"palpation" alone the various forms of fracture of the lower end of the radius, as classified by R. W. Smith, Voilemier, Chiene, Bennett, and other notable authorities, could be accurately differentiated; or how in a recently severely-injured elbow-joint, one in consequence probably enormously swollen, a surgeon could, under such circumstances, recognise the exact nature of the lesion. Many other instances I might adduce in which *x-ray* photography is in such cases of distinctive value.

The following instance of the comparatively rare lesion—fracture of the carpal scaphoid—is one about which I was recently consulted, and of which the following are the principal details:

R. M. M., aged 30, by profession a Clerk in Orders, whilst engaged as temporary chaplain at Badenweiler in Germany in the autumn of 1898, met with the accident in the following manner: He was going up the stairs of his hotel, and seeing the lift he determined to ascend by it to the floor where his room was situated. Not waiting for or summoning the lift attendant, he incautiously opened the door and stepped in. The lift, however, being at the time at a higher level, he fell down to the floor of the basement storey, a distance of about 21 feet. The mistake he made he attributed to the fact that the electric light was not "on." "I can hardly remember," he observed, "how I felt falling, but think I remember putting out my left arm as a sort of protection." He felt as if someone had twisted his wrist "right round." The case was treated by a local German practitioner who recommended the application of dry cold. The injured wrist was subsequently bandaged and kept at rest in a sling. For several days great pain was experienced, so much so that anodynes had to be employed both locally and internally. Four days subsequently, the arm being carefully fixed on a splint, the patient went to Heidelberg, and from there returned to England by easy stages, but suffering great pain in the wrist all the time. On reaching home the wrist, hand, and forearm close to the wrist were found greatly swollen, most probably due to acute synovitis of the wrist and carpal joints. Poultices were diligently applied, which afforded much relief, and the arm kept on a splint. This treatment was continued for about four weeks. Massage and passive exercises were then recommended, which were attended with "great pain." At this time an *x-ray* photograph was made of the wrist, from which the illustration (Special Plate) is taken, and in which the fracture of the carpal scaphoid is clearly seen. The skiagraph was forwarded to me, and my advice asked as to the further treatment of the case. While concurring in the main with the treatment previously adopted, I urged the importance of great caution being employed in the use of passive exercises of the joint, especially as they were followed at times by great pain in the wrist. At the present time, under the influence of rest, occasional massage, and the cautious use of passive exercises, the motions of the joint, though still limited, are to a great extent regained, and a fairly good recovery may, I think, be confidently anticipated.

As a proof of how these injuries, which, I believe, occur much more frequently than has up to this been believed—a view in which Professor Stimson concurs—have been left unnoticed is the fact that in few of the systematic treatises on fractures, and in none of the older ones, is any mention made of them. This is the case even in the beautifully illustrated work on fractures by Helferich (1897), of which an admirable translation by Mr. J. Hutchinson, jun., has recently been published by the New Sydenham Society. Malgaigne, in his classical treatise on fractures, speaks of these cases as being "extremely rare." He mentions that Cloquet¹ met with them in 2 cases which occurred in persons who had sustained falls on the wrist, and that M. Jaijaray² has also described a case produced in a similar manner.

In the last edition of Hamilton's work on *Fractures* the author states that in all the cases that have come under his observation the fractures have been compound and complicated, and resulted in the complete loss of the hand or serious mutilation or maiming. In no instance was treatment adopted that had special reference to the fracture with the object of insuring apposition and union of the fragments. The author apparently is of opinion that simple carpal

fractures demand very little surgical interference, and that they will generally unite without any considerable maiming; that probably some degree of ankylosis may supervene between the adjacent surfaces, but that in the normal condition of things there is so little motion that the complete loss of it would not be much felt. The author, however, apparently forgets that the injury that produced the carpal fracture could hardly occur without more or less serious damage being done to the radio-carpal and other carpal articulations, and that in order to avoid the unfavourable consequences of such injury the treatment in the early stages, at all events, of immobilisation and rest is distinctly indicated.

In Dublin the only cases of this fracture that have been noted are two, both observed by Professor Bennett of Trinity College. One of these occurred in a case in which there was evidence of previous chronic rheumatic arthritis. It was a *post-mortem* observation. The other case was observed during life, and was recognised by the aid of an *x-ray* skiagraph. The particulars of both these cases were discussed by Professor Bennett at a meeting of the Dublin Biological Club last session, and will, I hope, eventually be published.

In making the diagnosis in these cases we cannot rely on either symptoms or external physical signs—pain, swelling, crepitation, loss of power, may all be present in the absence of any carpal fracture, and in the absence of Roentgen-ray photography no accurate diagnosis can possibly be made as to the nature or exact situation of the lesion producing these signs and symptoms.

