CASE XVI.

Pte. S.; wounded by a bomb on May 13th, 1917. There was a wound of entrance on a level with the lower margin of the patella and internal to the tendon. X rays showed metal impacted in the inner head of the tibia.

Operation.

The wound and track were excised in a crescent-shaped skin incision; the patella was reflected upwards, and the comminuted lower tip resected; the foreign body was removed with a portion of the surrounding bone; the joint was irrigated with saline and completely closed. He was transferred to the base on May 16th, 1917.

Report from Base (a Red Cross Hospital).

Wound healed by primary union; most successful knee-joint operation. Evacuated May 30th.

CASE XVII.

Pte. C.; wounded on May 21st, 1917, by a bomb. On admission there was a large flesh wound involving the antero-internal aspect of the knee, with considerable loss of skin and deep tissue, exposing the joint cavity from the top of the suprapatellar pouch to the head of the tibia. X rays showed that a portion of the inner head of the tibia and internal condyle had been chipped off.

Operation.

The wound and infected tissue were excised, the internal meniscus removed, the cavity in the condyle and in the inner head of the tibia was cut clean out with a portion of the surrounding bone, and the joint irrigated with saline; the lateral attachment of the synovial membrane was loosened, rendering it possible to close the joint more or less; the hole in the tibia was dressed with bipp. The operation was completed by making a skin flap from the popliteal space and suturing it in position. He was transferred to the base on May 22nd, 1917.

Base Report (St. John Ambulance Brigade Hospital).

Wound healed by first intention. Raw surface at back has closed to such an extent as to render grafting needless; excellent result so far. To England June 28th.

CASE XVIII.

Second Lieut. H., Fusiliers, wounded June 6th, 1917, by shell fragment, was admitted with a large wound of entry over the external condyle. X rays showed a large piece of metal impacted in the condyle close to the anterior border.

Operation.

On June 7th the wound was excised and further enlarged; the foreign body, found impacted at a depth of half an inch in the condyle, was removed in the usual way; the joint was irrigated, the bone cavity smeared with bipp and filled with fat graft, and the wound closed in layers. He was transferred to base on the same day.

Base Reports.

From a General Hospital: Wound healed by first intention. Transferred to England June 14th. From 2nd Southern General Hospital, Bristol:—June 27th, 1917: Stitches removed; wound healed. Without a splint and doing well. (From the patient.)

CASE XIX.

Cpl. W. B.; wounded September 7th, 1917, by a bomb. There was a large through-and-through wound on the antero-external aspect of the knee-joint. Synovial fluid was escaping from the wound.

Operation.

The wounds of entrance and exit were excised in one piece; no injury to bone; the joint was washed out with saline and closed. He was transferred to the base on September 17th.

Base Report (a General Hospital).

October 6th. Wound healed by first intention. Transferred to England.

CASE XX.

Pte. J. T. A.; wounded October 5th, 1917, by shell fragment. The entrance was to the inner side of the patellar tendon and there was a large exit wound over the outer side of the head of the tibia; the wounds were very dirty. X rays showed severe comminution of the head of the tibia on its outer side.

Operation.

On June 6th the wound of entrance and the track in the soft tissues were excised by a crescent-shaped skin incision, the patella was reflected, the external semilunar cartilage and infrapatellar pad of fat removed, and the head of the tibia then exposed by prolonging the excised exit wound vertically downwards; the damaged bone was removed *en masse*; the bone cavity was packed with bipp gauze, the joint washed out with saline, and the wound closed. He was transferred to the base on October 12th.

Report from Base (a Stationary Hospital).

October 18th, 1917. Knee-joint distended; purulent fluid withdrawn by needle; joint opened and Carrel tubes inserted.

Bipp plug to tibia. October 31st. Has cleared up, and there is now no discharge from the joint, though there is still a good deal from the hole in the tibia. Transferred to England.

[I desire to thank Colonel H. Gray, C.B., for much valuable advice on this subject. My thanks are also due to Lieut.-Colonel W. D. C. Kelly, D.S.O., for permission to publish these cases, and to Captain A. Campbell Haddon, R.A.M.C.(T.F.), for the drawings illustrating this article.]

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, 1915, vol. ii, p. 41. ² *Surgery, Gynaecology, and Obstetrics*, February, 1917.

THE KNEE-JOINT CAPSULE:

A RADIOGRAPHIC STUDY.

BY

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It is not the purpose of this paper to refer to any of the points raised in recent articles by Colonel Sir A. W. Mayo-Robson and Major Keith Monsarrat on knee-joint injuries, but rather to show at a glance the salient and more obvious features of an injected normal knee-joint capsule, representing as it does an acutely inflamed, distended, synovial membrane which from a surgical point of view requires immediate interference. The minute anatomical detail has already been thoroughly dealt with by Colonel Andrew Fullerton, C.M.G.¹ Knowing, however, the difficulty of reproducing shadow contrasts in many x-ray photographs, it is hoped that these simple graphic drawings, made for me from the original skiagrams by Mr. Noel Leaver, A.R.C.A.Lond., will facilitate the grasping of the points at issue in discussions relating to the surgical treatment of knee-joint affections.

