

a condition which has been verified in several autopsies of old shoulder dislocation.

The rapid changes which often take place in the socket, and in the condition of the adjacent tissues, may also account for the difficulty which we often experience in reducing these dislocations, and of retaining them in place after reduction. In Professor Lister's case, already referred to, at the end of seven weeks there was a complete socket formed, smooth, cartilaginous, and partly bony; and strong fibrous bands had formed between the coracoid process, the surgical neck of the humerus, and the axillary artery, containing a spiculum of bone.

In the case of a woman whose shoulder had been dislocated six weeks, sent to me Nov. 3, 1880, by Dr. Payne, of this city, I was unable to effect reduction. During the examination a well-marked exostosis was felt upon the ribs near where the head of the humerus was resting; and I have already related the case reported by Mr. Annandale, in which, in a dislocation of six weeks, while practising resection, he found the head of the humerus united to the ribs by fibrous and bony tissues.

### § 3. Dislocations of the Humerus Backwards. (Subspinous.)

This form of dislocation has been seldom met with. Only two cases, according to Sir Astley Cooper, occurred in Guy's Hospital in thirty-eight years; but in the last edition of Sir Astley Cooper's treatise on *Fractures and Dislocations*, edited by Bransby Cooper, nine cases are mentioned.<sup>1</sup> Sédillot,<sup>2</sup> Malgaigne, Desclaux,<sup>3</sup> Van Buren,<sup>4</sup> W. Parker,<sup>5</sup> Lepelletier,<sup>6</sup> Trowbridge,<sup>7</sup> Physick, Snyder,<sup>8</sup> Stephen Smith, and myself, have each seen one example. Examples have also been seen by Dupuytren, Arnolt, Best, Levacher, Bernard, Fizeau, Velpeau, Fergusson, Kirkbride,<sup>9</sup> and by Rogers.<sup>10</sup>

To these the researches of Poinso<sup>11</sup> have added the observations of Lacaussade, Ph. Boyer, Goyrand, Alaboissette, Enright, Langier, Bonisson, Piel, Markham, D. Mollière, Ball, C. Périer, Desprès, Duplay, Sebilleau, Schmidt, and Tillaux.

Dr. Stephen Smith's case was seen by myself ten days after the accident, by courtesy of Dr. Smith. The patient, John Creswell, æt. 36, fell down a flight of stairs Sept. 11, 1881, striking on the front of his shoulder. A surgeon, who saw him a few hours after, thought it was simply a bruise. Sept. 21, he was an inmate of Bellevue Hospital. The head of the humerus could be distinctly seen in its new position, and there was a marked depression under the acromion process, especially in

<sup>1</sup> A. Cooper, op. cit., p. 352.

<sup>2</sup> Sédillot, Amer. Journ. of Med. Sci., vol. xiii. p. 551, Feb. 1834.

<sup>3</sup> Desclaux, New York Journ. of Med., Nov. 1851, p. 109, from Revue Médicale.

<sup>4</sup> Van Buren, Ibid., Nov. 1851, p. 110.

<sup>5</sup> Parker, Ibid., March, 1852, p. 186.

<sup>6</sup> Lepelletier, Amer. Journ. Med. Sci., vol. xvi. p. 526, from Arch. Gén., Nov. 1834.

<sup>7</sup> Trowbridge, Boston Med. and Surg. Journ., vol. xxvii. p. 99.

<sup>8</sup> Gibson's Surgery. <sup>9</sup> New York Journ. Med., March, 1852.

<sup>10</sup> Amer. Med. Times, November 9, 1861, vol. v. p. 303.

<sup>11</sup> Poinso, French ed. of this treatise, p. 860.

front. The elbow hung very slightly from the body, and scarcely more forwards than the opposite elbow. He could carry it forwards pretty freely, and a little out, but he could not carry it back. He suffered very little pain, and there was no swelling of the arm or hand. On the following day Dr. Smith reduced the dislocation easily, by pulling the arm forwards, and at the same time pushing upon the head from behind. Dr. Smith informs me, however, that the bone became displaced on the following day; but that it was easily reduced, and afterwards remained in place.

*Causes.*—One of the patients mentioned in Mr. Cooper's book had his shoulder dislocated backwards in an epileptic convulsion; one had fallen upon his shoulder; another met with the accident while pushing a person violently with the arm elevated; and a fourth, seen by Coley, was "pulled down by a calf which he was driving, a cord having been tied to one of the calf's legs, and being held fast by the man's hand." Markham's patient being thrown from his horse and holding upon the bridle with his right hand, the arm was drawn forcibly upwards. Desprès's patient had his left arm engaged in the collar of his horse, when the animal lifting his head suddenly threw his arm upwards. Bell's patient, a miner, æt. 18, had been caught in an earth-slide when his arm was extended upwards. My own patient, Frederick Kretner, had his arm caught in machinery on the 14th of January, 1860. The dislocation was discovered when I was preparing to amputate the arm soon after the accident occurred. Pile's patient, a woman, had her arm forcibly twisted by her husband during an altercation. Desclaux's patient fell from a height with his arm in front of him. The same was the fact with Mollière's patient, except that the fall was upon the sidewalk. In the case seen by Dr. Parker, of New York, a woman, æt. 60, had fallen forwards and struck upon the outside of her elbow, arm, and shoulder. No attempt was made to reduce it until the fourteenth day, she not having for some time called the attention of any surgeon to its condition. Trowbridge's patient was thrown from a horse, striking on the palm of his hand. With the patient of Périer the dislocation was recurrent, but it occurred in the first instance during an epileptic fit.

