Summary

1. Using the method of examining the retina in bulk unstained and stained with scarlet red, we found that the ganglion cells of the retinal periphery showed fatty droplets in their plasma in diabetic, hypertensive, and other diseased conditions, and in the senile retina. The retinal glial cells contained fatty droplets in these conditions also.

2. The plasma of the large ganglion cells stained diffusely brownish-yellow with scarlet red in hypertensive and diabetic retinopathy and other diseased conditions, and also in the senile retina.

3. There was no quantitative relationship between the fatty droplet content and the diffuse brownish-yellow staining.

4. Unstained retina cleared in glycerine revealed a sulphur-yellow pigment in the plasma of the ganglion cells in old age.

5. This pigment is also found in the retinae of younger people in whom the eye is diseased, and is analogous to that found in cerebral tissue in senile and diseased brains. The chemical nature of the diffuse pigment is unknown but it may be a lipid precursor.

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CATARACT EXTRACTION*

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CATARACT extraction is a fearful joy: one of the most difficult, important, and interesting operations in surgery. Extraction is unique in that not only is a high degree of technical skill required for its successful achievement, but because each case presents a psychological problem that must be solved. I began to extract cataracts over 40 years ago, I still have the same if not greater respect for cataract extraction that I had when I faced my first. To fail in this operation is a dreadful calamity. The patient may have

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been blind for some time, he has month after month looked forward to receiving his sight back; he nerves himself for the operation: he leaves the hospital blind, and this time if he has only one eye, bereft of hope: blind for life. This is a shocking prospect, and it behoves us to strain every nerve to prevent such a catastrophe. It is comparatively easy to succeed in a few operations, but difficult to obtain a good series. I wish to consider in the light of my own experience how to avoid failure, and to obtain a high percentage of useful visual acuity after operation. We must deal with: first the surgeon himself, then the nursing staff, the operative environment, and finally the patient.

The Surgeon. *Poeta nascitur non fit*: "Some men are born great; some achieve greatness: and some have, alas! greatness thrust upon them.

The Born Operator.—There is no doubt that a few men have a natural gift for ophthalmic operating. Once, at the Coventry Hospital, I had a house surgeon of this type. He was not wholly an ophthalmic house surgeon; I shared with him the medical side, one of the house physicians. He assisted me for a short time, and then I gave him an iridectomy, and was amazed that he performed it as though he had been doing eye operations all his life. He was an extraordinarily able man and a fine general surgeon both in knowledge and operating. When a man of this type takes the trouble to perfect himself in every way he can become one of the world's great operators. Such natural gifts are given to few; most of us with more or less ability have to achieve greatness. There are a few, those who have greatness thrust upon them, who have no natural gifts; they have never learnt to use their hands, and are quite out of place as ophthalmic surgeons. How can we achieve success, become reasonably safe operators? This is a most important question and calls for a careful study. Let us first consider what are the chief qualities necessary. Good sight and perfect stereoscopic vision are essential. A man with an amblyopic eye, or defective acuity ought never to take up ophthalmology. Then the eye surgeon needs "Good Hands." He ought to have good health, and steady nerves. The temperamental neurotic surgeon should avoid this sphere of surgery. A shaky trembling hand is a handicap, although the late William Lang was a marked exception. His hands were tremulous but the moment the operation began they become perfectly steady and his work was a joy to behold. Finally the ophthalmic surgeon must be a psychologist, able to inspire confidence in his patients. The education of the ophthalmic surgeon must begin early. No one should learn any kind of surgery upon the patient. The hands ought to be trained early. Every medical man ought to begin with some form of handiwork, chip-carving for the otologist, and carpentering for

