flaps were made and the wounds closed by suture, except a small part posteriorly.

The note on December 10th was that he had made uninterrupted progress and that the wounds were clean and healthy, healing by first intention.

On December 31st the wounds were completely healed.

EXTRACTION OF A SHRAPNEL BULLET FROM THE KNEE-JOINT THROUGH A VERTICAL INCISION.

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THE object of this short paper is to draw attention to the great advantages obtained by a long vertical incision in opening the knee-joint for the purpose of exploring it or for treating certain injuries of the joint. Other surgeons have written on this subject—for example, Ollicr, R. Jones and Alwyn Smith¹ and Corner.²

One great advantage of this incision is that a full view of the joint is obtained, including the suprapatellar pouch, the crucial ligaments, both condyles, both semilunar cartilages, and the upper surface of the tibia, after dividing the ligamentum mucosum near its attachment to the intercondyloid notch, and removing the infrapatellar fat. Then also the movements of the semilunar cartilages can be watched during rotation outwards and inwards of the leg and the method by which these cartilages may be caught between the bones whilst the leg is rotated out or in and torn by a sudden contraction of the strong extensor muscles of the thigh, which are inserted into the capsule of the joint, demonstrated, as was first pointed out in my paper on "Torn Semilunar Cartilages" in this JOURNAL of January 17th, 1914.

Other advantages of this incision are that none of the important structures which bind the bones together are divided

Fig. 1.—Shrapnel bullet in left knee-joint: lateral view.
A, Cartilages grazed by bullet.

transversely, therefore the divided parts tend to come together naturally, and after healing is complete the joint is in no way weakened.

A sergeant of the 2nd Manchesters was wounded on October 13th last outside Bethune and was admitted a few days later into the Royal Infirmary, Sunderland. A

D

shrapnel bullet had penetrated the left knee-joint, the point of entry being one inch to the inner side and slightly above the knee-cap. The joint was swollen for some

Fig. 2.—Shrapnel bullet in left knee-joint: front view.

weeks, and movements of extension and flexion were both painful and limited, even after the swelling had subsided and the small wound had healed. Stereoscopic radiograms made by Dr. Squance and Dr. Hamilton Ross showed the bullet to be lying free in the joint in front of the anterior crucial ligament.

Operation.

On December 9th, assisted by Dr. Squance, I operated upon the joint. The patient was placed in the Trendelenburg position, and a vertical incision made through the skin, extending from 3 inches above the patella to the tubercle of the tibia, and the muscle, the periosteum of the patella, and its tendon were divided in the mid-line, whilst the joint was flexed. The loose fatty layer of connective tissue lying between the extensor muscle and the synovial pouch was divided and the latter also opened vertically. The cancellous tissue of the knee-cap was easily and rapidly sawn through with a small saw and the halves of the bone pulled apart by two hooks and the joint exposed. The synovial pouch above the knee-cap was practically obliterated by recent adhesions. The bullet was at once seen to be lying in the base of the ligamentum mucosum.

Fig. 3.—Left knee ten days after operation: front view. Line of incision covered by a strip of lead foil. B, Upper end of incision; C, lower end of incision; D, wound of entrance.

It was freed by a couple of snips with the scissors and removed with the greatest ease. The track of the bullet was easily made out, as it had grazed and torn off a little of the cartilage covering the upper and inner half of the patella, whence it had ricocheted downwards, grazing and scooping out another bit of cartilage covering the internal condyle. These detached pieces of cartilage were seen to be adherent to the inner surface of the capsule of the joint and were no longer loose bodies—a process which has been noted before.

The synovial membrane, the muscle, the periosteum and the tendon were sutured with iodized catgut. No wire or sutures were put through the patella. The skin incision was closed by metal clips. No drain was inserted and no splint used, the knee being laid over a pillow. The operation was completed in twenty minutes.

The wound healed *per primam*. The patient was out of bed in ten days, when photographs were taken and movements of the joint allowed.

[Pen and ink sketches have been made from the skiagrams supplied by Mr. Robinson to illustrate his paper. This course has been taken owing to the difficulty of making satisfactory reproductions for printing of skiagrams, save in exceptional cases. The Editor accepts responsibility for the artist's pen and ink sketches being faithful reproductions of the appearances in the skiagrams.]

REFERENCES.

¹ *The British Journal of Surgery*, vol. i, p. 70. ² *Ibid.*, vol. ii, p. 191.

REMOVAL OF EYES IN THE PRESENCE OF ORBITAL CELLULITIS.

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It is well known that to remove an eye in which there is panophthalmitis and an open wound in the globe is a risky procedure, and liable to be followed by septic meningitis if carried out in the ordinary way with division of the optic nerve.

To avoid this serious complication some surgeons merely eviscerate the globe and leave the sclerotic to shrink up, a process which, as a rule, takes about a fortnight or even longer. Others first eviscerate the eye, then, after carefully washing the sclera and conjunctiva, to remove, as far as possible, all septic matter, proceed to remove the sclerotic. In this way the process of healing is greatly shortened, and much less risk of infection of the sheath is run.