The etiology, too, of these injuries is involved in much obscurity, especially in the cases where the injury is produced by force indirectly applied. It is especially hard to understand how excessive dorsiflexion, as held by Hamilton, could produce a scaphoid fracture. M. Bouchet,³ however, in making forcible flexion and extension of the hand in the dead body, found among other lesions one or more fractures of the bones of the wrist. Probably a more usual etiological factor is that in falling, when the hand is thrown forward for purposes of protection, at the moment of impact with the ground, the axis of the forearm is at or nearly at a right angle with the wound, and the direction of the force, instead of passing, as it usually does under these circumstances, obliquely through the carpus and lower end of the radius, passes through the "ball of the thumb," scaphoid, and directly upwards in a line corresponding to the axis of the forearm, and not in front of it, as it is believed to do in the production of Colles's fracture of the radius. The results of such a fall as is mentioned above would be more likely to be either a fracture or luxation of the carpus, or a luxation at the elbow, than fracture of the radius. The former occur when at the time of impact the angle between the axis of the forearm and the ground is greater than 60°, a fact pointed out many years ago by Professor Chiene of Edinburgh.

The peculiar, somewhat oval, concavo-convex shape of the carpal scaphoid would, I think, render it more liable to be affected by such an injury than any of the other carpal bones, and hence the greater liability of its being fractured than any of the others in its immediate vicinity.

REFERENCES.

- ¹ J. Cloquet, art. Main, *Dict. de Méd.* ² Jaijaray, *Thèse Inaug.*, Paris, 1846.
³ Sur les Luxations du Poignet, *Thèse de Paris*, 1834.

THE SO-CALLED "STAVE OF THUMB," OR
BENNETT'S FRACTURE.

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(SEE SPECIAL PLATE.)

It was as far back as August 1st, 1885, that Professor E. H. Bennett, of Dublin, drew special attention in the *BRITISH MEDICAL JOURNAL*¹ to the fact that museum specimens show that fracture of the metacarpal bone of the thumb is more common than that of any other of these bones; and, further, that when the fracture occurs in the metacarpal bone of the right thumb, it is not "just above the middle," as is usually asserted, but that it is situated at the base of the bone. This teaching of Professor Bennett has not, I am afraid, received that general recognition that it deserves, and reference to

late editions of what are regarded as standard works on the subject of fractures shows that this injury is not even mentioned.

In his recent study of fractures of the upper extremity I am glad to see Mr. Platt gives it proper notice, for, as Professor Bennett has pointed out, not only does it somewhat simulate a dislocation in the living subject, but the pain and swelling that accompany it so mask crepitus that the injury is generally regarded as a "sprain of the thumb." It is true that, even if untreated, the fracture unites with a trivial deformity after all, but at the same time a hand so injured "remains under the best of treatment long disabled, and without treatment for a greatly longer time" (Bennett). This statement receives confirmation from the following case, which is also of interest in that the skiagraph I took of the injury corroborates in every detail Professor Bennett's original description of it, and, further, in that the accident happened to a medical man, who had simply regarded his right thumb as being "badly bruised."

When I first saw the patient 16 days had elapsed since the accident, which had been caused by a fall during rough weather down the stairs leading to the cabin of the steamer on which he was acting as surgeon. When he fell the terminal phalanx of the right thumb happened to be flexed on the first phalanx, and he struck the point of this latter against a projecting bit of woodwork. As he said, he thought he had severely bruised his thumb, and the only treatment used was hot bathing and a soothing liniment, but recovery was so slow that he consulted me on his return to Glasgow.

Even after the lapse of 16 days I thought I could still detect some crepitus, and an x-ray photograph confirmed the existence of a fracture of the base of the first metacarpal bone.

Reference to Fig. 1 shows that the fracture there depicted is exactly that described by Professor Bennett. It is oblique, detaching the palmar half or more of the articular surface of the metacarpal bone facing the trapezium; while, in addition, the entire metacarpal bone, except the little piece so separated, has slipped backwards, no doubt through the action of the extensor ossis metacarpi, and thus simulates a subluxation of the bone in this direction. Both these points are clearly brought out in the skiagraph.

It may be as well to allude here to the kind of disablement which this fracture causes, especially as it is very well illustrated by this case. Summed up briefly, the leading feature of it is the inability to oppose the thumb to the index finger. It was interesting to hear from the patient in how many ways this was felt. Thus, while dressing he found he could not button his collar stud, nor could he make a bow on his tie. He could grasp his boot lace and push it through the eyelet holes, but he could not pull it through. He could hold a pair of scissors but he could not cut his nails, nor could he pick up a pin off the table. When washing his face he could only do so with the palm of his hand, as, owing to the pain it caused, he had to keep off the ball of the thumb. Again, being a smoker he found he could hold a match but he could not strike it. At the piano he could with difficulty stretch an octave, and he could not come down on the notes with any force. Writing, too, was out of the question, and professionally he was very much handicapped, for though he could hold a bistoury he could not make an incision with it. These illustrations indicate how much such an injury cripples the hand, and how much it is felt in many of the little details of everyday life. The cause of this injury is usually some force applied directly to the point of the thumb, as when the carpenter in using his plane strikes against any obstacle, or when a person falls and the end of the digit comes in contact with the ground. The treatment of these cases is to extend and fully abduct the thumb, retaining it in this position by a suitable apparatus. This was what was done in the present case. I extended and fully abducted the thumb, and when it was in that position I moulded a poroplastic splint to it. After two and a half weeks of treatment I took another skiagraph (Fig. 2), and it shows how satisfactory has been the apposition of the fragments as well as the reposition of the displaced metacarpal bone on to the trapezium. By this time, too, there was a decided improvement in the usefulness of the hand. Later on all disablement quite passed away, and the patient resumed his duties as surgeon on a large steamer.

