it below the opening in the dura mater, all round, and then filling the bone defect with celluloid, one-sixteenth of an inch thick, laid upon a shelf made by chiselling completely round the bone margin. The layer of thin celluloid was used with the idea of having a perfectly smooth surface which might exert a slight pressure upon the brain wound and prevent broad and extensive adhesions from forming between it and the dura mater; I believe that it was definitely useful. The scalp incision was always close-sutured with deep and superficial stitches and without drainage. In several of the patients fluid—blood, serum, or cerebrospinal fluid—collected beneath the flap, at times causing considerable tension; this fluid was removed by aspiration through the substance of the flap, repeated as often as necessary until the flap came to lie permanently on the surface of the plate. I am of the opinion that the removal of fluid from the cavity of an aseptic surgical wound through the cut edges of the wound is a surgical error, for it constantly leads to sepsis. The fluid should be aspirated through the otherwise intact skin.

The chief purpose of these notes is to indicate that celluloid is a thoroughly satisfactory material for the object in hand, provided that asepsis can be maintained.

Its durability is proved by the fact that in nine patients examined this current year the plates which were inserted in 1916–17 are to all intents as good as on the day of operation and are all fitting accurately.

Of the six patients reported in 1906 the after-history of only two of them is known. One of these, a man with a large plate in his right temporal fossa, lived for thirty years, and died, from senile gangrene, with the plate *in situ*. The other, a female, was the first patient for whom I used celluloid. This was in 1897, to fill a gap that had been produced by the removal of a tumour of the left frontal bone, the diagnosis of which lay between sarcoma and gumma, and which had not reacted to a course of anti-specific treatment of those days, being still the cause of intense pain. It was removed ten years before Wassermann's test or Ehrlich's treatment had been elaborated, but when the test was ultimately made and a positive reaction obtained the treatment was given with an entirely satisfactory result. This patient is still alive and well with the plate *in situ*, just forty years after it was inserted. At that time it had been moulded into a dome shape that corresponded fairly accurately with the natural convexity of the left frontal bone. Several years later the patient received a severe blow upon the plate, with the result that it was considerably flattened, but it possibly saved a brain contusion.

As further evidence of the resisting power of celluloid, another patient, also with a frontal plate, while working as a gardener was struck with the flat surface of a spade sufficiently heavily to produce a scalp wound over his plate, but without further injury. And one of the epileptic patients with a frontal plate who was recently seen volunteered the statement that during his fits he had often had his forehead bruised, and felt sure the plate had given definite protection. These facts regarding its resistance to external violence and its durability indicate that celluloid is an excellent substitute for transplanted bone, which is only superior to it in that it can become an integral part of the skull.

The total number of men doctors in Germany has risen from 52,342 in 1935 to 55,259, or 5.6 per cent. The number of women doctors during the same period has risen from 3,644 to 4,339, or 19.1 per cent.

SOME UNUSUAL CASES OF GLAUCOMA SECONDARY TO INJURY*

BY

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The occurrence of glaucoma as a complication of ocular injuries, both non-perforating and perforating, is familiar to all of us, and I think I may say that in most cases a satisfactory explanation for its development can be given. The cases which I am about to describe, however, seem to me to be worthy of report, because not only do they not belong to any of the commoner types, but I am not aware that similar cases are to be found in the ophthalmological literature. Unfortunately the mechanical explanation of the rise of tension in each of these is, so far as I am concerned, so obscure that I am unable even to make any reasonable suggestions, but I can at least inform you fully as to how three of the four cases reacted to treatment.