*Pathology.*—Mr. Cooper has given us a careful account of the dissection in the case of Mr. Complin, already alluded to, whose arm had been dislocated by muscular spasm. This gentleman was fifty-two years of age, and had been subject to epileptic fits, in one of which the shoulder was dislocated. Many attempts were made to reduce it, but although it seemed to be easily drawn into its socket by extension merely, yet, as soon as the force ceased, the head of the bone slipped again upon the dorsum scapulæ, and in this situation it was finally permitted to remain until his death, which did not take place until five years after. In the meantime he was able to move the limb but very slightly, so that his arm was almost useless.

Mr. Cooper, to whom the arm was sent after death, found the head of the bone resting under the spine of the scapula, and against the posterior edge of the glenoid fossa, where it had formed a slight depression, and the head itself had become somewhat changed in form by absorption. The tendon of the subscapularis muscle and the internal portion of the

capsular ligament were torn at the point where the muscle was inserted, but the greater portion of the capsule remained, having been pressed back by the head of the bone. The supraspinatus was stretched, while the infraspinatus and teres minor were relaxed. The long head of the biceps was elongated, but not ruptured. The glenoid fossa was rough and irregular upon its surface, the cartilage being absorbed.

The fact that the bone would not remain in place when reduced, was explained by the rupture of the subscapularis, and the consequent loss

of antagonism to the action of the infraspinatus and teres minor.<sup>1</sup>

The accompanying drawing is a copy of that furnished by Mr. Cooper, to illustrate the position occupied by the bone.

I ought to mention that this case has been regarded by Vidal (de Cassis), Malgaigne, and others, as only subacromial, and as a variety of the dislocation backwards, differing from that in which the head of the bone occupies a position underneath the spine. But as I can see no difference except in the degree or extent of the displacement, I prefer not to regard the distinction made by these surgeons.

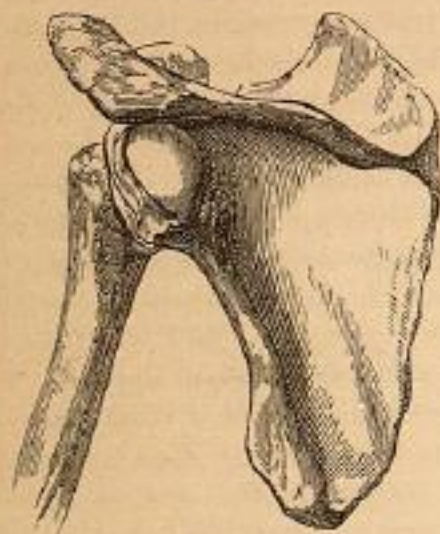
Langier, who dissected a recent case, found the tendon of the subscapularis torn from its attachment. The same was the fact with the supraspinatus, and the head, having passed between the infraspinatus and the teres minor, lay exposed under the deltoid.

In Malgaigne's case the infrascapularis was intact; but the greater tuberosity was torn off, and remained attached to the infra- and supraspinatus muscles. The head, having passed between the teres minor and the infraspinatus, was situated under the deltoid, below the posterior angle of the acromion, one-third of the articular surface overhanging the glenoid cavity.

Périer dissected the arm of an epileptic woman who had been subject to recurrent backward dislocation. The capsule was not ruptured; the outer margin of the glenoid cavity was partially absorbed; the head lay slightly overhanging the glenoid cavity under the acromion process, and was greatly changed in form and texture.

Kronlein describes a specimen contained in the Museum of the Clinic at Berlin, in which the head had rested just back of the glenoid cavity, where it had formed for itself a complete bony socket.

*Symptoms.*—The signs of this accident are, a projection under the spine of the scapula, produced by the head of the bone, the head being obedient to the motions of the arm; a corresponding depression in front and under the outer extremity of the acromion process; a wide space



Subspinous dislocation.

<sup>1</sup> Sir Astley Cooper, op. cit., p. 354

between the head of the bone and the coracoid process, into which the fingers may be pushed deeply; the axis of the shaft of the humerus directed upwards and outwards toward a point posterior to the glenoid fossa. The forearm is usually carried forwards across the chest, and the humerus rotated inwards, unless the subscapularis muscle is torn. Im-mobility exists, but the motions of the arm are not generally so much impaired as in either of the other dislocations; and finally, as in all other dislocations of the humerus, the hand cannot be laid upon the opposite shoulder while the elbow touches the front or side of the chest. In Parker's case the elbow was thrown outwards, although the arm was carried very much across the chest. In Smith's case the arm was nearly vertical. Desclaux's patient held his hand upon his head, with his arm horizontally across his body.

In Ball's case the position of the arm was also horizontal. In Duplay's patient the arm was hanging beside the body with a slight rotation inwards, the elbow being carried a little forwards. In Markham's patient the arm hung beside the body and was immobile.

