

accurate measurements between the bony prominences were taken, and all agreed that there was dislocation inwards of the olecranon process upon the inner condyle of the humerus, the head of the radius remaining in its normal position. There was no pain or swelling; all the motions of the arm were perfect; but the patient was unable to sustain any weight upon the arm in extension by reason of the tendency to rotate inwards, and the "carrying power" was lost. I attempted reduction under anaesthetics, but after an hour and a half's effort by myself and all the gentlemen present, and by every means suggested by the best authorities, we failed to reduce the dislocation. The arm was put in an elevated easy position, with patient in bed, cold water applied, and not a single bad symptom followed this somewhat violent manipulation. The friends refused to allow any further attempts at reduction.

In explanation of the peculiarity of the displacement, Dr. Wright states that there existed a congenital laxity of the ligaments of all the joints, and that "when the child was two years of age she received an injury to this same elbow which caused the separation of this epiphysis, the external condyle being broken off, and it may be that this accident left a condition in the joint which favored the possibility of the inward displacement of the upper extremity of the ulna without carrying the radius with it."

CHAPTER X.

DISLOCATIONS OF THE RADIUS AND ULNA (FOREARM) AT THE ELBOW-JOINT.

THE radius and ulna may be dislocated at the elbow-joint backwards; laterally, that is, either inwards or outwards; and forwards. They may also be dislocated in opposite directions.

§ 1. Dislocations of the Radius and Ulna Backwards.

Causes.—My records of private and hospital practice supply seventy-two cases; the youngest being four years old, and the oldest sixty-one. Twenty-nine of this number occurred in children under fourteen years of age.

Generally the dislocation has been produced by a fall upon the palm of the hand, as when in running a person has fallen forwards with the forearm extended in front of the body, or he may have fallen from a height; once I have known it produced by a blow received upon the back and lower part of the humerus; and in several instances the patients have declared that they had fallen upon the elbow; it is produced, occasionally, by twisting the forearm violently, as when the limb has been caught and wrenched about by machinery, by a blow upon the front and upper part of the forearm, and by forced flexion.

Pathological Anatomy.—The radius and ulna are not only carried backwards behind the articulating surface of the humerus, but they are also, through the action of the triceps, almost always drawn more or less upwards, so that often the coronoid process of the ulna rests in the olecranon fossa. In some cases it has been known to mount even higher, while in others it is arrested short of this point. The radius still retaining its relative position to the ulna, lies upon the back of the humerus, or rather upon the posterior margin of its articulating surface.

The anterior and two lateral ligaments are generally more or less completely torn asunder; but the posterior ligament and the annular do not usually suffer disruption.

The biceps muscle is drawn over the lower articulating surface of the humerus, but is in a condition of only moderate tension, while the brachialis anticus is forcibly stretched, or even torn. Malgaigne says the tendon of the biceps has once been found behind the humerus.

The median nerve is also pressed upon in front by the humerus, and the ulnar is occasionally painfully stretched over the projecting extremity of the ulna from behind.

Symptoms.—Sir Astley Cooper does not mention particularly the position of the arm as to flexion or extension, except to say that "the flexion of the joint is in a great degree lost;" nor, in his original work, published in London in 1823, is there any illustration accompanying the text to indicate in what position he had usually seen the limb; but in the later editions, edited by Mr. Bransby Cooper, is found a drawing which represents the forearm at a right angle with the arm. It is very certain that Sir Astley never sanctioned this error by anything which he had written or communicated to others. It is very certain, I say, because the fact that it seldom, if ever, occupies, this position, could not have escaped the notice of one whose experience was so large, and whose habits of observation were generally so accurate. The truth is that it is almost constantly found only slightly flexed, or forming an angle in front of about 120° .