the general surgeon. Later on in the early medical courses there should be more zoological dissection, especially under the dissecting microscope. Piano-playing is excellent for training the fingers for eye operating, but stringed instruments should be avoided. To play the violin properly hours must be spent in developing a tremor of the wrist, the very worst thing possible for a surgeon. All forms of drawing are excellent. I find that I operate best when I have been drawing the day before. Medical students ought to have to pass an examination in drawing. Since I have been examining for the Diploma in Ophthalmology at Oxford I have been surprised by the low standard of the diagrams sent in. So much for the hands. The general training of the surgeon is quite as important. A cataract operation is a tense trial of the senses. A general surgeon may begin by being nervous, but he has plenty of time to settle down and forget all about his nerves. Not so the cataract extractor. The whole thing is concentrated into a few moments. A bad section is a bad operation, *l'extraction c'est la section* in the words of a well known French oculist. We must keep fit, avoid alcohol, and excessive smoking, get to bed early, and get as much fresh air as possible. Finally avoid any heavy muscular work just before operating, for such favours tremour. Many years ago I read the advice of an Indian surgeon to the oculist. He suggested that he ought to have an injection of morphia before operating. A man whose nerves require such treatment ought not to operate at all. To be a really good cataract extractor one ought to do many operations. The man who does one operation a week or even less can never attain the dexterity of one who does one or more a day. The Continental plan, when one man is Director of the Hospital and does as many operations as he wishes, is far better for the patient. The whole thing becomes automatic and as near perfection as possible. Skilled nursing is essential if good results are to be obtained, and here again the nurse is born, not made. At the present moment I am doing most of my operating in an E.M.S. Hospital. The nurse who assists me in the operations does not assist, she gives me four hands. Her fingers are always in the right place at the right time, and if I am about to do anything wrong she corrects me at once. And yet she has no State Certificate but merely a training at a Home for Incurables. Most of the rest of the staff are V.A.D.s, but I have yet to find their equal in efficiency.

The *environment* is most important. A good eye hospital, or better a good eye department in a General Hospital is of course the best. The very worst is a bad eye department in a small General Hospital where there is no proper eye-ward, and no skilled ophthalmic nursing. Most fatal of all is when the eye patients

are in a general surgical ward. During the first eight years of my work at the Warneford Hospital, Leamington, seven per cent. of my extractions were lost being in a surgical ward. When the eye cases were removed to a medical ward, and all the globe operations placed in a side-ward, I did not lose a single eye in twelve years. My experience at the West Bromwich Hospital has been similar. It comes to this: with the best nursing you cannot get good results if the eye cases are in the same ward with general surgical cases. I do not like nursing homes where the operations are done on the same table that is used for surgical patients. The previous case may have been an extravasation of urine or a septic appendix, and the nurse who dresses a cataract may have been dressing a foul burn. Septic fingers remain septic for a long time in spite of disinfection. For this reason the eye surgeon must never handle anything septic. Far better to do the operation at the patient's home where there is no likelihood of sepsis. I have never had a case go wrong that was done under such conditions.

The Preparation of the Patient.—The most important preparation is psychological. The patient must be put upon the table in an equable and happy frame of mind, free from fear, and confident of a happy outcome of his operation. This psychic training depends largely upon the nursing staff and on the ophthalmic atmosphere of the ward. A sensible sister will have an enormous influence upon the moral outlook of the patient, and conversation with other patients who have undergone operation, especially with children, will inspire confidence. If the patient, instead of being happily housed in a quiet ophthalmic ward or in his own home, is placed in a surgical ward, he cannot be expected to be in the right frame of mind to undergo his own operation.

The actual physical preparation of the patient is quite simple; in fact, the simpler the better. He must be thoroughly examined for any foci of sepsis, special attention being given to the teeth. The lacrymal sacs should be irrigated a few days before the operation, not on the day before, for if there are any septic organisms in the sac they may be washed out into the conjunctival sac and lie ready to infect the wound. A culture ought to be taken 48 hours or more before operation, for medico-legal reasons if for no other. I am a little sceptical of the value of the ordinary bacteriological examination. There are far too many sterile cultures. Mr. Browning, the bacteriologist at Moorfields, told me that in his opinion a sterile culture means a faulty technique. In practice I have found that a clean culture is not a safeguard against infection, for every case of pan-ophthalmitis that I have had has been sterile.

