

facility of reduction, accomplished by the same means, and always with the same perfect result.

If to these singular coincidences we add the fact that only one other surgeon has ever claimed to have met with the accident, and if we notice the actual anatomical difficulties which stand in the way of its occurrence, such especially as the complete occlusion of the subcoracoid space by the tendons and muscles which pass from its extremity toward the chest and arm, we shall find a fair apology for some degree of scepticism.

(d) DISLOCATIONS OF THE CLAVICLE AT BOTH ENDS, SIMULTANEOUSLY.

On the 26th of January, 1863, Dr. North, of Brooklyn, N. Y., was called to see a lad fourteen years of age, who had been thrown with violence backwards from a stool upon which he was sitting, striking the back of his left shoulder against the floor. Dr. North found him suffering severely from pain, and with some difficulty of breathing. The shoulder was depressed and thrown forwards. The sternal end of the clavicle, turned forwards, formed an abrupt, rounded prominence; the acromial end, turned forwards also, presented its longest diameter toward the surface, and rested above the acromion process; while the central portion seemed depressed or thrown back, an appearance which was caused by the rotation of the clavicle upon its axis.

Reduction was accomplished by throwing the shoulders forcibly backwards, and at the same time pressing with the thumbs upon the two extremities in such a manner as to reverse the rotation, as follows: pressing at the acromial end backwards and downwards, and at the sternal end backwards and upwards. The restoration was complete, and the bones were retained in place by compresses and adhesive plaster, with the aid of Day's "neck yoke." At the end of three weeks the dressings were removed; and when last seen by his surgeon "there was but little, if any trace of the accident remaining." It is the opinion of Dr. North that the rotation was caused by the action of the pectoralis major and deltoid after the dislocation took place.¹

Erichsen says that Richerand and Morel-Lavallée have each reported one example of double dislocation of the clavicle. Another example has been reported by Dr. Col.²

In a case observed by Lund,³ and reported by Jones, the patient, a man 32 years of age, was struck on the posterior portion of the right shoulder, dislocating the sternal end of the right clavicle forwards, and the acromial extremity upwards and backwards. It was found impossible to reduce the dislocation except under the influence of an anæsthetic. In a few days the functions of the arm were completely restored.

Rombeau⁴ met with a similar case, which is reported by Gros. The dislocation, having been first recognized several days after the accident, was reduced and maintained by an apparatus similar to that of Desault, which remained in place five weeks. Ultimately the patient recovered

¹ N. L. North, M.D., New York Med. Record, April 16, 1866.

² Col. Gaz. des Hôpitaux, 1872, p. 893.

³ Lund, Brit. Med. Journ., 1874, No. 682, p. 106.

⁴ Rombeau, Bull. Gén. de Thérapeutique, 1874, vol. lxxxvi. p. 537.

with slight remaining deformity, and with the motions of the arm completely restored.

Dr. Stanley Haynes, of Malvern Link, has reported the only remaining case of which I have been able to find a record.

"A girl, aged 13, rapidly growing, of lax tissues, and of a consumptive family, but who had always had good health, while washing the back of her neck with her left hand, one morning in September, felt something give away in the shoulder of the same side. I found dislocation forwards of the sternal end of the clavicle and partial dislocation upwards of the acromial one. There was very little pain. Both extremities of the bone were easily replaced by drawing the shoulder backwards and downwards, but the double deformity was reproduced immediately the shoulder was liberated. A pad was applied under a figure-of-8 bandage over the sternal end, and the arm was placed in a sling as a temporary measure. To a strap, fastening round the chest, a strap bearing a truss-pad was attached in such a manner that the pad kept the sternal end of the clavicle reduced, the other end of the strap passing over the shoulder and diagonally across the back to the horizontal strap: the wearing of a sling kept the acromial end in its natural position. The patient soon afterwards returned to school at a distance. She is now at home, and I have found the sling has been discontinued some time; that the straps have stretched and are useless; and that the ends of the bone are as mobile as, but not more than, they were when I first saw the patient, but that the sternal end does not become dislocated unless the arm is raised, when it nearly always starts forwards."¹

CHAPTER VII.

DISLOCATIONS OF THE SHOULDER (SCAPULO-HUMERAL.)

OWING to the great exposure and the peculiar anatomical structure of the shoulder-joint, its structure having reference mainly to freedom of motion rather than to firmness and security in the articulation, dislocations of the humerus are very common.

My private and hospital records furnish me with 117 cases of dislocation of the shoulder, seen and recorded by myself. Of these, 41 were recognized as subglenoid, 33 as subcoracoid, a very small proportion as subclavicular, 2 as subspinous, and the remainder were not accurately diagnosticated.

Writers have not been agreed as to the precise anatomical relations of these dislocations, nor as to the nomenclature. Velpeau, Malgaigne, Vidal (de Cassis), Skey, and Sir Astley Cooper have each adopted explanations and classifications peculiar to themselves. With the arrangement established by this latter surgeon, English and American students

¹ The British Medical Journal, Jan. 27, 1872.

are the most familiar; and believing that it is more simple, and quite as appropriate as either of the others, I shall adopt it as the basis of my own descriptions.

I shall have occasion, however, to dissent from the opinions and teachings of this distinguished surgeon, as to the exact seat and relations of the head of the humerus in some of these dislocations.

According to Sir Astley Cooper, there are three complete dislocations of the shoulder; namely, downwards, forwards, and backwards.

The so-called "*supra-coracoid*" dislocation, without a fracture of the coracoid or acromion processes, the possibility of which has been denied by Boyer, but examples of which are declared to have been seen by Malgaigne, Holmes, Hewitt, have now sufficient affirmative testimony to justify me in devoting a section to its consideration.

§ 1. Dislocations of the Shoulder Downwards (Subglenoid).

This is usually called a dislocation into the axilla; the head of the bone resting rather upon the inner side of the inferior border of the scapula, near the base of that triangular surface which is found below the glenoid fossa.

