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By D'Arcy Power.

[With Plate XII.]

The specimens which I bring under your notice to-night, Mr. President, are interesting less on account of their rarity than for the slight notice which such cases appear to have attracted. In an article upon popliteal cysts published in the 'Archiv. génér. de Méd.' for 1856, by M. Foucher, I find a notice of a somewhat similar appearance. Mr. Morrant Baker, however, first drew attention to this peculiar condition in a paper which he published in the 'St. Bartholomew's Hospital Reports' for 1877.

For permission to show these cases I am indebted to Mr. Smith and Mr. Langton, whilst Mr. Baker has kindly allowed me to exhibit as a card specimen a humerus which he removed at the shoulder-joint on account of the disorganisation resulting from the sloughing of a cyst beneath the teres minor.

The first specimen (Pl. XII, fig. A) is the left knee of a man aged 44, a hawker by trade, who had suffered pain in this joint for a period of two years before its amputation. At some time between March and October, 1884, a swelling appeared in the calf of the leg behind and below the head of the fibula. In October the swelling was punctured and a few drops of blood with some glairy fluid was removed, but there was no pus. He stated that many years before he had rheumatism in his shoulder.

On admission to St. Bartholomew's Hospital his symptoms were recorded by Mr. Bowlby to be as follows:—"The knee is stiff, and as the patient lies the leg is at right angles with the thigh. The head of the tibia is enlarged and the patella is displaced outwards. A fluctuating swelling about the size of half an orange is situated behind and below the head of the fibula extending into the popliteal space. A sinus in the middle of this swelling constantly discharges pus. The skin over it is red and inflamed."

On opening the knee-joint after amputation of the leg about half an ounce of pus escaped. Subsequent examination revealed the following features, most of which may be verified at the present time by inspection of the specimen.

The cartilage covering the external condyle of the femur is ulcerated in patches, whilst that near the attachment of the anterior crucial ligament has disappeared. The upper border of the patella presents a single roughened and ulcerated spot.

The synovial membrane is much thickened and in parts has grown over the upper portion of the femoral condyles. It is slightly pedunculated, the tufts of synovial membrane being well defined. The crucial ligaments are destroyed. There is no lipping or eburnation of the bones in any part, and the cartilage upon microscopic examination does not appear to be fibrillated.

On the outer side of the spine of the tibia is a passage through which a probe can be passed downwards, backwards, and slightly inwards through the posterior ligament into a sac containing about four ounces of a thick curdy pus. Immediately after amputation pus could be squeezed from the cyst along this channel into the knee-joint.

The cyst (*a*, fig. A, Pl. XII) lies beneath the gastrocnemius muscle in the situation of the popliteus. It is, I believe, the popliteus muscle which itself has been gradually distended until all traces of muscular substance have disappeared. It is pyriform in shape, measuring three and a half inches in length by two inches at its broadest part. It is two inches in depth. Its inner wall is formed in part by the fibres of the plantaris, whilst some of the fibres of the outer head of the gastrocnemius are fused with the superficial aspect. The posterior tibial nerve and a large muscular branch blend with the inner and superficial walls of the cyst.

The cyst is bounded below by the tendinous arch of the soleus. On the outer side of the leg the cyst has burrowed for some distance, dissecting out the peroneal nerve (Pl. XII, fig. A, *f*) at the point where it turns round the head of the fibula. At this spot the skin had sloughed, and a communication with the surrounding air was established. The floor of the cyst is formed by the back of the tibia at a point where it is covered by the tibialis posticus.

The tibio-fibular articulation has been opened, but the joint has not suppurated.

Near the outer edge of the plantaris at the back of the joint is a well-marked hernia or pouch of the synovial membrane (fig. A, *b*) which has protruded between the fibres of the ligamentum posticum.

The second joint is the left knee of a girl, aged 22, who was admitted to the Mildmay Park Hospital on September 5th, 1884.

