be undertaken it is better to excise the lunate than to replace it, as the latter treatment always causes aseptic necrosis of the lunate. The writer has met a surgeon who was able to amputate a leg through the thigh seventeen days after removal of the lunate upon his own wrist, following several attempts at manipulative reduction. Twenty years later he appears to have a normal wrist.

Bennett's Fracture-Dislocation of the Thumb

This is a fracture-dislocation of the base of the first metacarpal. Treatment should consist of traction with a pin through the pulp fixed to cramer wire, which is incorporated in a forearm and wrist plaster. The thumb should be in a plane at right angles to the palm, and extension should last for four weeks.

Fractures of the Metacarpals

Fractures of the shafts of the metacarpals other than that of the thumb should be treated by manipulation followed by active exercises only. The fingers should never be splinted nor immobilised in these fractures. Stiff fingers are the result.

Fractures of the neck of the metacarpals with forward angulation of the distal fragment should be corrected by right-angled flexion and backward pressure, and not by hyper-extension.

Fractures of the Phalanges

These fractures usually show forward angulation and should be treated by extension by strapping on either side of the fingers in flexion on a malleable wire splint on the palmar surface for ten days. Each finger should point to the tubercle of the scaphoid. No finger must ever be splinted in extension. Strapping should never be applied round a finger or toe. It should be applied longitudinally on either side.

All compound fractures of the fingers must be operated upon immediately. They can give more serious after-results than a fracture of the femur in a working man. In operating upon a compound fracture of the finger, the fracture should be reduced. Cut tendons should never be sutured at the original operation. Tendons should be sutured two weeks after healing in the case of a clean wound, and two months after healing in the case of an infected one. The skin should not be sutured at the original operation. Catgut should not be buried. The finger should be splinted in a palmar malleable wire or *plaster in flexion*. If traction is required, it should be done by means of two lateral strips of strapping.

All compound fractures of the fingers should be admitted as emergencies, and should be under the direct supervision of an experienced surgeon. The after-results of these injuries are still very depressing, and only too frequently result in the patient losing his occupation or being down-graded.

THE ART OF ORTHOPAEDICS

PART IV

INJURIES AND DISEASES OF THE SHOULDER AND ELBOW JOINTS

By G. O. TIPPETT, F.R.C.S.

(Hon. Asst. Orth. Surgeon to Queen's Hospital for Children and Croydon Hospital; Med. Off. Physiotherapy Dept. Bermondsey Health Centre)

Shoulder Joint

Owing to the varied uses to which the arms are subjected injuries of the shoulder joint are extremely common, ranging from injuries to the soft parts to dislocations and fractures. As in previous articles, fractures are not being discussed. The traumatic injuries which the examiner must bear in mind are the following:—

Sprains

A sprain may damage by tearing either some of the muscles surrounding a joint or may partially or completely tear the ligaments or capsule of a joint. In injuries to the muscles around the joint the patient usually can tell the examiner what particular movement brought on his trouble and the examiner, by making that group of muscles perform a particular movement, can reproduce the patient's pain. Similarly, if the examiner puts the joint through the opposite range of movement, that is passive movement, pain again will be reproduced. Sometimes, however, all muscles around a joint have been over-stretched, in which case all joint movements will be rather painful. At this stage it is well to bear in mind that what are commonly called the movements of the shoulder joint by the patient are not only the movements between the humerus and the scapula, but also the movements between the scapula and the chest wall, sometimes called the compensatory shoulder movement. The differentiation of these two groups of movement is extremely important in the

diagnosis of shoulder joint injuries. If the examiner asks the patient to raise his arm from the side, in a normal shoulder joint this movement of abduction is carried out through 90 degrees and then, in order to enable the patient to put his hand above the head, the scapula commences to rotate around the chest wall. The further significance of this compensatory movement will be dealt with later on in the discussion of adhesions around the joint.

Sprain of the ligaments is usually difficult to diagnose as so often the muscles are tender and painful due to the injury.

Occasionally, following a history of a fall, the patient may notice inability to abduct the shoulder when the examiner must bear in mind the diagnosis of a supra-spinatus tendon injury. In these cases the patient is unable to commence the movement of abduction, but if the examiner assists him to make the first twenty degrees of this movement abduction can then be carried out by the patient using the deltoid muscle. Similarly, a patient will be unable to make fully the movement of abduction and external rotation owing to the fact that the external rotation factor cannot be made owing to the supra-spinatus injury.

Peri-articular Adhesions

In many cases of slight injury of the shoulder joint in persons of middle life the stiffness that ensues in this joint is out of proportion to the degree of violence sustained by the joint. In younger persons the oedema that results from a sprain or a contusion to the structures about the shoulder joint usually resolves and is dispersed by movement, hence stiffness following injury of a shoulder joint is not so common in the younger periods of life. But in the elderly person this oedema is not so easily dispersed; it clots and forms dense adhesions between the muscles and the capsule of the joint, giving rise to gross limitation of all the movements of the shoulder. Very often this condition of frozen shoulder joint occurs much more commonly in those persons suffering from rheumatism or fibrositis. Its diagnosis is easy in so much as if, on examination, a shoulder joint is found to have practically no movement and there is a history of predisposing trauma; there is only one other disease with which this condition of peri-articular adhesions has to be differentiated, namely, that of a tuberculous joint.

