

**An analysis of one thousand consecutive cataract extractions / by F. P. Maynard.**

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*with kind regards*

*Yours*

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(Nos. 2 & 3, Feb. & March 1903).

AN ANALYSIS OF ONE THOUSAND  
CONSECUTIVE CATARACT  
EXTRACTIONS.

BY F. P. MAYNARD, M.B., F.R.C.S. (ENG.), D.H.P. (CAMB.),  
MAJOR, I.M.S.,

*Offg. Ophthalmic Surgeon, Medical College Hospital, and  
Professor of Ophthalmic Surgery, Medical College, Calcutta.*

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## AN ANALYSIS OF ONE THOUSAND CONSECUTIVE CATARACT EXTRACTIONS.

By F. P. MAYNARD, M.B., F.R.C.S. (ENG.), D.P.H. (CAMB.),  
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Professor of Ophthalmic Surgery, Medical College, Calcutta.*

IN the Special Ophthalmic Number of the *Indian Medical Gazette*, Vol. XXXVI, June 1901, appeared an analysis of my first three hundred cataract extractions. They are included in the one thousand analysed in the present paper.

### GENERAL.

*General results.*—The 1,000 extractions were performed on 864 patients, 136 patients having both eyes operated upon. The results were good in 89 per cent., indifferent in 5·7 per cent., bad in 4·5 per cent., and unknown in eight cases. Good results mean vision ranging from  $\frac{5}{32}$  to  $\frac{6}{8}$  with correcting glasses; indifferent results where sight was poor but sufficient to enable the patient to move about alone, and bad results where sight was lost. The causes of failure in the 4·5 per cent. were sepsis in 36 cases, intra-ocular hæmorrhage five cases, detached retina one, iritis two, and iridocyclitis one. Twenty-

six of them had been done with iridectomy and nineteen without. In fourteen of the cases that were lost from sepsis mucus was present before operation. On the other hand, eleven cases became septic without any mucus in the sac, and many cases had mucus yet did not become septic (v. *infra*). The indifferent results (5·7 per cent.) were due to various causes, such as sepsis, opaque cortex, iritis, glaucoma (one case), over-ripeness, mercurial cloudiness (2), vitreous prolapse, &c.

Double extractions were performed at the same time for unavoidable reasons in six patients. Eleven of the eyes did well, but in one intra-ocular hæmorrhage followed on some 'fits' some hours after operation and the eye was lost. In all other double extractions the second eye was done after an interval of a few days or weeks. In 127 cases the other cataractous lens had been previously extracted. The results were good in 121 and indifferent in six. In 59 extractions the other eye had been 'couched,' with in several cases very good results. The couching did not appear to affect the extraction in any way. In seventeen others the second eye had been lost from small-pox, ulcer of cornea, &c. These gave eleven good, four indifferent, and two bad results. Although these poor results could not be directly connected with the previous loss of the other eye, they show the desirability of further investigation into the possible injurious influence on cataract extraction of previous destructive disease of the fellow eye.

Vision was tested as before by means of square dots made by filling in Snellen's letter squares with Indian ink. Landolt's opto-types were used latterly and proved very satisfactory with illiterate patients.

*Family history.*—Enquiries were made into the history of 351 patients, and a family history was forthcoming in 84, or in 23·93 per cent. The more intelligent the class of patient, the more frequently was such a history forthcoming. Thirty patients gave a history of cataract in the father and 22 patients in the mother. Fourteen had brothers who had had cataracts and one a sister. The rest of the patients had cataractous relatives as follows:—Maternal aunt one, paternal aunt one, father *and* uncle one, uncle three, mother *and* cousin one, father's mother two, mother's father one, mother *and* brother one, mother *and* sister one, grandmother one, son two, daughter one. The age of the affected relative was ascertained in 25 cases. In fifteen the younger generation developed cataract at an earlier age, in three at the same age, and in seven at a later age. Five had more than one relative affected. One case of senile cataract had a history of the disease in three generations. He was aged 50, his mother had it at 55, his grandmother at 65, and a maternal uncle had it in middle age. In three cases husband and wife both had cataract.

