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OF

## MEDICAL SCIENCE.

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### PART I.

### ORIGINAL COMMUNICATIONS.

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ART. XIV.—*Fractures of the Leg.*<sup>a</sup> By ALEXANDER GORDON, M.D., Edin.; Professor of Surgery, Queen's College, Belfast; late Visiting Surgeon, Belfast Royal Hospital.

DOES a good collection of specimens of fractures of the leg resolve itself into well-defined species? To this I reply most decidedly in the affirmative. Does each species demand distinct modifications of treatment? To this I also give the same answer. When I consider the frequency of fractures of the leg, and the deformity and lameness too often dependent upon them, I think these results may be attributed to the practice of viewing them in too narrow and restricted a light, assuming that they require for their successful treatment little variations in position and apparatus.

The following are the species and varieties into which the specimens in Queen's College Museum resolve themselves. I have no doubt as the collection increases other forms shall present themselves—of which the present classification is the beginning—of a more extensive and accurate system than that which now prevails, and without which our practice will be empirical rather than scientific.

1. *The Articular Fracture of the Upper End of the Tibia.*—The obliquity of the femur from without inwards and downwards, and the perpendicular position of the bones of the leg, cause the shock or impulse of the body, in leaping or falling from a height, to impinge chiefly upon the outer articular facet of the tibia; besides,

<sup>a</sup> Read before the Ulster Medical Society, on February 26th, 1884.

the sharpness of the outer margin of the external condyle of the femur concentrates the force upon the outer part of the outer articular facet, and sometimes drives it into the cancellated tissue of the head of the tibia beneath it. There are three specimens of this accident in the Museum of the Queen's College. In two of them the tibia and fibula are also broken near their middle, presenting examples of the chisel-shaped fracture of both bones of the leg. In one of the two the compact tissue has been driven nearly half an inch into the cancelli of the head of the tibia. The appearance of the knee in this form of fracture would resemble, in a slight degree, genu valgum.

The third specimen shows less depression than the other two, but equally well marked, and not complicated with any other fracture of either of the bones of the leg. I leave it to future observers to give us a more detailed account of this accident, which I believe to be not uncommon.

*Treatment.*—In the first form, where the compact tissue is driven into the cancelli, I do not see how it can be elevated. But in the second variety, where the condyle is broken with fracture of the fibula, we might, by adduction of the leg, separate, to a slight degree, the articular surfaces from each other; and if at the same time the leg were extended, the biceps flexor cruris would be extended, and more or less elevation of the condyle and broken fibula might be attained.

2. *Simple Transverse Fracture of the Upper End of the Tibia.*—This fracture traverses the upper expanded extremities of the tibia, a little above, through, or a little below the anterior tuberosity. There is no appreciable displacement. The patient is unable to raise the leg in the extended position, but when we grasp and fix the upper end of the tibia with one hand, and with the other seize the leg above the ankle and move it from side to side, distinct motion between the fragments, with slight crepitus, will be easily recognised; but all doubts will be removed when we make pressure along the line of fracture, acute pricking pain will be complained of, caused by the very minute spicula wounding the soft parts, especially under the tendons of the gracilis and sartorius muscles.

*Treatment.*—As there is little or no tendency to displacement, all that is requisite to do is to keep the extremity in the extended position and apply a well-padded splint on each side of the limb, extending from the foot to the middle of the thigh, well secured by straps and buckles.

3. *Oblique Fracture of the Tibia from before upwards and backwards.*—This fracture is often compound, and is usually caused by great force applied to the crista. When the fracture is high up, the lower end of the upper fragment projects very much forwards, while the upper end of the lower fragment is displaced backwards. The fibula is usually broken opposite the seat of fracture in the tibia. In one instance the fibula was dislocated.

*Treatment.*—If we place the limb in the extended position, the deformity persists, and the more we extend or pull the worse it becomes. If we place it on its outer side, and attempt to relax the muscles by flexion, muscular spasm supervenes, aggravating very much the deformity. If, on the other hand, the heel splint, suitably padded, be applied to the back of the leg, and the limb slowly and gently raised until the thigh forms nearly a right angle with the pelvis, and the leg a right angle with the thigh, the deformity will generally disappear; then placing a thick pad along the anterior border of the upper fragment and dorsum of the foot, we apply the front splint, and, to prevent rotation or lateral motion, a Cline's splint well padded on each side of the limb.

