There are no clinical signs of keratitis or iridocyclitis in the above case, but George Coats microscopically examined a dog's eye with cataract after thyroidectomy, for Mr. Walter Edmunds, and reported "a certain amount of infiltration of the ciliary processes, with loosening and tightening of the pigmentation of the outer layer of the epithelium." He also noted that "the aqueous contains a good deal of fibrinous coagulum, perhaps indicating an alteration in composition." In his report, Coats does not describe the condition of the retina and optic nerve, but F. Krauss⁵ recently describes a case in which bilateral choked discs followed thyroidectomy.

Whether the cataract is due to a toxæmia acting on the lens through the ciliary blood-vessels or the aqueous humour, or to general nutritional changes connected with the removal of the thyroid and para-thyroid glands is uncertain, but the balance of evidence seems to point to the cause being a toxæmia uncontrolled by sufficient thyroid and parathyroid secretion.

I am indebted to Colonel W. T. Lister, C.M.G., for his permission to publish this case.

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SOME STATISTICS OF CATARACT EXTRACTION*

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THE success of an operation for the extraction of senile cataract is apt to be unfavourably influenced by three classes of complications: those which occur at the operation itself; those that supervene during the healing process; and by those which may arise at any period, even years, after a successful operation. Finally, disease of the fundus oculi may cause disappointment to both patient and surgeon. Given reasonable skill, careful attention to details, and even moderately docile patients, few cases should be lost on the table, and when such a tragedy occurs, it is almost always the fault of the patient. In my own case, losses in this manner amount to 1·5 per cent. of the total number of operations. We in

*Read at the Oxford Ophthalmological Congress, 1918.

England are very fortunate in our patients. I have operated upon many races of mankind, and have no hesitation in saying that the men and women of our race are by far the most satisfactory subjects for operations upon the eye.

The complications of healing account for the large majority of our bad results, and these are in the main, I think, due to the action of toxins either of endogenous or exogenous origin. •

The problem of the safe cataract operation will be almost solved when we can eliminate iridocyclitis.

In the later stages of convalescence a late iridocyclitis or glaucoma may vitiate a successful operation, and still later, infection of the eye through a filtering scar is a complication not unknown. One of my patients lost her eye in this way after enjoying perfect vision for six years. The presence of a fundus lesion which cannot be detected before operation is not an uncommon cause of disappointment, for an ideal surgical result will not comfort the patient if sight be absent. Macular changes sometimes appear within a year of operation, and an acuity which has been good gradually fails. I have noted this more frequently in myopic eyes. Accidents after extraction are not uncommon; I have had several, but fortunately no permanent damage has resulted. The statistics I offer you comprise all my cataract extractions up to the end of 1917. They include four years' work at the British Ophthalmic Hospital, Jerusalem; and eleven years in England. The majority of the English cases were treated at the Coventry and Warwickshire Hospital, many attended the Birmingham and Midland Eye Hospital, and about fifty were operated on at the Warneford Hospital, Leamington. I have not kept a separate record to compare the work of these Institutions, but there is little to choose between the results obtained at Birmingham and Coventry. The Leamington statistics are not so good, and include four of the total losses, with both cases of panophthalmitis. This may be a mere coincidence, or it may be due to the small number of ophthalmic operations performed, and to the fact that there are no special eye wards, the ophthalmic cases being placed in the general wards. If so, it emphasizes the value of what I may term an "ophthalmic atmosphere." Patients in ophthalmic wards talk to each other, learn that they have nothing to dread, and enter the operating theatre with confidence. The statistics also embody all my private cases. The results in these have been very much superior to the others. The majority obtained an acuity of 6/12 or better, and only one case was lost from iridocyclitis. A second developed glaucoma three or four months after operation, and I believe did badly. The acuity at first was 6/9.

The first series of extractions were performed at Jerusalem, and include 64 cases.

The results obtained were as follows :

Normal extractions—52 = 80·3 per cent.