*Association with other diseases.*—*Diabetes* was present in only six cases, and all did well. Three of the patients had a family history of cataract. The cataract might just as reasonably be put down to heredity as to diabetes. Personally I do not believe in diabetes being a cause of cataract, or even that cataract is common in diabetes. This disease is very common in Bengal, yet no one I have ever asked believed in any connection between diabetes and cataract. It is one of those errors founded on impression which is perpetuated in every book published. Statistical evidence does not support it.

*Albuminuria* was present in two patients who did well. One got erythrospia for a time.

*Bronchitis*.—Fourteen patients had bronchitis, of whom one did badly. We found afterwards that he kept his sputum in a cup under his pillow.

*Epilepsy*.—Two patients were epileptics, another had had a fit of doubtful nature, and one was the daughter of an epileptic mother. One epileptic, aged 30, became severely epileptic at 20. His sight, perfect before, then became dim. The lenses looked like lamellar cataracts *in situ*, but after removal the nuclei were found to be involved also. The man's father (seen) had been successfully couched for cataract. The other epileptic, a clerk aged 36, had been temporarily insane four years previously, and, on recovering after three months, was found to have diabetes. He had occasional epileptic fits. When first seen he had wedge-shaped cortical opacities. He did well and obtained  $V = \frac{6}{9}$  with glasses. Among other diseases met with among the cataractous patients were *hemiplegia* [three cases, two good and one indifferent (iritis) result], *phthisis* (one good), *elephantiasis* (two good), *malarial cachexia* (one good), *anæmia* (two good), *leprosy* (severe case) both eyes very good results; *gonorrhœa* (one indifferent and one bad result), *nasal discharge* (one good and two bad results), *dacryocystitis* (one bad result). The cases of nasal discharge were not known to be such before operation. In the case of dacryocystitis the sac was extirpated on the left side, probing and syringing, &c., having failed to cure it, and after an interval the right eye was operated on as its sac appeared healthy. It could not have been so as the eye suppurated.

*Age and sex*.—The average age of 212 cases in the 300 series was 51·7 years. In 602 of the

last 700 cases it was 53. Of the 602 cases, 382 were males and 220 females. The average age of the males was 54·5 and of females 51. This result, in spite of the fact that native women (which most of them were) age in appearance much more rapidly than men, and would thus be shown as older than they really were, confirms my impression that cataract comes on earlier in women. The average age agrees with the general belief that cataract comes on earlier in the tropics.\*

#### LOCAL CONDITIONS.

*Arcus senilis* in no way influenced the results. As it hides the scar of the incision it is so far an advantage.

*Pigmentation of the conjunctiva* was very frequent, but had no influence upon the result.

*Pterygium* was usually removed before operation, but beyond causing hæmorrhage it had no ill effect when left till afterwards.

*Conjunctivitis* is an important local condition in its effects and requires preliminary treatment when present, more especially if it is trachomatous. The presence of flaky or stringy mucus in the conjunctival sac is undesirable, but it often follows the preparatory treatment especially bandaging. Two hundred and nine cases that had mucus in the sac when put on the table for operation gave 194 good, seven indifferent and eight bad results. Four hundred and ninety cases that had no mucus gave 452 good, 21 indifferent and 17 bad results. In other words, the indifferent and bad results amounted to 7·16 per cent. in cases with mucus, and to 7·76 per cent. in cases with no mucus. The fact of the presence

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\* See Prof. Hirschberg's paper on 'Cataract Pricking of the Hindus,' translated in *Indian Medical Gazette*, June 1894.



of mucus is no guide to the presence of pathogenic bacteria, and only a bacteriological examination can reveal the presence or absence of pyococci. In the absence of this desirable precaution there must always remain a possibility of pyogenic cocci having eluded our preparatory treatment.

*Leucoma* did not appear to affect the results unfavourably nor did anterior synechiæ.