There need be no local treatment of the eye. The tears contain

their own antiseptic, lysozyme, and any irritating lotion causes lacrymation, and reduces its amount. I like to have the eyes washed out with normal saline just before the operation, and with nothing else.

The only general treatment is to have the bowels properly emptied so that there need be no evacuations for a day or two after the extraction. No purgatives should be given the day before. If they are necessary they should be used two days before. Free purgation is wrong; a fluid stool is a toxic stool, weakening the patient both by dehydration and by poisoning. If the bowels have not acted properly the day before operation, enemata must be given. If a preliminary iridectomy is to be done, eserine must be used with the cocaine, for it is difficult to perform a neat iridectomy with a dilated pupil. Some surgeons like partially to stupefy their patients with medinal or other narcotics. These drugs may be useful after operation, but I prefer to have my patient dead or alive. I want full co-operation, and feel that the patient ought to be calmed by the psychic powers of the sister and the surgeon, and not by drugs. I always use cocaine as the local anaesthetic, a 2 per cent. solution, a few drops every five minutes, about four instillations being sufficient. If a preliminary iridectomy has been done, the pupil may be dilated with atropine.

The Operation.—In this lecture I am describing my own methods. I have tried others but they have crystallised down to the very old-fashioned operation that was performed at St. Bartholomew's Hospital by Mr. Henry Power and Mr. Vernon when I was a dresser in the ophthalmic wards. I am more than old-fashioned in liking preliminary iridectomy. Most surgeons admit that it is the safest way, and many say that they perform it when the patient has only one eye. Well, he has only two, and I like the safest operation, and so I perform a preliminary iridectomy whenever I can. I advise all beginners to adopt this method, for it is the easiest as well as the safest. There are three main reasons why I adopt preliminary iridectomy. It gives one an indication how the patient will behave at the extraction, and the size of the lens can be estimated in the coloboma. Quite recently I did an iridectomy and it was at once obvious that the patient had no control, and would be a real menace at the extraction. I extracted under pentothal anaesthesia and all went well. Then when one is making the section with an intact iris one has two things to consider: to avoid wounding the iris, and to make the section exactly as designed. If the slightest drop of aqueous is lost the iris tends to float up before the knife, and in trying to avoid it the section may come to lie too far forward, even in the cornea. If there is an iris coloboma the surgeon can devote his whole

attention to the section and neglect the iris. Then before the extraction one can estimate the size of the lens by examination with the slit-lamp because the edge of the lens is visible in the coloboma.

Preliminary Iridectomy.—I use my own keratome which has proved to be the correct size, and I prefer an iris hook to forceps. The grip of the forceps may cause pain, because the iris may not be fully anaesthetised, and the patient may jump. The hook tends to make a smaller and more symmetrical coloboma than the forceps.

Diagram shewing how the iris hook if not rotated through 180 degrees may catch on the wound spur.

On the other hand it is more dangerous, and I recommend the beginner to use forceps until he is quite proficient. The hook is introduced on the flat and cautiously rotated to engage the pupil margin, great care being taken to avoid any pressure on the lens capsule. Then it is twisted through 180° and drawn out with the short arm of the hook outwards. A consideration of the nature of the section shows that there is a sharp lip on the limbal side, whereas the corneal edge is smooth. This is shown in the diagram. If the hook is rotated there is nothing for it to catch on, otherwise it may catch on to sharp spur of the wound edge. If I have a

really good assistant I let him cut the iris with ordinary angled iris scissors, which are better than the de Wecker type which we use if we cut the iris ourselves. I hold the iris hook and the fixation forceps in the left hand, make the section, hand the keratome to a waiting hand, insert the hook, and the assistant cuts the iris. One never lets go of the eye, and the operation is just one, two, three, four, and it is complete, in under half a minute. No atropine is necessary in the majority of cases, and the patient goes home on the fourth day if there is no injection. He is now satisfied that there is nothing to fear in an ophthalmic operation and faces the final extraction without anxiety. You will be told that this is "an old woman's operation"; well, the war has shown that old women have their uses. Sir Anderson Critchett, who had an enormous experience in extraction, told me shortly before his death that he always did a preliminary iridectomy and thought it by far the best and safest procedure. About a month later we can proceed to the extraction. For this and all other globe operations I always use a projection lamp, and the beam is directed from behind the surgeon so that all reflections are thrown away from the surgeon's eye. Keratomes and the corneal surface are good mirrors, and if the light is employed so that it is reflected back to the operator, he may find that he can see nothing but a glare.