Lost eyes 4 = 6·5 „

Caused by—Panophthalmitis, 1.

Sympathetic cyclitis, 1.

Loss of vitreous, 2.

The case of panophthalmitis followed an unsuccessful attempt to extract the lens, which fell into the vitreous and could not be removed with the vectis. The other eye had previously been lost from panophthalmitis after a normal extraction by my senior colleague, Mr. W. E. Cant.

The case of sympathetic ophthalmitis left the hospital as a successful result. The last note was "slight injection." Six months later the patient re-appeared with both eyes blind, evidently from sympathetic disease. No case suffered from iridocyclitis, a complication unknown in the Hospital.

Vitreous escaped in 11 cases, a percentage of 17·2 per cent.

Many of our native and Jewish patients possessed no self-control; occasionally they squeezed out the lens in its capsule as soon as the incision was made, and the high percentage of vitreous loss must be put down to this defect.

These figures give an immediate success in 93·5 per cent. and a failure in 6·5 per cent. I am unable to give statistics of the actual acuity obtained, because most of the patients were fitted up with spherical lenses only, before leaving the hospital, say, at the end of a fortnight. A small proportion were followed up and finally provided with an accurate correction. The results, however, have some interest, for they can be compared with those claimed in India for the intracapsular operations obtained under very similar conditions. They are almost identical and afford no encouragement to surgeons to select the more difficult and hazardous procedure. The most remarkable feature of our work in Palestine was the entire absence of iridocyclitis. Few of the eyes were clean, most of them had trachoma, no cultures were taken, nor were the lacrymal sacs syringed out before operation. The conclusion is almost irresistible that iridocyclitis after operations upon the globe is not due to infection, but to a toxæmia of a nature similar to that causing iritis. In Palestine we got practically no primary iritis and no post-operative iritis. In Europe both are common.

My English cases number 200 operations upon non-diabetic patients, and 10 on diabetics. It is quite possible that there were a few diabetics among the 200, but if so the fact has not been entered in the notes.

The details of the non-diabetics are presented in the following table :

STATISTICS OF 200 NON-DIABETIC CATARACT OPERATIONS.

Vision	Numbers	Normal Operation	Needed	Vitreous Loss	Prolapsed Iris	Complica- tions
6/4.5 ...	22 11% ...	19 ...	3 ...	2 ...	0 ...	0
6/6 ...	15 7.5% ...	15 ...	1 ...	0 ...	1 ...	0
6/9 ...	37 18.5% ...	36 ...	11 ...	1 ...	3 ...	0
6/12 ...	43 21.5% ...	42 ...	4 ...	0 ...	1 ...	3
6/18 ...	28 14% ...	23 ...	10 ...	4 ...	2 ...	3
6/24 ...	18 9% ...	17 ...	5 ...	1 ...	0 ...	3
6/36 ...	12 6% ...	11 ...	3 ...	1 ...	0 ...	7
6/60 ...	6 3% ...	5 ...	4 ...	1 ...	0 ...	4
<6/60 ...	5 2.5% ...	4 ...	2 ...	0 ...	1 ...	4
Losses ...	14 7% ...	12 ...	1 ...	1 ...	0 ...	0

Total ... 200 100% ... 184; 92% 44; 22% *11; 5.5% 8; 4% 24; 12%

The complications in the last column are : Fundus changes, corneal nebulae, and vitreous opacities.

* Five of these were vectis extractions.

Two of the successful cases in the list developed glaucoma with gradual loss of vision.

Two suffered from a late iridocyclitis, one after nine months. The operations employed were :

After *preliminary iridectomy*, 177 cases ; *combined extraction*, 22 cases ; *simple extraction*, one case.

Of these, four were *intracapsular extractions* which yielded a vision of 6/6 in two and 6/36 in two cases.

Six lenses were *removed with the vectis*, either because vitreous presented, or because the lens refused to present by pressure. The visions obtained were as follows, "v" indicating loss of vitreous : 6/9, v ; 6/12, v ; 6/18, v ; 6/18 v ; 6/18 ; lost, v. Four lenses were extracted under general ether anaesthesia because the patient lacked control. All did well.