*Lens, Ripeness, Size, &c.*—One hundred and eleven unripe cataracts were extracted with 93 good, nine indifferent and eight bad results. Sixty-three overripe lenses were extracted with 57 good, five indifferent and seven bad results. Fourteen of these had prolapse of vitreous, two suppurated, one was lost from intraocular hæmorrhage and one from retinal detachment.

Observations were made in 517 instances on the appearance of the lens before operation and the condition of its capsule, cortex and nucleus after removal, with resulting vision, with the following results:—

These figures were compiled because of the importance of knowing what the cortex and nucleus will be like in any case. If sepsis be excluded, the most important factor in producing clear sight is the removal or absorption of the cortex and anterior capsule. The latter is got rid of by dilating the pupil and lacerating it over as large a circle as possible, the former by having a large enough incision and removing as much cortex as possible with the lens. The prognosis, therefore, and the measures required, depend upon the condition of the cortex. The above figures show that whereas all kinds of capsule, cortex and nucleus may be met with in lenses presenting similar appearances when seen before operation, yet certain kinds do accompany certain appearances oftenest. Thus *milky-white*

Appearance of lens before operation.	CAPSULE.			CORTEX.				NUCLEUS.				VISION.		
	Tough.	Thin.	Greasy.	Solid.	Glutinous.	Liquid.	Sago-like.	Brown.	Fatty- looking.	Lemon.	Yellow.	Good.	Ind.	B.
Milky-white ...	60	57	12	5	16	80	28	92	8	0	22	111	9	9
Glistening white sec- tors ...	21	30	7	6	6	12	32	29	8	2	11	53	2	1
Grey uniform ...	49	19	42	21	46	18	20	87	1	8	6	103	4	3
Grey striated ...	6	16	24	4	14	4	24	36	3	0	5	44	1	1
Brown ...	32	5	23	21	36	3	0	51	0	7	3	65	1	1
Cribriform ...	41	9	40	18	40	9	15	74	3	0	6	83	5	2
Black ...	2	1	2	3	...	1	...	5	...	...	...	4	1	...

*lenses* most often have a tough or thin capsule (117 out of 129), liquid or sago-like cortex (108 out of 129), and a brown or yellow nucleus. These are accompanied by the best results and are the only kind of lenses in which it is advisable to omit an iridectomy. The results are good in a great measure because the cortex is soft and escapes readily and the nucleus separates easily. *Lenses with glistening white sectors* are of the same nature, and probably develop into the first kind if left. They also give little trouble with capsule or cortex, and may often be operated upon without iridectomy. *Grey uniform lenses* have often a 'greasy' capsule (42 out of 110), *i.e.*, the cystitome cuts them as if scraping cold bacon, have often a solid or glutinous cortex (21 and 46 out of 110), and generally a brown nucleus. These kinds of cortex make removal very difficult and by becoming subsequently opaque necessitate discission, while at the operation they cause bruising of the iris and require a larger incision for successful extraction.

*Grey striated lenses* resemble white striated lenses as regards cortex and nucleus, but their capsules are often 'greasy.' They also require large incisions and iridectomy. *Brown lenses* have often a 'greasy' capsule and glutinous cortex, and as they are large also they require a large incision and iridectomy. By '*cribriform*' lenses are meant grey lenses which are not uniform, but which present transparencies and opacities arranged in a net-like manner so as to resemble a veil. These have often a greasy capsule and a glutinous cortex and are probably early stages of the grey uniform lenses which they resemble in appearance and character and in the treatment they require. *Black cataracts* are rare—only five were met with in the thousand. The

ages of the patients were 70, 70, 65, 60 and 40. The capsule was greasy in two, tough in two, and thin in one. The cortex was solid in three, liquid in one, and not noted in one. Iridectomy was done in all, and the resulting vision was good in all except one in whom it was only  $\frac{1}{80}$ . This patient had had the cataract nine years, and the tension was + 1. The average duration of the cataract in the five patients was seven years. Two factors are noteworthy therefore, the greater age of the patients and the longer duration of the cataracts.