There is a correct way to hold all ophthalmic scissors. The thumb and the ring finger engage the loops of the handles, the index finger rests upon the hinge, and the middle finger rests below the loop upon the ring finger. By this method the hand and scissors become almost one, and the blades are pressed upon each other, so making a clean cut. In most operations the hand is held in the supine position, with the arm close to the side. A little practice with a pair of dressing scissors will make this hand-hold almost automatic.

The Extraction.—The patient must be placed on the table at a convenient height so that the operator's forearm makes a right-angle with the upper arm. The face should lie quite flat. A nurse must take one of the patient's hands and hold it centrally over the chest. Then we do not ask the patient to look down, but say "look at your hand." This is most effective and was I think recommended by Priestley Smith. The patient must, during the actual operation, keep his mouth open, for it is not easy to squeeze the eyes with an open mouth.

Akinesis.—I like my cases to have an injection of novocain and adrenalin half an hour before the operation into both lids and into the temple to anaesthetise the fan-like expansion of the facial nerve. I have never used retro-ocular injections which may cause a large intra-orbital haemorrhage and make the eye soft. Nor

have I ever tried nerve blocking of the facial nerve at the angle of the jaw. It is probably an excellent procedure. If the patient is obviously likely to lose control, some form of general anaesthesia is necessary. I have adopted it in not more than five cases, and I dislike it very much. It is difficult to keep the eye from turning up, but this is helped by a suture under the superior rectus. Then there is always the danger of vomiting after the operation. Post-operative vomiting may occur after local anaesthesia. It is I think due to a too lavish use of cocaine. Only a few drops are necessary at each instillation. If more is used it passes into the nose, which is a much more efficient absorber of cocaine than the stomach. While the patient is being cocaineised the eye should be covered with a pad to avoid desiccation, and exfoliation of the corneal epithelium.

The face and mouth must be covered with a bit of gauze. It is best cut from a six-inch cotton bandage. There will be an adequate hole for the eye and another for the nose so that the patient may not get the idea that he cannot breathe. We now insert the speculum and proceed to the section. The surgeon must remember that he has two hands to think about. He must not, in his anxiety to make a good section, forget his fixation hand. He may unwittingly make considerable pressure with these forceps instead of drawing the eye gently forwards. I notice that the beginner is very apt to fall into this trap. No one ought to perform his early extractions except in the presence of an experienced operator. I always tell my house surgeons that they must be prepared to hand over the operation to me if I think it necessary. He may have made a bad section and then it needs a good operator to overcome this initial fault, and there are other difficulties which experience can overcome. Naturally he will have practised with the phantom, using both hands. I remember that Mr. Power used to advise us, if we intended to take up eye surgery, to shave with the left hand. I followed out this advice, although at that time I had no idea that I should one day have to operate upon eyes. After trying many knives I think that the best is the so-called Smith's knife. This has a straight back so that the line of the section lies exactly in front of the knife. The Graefe knife has a bulge behind the line of the back and tends to push the corneal tissue without cutting it. Also the Smith has a more acute-angled point than the other type, and is therefore sharper. Another good knife is the Lindsay Rea, but I think that this is a little too short to get a good sweep and avoid sawing. The knife must be as sharp as the maker can achieve; a really good one will make a large number of sections. I dry the knives myself and strop them on the towel as I do so. It is not a bad plan to have a bowl of boiling oil and dip the knife into it before making the section. The section