Late closure of the wound occurred twice, both did well, but one developed acute glaucoma as soon as the wound closed. It was treated by general depletive measures, rest in bed, and hot applications, and rapidly disappeared.

Slight irido-enclieisis, short of prolapse, was noted 10 times=5 per cent.

One of these developed a late infection after six years, and was lost.

Cystoid scar occurred three times.

Mania developed after six operations=3 per cent.

Iridocyclitis which did not destroy useful vision was present after 12 operations=6 per cent. If to this figure we add the nine examples which rendered the operation a complete failure, we get 21 cases, a percentage of 10.5.

I think that the most noteworthy fact in connection with these figures is the small number of cases needed. Only 22 per cent. of the operations called for this treatment, and only four of the 37 cases which obtained 6/6 or better, a percentage of 10.8. I believe

that most surgeons needle more frequently. I ascribe my low figure to three circumstances. One is that I generally perform a preliminary iridectomy; another, that I rarely operate until the cataract is mature; and the last, that if the patient is perfectly satisfied with 6/12 I do not needle to get better acuity.

I have lost two eyes after dissection, and a third had a narrow escape, and so I never tempt Providence if I can avoid it. If we compare the English with the Palestine figures we get the following, in round numbers:

	England.	Palestine.
Successful extractions ...	90 per cent.	93 per cent.
Lost eyes ...	7.5 "	6.5 "
Iridocyclitis ...	10 "	none
Vitreous loss... ..	5.5 "	17 per cent.
Normal operations ...	90 "	80 "

Diabetic Cases

I wish to make no final comparison between the results obtained in the diabetic and non-diabetic cases, for the number of the former is too small for the purpose, and three of them were lost during my first year's work in England before I had introduced many of the precautions which I now adopt.

I have notes of 10 cases only, and the results were the following: 6/4.5, 1; 6/12, 4; 6/18, 1; lost, 4.

Iridocyclitis was responsible for all the failures. One eye became septic after the preliminary iridectomy. Two eyes in the same patient were lost from iridocyclitis which followed both iridectomy and extraction. He had previously suffered from diabetic iritis. With the exception of these three cases, I have never seen iritis after preliminary iridectomy. A fourth eye developed haemorrhagic iridocyclitis after a needling operation, and was removed.

The most profitable use we can make of such an analysis as I have compiled is to study carefully the causes which led to a total loss, or to such poor acuity that the eye was of little value to the patient. These were as follows:

Iridocyclitis	9
Panophthalmitis	2
Haemorrhage	1
Mania and recurrent haemorrhage	1
Dislocated lens... ..	1
	—
	14
	—

Of the cases of iridocyclitis: Two followed an operation upon an eye which had yielded a sterile culture. One followed a needling

operation, and it was discovered that although the lacrymal sac contained no pus, and the duct was freely patent, a dacryocystitis had been "cured" by probing many years before the extraction. One was associated with a pyorrhœa alveolaris, which had been overlooked. Another developed an acute conjunctivitis caught from a patient in the same ward, and iridocyclitis followed. The two cases of panophthalmitis occurred in the same hospital, one in which few extractions are performed. One was infected with bacillus subtilis with a few staphylococci albi and diphtheria bacilli. The second was one of the very few cases in which I have washed cortical remains out of the anterior chamber with sterile normal saline solution. The patient developed a severe attack of hay fever, and the wound suppurated on the third day.

The case of dislocated lens was in a very bad patient with no control, and the incision was a trifle small. The lens was nearly delivered but slipped back and dislocated upwards where it remained out of reach. Chronic iridocyclitis gradually developed, and after some weeks the eye was removed. Had my assistant had a lens hook ready the lens would have been delivered, and now I never omit to provide him with one.