Since in both the other complete dislocations of the shoulder, the head of the humerus, in order to escape from its socket, must be made to descend more or less downwards, I shall regard this dislocation as the type of all the others, and shall make it the subject of especial consideration as well as of reference when speaking of the other forms of dislocation.

Causes.—The most frequent cause of this accident is a blow received directly upon the upper end and outer surface of the humerus. I have found the arm dislocated into the axilla by this cause thirty-one times; five times by a fall upon the extended hand; three times by a fall upon the elbow; and in these latter cases the arm was probably carried away from the body at the moment of the receipt of the injury.

In all the above examples the shoulder has been dislocated by the simple force of the blow, or with only slight aid from muscular action; but in a considerable number of cases the bone is displaced almost wholly by the action of the muscles, the arm having been previously violently abducted; and perhaps in some cases the capsule being torn before the resistance of the overstrained muscles has accomplished the displacement. Thus, in three instances I have known the dislocation to result from holding on to the reins after being thrown from a carriage; in two cases the patients have fallen through a hatchway and been caught and suspended by the arms; once a woman met with this accident by holding on to a pump-handle when she had slipped and fallen upon the ice. A few years since I examined the arm of a Swiss woman, Maria Norregan, who was then sixty-five years old, and whose humerus had been dislocated into the axilla seventeen years before, where it still remained. Her own account of the accident was, that she was returning from the Jura Mountains, near Neufchatel, with a load of hay upon her head. She had carried it a long way with her hands held upwards, without once stopping to rest, and when at length she threw down the

load at her door, the right shoulder was dislocated. The arm soon became very painful, and swollen to the fingers' ends; but she was too remote from, and too poor to employ, a surgeon. A tailor, who used to do the minor surgery of the neighborhood, bled her three or four times, but the dislocation was not recognized until many months after.

A Mrs. Hunn informed me that when she was twenty-two years old she had a convulsion, and that her attendants in trying to hold her upon her bed, actually pulled the shoulder out of joint. After the first accident the dislocation was not repeated for four years, but since then it had occurred from very slight causes many times. She was in the habit of reducing it herself by placing a ball in the axilla and using the arm as a lever.

Dr. Scatliff, of Brighton,¹ Coombs, of Castle Cary,² and others have published examples of this dislocation, caused by epileptic convulsions. I have myself seen such examples.

Dr. Lehman reports the case of a sailor on board an American brig, who was subject to a dislocation into the axilla from very slight causes, and especially if he bent his body far over to raise anything. He could also, by pulling horizontally, remove the head of the bone from its socket. It was reduced easily, and he experienced no pain either in the reduction or dislocation, nor, indeed, during the displacement.³

Pathology.—In this accident the head of the bone is made to press against the capsule below and immediately in front of the long head of the triceps, until the capsule gives way, and continuing to descend in the same direction it is finally arrested by the triangular surface of the inferior edge of the scapula immediately below the glenoid fossa. Owing to the pressure of the tendon of the triceps behind, it occupies a position also a little in advance of the centre of this triangle, or rather upon its anterior edge, so that it rests more or less upon the belly of the subscapularis muscle.

The capsule is generally torn quite extensively, especially below and in front; and the tendon of the long head of the biceps may be broken asunder, or detached completely from its insertion; the supra-spinatus muscle is stretched or lacerated; the infra-spinatus, subscapularis, and coraco-brachialis are put upon the stretch; the subscapularis being also sometimes completely torn from its attachment to the head of the humerus, and in either case, whether torn or merely compressed and stretched, the circumflex nerve, which runs along its lower margin, is subject to severe injury; the deltoid muscle is also placed in a condition of extreme tension; while the teres major and minor in this respect are subjected to but little change.

In some cases a portion or the whole of the greater tuberosity is completely detached, and the fragment displaced by the action of the muscles inserted into it.

In one case the axillary artery has been ruptured. The patient had been thrown down by a runaway horse, and was taken to Jervis Street

¹ Scatliff, *The Lancet*, 1878, vol. i. p. 31.

² Coombs, *Idem.*, p. 160.

³ Lehman, *Amer. Journ. Med. Sci.*, vol. i. p. 242, 1828.

Hospital, London. On the tenth day Surgeon O'Reily tied the subclavian artery, and the patient recovered after the loss of two fingers from erysipelas and gangrene.¹

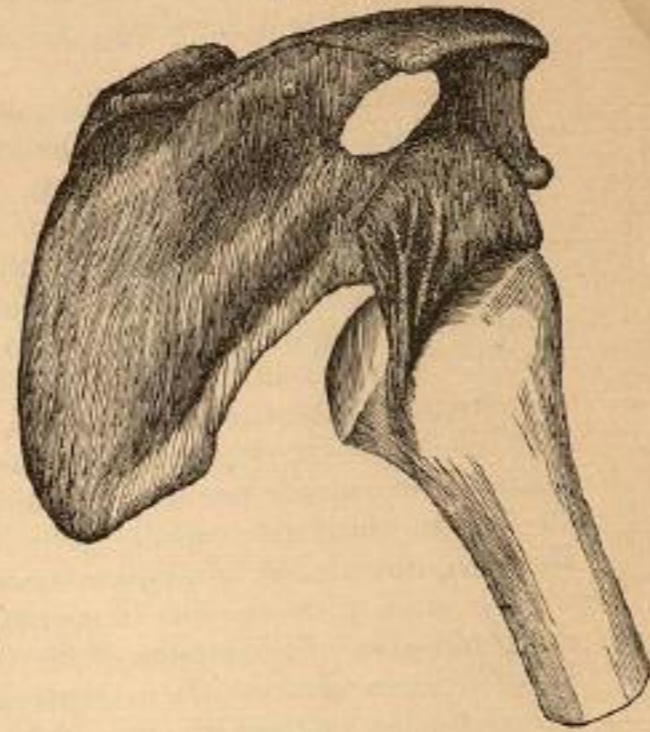
With more or less rapidity, after the occurrence of the dislocation, if the bone remains unreduced, various changes take place in the anatomical relations and structure of the parts. The following is a brief account of the condition in which the parts were found in the case of an old man, whose history is unknown. The dissection was made by my assistant,

FIG. 272.



