THE DUBLIN JOURNAL

OF

MEDICAL SCIENCE.

MARCH 1, 1887.

PART I.

ORIGINAL COMMUNICATIONS.

ART. XII.—*Conservative Surgery in Diseases of the Foot and Ankle-joint.*^a By W. I. WHEELER, F.R.C.S.I.; M.D. and Master of Surgery, Dublin University; M.K.Q.C.P.I.; Member of Council, R.C.S., and of the Surgical Section of the Academy of Medicine; Past President, R.C.S.; Surgeon and Lecturer on Clinical and Operative Surgery, City of Dublin Hospital; Consulting Surgeon to the National Lying-in Hospital.

I. EXCISION OF OS CALCIS (FEMALE).

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BEFORE entering into the essential details of the conservative surgery of the foot, it will not be out of place to refer briefly to some of the anatomical points more especially bearing on the subject. Putting aside the freely movable joints of the toes, there are three joints in connection with the tarsus that are capable of free movement in a direction of flexion and extension. The first

^a Read before the Surgical Section of the Academy of Medicine in Ireland, Friday, December 10, 1886. [For the Discussion on this paper see page 292.]

is the ankle proper, between the tibia, fibula, and the astragalus; the second is the transverse tarsal joint, between the os calcis and cuboid and the globular head of the astragalus and the scaphoid; the third and last joint being that between the tarsus and the metatarsus. The other articulations of the tarsus permit of extremely limited motion (only), and their actions subserve the purpose of elasticity of the tarsus as a whole rather than actual movement. The joint that is most intimately connected with the intrinsic movements of the foot is the astragalo-scaphoid, consisting, as it does, of an almost enarthrodeal articulation, partly composed of an extremely elastic ligament (the inferior calcaneo-scaphoid), which allows of considerable increase of mobility on account of its elasticity. The surface of the astragalus is much larger than the scaphoid, but its free movement on the latter is allowed by the ligament just mentioned.

In connection with these joints the synovial membranes become important. The largest and most complex is that which lines the anterior surface of the scaphoid, passing forward in three processes—one between the cuboid and external cuneiform, one between the middle and internal cuneiform, and the third (by far the most important) passes forward, lining the contiguous surfaces of the middle and external cuneiform bones, and then passes between the anterior surfaces of the external and middle cuneiforms and the proximal surfaces of the second and third metatarsal bones, and also passes between the surfaces of the second, third, and fourth metatarsals. This synovial sac varies but seldom, sometimes allowing the prolongation between the internal and middle cuneiforms to join the expansion between the second metatarsal and anterior surface of the middle cuneiform, and thus the middle cuneiform may be surrounded with a complete synovial membrane. By means of this sac the following bones are in communication by their synovial membrane:—Second, third, and fourth metatarsals, the three cuneiforms, the cuboid and scaphoid—in fact, all the tarsus anterior to the transverse tarsal articulation. The other synovial membranes are not of such importance—(1) between the internal cuneiform and first metatarsal, (2) cuboid and third and fourth metatarsals, (3) calcis and cuboid, (4) posterior surface of astragalus and calcis—except one, that which lines the concave surface of the scaphoid, the convex head of the astragalus, the anterior articular surface of the scaphoid, and the calcaneo-scaphoid ligament. On account of the close bond between the bones of the

tarsus by means of ligaments, the synovial sacs become related to a much greater extent of ligamentous structures than is the case in other articulations.

With reference to the arches of the tarsus, the antero-posterior arch is maintained not alone by the fascia muscles and ligaments that run in an antero-posterior direction, but also by the strong tendon of the *tibialis anticus* which is inserted into the keystone of the arch (the internal cuneiform bone); and the preservation of this arch is necessary for the existence of the transverse half arch which completes the tripod of which the internal cuneiform is the apex. In this connection may also be mentioned the tendon of the *peroneus longus*, which, by its insertion into the base of the first metatarsal bone, forms the opposing point to the half arch of the tarsus.

To epitomise what I have written—the tarsus, for practical purposes, may be divided into four separate or distinct synovial sacs, no one of them communicating with the other.