I am indebted to Mr. J. L. Hewer for the following account of the case:—Four years ago she was said to have had a "housemaid's knee," for which she was treated by blisters and a plaster-of-Paris bandage. Eight months later she fell and injured her knee. The injury appears to have set up arthritis, for she suffered much pain, and was left with a stiff joint, which was always painful after prolonged use. On admission to the Cottage Hospital at Mildmay Park the knee was slightly flexed, and hardly any movement could be obtained. All attempts to alter the position of the joint were attended with great pain. The knee was shapeless, and was slightly larger than its fellow. The superficial veins were enlarged. On the inner side of the leg, commencing at a point two inches below the inner condyle, and extending downwards for about six inches, was a fluctuating swelling. This swelling, the patient said, had existed for about six weeks, and was getting larger. The skin over it was normal. No communication could be detected between the swelling and the knee-joint. The swelling was punctured, and 3 oz. of puriform viscid fluid was drawn off. Three weeks later the swelling was again punctured, and an ounce of very viscid fluid was with difficulty removed.

The leg was amputated. Subsequent dissection showed that, as in the previous case, the joint was completely disorganised. The synovial membrane was thickened and pulpy; it had grown over the articular surfaces of the femur, tibia, and patella. The cartilages were eroded and the bones were bare in places. The crucial ligaments were destroyed. The synovial cavity of the joint was nearly obliterated. The bones showed no signs of rheumatoid change, and no history of rheumatoid or other affection could be obtained from the patient.

On the posterior surface of the joint two openings are visible. The one situated at the back of the internal condyle, immediately above the inner head of the gastrocnemius, is large enough to receive a lead pencil. This opening is part of a canal which led from the cyst into the connective tissue surrounding the muscles at the back of the thigh. It was cut through at the time of the amputation. The second aperture is situated in the tendon of the inner head of the gastrocnemius; it is somewhat below and a little to the inner side of the preceding, and is in communication with the cyst. By an opening in communication with this channel a connection is formed between the cyst and the knee-joint, through

which a probe can be passed beneath the internal condyle of the femur. Through each of these openings, when the specimen was fresh, pus could be squeezed into the surrounding tissues from the cyst. A small opening is seen in the fibres of the inner head of the gastrocnemius; it was made by the trocar and cannula with which the cyst was tapped a short time before amputation was performed. It was occupied by granulation tissue.

The cyst measures four by three inches. It appears to have been formed by an enlargement of the bursa, which normally exists beneath the semi-membranosus muscle, and which in this instance may have communicated with the knee-joint. The enlargement has taken place in the connective-tissue on the inner side of the gastrocnemius muscle and some of the fibres of this muscle form its inner and posterior wall.

The cast is taken from the left leg of a man who had rheumatoid arthritis of both knees. It shows a tumour on the outer side of the leg below the knee, from which about 20 oz. of a thick gelatinous yellow fluid was drawn off. The man was a porter, aged 53. The swelling was first noticed a year before he came under observation as a small red lump no larger than a pea. It was translucent and grew rapidly in size. A few days after the tapping of the cyst the patient was discharged. He reappeared nearly a year later, when the cyst was found to have attained a larger size than before, although he suffered very little inconvenience from it.

The second cast is part of the lower extremity of a man. At the upper part of the calf is a large rounded swelling found after amputation to be due to a cyst lying between the integuments and the gastrocnemius muscle communicating with the knee-joint. The synovial membrane of the knee-joint was distended, and the joint was the seat of destructive inflammation.