Measurements were made of the corneal diameter, wound extremities and lens diameters in 61 cases. The average corneal horizontal diameter was 12 mm., the maximum being 14 mm., and the minimum 10.5 mm. The lenses removed from these 61 eyes measured on an average 8.25 mm. The distance between the external extremities of the wound averaged 10.7 mm., the internal measurement available for the passage of the lens being of course less. The ratio of the corneal diameter to the lens diameter was therefore 12.05 to 8.25, or, in other words, the lens diameter may be taken roughly to be a little more than  $\frac{2}{3}$  of the corneal horizontal diameter.

*Alteration of tension.*—Tension was increased in 41 cases; 32 gave good results, five indifferent, and four bad results. Tension was diminished in 90 cases. 77 results were good, eight indifferent, four bad, and one unknown. Vitreous prolapse occurred twice where tension was raised, and six times where it was lowered. In no case was the tension altered beyond + or - 1.

*Anæsthetic.*—Chloroform was used in eight cases for special reasons, cocain was used in 910

cases, and eucain in 82. Eucain was given up on account of the pain and increased hæmorrhage it causes. Otherwise it is an ideal anæsthetic.

*Preparations for operation.*—The face, forehead and eyelids were washed with soap and water and then with sublimate solution (1 in 5,000) the day before operation. The eyelashes were cut and the conjunctival sac washed out with sublimate also and a bandage applied. On the morning of the operations this procedure was repeated. Formerly, in 2,000 solution was used for washing out the sac, but latterly 1 in 5,000 sublimate, and more recently still 1 in 10,000 solution of biniodide solution. The results as regards sepsis have improved in the later series. In the 1 in 2,000 series, roughly the first 300, the bad results, mostly from sepsis, reached 6·82 per cent.; in the last 700 when weaker solution have been used, but much more care taken in boiling the instruments and preparing dressings, the bad results came to 3·57 per cent. Dividing up these 700 cases among the three hospitals at which they were principally performed, the failures were 3·52 per cent. at the Temple Medical School Hospital, Bankipur; 3·69 per cent. at the Medical College Eye Hospital, Calcutta; and 3·50 per cent. at the Mayo Hospital, Calcutta. The instruments were boiled and the dressings carefully prepared in these three institutions, whereas in the first series of 300 the instruments were only boiled for 49 of the operations, and the dressings were not as carefully prepared, so that the results were nearly twice as good in the later series, although lotions of much weaker strength were being used. Atropin was used almost always before and after operation for reasons which will be given later.

## OPERATION.

*Incision.*—A purely corneal incision was used in the vast majority of the cases (948). It lay in a plane parallel and well anterior to the iris. It occupied nearly half the corneal circumference and, with a conjunctival flap, which was made in 609 cases, this is not dangerous to the nutrition of the cornea. In order to combine a conjunctival flap with a purely corneal incision, the knife edge has to be turned towards the sclera just before completing the incision. With a firmly adherent thin tough conjunctiva it is more difficult to make than with a thick loose membrane. Modified linear incisions through the sclero-corneal junction were made in 21 cases, the 3 mm. flap (Swanzy) in 28 cases, and scleral extraction in three cases. The percentage of iris and vitreous prolapses in the four kinds of incision were corneal, 6.2 and 10.01 per cent.; modified linear, 14.3 and 4.8 per cent.; 3 mm. flap, 7.1 and 21.4 per cent. In the three scleral extractions neither occurred. These figures support the view generally held that purely corneal incisions are less often followed by prolapse of the iris. Vitreous prolapse does not depend upon the seat of incision. *Conjunctival flaps* were made in 609 cases. Bleeding was met with in 128 of these, with 119 good, six indifferent and three bad results—not in any way due to the bleeding. If adrenalin solution is used, bleeding does not occur, though it was not generally used in this series unless injection of the eye led one to expect bleeding.

Thirteen of the flaps were sutured with fine silk. This was given up because the suture appeared to set up conjunctivitis, and the advantages gained were not sufficient to counterbalance this risk.