In nearly all the cases of disease of the foot that have come under my notice, the osseous structures were primarily affected, and not the articulations; and on considering the arrangement of the synovial membranes, as above described, it will be readily understood that the original starting-point of disease will greatly influence its extent; thus, disease in the calcis extending to the cuboid will for a lengthened period be limited to these bones; but should disease commence in the middle cuneiform or in the bases of the second or third metatarsal bones, the rapidity of its progress will soon implicate the centre of the inner and front part of the tarsus.

Having thus briefly reviewed the anatomy of the parts, the first consideration that presents is the comparatively recent date that marks any attempt to advance the conservative surgery of the foot to the same level as that of its analogue in the upper limb—the hand. In a point of surgical interest, the foot is in no way of less importance. Its intrinsic movements, no doubt, are less; but, excluding the proper movements of the thumb, those of the foot are not inferior. Anatomically it is composed of just as complicated a series of structures; its powers of repair are not unequal to those of the hand; but, until recent years, the surgeon who would preserve the smallest portion of the hand with scrupulous care, would condemn the entire foot to amputation without sufficient hesitation. At no very distant date no distinction was made between the diseased portions of the foot, and those who suffered

from diseased tarsus were indiscriminately condemned to amputation of the leg—the wealthy and affluent who could afford suitable artificial limbs, above the ankle-joint; to the poorer classes, just below the knee; and thus not only was a limb perfectly sound removed, but the risk to the patient materially increased. And thus this practice prevailed until Chopart drew decided attention to the propriety of treating limited disease of the tarsus by operation other than amputation of the leg, when he introduced the medio-tarsal operation, or that called by his name. Then came Symes' operation, another advance in conservative surgery; and, without doubt, the introduction and use of anæsthetics also assisted. But it is not my intention to enter into any detail or to discuss the modifications and relative merits of these many excellent operations devised for removing only the diseased structures of the foot—such as Lisfranc's, Hey's, Pirogoff's, the subastragaloid, Chopart's, and others too numerous to be mentioned, but to shortly relate some of the more interesting cases of disease that have occurred in my own practice, the operations necessary for the removal, and the results.

I. Complete Excision of the Os Calcis for Carious Disease.

CASE I.—A. T., a young lady, aged nineteen years, above the middle height, of healthy appearance, suffered from carious disease of her left os calcis, which was said to have been excited by a fall when skating. Two years subsequently, when I saw her, an abscess had formed on the posterior and external surface of the os calcis, which had burst. On passing a probe into the small aperture which existed, the bone could easily be felt denuded and roughened to the extent of about the size of a shilling. An incision was made in the site of the opening, and potassa c. calce applied, commonly called Kirkpatrick's treatment, but more correctly it should be accredited to Munroe *primus*. This line of treatment had not a beneficial effect. The disease extended, and I was obliged to excise the entire bone, which was done by making a semilunar incision, carried a little anterior to the calcaneo-cuboid articulation to a point corresponding on the opposite side. I dissected the flap forwards, and opened the calcaneo-cuboid articulation, divided the ligaments, and removed the bone. Dr. H. Benson administered the anæsthetic; my pupil, Mr. Corry, assisted me. Free drainage was established, and the foot placed on a splint. The operation was performed in 1875; in three years after the young lady walked almost perfectly. The heel of the boot on her right foot was made as low as possible, that on the left added to sufficiently to compensate for the deficiency.

II. *Removal of the Right Os Calcis for Carious Disease.*

CASE II.—G. A., a sailor residing in Dalkey, was admitted into the City of Dublin Hospital, under my care, on the recommendation of my friend and colleague, the late Mr. Tufnell, in 1877. There was not any history of injury. He stated that a sudden pain came in his heel, which he attributed to cold and wet when fishing; and this was followed by abscess, forming a sinus which led down to roughened bone on the inferior surface near the centre. The sinus was enlarged, and sulphuric acid injections resorted to; afterwards iodine. The treatment did not control the disease; the bone softened, and became carious to a greater extent. I decided to excise it, which I did after the manner before described. The under-surface of the astragalus was roughened at the inferior posterior surface, which I removed, taking off a thin section of bone by means of a fine saw. The patient made an excellent recovery, and may be seen at Dalkey following his accustomed avocations.