Sometimes, notwithstanding the relaxation of the muscles consequent upon this position, the lower end of the upper fragment still projects forwards. Now the question will arise: What is the cause of this projection? Is it the quadriceps extensor cruris which pulls the fragments forwards, or the upper end of the lower fragment tilting it forwards? If the projection be from the action of the gastrocnemius and soleus acting on the lower fragment, then the flexion of the leg upon the thigh must be increased, whilst upon the other hand, if it be from the quadriceps extensor, the leg must be more raised, and the angle of the thigh with the pelvis diminished until the extremity assumes the position adopted for fractured patella.

When the seat of fracture is lower, approaching the middle of the bone, the padding applied to the back of the leg must be full, whilst that in front should extend only to the lower end of the upper fragment. A small pad must also be applied to the dorsum of the foot. By this arrangement of the pads, there is a space between the lower fragment and the back of the anterior splint, and there is therefore no impediment to the lower fragment being pressed forward.

4. *Oblique Fracture of the Tibia from before downwards and backwards.*—In this fracture, which is generally about the middle of the tibia, the sharp end of the lower fragment often protrudes

through the integument, the foot is carried backwards, bringing with it the contiguous part of the lower fragment, and causing its upper end to project very much forwards. The fibula is generally broken at or near the seat of fracture in the tibia.

*Treatment.*—When the upper end of the lower fragment protrudes through the integument the patient is to be placed upon the back, the thigh flexed very much upon the pelvis, and the leg upon the thigh; then an assistant seizes the upper portion of the leg, whilst the surgeon grasps the foot and lower part of the limb, and makes extension downwards and backwards; then, on slowly raising the heel, the deformity will disappear. The heel splint, well padded below, is applied to the back of the leg; then a pad in front, extending over the dorsum of the foot and entire length of the tibia, is laid along the crista, and over this is placed the anterior splint; then a Cline's splint, well padded, is applied to each side of the limb, to prevent lateral displacement, and the whole secured by straps and buckles, or a bandage, and the limb placed upon the "rest," or a MacIntyre's splint, with the leg-piece elevated. Salter's apparatus, as usually made, does not allow of sufficient elevation, and, therefore, does not give us the relaxation of the posterior muscles of the leg requisite to the apposition of the fragments. It is in this form that the sharp angular end of the lower fragment is found to have burst through the skin, which, closing around it, prevents reduction. The practice to be followed, I think, should depend upon the acuteness of the fracture. If it be narrow and long, we may saw it off, and then, raising the heel, it will slip into its place; or it may be necessary to pass a director into the wound, elevate the integument, so as to draw it over the projecting point. If the projecting end be of considerable thickness, it will be better to enlarge the wound in the skin. After this we cover the wound with a piece of lint, saturated in the compound tincture of benzoin, and apply the splints as before mentioned.

5. *Fracture of the Tibia, with displacement of a large central fragment.*—I saw lately an instance of this form of fracture, the result of a railway accident. The seat opposite to that upon which the patient had been sitting at the time of collision striking the leg, forced from the middle of the tibia backwards a large triangular fragment. It was in the eighth week after the accident when I first saw him. This triangular fragment was quite movable, and displaced considerably backwards and slightly inwards. The upper and lower portions of the tibia were approximated, causing con-

siderable shortening of the limb; the latter, at its lower end, was inclined considerably inwards, while its upper end pointed outwards. The impediment to the replacement of the middle fragment was the approximation of the upper and lower pieces of the tibia.

*Treatment.*—The limb had been slightly raised, and two Cline's splints had been applied, with pads on each side. To allow of the return of the displaced fragments, it was necessary to raise the leg much higher, in order to produce greater muscular relaxation. Flexing it upon the thigh, and the thigh upon the pelvis, the heel splint, well padded, was applied posteriorly; a small, soft pad was placed over the triangular or middle fragment, and a thick one along the inner side of the foot and ankle, and a Cline's splint applied to the leg on its outer and inner surfaces. The effect of this change in the position of the limb in a few days became apparent, as the middle fragment had nearly resumed its proper position, and after this the case progressed most favourably; and, considering the serious character of the injury, the patient has recovered with a very useful limb, with scarcely any deformity or lameness.

The case may be regarded as the type of this form of accident, and its treatment cannot be successful unless the muscles are relaxed to their utmost, to enable us to make room for the displaced middle fragment.