Dislocation of the shoulder downwards into the axilla. (Subglenoid.)

FIG. 273.



Dislocation downwards, showing the untorn portion of the capsular ligament. (Gunn.)

Dr. Frank Deems, at the Bellevue dead-house. The head of the humerus was in front of the socket, below, but not in contact with, the coracoid process, lying upon the anterior surface of the neck of the scapula. A new socket was formed in the bone at this point, mostly cartilaginous, and a fibrous capsule inclosed the head of the humerus. The margins of the old socket were removed, and the socket was filled with fibrous tissue. The axillary nerves and artery were not injured or compressed. The biceps tendon was not torn. All the muscles about the shoulder were atrophied.

Symptoms.—A palpable depression immediately under the extremity of the acromion process, more distinct in children, in very old and in thin people, than in adults of middle life or than in fat or muscular people, but never absent completely, unless the shoulder is very much swollen; the elbow carried out from the body three or four inches, sometimes a little backwards, and the line of its axis directed toward the axilla; the outer surface of the arm presenting two planes inclined

¹ Todd's Cyclop. Anat. and Surg., p. 616; Holmes's Surg., vol. ii. p. 827.

toward each other, and meeting at the point of insertion of the deltoid muscle; the head of the humerus felt in the axilla, particularly when the elbow is carried away from the body; numbness of the arm, accompanied generally with pain, especially when any attempt is made to press the elbow against the side; rigidity with inability to move the arm freely in any direction, but especially inwards; allowing, however, of pretty free passive motion, but not permitting the elbow to touch the body without great pain, which pain is occasioned mostly by the pressure of the humerus upon the axillary plexus; under no circumstances can the hand be placed upon the opposite shoulder while at the same moment

FIG. 274.



Dislocation of the shoulder downwards into the axilla. (Subglenoid.)

the elbow touches the thorax; the head of the patient, and sometimes the whole body, inclined toward the injured arm; the arm lengthened from half an inch to an inch; a chafing or friction sound is not unfrequently present, especially if the bone has been some days dislocated; but Mr. Lawrence mentions a case in which there was a distinct crepitus, yet there was no fracture; Dr. Hays saw a similar case in Wills Hospital, Philadelphia, in a woman sixty years old, whose arm had been dislocated forwards eight weeks.¹ Other surgeons have related like examples, but it is probable that in all these cases there has been an exposure of the bone at or near the edge of the glenoid fossa, by the partial detachment of its ligamentous margin, or some portion of the head has become divested of its cartilaginous covering. (For a more complete differential diagnosis, see chapter on Fractures of the Humerus.)

Decisive as these signs usually are of the true nature of the accident,

Lawrence, Hays, Amer. Journ. Med. Sci., vol. xxiv. p. 236, May, 1839.

cases will every now and then occur in which the diagnosis will be attended with great difficulty, and especially if a few hours have been permitted to elapse since the occurrence of the injury, so that considerable effusions of blood and of lymph may have taken place; while at a still later period, when the swelling has subsided, the diagnosis again becomes easy. "At this latter period," says Sir Astley Cooper, "it is that surgeons of the metropolis are usually consulted; and if we detect a dislocation which has been overlooked, it is our duty in candor to state to the patient that the difficulty of detecting the nature of the accident is exceedingly diminished by the cessation of inflammation, and the absence of tumefaction."

In a rapid review of the cases of dislocation of the shoulder which have come under my notice, and of which I have taken pains to make a record, I find thirteen subglenoid and ten subcoracoid dislocations which were not recognized as such by the surgeons first called. Some were mistaken for fractures, and some were called contusions or sprains. And among the surgeons who fell into these errors are some of our oldest and most experienced hospital surgeons. I have, however, seen many more unrecognized and unreduced dislocations of the shoulder, than are mentioned above; but the frequency with which I have met them must not be regarded as representing the usual ratio of these errors of diagnosis in general practice, inasmuch as the majority of them were examples in which the patients or the surgeons have consulted me for advice.

It is due to science, if not to myself, to say that it has never happened to me to have seen a case of dislocation of the shoulder which I have not recognized. Although, therefore, I am prepared to admit the justness of the observations made by Sir Astley Cooper, I think that errors in diagnosis are often due to carelessness, or to a lack of experience, or to an insufficient study of the well-established rules of diagnosis. Upon this subject I have already spoken very fully in the chapter on Fractures of the Humerus; and from the examples and opinions which I have there presented it will be inferred that it is much more common to mistake a fracture for a dislocation, than a dislocation for a fracture, an observation which is equally as applicable to dislocations forwards as to the form of dislocation now under consideration.

Prognosis.—If the force which displaced the bone was not great, or if the shoulder-joint has not suffered any injury from the accident itself beyond the mere rupture of the capsule and a moderate straining of the muscles, and if the dislocation has been early and easily reduced, the patient is immediately after the reduction able to move the arm freely in all directions; very little swelling follows, and in a short time a perfect restoration of all the functions of the limb is accomplished.

It cannot, however, always be inferred from the degree of violence employed in the production of the dislocation, nor from the absence or presence of swelling, how much injury the tendons, muscles, and nerves have suffered, since the same causes produce greater lesions in one person than in another, and the amount of swelling may depend upon the accidental rupture of an unimportant bloodvessel, or upon some peculiarity in the constitution of the patient predisposing to serous, fibrous, or sanguineous effusions.

To whatever cause we may find occasion to attribute the result, it will nevertheless be observed that, in a great majority of cases, the limb is not restored to all its original strength and freedom of motion until after the lapse of some months; and the shoulder does not resume its perfect form and symmetry until a much later period; occasional pains, especially after exercise of the muscles, and in certain conditions of the weather, are present also at irregular intervals and for indefinite periods of time. Opposite and more favorable terminations must be regarded as exceptions to the rule.

Where the reduction has been made within a few hours, I have found the shoulder affected with muscular ankylosis with more or less weakness of the arm after a lapse of from a few days to one or two years.