III. *Excision of the Os Calcis for disease which attacked the inferior and external surface, the articular surfaces being healthy.*

CASE III.—R. T., a young gentleman, aged twenty-one years, born of healthy parents, about five feet eight inches in height, of sallow complexion, for whom I was consulted, in October, 1880, for pain over the external portion of his right os calcis, on which surface was a small opening which occasionally closed and then again burst, discharging a thin fluid. He was seen by Mr. Butcher, who advised injections and subsequently removal of the diseased bone by the gouge. A month after I first saw him—that is, about the 20th November, 1880—he was placed under an anæsthetic by Dr. Harley. Mr. Butcher and Mr. Tufnell were present. It was now ascertained that the disease was so extensive that excision of the bone should be practised, which I did by the subperiosteal method. The external incision, which was curved, commenced on the outside of the tendo-Achillis, at the level of the ankle-joint, and was carried down to the tuberosity on the external surface of the os calcis, and as far forwards as the base of the fifth metatarsal bone. The flap having been raised, I separated the periosteum carefully. This operation was long and tedious. The periosteum did not strip off easily from the bone, as we are wont to observe in disease. Small particles of bone remained adherent to the periosteum. The drainage was not as satisfactory as in the other cases. The progress of the case was slow, and portions of bone were thrown off during the treatment, to cure which was eventually accomplished in three months after the operation. In two years after the operation (1882) the patient walked well. I could not satisfy myself that there was any reproduction of the bone.

If called on again to excise the os calcis, I would not adopt the subperiosteal method. I do not believe in the advantages claimed for it, and to my mind it has many disadvantages; besides, the periosteum is often diseased, and does not, after operations, always carry out its wonted functions. [The excised bones were exhibited at the Pathological and Surgical Societies.]

IV. *Complete Excision of the Right Astragalus for Disease.*

CASE IV.—In March, 1881, I was consulted by the parents of a healthy young lady, nineteen years of age, for caries of her right astragalus. The exciting cause of the disease appears to have been a blow over the bone a year previous, which occurred when running upstairs, when she slipped and fell forwards, the edge of the stair step causing a severe contusion over the front of her ankle-joint. This accident confined her to bed for a week, after which period she resumed her active country life. She continually felt stiffness and aching pain in the neighbourhood of her ankle-joint, especially after exercise. Two months before I saw her—that is, early in January, 1881—without any known immediate cause, an abscess formed in the front of her ankle, which rapidly ran its course, and burst in about a week after the first acute symptoms, leaving two sinuses. On entering a probe into the most anterior, that part of the astragalus just behind the head could be felt exposed, and on passing a probe into the sinus situated anteriorly and externally, the denuded bone was easily reached. Having examined this patient on two occasions, I advised the removal of the astragalus. The lady was anæsthetised by Dr. Harley, Mr. Butcher was present, and Mr. Kelly (now Dr. Kelly), my former pupil, assisted. I made a somewhat curved incision from the external malleolus, and extended it to the outer border of the foot, passing through the sinuses. I divided portion of the external lateral ligament of the ankle-joint, the peroneus brevis tertius and short extensor of the foot. The extensor tendons in front and the dorsalis pedis vessel were not injured. The peroneus longus muscle was retracted posteriorly. I next turned the foot forcibly inwards, and divided the ligamentous attachments, and then seizing the bone with a lion forceps I drew it forwards, and further divided any structures necessary, being careful not to injure the plantar arteries on the inner side. There was not any hæmorrhage of consequence. A few muscular branches were ligatured; the cavity, which I had previously examined, I washed out with a solution of chloride of zinc, 15 grains to the ounce in strength; free drainage was established; and the foot and limb was placed on a splint, such as is commonly used in excision of the ankle-joint. The wound progressed kindly, and in a little less than three weeks had completely healed. Before the end of the fifth week I applied a plaster

bandage, which remained on for six weeks, which allowed of some slight motion. Suffice it to say that the result is all that could be desired—the limb but little shortened, her powers of locomotion scarcely impaired, and a movable articulation exists between the os calcis and malleoli. The lady, who is in town at present, I saw about a week ago.