This fact is especially noticed in my records twenty-six times, and, if it had ever been found in any other position, it would certainly have been stated. Once, where the dislocation was accompanied with a fracture of the outer condyle of the humerus, the arm was at first straight, a position in which it is said to be found occasionally with children; and in the case of a patient admitted to Bellevue Hospital, on the 14th of December, 1864, the dislocation having existed thirty-one days, but unaccompanied with a fracture, I found the arm straight, and there existed also a preternatural lateral mobility of the elbow-joint; but never, in any case of a recent dislocation, and but once in an old dislocation, have I found it flexed to a right angle; yet I will

FIG. 297.



Dislocation of the radius and ulna backwards.

not deny that such unusual phenomena are possible in recent dislocations; indeed, it is certain that they have occasionally been presented, but they must be regarded as only exceptional, and as by no means diagnostic of this accident.

Sir Astley Cooper and Miller declare that in this dislocation the forearm is usually supinated; Pirrie says "the hand is between pronation and supination, but more inclined to the latter." Desault thinks it is sometimes in supination and sometimes in pronation; Denucé concludes that it will occupy that position, whatever it may be, in which the force of the blow has thrown it; while by most surgical writers no allusion is made to the position of the forearm in reference to pronation or supination. For myself, I can only say that I have found the forearm and hand almost constantly in a position of moderate but positive pronation, and I am compelled to regard it, therefore, as one of the usual signs of a backward dislocation of these bones.

The limb can be neither flexed nor extended without force, and such motion is almost always accompanied with pain. It is, however, possible in most cases to give to the arm a slight lateral motion, such as does not belong to it in its natural condition.

In front, and deep in the fold of the elbow, is felt the lower end of the humerus, forming a hard, broad, and somewhat irregular projection, over which the integuments and muscles are swollen, and tender to pressure. Behind, the head of the radius may be felt, when not much tumefaction exists, rotating or moving under the finger when the forearm is supinated and pronated; while the olecranon process projects strongly backwards and upwards. If now we flex the arm slightly, this projection of the olecranon process will be sensibly increased; but if an attempt is made to straighten the arm, it will be diminished, the reverse of what we have seen to happen in cases of fracture of the lower end of the humerus (at the base of the condyles). This circumstance becomes, therefore, an important diagnostic mark between these two accidents.

The relation of the olecranon process, also, to the condyle is changed, and the upper end of this process, instead of being a little below the internal condyle, as it would be naturally when the arm is slightly flexed, is found generally carried upwards toward the shoulder, from half an inch to one inch or more above the condyle.

Measuring from the internal condyle to the styloid process of the ulna, the forearm is shortened; the same result will be obtained also by measuring from the acromion process to either of the styloid processes; while from the acromion process to the condyle, the length will be the same in both arms.

The signs which have now been enumerated will be sufficient to enable us to make the diagnosis promptly in the great majority of cases, but, if considerable swelling has already taken place, the diagnosis may be rendered exceedingly difficult, if not impossible; and in such cases we should confine the patient at once to his bed, and proceed to reduce the tumefaction by appropriate means as rapidly as possible, examining the limb carefully from day to day, in order that we may

seize the earliest opportunity to ascertain its actual condition and to effect the reduction.

In relation to the difficulty of diagnosis in certain examples of this accident, and under certain circumstances, Mr. Skey, in his *Operative Surgery*, has made some very judicious remarks:

"Severe injuries of the elbow-joint, whether in the form of fracture, dislocation, or a compound of the two, are frequently followed, at a short interval, by swelling of a formidable kind, in which it is impossible, but by the aid of a perfect intimacy with the anatomical structure of the joint, to detect the relations of one part with another; but even under this difficulty, the two points in question are readily distinguishable. In such forms of swelling, the arm, including the length of six inches both above and below the joint, may be involved in the extravasation, and this swelling may distend the arm to a circumference of one-third beyond its natural size. In such circumstances, in which it is impossible to determine with any certainty whether any, or what bones are broken, or whether or not dislocated, the difficulty of the case should at once be stated to the friends of the patient."