A laborer, *æt.* 41, had dislocated his right shoulder into the axilla. Dr. H., an intelligent young surgeon, reduced the bone easily with his hands alone, while the patient was still unconscious from the shock of the injury. After six weeks he called upon me, accompanied by his surgeon, thinking that it was not properly reduced because the arm was still painful, and he could not move it freely. The bone was, however, well in its socket. One year later I examined this man, and found some ankylosis remaining in his shoulder-joint.

James Rogers, *æt.* 39, fell while running, and struck upon his right shoulder. Dr. Eastman, Professor of Anatomy in the Buffalo Medical College, reduced the dislocation four hours after the occurrence, in the following manner: The patient being seated in a chair, Dr. Eastman placed his knee in the axilla and manipulated, while one assistant supported the acromion process, and another pulled downwards upon the forearm. The time occupied in the reduction was about two minutes, and the bone finally resumed its position with a snap audible to all the persons in the room. For some months after, and at the period when I was invited to see him, the muscles about the shoulder were rigid, and the motions of the joint embarrassed; but at the end of two years, Dr. Eastman informed me that the joint had become free and the arm as useful as before, except that he could not throw a stone.

In another case, a gentleman residing in an adjoining county, *æt.* 42, was thrown from his carriage, falling forwards upon his hands. The dislocation was reduced promptly, by placing the heel in the axilla, and within fifteen minutes after it had occurred. Three months after this the patient consulted me on account of the immobility of the shoulder-joint, and because several surgeons had expressed a doubt whether it was properly reduced. The ankylosis was then so complete that the humerus could not be moved separately from the scapula, but there was no displacement. This gentleman again called upon me at the end of four years, and I then found the arm nearly restored to its original condition, but it was not quite so strong as before. He experienced also "curious" sensations in his arm and hand occasionally. The ankylosis had continued with very little improvement about two years, after which it had been gradually disappearing.

I need scarcely say that in those examples in which the reduction of the bone has been delayed beyond a few hours, or for several days or weeks, the continuance of the ankylosis has been more persistent; but

in no case which has come under my observation, unless the bone still remained unreduced, has the ankylosis been permanent. For this reason I am disposed to think that muscular, rather than fibrous or ligamentous ankylosis, is the cause, generally, of the immobility of the joint. I have certainly never in any instance met with a true bony ankylosis as a consequence of a shoulder dislocation. The ankylosis in question seems to be a result simply of laceration or more generally of a severe strain of the muscular fibres, resulting in inflammation and a contraction of these fibres; and its occurrence in any particular case may therefore be justly attributable either to the position of the bone when it is dislocated, to the force of the blow which has produced the dislocation, or to the violence applied in the attempts at reduction.

Paralysis and wasting of the muscles of the arm, either with or without muscular contraction and rigidity, are also observed in a certain number of cases. Especially has it been noticed that the deltoid muscle is liable to atrophy; and in their attempts to explain the frequency of its occurrence in this latter muscle, surgeons have generally referred to a probable rupture of the circumflex nerve, a circumstance which the autopsies show does occasionally take place; or to a mere stretching of this nerve; yet it is quite as fair to presume that in many cases it is due solely to the greater injury which the deltoid muscle has sustained by the unnatural position of the head of the bone during the continuance of the dislocation, for, with the exception of the supraspinatus, it is placed more upon the stretch than any other. Nor is it improbable that in some cases it is due to the mere force of the blow, which, having been directed upon the top of the shoulder, has contused the muscle. In short, any of the causes which may determine in the deltoid inflammation and consequent rigidity, must finally result in desuetude and consequent atrophy.

In the case of an adult, P. Madden, who consulted me in June, 1874, there were slight atrophy and paralysis of the deltoid, and almost complete atrophy of the supraspinatus, with much ankylosis, due, I think, to prolonged efforts at reduction.

In quite a number of cases my attention has been called to a remarkable fulness just in front of the head of the bone, which has continued sometimes for many months and even years after the reduction has been effected; the patients having in several cases applied to me to know whether this did not indicate that the bone was not in its socket, especially as it has usually been attended with some stiffness in the joint. Not unfrequently I have been told that surgeons who had noticed this fulness, thought the bone was not reduced; and in one instance I am informed that a jury returned a verdict against the surgeon, where there was no other evidence of malpractice than this fulness with some ankylosis, but which, in the opinion of some medical gentlemen who testified, was conclusive evidence that the bone was not properly set. The deception is also often the more complete from the fact that there may exist a corresponding depression underneath the acromion process, behind.

These phenomena may be present where but little force has been used, either in the production of the dislocation or in its reduction. I have seen it in a girl only fourteen years of age, who had dislocated her left shoul-

der into the axilla, by a fall upon a slippery sidewalk. I reduced the bone, assisted by Dr. George Burwell, within half an hour after the accident. Dr. Burwell held upon the acromion process, while I lifted the arm to a right angle with the body, and pulled gently, and the reduction was at once accomplished; but we immediately noticed that the head of the bone seemed to press forwards in the socket so as to resemble what Sir Astley Cooper has described as a partial forward dislocation. There was also a corresponding depression behind. Carrying the elbow back rendered the projection more decided, but bringing it forwards did not make it entirely disappear.

In other instances where the deformity in question has been present, more force has been employed in the reduction. A man weighing two hundred pounds, forty-one years of age, residing at Bath, Steuben Co., fell from a load of hay in May, 1853, striking upon the top and front of the left shoulder. It was immediately ascertained that he had dislocated his arm into the axilla, and broken his leg. A young surgeon attempted within a few minutes to reduce the dislocation, but failed; and about two hours later it was reduced by another surgeon, with the aid of chloroform and Jarvis's adjuster. Four years after the accident this gentleman came to me accompanied by the surgeon who had made the reduction, in consequence of its having been intimated by some medical men that it was not properly reduced. The arm was not as strong as the other; some ankylosis existed at the shoulder-joint; but especially it was noticed that there remained a remarkable fulness in front, as if the head of the bone was pressed forwards. By no manipulation or position could this fulness be made to disappear, yet the bone was plainly enough in its socket.