Case I

My first case is one in which the glaucoma was the result of a non-perforating injury. A man, 21 years of age, when playing Association football received a blow on his left eye—he thinks that the loose end of the lace of the football struck him. The eye was very painful at the time, but the pain disappeared in the course of a day or two, and the sight seemed to be unaffected. Some time after the accident—he cannot say definitely when—he had a sudden attack of misty vision, associated with neuralgic pain and haloes. Similar attacks occurred at intervals, especially in the evening, and these became gradually more frequent and severe. I first saw him two months after the accident—he was then having a particularly severe and prolonged attack, the eye having been painful and the sight misty for two days. The left cornea was slightly hazy, the pupil semi-dilated and sluggish; the tension was raised and arterial pulsation in the retinal arteries was present; there was no cupping of the disk; the vision with a -1D sphere was 6/9 partly. After instillation of 1 per cent. eserine the tension became normal in half an hour. Apart from the increased tension no abnormality of any kind could be found; the anterior chamber was of normal depth and the lens in place and undamaged. After the fall of tension to normal, vision was 6/5 with a +1D sphere. The field of vision was full. The patient was delighted with the effect of the eserine, and I prescribed 1/4 per cent. eserine drops twice daily. This kept the tension normal for a time, but if the eserine drops were left off the attacks began again. The patient came to see me several times just as one was beginning, and on each occasion the eye became temporarily myopic just before and during the attack. After about two months, as the attacks recurred directly the eserine was discontinued, I decided to operate; several of my colleagues saw the patient, and agreed that this was the right thing to do. As the only abnormality discoverable was a suggestion of increased flare in the aqueous, I thought it best to begin with a paracentesis. The result of this procedure was that the attacks ceased for a fortnight, but after that they recurred again as badly as ever. I then trephined the eye. Two days afterwards, when I was dressing the eye, the patient closed the other one and said that everything looked distorted. On examining the fundus I saw an enormous papilloedema, of about 6 dioptres measurement, and numerous large retinal haemorrhages surrounding the disk. The papilloedema subsided in about three weeks, the haemorrhages ultimately disappeared, and two months after the operation central vision was 6/4 unaided. The visual field, however, showed a general peripheral constriction, especially marked on the temporal side. The constriction of field was accounted for by a reduction in size of the peripheral retinal arteries.

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which had a thread-like appearance. This state of affairs has now persisted for over ten years. No further attacks of raised tension have occurred in spite of the fact that the trephine hole became closed in the course of a few months. At the present time the eye looks exactly the same as the other—there is no cupping of the disk, and apart from the field constriction, which is greatest on the temporal side, and the thinning of the retinal arteries peripherally, there is no visible abnormality. The central vision remains 6/4 unaided, neither hypermetropia nor myopia being present.

Quite recently I saw another case, similar in some ways to the one just described.

Case II

The patient is a man, 30 years of age, who gives a history of a blow on the eye twenty-two years ago. Central vision has never been good since the accident. Eight years ago he began to have occasional attacks of haloes and pain, these being first noticed when diving. The attacks subsequently occurred more frequently. When I first saw the patient the disk was deeply cupped, and an area of pigmentation due to commotio retinae was present below the macula, the latter appearance probably accounting for the diminution of vision immediately following the accident. A large iridodialysis was also present in the lower segment—this, too, had been caused by the accident. Nothing else abnormal was seen: the lens was in place and the anterior chamber of normal depth. The iridodialysis being a large one, a considerable part of the iris root was completely separated from its attachment, leaving that part of the filtration angle widely open. The cupping of the disk was definitely glaucomatous, and the patient had recently become aware that the nasal part of his visual field was deteriorating. In this case no symptoms of glaucoma appear to have set in until fourteen years had elapsed since the accident. No treatment has as yet been undertaken.