Prognosis—If the dislocation is recent, reduction is in general easily effected; but if considerable time has elapsed, the reduction is often accomplished with difficulty. As to the probability of its redislocation, I have already spoken when considering the subject of fractures of the coronoid process. Unless this process is broken, it is not likely to occur except where some violence has again been applied. It has happened to me, however, to find these bones unreduced in several instances. In some of these examples surgeons recognized the accident and supposed that they had accomplished reduction, while in others the dislocation was mistaken for a fracture.

A lad, W. F., twelve years old, residing in Erie County, N. Y., was brought to me six weeks after the accident had occurred. The surgeon who was first called declared it to be a dislocation, and told the parents he had reduced it; but the dislocation was now complete, and the arm immovably fixed in its abnormal position.

On the 10th of May, 1850, J. P., of Canada West, æt. 25, was thrown from a load of hay, striking upon his left hand, and producing a dislocation backwards of both bones at the elbow-joint. A Canadian surgeon, who saw the patient within three hours, recognized the dislocation, and by pulling the arm straight forwards he supposed he had reduced it; the patient also thought he felt the bones slip into place. No attempt was made subsequently to flex the arm, and it was immediately dressed with a straight splint laid along the palmar surface. On the sixth day it was found to be unreduced, and the surgeon again attempted to reduce it as before, and thought he had succeeded. The same splint was reapplied. At about the end of six weeks three surgeons, residing in Canada also, placed the patient under the complete influence of chloroform, and attempted the reduction. They first made extension for half an hour in a straight line, then five men seized upon the arm and forearm, bending it with great force to a right angle. It was now believed that the ulna was reduced, but not the radius. Four days after, the attempt was renewed. Three months after the accident the young man called upon

me, and I found the arm nearly straight, with almost complete ankylosis at the elbow-joint. Both the radius and ulna were displaced backwards, but not upwards. The arm was of the same length with the other, and the relation of the condyles to the olecranon was so manifest, that the absence of the usual displacement upwards was easily determined. I was unwilling to make any further attempts at reduction, not believing that I should succeed after so much time had elapsed, and after so many ineffectual attempts had been made by clever surgeons.

In the following examples the dislocation was supposed to have been a fracture of the lower end of the humerus.

A man, residing in Pittsfield, Mass., dislocated his left arm by falling from a horse. The surgeon who was called regarded it as a fracture at the base of the condyles, and treated it accordingly. Ten weeks after, the error was discovered and an attempt was made to reduce it, but without success. A second attempt was also made, with the same result.

The patient was brought to me eight months after the accident, with the bones still unreduced. The forearm hung at a very obtuse angle with the arm, and there was very slight motion at the elbow-joint. I discouraged any further attempts at reduction.

Mr. W., of Alleghany Co., N. Y., *æt.* 43, fell from a load of hay, striking upon his left arm, Feb. 16, 1853. Four hours after, he was seen by a young but very intelligent surgeon, who thought the humerus was broken just above the condyles. After eight weeks, the fact that it was a dislocation having become apparent, three surgeons, well known to me as men of large experience, attempted its reduction aided by pulleys and chloroform. The patient was also bled, and nauseated with antimony. The efforts were protracted through many hours, and frequently varied. A second attempt made by these same gentlemen, a few days after, was equally unsuccessful.

On the ninth week Mr. W. came to me, and I placed him at once in the Buffalo Hospital of the Sisters of Charity, where, assisted by my friend Prof. Moore, of Rochester, I renewed the attempt at reduction. The patient was placed under the influence of chloroform, and during a great portion of the time occupied the pulleys were in use. The elbow was pulled upon, twisted, flexed, and extended, until there seemed to be neither adhesions, nor ligaments, nor capsule, to prevent the reduction. We could move the joint in every direction, even laterally, as well as forwards and backwards. Still the bones would not return to their sockets. Section of the triceps seemed to be the only remaining expedient, but the injury already done to the joint was so great that we did not deem it prudent to prosecute the attempt any further. We had occupied two hours in the various procedures. Violent inflammation supervened, but he was able to return home in about two weeks. Two years after, I learned that the arm still remained unreduced, and nearly ankylosed; the whole limb was also much atrophied and very weak.