6. *Simple Transverse Fracture of both Tibia and Fibula at the junction of the Lower Third with the Upper Two-thirds.*—Is a comparatively rare accident, and is caused by direct violence, applied transversely, breaking both bones on the same plane. There is no vertical displacement, and the deformity which results is displacement backwards of both fragments. The tibia and fibula are sometimes soldered together; at other times they are not so, but the interosseous space is diminished, with a narrowing of the transverse breadth of the leg at the seat of fracture.

*Treatment.*—In the treatment of this fracture the heel, or posterior splint, must be well padded at the seat of fracture. The front pad should be thick over the lower end of the tibia. The limb may be placed in the straight position, and when the anterior splint is applied and the straps tightened it will act chiefly upon the lower end of the lower fragment, and push it backwards. In this, as in the spiroid fracture, we must be on our guard not to allow the lower fragment to rotate on its vertical axis. For this purpose we must apply a Cline's splint on the outer side of the limb, the foot-piece being well padded to prevent this rotation.

In two well-marked specimens of this accident, in the Queen's College Museum, inclination of the fragments backwards has produced a very great convexity behind, or concavity in front, which becomes remarkably apparent when we stand and look horizontally across the limb; and more than this, as the weight of the body is thrown on the posterior part of the articular surface of the tibia, and the astragalus, a chronic arthritis and osteitis supervenes. This is a very good example of the mischief which results, unperceived by the surgeon, until too late, by treating the accident with a Cline's splint on each side, or by the use of a starch bandage. By the former there is no support behind, and both fragments gravitate backwards; and by the latter, from the looseness caused by the shrinking of the limb, and the weight upon the heel, a similar deformity results. And, moreover, it presents us with another instance of chronic osteitis, supervening when the natural bearing of the joint surfaces upon each other is altered, and leading to a chronic inflammation which persists, entailing lameness for a long time after the accident.

If the limb be placed on the "double-inclined plane," and steadied by two Cline's splints, the heel will gravitate backwards, carrying with it the lower end of the tibia, and producing an unusual prominence of the upper end of the lower fragment in front. And this remark is applicable not only to this, but to other forms of fracture of the leg, which tend to gravitate backwards from want of adequate support to the heel.

7. *The Chisel-shaped Fracture of the Tibia.*—This is by far the most common of all the fractures of the leg, equalling in number almost all the other fractures conjoined.

It is caused by force being applied from without inwards. The patient in walking sets the outer side of his foot upon a stone. The outer side of the foot being thus elevated, the inner side is depressed, and the weight of the body being suddenly thrown obliquely across the tibia, it breaks obliquely from without inwards and downwards, the fibula, giving way sometimes opposite, but most frequently close to the head. On examination, the lower end of the upper fragment may be felt somewhat rounded, with a little projection in its middle, and the displacement seems slight, but it is always much greater than it appears.

As the upper end of the lower fragment is displaced outwards, the change which the lower or articular end undergoes deserves more consideration than has been accorded to it. The articular

surface becomes more oblique with elevation of the internal malleolus, and the foot following the articular surface, its inner border is more raised, and most of the patients who have received this accident walk afterwards more on the outer side of the foot than usual.

*Treatment.*—Of all the fractures of the leg, the following mode of treatment is that which I found followed by the most satisfactory results:—Observing that the inner malleolus was raised, in order to bring it downwards to its natural position, two conditions were necessary—the first was to relax the muscles; the second was to powerfully abduct the foot; and to enable me to do so I had a splint constructed, to which I have given the name of the “double-bevelled splint.” It is made of a piece of pine, about an inch in thickness, and of the general form of Cline’s splint. The foot-piece is cut off obliquely, so as to allow of abduction of the foot. Placing a thick pad on the leg portion of the splint, the limb resting on its outer side is placed upon it, then grasping the upper end of the leg with the one hand, whilst with the other seizing the foot and foot-pieces of the splint, and gently flexing the leg upon the thigh, at the same time abducting the foot, it will almost uniformly be found that in the act of flexion the bones drop accurately into position—so accurately, that it is even difficult to detect where the limb is broken. Then apply the front and back splints, secured by straps and buckles. The patient is to be kept lying upon his side, with the leg flexed upon the thigh, and the thigh flexed upon the pelvis. Some patients dislike the side position, and will complain against it; but if the surgeon be resolute, in a few days they will become reconciled to it.