The advantages of making conjunctival flaps are the rapid healing of the wound shutting it off from septic infection, the better nutrition of the cornea enabling one to make larger corneal incisions when necessary, the lesser degree of astigmatism that results, and the impossibility of epithelial involution occurring in the wound with its resulting weak cicatrix. Against these advantages the occurrence of bleeding and the difficulty there is in making flaps do not weigh very heavily.

*Iridectomy.*—In 631 cases iridectomy was performed. In 369 it was not. The 631 iridectomies gave 89·6 per cent. good, 5·7 per cent. indifferent, and 4·2 per cent. bad results. The simple extractions gave 89·1 per cent. good, 5·4 per cent. indifferent, and 5·14 per cent. bad results. Iris prolapsed in 3·15 per cent. of the iridectomies and in 10·3 per cent. of the simple extractions. Vitreous prolapsed in 8·23 per cent. of the iridectomies and in 10·84 per cent. of the simple extractions. Iritis occurred in 5·07 per cent. of the former and in 5·42 per cent. of the latter. These figures show that prolapse of iris is more than three times as frequent in simple extractions as after iridectomy. Iritis and prolapse of vitreous occur oftener after simple extraction also. These worse results after simple extraction were met with in spite of the fact that only the most favourable cases were extracted without iridectomy and that when any complication was present or arose during the operation, an iridectomy was at once performed; such cases consequently passed into the list of those iridectomised. The cosmetic objection to iridectomy is groundless. With a blue iris it is generally impossible to 'spot' an iridectomy upwards until the upper lid is raised,

and in a brown iris this is still more the case. The advantages of iridectomy are that it enables large lenses to be removed with less bruising of the iris and with more capsule and cortex adhering, that it lessens the likelihood of prolapse of iris partly by there being less bruising of it, and partly by providing a sluice for aqueous to escape through in case of the wound reopening from any cause. As the capsule and cortex are better removed, sight is better and secondary operations are less often necessary after iridectomy.

*Capsulotomy.*—The capsule was opened by a sharp cystitome. It was generally opened at the lower margin (G. Hall), and then, if possible, the capsule was opened all round just inside the pupillary margin, so that most of the anterior capsule came away with the lens. By dilating the pupil widely beforehand a larger area of capsule became removable, and less of capsule and cortex remained behind to form secondary cataract and require discission.

Sixty-eight cataracts were removed in their capsules. Thirty-three or nearly half were followed by prolapse of vitreous. Only 51 such prolapses were met with in the whole thousand extractions, so that about two-thirds of them were met with in extraction of the lens in its capsule. Twenty-two of the lenses so removed were overripe. Sixty-one gave good results, three indifferent, and four bad. No lens was removed in its capsule unless its capsule proved very tough and the lens bulged into the wound in it. The lens was removed in its very tough capsule followed by vitreous prolapse in the eye which was lost from retinal detachment.



## AFTER-TREATMENT.

*Irrigation* was not done as a rule after operation, only just before. If done after, sterile saline solution was used. Irrigation after extraction is unnecessary and may cause harm from causing the patient to screw up his eyes. Any blood or cortex was wiped away with wool soaked in weak sublimate or bin-iodide solution. The introduction of instruments into the anterior chamber 'fishing' for cortex or capsule is strongly to be deprecated. *Iodoform* was dusted along the lids in 808 cases with 90·4 per cent. good and 3·8 bad results. When it was not used, the bad results amounted to over 10 per cent. This result in the larger series confirms my earlier figures, *viz.*, that iodoform is valuable in preventing sepsis in spite of all that has been said against it.

*Bandaging.*—Roller bandages were always used. With the object of preventing patients from opening their bandages to see if they can see the operated eye alone was bandaged in cases where there was some vision in the other eye. This was done in 643 cases with good results and no ill-effects that could be attributed to the practice. Both eyes were bandaged in 357 cases. One had no bandage because he suffered from trachoma, and without any bandage the mucus, which treatment failed to stop, could escape easily and not remain pent up in contact with the wound. His eye did well.