This phenomenon is probably due in some cases to a rupture of the supraspinatus muscle, and the consequent preponderating action of the antagonizing muscles, or to the extensive laceration of the capsule; but in others, I imagine, to a rupture or possibly to a displacement of the long head of the biceps, a circumstance to which I shall more particularly allude under the subject of "Partial Dislocations."

Among the results of this dislocation must be placed a tendency to redislocation, which, although it may not often be made manifest by its actual occurrence, owing perhaps to the prudence of the surgeon, yet it does take place in a sufficient number of cases to establish its peculiar liability. Indeed, we need only consider how imperfect is the protection against this accident, when once the capsule has been torn, to appreciate this observation. Examples of spontaneous dislocation, or of dislocation of the shoulder from very trivial causes after it once has been dislocated, may be found in the experience of almost every surgeon. I have met with several persons who have had repeated dislocations from a slight cause, and in some instances where the patients were subject to epilepsy the dislocations have occurred whenever the convulsions returned.

A gentleman residing at Toronto, Canada West, had a dislocation of the right shoulder into the axilla when he was quite a child, and the accident was renewed when twenty-nine years old by falling from a carriage headforemost, with his right arm extended and uplifted. Since then,

until he called upon me, a period of about six years, he has been constantly subject to the same dislocation; and he cannot raise his arm high above his shoulders without producing a partial dislocation, the head of the humerus resting upon the outer margin of the lower and anterior edge of the glenoid fossa, but by rotating the arm outwards it immediately resumes its place. I found the whole limb as fully developed, and he said it was quite as strong, as the opposite limb.

I have already mentioned the case of Mrs. Hunn, whose arm had been dislocated more than twenty times during five years; and I remember a lad, Pat Dolan, aged nineteen years, whose left arm was dislocated by falling from the masthead of a vessel, and hanging by his hand. No attempt was made to reduce it until fourteen hours after the accident, at which time it was set by two German doctors, but not until they had pulled upon it three hours. Four months after, it was again dislocated by the slipping of an oar while he was rowing a boat. A surgeon having failed this time to bring it into place, I succeeded readily, and without the aid of an anæsthetic, by raising the arm directly upwards in the line of the body, while my foot was pressed upon the top of the scapula. Many other similar examples have come under my notice.

I have referred more than once to the occasional difficulty of diagnosis in this as well as in many other shoulder accidents. Other writers have mentioned many examples of unreduced dislocations of the shoulder, for which surgeons of skill and experience were responsible. I have myself, as before stated, met with these cases quite often. For example, I will mention here that I have seen two dislocations of the humerus into the axilla, both of which had been seen and examined by New York hospital surgeons within a few hours after the receipt of the injury, but the nature of the accident had not been recognized. One of these I reduced at Bellevue Hospital on the seventh day, and one on the tenth. There was also presented to me, at the Charity Hospital (Blackwell's Island), in my service, an axillary dislocation of twenty years' standing, which a surgeon saw immediately after the receipt of the injury and failed to recognize. In other cases the dislocation has been clearly made out, but the surgeon has been unable to reduce the bone. It has been my fortune to succeed in several instances where others have made a fair trial and have failed, but the following case leaves me no opportunity to boast the superiority of my own skill above that of my *confrères*.

Mary Kanally, æt. 49, a large, fat, laboring woman, was admitted into the Buffalo Hospital of the Sisters of Charity, with a dislocation of the right humerus into the axilla, which had occurred twelve hours before. This is the same woman of whom I have before spoken as having produced the dislocation by a fall while holding upon the handle of a pump.

Drs. Lockwood and Baker, of Buffalo, were first called, and attempted reduction. They made extension and counter-extension in every possible direction, and for a long time, but to no purpose. She was then sent to the hospital. Without attempting to describe minutely the various modes of extension and manipulation which I employed, I will briefly state that, having placed her completely under the influence of chloroform, the manipulations were made assiduously during one hour, without success.

On the following morning she was bled freely from the opposite arm, and chloroform again administered; extension being made, in the presence of Prof. Charles A. Lee and other gentlemen, with Jarvis's adjuster. After more than an hour, the effort was again suspended. On the following day we made a third attempt, the patient being completely under the influence of chloroform, but with no better success. The chloroform produced a condition approaching apoplexy, and it was not again used. On the tenth day, assisted by Prof. James P. White and other surgeons, we applied the compound pulleys, moving the arm in various directions. Twice we thought the reduction was accomplished, but as often as we proceeded to examine it attentively we found it was not. If it did ever pass into the socket, it was immediately displaced.

The woman after this refused to submit to any further attempts, and she soon left the hospital, nor have I seen or heard from her since.

Sir Astley Cooper has thus described the appearances presented on dissection of a dislocation which had been long unreduced: "The head of the bone altered in its form; the surface toward the scapula being flattened. A complete capsular ligament surrounding the head of the os humeri. The glenoid cavity entirely filled by ligamentous matter, in which were suspended small portions of bone, which were of new formation, as no portion of the scapula or humerus was broken. A new cavity formed for the head of the os humeri on the inferior costa of the scapula; but this was shallow, like that from which the bone had escaped."

When the dislocation into the axilla remains unreduced, the consequences are always sufficiently grave; but they differ very much in degree, in character, and in persistence, according as the arm has remained a longer or shorter time unreduced, and according to the presence or absence of complications. These conditions will be best illustrated by a reference to examples.

Wm. S., a German, æt. 51, fell down a flight of steps while intoxicated, producing a dislocation of the left arm into the axilla. Eleven hours after the accident he was received into the Buffalo Hospital of the Sisters of Charity. No attempt had been made to reduce the bone. The reduction was effected by myself with tolerable ease, by extending the arm perpendicularly above the head, while my foot pressed upon the top of the scapula. The head of the humerus could be plainly felt in the axilla, approaching the socket, until it seemed to be directly over it, when, on lowering the arm, it was found to be reduced. After the reduction the patient could not raise the arm more than eight inches from

FIG. 275.