I have a cast of a fracture of this variety, in which the tibia is broken an inch above the inner malleolus, with fracture of the fibula, two inches from the lower end, with displacement of the malleolus outwards, consequently with great increase of the inter-malleolar space. Where the fibula is broken so low down, and displaced as described, the abduction of the foot would be injurious; it, therefore, must be kept straight, and with this exception treated as previously described.

There is also another specimen of this accident, in which the foot is so much turned inwards that the patient walked on the outer part of its upper surface, as if he had been suffering from talipes varus.

8. *Spiroid Fracture of the Tibia.*—This fracture occurs in the middle third, or rather in the lower end of the middle third of the tibia, and is usually caused by force applied to the inner surface of

the tibia whilst unsupported, except at its extremities. The lower end of the upper fragment presents internally an elongated spire, which, being driven into the upper end of the lower fragment, splits it obliquely downwards, the fissure extending into the articular surface. The upper end of the lower fragment behind presents also an elongated spire, less acute, however, than the internal. The sides of the inner spire are cut vertically to the surface, whilst the spire of the lower fragment is divided obliquely, showing in the clearest manner that the osseous fibres of the compact tissue of the internal surface of the tibia have been broken by compression, whilst those behind, or externally from their obliquity, have given way by elongation.

*Diagnosis.*—The diagnosis of this accident is easily made. The elongated spire of the upper fragment projects the integument so prominently that it can be easily seen and felt, and the crista of the tibia is also remarkably prominent, notwithstanding the great effusion of blood which takes place immediately after the accident.

*Treatment.*—Those surgeons who have written on this accident regard it as one which will often require amputation. From the few examples I have seen of it, the treatment will be as successful as any other fracture of the leg, and with as little deformity. Take the heel splint, pad it well, especially opposite the seat of fracture, then raise the limb, supported by the splint, until the thigh forms a right angle with the pelvis, and the leg a right angle with the thigh, and whilst the assistant holds the leg in this position, the surgeon, seizing the foot, makes gentle extension, and at the same time rotates the foot inwards—the fragments then usually drop into their most accurate approximation, all deformity disappearing. Immediately after the accident, from the foot resting upon the heel, and from the action of the tibialis anticus and the extensors of the toes, the lower fragment is rotated outwards.

If extension be made with the outward rotation maintained, it will be of no use; the fragments will not go into position. It is absolutely necessary, then, while we extend to rotate inwards. If we place the limb in the extended position the fragments will not go into their place; and, even should we succeed in the reduction, on the following day the deformity will have reappeared.

The way to treat this accident is to take the heel splint, well padded, raise the limb, flex the thigh upon the pelvis, and the leg upon the thigh, and having corrected the deformity by extension and rotation of the foot inwards, place a Cline's splint on the outer



and another on the inner side, with a front splint, all suitably padded, and made firm with straps and buckles. This position must be maintained for four or five weeks by placing the limb upon a box, a "double-inclined plane" with the foot-piece elevated, or a leg—"rest."

Special care must be taken to place a thick pad between the foot-piece of the outer Cline's splint and outer margin of the foot, to maintain the rotation inwards of the foot. The limb may also be placed flexed in the same manner resting on its outer surface, but the leg must be well flexed on the thigh.

The explanation of the great fatality of this accident is mainly due to two causes, viz.:—(1). The sharpened end of the upper fragment often bursts through the skin, making the fracture compound, or subsequently making its way through the integument by ulceration. (2). The spire of the lower fragment, which is usually very sharp, wounds the vessels behind, and great effusion of blood takes place, injecting the limb; and if we add to this the inflammatory products and putrefaction of the effused blood, we can then easily see why the accident should be so frequently fatal. Now, however, the antiseptic mode of treatment may have some influence in counteracting such disastrous results.