Case III

The other two cases which I am about to describe are of glaucoma arising from a perforating injury—to be more exact, from the retention of an intra-ocular foreign body. The first case is that of an engineer aged 50 who consulted me because of failure of vision in the right eye, which he had observed over a period of seven months. He had seen two oculists in America, both of whom had diagnosed glaucoma and had advised operation, but neither had suggested a cause for the condition. When I first saw him the left eye was normal, except for a small myopic error. The tension of the right eye was definitely raised, and the optic disk showed early cupping. In addition a hole about 2 mm. in diameter was visible in the iris on the nasal side, and through this hole a red fundus reflex could be obtained. Immediately in front of the hole a minute scar from an old perforating injury could be seen in the cornea. In the vitreous a considerable amount of fine floating opacity was visible. The pupil was small and only just reacted to light: on instilling homatropine partial dilatation resulted and a small localized lens opacity was observed just below the iris hole. Otherwise the effect of the mydriatic was to cause further rise of tension, which again fell to its original level, but not to normal, on contraction of the pupil with eserine. The anterior chamber was of normal depth. The visual acuity was 6/9 partly. An x-ray picture of the right orbital region revealed the presence of an intra-ocular foreign body 8 mm. below the horizontal line, 1 mm. to the nasal side of the vertical line and 7.5 mm. deep to a plane tangential to the surface of the cornea. On putting the eye up to the Haab magnet the foreign body gave evidence of being magnetic. It was impossible to remove this by the anterior route, but by repeated daily applications of the magnet it was gradually pulled forwards until it lay immediately under the sclerotic. After each application of the magnet the change in position was verified by an x-ray picture. Finally I made a meridional incision in the sclerotic over the site of the foreign body, which was successfully extracted with the magnet, and which proved to be a small chip of steel. On its removal the tension fell to normal, and

was still normal two months after the operation, when I last saw the patient. On this occasion I instilled homatropine to note its effect. The pupil again dilated partially, but the intra-ocular tension was not affected. The visual acuity was now 6/6, and I attribute the improvement in vision to the fact that the vitreous had become much clearer. One curious point about the case is the complete absence of siderosis, and in this connexion it has been suggested that a foreign body composed of one of the modern non-rusting varieties of steel might not give rise to siderosis if retained intra-ocularly. The patient himself was quite unaware that a chip of metal had entered his eye, and could not remember that any accident had occurred. He is a designing engineer and does no manual work himself, but is frequently in the neighbourhood of workmen who are engaged in hammering metals of various kinds.

Case IV

My last case is similar in essential points to the one just described. The patient, a chauffeur, came to Moorfields complaining of attacks of pain and misty vision in the left eye. He thought that a piece of china had gone into the eye about seven months before, since when the sight had gradually failed. On examination the right eye was normal, but the left showed a hazy cornea, raised tension, and a cupped disk, the anterior chamber being of normal depth. A hole was present in the iris on the nasal side, and a small corneal perforating scar could be seen opposite to the hole, as well as a localized lens opacity. The pupil was slightly dilated and did not react at all. X-ray examination revealed the presence of an intra-ocular foreign body in the vitreous, which, however, gave no response to repeated applications of the magnet. The disk was deeply cupped and pale, and vision was reduced to counting fingers at a metre. In this case I performed a trephining operation, which successfully reduced the tension to a normal level.

Commentary

I cannot offer an explanation of the rise of tension in any of these cases. In the first case the occurrence of papilloedema and retinal haemorrhage, with ultimate peripheral arterial constriction, may perhaps suggest that the fundamental disturbance was a vascular one. An alteration in the drainage channels of the eye seems to me to be unlikely in view of the persistence of normal tension in spite of the closure of the trephine fistula. In the second case, too, an interference with drainage seems improbable, especially bearing in mind the wide iridodialysis below. Again, in the third case the circulatory mechanism of the intra-ocular fluid appeared to function satisfactorily after the foreign body had been removed. No permanent leakage could possibly have taken place through the small scleral wound. In the fourth case the glaucoma was relieved by a trephining operation.

The Swedish State Bacteriological Institute has recently moved into new premises at Huvudsta, a suburb of Stockholm. The new institute forms a town in itself, comprising three laboratory buildings and five pavilions for the animals necessary for the work. With all requisite laboratories and chemical, photographic, and optical departments, library, etc., it presents several new and interesting features. In the main building, three stories high, a giant refrigerator stretches from the ground floor upwards through all the floors, and constitutes a storing place for the various sera and vaccines produced at the institute. Each floor has a separate refrigerating room for the preparations dealt with in the different departments. In one department, where sterilization work is carried on, special air-conditioning by means of water and wadding floors has been arranged to guard the work against infection.