was made over the inner aspect of the ankle-joint, and through it the tibia was brought backwards till the broken fragment could be fitted accurately in position. A screw was driven through the malleolus into the lower end of the tibia, fixing the fragments securely in apposition, and restoring both the tibia and fibula to their normal form. The result was excellent (Fig. 12), the patient rapidly regaining the use of the limb.

These cases illustrate very well the use of the several appliances—screw, wire and staple—under varying conditions, and all with complete success.

I may say that age is no barrier to operation; indeed, in old people an operation is often more imperatively called for than in vigorous life, for the reason that prolonged recumbency in old age is a very serious matter, often entailing of necessity a fatal result. The shock sustained because of surgical interference is trivial, and old people bear operations very well indeed.

REFERENCE.

¹ Une agrafe pour sutures osseuses, *La Presse Médicale*, December 25th, 1901.

OPERATIVE INTERFERENCE IN FRACTURED CLAVICLE.

By H. N. TAYLOR, M.A. CANTAB., M.A., M.D. DUBLIN,
F.R.C.S. Edin.

Surgeon-Captain, Army Medical Reserve; late (temporary)
Surgeon-Captain in the Army.

THE patient, No. 6074 Private A. E. S., 5th Royal Irish Lancers, was admitted into my wards in the Colchester Station Hospital on March 28th, 1903, having sustained a fracture of the left collarbone, which was treated by Sayre's method. At the end of three weeks, however, there was no sign of union or of any formation of callus; the ends of the bone were, therefore, well rubbed on each other, and the arm secured as before.

After the lapse of another fortnight, there being still no evidence of any attempt at union, the arm was simply placed in a sling, in the hope that the somewhat limited mobility thus allowed would excite the formation of the encircling callus usual under such circumstances.

By the end of May, however, not only had the clavicle remained ununited but there was not the slightest evidence of any preparation for union, and the patient was very anxious that "something should be done" to enable him to return to his duty—an anxiety which was increased by the fact that a comrade who had been admitted on March 29th had now been discharged from the hospital. I therefore decided to cut down on the clavicle and wire the fragments.

Adopting Mr. Barker's plan¹ I turned up a semilunar flap including some muscular fibres, and exposed the clavicle. There was no false joint, as in Mr. Barker's case, and no formation of any ensheathing callus, but merely a very thin layer between and strictly limited to the surfaces of the fracture.

I decided not to remove any bone, but after refreshing the surfaces, I passed a stout silver wire from above downwards and a little forwards, about $\frac{1}{2}$ in. from the ends of each fragment. The wire was tightened and twisted, thus securing firm apposition, and the ends were nipped off and bent well under the bone to guard against any subsequent irritation from the pressure of braces or shoulder straps.

The wound, which was dressed with iodoform gauze and a large pad of salicylic wool, healed readily, though there was some little delay from a small stitch abscess.

The arm was secured to the side by firm bandaging, and there was at no time any exuberant formation of callus. The man was discharged on "sick furlough" on July 14th with an apparently firmly-united clavicle and with no impairment in the mobility or usefulness of the arm.

If I may venture to express an opinion, I think that this operation might be performed more often than it is in the case of delayed union of the clavicle, with the advantage to the patient of a considerable saving of time, and in those cases of deformity, especially in women, produced by a vicious union, Jacobson considers the procedure quite justifiable. The structures beneath the clavicle are, as the same authority points out, rendered quite safe by the interposition of the subclavius muscle.

My thanks are due to Major Beyts, R.A.M.C., for his kind assistance during the operation.

REFERENCE.

¹ Jacobson's *Operations of Surgery*, vol. i, p. 187, 1902.

A CASE OF CONGENITAL SYNOSTOSIS OF BOTH UPPER RADIO-ULNAR ARTICULATIONS.*

By S. HAMILTON, B.A., M.B., B.CH.,
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THE defect in this case is clearly shown in the two radiographs which are here produced. There is a complete bony fusion of the radius and ulna at their proximal ends in both arms. I have described it as synostosis because the condition is congenital, as the history will show, rather than

Fig. 1.—Normal elbow (for comparison).

ankylosis, because this term is generally applied to the result of a pathological process, such as acute suppurative arthritis, tuberculous joint disease, or chronic rheumatism.

The patient is a man aged 32. His mother, who is alive,

Fig. 2.—Congenital synostosis of right upper radio-ulnar articulation.

gives a very clear history of the case. Nothing unusual was noticed until between the age of $3\frac{1}{2}$ and 4 years, when he was

* Read before the Monmouthshire Division of the British Medical Association (and patient shown), November 25th, 1904.

sent to an infants' school. The teacher asked him to hold out his hand. He tried but failed to perform the act of supination. The teacher grasped his hand and tried to forcibly supinate it but was unable to do so. She then took the boy home to his mother and told her that there was something wrong with his arms. He was shown to two medical men (since deceased) who expressed the opinion that his arms were in the same condition at birth, suggested an operation, but did nothing. His mother states that previous to the abnormality being noticed he had not suffered from any acute illness or fever. He has never had an accident to his arms. He has never had rheumatism. There is no history of syphilis either congenital or acquired. There are no cicatrices about his elbow or other joints to indicate old suppurative disease. He never remembers any swelling of his joints. Necessarily he has never had the power of supination and pronation, and his forearms were in exactly the same state when first I saw him six or seven years ago. He works every day as a fitter's helper. In doing his shopping he finds it most inconvenient to receive change, as he cannot take it in the palm of his hand, but can only grasp it between his index finger and thumb.

