

CLINICAL LECTURES

AT THE

WESTERN OPHTHALMIC INSTITUTION,
DORSET STREET, PORTMAN SQUARE.

By F. H. BRETT, Esq., F.R.C.S.,

LATE SURGEON TO THE GOVERNOR-GENERAL OF INDIA'S BODY-GUARD,
AND TO THE GOVERNMENT EYE INFIRMARY, CALCUTTA.

LECTURE I.

ON ARTIFICIAL PUPIL, (*κορη μορφω.*)

SINCE the time of Cheselden,* who first restored vision by the formation of an artificial pupil, accomplishing for that purpose an incision of the iris, a great variety of methods have been invented, all of them being only different modifications of the three following—viz., 1st. Iridotomy, or cerotomy, (*κορη τεμνω.*) in which this diaphragm is incised: 2ndly. Iridec-tomy, or corectomy, (*κορη εκτομη.*) in which a portion is ex-cised: and 3rdly. Coredialysis, (*κορη διαλυσις.*) or detachment of the outer circumference of the iris, from the ciliary liga-ment. The last operation, which consists in tearing away the iris from its ciliary attachment, is attended with such laceration of the ciliary nerves and bloodvessels at their trunks, and consequent hæmorrhage, and generally severe inflammation, that I think it may be set aside. Scarpa, who proposed the operation, in his "Trettato delle Principale Malattie degli occhi," now acknowledges another inconvenience—viz., that the iris is apt to resume its position, even in the best case, be-coming, as he observes, filiform. Schmidt, Reisinger, Von Graafe, and others, have likewise performed, and variously modified, this operation; but it is now generally discarded by the best surgeons. Experience the most extensive in the East has convinced me that it is worthless. I shall therefore confine myself, in the following remarks, to the several modi-fications of the two first methods, to which I shall add the more modern operation of drilling.

Artificial pupil is required when the pupillary opening is concealed by a leucoma, or when it is itself obliterated. But the morbid conditions which require the formation of an arti-ficial pupil will be more comprehensively described under the following heads:—

1st. *Occlusion of the pupil by an opacity of the cornea.*—The pupillary opening is in its normal condition; but a dense and incurable opacity exists in front of it. The vision is more or less deteriorated according as the obstacle exceeds the peri-phy of the pupil; and when the patient retains the power of distinguishing objects, he can only look at them by painful efforts, and sidewise. This form is frequently complicated with a central cataract, which can only be detected by exa-mining the eye in profile. This double obscurity of the diop-tric media is explained in the following manner:—When the cornea becomes the seat of a central perforating ulceration, the aqueous humour escapes, the iris falls forward, and the lens, in obedience to the contraction of the muscles, advances towards the cornea. The centre of the anterior part of the crystalline capsule comes in contact with, and receives the morbid products of, the ulcer, inflames, and becomes opaque. When the ulcer closes, the aqueous humour again fills the two chambers, and the lens resumes its primitive position; but the corneal ulcer has been replaced by a dense white opacity, and a circumscribed opacity likewise occupies the capsule and the lens itself.

2nd. *Occlusion of the pupil by a leucoma, accompanied by a synechia anterior.*—In this case sometimes one portion of the pupillary margin is united to the cornea, and the pupil is ob-scured by the leucoma. Sometimes this last is situated to-wards the corneal circumference, the pupil being very much narrowed or closed, in consequence of the drawing which the iris suffers by its adherence to the cicatrix. These lesions are generally produced by a perforation of the cornea, either tra-umatic or ulcerous, which has determined the approximation of the two membranes, and a prolapsus of the iris, after the escape of the aqueous humour. The solution of continuity being cured, the iris remains fixed to the cornea, which was the seat of the wound. The second of these cases is princi-pally observed after the operation for cataract by extraction, when the section has been occupied by a hernia of the iris, which could not be reduced.

3rd. *Occlusion of the pupil by plastic deposition.* (*Synizesis, phthisis pupillæ.*)—This arises from an inflammation of the

iris. The tissue whence the obstruction results is engen-dered by an escape of coagulable lymph, mixed, in some in-stances, with the pus incompletely absorbed, or it becomes combined with the fibrinous residue of a clot of blood. In certain cases, the pupil, strongly contracted in the course of an ophthalmia affecting the interior of the eye, closes in upon itself, so that the divers points of its extent touch each other, and unite with the plastic substance, the presence of which can scarcely be perceived. Occasionally, at the seat of the atresia, a black point is perceived, which resembles an open-ing, but which is only a layer of pigmentum.