New socket, in an ancient dislocation of the shoulder downwards. (From Sir A. Cooper.)

the body. The fingers, hand, and forearm were almost paralyzed. Three weeks later, when he left the hospital, his arm had improved, but he could not flex his fingers.

Mrs. G., æt. 70, fell down a flight of steps and dislocated her arm into the axilla. She did not suspect the nature of the injury, and no surgeon was called. I was consulted one week after the accident, at which time she was suffering great pain from the pressure of the head of the bone upon the axillary nerves. We first attempted to reduce the bone by resting the knee in the axilla while she was sitting, but without success. We then placed her in bed, and with my knee in the axilla, the acromion process being supported by the hands of an assistant, we restored the bone after a few moments of pretty firm extension downwards and outwards. After the reduction she could not raise her arm, but the pain was much abated. One month later the arm remained very weak. She could not raise it more than six inches toward her head, but I could raise it to a right angle with the body without causing pain. The whole hand felt numb, and was occasionally painful. The deltoid muscle was slightly atrophied. There was also a slight flatness under the acromion process behind, and on the outer side, with a corresponding fulness in front.

Mary Ann Hasler, æt. 47, was admitted to the hospital with a dislocation of the right humerus into the axilla. The arm had been dislocated three weeks, in consequence of a fall upon the upper and outer part of the shoulder. An empiric, who saw it fifteen minutes after the fall, and when the arm was not swollen, said it was not dislocated. On the fifth day a Catholic clergyman discovered that it was out, and attempted to reduce it, but was not successful. When she came under my notice the arm was lengthened about one-quarter or one-half of an inch, and hung out from the body in a condition of almost complete paralysis. There was very little swelling about the shoulder or arm, and the head of the bone could be distinctly felt in the axilla. The patient being rendered partially insensible by chloroform, I placed my heel in the axilla, and pulling moderately about thirty seconds in a direction slightly outwards from the line of the body, the bone was reduced. Seven days after the reduction she left the hospital, the arm being yet quite useless, though not greatly swollen. There was also a striking fulness in front of the head of the bone.

Wm. Gardner, of Painted Post, N. Y., æt. 75, dislocated the right humerus into the axilla, twenty years before I saw him, by falling upon his hands with his arm extended. I found the arm weak and atrophied, so that he could raise it but slightly outwards from his side; he was unable to move it forwards much beyond the line of his body; but he could carry it back quite freely. The whole hand was in a condition of partial insensibility.

I have before mentioned the case of Maria Norregan, the Swiss woman, whose arm had been dislocated downwards seventeen years. The deltoid muscle has become greatly wasted; the head of the bone can be felt obscurely in the axilla; the arm is shortened perceptibly; the elbow hangs freely against the side; the little and ring fingers are numb, and

also one-half of the forearm; the whole hand and arm are weak and atrophied; she complains also occasionally of a troublesome sensation of formication over the arm and hand; she cannot straighten her fingers perfectly; the elbow may be raised from the side to a right angle with the body, but she cannot raise it herself more than one foot; she carries it back a little more freely than forwards.

In compound dislocations the prognosis must always be regarded as exceedingly grave. In the only example which has come under my notice, the circumstances attending which I shall hereafter mention in the general chapter devoted to Compound Dislocations, the patient died from sloughing of the axillary artery. Mr. Scott has, however, reported a case, in a boy fourteen years of age, who recovered rapidly after the reduction was effected, and in thirteen months his arm was nearly as useful as before.¹

Treatment.—The principles of treatment in this dislocation are very simple and easy to be comprehended. I speak now of recent uncomplicated cases of dislocation into the axilla; and, notwithstanding the various and sometimes almost contradictory views which surgeons have entertained as to the best and most rational modes of procedure, I continue to affirm that the laws which are to govern the reduction in a great majority of cases are established and indisputable.

Observe now the obvious anatomical facts, and then consider the inevitable inferences.

The capsule is torn, generally extensively, along the inner and lower margins of the socket. The head of the bone is lodged below and slightly in advance of its natural position, in consequence of which the points of origin and insertion of the deltoid muscle and the supraspinatus are separated somewhat and their fibres rendered tense, insomuch that the arm is abducted and actually lengthened.

At first, and in the most simple cases, these are the only muscles which are in a state of extreme tension, but after the lapse of a few hours, or of a few days, nearly all the other muscles about the joint, most of which were originally only in a condition of moderate extension, and some of which were rather relaxed than extended, sympathize with those which are suffering the most, and a general contraction and rigidity ensue, increased also at the last by the supervention of inflammation and its consequences.

What, from these simple premises, must be the obvious practical deductions?

That in the simplest forms of the dislocation the most rational mode of reduction will be to elevate the arm sufficiently to relax the overstrained deltoid and supraspinatus muscles, which, together with the upper and untorn portion of the capsule, bind the head of the bone in its new position, and to pull gently in the same direction, in order to overcome the moderate resistance offered by several other muscles, but whose tension cannot be relieved by the same manœuvre.

Failing in this, that we shall increase the relaxation of the first-named

¹ Scott, Amer. Journ. of Med. Sci., vol. xx. p. 515, Aug. 1837, from the London Lancet for March 4, 1837.

muscles, by pulling at a right angle with the body, or even directly upwards; and meanwhile, as we carry the arm more and more upwards, we shall operate more powerfully against the resistance of the other muscles.

If in all these modifications of the same procedure except when drawing directly upwards, we keep the arm a little back of the axis of the body, we shall accomplish the indications the most perfectly.

Such are the conclusions which must be drawn from the anatomical, or, as Mr. Pott would call it, the "physiological," argument; and which assumes as its basis that the muscles with the untorn portion of the capsule constitute the sole or the main obstacle to the return of the bone to its socket.