Several important questions appear to be raised by these cases. Of these the first is whether the cyst is the result or the cause of the joint disease. The answer appears to be unhesitatingly that the cyst is the result of the joint affection, since in each case there is a clear history that the joint was a source of trouble before the appearance of the cyst. In this point the present specimens are nearer akin to those described by Mr. Morrant Baker than to those of M. Foucher. The latter observer only records one case which had been preceded by an arthritis of the knee, whilst in the

remainder the cysts appeared in persons who were otherwise in good health, but who followed occupations which required prolonged standing. The cysts too appear to have differed in other important respects; thus they were confined to the popliteal space and were the result of dropsy of the bursæ normally existing beneath the muscles in this region. The injection of iodine into them only gave rise to a transient attack of synovitis of the knee in a few cases, thus showing that there was no direct communication between the cyst and the joint.

Surgeon-Major Gribbon records (in last week's 'Lancet,' March 7th, 1885, p. 427) an interesting example of a case similar to those of M. Foucher, in which the enlarged bursa preceded the joint affection and became its predisposing cause; and in the card specimen which I show this evening of a cyst in connection with the shoulder-joint, the swelling appears to have existed antecedently to any disease of the joint.

It appears that these cysts may be formed in more than one way. Mr. Baker, in the paper to which reference has previously been made, suggests that the cyst is due to an escape of synovial fluid from the joint into the surrounding tissues. In support of this theory he quotes an observation of the late Mr. Wormald to the effect that "the synovial membrane of the knee-joint is thinnest, and is therefore the most likely to give way under distension at the spot where it partially encircles the tendon of the popliteus muscle." He also refers to the teaching of Mr. Holden as to the presence of a bursa under the tendon of this muscle, which generally communicates with the interior of the joint. In the first of the joints which I have brought before you it appears that the cyst was not formed either by an enlargement of the bursa beneath the popliteus or by an increase in size of the one underneath the semimembranosus muscles. At the posterior part of the joint, however, and exactly in the situation figured by Billroth as a common one, is a well-marked hernia of the synovial membrane of the joint. This I think forms a clue to the formation of the cyst in this case, and its history would be as follows:—The joint became diseased; as a result of the disease there was an increase in the quantity of the synovial fluid secreted; the synovia escaped at the weakest point by causing a protrusion of the synovial membrane; as the swelling increased in size its course was directed by the popliteus muscle.

This is not, however, the only way in which such a cyst may be formed, since its origin in the second case appears to be equally obvious. It was produced by the enlargement of the bursa which exists normally beneath the semi-membranosus muscle and which in this case communicated as it so often does with the joint. In this case the amount of synovial fluid secreted was so great as to cause the cyst to extend upwards as well as downwards. In the cases which came under the notice of M. Foucher, the cysts were usually formed in this manner, for he says that they were rarely due to herniæ of the synovial membrane.

In only one of the cases which I have brought forward was there any history of osteo-arthritis, and in this case, curiously enough, the patient still has the use of his leg. In the remaining instances there was no pathological evidence of this disease. I am therefore inclined to think that the connection between osteo-arthritis and the formation of such cysts is accidental rather than causal.

Looking to the sharp attack of panarthritis and the rapid conversion of the synovial contents of the cyst into pus which followed upon the tapping in more than one case, it appears that this plan of treatment should not be adopted.

The specimens are preserved in the Museum of St. Bartholomew's Hospital, Series VI, Nos. 1205, *a* and *b*. *March 17th*, 1885.

DESCRIPTION OF PLATE XII.

To illustrate Mr. D'Arcy Power's paper upon Intermuscular Synovial Cysts, associated with Joint Disease.

From drawings by Mr. J. Godart.

A.—The posterior aspect of a knee-joint (Case 1), showing :—

(*a*) The cyst covered by the expanded popliteus muscle.

(*b*) A hernial protrusion of the synovial membrane of the joint, projecting through the fibres of the ligamentum posticum Winslowii.