John Sharkie, *æt.* 53, fell on the 4th of August, 1854. A botanic doctor, who saw him on the same day, and a regular physician, who saw him on the third day, thought he had broken his arm. About six weeks after this he came under the charge of an almshouse doctor, who "re-

broke" it, supposing it to be a fracture; and two months later he "broke" it again; but as the arm was not improved by these operations, he finally urged upon the poor fellow to submit to amputation; and it was in reference to this last proposition that Sharkie consulted me. I found the radius and ulna dislocated backwards and upwards one inch; the arm perfectly straight and the elbow ankylosed; no pronation or supination. I did not think it prudent to make any attempt to reduce it, but assured him that if let alone it would ultimately be quite useful in many ways, and that he should never think of having it cut off.

In at least eleven additional cases, according to my records, the accident has been overlooked by reputable surgeons; the injury having been supposed to be either fracture or a mere contusion. Two of these had been examined by house surgeons at Bellevue. In one other case my house surgeon supposed he had reduced the dislocation, when he had not.

In three or four instances, also, the accident has been overlooked by the patient himself, or by some empiric, no surgeon having been called to see the case until after the lapse of several days or weeks.

In general, when the reduction has been effected promptly, the patients have recovered the complete use of the elbow-joint within a few weeks; but many exceptions have from time to time come under my notice.

A lad eight years old was brought to me, whose arm had been dislocated six months before, and the reduction of which had been accomplished easily and promptly by Sir Astley Cooper's method. At this time the arm was bent to a right angle, and quite stiff at the elbow-joint. Four years later I learned that the stiffness still continued in a great measure, with only slight improvement.

Treatment.—Sir Astley Cooper thus describes his own method of reducing this dislocation: "The patient is made to sit upon a chair, and the surgeon, placing his knee on the inner side of the elbow-joint, in the bend of the arm, takes hold of the patient's wrist, and bends the arm. At the same time he presses on the radius and ulna with his knee, so as to separate them from the *os humeri*, and thus the coronoid process is thrown from the posterior fossa of the humerus; and while this pressure is supported by the knee, the arm is to be forcibly but slowly bent, and the reduction is soon effected."

The same practice has been recommended by Erichsen, Gibson, Samuel Cooper, and others. The plan recommended by Dorsey is nearly iden-

FIG. 298.



Reduction with the knee in the bend of the elbow.

tical with that just described, only that, instead of the knee, he advises that the surgeon "interlock his fingers in front of the arm, just above the elbow, and draw it backwards."

On the other hand, Liston and Miller recommend, as a better mode of procedure, that the patient shall be seated upon a chair, and that the arm and forearm shall be pulled directly backwards, so as to relax as completely as possibly the triceps muscle, while counter-extension is made against the scapula.

Skey says: "Extension of the forearm should be made from the hand or wrist in a straight direction downwards, as if for the purpose of simply elongating the arm."

Pirrie prefers that an assistant shall grasp the forearm near its middle, instead of the wrist, and pull the arm straight forwards, while at the same moment the surgeon seizes upon the olecranon process with the fingers of one hand, and, placing the palm of the other against the front and upper part of the forearm, pulls forcibly backwards, so as to draw out the coronoid process from the olecranon fossa. Waterman recommends forced extension; that is, bending the forearm forcibly back, as preliminary to flexion, with the view of lifting the coronoid process from the olecranon fossa.¹

For myself, having generally practised the method recommended by Sir Astley, and having usually succeeded in the first attempt and with the employment of only moderate force, I confess that my predilections are in its favor; yet I am not entirely certain but that an equal experience with either of the other modes recommended might have changed these convictions. The truth is, I think, that in recent cases very little force is generally requisite to accomplish the reduction, and that it is not very material which of these several modes we adopt; but in case of a failure by one mode, we ought immediately and without hesitation to resort to another, as the following case of a failure by flexion will illustrate:

A lad, *æt.* 11, fell in a gymnasium from a height of six feet, striking probably upon his hand. I saw him within twenty minutes, and found the arm in the usual position. I attempted immediately to reduce it by Sir Astley's method, but after a fair yet unsuccessful trial, I extended the forearm upon the arm until it was nearly straight, and then, with only moderate force, drew it promptly into place.