It must not be forgotten that in all these modes of extension, for with nearly all of them some slight degree of extension is found necessary, there must be afforded some point of resistance beyond the bone; and this it is really which has constituted one of the greatest impediments to reduction. It is not that the muscles are in such an extraordinary state of extension or rigidity that they must be operated against with great force; it is not that the margin of the glenoid fossa is an elevated barrier, like the margin of the acetabulum, over which the bone must be lifted before it can fall into its socket; but the explanation of the difficulty so often experienced in producing effective extension and counter-extension is to be sought for mainly in the fact that the scapula, upon which the humerus rests, is movable, being held to the body by little else than muscles, which, in fact, bind the scapula much less firmly to the body than the muscles of the shoulder now bind the scapula to the arm; while at the same time the scapula itself presents very few points against which a counter-extending force can be properly and efficiently applied.

Occasionally it will be only necessary to elevate the arm to an acute angle, or to a right angle with the body, when, the resistance of the deltoid and supraspinatus being overcome, the bone will at once resume its place. In several instances which have come under my notice nothing more has been necessary; and where it can be done, the least possible pain and injury are inflicted. It is the method, therefore, which in all recent cases I have first tried and would wish to recommend. By it I have more than once succeeded when other and more violent efforts have failed.

At other times it will be necessary to add to this simple manipulation only a moderate degree of extension, such as the hands of the surgeon can make, without the application of direct counter-extension except what is effected by the weight and resistance of the body.

Professor Moses Gunn, of the Rush Medical College, Chicago, who regards the upper and untorn portion of the capsule as the chief obstacle to the reduction, says: "For the reduction of this dislocation it is convenient to have the patient sit upon the floor. The arm is then raised to an angle of 45 degrees from the horizontal, and intrusted to an assistant, while the surgeon places his hands on the shoulder with the tips of the fingers in the axilla, resting on the dislocated head. The assistant now

makes upward and outward traction, and the head glides into place followed by the surgeon's fingers in the axilla. The arm is then lowered to the pendent position, keeping up the tension till the arm is by the side of the body."¹

The late Dr. John T. Darby, Professor of Surgical Anatomy in the University of the City of New York, informed me that he had been very successful in reducing dislocations of the shoulder, by adopting a rule similar to that which I have laid down for reducing dislocations of the thigh, namely, to carry the arm only in those directions in which it meets with the least resistance. He found that, in most cases, he could carry the arm up to nearly or quite a perpendicular, by humoring the action of the muscles; and that in this position the reduction was easily effected. I have no doubt that the principle, as stated by Professor Darby, is sound, and that in nearly all dislocations the same may be applied successfully, whenever we can depend upon manipulation alone.

If, however, the bone refuse to move, we shall then be obliged to consider upon what point and by what means we can best apply a counter-extending force. Ample experience has taught me that the extremity of the acromion process is the only available point when we are making the extension in a line below a right angle, or in a line downwards more or less approaching the axis of the body. It has been supposed that the counter-extension could be made in the axilla against the inferior margin of the scapula; but several obstacles are presented to the successful application of force at this point. The axillary space is narrow and deep, so that even with the ingenious contrivance of placing first a ball of yarn in the axilla, and upon this the heel of the operator, it will be found exceedingly difficult to enter the axilla without at the same time pressing with considerable force against its muscular margins; but to press upon the pectoralis major and latissimus dorsi is to neutralize our own efforts. If, however, the heel or the ball does press fairly into the axilla, it will not find the scapula readily, but it must impinge first upon the head of the humerus, which is always a little to the inner side of the scapula. If it ever is made to reach actually the inferior border of the scapula, and I do not think it is, the effect must be still only to tilt the scapula upon itself by throwing back its lower angle, and not to separate the glenoid cavity or its upper and anterior margin from the head of the humerus.

Whatever success, therefore, may have attended this mode of practice, either in my own hands or in the hands of other surgeons, must be ascribed not to the counter-extension thus effected, but simply to the operation of the heel as a wedge, which, by insinuating itself between the body and the head of the bone, has thrust it outwards and upwards into its socket; or to its having acted as a fulcrum upon which the humerus has operated as a lever.

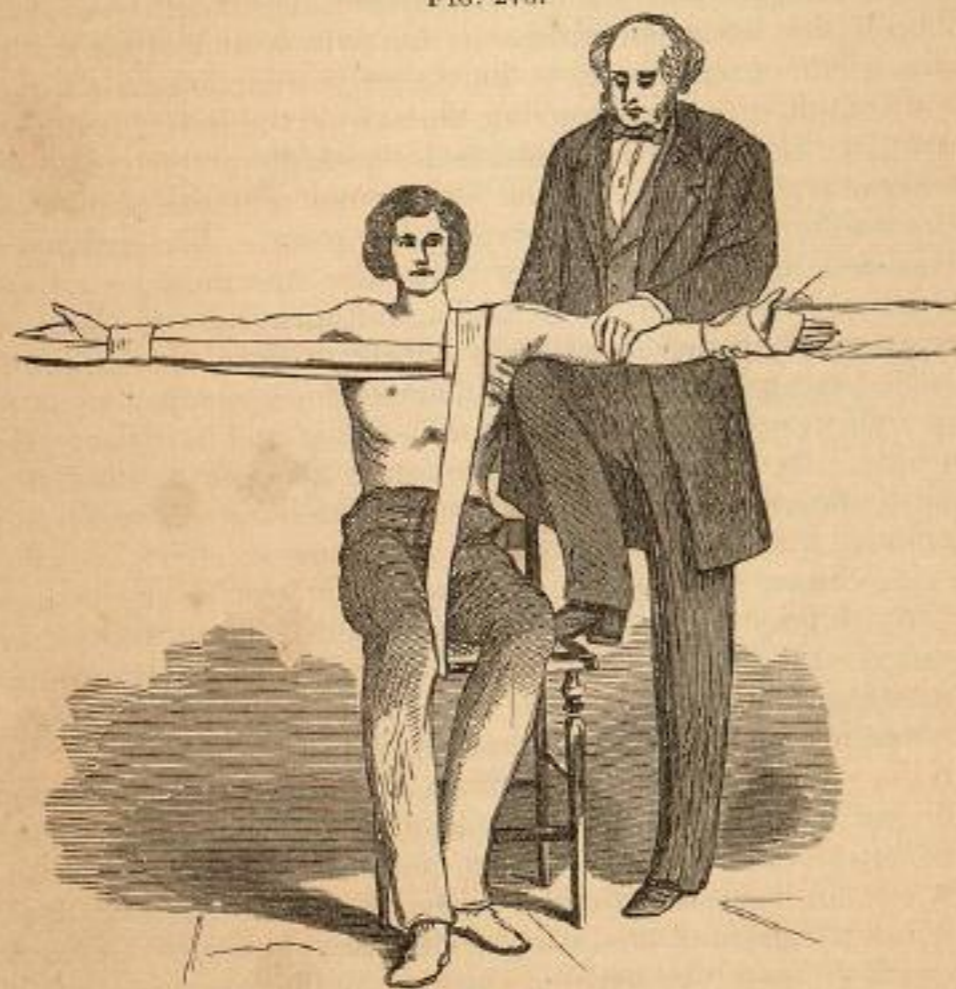
It is to the extremity of the acromion process, then, that we must apply our counter-extension when we are employing this mode of extension.