This case illustrates well the practical utility in surgical work of the Roentgen rays, and it teaches the lesson that all so-called "sprains of the right thumb" should be subjected to them, as otherwise a "Bennett's fracture" is liable to be overlooked.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, August 1st, 1885, p. 200.

A CASE OF FRACTURE DISLOCATION OF THE SPINE,

WITH COMPLETE DESTRUCTION OF THE CORD IN THE UPPER LUMBAR REGION.*

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ALTHOUGH so much attention has been given to the subject within recent years—notably by Ross, Thorburn, Starr, Head, Sherrington, Bruns, and Kocher—there is still no certainty as to the exact localisation of the motor and sensory functions of the various cord segments and spinal roots. It seems therefore desirable that all cases bearing on the subject should be put on record, especially those in which it was possible to obtain not only an accurate clinical record, but also an exact knowledge of the site and extent of the lesion as shown by a necropsy. Last year¹ I gave in the BRITISH MEDICAL JOURNAL the notes of a case of spinal caries, and drew therefrom some deductions as to the distribution of certain sensory spinal roots. On the present occasion, as on the last, I have to express my great indebtedness to Professor Ogston for affording me every opportunity of observing and recording a most interesting case of spinal lesion. A comparison of the two cases is instructive, as the spinal roots affected are very much the same in both, whereas the deductions to be drawn as to the sensory localisation of certain root areas seem to be different; whether it is impossible to reconcile the two will be considered later.

The following is an abstract of the notes of the case of fracture dislocation of the spine which is the subject of the present paper:

Synopsis.

A strong, healthy man, aged 32, as the result of a fall, showed depression of the eleventh dorsal spine and prominence of twelfth dorsal and first lumbar spines. From the onset complete paraplegia; lower limbs quite flaccid and reflexes abolished (knee-jerks, plantar, and cremasteric); loss of sensation of all forms on legs and lower trunk, on right side up to level of umbilicus, and on left side two and a-half inches lower; upper limit of total analgesia and thermo-anæsthesia higher and sharper than that of total anæsthesia; a zone of incomplete anæsthesia; marked constipation and incontinence of feces; reflex or intermittent incontinence of urine, with imperfect emptying of bladder. During course of illness, rapid wasting and loss of faradic excitability in all leg muscles; vasomotor and trophic changes in anæsthetic area; cystitis and, later, diminution in capacity of bladder and simple dribbling of urine; uræmic symptoms; death in three and a-half months.

Necropsy: Fracture dislocation of the eleventh and twelfth dorsal vertebra; complete division of cord below origin of twelfth dorsal roots; destruction of upper three (or four) lumbar segments: sacral cord much compressed and disintegrated; eleventh intervertebral foramen on right side obliterated by callus; complete degeneration of eleventh dorsal posterior root right, not left; also of both twelfth dorsal posterior roots; anterior sacral roots considerably degenerated.

J. S., aged 32, a strong and healthy man, fell over a railway cutting, about 30 feet deep, at 8 P.M. on August 23th, 1897. He was admitted into the Aberdeen Royal Infirmary, under Professor Ogston, at 4 A.M. next day.

He was found on admission to be in a state of extreme collapse and partially insensible, probably due partly to concussion and partly to alcohol: the temperature was subnormal, and the radial pulse almost imperceptible. There was a compound fracture of the left humerus, and a deformity of the spine in the lower dorsal region. The legs were completely paralysed and flaccid, and the lower half of the body quite anæsthetic; no knee-jerks could be elicited.

On August 31st he had recovered complete consciousness, and a more minute examination could be made, which revealed the following conditions:

There was swelling and ecchymosis in the neighbourhood of the eleventh and twelfth dorsal and first lumbar spines, and an abraded contusion to the left of the eleventh dorsal spine and another over the sacrum. The eleventh dorsal spine was depressed, the twelfth dorsal and first lumbar spines prominent. There was absolute paralysis of the legs, which were quite flaccid; the abdominal muscles were very flabby. Patient did not complain of any pain. Objectively, sensation of all forms was found to be abolished on the legs and lower part of the trunk; the upper limit of loss of the various forms of sensation followed very much the same lines as those given later in detail, and figured (Fig. 1), except that, on the right side intact sensation of all forms were noted to extend for about an inch beneath the umbilicus.

* Read before the Aberdeen, Banff, and Kincardine Branch of the British Medical Association.