Usually the diagnosis will be easily made; in my own and Smith's case the position of the head of the bone was easily recognized, but Sir Astley relates one case in which, on the morning following the accident, a surgeon was unable to discover the dislocation, and on the seventeenth day Bransby Cooper failed to make the diagnosis; nor, indeed, on the twenty-third day did Sir Astley himself determine that it was a dislocation, until he had unexpectedly reduced it while manipulating upon the arm. In a second example, Sir Astley at first believed it to be a fracture, but a more careful examination showed it to be a dislocation backwards. In this instance the limb could not be rotated outwards, as the subscapularis was not torn, and continued to offer resistance when the arm was moved in this direction; he was also suffering much more pain than did the other patients, owing, as Sir Astley thinks, to pressure upon the articular nerves. In the case of Mr. Collinson, also mentioned by Mr. Cooper, a surgeon, who saw the patient immediately after the accident, failed to discover the true nature of the injury; and Trowbridge's patient had suffered a dislocation several weeks before the nature of the accident was fully determined. In a patient of Sédillot's, Dupuytren, who was first consulted, thought it was a simple inflammation of the joint; and Nélaton related to Panas in 1870, three errors in diagnosis committed by surgeons of merit in connection with this accident.

*Prognosis.*—In B. Cooper's case the arm was not reduced, and never recovered any considerable degree of usefulness. Sebilleau reports a case in which the reduction having been attempted fifteen days after the accident, proved unsuccessful. Three months later the attempt at reduction was repeated by Richet, at Hôtel Dieu, but without success; and at the end of four years the arm was nearly immobile, the muscles of the forearm and hand being much contracted.

Tillaux's patient, æt. 59, having a dislocation of six years' standing, which being reduced could not be maintained in place, had but limited use of his arm. Elevation of the arm was impossible. In Schmidt's

case, the dislocation was of eighteen years' standing, and the motions of the arm were almost completely restored.

Mr. Collinson's arm, reduced on the second day, was restored to all its functions within one month. Dr. Parker's patient had nearly recovered the complete use of her arm at the end of four weeks, although it was not reduced until it had been out fourteen days. Sédillot succeeded in reducing the dislocation in the case of his patient, at the end of one year and fifteen days. Lepelletier, after forty-five days. Trowbridge, after forty days; and in this latter case we are informed that the arm was restored to usefulness.

*Treatment.*—In the first case mentioned by Sir Astley Cooper, "the bandages were applied in the same manner as if the head of the humerus had been in the axilla, and the extension was made in the same direction as in that accident" (downwards and a little outwards). In less than five minutes the bone slipped into its socket with a loud snap. The second case was treated successfully in the same way. Mr. Dunn also having failed to reduce by pulling upwards, finally succeeded by pulling at the wrist downwards and forwards, while an assistant pushed the head of the bone toward the socket; the heel was not placed in the axilla, which Mr. Bransby Cooper thinks would have only retarded the reduction. Smith succeeded by a similar manœuvre. Mr. Key also failed to accomplish reduction while carrying the arm upwards and backwards, but when the patient had become faint, by placing the heel in the axilla and pulling downwards a minute or two, the bone was reduced. Vidal (de Cassis) recommends the same plan, namely, that we shall pull in the direction in which we find the limb; Trowbridge employed the pulleys successfully, the extension being made downwards and forwards; while Dr. Parker succeeded equally well with his patient, by "pulling the arm outwards, downwards, and slightly forwards." Counter-extension was at the same time made by a sheet in the axilla, and the head of the humerus was pushed toward the socket by the hand. In Mr. Collinson's case, the scapula was supported by a towel, while "gradual extension of the limb was made directly outwards, and then the arm being moved slowly forwards, the head of the bone was distinctly heard to snap into its socket." The time occupied was not more than two or three minutes. Rogers succeeded by N. R. Smith's method. Sir Astley, however, seems to give the preference to the method which succeeded so happily in the case of Mr. G., while he was still manipulating with a view to determine the character of the accident. "I readily reduced the bone," he remarks, "by raising the hand and arm, and by turning the hand backwards behind the head." In one other instance, having failed to reduce it by slight extension outwards, he raised the arm perpendicularly, at the same time forced it backwards behind the patient's head, and the reduction was promptly effected. Markham succeeded by a similar manœuvre. In the case of Kretner, I first attempted reduction by pressure directly upon the head of the humerus; but failing, I proceeded to pull the arm with moderate force outwards and downwards, which procedure was attended with immediate success. The patient was under the influence of chloroform.

Slight forward traction was sufficient in the case of Duplay. Mollière combined direct pressure upon the head with slight extension. Arm. Desprès succeeded by traction made at a right angle with the body, combined with moderate rotation.

Prof. Gunn, in describing the specimen from which the accompanying illustration is taken, remarked: "It is seen that the head rests on the dorsum of the scapula, while the vacated glenoid cavity is covered by the anterior untorn half of the capsular ligament, which is stretched across the articular surface, holding the head snugly against the posterior edge of the fossa, and by its inferior fibres causing the advanced position of the lower end of the humerus, which is so characteristic of the accident. Internal rotation relaxes this untorn portion of the ligament, as does also a still more advanced position of the elbow with the humerus elevated to a horizontal position.

"For a reduction of this luxation the shoulder should be properly fixed by an assistant, while the surgeon seizes the arm by the elbow and forearm, raises it to a horizontal position, carries it to the front, rotates inwardly and draws it into place."

After the reduction, a compress should be placed against the head of the bone, and underneath the spine of the scapula, and this should be secured in its place by several turns of a roller. The forearm ought also

FIG. 289.



Showing untorn anterior half of capsule in dorsal dislocation of the humerus. (Gunn).

to be placed in a sling, with the elbow thrown a little back of the centre of the body, so as to direct the head of the humerus forwards.

<sup>1</sup> Gunn, loc. cit.

## § 4. Dislocations of the Humerus Upwards.

*Syn.*—"Sus-Coracoïdienne;" Malgaigne.