Adhesions

In other cases where the shoulder joint has sustained either a contusion or a sprain, a traumatic synovitis has followed resulting in thickening

and hyperaemia of the capsule and synovial membrane together with distention of the joint. When the effusion disappears as movement returns, some of the redundant folds of the membrane may become adherent either to themselves or to the articular surfaces of the bone, resulting in intra-articular adhesions. The diagnosis of this type

FIG. 1.—A. Upper site of tenderness on pressure.
B. Newer site of tenderness on pressure.

of adhesion is easy, since the patient will give a history of having sustained an injury; that recovery of shoulder movements has progressed up to a point but that he knows, and the examiner can demonstrate, that movement of the arm in one or two directions is limited by pain. Sometimes tenderness of the capsule at the side of adhesions can be made out.

Dislocations

Since the head of the humerus is surrounded by thick muscles there are times when the diagnosis of a dislocation may not be easy. Then an X-ray and the presence of a stiff, painful shoulder following recent injury must make the examiner remember the possibility of a dislocation which, if not possible to diagnose by palpation, will readily be recognised by an X-ray.

Fractures

Owing to the head of the humerus being deeply placed, impacted fractures and chip fractures of the greater tuberosity may sometimes be difficult to diagnose without an X-ray, though the presence of pain with all attempted movements, together with evidence of bruising appearing a day or so after the injury, should make the examiner consider the possibility of an impacted fracture without displacement, its presence being confirmed by X-ray photograph.

Osteo-arthritis

The commonest cause of pain in the shoulder in relation to trauma is undoubtedly due to osteo-arthritis. In osteo-arthritis probably the movements of abduction and abduction-external-rotation are the earliest movements to be diminished. There is little muscle wasting and no signs of inflammation. The diagnosis of the presence of osteo-arthritis can therefore only be made bearing in mind the age and occupation of the patient, confirmed by creaking and the presence of X-ray changes.

Tuberculosis

The diagnosis of a tuberculous shoulder is either that of a gradually increasing stiffness of the joint as is seen in that type of tuberculosis called Caries Sicca, or in the more usual form that tuberculosis takes, namely, where pain of a constant aching nature is the more prominent symptom caused by progressive destruction of the articular surfaces of the joint. Wasting of the muscles around the joint will be very noticeable. There will be limitation of movement due to muscle spasm. The joint itself will be noticeably distended and there may be evidence of warmth. The final diagnosis will probably be made by the X-ray appearance which will show decalcification and erosion of the joint surfaces.

Rheumatoid Arthritis

This may affect the shoulder joint, when the diagnosis is usually made by the presence of the typical spindle-shaped swelling of the smaller joints. It manifests itself by an increasing diminution of the range of movements of the shoulder together with a certain amount of aching. Differentiation from tuberculosis by means of an X-ray will be easy, since there will be in the early stages little of the decalcification which is so noticeable in the tubercular radiograph. Fibrositic lesions of the trapezius muscle and an arthritis of

the cervical spine commonly give rise to referred pain around the shoulder joint. The diagnosis will be made by the presence of tender nodules in the muscles around the shoulder joint and by limitation of movement, creaking, and pain on moving the cervical spine. In the latter case X-ray photographs will show a typical lipping of an osteo-arthritis.

A rare cause of pain in the shoulder region is due to an inflammation of the sub-deltoid bursa. The diagnosis of this condition is made by the complaint of pain on abduction of the arm together with tenderness below the acromium process. Allied to this condition inflammation and calcification may be found in the tendon of the supraspinatus muscle, which is again diagnosed by pain and limitation of the movements of abduction and abduction-external-rotation.

Elbows

Injury to the elbows may give rise to sprains, dislocations, and fractures.

Sprains

In children the injury, which in an adult would give rise to a tearing of some of the fibres of a ligament, will tear off a flake of bone rather than tear the ligaments. Thus sudden jerks of the internal or external lateral ligaments in children often pull off the internal or external epicondyle, and as the force tears the capsule and the joint is opened up into abduction or adduction this fragment may get caught and nipped in the elbow joint. Therefore the presence of a painful, stiff elbow joint in children must make the examiner consider the possibility of this condition which is really that of a fracture. In adults the same type of injury will produce a tearing of the ligaments resulting in pain and tenderness at the side of that ligament. As in the injury of the internal lateral ligament of the knee joint, limitation of the movement of full extension is commonly present in sprains of the ligament about the elbow. Allied to the condition of sprained ligament is the condition commonly called "tennis elbow". Tennis elbow may be caused by a direct violence on to the joint, which tears off either some of the origins of the radial extensor muscles from the humerus, or from their origins in the deep external lateral ligaments. In either case a condition of tennis elbow is brought on by repeated over-use of the arm under certain conditions when these extensor muscles are used. The diagnosis of the so-called tennis elbow is made by fully extending the elbow, flexing the fingers and the wrist, whilst at the same time the arm is forcibly pronated, when

FIG. 2.
SHOULDER MOVEMENTS

1. This degree of abduction has only been secured because when the humerus passes the horizontal position the scapula now starts to rotate around the chest wall.