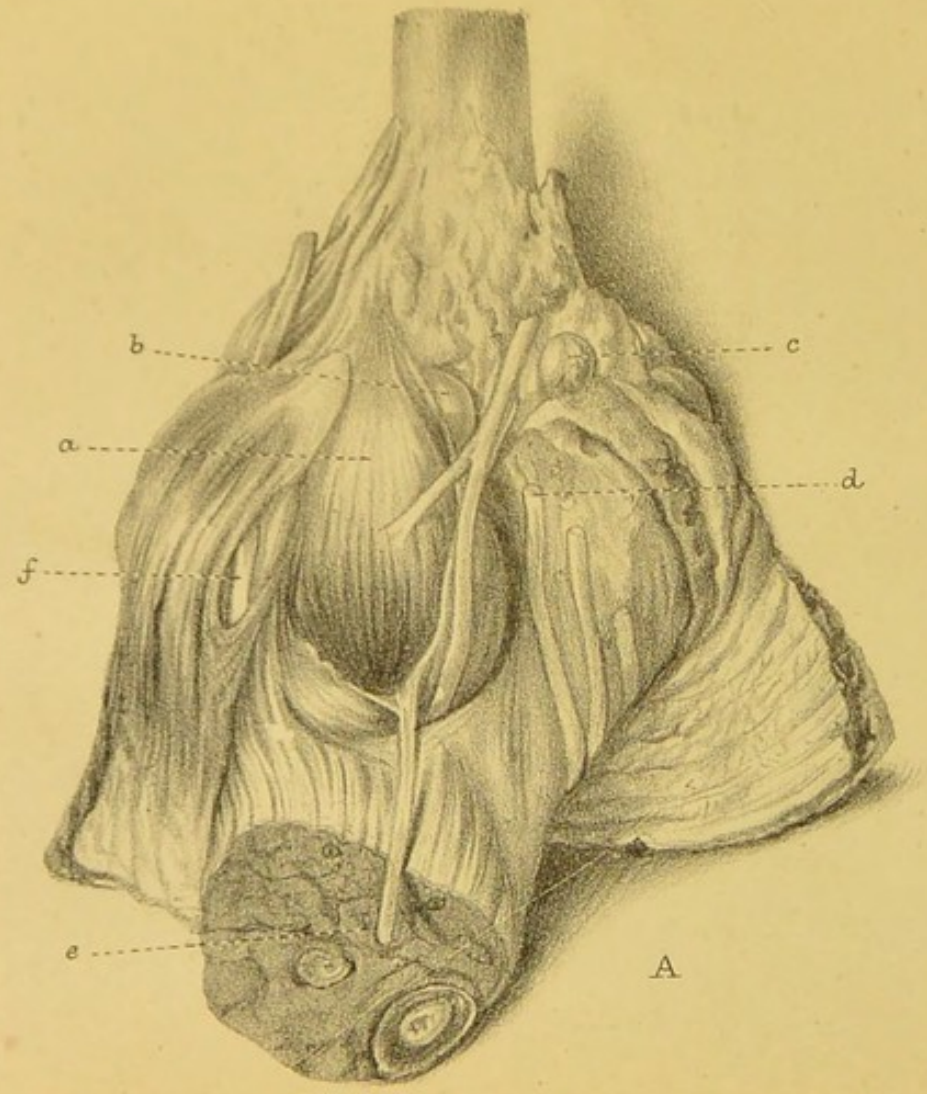
(*c*) A second hernial projection of the synovial membrane.

(*d*) Tendon of the semitendinosus: the gracilis and sartorius tendons are to its right. The insertions of all these tendons are concealed by the inner head of the gastrocnemius muscle, which has been turned upwards and to the inner side.

(*e*) The tendon of the plantaris muscle; its muscular fibres are blended with the inner side of the cyst wall.

(*f*) The external popliteal nerve seen through a hole in the outer head of the gastrocnemius. This aperture was the means by which the cyst communicated with the exterior.

B.—The head of a humerus (Case 3), showing the remains of a cyst (*a*), probably in connection with the bursa beneath the subscapularis muscle. The ulceration and destruction of the cartilage, and the inflamed bone, are well shown. The masses above the cyst consist of thickened synovial membrane.