must be made with the fingers and not with the arm. Grasp the handle well away from the blade as possible; do not hold it short, otherwise there is no room to make the full sweep with the fingers. The knife is held by the thumb and the first and middle fingers like a pencil, the little finger rests upon the patient's face. You will now see why I have advised you to practise drawing. It is essential to make an adequate section; a small section leads to all kinds of complications. Enter the point of the knife at a spot about two-fifths of the vertical diameter from the top and, being careful not to twist, pass it slowly across the anterior chamber. There is at this stage no need for any hurry; there will be no loss of aqueous if the knife is not twisted. A twist has two disadvantages: aqueous will be lost, and the iris will rise up before the knife, and the knife may jamb, and great difficulty will be experienced in freeing it. The knife must be passed across perfectly horizontally or it will emerge too high or too low. The second fault means a danger of wounding the ciliary body, with great haemorrhage. A superficial exit means a corneal section which may be too small. The moment the point of the knife appears, do not lose a moment, but carry on the section with a sweeping movement, letting the handle of the knife move towards the patient's chin. The section must be a clean sweep, cutting upwards all the time—a drawing, not a sawing motion. It is sometimes possible to complete the section with this initial sweep, but generally it is ended with the withdrawing action of the knife, *in and out, cutting every fraction of the time*. The conjunctival flap may call for a few sawing movements. I like a medium-sized conjunctival flap. Now gently remove the speculum and perform the capsulotomy, either with capsule forceps or with the capsulotome. I prefer the kind that has a sharp spike at right-angles to the shaft. I enter it at the lower end of the vertical diameter and draw it upwards, making a central sagittal slit in the capsule. Now take the lens expressor (the glass pattern is the nicest) in the thumb and first two fingers of the right hand, again holding it like a pencil or paint brush, and, with the ring finger of the right hand, draw up the upper lid. Take the capsulotome or a lens hook in the left hand and use the left ring finger to depress the lower lid. If you have a really good assistant let him draw down the lower lid. We remove the speculum because it makes squeezing less likely. Now place the expressor on the lower aspect of the cornea and make backward pressure gently, displacing the lower edge of the lens backwards and upwards. The upper edge will now appear in the wound tilting slightly forwards. The next action is to insert the capsulotome spike into the back of the lens and deliberately to draw it out, making slight pressure the while with the expressor. It is wrong to *express* the lens; we must

deliver it by *traction*. The most important factor is extreme gentleness. Avoid pressure, which may lead to loss of vitreous and haemorrhages.

The operation may now be complete. If there are no obvious masses of cortex, and if the pillars of the coloboma are in their correct position, there is nothing more to do. Shut the eye and put on the bandage. If there is visible cortex, gently depress the posterior lip of the wound with a lens spoon, and with the utmost care express as much of the cortex as will come out easily. The rest I leave to absorb. If the patient is obviously dangerous and liable to express the whole contents of his eye at any moment, then I make no attempt to remove the cortex. Some operators wash out the cortex. Many years ago I did this for the first time. I had myself sterilised the normal saline and all the apparatus. Everything seemed to be normal and I had had a sterile culture, but the eye developed pan-ophthalmitis on the third day and had to be removed. Since then I have viewed washing out with some misgiving, and wonder whether it has the same effect upon the eye as upon the peritoneum. In the old days surgeons washed out the whole of the abdomen after a laparotomy with normal saline, and in spite of careful asepsis many patients died of peritonitis. We may be removing some substance that is inimical to the growth of organisms. I think that the less the interior of the eye is interfered with the better. Never introduce two instruments if one will do. For this reason, if the surgeon is sufficiently expert, it is a good thing to rupture the capsule with the knife during the section.