4th. *Occlusion of the pupil by a cataract, complicated with a synechia posterior.*—The operation for the formation of an arti-ficial pupil is indicated, when the margin of the pupil is adherent through the whole of its extent, or nearly so, to the opaque anterior portion of the capsule. The difficulties of separating such adherence are evident. Scarpa himself acknowledges that depression cannot, in such instances, suc-ceed, and recommends the operation for the formation of an artificial pupil. It should be had recourse to whenever the synechia comprehends more than a third of the pupil. It will be seen in the sequel that these cases are adapted for the ope-ration of *drilling*. The lens itself will generally be found to be fluid, or partially, if not entirely, absorbed.

1. *Previous to undertaking an operation,* a careful inquiry must be instituted into the state of the eye, and its generally healthy appearance in every other respect excepting the ob-structed vision. The condition of the organ rendering an operation requisite has always been attended by more or less inflammation, generally of a specific character. This must be carefully inquired into, and the existing state of the patient's health satisfactorily ascertained.

2. That part of the cornea destined to correspond to the artificial pupil ought to be diaphanous. It is also necessary that the region of the iridian diaphragm, on which it is pro-posed to form the opening, be in a normal condition. An opening formed in a disorganized iris would almost inevitably be closed up by exudation of lymph.

3. It is essential that there should be, at the point where it is proposed to operate, a space, however small—i.e., an an-terior chamber.

4. The existence of a total opacity of the crystalline lens does not contraindicate the operation, but it becomes neces-sary to practise a second operation, either at the same time or subsequently.

5. The patient should be able to distinguish between night and day; whatever may be the density of the obstacle, the individual must be able to recognise so much light as to re-move all doubt as to the possible complication of amaurosis. This principle admits of some exceptions. In a patient, for example, labouring under a leucoma, the pupil being free behind the corneal obscurity, the operation would, doubtless, be contraindicated, where the power of vision had become completely abolished. But if, under the same circumstances, a false membrane also obstructed the pupil, who can say that a soft cataract may not exist behind it, sufficient, of itself, to intercept every ray of light. An operation is therefore allow-able in these doubtful cases, the surgeon at the same time warning the patient of the slight chance of success. Such is the advice of Graafe, whose efforts have been sometimes crowned with success, although the individuals were entirely insensible to the influence of light.

6. No operation should be performed on one eye where the opposite enjoys the faculty of vision, excepting where it is practicable to form a central pupil, otherwise there would re-sult a want of correspondence in the axis of vision of the two eyes, and, consequently, a general confusion of vision, or a diplopia. Experience has proved, in these cases, that the patient has been compelled to obscure the eye operated on, and only to employ the other; he has therefore lost instead of gained by the operation.

7. When one eye is affected with a simple cataract, and the other with closed pupil, Rosas advises to proceed at first to operate for the cataract, and not to perform artificial pupil, if the patient recovers his sight. It is only when the operation for cataract has failed that the attempt to form a new pupil should be made.

8. If the patient is too young, coreomorphosis should be de-ferred. It should not be executed before the age of six or seven years.

9. The general condition of the organism, pregnancy, the period of the establishment or cessation of the menses, the existence of an epidemic affection, may require the operation to be delayed. It is prudent, in certain cases, to have recourse

* Philosophical Transactions, 1728, vol. xxxv.

to a preparatory treatment, with the view of weakening a prevailing diathesis, and of rendering less probable a fresh invasion of the morbid phenomena which have produced the condition on account of which the operation is undertaken. All attempts should be postponed if there is pain in the eyeball on perception of luminous objects. When the palpebræ are the seat of granulations, of trichiasis, or of any alteration whatsoever likely to oppose the success of the cure, it is necessary to cure or palliate these several lesions before operating.

10. The situation most favourable for the formation of an artificial pupil is that which approaches nearest to the position of the natural one. It is at the centre of the pupil that the greatest convexity of the cornea exists; it is, then, on this point that the greatest number of luminous rays ought to fall. Accordingly, when the peculiarities of the malady do not admit of our selecting this advantageous situation, the patients, after the operation, are obliged to have recourse to convex glasses. The internal side of the iris, at the transverse diameter, or under that diameter, is the next best situation; next in order, the external and inferior external; the superior portion is the least convenient, on account of the correspondent region of the cornea being ordinarily covered by the upper lid.

If an artificial pupil is to be formed in each eye, some direct us to make the one at the temporal and the other at the nasal edge, alleging that in this way there is a greater degree of correspondence between them than if they were formed in any other situations except in the centre of the eyes. If both pupils are towards the temple, the appearance is far from being natural or agreeable.