As has already been stated, the existence of this form of dislocation, unaccompanied with a fracture of the coracoid or acromion processes, or of both, has been denied by Boyer, Sédillot, and most other surgical writers. A certain number of facts and of observations, however, which tend to establish its possibility or its actual occurrence, render it necessary that I should present a *résumé* of the testimony relating to this subject.

Malgaigne,<sup>1</sup> who was the first to admit of its possibility, writes as follows:

"A man, æt. 68, was seated upon a wagon loaded with fagots, when the wagon was overturned. He was thrown a great distance, and struck upon the point of the shoulder, with the arm against the side of the body. The man immediately experienced a sharp pain, and it was impossible to move the arm. A bone-setter made violent tractions, and sent him away with his arm in a sling. Eight days after he tried to move it, but without much success; and he came to consult me at the end of two months and a half. The head of the humerus was dislocated forwards and upwards above the acromio-coracoid ligament, corresponding outwards to the internal border of the acromion, covering inwards the coracoid process, and resting above against the inferior surface of the clavicle, raising the deltoid muscle to such an extent, that a pin inserted into the most projecting part did not show more than eight millimetres of flesh; while the pectoralis major and the deltoid were six millimetres from the surface. The arm was not shortened more than half a centimetre.

"I attempted reduction by elevating the arm to a right angle, at the same time pressing on the head to push it downwards, outwards, and backwards, while an aid tried to press the acromion upwards, inwards, and forwards. At 205 kilogrammes I heard a cracking as if a bone had been broken, although the reduction did not seem to have been effected. I ceased traction, and explored all the points of the shoulder without discovering any fracture. There did not even ensue any sensible tumefaction. The head was more movable, and it was possible to draw it downwards until the fingers could be laid in the space thus created below the clavicle. There was also some gain in the freedom and extent of the movements. I thought of dividing the acromio-coracoid ligament, but after some reflection I judged it preferable not to do so."

According to Poincot, similar examples have been reported by Verneuil, Le Dentu, Busch, Laugier, Chassaignac, and Denonvilliers.

Verneuil and Le Dentu were unable in their patients to find a fracture of the coracoid process. The same was the fact with Busch; while Laugier, Chassaignac, and Denonvilliers are silent upon this subject.

In the case seen by Busch,<sup>2</sup> a man was driving a horse, when it ran away; but while he was still holding the reins, he seized the bit with

<sup>1</sup> Malgaigne, *op. cit.*, vol. 2, p. 530.

<sup>2</sup> Busch, *Arch. für Klin.*, Bd. 19, Hft. 3, p. 400.

his right hand, when the horse rearing struck the shoulder with its foot at the antero-internal portion of the scapulo-humeral region.

In Laugier's case, a lad, 16 years old, having his arm stretched out and fixed on a machine, with his body resting on his arm, and his feet far from the resting point, felt suddenly a violent torsion of the body from before backwards, and from right to left.

M. Poincot thus explains the mechanism of the accident in this case: "In that movement, the head of the humerus, on which the body rotated, underwent a movement of rotation outwards, being carried at the same time upwards and forwards, so as to correspond to the superior and anterior part of the articular capsule; which latter being torn where it was stretched, the bone was permitted to go upwards, so as to place itself outside the beak of the coracoid apophysis."

In a case seen by Dr. Holmes,<sup>1</sup> the patient, a man, 60 years of age, had fallen a great height (about 30 feet) upon a pile of stones, striking upon the head, the left side of the body, and the left elbow. When brought to St. George's Hospital, his unconsciousness, indicating cerebral concussion, rendered it necessary to postpone the reduction for several days. When it had been decided to attempt it, he was taken with septicæmic symptoms, which originated in a compound fracture of the elbow, and he died fifteen days after the accident.

On examining the dislocated shoulder, the head of the humerus was found immediately under the skin, with the cephalic vein at its internal portion. It had fractured the coracoid apophysis in its movement from below upwards, and was resting behind on the projection of that apophysis and on the clavicle, pulling with it a small portion of the acromio-coracoid ligament which had not been torn. At its internal portion, beside a few fibres of the deltoid and of the cephalic vein, the fractured extremity of the coracoid process was found, with the muscles which are inserted in it: the pectoralis minor, the coraco-brachialis, and the short portion of the biceps. At the external portion and a little backwards was the acromion, separated from the head by a few fibres of the deltoid. Below and a little outside was the glenoid cavity, whose superior border was situated entirely below the level of the humeral extremity. The tendon of the longer portion of the biceps was still attached to the scapula, and was consequently situated below and outside of the dislocated head, which, as it came out of its socket, had slightly torn this tendon, so that a few of its internal fibres had been separated from the muscle and remained floating freely, with a cluster of muscular fibres attached to them. The coracoid apophysis had been fractured near its base, the coraco-acromial ligament remaining attached to the two fragments, so that they could not be much separated from each other; the summit was pulled from above downwards, and from out inwards, by the muscles inserted in it. The humeral head rested directly on the projection of the apophysis, which had produced a slight erosion on the corresponding articular cartilage. The humerus had slightly turned on its axis, so that the greater tuberosity was relatively more in front than in its normal position. The subscapularis muscle was intact. The muscles inserted

<sup>1</sup> Holmes, *Med.-Chir. Trans.*, vol. 41.