V. *Medio-Tarsal Operation.*

CASE V.—The next case which I shall record is one which required the medio-tarsal, or Chopart's, amputation, which I performed some five years ago for disease, commencing in the middle cuneiform bone, which extended to the external and internal cuneiform, 2nd and 3rd metatarsal and scaphoid bones. The subject of this operation was a delicate lad about eleven years of age. There was not any history of injury. The result of this operation was seen at the Surgical Section some two years ago. The photograph here shown represents the stump three months after the operation. There was no tendency to contraction. When bringing the flaps together, I sutured the tibialis anticus and peroneus longus to the cicatrix.

VI. *Excision of the Os Calcis, Astragalus, and portions of the Tibia and Fibula for Disease.*

CASE VI.—E., a gentleman about forty years of age, was admitted into the City of Dublin Hospital under my care in October, 1885. He gave the following history:—

“Whilst in India, 14 years since, a Buggy wheel went over my left foot, which discoloured the instep and caused me to be lame for a short time. Again, about five years since, the same foot was a second time run over, which in no way inconvenienced me for about three years. It then pained me on walking much, and eventually became swollen, and a sinus formed last March two years, which was cured in about two months. On using the foot again the ankle became much swollen and painful. I was then directed to give it rest and apply cold lotions. The foot did not improve, but became more painful, with constant twitching. Then for a long time I applied hot stupes with no good results, blisters were applied, and eventually iodine. Not having improved, I went by advice to China for change of air. Having returned from China, it was found that an abscess had formed, which was lanced. I remained in Calcutta for ten days, and was told that the bone was not diseased, and that I might return to my district. It had, however, soon to be lanced again, which was repeated on several occasions. Before leaving Calcutta a large quantity of the flesh which was between the sinuses on the inside of my ankle was removed. During the voyage another abscess which formed on the outside of my ankle had to be lanced. When

I arrived in London I went to St. Thomas's Hospital, where Mr. — was of opinion that the bones were not implicated. He repeatedly lanced and scraped the sinuses, also giving medicine internally, and he was of opinion, from the way I progressed, that I would be quite well in two months. I attended at St. Thomas's Hospital for a little over three months, and then left for Dublin, October, 1885. On arrival I had an attack of ague, which I had never suffered from in India."

On examining this patient in the City of Dublin Hospital there was not any difficulty in discovering that his os calcis was extensively diseased. Four sinuses led down to diseased bone. In a few days after I passed a probe into the inferior sinus, which penetrated the astragalus. The motions of his ankle-joint were not impaired, and pressure of the astragalus against the tibia did not cause him any pain whatever.

Having fully explained to the patient the nature and extent of the disease, I told him of the operation I proposed to perform. It was a great matter to him to have the anterior portion of his foot sound, as it would enable him to ride on his return to India. Formerly an indigo planter, now the manager of an indigo plantation, it was a matter of the utmost importance that he should as speedily as possible return to his business. I was obliged, however, to delay the operation for a while on account of his attack of ague.

The operation was performed in this way:—A semilunar incision was made, such as I have described for removal of the os calcis, keeping, however, a little higher up at the posterior surface, and dissecting the flap forward. The calcaneo-cuboid articulation was next opened and the ligaments of the ankle-joints divided; the astragalus and calcis now separated, so I removed the latter bone and afterwards the astragalus. Having seized it with a lion forceps I forcibly brought it forwards and opened its articulation with the scaphoid bone. I next removed the malleoli, and with the internal the articular surface of the tibia. The flap was now adjusted and placed in position, but not pressed firmly. The lines of incision healed slowly. He was not discharged from hospital until April last, when he could bear a tolerable amount of pressure over the seat of operation. The bones which you now see show carious disease. The inner malleolus was rough, and the articular surface of the tibia congested and ecchymosed. The cast which represents the foot after operation was taken in August last, at which time he was able to wear a properly-adapted boot and walk fairly well, with the assistance of a stick. I received a letter

MR. WHEELER

On Excision of Os Calcis, Astragalus, and Malleoli.