9. *The Bread-cart Fracture*.—I have given this name to a not uncommon accident in which a person is thrown down by a bread-cart, jaunting-car, or other vehicle running quickly. The patient being thrown on his side, the wheel passes over the inner surface of the leg. If it be at the ankle-joint, both malleoli will be found to be broken off, and the lower end of the tibia crushed and comminuted. If it be higher up, at the junction of the lower with the two upper thirds, the compact tissue of the inner surface will be broken into lozenge-shaped fragments, and driven into the medulla, and also displaced outwards, with fracture of the fibula, at the point where the wheel passes over the limb, the inner malleolus being elevated. If the wheel has passed higher up, the inner surface of the compact tissue will present numerous elongated spicula, whilst the angles, which are the strongest portions of the bone, will be broken off, and present themselves as long detached fragments. A moment's reflection will show us that this is a most serious accident, although there may be no external wound; for the long sharp fragments are driven into the medulla, which will lead to inflammatory action ending in death of many of the loose spicula; therefore, the fact of a wheel passing over the limb as described, although

the injury and deformity may seem at first sight trifling, should lead the surgeon to give a very guarded prognosis, as the inflammation, suppuration, and necrosis will sooner or later necessitate amputation.

*Treatment.*—The limb should be placed resting upon its outer side, with the thigh flexed upon the pelvis, and the leg upon the thigh, with the foot abducted, and the inclination of the fragments either forwards or backwards should be prevented by the anterior and posterior splints.

10. *Fracture of both Malleoli on the same plane as the inferior surface of the Tibia.*—Both malleoli may be broken off with various forms of severe fractures of the leg, but, in the accident to which I have given this name, the injury is confined to the fracture of the malleoli, and it is caused by (1) forced extension of the foot with the leg more or less fixed, or (2) by forcible extension of the leg with the foot fixed. The accident may be regarded as the first stage of dislocation of both bones of the leg forwards or of the foot backwards.

*Diagnosis.*—The diagnosis is very easy, as the heel is carried backwards and upwards, whilst in front the lower end of the tibia projects slightly forwards. Both malleoli may be felt movable with slight crepitus; and as the processes follow the foot backwards, a small space in front may be felt between the inner malleolus and the tibia.

*Treatment.*—Apply the heel splint well padded below, then the front splint with a thick pad over the lower end of the tibia, a Cline's splint on each side, thickly padded, over the malleoli, so as to press them firmly against the articular surface of the astragalus. The heel splint pushes the foot forwards, whilst the front splint presses the tibia backwards, and the Cline's splint fixes the foot, preventing any lateral deviation of the fragments, as either abduction or adduction would act injuriously by displacing the fragments. The leg may be placed in the extended position—if so, it may be requisite to have the straps, which bind the splints together just above the ankle-joint, very tightly buckled, to prevent the heel from going backwards; however, if there be the slightest tendency to projection of the heel backwards, then the leg should be placed upon the "rest" in a semi-flexed position. Dislocation of both bones of the leg forwards is to be treated in precisely the same way, but the semi-flexed position should be adopted from the beginning.

11. *Potts' Fracture.*—There may be some difference of opinion as to what is meant by Potts' fracture. I, therefore, restrict the term

to that not uncommon form of accident in which the inner malleolus is broken off with fracture of the fibula from one and a half to two and a half inches above the lower end of the outer malleolus. In whatever position the patient may be lying when we see this accident, the foot is usually abducted and displaced outwards, with its inner border depressed, and the heel carried usually more or less backwards.

*Diagnosis.*—The diagnosis is very easy. The inner malleolus may be felt to be movable, and the border of the tibia from which it has been detached may be distinctly felt. On the outside the outer malleolus will be pressed outwards by the displaced foot, whilst the upper end of the lower fragment will be carried inwards and often forwards, producing a diminished transverse breadth of the leg at this point, with increased lateral diameter lower down, at the point of the malleoli. As this accident is caused by twisting of the foot outwards, or by forcible abduction, we may consider as different degrees of the same accident—(1) *Simple Fracture of the Fibula*, from one and a half to two and a half inches from its lower end; (2) *Potts' Fracture*; and (3) *Dislocation of the Tibia inwards, or the foot outwards*—the simple fracture of the fibula being its mildest form, Potts' fracture being the more severe, and the dislocation of the tibia inwards the most severe form. This classification or arrangement of the subject will simplify matters, as the principles of treatment are the same in each. In simple fracture of the fibula the heel is usually displaced backwards, with widening of the inter-malleolar spaces.

*Treatment.*—Various modes of treatment have from time to time been recommended, but whatever mode be adopted, the heel must be pressed forward and the foot adducted. By Dupuytren's mode of treatment, or placing a thick pad extending along the inner side of the tibia to the malleolus, with a wooden splint extending beyond the foot, it will maintain the foot sufficiently adducted to correct the deformity caused by abduction; but it does not act sufficiently on the heel to bring it forwards and restore the fibula to its natural position.

