the blurring caused by the excessive amount of light which would otherwise reach the retina. In instances of ulceration or opacity of the cornea, the position of the iridectomy must be adapted to the circumstances of the case.

Instruments.

The knife employed in making the opening through the upper and inner part of the sclerotic, should have the blade bent at an obtuse angle with the shaft; an instrument of this kind facilitates the operation. But in making the lower and outer section, I prefer such a knife as one ordinarily uses in cases of linear extraction.

After-treatment.

The after-treatment consists in keeping a pad and bandage over the eye, and the patient should be confined to his bed for a few days. The wound in the sclerotic heals in three or four days. Nevertheless, it frequently happens, as in instances of inflammatory glaucoma, that a few days after the operation of iridectomy the tension of the eyeball increases, and continues in this condition for some time, after which the intra-ocular pressure diminishes, but the full advantages of the operation are not perfected, until it may be six weeks, or even two months' time after it was performed.

Iridectomy, its increasing usefulness.

Increasing use of Iridectomy.—It is remarkable how rapidly the advantages to be derived from the operation of iridectomy have been developed, and its employment extended, since its first introduction at a very recent period into ophthalmic practice. Iridectomy is especially called for in glaucoma, acute choroiditis, irido-choroiditis, rapidly advancing or intractable ulcers of the cornea, in occlusion of the pupil, and, in combination with other operative means, for the removal of the lens.

When called for.

An easy operation.

Iridectomy, when the patient is under the influence of chloroform, and with a stop-speculum to separate the lids, is by no means a difficult undertaking, and it is an operation which every medical man, however small his field of work, should be prepared to undertake promptly, as being in some instances the only means at command for saving a patient's sight.

Artificial Pupil when required.

Circumstances requiring an Artificial Pupil.—We may now proceed to consider the circumstances which necessitate an operation for an artificial pupil,

and the condition of an eye which would lead us to choose one operation in preference to another for the end we have in view: this is evidently to make an opening through the iris behind a healthy portion of the cornea, when vision is prevented by a central opacity of the cornea, a closed pupil, or other obstruction to the passage of the rays of light to the retina.

Conditions necessary for success.

The conditions necessary, therefore, for the successful performance of this operation, are—First, that a portion of the cornea be transparent, and its curvature not greatly altered, otherwise the refraction of the rays of light which reach the retina may be so much deranged as to lead to serious impairment of vision. Secondly, if the iris is completely adherent to the lens or cornea, we can hardly expect to be able to form an artificial pupil. Lastly, the lens and internal membranes of the eye must be tolerably healthy, otherwise the making of an opening in the iris will scarcely improve the patient's condition.

Amount of sight tested.

We may generally form a tolerably accurate judgment as to the state of the retina under these circumstances, by holding a bright lamp in front of the affected eye. The degree in which the patient is conscious of the illumination will be our guide to the amount of retinal sensibility; if he cannot distinguish the existence of the flame it will be useless operating.*

Tension of eye.

The tension of the eyeball will also afford us valuable information as to the condition of the deeper structures. In many instances the globe will be found soft and hopelessly atrophied; in other cases its tension may be increased from intra-ocular pressure: in either case, our chance of success by means of an artificial pupil will be lessened.

1. Choice of operation in central opacity.

1. In cases of central opacity of the cornea, whether complicated with staphyloma or not, but obstructing the passage of light to the retina, it is well in the first place to apply atropine to the eye, and thus discover to what extent the pupil is dilatable. If the pupil expands freely, it will be advisable to make an artificial pupil behind a transparent portion of the cornea, and, if practicable, on the inner side of the original pupil. Should the cornea not be clear in this position, we

Iridesis, if pupil dilatable.

* "Iconographie Ophthalmologique," par J. Sichel, p. 451.

must make the artificial pupil behind the outer and upper section of the cornea; and failing this, behind the most healthy part of the cornea.

But if, in central opacity of the cornea, we find the pupil will not dilate at all, the iris being firmly tied down to the capsule of the lens or to the cornea, it will be necessary to employ the forceps in order to withdraw a fold of iris from the eye, which must then be snipped off by an assistant.

Size of new pupil.

With regard to the dimensions of an artificial pupil, this will depend much on the condition of the cornea; but as a general rule, we may endeavour to imitate nature in this respect, making one opening through the iris about the size of the healthy semi-dilated pupil.

2. In closed pupil from prolapse,

2. It may, however, be necessary to make an artificial opening through the iris under other circumstances than those of opacity of the cornea; as, for instance, after injuries or wounds of the cornea, where a prolapse of the iris has taken place into the wound and the pupil has been drawn into the cicatrix. Such an accident sometimes occurs after extraction of the lens. In cases of this kind, it will be well to use the forceps, excising a fold of the iris as nearly as possible in the axis of vision. To prevent any dragging on the iris during the operation, the opening in the cornea must be made well forward, in fact, as near as possible to the position of the artificial pupil, without being actually in front of it, and so obstructing the passage of the light.

excise a portion of iris.

Position of incision.

3. In closure from synechia,

3. Again, in cases where the pupil has been closed by neo-plastic growths, the result of iritis, it will be necessary to open a passage for the rays of light through it. I have already described the operation of corelysis (p. 320), employed in breaking down partial synechia, under the heading of iritis, because it often forms a very important element in the treatment of that affection, preventing a recurrence of the inflammation. But, as I then remarked, if the pupil is entirely closed, and atropine fails to dilate it, we must resort to the operation of iridectomy, removing a portion of the upper section of the iris; for it is not sufficient in this case simply to make a passage for the rays of light to the retina, we must also endeavour to prevent the occurrence of those glaucomatous

employ iridectomy.

changes which tend to absolute destruction of the eye.*

4. In zonular cataract.

4. Lastly, an artificial pupil may be necessary in certain forms of zonular cataract, characterized by central opacity of the lens, its margin being perfectly transparent. A cataract of this kind has but little tendency to spread, and therefore it will be unnecessary to remove the lens; but the pupil may be very advantageously displaced towards the margin of the lens, so that for all practical purposes his eye will be a very good one.†

Iridesis.

Should a pupil be made when one eye is sound?

We are often consulted by patients having one sound eye, and the other damaged in such a way as to render an artificial pupil necessary for the perfection of vision; and the question arises as to how far it is advisable to operate on the diseased eye, when the patient sees perfectly well with the other one.

As a rule, it is well to operate on the diseased eye, for in the first place we may, by this means restore binocular vision, and can most certainly enlarge the field of view by bringing both eyes into play. The only objection which can well be urged against this proceeding is that the eye operated on is apt subsequently to become either inverted or everted, being involuntarily turned in such a direction that the rays of light from the object under observation, passing through the artificial pupil, shall fall upon the macula lutea. To effect this if the pupil is normal in one eye, and eccentric in the other, one eye must evidently be rotated inwards or outwards, as the case may be, so that rays may reach the corresponding portions of the retinæ. But even supposing a squint to arise under these circumstances, we need hardly take this contingency into consideration when weighing the *pros* and *cons* of making an artificial pupil.

A possible squint the only objection.

Not a valid one.

It will of course be necessary, before operating in cases of this kind, to ascertain the amount of vision the patient possesses with the diseased eye; it is useless interfering if it has no perception of light; in fact, we must take the precautions I have already detailed regarding these matters, and act in every way according to the rules laid down.

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* *Ophthalmic Hospital Reports*, vol. i. p. 207.

† *Idem*, vol. iv., p. 150: Cases and Remarks by Mr. Critchett.