Difficulties in Delivery.—If gentle pressure of the right kind in the right direction fails to make the lens present, on no account try a little more pressure; that way lies danger. Perhaps the capsule has not been ruptured. Try again with capsulotome or forceps or both. If this fails, then it is almost certain that the section is too small, either because the surgeon has made it too small or because the lens is abnormally big. Enlarge the section on each side with angled iris scissors. Now make another attempt. Generally the lens will present. If it fails to appear, there may be a shrunken vitreous behind it, what my colleague at Jerusalem, Mr. Edmund Cant, used to call an absence of *vis-a-tergo*. Do not attempt to remove the lens by extra pressure; remove it with the vectis. Under normal conditions this can generally be accomplished with little or no loss of vitreous. The vectis must be thrust vertically downwards past the edge of the lens and then lifted under the lens so as to draw the lens forward towards the centre of the cornea. Then, always maintaining this forward pressure so that the lens cannot escape from the vectis, it is gently drawn out. Never forget that, come what may, you have to extract the

lens; if not, you extract the eye later on. Only twice in perhaps something near 1,000 extractions have I failed to remove the lens, and in each case the eye was removed. In one example the other eye was lost from an inflammation arising four months later, which may or may not have been of the sympathetic type.

Loss of Vitreous.—This may occur at any time during the operation, and is due to one or more of three causes: the operator may have been clumsy or inexperienced; the patient has strained; or, finally, a sub-choroidal haemorrhage may have caused a detachment of the choroid, thus thrusting out vitreous. I think that this last cause has not received the merit it deserves. It is obvious that if the choroid detaches, and the detachment is often quite large, it takes up space in the globe, and that therefore vitreous must seep out. I am not alluding to that dreadful calamity, expulsive haemorrhage. I have lost vitreous after a perfect section, when the patient did not make a movement of any kind. The section was made and vitreous appeared between the lips of the wound. If this happens, at once take up the vectis and remove the lens. Probably you will lose very little vitreous. If you have done a preliminary iridectomy, at once put on the bandage. If not, and if the patient is quite quiet, perform iridectomy. If the pupil has become round, you may leave well alone; but if the iris is impacted in the wound, you must remove it if you can. I am now considering that mild form of loss which is associated with choroidal detachment. The common form of loss is caused by the patient straining after the lens has been extracted. It may happen while you are merely looking at the eye to see whether you have to perform an iris toilet or extract cortex, but it generally comes with the lens, and may be massive. The patient is now out of hand, and by far the best thing is to close the eye at once, and not to open it again for about four days. If the iris is impacted it can be dealt with now under a general anaesthetic, pentothal for choice. Any attempt to replace the iris at the time of the operation will be followed by more and more loss. My statistics show that practically all the complications of a cataract operation are twice as frequent after loss of vitreous than after a normal extraction. Nevertheless, in general we obtain a good result, but the visual acuity that follows is not usually as good as it is when no vitreous has been lost.

Collapse of the Cornea is not uncommon, and I welcome it, for one never has the fear of vitreous loss in these cases. On the other hand, I think that the removal of the lens may be more difficult, for those patients who get collapse of the cornea may also have a shrunken vitreous and an absence of that *vis-a-tergo* that is so necessary for delivery.

After Cataract and Discission.—The latter word is an anachronism, for it means tearing apart, and no modern surgeon tears when he can cut. The discission needle is now a museum piece, and I imagine that a small knife of the Ziegler type has taken its place. It is better to use the word capsulotomy and let discission die a natural death. This operation is necessary if adequate vision has not been gained by the extraction. The age of the patient, his work, and his own feelings on the subject must all be taken into account, and also the results of the surgeon's own objective examination with the ophthalmoscope and slit-lamp. If the patient has 6/18 acuity and is satisfied with this, leave well alone. It is a golden rule in surgery never to perform any operation that can be avoided. In my own practice I find that I have done capsulotomy in 25 per cent. of my cases. Others I know perform it far more frequently—some, I am told, in almost every case. It is said that in most cases the capsule becomes thickened or crinkled, and that if this happens some years after the first operation, capsulotomy is apt to be difficult and unsatisfactory. This in general has not been my own experience. If the operation is necessary, it should be done within a month of the extraction if the eye is free from inflammation. At this time the zonule is still maintaining some tension upon the capsule, and if we make a vertical incision into it, the wound gapes, leaving a nice oval aperture in the capsule. Later on this does not happen, and the procedure is apt to be difficult, and it may be necessary to repeat it. The knife must not be introduced through the clear cornea, but through the limbus. Statistics have shown that a corneal section is far more likely to cause infection of the eye; I think in one paper that I read it was placed at ten times more dangerous. I have never had an infection from a limbal capsulotomy, but I can recollect three after a corneal operation.