The bandage was removed the following morning always, and daily after, for inspection of the eye. If pain occurred it was opened the same evening. Atropin was applied after operation, again the next morning, when the pupil was often

found to have contracted again, and not afterwards unless specially indicated. Eserin was used after sixteen of the earlier operations but only once after. Twice after eserin vomiting came on and the eyes were lost from intraocular hæmorrhage. The Revd. Dr. Kennedy, of the Dublin University Mission, first told me that eserin instillation sometimes caused vomiting, and that he had had similar cases. I never use it now for this reason and for others to be given later on.

*Length of stay in hospital.*—As many patients did not stay as long as they ought, the figures regarding this need not be given. It is remarkable that in 46 patients (in out-of-the-way uncivilised places) who did not remain in hospital more than a few hours and who then attended daily, there were not more than four bad and seven indifferent results.

#### COMPLICATIONS.

*Hæmorrhage.*—Bleeding occurred 128 times from 609 conjunctival flaps without any bad result due to it. Adrenalin solution stops it or prevents it satisfactorily.

The cut iris in the 631 iridectomies bled 109 times, the result being good in 108 cases and indifferent in one case.

*Involuntary iridectomy* was performed 69 times. Careful notes were not kept of the 27 that occurred in the first 300 cases, but they were of the 42 in the last 700. Want of experience has been alleged as a cause. The numbers in each successive hundred were 7, 18, 2, 9, 7, 2, 5, 5, 4, 10.

In the 42 observations the size of the pupil was large (*i.e.*, 6 mm. or more) in 30, and small (less than 6 mm.) in 6. The anterior chamber was

shallow in 7, deep in 11, and normal in 24. The aqueous escaped early in 29 out of the 42. It also escaped early in 11 other cases, in which the iris was not cut. Therefore the iris was cut 29 times out of 40 (29+11) cases, in which the aqueous escaped early, and it was cut 13 times (42-29), in all the remaining cases, in which the aqueous did not escape early, *i.e.*, in 660 cases (700-40). In other words, the iris was cut in 68.5 per cent. of the cases when the aqueous escaped early, and in only 19.7 per cent. of those when it did not. In my own mind there is no doubt whatever that early escape of aqueous is the cause of involuntary iridectomy. Its escape is due usually either to the patient screwing up his eye and so tilting the knife, or to the surgeon doing this by raising or lowering the handle unduly while making the section, or to his pressing on the globe with the fixation forceps. An important detail also is to complete the puncture and counter-puncture *before* beginning to make the section, and then to complete the section without any halting or tilting of the knife. The accident is more likely to happen with deep set eyes and with small palpebral fissures.

The section was completed and the cut piece of iris removed. If at all large and not up to the pupillary margin an iridectomy was then performed to avoid leaving the patient with a double pupil. No harm resulted from the accident.

*Too small an incision* for the lens to be removed through was made in 25 cases. It was enlarged with scissors without difficulty.

*Iritic adhesions* to the anterior capsule were met with in 79 cases, of which 68 gave good, six indifferent, and five bad results. The bad results were not due to the complication, though some

of the indifferent were. It makes the operation more difficult, and lessens the chances of good sight.

*The cornea became concave* after extraction in 112 cases without affecting the ultimate result. It seemed generally due to the rigidity of the sclerotic, though in some cases the cornea may have been abnormally thin. The average age of the cases in which it was met with was 56, whereas the average age of the whole of the patients was 53.

*Corneal haziness*, believed to be due to the mercurial lotion used, was met with in 44 cases. It cleared up in all. In 12 cases *striped keratitis* was present and seemed to be due to damage of Descemet's membrane from the passage of a large lens. It cleared up well.