CASE.—A young girl, thirteen years of age, presented herself at the Government Ophthalmic Institution in Calcutta, in 1843, with dense opacity of both eyes, and cataracts behind these opacities, the result of purulent ophthalmia during infancy. Vision was totally obscured in the right eye, and there was only a faint lateral perception of light in the left, effected by turning the eye inwards, accompanied by a tremulous motion of the eyeballs. Having made an incision with a lancet in the margin of the cornea, I formed, by excision, a moderate-sized pupil at the inferior and internal portion of the iris, and about a fortnight afterwards I practised a similar operation at the inferior and external portion of the iris of the other eye. The vision was restored in a most satisfactory manner. She walked about without assistance, and she acquired the power over the muscles of the eye, so as to fix her look on objects. Numerous similar cases have occurred in my practice during my career in India, some of which were published in the *Transactions* of the Royal Asiatic Society of Bengal, in an account of a series of cases in which "certain interesting phenomena were manifested in individuals born blind, and in those having no recollection of the sense of vision, on their being restored to sight at various periods of life."

As an artificial pupil generally possesses no power of contracting or dilating, care must be taken that it be made neither too large nor too small. It is remarkable, indeed, how useful a very small artificial pupil may prove, as is well illustrated in the celebrated instance of M. Sauvages, operated on by Demours. In general, however, so small a pupil does not prove very serviceable, while, on the other hand, an artificial pupil, much above the medium size, exposes the eye to be constantly dazzled, and is thus rendered comparatively useless.

The prognosis of the operation may be deduced from the foregoing considerations. It is favourable when the pupillary occlusion, the result of a diseased action long since subsided, is the sole cause of the blindness, and the other parts of the globe are sound; when the region of the cornea, which ought to correspond to the new pupil, is in a normal condition; when the patient distinguishes the different gradations of light; when he is in good health, and free from all morbid diathesis. The chances are, in general, better, if we have to deal with a cornea partially diseased, if it be accompanied with a synechia anterior, than when the pupillary orifice is closed in consequence of an affection of the iris. The traumatic lesion involving more particularly this diaphragm, there is reason to fear lest a new inflammation produce, in the recent pupil, effects similar to those produced in the primitive one. The prognosis depends, moreover, on the dimensions afforded for the artificial perforation, and on the method according to which we effect it. We shall see, other things being equal, that it is iridectomy which offers the greatest chance of success. The result is the more uncertain when the cornea only presents a very small diaphanous space; when

the iris is discoloured and swollen; when the globe has neither its natural consistence nor dimensions; when there is no impression of light, or but a vague sense of it. It often happens that the surgeon is obliged, notwithstanding a certain number of contraindications, to yield to the solicitations of the patient, and to attempt an operation which, without ever hurting, when the patient is totally blind, may produce, under certain circumstances, some slight degree of vision. In other cases, sight is re-established in a manner sufficiently perfect for the individual to distinguish small objects. Such a success is rare; the patient ought to think himself happy when he has acquired the power of pursuing occupations which do not require great exertions of sight, and can walk about without a guide.

METHODS OF OPERATION.

1. *Iridotomy, Iridisection, or Coretomy.*—This method is only applicable where the original opening in the iris has been destroyed, and where the crystalline lens has been lost. This occurs most frequently after the operation of extraction of a cataract, which is followed by a large prolapsus of the iris; but it also results from wound of the cornea, &c., which allows of the escape of the aqueous and crystalline humours, and is also followed by prolapse of the iris. In both these cases, the fibres of the iris are subject to much tension. The cornea is transparent, or there is only a very limited cicatrix near its circumference.

After removal of the lens, by extraction or solution, the pupil closes, in consequence of inflammation of the iris; or the aperture becomes exceedingly contracted, and occupied by a dense and tough adventitious membrane, or capsule, thickened by a fibrous deposit; in this case, also, the fibres of the iris are much on the stretch, which can nearly always be readily ascertained, as the fibres observable on the anterior surface of the membrane pass in straight radii, without any perceptible curve or bend.

The success of an operation for readily forming an artificial pupil, in all these cases, depends upon the fibres of the iris being tense, so that they contract when divided, and, according to Jungken,* we ought first to instil the solution of belladonna, so as to favour this tension of the fibres of the iris.