[FALCONER,

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from this gentleman from Malta dated 1st of last month, in which he gave me the most favourable report of his locomotive progress. The lithograph, taken from cast, admirably shows the condition of the foot after operation.

I shall not recount in detail any of the other operations that I have successfully performed on the foot—as Syme, Hey, and Pirogoff—but may add that I have removed the cuboid bone twice, the scaphoid once, the middle cuneiform once, several times the metatarsal bones, and I have once resected the first phalango-metatarsal articulation. The results of these operations were satisfactory. It may not be uninteresting to review briefly some of the operations I have brought before this Section.

The first excision of the os calcis appears to have been performed by M. Robert, in 1837; and the first in England by Greenhow, about ten years later. I shall not discuss the advantages claimed for the various incisions recommended for the removal of the entire os calcis. Such can be found in the various works on surgery. I prefer the method which I have recorded, which is very similar to that mentioned by Erichsen, except that I do not make the perpendicular incision, and consequently have only the one flap—horse-shoe in shape. In making the external incision the operator should be careful not to divide the tendon of the peroneus longus as it passes through the groove in the cuboid bone. Many surgeons have condemned this operation, the late Sir William Fergusson said he never found it necessary to perform such operation; Syme and Lisfranc also disapproved of it; others urge that on account of the large size of the bone—the important part that it takes in support—that its complete or even partial extirpation should be delayed as long as possible. This latter statement, indeed, appears to me to be erratic in principle, and to be one of the many reasons why the removal of the calcis may subsequently be followed by disease in other bones. I must not be understood as advocating excision of this bone without due and careful deliberation, but I wish emphatically to express my disapproval of any half measures when disease is evident, and established statistics declare that it is a favourable operation, and affords results that could scarcely be anticipated. Dissection has proved that dense tissue occupies the former situation of the bone into which the tendo-Achillis is inserted, and the short flexor muscle of the toes, together with the abductor pollicis and minimi digiti,

lose themselves. The cuboid bone inclines backwards towards the astragalus to which it is frequently united by fibrous bands.

Complete excision of the astragalus for displacement is undoubtedly of ancient origin, but for disease is of comparatively recent date. In England up to 1864 only three cases of complete removal for disease had been recorded. Assuredly, if there should not be undue delay in removal of the os calcis, greater expedition is called for when disease occurs in the astragalus. Experience has shown that amongst all the bones of the tarsus it takes a foremost place in rapid implication of adjoining osseous structures. The surgeon will act well to his patient who advises early removal of the astragalus when diseased. This operation, according to the most recent statistics, is very favourable. Mr. Hancock gives 109 cases of complete excision of the astragalus for compound dislocation, simple dislocation, and disease, out of which number 76 recovered, 16 died—a death-rate of 14·6 per cent. Of the 10 cases quoted by Hancock operated on for disease, 6 recovered with good and useful limbs, 1 underwent secondary amputation and recovered, 1 died, in 2 the result is not stated. Mr. Gant records 14 cases of complete excision of the astragalus for disease. Of these, 9 recovered, 2 underwent secondary amputation and recovered, in 2 the result was not reported, and 1 died. Excision of this bone appears to have been first performed in 1582 by a surgeon of Duisburg for accident.

Those cases that demand excision from displacement, the result of injury, must be carefully distinguished from cases of apparent dislocation, the result of hysterical contraction. In the latter class of cases, from the continual contraction of the muscles, the bone becomes much more prominent, owing to the laxity of the ligaments produced by constant tension. Mistakes of this kind can be easily obviated by observing the conditions of the parts during sleep (considering also the age and sex of the patient) or under the influence of an anæsthetic. An astragalus apparently displaced to such an extent that the patient walked on the external surface of her foot, will probably be recalled to the memory of some here present, in which excision of the astragalus was not only contemplated, but about to be performed, on an hospital patient, when the resident staff observed that during sleep the displacement disappeared. In removal of the astragalus I did not find it necessary to saw the bone at the neck and leave the head articulating with the scaphoid, to be afterwards removed. This procedure is advised by some surgeons, but is unnecessary.