*Prolapse of iris* occurred in 58 cases, or in 5·8 per cent. of the extractions. After iridectomy, 3·15 per cent. occurred, and after simple extraction 10·3 per cent., or more than three times as many. The dependence of prolapsed iris upon the kind of incision, and upon iridectomy or the absence of it, has been dwelt upon already under the headings '*incision*' and '*iridectomy*.' Some other points which bear upon this question may be mentioned here. Bruising of the iris is an important cause of prolapse. It results from disparity in the size of the incision and of the lens. A large lens passing through an average incision or an average lens through a small incision bruises and stretches the iris, and so renders it flabby and less contractile. The size of the pupil is also of importance, as a lens is easier to extract through a large than through a small pupil. Prolapse results generally from there being insufficient provision for free escape of aqueous humour from the posterior chamber

in case of sudden effort on the part of the patient re-opening the wound. Iridectomy provides a sluice for the aqueous to pass from the posterior to the anterior chamber without pushing the iris in front of it. Atropin used before operation has somewhat the same effect; only it provides a circular instead of a radial sluice. The larger the pupil the freer the communication between the anterior and posterior chambers. The two chambers are in fact almost thrown into one. Atropin moreover prevents prolapse in my opinion, because it stimulates the radiating fibres of the dilator pupillæ. These exert radial traction upon the pupillary margin of the iris in every meridian. The pupillary margin thus being held taut, prolapse of it in any one direction is rendered more difficult. An iridectomy does not abolish this action, as the working of the radiating fibres is not interfered with by division of the sphincter. The reasons for believing atropin to act by stimulating the radiating rather than by paralysing the circular fibres of the iris, are (1) in paralytic mydriasis from lesion of the third nerve instillation of atropin dilates the pupil still more. The sphincter fibres are already completely paralysed, and vaso-constriction will hardly explain this effect; (2) dilatation of the pupil by atropin in cases where posterior synechiæ exist is evidently an active dilatation and not a passive relaxation; (3) during cataract extraction where the pupil has been thoroughly well dilated by atropin, the pupil contracts on completing the section as the aqueous humour escapes, and again after the lens has been extracted. If the sphincter were paralysed, this reflex contraction of it could not take place; (4) after a narrow

optical iridectomy the pillars of the coloboma frequently remain close together until atropin is instilled, when they rapidly separate and form a large pupil. Here the sphincter has been actually cut across without any dilatation occurring, yet atropin at once produces that effect, evidently by stimulating the radiating fibres.

Eserin has the opposite effect of atropin. It makes the performance of simple or combined extraction more difficult, and as the pupil must be made large enough for the lens to pass through, it is not easy to see how eserin can do any good before or during the operation. Used afterwards it may possibly be of use after simple extraction where the sphincter remains contractile, though here, I believe, atropin acts better in preventing prolapse in the manner already described, while the danger of eserin setting up iritis and vomiting is real.

*Prolapse of vitreous* occurred 92 times, or in 9·2 per cent.; 33 occurred in cases where the lens was removed in its capsule; 52 prolapses followed iridectomy and 40 simple extraction; 28 occurred before the lens was extracted and 64 after. The lens was overripe in 22.

*Intraocular hæmorrhage* was met with in seven cases, or 0·7 per cent. Five of the eyes were lost, and in two some sight remained. Two of the eyes were glaucomatous, and after completing the iridectomy, which alone was intended, the lens bulged into the wound and had to be removed, followed by vitreous and subsequently by hæmorrhage. Of the remaining five, one had T—1 and paralysis agitans, one had unripe cataract, and the eye received an injury the day after operation which caused the bleeding. Two had vomiting caused apparently by eserin, and the fifth lost vitreous at the operation.

*Discission* was performed after 33 extractions. The number would have been greater had more patients been willing to stay in hospital and submit to it. It was generally done about ten days after extraction, *i.e.*, as soon as it seemed probable that no more cortex would be absorbed and that the wound was firmly healed.

*Extraction in lunatics* was performed on four eyes in three individuals. One woman had both eyes done, one under chloroform with iridectomy, the other some years after with iridectomy under cocain. Vitreous prolapsed in the latter. Both eyes did well. There was some improvement in her mental condition. Suppuration followed extraction with iridectomy under chloroform in another male lunatic. He became unruly after operation and opened his dressings. The fourth was done without iridectomy in an unruly man under cocain. He had prolapse of the iris, but did well and obtained good sight. His mind improved somewhat.

*Erythroptia* followed extraction in three cases, but gradually disappeared.

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