If we still continue to encounter difficulties, the patient ought at once to be placed under the influence of an anæsthetic, and, if necessary, the pulleys should be employed.

When the reduction is accomplished, which is indicated generally by the sudden slipping of the bones and by the restoration of the natural form to the elbow-joint, the surgeon, in order to confirm his opinion, must flex the forearm upon the arm to a right angle. If the bones are in place, and there is not much swelling, this can generally be done without causing much, if any, pain; but if it cannot be done, this fact furnishes presumptive evidence that the reduction is not effected. In

¹ New Method of Reduction of the Elbow, by Thomas Waterman, M.D., Boston Med. and Surg. Journ., vol. iv. Nos. 12, 13, new series, 1869.

one instance, however, of recent dislocation, this rule has not held good. A girl, *æt.* 10, fell from a tree upon her hand. I was in attendance within half an hour, and found the usual signs characterizing this accident. Reduction was accomplished readily by pulling at the hand moderately, with the forearm flexed, while my left hand pressed back the lower part of the humerus. After the reduction it was found impossible to flex the arm to a right angle without causing severe pain, and it became necessary, after placing it in a sling, to allow the hand to drop very low beside the body. A good deal of inflammation followed; but in a few weeks the arm was well, only that for a period of two years or more the elbow remained very tender.

On the other hand, an omission to apply this rule has often led the surgeon to believe the reduction accomplished when it was not. This same thing has happened to myself, and as it is the only instance in which I have omitted to adopt this test, and the only one also in which I have left a bone unreduced which I believed to have been reduced, it will be proper to state the case and its results more fully.

A lad, *æt.* 11, fell from a fence on the 22d of December, 1858, and dislocated both bones backwards. I saw him within two hours from the occurrence of the accident. The elbow was already considerably swollen and quite tender, but the signs of dislocation were very manifest. Seizing the wrist with one hand, and placing my knee against the front and lower part of the humerus, I pulled steadily for some time, and with much more force than is usually necessary, until at length two distinct and successive snaps were felt, such as one often feels when the two bones resume their sockets. Relinquishing my grasp, it was observed by myself and the parents that the deformity had disappeared. The reduction seemed to be complete, and so I announced. I then requested the lad to permit me to bend the elbow, and place it in a sling, but this he peremptorily refused to do, and ran away from me, nor would any arguments or entreaties persuade him to allow me again to touch it. I reassured the parents and child, however, that all was right, and left the house. During several successive days I saw the little patient, but although the arm remained swollen and very tender, I did not suspect the cause until the ninth day; and on the tenth day, having placed him under the influence of chloroform, the reduction was easily and satisfactorily accomplished. The recovery was slow. At the end of six weeks I found the motions of the elbow joint not completely restored, and the forefinger was partially paralyzed; but from this condition it gradually recovered, and two months later the functions of the arm and hand were completely restored.

The mistake in this instance was the more mortifying because I had just seen a case in a lad only a little older, in which another surgeon had committed the same error, and after the lapse of twelve or fourteen days I had myself made the reduction; and I was fully awake, therefore, to the possibility of the mistake.

The circumstance of the diminution and apparent disappearance of the deformity, and the sensation of a double click, can only be explained by assuming that originally the coronoid process was resting in the olecranon fossa, and that by manipulation the bones had been removed

nearer their sockets, yet not actually reduced. The swelling, also, rendered more difficult a diagnosis which, now, nothing but the flexion of the forearm could have determined positively.