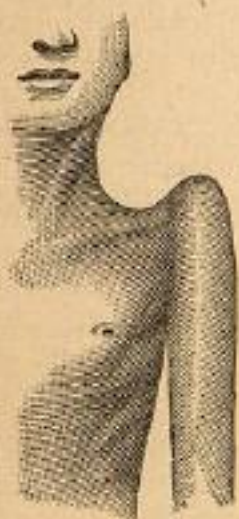
into the greater tuberosity had been lacerated, except a portion of the tores minor, which had remained uninjured; the capsular ligament, torn at its superior and internal portion, presented a large opening which had given passage to the head.

Albert,<sup>1</sup> of Innsbrück, has reported a case of double dislocation upwards, in a man 60 years old, which had existed many years. This man having died of pneumonia, an autopsy was obtained. All that was known about the origin of the dislocation was, that it was caused while he was trying to hold a pair of spirited horses by the bridle.

The following condition of the parts was found at the autopsy:

"*Left Shoulder.*—After the removal of the skin, the great pectoral muscle was seen gathered on itself, from below upwards, so that its vertical diameter, on a level with the mammary line, was ten centimetres long; the fan-like direction of its fibres, at the level of its insertion being consequently far more noticeable than in the normal state. The deltoid was very much stretched in its middle part, and was relaxed, on the contrary, in its scapular portion. In the movements of slight abduction, the great pectoral and the teres major muscles were stretched and resisted the effort. The deltoid being detached at its inferior insertion, a small independent subdeltoid bursa was found; the subacromial bursa, situated more backwards and small, presented on its internal surface papillary vegetations. After removing the great pectoral, at the inner side of the humerus, the coraco-brachialis and the smaller portion of the biceps were found intact, as well as the plexus and the vessels which were also situated at the inner side of the bone; the tendon of the longer portion of the biceps could be followed to the inferior limit of the surgical neck, where there existed a bony prominence, which we shall mention further

FIG. 290.



Front view.

FIG. 291.



Side view.

Albert's case of double upward dislocation.

on; but the tendon ended there by a sort of swelling; the bicipital groove was no more distinguishable. The capsule, of medium thickness, was inserted into the whole circumference of the anatomical neck; on a

<sup>1</sup> Albert, Wiener Med. Blatter, 1879, 19, S. 453.

level with the humeral head it adhered also to the articular surface; looking downwards and backwards to its central insertion, the capsule presented in front and above a considerable enlargement of its cavity so as to touch the lateral part of the coracoid apophysis, and it was attached to the edge of the acromio-coracoid ligament. The acromio-coracoid, the trapezoid, and conoid ligaments were intact. The humeral head overlapped, by its superior third, the edge of the acromio-coracoid ligament, but could easily be pushed upwards, into the space comprised between that ligament, the acromion, and the coracoid processes, so as to overlap the ligament by all its superior half when the humerus was carried outwards and backwards. The glenoid cavity was filled with cellular tissue, which on a level with the margin presented a highly polished surface. From the inferior edge of the surgical neck to the head of the humerus, was a bony lamella, starting from the postero-lateral part of the bone and terminating backwards by a very irregular free edge. From the base of the coracoid apophysis a very nodulated bony prominence was detached, its shape being that of a crow's beak, or rather a deer's horn, and measuring two centimetres and a half in length.

"*Right Shoulder.*—The muscles, the large vessels, the acromio-coracoid, conoid, and trapezoid ligaments, as well as the scapula and the humerus, were all in their normal state. The acromial extremity of the clavicle was enlarged, with a flattening of the portion corresponding to the head. The capsule presented the appearance of a large sac with walls very much thickened at certain points. In the part corresponding to the superior margin of the glenoid cavity were a number of superposed horizontal folds, of the size of a centimetre, and projecting into the interior of the cavity; these folds divided it into two portions, an inferior one, corresponding to the old articular cavity, and a superior one, corresponding to the new one. The head could be abnormally moved in all directions within the capsule, and it appeared flattened above and behind and was denuded of its cartilage. On the level of the anatomical neck, the cartilage was worn out in places; in others it presented a velvety alteration, at which points it was of a yellowish-gray color. The bicipital groove was very shallow."

Panas and Angers<sup>1</sup> have demonstrated upon the cadaver that the head of the humerus could be dislocated upwards above the acromio-coracoid vault without destroying it.

It may be here stated briefly, by way of summary, that the testimony which is to establish the possibility of this accident, unaccompanied with a fracture, is found in seven clinical cases not verified by an autopsy, in certain experiments made upon the cadaver, and in the single case reported by Albert, and demonstrated by a dissection.

With the imperfect knowledge in my possession relative to the purely clinical cases, I am not warranted in subjecting them to criticism. As to the value of Panas's experiments made upon the cadaver, I must repeat what I have often said before in reference to similar experiments made upon other joints. The results of such experiments cannot be applied without great reserve, to dislocations occurring upon the living

<sup>1</sup> Panas, Art. Épaule, Nouveau Dict. de Med. et de chir. prat., t. 13, p. 466.

subject, and when the muscles have their normal power and activity. Of the case of the man *æt.* 60, reported by Albert, and in which case alone has a dissection revealed a dislocation without a fracture, the fact that it existed in both shoulders at the same time, connected with the obscurity of its history, suggest the possibility that, instead of having been primarily a dislocation, it was at first only a sprain, from which resulted an arthritic and muscular affection, in consequence of which latter conditions the displacement had gradually been produced.