A direct antero-posterior view is shown in Fig. 1. In the first place there is to be noted the marked tendency to displacement well over to the outer side of the femur, and not to the inner, where it barely reaches the border of the bone; it shows also the distance it extends above the joint line, nearly five inches, and three inches above the patella; almost the entire outer condyle is covered by the overlapping capsule in front, whereas the inner condyle is very nearly free. The patella is seen in its normal position,

FIG. 1.

much more over the outer than the inner condyle.

In Fig. 2 is shown a direct lateral view with the leg straight and lying on its outer side, thus bringing the inner side uppermost and nearest the plate. Here again it is manifest that the inner condyle is comparatively free from covering; the upward extension of the capsule three inches above the patella is shown, and also that it is slightly off the actual surface of the bone. The square-like upper border of the capsule is very marked, though this, of course, changes its shape on flexion.

The pouch underneath the patella averages about one fingerbreadth in thickness from the surface of the femur; but the most marked feature of this view is the extent to which the capsule is seen overlapping the inner surface of the shaft to nearly half the thickness of the bone. It is seen that in the popliteal space little more than the deepest part of the intercondylar notch is filled, and this only to the level of the upper intercondylar line; along the

head of the tibia the horizontally shaded portion represents the extent to which the upper and posterior portion of the head of the tibia is covered. The dotted line running from the top of the capsule from before backwards (through the vertically shaded portion) shows the extent to which the outer side of the shaft is overlapped.

Fig. 3 is from a skiagram taken with the knee in semi-flexion, but otherwise in the same position as in Fig. 2. This brings out the covering over the head of the tibia more forcibly in relation to the inner and posterior portion;

FIG. 2.

it shows also the little tongue of projection under the ligamentum patellae just where this overrides the head of the tibia; the most outstanding feature, however, is the marked extension of the capsule posteriorly, forming a large cushion-like pad more than filling the intercondylar notch, and even bulging out so far behind as to leave the posterior border of the outer condyle of the femur well in the background. This pad, however, is in relation with the inner aspect and not the outer.

The skiagrams were obtained by injection of the right knee-joint immediately after death, through the interosseous

space to the outer side of and about 1 inch above the insertion of the ligamentum patellae. No difficulty was experienced in introducing the emulsion with a 1 oz. glass serum syringe. The pressure required was no more than that to emit such an emulsion from the nozzle of the syringe, and as soon as the capsule was just tense no attempt was made to risk distortion by overdistension; none of the emulsion escaped.

A dilute bismuth emulsion was used of the consistency of ordinary cream. It was carefully prepared by rubbing

FIG. 3.

up in a mortar, the following proportions being employed: Bismuth carbonate 3 iv, aq. dest. (slowly added) to 3 vi, compound tragacanth powder gr. xx. Great care was taken to ensure that the central ray was in the middle of the field in each case.

I am indebted to Captain Claude Horton, R.A.M.C., surgical specialist, for kindly carrying out the injection, also to Lieutenant P. W. Hampden, R.A.M.C., surgical specialist, for his collaboration in this report.

REFERENCE.

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THE ABUSE OF DRAINAGE TUBES.

BY

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SINCE I returned from France I have often been asked, even by intelligent members of our own profession, "What use is your experience of war surgery going to be in civil surgery?" These short notes are the answer, and are the experience of six months' civil surgery since my return from France.

War surgery, as is well known, is a very different thing now from what it was at the beginning of the war.

Now wounds of the head, chest, abdomen (even with faecal contamination), and knee and other joints are sewn up with impunity after early and complete operation, and the results are excellent.

These results are largely due to Colonel H. M. W. Gray, Consulting Surgeon, — Army, and to his devoted band of young and brilliant surgeons. One day the surgical world will realize what an enormous debt of gratitude it owes to Colonel Gray, and he will get the reward he deserves. It was he who first opened my eyes to the "abuse of drainage tubes," and it is his teaching I have applied to civil surgery.

He tells the story of a wounded man arriving at the base with over thirty separate wounds, into each of which a

drainage tube had been placed. What a waste of labour—to say nothing of rubber! The first and most important result of the war in the surgical world will be the abandonment once and for all of the drainage tube. Its day is past, and soon it will only be seen, where it should be, in a museum. When one seriously sits down to think, it is incredible that we have for years deliberately placed into the soft and pliable tissues of the human body a more or less rigid drainage tube with an open passage for secondary infection to creep down. They are well termed, for they are an open "drain in" for infection from outside, and an open "drain out" for the strongly antimicrobial fluids poured out around any infection.

Sir George Lenthal Cheatle grasped this fundamental fact when he introduced his solid drainage tube with flanges; but he still kept to the rigid design. For years it has always been taught that if there is the least infection in any part of the body "put in a drainage tube." This is a mistake.

If surgeons will take their courage in both hands and will not be frightened by a little infection, leaving it to be dealt with by the natural resistance of the tissues to infection, and will give up the use of drainage tubes, they will not only find their results very much better, but they will find their outlook on surgery totally changed. I have proved this for myself, and a complete revolution has taken place in my surgical work.

The first question is, "What is to replace a drainage