If much time has elapsed since the occurrence of the dislocation, the reduction is accomplished with difficulty, if, indeed, it can be reduced at all. There are many cases upon record, however, in which surgeons have been successful after the lapse of many weeks, or even months. Boyer thought it was not possible to effect the reduction after four or six weeks; but Cappelletti, of Trieste, succeeded after seventy days;¹ Sir Astley Cooper, at three months;² Malgaigne, after three months and twenty-one days.³ Roux succeeded in a case of a young man twenty-two years of age, whose elbow had been dislocated five months.⁴ Blackman, of Cincinnati, informs me that he has reduced a lateral dislocation after five months. Brainard, of Chicago, reduced a dislocated elbow in a boy of nineteen years, after five months and thirteen days. In this case the surgeon who had first seen the patient supposed that he had reduced the dislocation.⁵ Gorre, Gerdy, and Drake succeeded in four cases after six months;⁶ I have succeeded at seven months; and Starch claims to have been successful after two years and one month.⁷ To which enumeration Denucé has added seventeen other examples said to have been reduced at various periods ranging from one month to one hundred and fourteen days.⁸

I have reduced a number of these old dislocations, the last five of which will be briefly recorded.

Thomas Robertson, *æt.* 35, was admitted to Bellevue Hospital, December 14, 1864, with a simple dislocation of the radius and ulna backwards, which had existed thirty-one days, but which had not been up to this moment recognized by his surgeon. I reduced it before the class, by Sir Astley's method, the patient being under the influence of ether. Considerable force was required.

J. G., *æt.* 7, was brought to me in November, 1865, with a backward dislocation of the right radius and ulna, which had existed nine weeks. The arm was nearly straight and fixed. Having placed him under the influence of ether, assisted by Dr. Gurdon Buck, of this city, I proceeded to flex the arm slowly, and after a few seconds, and when the elbow was bent about ten or fifteen degrees, the olecranon process separated at the line of epiphyseal union. In a few moments the reduction was completed, and the arm brought to an acute angle, but the olecranon had separated fully half an inch. We were quite certain that the ulna was perfectly reduced, but the head of the radius did not seem to occupy its original position fully. Only moderate inflammation ensued. Passive motion was soon commenced, and considerable motion of the joint was finally obtained.

¹ Cappelletti, *Am. Journ. Med. Sci.*, vol. xix. from *Annal. Univ. de Méd.* for Oct. 1835.

² Sir Astley Cooper, *On Dislocations and Fractures*, Amer. ed., p. 388.

³ Malgaigne, *Amer. Journ. Med. Sci.*, vol. xxiii. p. 238, from *Revue Méd.*, Dec. 1837.

⁴ Roux, *Amer. Journ. Med. Sci.*, vol. xvi. p. 526, from *Archives Gén.*, Dec. 1834.

⁵ Brainard, *Illinois and Indiana Med. Journ.*, 1847.

⁶ *Mémoire sur les Luxations de Coude*, par Paul Denucé, Paris, 1854, pp. 86, 87.

⁷ Denucé, *op. cit.*, p. 87.

⁸ *Op. cit.*

In April, 1869, a gentleman, *æt.* 30, consulted me on account of a dislocation which had then existed ten weeks, and which had not been recognized by his surgeon. In attempting to reduce the dislocation I fractured the olecranon, and brought the ulna into position, but I could not reduce the radius. Almost complete ankylosis of the elbow remains.

In 1870, a man was brought to me whose elbow had been dislocated eight weeks. Under ether, I succeeded in reducing the dislocation, but fractured the olecranon process in doing so. He has recovered very good use of the joint.

October 22, 1869, before the class of medical students at Bellevue, I reduced a dislocation in the case of a woman *æt.* 37, which had existed since the 10th of the preceding March, a little more than seven months. I have seen her often since; she has a somewhat limited but very useful motion of the joint.

A few years since I assisted Dr. Sayre in reducing an old backward dislocation of these bones in the case of a boy. Other means having failed, while Dr. Sayre forcibly flexed the arm, I cut the triceps, after which the reduction was easily effected. Some months later the arm was nearly ankylosed at the elbow-joint, and it did not promise very well, so far as the usefulness of the member was concerned.