The tibio-fibular articulation is the centre of the movements in these accidents—thus, when the heel is carried backwards, the lower end of the lower fragment is carried backwards, while its upper end projects forwards; and in addition to the lower end being displaced outwards by the abducted foot, the inter-malleolar space is increased, with diminution of the transverse breadth of the interosseous space

at the seat of fracture. In the treatment of fractures of the fibula no pressure should be made on any part of the shaft of the bone between the points at which it rests against the tibia; hence, in the treatment by Cline's splint along the outer side of the limb, one pad should be applied over the outer malleolus and outer surface of the foot, whilst the upper pad should rest upon the head of the fibula and above it, so that the whole length of the body of the fibula will be free and uncompressed.

If the upper end of the lower fragment projects forwards, then it becomes necessary to use some appliance to push and maintain the heel well forwards. The heel splint will do this. It is necessary to apply an anterior splint to enable us to act upon the posterior splint. Then place the limb on its outer side, with a pad on its outer margin, so that when the limb is placed on its outer side the foot shall be well adducted. Care should also be taken that in Potts' fracture and in dislocation inwards, where the inner malleolus has been broken off, the outer margin of the foot should be well raised; for if the foot be allowed to rotate outwards, the inner malleolus will also be unnaturally rotated.

From the description now given of the treatment of fractures of the leg followed by me, it resolves itself into the use of apparatus of the most simple kind—the heel splint, the front splint, two Cline's splints, and a double-bevelled splint, which permits of the fullest abduction of the foot. Next, the position in which the limb is to be placed—first, in the straight or extended position, which is applicable only to a few cases, and it may be confined to those cases in which, from their nature, vertical overriding is impossible; secondly, where the patient lies on his back, the thigh flexed almost to a right angle on the pelvis, and the leg upon the thigh; thirdly, those in which the patient lies upon his side, with the leg well flexed upon the thigh, and the foot either abducted or adducted.

I have used the term "rest," and this name is given to an apparatus which consists of four upright posts made of iron, which support a platform either end of which can be elevated or depressed, and which admits of the leg being placed upon it with very slight extension, or of being at either a right or acute angle with the thigh, giving us all the muscular relaxation necessary to enable us to counteract overriding of the fragments.

I have no faith in the prevention of overriding by forcible extension. Where I have tried it I have failed, but when my attention

was directed so as to produce the most perfect muscular relaxation, I do not remember an instance in which it failed. All displacements—forwards, inwards, backwards, or outwards—may be easily prevented by the four splints—the front, heel, and two Cline’s splints—and then placing the limb in a position in which the muscles are relaxed.

There is another point which, as regards position, must be carefully observed by the surgeon—namely, if the fracture be oblique from before backwards and upwards, or from above downwards and backwards, the patient must lie on his back; for if he be placed on his side lateral deviation of the fragments will take place, and muscular spasm will be the result. If the fracture be oblique from without inwards and downwards, then the limb must be placed on its outer side, with flexion of the leg upon the thigh, and the thigh upon the pelvis. To make my meaning more easily understood, placing the one hand upon the top of the other, the flat surfaces must look upwards and downwards. That is the position in which the fracture must be treated. Turn the hands so that the edges will be vertical, then it will be seen how easily the ends of the fragments will become displaced.

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ART. XV.—*Notes of a Case of Primary Lateral Sclerosis.*<sup>a</sup> By C. J. NIXON, M.B. Univ. Dub.; Senior Physician to the Mater Misericordiæ Hospital.

THE records of cases of primary lateral sclerosis have been of late years so numerous that but little, if any, value can be attached to a reiteration of symptoms already well known and fully analysed; yet recent experience has shown me that the advances made in the semeiology and localisation of affections of the spinal cord—advances of a degree perhaps not equalled by the results of investigation of diseases of any other organs—are not as widely known as they might be, or as they deserve to be. There is probably no class of diseases to the investigation of which more interest is attached than that of spinal cord disease—none of more importance than when its existence or non-existence, its trivial or its grave nature, becomes the subject of legal investigation. Notwithstanding the obscurity which still surrounds the development of many of its morbid changes and the unsatisfactory results of the

<sup>a</sup> Read before the Medical Section of the Academy of Medicine in Ireland, Friday, February 15, 1884. [For the discussion on this paper, see page 363.]