¹ Gunn, *The Philosophy of Manipulation in the reduction of Hip and Shoulder Dislocations*. Read before the American Surgical Association, 1884. Also *Chicago Med. and Surg. Journ. and Exam.*, May, 1884.

The fingers or hands of a faithful assistant may answer the purpose, or, having removed his boot, the operator may often press successfully with the ball of his foot, and the more he carries the arm outwards, the more secure will be his seat upon the process; or we may adopt some of the contrivances for securing the process which have been suggested by other surgeons; such as a band crossing the shoulder, and made fast to a counter-band, which passes through the armpit and against the side of the body. Dr. Physick, of Philadelphia, reduced a dislocation in this way as early as the year 1790, in the case of a patient admitted to St. George's Hospital, in London, while he was a student of medicine, and he subsequently taught the same in his lectures. Physick directed that an assistant should press firmly against the process with the palm of his hand. Dorsey and Hays approved of the same method,¹ and perhaps a majority of American surgeons have regarded it favorably.

If we pull directly outwards, at a right angle with the body, we may still continue to press upon the acromion process with the foot; or we

FIG. 276.



N. R. Smith's method.

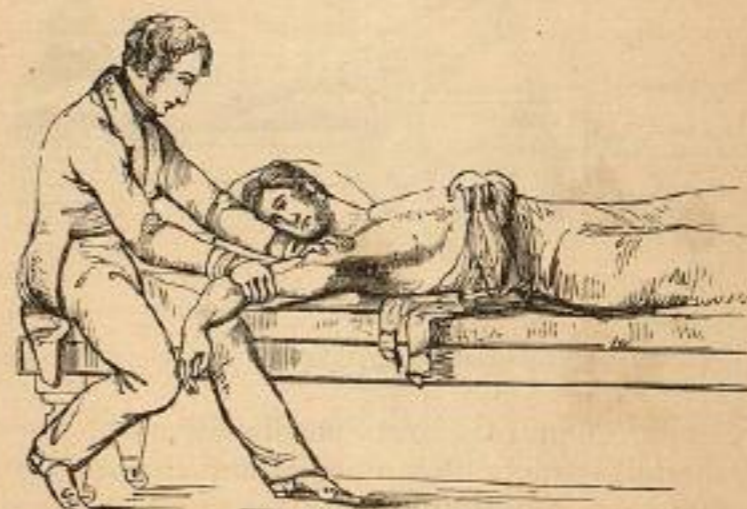
may perhaps trust to the method of making counter-extension, first suggested by Nathan Smith, of New Haven, and subsequently recommended by his son, Prof. Nathan R. Smith, of Baltimore. Says Prof. N. R.

¹ Physick, Amer. Journ. Med. Sci., vol. xix. p. 386, Feb. 1837. Dorsey's Elements of Surgery, vol. i. p. 214. Philadelphia, 1813.

Smith:¹ "What surgeon of experience has not encountered the difficulty which almost always occurs in fixing the scapula?" and he then proceeds to give what seems to him the most effectual mode of rendering the scapula immovable, namely, to make the counter-extension from the opposite wrist. By this method the trapezii are provoked to contraction, and the scapula of the injured side is drawn firmly toward the spine and the opposite scapula. In illustration of the value of this procedure he relates the case of a gentleman who had suffered a dislocation of his left shoulder, and upon whom an unsuccessful attempt at reduction had already been made by a respectable surgeon. Dr. Smith, being called, proceeded as follows: Two gentlemen made counter-extension from the opposite wrist, while Dr. Smith and Dr. Knapp made extension from the wrist of the injured side, at first pulling it downwards, but gradually raising it to the horizontal direction, and then gently depressing the wrist. On the effort being steadily continued for two or three minutes, the bone was observed to slip easily into its place.

But no position places the scapula so completely under our control as that in which the arm is carried almost directly upwards, and the foot is placed upon the top of the scapula. By this method we may succeed generally when every other expedient has failed; but it probably increases the danger of lacerating the axillary artery and vein; and even when employed in recent cases, it must sometimes do serious injury to the muscles about the joint. In Lister's case of rupture of the axillary

FIG. 277.



La Mothe's method, modified.

artery, and in Agnew's case of rupture of the axillary vein, both of which will again be referred to in connection with ancient dislocations, the accidents occurred when the arm was drawn upwards.

La Mothe was the first to recommend pulling directly upwards;² but as early as the year 1764, Charles White, of Manchester, made fast a set

¹ Smith's Med. and Surg. Memoirs, Baltimore, 1831, p. 337; also Amer. Journ. Med. Sci., July, 1861; also Amer. Med. Times, Nov. 9, 1861; paper by Stephen Rogers, M.D.

² La Mothe, Amer. Journ. Med. Sci., vol. xix. p. 387, Nov. 1836, from Mélanges de Méd. et Chir., Paris, 1812.