Dr. W. F. Westmoreland, of Atlanta, Ga., has reported a case in which he succeeded readily in reducing a dislocation of the elbow backwards, of five months' standing, in a woman aged 22 years. The reduction was followed by great pain, a good deal of swelling, temporary impairment of circulation in the radial artery, complete paralysis of the little finger, and partial paralysis of the middle and ring fingers. On the fourteenth day, at which period the history of the case closes, all these symptoms were rapidly disappearing.¹

Nevertheless, the fact is in the main as stated by Boyer; and if so many cases can be found in which surgeons have succeeded at a late period, they are not probably in the proportion of one to five as compared with the failures. But the failures have not received the same publicity. Nor, indeed, have all the severe accidents, such as violent inflammation, suppuration, gangrene, and even death, been faithfully declared. Denucé says he has been able to trace out five or six examples in which, although the arm was reduced, grave accidents resulted, and Velpeau's patient actually died in consequence.

Michaux, at the Hôpital de Louvain, in 1841, in reducing an elbow dislocation, tore off the median nerve and brachial artery. Amputation was made and the life of the patient saved.²

Dixie Crosby, of New Hampshire, has treated two cases of ancient dislocation of the forearm backwards, by bending the elbow forcibly so as to break the olecranon process, after which the reduction was easily accomplished by extension. R. D. Mussey, of Cincinnati, has succeeded once in the same manner.³ I have reported three similar examples. Malgaigne says that Cappelletti published an example in 1835, and that

¹ Westmoreland, *Atlanta Med. and Surg. Journ.*, May, 1866.

² Debruyne, *Des Luxations du Coude*. Thèse Inaug., Louvain, 1843, p. 77.

³ Crosby, *Mussey, Trans. Amer. Med. Assoc.* vol. iii. p. 357.

Morel-Lavallée, Roux, and Maisonneuve had each met with the accident.¹

In 1879, Trendelenburg,² in a girl, æt. 15, with an irreducible dislocation of eight weeks' standing, having made an external incision, with a chisel separated the olecranon process from the shaft, and then reduced the dislocation. Observing now that, when the arm was flexed there was a wide separation of the fragments, he again straightened the arm and brought the fragments together with a wire suture. He states that the results were satisfactory!

Voelker,³ in an old incomplete backward and outward dislocation in a boy, æt. 13, attended with complete paralysis of the parts supplied by the ulnar nerve, severed the olecranon with a saw and then wired the fragments together. The result of the operation was a certain degree of improvement in the motions of the arm, and the disappearance of the paralysis.

In 1839, Gerdy,⁴ in a dislocation of six months' standing, divided subcutaneously the triceps and the adjacent adhesions, but he was still unable to reduce the dislocation.

Maisonneuve⁵ and Blumhart⁶ only effected the reduction after the most extensive tegumentary, muscular, and ligamentous dissections. Von Wahl,⁷ in two cases made an external incision, and having divided in one case both of the lateral ligaments, and in the other the external only, and having destroyed the adhesions, was unable to effect reduction. He proceeded therefore to practise resection of the joint.

Emmert⁸ and Boeckel⁹ have each practised resection in similar cases; and Ollier¹⁰ has three times resorted to the same expedient in old irreducible dislocations.

It is scarcely necessary to say that all of these latter surgical expedients should be reserved for exceptional cases. Not one of them is wholly free from danger, and the results are not in all cases such as might be hoped for. Moreover, experience has abundantly shown, and especially when the accidents have occurred in early life, that a persistence of the dislocation is not incompatible with the subsequent formation of a new and very useful joint.

In a recent case, the dislocation being reduced, it may be a matter of prudence, sometimes, to apply a right-angled splint, first carefully padded, to the palmar surface of the arm and forearm; remembering, however, that considerable swelling will soon occur, and that it ought not therefore to be bandaged to the limb very tightly. At least once a day it should be removed, and the arm examined; and in a very few cases can it be necessary or judicious to continue its application beyond

¹ Malgaigne, op. cit., Paris ed., 1855, vol. ii. p. 144.

² Trendelenburg, Centralblatt für Chir., 1880, No. 52, p. 833.