Infection.—This may take the form of a pan-ophthalmitis or of a slowly developing irido-cyclitis. The first form was in the past always fatal to the eye, but since the introduction of the sulphonamides it is slightly less deadly. I have, during the past four years, saved three cases by the use of sulphanilamide (prontosil). In the last case capsulotomy was performed after an extraction that had not caused the slightest trouble. An abscess formed in the vitreous and I could see a track of pus from the limbal puncture to the vitreous. We pushed prontosil and M. & B. and the eye made a perfect recovery with an acuity of 6/12.

Maturity.—The old idea that one ought not to extract till the cataract is complete, judged by the fact that the iris no longer throws a shadow upon the lens, is still not dead, and patients are even to-day made to wait in blindness for a "maturity" that may

never materialise. Some years ago I extracted the lens of a woman aged 94 years. Her anterior chamber was so shallow that I had to begin the section with a broad keratome and enlarge it with scissors. The lens was very soft and there were masses of cortex that had to be removed after the delivery of the small lens nucleus. She did very well and lived for two years enjoying her eye-sight.

Double Cataract.—If one has operated upon one eye in an elderly patient and has obtained a good result, it is I think wise not to tempt providence a second time. Not only is there the risk of failure, but there is a general risk. These old people sometimes begin to go downhill after any operation upon the globe, and some of them become mentally deranged. In my early days I had many of these cases, but during the past twenty years I have had no case of post-operative insanity. In a younger and healthy patient it is quite justifiable to extract the second lens if the patient wishes, but I would never urge him to have a second operation.

Unilateral Cataract.—I never operate upon a cataract in one eye if the other has useful vision. Nearly all these cases suffer from diplopia after the operation, and it may be so distressing that they have to wear an obturator or ground-glass over the better eye. I have seen several examples of this calamity, some in my own practice. It is said that a cataract ought always to be extracted because it may become hypermature. Now hypermaturity is very rare in this country, although I saw several cases in Jerusalem. It is not an end-stage, but a disease of cataract. I have never had any difficulty in dealing with hypermature cataracts, and sometimes they cure themselves.

Refraction after Extraction.—The eye, after extraction, ought always to be examined with Placido's Rings. These will always show gross regular distortion after an extraction. At first the figure will be rhomboidal with the corners rounded off. This will rapidly change to a vertical oval, and it may be some weeks before the rings become circular. The final refraction must be carried out with great care. Often a very small alteration of the angle of the cylinder will greatly increase the acuity obtained. In general, the sum of the sphere and the cylinder is 12 dioptries. Thus, soon after the operation, the eye may take a 6D. sphere with a 6D. cylinder, axis horizontal. Then this changes to 8D. and 4D., and finally to 10 and 2, which is the most common refraction after extraction upon an emetropic eye.

Alternative Methods of Extraction.—I have described the ordinary extraction with iridectomy. This has always been my method of choice, but there are many alternatives.