The following remarks are quoted from Poincot, who accepts the dislocation as an established fact:

*Prognosis.*—In all cases of absolutely recent dislocation, and where reduction has been effected without great efforts, the prognosis is possessed of little gravity; but it soon becomes very serious both on account of the extreme hindrance resulting from the persisting displacement, and of the infinite, if not insurmountable difficulties which are met with during the attempts at reduction after a certain lapse of time. Laugier, on the twelfth day, could not reduce the dislocation in his patient; Malgaigne after two months and a half, and Busch after five months, were also unsuccessful. Professor Verneuil, it is true, was able to effect reduction on the thirty-sixth day, but it was a dislocation which had already been reduced on the very day of the accident, and which had been reproduced.

*Treatment.*—Malgaigne, in the case of his patient, had attempted reduction by making tractions upon the arm elevated at a right angle, and by pressing upon the head in such manner as to push it downwards, outwards, and backwards, while an assistant tried to pull the acromion upwards, inwards, and forwards. Busch employed, without being more successful, Schinzinger's procedure (rotation outwards), and that of A. Cooper, elevation of the arm at different degrees. Denonvilliers and M. Verneuil effected reduction by means of tractions downwards, combined with a tilting motion with the view of bringing back the head toward the cavity. M. Verneuil had failed the first time, when tractions downwards were made alone, and, during his second attempt, he thought it necessary to anaesthetize the patient.

"M. Panas, being guided by experiments, advises 'to carry the arm away from the body until the head is sufficiently lowered to pass under the coracoid; at the same time that the elbow is being raised, it is necessary to give the humerus a movement of rotation inwards, gradually increased.' Albert, of Innsbrück, recommends abduction, extension backwards, and rotation inwards.

"Verneuil, in order to prevent the dislocation from being reproduced, as had already happened twice, placed the arm (strongly adducted) in front of the chest, the hand being placed upon the sound shoulder, and maintained it in that position by means of a silicate bandage."

##### § 5. Partial Dislocations of the Humerus.

Sir Astley Cooper has related in his treatise two cases of supposed incomplete dislocation of the head of the humerus forwards; and in confirmation of his views he has added an account of the appearances pre-

sented on dissection in the body of a subject brought into the rooms of St. Thomas's Hospital. Bransby Cooper, in his edition of the same work, furnishes the report of a similar case which came under the observation of Mr. Douglass, of Glasgow. Hargrave and Dupuytren have each reported one example of this species of dislocation, in which its existence was said to be confirmed by dissection.

Petit, Duverney, Chopart, Sédillot, Miller, Gibson, Malgaigne, and many others, have admitted its possibility; Malgaigne, however, only admits its existence when the capsule remains entire.

Without intending to discuss very much at length the value of these opinions, I shall content myself with declaring that the existence of this or of any other form of partial dislocation of the shoulder-joint, as a traumatic accident, has not up to this moment been fairly established; and that the anatomical structure of the joint renders its occurrence exceedingly improbable, if not absolutely impossible.

The only example mentioned by Sir Astley Cooper, in which a dissection was made, showed that the long head of the biceps had been ruptured, and that the capsule was torn, while the head of the humerus was resting under the coracoid process. We shall have no difficulty, therefore, in assigning it to its proper place as a complete subcoracoid dislocation. In Mr. Hargrave's case, also, the tendon of the biceps was torn; while Dupuytren omits to mention what was the actual fact in relation to this tendon in the case seen by him, but it is distinctly stated that the head of the bone rested upon the ribs. Mr. Hargrave seems, therefore, to have described a case of rupture of the long head of the biceps, and it is probable that Dupuytren, who knew nothing of the previous history of the subject, has given us a faithful account of a pathological dislocation, a result of disease, and not of a direct injury. Poincot remarks, also, that the four cases mentioned by Owen<sup>1</sup> were examples of chronic lesion.

If the head of the humerus is driven from its socket by violence, and remains thus displaced, it is, I assume, a complete dislocation; since it is only by having placed the semi-diameter of the head of the bone outside of the margin of the glenoid fossa that it can be made for one moment to retain its abnormal position. To accomplish this amount of displacement upwards, or upwards and forwards, or directly forwards, the acromion or the coracoid process must, as I think, be broken; while its occurrence in any other direction must involve at least a most extraordinary extension, if not an actual laceration, of the capsule. If we admit, with Malgaigne, that occasionally the capsule has been found capable of such extraordinary extension without actual rupture, I am still unwilling to regard this as a fair example of a partial dislocation, since the head of the bone no longer moves in its socket, being at no point in actual contact with the articular surface of the glenoid fossa. It is essentially a complete dislocation, according to all the admitted definitions of this term.

It is quite probable that a majority of these accidents were examples of rupture or displacement of the tendon of the long head of the biceps,

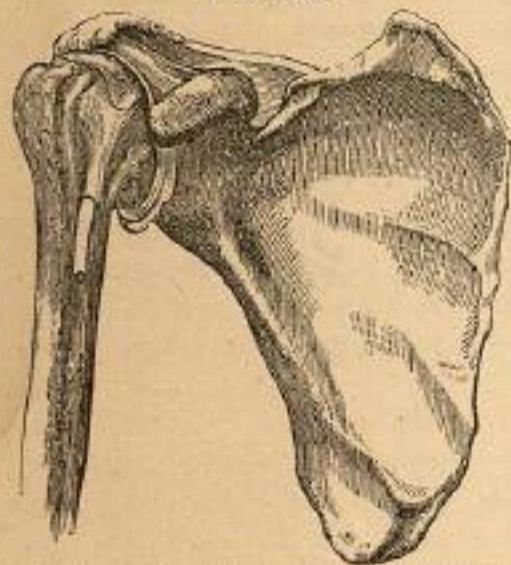
<sup>1</sup> E. Owen, *The Lancet*, 1875, vol. i. p. 759.