³ Voelker, Deutsche Zeitschrift für Chir., Bd. 12, Hft. 6.

⁴ Gerdy, Annal. de Chir. Française et Étrang., t. 2, p. 151.

⁵ Maisonneuve, Poinsot, op. cit., 918.

⁶ Blumhart, Gaz. Méd. de Paris, 1847, p. 238.

⁷ Von Wahl, St. Petersburger Med. Wochenschrift, 1879, No. 23, p. 221.

⁸ Emmert, Rev. Méd. Chir., t. 3, p. 177.

⁹ Boeckel, Frag. de Chir., Paris, 1882, p. 85.

¹⁰ Ollier, Rev. Mens. de Chir., 1882, pp. 722-734.

one week. At the same time, if there is any especial tendency in the radius to become displaced backwards, owing to a rupture of its annular ligament, this must be prevented, if possible, by a compress and bandage. Some surgeons regard these precautions as necessary in all cases, but I have seldom employed any splint or bandage whatever, nor have I ever had reason to regret this omission.

Finally, we are to place the arm in a sling, and adopt such measures as are calculated at first to reduce the inflammation; and at a very early day we ought to begin to move the elbow-joint, in order to prevent ankylosis.

Dislocations Backwards and to the Radial Side will be considered in connection with outward dislocations; and *Dislocations Backwards and to the Ulnar Side*, in connection with dislocations inwards.

§ 2. Dislocations of the Radius and Ulna Outwards (to the Radial Side).

(a) COMPLETE OUTWARD DISLOCATIONS.

The large majority of outward dislocations of the forearm are incomplete; indeed, only nine examples of a complete dislocation have been collected by Denucé, including two seen by himself.¹ (In his last memoir he has added four more.) Malgaigne has recorded two;² Mollière, of Lyons, has reported one,³ Amboni,⁴ Hatry,⁵ Bertin,⁶ have each reported one. Andrews⁷ has also reported one, and Salleron one,⁸ Osborne one,⁹ Varick one,¹⁰ Wylie one.¹¹ Dr. Erskine Mason has reported two, in children of seven and twelve years respectively, and he refers to another reported by one of his colleagues at Bellevue in the Medical Record for Oct. 9, 1875, in the person of a lad æt. 17,¹² making in all nineteen cases. Dr. Varick's case is reported as follows:

"George Knight, æt. 9 years, was thrown violently from a wagon while in rapid motion, striking on his head and back, with his left arm behind him in a state of flexion. He was brought to my office on the 31st of August, 1867, within ten minutes after the receipt of the injury, and, consequently, in the most favorable condition for manipulation, no swelling of the soft parts having yet occurred. The forearm was in a state of semiflexion, supported by the hand of the opposite side, the ulna lying to the outer side of the external condyle, with slight posterior projection of the olecranon. The olecranon, coronoid process, and greater sigmoid cavity could be distinctly defined, and the head of the radius, in its normal relations to the ulna, could be felt rotating subcutaneously on

¹ Denucé, Mém. sur. Lux. des Coudes. Paris, 1854.

² Malgaigne, op. cit.

³ Mollière, Monthly Abstract Med. Sci., vol. i. p. 269, 1874.

⁴ Amboni, Annal. Univ. di Med., July, 1872.

⁵ Hatry, Lyon Méd., t. 18, p. 13, 1875.

⁶ Bertin, Union Méd., 1876, p. 609.

⁷ Andrews, Med. Record, Oct. 23, 1875, p. 720.

⁸ Salleron, Pingaud, Art. Coude, Dic. Encyc. Sci. Méd., ser. 1, t. 21.

⁹ H. B. Osborne, Hosp. Gazette, Nov. 29, 1879, p. 613.

¹⁰ T. R. Varick, Med. Record, Nov. 1, 1867, p. 337.

¹¹ W. Wylie, Med. and Surg. Rep., March 22, 1879, p. 250.

¹² Mason, Med. Record, April 10, 1880, p. 397.