In dealing with eyes which have been penetrated or ruptured by bullets or large foreign bodies, there is usually orbital cellulitis more or less severe as a complication. In these cases it would seem that still greater risk of infection of the sheath of the optic nerve might exist, which in turn could easily be followed by meningitis, if the remains of the eye be removed in the ordinary way with division of the optic nerve, and consequent opening of its sheath.

In order to prevent infection of the nerve sheath the following plan appears to be a good one:

1. The contents of the globe are thoroughly eviscerated, all traces of retina and choroid being scraped away to avoid any chance of sympathetic ophthalmia.

2. The muscles are divided.

3. The sclerotic is pulled forward and divided far back, leaving only a frill round the intact optic nerve.

The actual procedure may be varied according to the following circumstances:

(a) When the opening in the globe is small, or has firmly healed, the conjunctiva and muscles are divided first, as this is, of course, much more simply done while there is some tension in the globe. The cornea is then cut away and the contents of the eye carefully scraped out, either with a large sharp spoon or a scoop made for the purpose, and the process completed by scrubbing out the sclera with a swab held in a pair of forceps. The sclerotic is drawn well forward by two or three pairs of pressure forceps, and cut far back, leaving a frill round the nerve as described above.

(b) If the globe has an open rent or wound the contents should be scraped out first and the shell of sclerotic and conjunctiva thoroughly washed. The sclerotic is now

packed firmly with a strip of gauze to facilitate the division of the muscles, which is next performed. The gauze is now removed, the sclera drawn well forward and divided as before.

(c) Where the globe is split open in all directions, as is often the case when a bullet has passed through it, packing is impossible. In this case, after scooping and wiping out the contents of the eye, the separate portions of the sclera can be picked up and made taut with pressure forceps and the muscles dissected off as far back as possible. After drawing the bunch of forceps forwards the sclerotic is now cut through, as described above.

The three points to be kept in mind are:

1. To remove all trace of retina or choroid;
2. To take away the bulk of the sclerotic, but
3. To leave a frill of sclerotic round the intact optic nerve.

In this way all risk of infection of the nerve sheath and the meninges as the result of the operation is avoided; there is very little bleeding, the shock due to cutting the optic nerve does not occur, drainage for the cellulitis is afforded, and the healing process is not prolonged by leaving in the bulk of the sclerotic.

The same procedure would, I think, be the safest method of removing eyes with panophthalmitis.

The above simple method may have occurred to and been practised by many, but, so far as I know, is not in general use. The results are good, and those to whom I have mentioned this slight deviation from the usual procedure have thought it sufficiently valuable to justify the publication of a short note in the hope that it may prevent an uncommon but disastrous complication at a time when so many eyes have to be removed in the presence of orbital cellulitis.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SALICYLIC ACID IN WOUNDS INFECTED WITH VIRULENT ANAEROBIC ORGANISM.

IN the number of the JOURNAL of February 20th Dr. Albert Wilson shows how valuable salicylic acid is both for the treatment of wounds and as an intestinal antiseptic, and he gives a number of experiments carried out *in vitro* to demonstrate this. A committee was formed by the Medical Director-General of the Navy, consisting of Sir Watson Cheyne, Mr. Arthur Edmunds, and myself, to study the best method for treating wounds received in action. At the Royal Naval College, Greenwich, we have been testing various disinfectants on animals, and the results with a powder of equal parts of salicylic acid and boracic acid have been so remarkably good that a preliminary record is here given for information of all those who may have to treat the highly infected wounds so frequently found in the present war.

The material inoculated was a very infected sample of earth containing *B. aerogenes capsulatus* and *B. tetani*, kindly given to me by Dr. L. S. Dudgeon of St. Thomas's Hospital, and guinea-pigs were the animals experimented on. A small wound was made, and the lethal dose of the earth was rubbed in or buried in the subcutaneous tissue. The number of animals used was 24; the 3 controls died in forty-eight hours or less from acute haemorrhagic oedema; 7 were treated with 30 per cent. carbolic acid paste, 1 only survived—this one was treated five minutes after infection, and antitetanus serum was also given; 3 were treated with 30 per cent. cresol, 1 recovered—it was treated fifteen minutes after infection, and antitetanus serum was given; 1 was treated in five minutes with double cyanide paste—it died in forty-eight hours; 5 were treated with salicylic acid powder in five, fifteen, or thirty minutes, with or without antitetanus serum—all recovered; 5 were treated with salicylic acid powder, plus other disinfectants in five, fifteen, or thirty minutes—all recovered.

Thus, of the 24 animals experimented on all those treated with salicylic acid powder recovered, whether this was associated with other disinfectants or not. The 3 controls, and all but 2 of the remainder, died in from