the effect of which, as Mr. John G. Smith<sup>1</sup> and Mr. Soden<sup>2</sup> have shown by a number of dissections, is to allow the head of the humerus to be drawn upwards and forwards in its socket, until it is arrested by the two processes, and by the coraco-acromial ligament. Says Mr. Soden: "To enable the bone to maintain its equilibrium, it is necessary that the capsular muscles should exactly counterbalance each other; and as there is no muscle from the ribs to the humerus to antagonize the upper capsular muscles" (that is, to draw the head of the humerus downwards), "it is suggested that this office is performed by the singular course of the long tendon of the biceps, which, by passing over the head of the bone, when the muscle is put in action, tends to throw the head downwards and backwards; it follows, therefore, that, the tendon being removed, the head of the bone would rise upwards and forwards."

Fig. 292 represents the case of displacement of the tendon of the biceps seen by Mr. Soden, and of which he was permitted to make a dissection.<sup>3</sup>

I have myself frequently observed, and I have before, when speaking of the prognosis or results of dislocations, called attention to the fact,

FIG. 292.



Displacement of the long head of the biceps.

that the head of the humerus sometimes remains for a long time after the reduction has been effected slightly advanced in its socket, so as to lead to a suspicion that it is not properly reduced. Quite recently I have been consulted in the case of a lad about fourteen years of age, who had been subjected to the pulleys during four consecutive hours to accomplish a more complete reduction. The same thing, also, has been noticed by me occasionally where the shoulder had been subjected to a violent wrench, but no actual dislocation had ever occurred. In either case the explanation is perhaps the same, the long head of the biceps has been broken or displaced; or, when it follows a dislocation, some of the muscles inserted into the greater tuberosity have been torn from their attachments. I mean to say, that in these circumstances we may find a sufficient and perhaps the most frequent explanation; yet it is quite probable that, in a considerable number of cases, the laceration of the capsule, and the action of the muscles, are alone concerned in the production of this phenomenon. I have seen one example in the person of Mr. Craig, of Brooklyn, in which the tendon of the biceps suddenly resumed its position after the lapse of several days, and the prominence of the head of the humerus at once disappeared. David Prince,<sup>4</sup> Hewitt,<sup>5</sup>

<sup>1</sup> Amer. Journ. Med. Sci., vol. xvi. p. 219, May, 1835, from London Med. Gaz.

<sup>2</sup> Ibid., vol. xxix. p. 480, from Lond. Med. Gaz., July, 1841.

<sup>3</sup> Pirrie's System of Surgery, Amer. ed., p. 255; also, Sir Astley Cooper, edited by Bransby Cooper, Amer. ed., p. 363.

<sup>4</sup> Prince, St. Louis Med. and Surg. Journ., Nov. 1879.

<sup>5</sup> Hewitt, Holmes's Surgery, 2d Lond. ed., vol. ii. p. 820.

and Holmes<sup>1</sup> have reported similar cases. In Mr. Holmes's case, however, the coracoid process was broken also.

Alfred Mercer, of Syracuse, N. Y., in a very interesting paper on this same subject, relates several examples of forward displacement after injuries to the shoulder-joint, one of which, as being exceedingly pertinent, I shall take the liberty of quoting:

"Mrs. B., a well-developed woman, of full habit, aged fifty-six, seven years since was thrown from a carriage, dislocating her right shoulder, which was reduced a short time after the accident, but the shoulder was painful, and tender to the touch, and almost useless for months after. She could carry the arm forwards and backwards, but could not raise it from the side, or carry her hand behind her, or raise it to her head, for fourteen months. She has gradually gained better use of her arm, but now, July, 1858, she cannot raise her elbow from the side more than half-way to a horizontal position without assistance; but with assistance, the arm may be carried into any position without pain or resistance. Measurement shows no appreciable difference in the size or length of the arm, or size of the shoulder; but the point of the shoulder is still tender to the touch, is prominent in front, and correspondingly flattened behind. The head of the humerus appears to rest against the outside of the coracoid process, but the fulness of habit obscures the diagnosis, compared with other cases. Several doctors, at different times, have examined the shoulder; some have said it was not properly reduced, and advised a suit for malpractice.

"I examined the shoulder again in November last; it presented the same general appearance, although the patient was much thinner in flesh from recent sickness. Some six weeks previous to this examination, in a sudden and thoughtless effort to raise the arm above the head, the muscles unexpectedly obeyed the will; since which time she has had perfect use of it, though the deformity still remains. She thinks she felt or heard a snap when the arm went up, but it was followed by no pain, soreness, or swelling."

There cannot be much doubt, I think, that in this case, at least, the deformity and maiming were due in a great measure to a displacement of the long head of the biceps.<sup>2</sup>

If a displacement of the tendon necessarily causes a displacement of the head of the humerus, it might seem proper to infer that a rupture of the tendon would do the same. The only example of rupture of the tendon which has come under my observation does not confirm this opinion.

James Wallace, æt. 46, a sailor, and a man of remarkable muscular development, while pushing a swing with his arms extended felt something snap in his right arm, and the arm at once became powerless. The sensation of snapping was at a point about four and a half inches below the acromion process. The pain was like that caused by hitting a nerve; on the following day there was an extensive ecchymosis over

<sup>1</sup> Holmes's Surgery, 2d Lond. ed., vol. ii. p. 820.