In operating for division of the iris by incision, I usually place my patient in the same position as for extraction of the cataract, the horizontal, with the patient's head reclining on a pillow. A careful and intelligent assistant should support one or both of the eyelids, in order that the surgeon may have free use of both his hands. The edge of the iris knife, which is to be introduced through the sclerótica, ought to be exceedingly sharp, and finely pointed, shaped according to the annexed figure.

The surgeon, being seated behind the patient, with the instrument delicately balanced between the finger and thumb, and its edge directed backwards, plunges it into the sclerótica and choroid at the same point as for reclinatio, and a short distance into the vitreous humour; the instrument is then directed towards the centre of the iris, and its point protruded through it. The point is distinctly seen as it presses behind the fibres of the iris. He then carries the handle of the instrument forwards, at the same time slightly pushing the point along the anterior chamber, sweeping over the iris, and carefully avoiding to prick the cornea. The iris is now to be divided by a double motion of the instrument to an extent of one-third of its diameter. This will not be accomplished by merely pressing on the iris, nor by one rapid stroke of the edge of the iris scalpel, but by repeated strokes, as though we were dividing fibre after fibre, and by a drawing motion of the knife, as well as pressure with the edge. If the first attempt has not divided the iris to a sufficient extent, the point of the scalpel is to be again carried forwards, and again withdrawn, until the incision is of the proper length. Before finally removing the instrument, we ought to notice whether the artificial pupil expands; and if the edges of the incision do not immediately separate, the pupil may be opened up by touching its edges with the flat side of the instrument. This operation originated with Cheselden, and has been improved upon by Sir William Adams. Fig. 2 (see next page) exhibits an artificial pupil by incision.

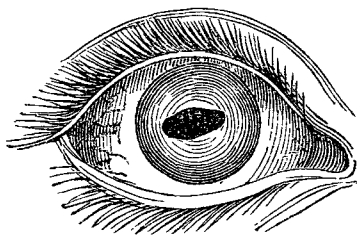
Guérin (of Lyons) was one of the first who executed iridotomy through the cornea. "The success of the operation of Cheselden," says he,† "has not encouraged me; I feared to

* Die Lehre von den Augenoperationen, p. 636.

† Traité sur les Maladies des Yeux, 1769, p. 235.



FIG. 2.



pierce the membrane of the crystalline. I prefer, in such circumstances, to make a section of the transparent cornea, and to carry through this way the instrument which cuts the iris. If hæmorrhage occurs, the blood flows through this opening; and being much more master of the instrument, I can easily make a crucial incision, which forms a pupil nearly circular. This method has perfectly succeeded, and I believe that it merits the preference over that of Cheselden."

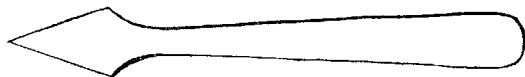
Flajani introduced through the cornea a needle with a cutting lance, and made in the iris, like Guérin, a crucial incision.

Janin operated on a woman for extraction of the cataract, when the patient, suddenly starting at the moment when the surgeon terminated the incision in the cornea by Daviel's scissors, the iris was vertically cut towards the external angle to the extent of three lines.* This opening remaining, whilst pupils made by the same operator, according to the method of Cheselden, became obliterated, Janin concluded that, to be durable, the wounds of the iris ought to cross the radii of this diaphragm, whilst the sections parallel to these same rays would soon cicatrize. It is upon this consideration that he has founded his procedure of coremorphosis. After having divided the cornea, as for extraction of cataract by keratotomy inferior, this oculist raises the lip of the wound with a cuvette confided to the left hand, whilst, with very delicate and sharp-curved scissors, which he holds in the right hand, he makes in the iris a long incision of two lines and a half or three lines, at a small distance from the primitive pupil, and most generally towards the great angle of the eye.

The above theory has found a great eulogist in the celebrated Maunoir, (of Geneva,) whose ideas of the organization of the iris are in all respects analogous to those of Janin. According to Maunoir;† it results from the dispositions of the iris, that it is possible to determine *à priori* the consequences of sections made in it. A wound made across the rays of the dilator muscle will have a variable form, according to the point at which it is situated. If it occupies the middle of the fibres of this muscle, their contraction being uniform, the two borders of the solution of continuity will separate in an equal manner, and a pupil like that of a cat, or of the configuration of a weaver's shuttle, will result. If it exists near the extremity of the fibres of this same muscle, the contraction will be unequal at the two lips; it will be so much the stronger in one or the other of these, as the fibres of the same side are the longest; on the side where they are very short, the contraction will be scarcely appreciable. An incision effected not far from the ligamentum ciliare will furnish, consequently, an orifice, the external border of which will be straight, or nearly so; whilst the border nearest the centre of the iris shall be semicircular, a section established near the sphincter muscle will have an external bent lip, and an internal almost straight.