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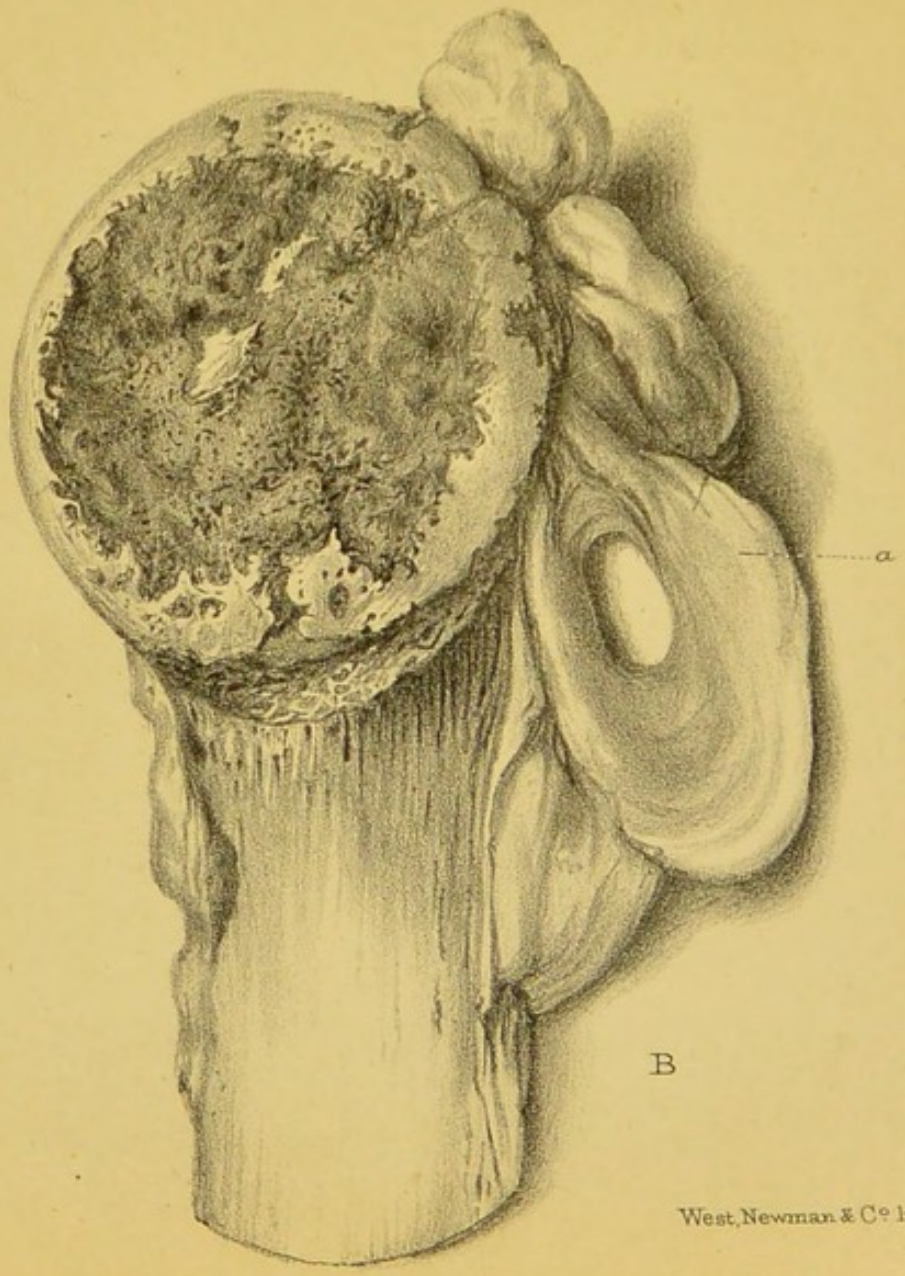

B

T. Godart, del.

West, Newman & Co lith.