The causes which reduced the vision under the heading 6/60 and less were as follows: Fundus, disease, 7; amblyopia, 1; iridocyclitis, 1; vitreous loss, 1.

If we seek to better our cataract results we must endeavour to reduce the amount of post-operative iridocyclitis, which, if we include the diabetic cases, led to the total loss of 13 eyes, and reduced the vision in another to 6/60; 14 eyes in 210 gives a percentage of nearly 7. We can hardly expect to lessen materially the number of the other complications.

I have come to the conclusion (I admit that it is a dangerous one) that iridocyclitis is not always the effect of an infection from without, and for the following reasons:—

1. An exactly similar iridocyclitis follows blows upon the eye in aged and decrepit persons.

2. The complication is entirely absent in Palestine in spite of the fact that the eyes there are very often affected with trachoma and chronic conjunctivitis. There, too, the refinements I employ in England seemed unnecessary. In Palestine, as I have already said, iritis is one of the rarest of diseases: in other words, there is not present that tendency to uveal inflammation which we meet here.

3. If one eye has been affected with post-operative iritis the second eye is likely to suffer in the same way.

4. Increased stringency in asepsis, the use of cultures, masks, etc., does not seem to have enough influence in reducing the percentage.

5. The fact that diabetics, who are liable to iritis, are far more

likely to suffer from the disease than normal persons. It is absolutely necessary to make the asepsis as strict as possible, and I am quite certain that my most recent methods are followed by more rapid convalescence, and fewer red eyes: but now and then, for no apparent cause, an eye is lost. I now pay great attention to the condition of the teeth, and refuse to operate in the presence of pyorrhoea alveolaris. I think we must study the general state of the patient more than we have done, and with this object I now get the patient into hospital some days before the operation. This affords an opportunity of getting cultures, recording his temperature, pulse, and blood pressure, and if necessary postponing the extraction till the conditions are more favourable. The practice of preliminary iridectomy is very helpful in this respect, and often gives most valuable information.

My usual procedure is the following.—The patient is admitted four or five days before the operation. The general condition is examined, special attention being paid to the teeth and urine. If the mouth be septic, I hand the patient over to the dentist, and wait till he has improved matters. The lacrymal sacs are syringed out, and if pus be present they are excised. A culture on agar or blood serum is made. I operate in the presence of a *few* colonies of staphylococcus albus or citreus, but refuse to do so if staphylococcus aureus, streptococci, or pneumococci grow. I reject a case which gives a luxuriant growth of any organism, and have the eye treated with protargol and a 1:5,000 solution of oxycyanide of mercury. With this treatment we generally get a sterile tube. The eye is anaesthetized with a 4 per cent. solution of cocaine. I shave the eyebrows, cut the lashes short, and rub with tincture of iodine. The eye is washed out with any solution I am given, oxycyanide of mercury 1:10,000, boric lotion, or normal saline. I use a Smith's knife by preference, and make an ample incision with or without a conjunctival flap as seems most convenient. I prefer to have a flap, but make no effort to get it if it does not come naturally. I try to avoid sawing, and with the right hand generally rupture the capsule with the knife if an iridectomy has been done.

If I am doing a combined operation I am now making a practice of first trying a simple extraction, but if there is the slightest call for any extra pressure I perform iridectomy. My main objection to the simple method is that it calls for decidedly more and longer pressure than when there is a coloboma. I express any cortex which comes easily, but I do not fiddle about long with it, but prefer rather to let it absorb, *than* to risk vitreous loss. I bandage both eyes for two days, and then instil atropin. If I have *myself* sterilized the atropin I have no objection to instilling it just before the section and have often done so. I have tried extracting with a fully dilated pupil, but I find that it favours iris incarceration, and

have given up the practice. If the eye become injected I find that the injection of *two* doses of 10 c.c. of an activated horse serum is very useful, and use it as a routine treatment. I give the second injection within a week of the first.

Since the above paper was read at the Oxford Congress, the statistics of my cataract extractions for 1918 have become available.