With respect to contraction after Chopart's operation, I may state that experience and dissection have shown that it is not only the tendo-Achillis that may be at fault, but the flexor communis, the tibialis posticus, and the long flexor pollicis. Hence, the want of success in relieving the contraction by the division of the tendo-Achillis. Out of the three medio-tarsal operations I have performed, I have been fortunate not to have had any contraction. In one case only did I secure the tibialis anticus and peroneus longus to the site of the cicatrix. I doubt not that if the ankle-joint is kept well flexed during the process of cure that no contraction will take place; but to me it seems that the removal of the scaphoid bone plays an important part in the cause of this contraction—an additional reason in favour of those who argue that if a bone of the foot be not diseased or implicated it should not be removed, because it may happen to form the line of a particular operation.

In the last case that I have recorded—the removal of the os calcis, astragalus, and external and internal malleoli with the articulating surface of the tibia—I find in the *Lancet* of 1848 not altogether a dissimilar case recorded by Mr. Thomas Wakley, entitled “Excision of the Ankle-joint and the entire Removal of the Astragalus and Os Calcis.” His incisions, however, are most complicated, and he removed a flap from the sole of the foot situated between two of the incisions made for the purpose of forming his flaps. The posterior tibial artery was cut, and the anterior tibial vessel narrowly escaped. The mode of procedure adopted by Mr. Wakley is complicated and unnecessary.

Heyfelder reports removal of the os calcis and astragalus in 1858 by a much less complicated method than that of Mr. Wakley—the second case on record. Many examples of advantageous and successful removal of the bones of the tarsus are related by Mr. Holmes in his “System of Surgery;” by Annandale in the *Edinburgh Surgical Journal* and in *St. George's Hospital Reports*; and one case is recorded in the *Lancet* of 1881, where it is stated that the entire tarsus was removed, no tendons were cut, the periosteum was preserved, and the tissues were replaced by a solid mass.

I am not aware of any successful case of the removal of os calcis and astragalus in Dublin until the one I have just reported.

In conclusion, I hope that I may state that before deciding on any particular operation it will be well to consider in what stage the disease is—whether acute or chronic, progressive or quiet, diffuse or limited. It is in the chronic and non-diffused cases that

partial operation is successful; when diffused and in large articulations partial operations are worse than useless. Again, caries following on inflammation of ligaments is much more favourable for partial excisions than when caries commences in the cancelli of the bones.

ART. XIII.—*Variations in Form of Mental Affections in Relation to the Classification of Insanity.*^a By CONOLLY NORMAN, M.K.Q.C.P., F.R.C.S.I.; Medical Superintendent, Richmond District Asylum, Dublin.

THE question of the classification of insanity is one that has given rise to an extreme diversity of opinion among alienists. In ordinary medical treatises, and among medical men who are not specialists, the time-honoured classification of Pinel, modified by the inclusion of Monomania (Esquirol) and General Paralysis, may be said to hold the field. Meanwhile, nearly every special writer has adopted a classificatory scheme of his own. The insufficiency of the ordinary arrangement is universally acknowledged, but grave objections are made to every one of the proposed substitutes, and no approach to concord on this subject among our greatest authorities has been arrived at.

Most of the older classifications are essentially metaphysical, and are founded upon fanciful distinctions and subdivisions of the mental faculties, which may be of some value from the metaphysician's point of view, but are entirely without clinical equivalent. On the other hand, some modern schemes have gone too far in the opposite direction, and their authors seem to forget that they are dealing with an organ that has functions of its own, the aberrations of which cannot be described in terms pertinent to the functions of any other part.

Two remarkable classifications have been produced in England in recent times. One of these—the somato-ætiological of Dr. Skae—was once extensively used, but has, I think, been generally relinquished of late. It has two chief faults—first, it gives undue prominence to all those causes of insanity which act indirectly, and throws into the shade those which act directly upon the brain itself; secondly, out of about two dozen divisions, one, which cannot properly be called a class at all—namely, idiopathic in-

^a Read before the Medical Section of the Academy of Medicine in Ireland, on Friday, January 28, 1887.