<sup>2</sup> Mercer, Buffalo Med. Journ., vol. xiv. p. 641, April, 1859.

<sup>3</sup> Broomfield's Chirurg. Observ., vol. ii. p. 76.

the upper end of the humerus, and the belly of the biceps was full and flabby.

Wallace was examined by me at Bellevue Hospital in March, 1875, about eight months after the injury was received. The belly of the biceps had shortened upon itself, and made a very remarkable prominence on the front of the arm, but he could not render it firm by contraction. He could flex the arm slowly, but not against any considerable resistance. The head of the humerus was not advanced in the socket. I could feel the tendon of the biceps in its groove, and inferred that the rupture took place near its insertion into the muscle.

J. L. Petit has reported a similar case, in which the rupture was caused by the extension employed in an attempt to reduce a dislocation of the arm.<sup>1</sup>

Poinsot records an example of rupture of this tendon in a man, caused by lifting, and in which the head of the humerus was not displaced. Three weeks later the same accident was reproduced in a similar manner, and Poinsot remarks that the phenomena presented were the same as in Wallace's case.

Dr. Arpad G. Gerster, in a paper read before the Society of the Physicians and Surgeons of the German Hospital and Dispensary of New York, Oct. 12, 1877, on "Subcutaneous Injuries of the Biceps Brachii,"<sup>2</sup> has made some historical notes and observations which seem deserving a place in this connection. He says: "Older surgeons (Stanley, Bromfield, Knox, Monteggia, for instance), up to the middle of this century, diagnosed as dislocations of the long head of the biceps, cases similar to the one related" (case of partial rupture of the tendon, and of the corresponding part of the sheath of the long head of the biceps). "They supposed that the tendon left its groove, and slipped upon the major tubercle. True, none of them ever found the tendon in its dislocated condition, but they assumed that a spontaneous reduction took place by a rotation of the humerus, before a competent judge could ascertain the nature of the injury. William Cooper and Boerhaave accepted the possibility of such an injury. Fergusson expressed himself cautiously on the subject. Bardeleben, Pitha, and Volkmann deny its existence, referring to a series of exhaustive articles in the *Gazette Hebdomadaire* (2d sér., iv. [xiv.], 21, 23, 25, 1867), written by Jarjavay, which completely disposes of this 'mysterious dislocation,' as Pitha sarcastically calls it."

Gerster states, moreover, that Pouteau had long before doubted the existence of this dislocation, and that Malgaigne had expressed scepticism as to the true character of Mr. Soden's case. In short, Dr. Gerster claims that its existence, uncomplicated with other accidents, has never been demonstrated satisfactorily upon the living or dead subject; and that, to say the least, it is doubtful whether it has ever occurred. The entire argument, together with the anatomical reasons assigned, are very ingenious; and while they do not settle conclusively in my own mind the question of its possibility, they seem to throw a doubt upon the true nature of some of the cases reported.

<sup>1</sup> Malgaigne, op. cit., Paris ed., 1855, vol. ii. p. 145.

<sup>2</sup> Gerster, N. Y. Med. Journ., May, 1878, p. 487.

Dr. White,<sup>1</sup> of Philadelphia, in an excellent *résumé* of this subject, concludes that the occurrence of a traumatic dislocation of the long tendon of the biceps, unaccompanied with a dislocation of the humerus, has not been absolutely proven. He reports, however, a case which both Dr. Agnew and himself believed to be such a dislocation. A man, æt. 37, had fallen upon his shoulder from a considerable height. Seen by these surgeons soon after the accident, it was thought that the empty bicipital groove and the displaced tendon could be distinctly felt. At the end of two years the displacement continued, and at this period the patient had recovered nearly, but not wholly, the free use of his arm.

## CHAPTER VIII.

### DISLOCATIONS OF THE HEAD OF THE RADIUS (HUMERO-RADIAL).

I HAVE recorded thirty-two examples of traumatic dislocation of the head of the radius as having been seen and examined by me; of which twenty-seven were dislocated forwards, or forwards and outwards, and only five backwards: or, rejecting those cases which were complicated with fracture, I have recorded fourteen cases of simple forward dislocation, and three of simple backward dislocation. My experience, therefore, does not correspond with the experience of Boyer, Velpeau, Vidal (de Cassis), Chelius, B. Cooper, Guthrie, Gibson, and some others, who declare that the dislocation backwards is the more frequent of the two. Indeed, I ought to say of two of the examples of backward dislocation of the radius which have come under my notice, and which I have marked as simple, that they were ancient dislocations; and I am not entirely certain, therefore, that they had not been originally complicated with a fracture, although at the time of my examination they presented no such evidence. The third, which I believe to have been a genuine, simple backward dislocation, I will mention again in connection with this latter form of dislocation. I have seen one congenital dislocation of the head of the radius outwards and forwards, which I will describe more particularly in the chapter on Congenital Dislocations.

#### § 1. Dislocations of the Head of the Radius Forwards.

*Causes.*—A fall upon the elbow, the blow being received directly upon the posterior face of the head of the radius; a fall upon the hand with the forearm extended and pronated; extreme pronation of the forearm; or, according to Denucé, a blow upon the inside of the elbow, which is equivalent to a violent adduction of the forearm.

<sup>1</sup> White, J. W., Surgeon to the Philadelphia Hospital, and Asst. Surgeon to the University Hospital, Amer. Journ. Med. Sci., Jan. 1884.