They are derived from 50 operations and should afford an interesting comparison because they form a series of operations performed under a technique which should have become more perfect by experience, and because they were carried out under the best possible conditions. In practically every case a culture was obtained before operation, and nothing was attempted till it was sterile, or at most contained only the staphylococcus albus or citreus. Under these circumstances it was to be expected that the number of cases which suffered from iridocyclitis would be greatly diminished. This hope was realized, for no eye was lost from this cause. Two cases only were recorded, and I have hope that I may yet improve the vision which is now under 6/60. Five cases had less than 6/60 and must be classed as complete failures; in fact, two were removed.

The causes of failure were as follows:—

Panophthalmitis	...	...	...	1	} Total loss.
Sympathetic ophthalmitis	...	...	...	1	
Iridocyclitis	...	...	...	2	} < 6/60.
Detached retina	...	...	...	1	
Amblyopia	...	...	...	1	

This gives failure in 10 per cent. from post-operative causes, for we cannot really include a case of amblyopia as a failure, although from the patient's point of view it is almost the same thing.

The case of panophthalmitis occurred in a feeble old man. He had been kept in the ward till he was in better condition and had a sterile conjunctival sac. When the eye was removed on the third day after the operation, a culture was made. It was found that the pus from the centre of the eye contained the staphylococcus albus in pure culture. Mr. Assinder considers that the methods adopted were faulty, and that most probably there was a pneumococcus present which, however, did not grow under conditions which were unfavourable.

The case which developed sympathetic disease had a normal operation and a sterile sac. A large prolapse developed which was excised as soon as the eye was quiet. The site was covered with a conjunctival flap and apparently the eye was doing well. She went home for a month and then appeared with a mild attack of sympathetic iritis which had been present for a fortnight. The exciting eye showed fine deposits on the cornea, and the vitreous was opaque. It was excised and large doses of sodium salicylate

were administered. A full injection of galyl was administered. A blood count showed a considerable increase of large mononuclear lymphocytes. The eye quieted down, but has again relapsed and I fear will become a total loss.

The detached retina was noted a month after the operation when good vision had been attained. I extracted the other lens, and I fear that here again the retina will become detached, for there was partial detachment at the periphery when I last examined the eye. In both cases the operation was quite normal.

One case of post-operative glaucoma is found in the series. I have trephined the eye without lowering the tension, and propose to repeat the operation. The present vision is 6/60. Vitreous loss occurred three times, a percentage of 6 against 5.5 in the earlier series. In two of the cases there was no straining and the section was made with ease with a sharp knife. There appeared to be absolutely no cause for the flow of vitreous which followed the section. The lens was removed with the vectis in all three cases and the vision obtained was 6/24, 6/24, and 6/36. The actual visions obtained were not so good as in the first series, but many of the cases require needling, and the refractions will be perfected as the patients reappear. Under the circumstances no useful purpose will be served by recording them.

The routine study of cultures from the conjunctiva brought out an interesting circumstance. At one-time we could not get the cases sterile and many of the patients had to be sent home as unfit for immediate operation. The wards had not been properly cleaned owing to the war. As soon as this had been done we at once began to get clean conjunctivae and the stay of the patients in the hospital at Birmingham was considerably reduced. Before the cleansing the Lay Committee had brought the long period the patients were remaining in the hospital to the notice of the Medical Committee, who pointed out the probable reason.

The net result of these 250 operations is that 87 per cent. got useful vision, and 50 per cent. 6/12 or better. Sixteen eyes were lost, the majority of them during my first two years at Coventry, before I had realized the necessity of removing septic teeth and examining the flora of the conjunctiva.

I would like to record one case which shows the danger of influenza after eye operations. During the December epidemic my house surgeon performed a preliminary iridectomy. The man left the hospital with a white eye. As soon as he got home he contracted a severe attack of influenza. The eye became very painful and inflamed. Fourteen days later he was able to return to the hospital. The eye was in a state of panophthalmitis.