The operation of Maunoir is performed in the following manner, with a cornea knife, (fig. 3.) and scissors bent at an

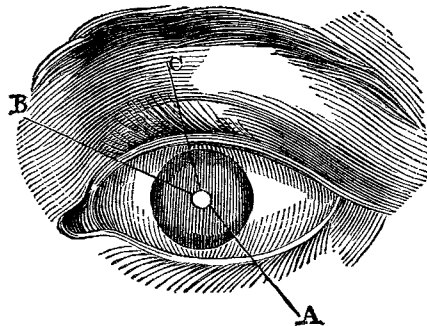
FIG. 3.



angle of about thirty degrees, and having one blunt and one sharp point. An incision is first made to the extent of one-fourth of the circumference of the cornea, close to its edge, and generally towards the temple. If the case is one in which the lens has been previously removed, this incision need not exceed one-fourth; but if we contemplate the removal of a cataract through the artificial pupil, more than one-fourth of the circumference of the cornea should be laid open. The scissors are to be directed through the cornea at the point intended to form the upper part of the incision, and carried across the anterior chamber, and the cornea is to be ripped open

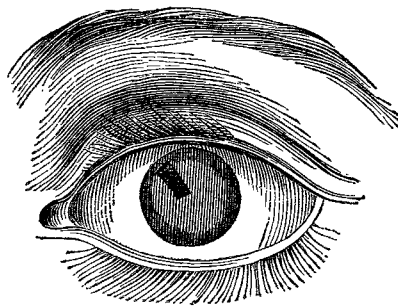
to the necessary extent. The instrument is introduced through the opening of the cornea; the sharp point is directed through the iris, and the blunt blade carried before that membrane, as near the edge of the cornea as it is intended to extend the incision. The scissors are now to be sharply closed, and the iris will be divided. Sometimes the pupil is formed by two small cuts in the iris, (fig 4, A B, A C,) united at the acute

FIG. 4.



angle A. The flap thus made retracts, and the lips of the section of the sphincter, the fibres of which have been cut across, separate, leaving a small triangular or quadrilateral opening, (fig. 5.) The former (as in fig. 2) will be found sufficient

FIG. 5.



where the iris is on the stretch; the latter, (fig. 4,) when we suspect the substance of the iris to be thickened, or adherent to the capsule. When the closure of the pupil is combined with cataract, the above incisions will lay open the capsule, and may even divide the lens, the fragments of which the operator must endeavour by gentle pressure to bring forward through the artificial pupil into the anterior chamber, whence they are to be extracted, by means of the scoop, if they are soft, or the hook, if hard. It may sometimes be possible to extract even the capsule through the artificial pupil. If a portion of the capsule is firmly adherent to the triangular flap of the iris, it will shrink along with this and form no obstacle to vision. Any fragments of the lens which may remain will gradually dissolve in the aqueous humour.

It is necessary for the performance of these operations that the cornea should be transparent to a considerable extent, and that the anterior chamber should be nearly of its natural dimensions. The instances in which the surgeon has an opportunity of restoring vision by either variety of this operation, are very numerous in India. I have restored some who had been blind for twelve years from simple closure of the pupil, as the sequela of iritis, as well as cases of synechia anterior supervening on prolapsus from wounds or ulcers of the cornea.

PREVENTION OF THE CICATRICES AFTER SMALL-POX.

"My own practice has been, to subdue inflammation, as far as possible, by cooling lotions, to open the pustules as soon as they fill, and wash them with milk and water, taking care also, as far as possible, to keep the face covered. It appears, however, that the most effectual means is the exclusion of light. Experiments made some years ago, at New Orleans, if they can be relied on,—and I know of no reason why they should be distrusted,—are very satisfactory on this point.

"To try the effect of this expedient, a certain number of patients, during the eruptive and maturative stages of the disease, were confined in a dark ward of an hospital, and not a pit or scar, or other deformity of the skin, was left, though some of them had the disease most violently, even in the confluent form. These experiments were originally performed by Dr. Picton, a graduate of the University of Pennsylvania, and were contained in his inaugural thesis. Notices of their confirmation I have lately seen in the medical journals of several of the European countries."—Dr. Chapman.

* Janin, *Memoires et Observations sur l'Oeil*, &c., p. 184.

† See his *Premier Mémoire sur l'Organisation de l'Iris et l'Operation de la Pupille Artificielle*. Paris et Genève, 1812, p. 1 à 7.