Simple Extraction.—This method is very fashionable and gives very pleasing results, but it has certain objections. The most important in my mind is that the eye has to be squeezed to bring the lens through the pupil. This is contrary to what I consider to be the fundamental factor in extraction—extreme gentleness and the minimum of pressure on the globe. The iris itself is traumatised, and with the slit-lamp I have seen a series of small ruptures in its pupillary margin. Prolapse of the iris is a common complication and a very serious one. A year ago I performed what I thought to be a perfect simple extraction. When the lens was delivered, the pupil returned to its circular shape almost with a snap. I did a small Hess peripheral iridectomy. When the dressings were removed on the third day there was a large iris prolapse. I excised this, but the anterior chamber did not reform, and the eye gradually went from bad to worse, and had to be removed some months after the extraction. I had a similar experience some thirty years ago at the Coventry Hospital. With an intact pupil it is more difficult to remove the cortex than with a coloboma in the iris. If there is any irido-cyclitis after the operation, the small pupil is more liable to become blocked with exudate than an iris coloboma. What are the advantages? It is said that there is not so great a liability for capsule to become impacted in the wound. The round pupil is, of course, more artistic than the usual key-hole pupil, and it has been claimed that a simple extraction gives better acuity than the combined method. I very much doubt whether this claim can be substantiated. On the whole, I prefer not to perform simple extraction because I consider that the combined method is safer.

Bridge-extraction.—Some twenty years ago I did a series of extractions under a conjunctival bridge. I discarded this operation because it was more difficult to deliver the lens, and more pressure was needed. There was a tendency for the scleral wound not to heal under the bridge because it was bathed by isotonic fluid and the stimulus to healing was absent. On the third day new blood vessels formed and these tended to rupture and fill the anterior chamber with blood. Finally, the pull of the flap caused extreme degrees of astigmatism. I did not think that the flap operation was helpful in avoiding vitreous loss; rather the reverse.

Intra-capsular Operations.—I have performed very few of these and shall most certainly never do any more. There can be no shadow of doubt that this operation is far more dangerous than the operation after capsulotomy. Heavy pressure is needed to extract the lens by Smith's method, and loss of vitreous is common. The whole of the posterior chamber of the eye is laid bare, and the vitreous exposed. This tissue has no resistance to infection. I have recently read some statistics from an Indian Clinic in which

the Indian operation gives superior results to the capsulotomy operation. But the author fails to point out that all the most suitable cases were operated upon by the intra-capsular method, and only the poor chances done with capsulotomy. This fact, of course, vitiates the statistics. Also it is a very great mistake to think that what is suitable for India is good for home consumption. After operating in Jerusalem, I was most disagreeably surprised when I began in England to find that I was faced with such complications as irido-cyclitis, that I had never seen in Palestine.

DIABETES AND THE EYE

THIS was the subject of discussion at a meeting of the Clinical Society held at the Royal Eye Hospital on July 16, 1943.

Miss Orr-Ewing, the Chairwoman, welcomed the visitors. She said that bricks and mortar might be destroyed; but never the democratic Royal Eye spirit. At these meetings all were equal. The Honoraries had no privileges; but if they took part must stand on their own merits. She thanked Dr. Lawrence, the principal speaker, for his kindness in coming to the meeting. He would be listened to with great attention, and might expect a barrage of questions and possibly criticisms.

Dr. Lawrence said that before describing the changes he had observed in many thousands of diabetic eyes, he proposed to give a brief outline of what the diabetic defective metabolism is and particularly what changes it makes in relation to the physiology of the eye. Normal people had got 100 milligrams per cent. of sugar in their blood in the fasting condition; after a meal containing carbohydrate—sugar, cakes, buns, etc.—the blood sugar rises for an hour or two, but practically never goes above 170 milligrams per cent., from absorption of sugar from the gut into the circulation. When this increased blood sugar reaches the pancreas it stimulates the production of sufficient insulin to burn and store this excess of sugar so that the blood sugar rapidly returns to normal. In diabetes, the production of insulin is defective, the blood sugar rises to 2, 3, or 4 times the normal, sugar spills into the urine and the typical symptoms of diabetes are produced by two main factors—the loss of the nourishing carbohydrate food, and dehydration—which always follows heavy glycosuria. When this loss of sugar becomes very heavy and the insulin production so low that little carbohydrate can be burned, then a secondary disturbance of fat metabolism occurs, known as ketosis — when acetone bodies appear in the urine, cause, and lead through stages of air hunger, vomiting, etc., to death through diabetic coma. During ketosis the intense