Fig. 3.—Skiagraph of left upper radio-ulnar articulation (congenital synostosis).

The morphological condition is a rare one. I have been unable to find any similar case recorded in any surgical work. Dr. Hepburn, Professor of Anatomy at Cardiff University College, who has kindly consulted for me the *Transactions* of anatomical societies and various works of reference on anatomy, cannot find a parallel case reported. In looking over the comparative anatomy of the mammalia for a homologue, we must look back some distance from *homo* before we come across a loss in the power of supination and pronation. In many mammals the bones of the forearm (antebrachium) are more or less coalesced. In bats and some ungulates—for example, the ruminants—the radius is enlarged at the expense of the ulna, of which only the proximal third remains ankylosed. The radius and ulna are completely ankylosed in camels. Among some insectivora they are ankylosed inferiorly. They ankylose at both ends in sirenias. They are never ankylosed in carnivora or rodentia, or monkeys and apes.

In man in the second month of embryonic life the elbow-joint appears. At first the radius is in front of the ulna; afterwards the radius moves sideways so as to lie parallel to the ulna, and by the rapid growth of the head of the radius the ulna becomes flattened or concave so as to form the lesser sigmoid cavity of the ulna.¹

In the case here described we are dealing with a condition which presents a partial return to one of the lower vertebral forms of the elbow-joint, whereby, owing to an arrest of growth, the joint cavity has failed to develop and the tissue which ought to have advanced to the formation of joint surfaces has remained in the embryonic condition until it was transformed into fibrous tissue and afterwards into bone, thus constituting a synostosis.

The radiographs which illustrate this paper were done for me by Mr. W. Jones Greer, F.R.C.S., whose kind offices I beg to acknowledge.

REFERENCE.

¹ Karl v. Bardeleben. *Handbuch der Anatomie des Menschen*. Vol. xi.

THE INFLUENCE OF POSTURE ON THE NORMAL CARDIAC SOUNDS AND ON THE NORMAL CARDIAC DULLNESS.

By WILLIAM GORDON, M.D., F.R.C.P.,
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THE changes in cardiac murmurs which occur on change of posture are so pronounced as to suggest the inquiry whether alteration of position also affects the normal heart sounds. Careful observation of normal hearts will soon convince any one that change of position does affect the normal heart sounds, sometimes slightly, sometimes markedly. The change produced is a change in the character of both sounds. It will generally be found that, in the upright position, the first sound is sharper, whilst the second sound is duller, than in the recumbent position, so that the two sounds are much more like each other in the upright position than they are in the recumbent. Indeed, it may be fairly said that the "lub-dup" of the textbooks is, in most cases, a true description only of the sounds when the body is recumbent, and that "lup-lup" more exactly describes them when the body is erect.

How can these differences be explained? I have shown elsewhere¹ that the changes in cardiac murmurs produced by

Fig. 1.

Fig. 2.

change of position can be explained partly by the action of gravity on the intracardiac currents, partly by the flattening of the chest which occurs, as I have pointed out, when the patient lies on his back.

As the changes now referred to are changes in the character of the sounds, differences in the depth of the chest cannot be held to account for them, and the question reduces itself to this: "Can the action of gravity account for the changes?"

If the position of the valves of the heart in the upright and recumbent positions are considered it becomes obvious that, when the first sound is produced, a weight of blood is resting on the mitral and tricuspid valves if the person examined be recumbent, but that if the person be erect no such weight rests on these valves. Also it is obvious that, when the second sound is produced, a weight of blood is resting on the aortic and pulmonary valves, if the person be erect, but that if he be recumbent no such weight rests on these valves. Therefore the question resolves itself into this (since the first sound is admittedly in part valvular): "Does a valvular sound vary according as a fluid weight does or does not rest on the valves producing it?" The following experiment shows that it does:

A glass tube A, 3 cm. in diameter, has one end open and the other drawn out to a neck. A membrane, B, of inelastic waterproof material is stretched not quite tightly over the broad end. The neck is connected with a ball syringe, C,* by a short length of rubber tubing, D. The whole apparatus is filled with water, so that a slight sudden pressure on C makes B suddenly tense, and thus produces a sound. It will be found that when A is held, as in Fig. 2, with B upwards, that is, with no weight of fluid on B, this sound is sharper than when A is held with B downwards,

* The ball syringe is kept base upwards in both experiments to prevent any air bubbles it may contain from getting into the tube A.