2. Humerus can abduct this amount before the scapula starts to move also.

This is very important to understand, since often when the patient states that he can raise his arm from his side, it will be found that all this movement is taking place between the scapula and the chest wall. There is no movement between the humerus and the scapula, due to adhesions, arthritis, etc.

In a lesion of the supra-spinatus tendon the patient needs assistance by the examiner to commence the movement of abduction. But when the arm has been raised beyond about 20 degrees, the deltoid muscle can then exert its leverage and take over the abducting power from the injured supra-spinatus muscle.

In bursitis of the sub deltoid bursa, tenderness is found as shown whilst the movement of abduction is painful as the inflamed and swollen-bursa becomes nipped by the tip of the acromium as the arm abducts.

pain and tenderness will be complained of if the examiner presses with his thumb the upper part of the affected radial extensor muscle.

Adhesions

Traumata to the joint may give rise to a synovitis with a sequelae of local and general adhesions. It may be noted that in many cases of injury and fractures about the elbow joint it takes many months for the movement of full extension to take place. This is due to the oedema of the traumatic synovitis diffusing into the brachialis anticus muscle, there clotting, organising and turning into fibrous tissue. Thus, the muscle is unable to fully relax and permit of full extension.

Dislocations

These are readily recognised by the degree of anatomical displacement. The only fractures I propose to mention are those where the epicondyle becomes nipped in the joint and fissures of the head of the radius. Commonly the elbow joint may sustain an injury which the patient may not take much notice of at the time, but within a few days he notices pain on attempting to extend and rotate the forearm. The examiner may find tenderness of the head of the radius and an X-ray will reveal a small crack of the articular surface. The limitation of extension being due to the traumatic sinovitis inhibiting full relaxation of the brachialis anticus muscle.

Diseases of the Elbow Joint with no Relation to Injury

Osteo-arthritis of the elbow joint is commoner in men than women, especially where the patient is engaged in hard manual labour. It is diagnosed by limitation of movement, pain, and creaking. An X-ray will reveal the typical changes of the disease.

Rheumatoid arthritis is common, resulting in a typical spindle-shaped swelling with wasting of the muscles above and below, with restriction of the range of movement due to spasm and peri-articular thickening. As this joint is not deeply placed, evidence of acute inflammation as shown by heat, redness and swelling may be readily discernible.

Tuberculosis is commoner in adults than children. It is diagnosed by the chronicity of the history, continuous aching, gross wasting of the muscles about the joint, the presence of a doughy swelling, and limitation of movement due to muscle spasm. An X-ray will confirm by the presence of decalcification and erosion of the articular surfaces.

Charcot's disease is commonly manifested in the

elbow joint as this joint is subjected to much trauma. The presence of a gross osteo-arthritis in a patient in whom pain is noticeably absent, when it would be expected in view of the disorganisation, and the X-ray appearances of the joint should make the examiner remember this rare condition. In women, similar appearances suggesting a Charcot disease may be found in sufferers from syringo-myelia.

Epitome

In attempting to give a résumé of the diagnosis of the orthopaedic conditions which affect the joints of the body, I am well aware, within the compass of the space allotted to me, that I have only touched on the fringe of the many conditions that may affect these joints. It is manifestly impossible for me to go into the full physical examination and, in any case, these articles are written for the post-graduate reader. I have therefore endeavoured to give a patchy physical examination but to bring out those special points which experience has taught me will enable a quick differential diagnosis to be made. I have not been able to deal with the numerous conditions of congenital malformations, nerve injuries, rheumatic conditions, or fractures which truly come within the province of the orthopaedic surgeon.

CHRONIC RHEUMATIC DISEASES

By E. FLETCHER, M.A., M.D., M.R.C.P. AND
E. LEWIS-FANNING, B.Sc., Ph.D.

PART IV

A STATISTICAL STUDY OF 1,000 CASES OF CHRONIC RHEUMATISM

By E. LEWIS-FANNING, B.Sc., Ph.D.

Duration of Disease, Length of Treatment, and Results.

Some course of treatment was given to all except twenty of these patients, and perhaps the most interesting aspect of the investigation centres around the results; whether treatment was more successful in certain types, and whether longer treatment would have been more beneficial in one type than another. Since the length of treatment varied from one day to eight years, it was evident at the outset that in comparing the results of treatment in relation to type of rheumatism, allowance must be made for variation in the length of treatment, but the problem was complicated still more by the presence of another variant, duration of