A SPLINT FOR COMPOUND FRACTURES OF THE ARM.

By GEORGE M. GILES, M.B., F.R.C.S.,
LIEUTENANT-COLONEL I.M.S.(RET.); ABINGDON.

The treatment of the ordinary simple fractures of the humerus is a matter of little difficulty, and, in peace, compound fractures of the upper arm are rare. The fractures, however, met with in military practice are compound, and the damage to both soft and hard parts so great that it is difficult to bandage any splints with adequate firmness, and well-nigh impossible to get any proximal point of fixation by means of any of the splints in ordinary use.

These difficulties were brought prominently to my notice in the case of a man nearly recovered from a gunshot fracture of the humerus about 5 in. above the elbow, who, when running upstairs, fell and refractured the arm, at the same time tearing open the well-nigh closed flesh wound on the front of the arm. He was an exceptionally powerfully made man, who had gained high distinctions as a wrestler, in the pursuance of which

sport the arm had been broken six times, so that the present is the eighth fracture. The bone is naturally ex-

tremely irregular and a good deal shortened.

Finding I could not get the ends in position with any of the ordinary splints I devised the appliance here described, which can easily be made in less than an hour by any one who is amateur mechanic enough to bend stout wire and clip into shape some scraps of tin.

The essential point of the contrivance is the long narrow extension, which is brought up and bent over the acromion and fixed there in position, directly over the head of the humerus, by means of a pair of body straps. Its form and method of application can easily be understood from the accompanying drawings.

To make the splint the following measurements of the patient's sound arm are required:

- A-B, length from knuckles to olecranon.
- B-C, length from olecranon to acromion, + 2 in. for tall and $1\frac{1}{2}$ in. for short men.
- D-E, length from anterior axillary fold to the insertion of the biceps, with the elbow flexed to right angles.
- E-F = A-B minus about 4 in., the diameter of the upper arm, allowing for padding.
- G-D, in a direct line, is about 6 in., but as the wire forms a double curve, dropping below the axillary folds vertically, and wrapping round the arm horizontally, about a couple of inches more must be allowed.

All transverse measurements vary with the muscularity of the patient, and the table is merely given as a suggestion for sizes to be kept in stock.

Height of Patient.	A-F	A-B	B-C	D-E	E-F	F-A
About 6 ft. ...	inches. $3\frac{1}{2}$	inches. $16\frac{1}{2}$	inches. $17\frac{1}{2}$	inches. $5\frac{1}{2}$	inches. 12	inches. $3\frac{1}{2}$
„ 5 ft. 10 in. ...	inches. $3\frac{1}{2}$	inches. 16	inches. 17	inches. $5\frac{1}{2}$	inches. $11\frac{1}{2}$	inches. $3\frac{1}{2}$
„ 5 ft. 8 in. ...	inches. $3\frac{1}{2}$	inches. $15\frac{1}{2}$	inches. $16\frac{1}{2}$	inches. 5	inches. $11\frac{1}{2}$	inches. $3\frac{1}{2}$
„ 5 ft. 6 in. ...	inches. $3\frac{1}{2}$	inches. 15	inches. 16	inches. 5	inches. 11	inches. $3\frac{1}{2}$
„ 5 ft. 5 in. ...	inches. 3	inches. $14\frac{1}{2}$	inches. $15\frac{1}{2}$	inches. 5	inches. $10\frac{1}{2}$	inches. 3
„ 5 ft. 4 in. ...	inches. 3	inches. $14\frac{1}{2}$	inches. 15	inches. 4	inches. $10\frac{1}{2}$	inches. 3
„ 5 ft. 3 in. ...	inches. 3	inches. 14	inches. 15	inches. 4	inches. 10	inches. 3

The short ends A-F and F-A are bound together with binding wire, preferably strengthened with solder.

Some stiff tool, such as a screwdriver, is passed through the loop c and twisted—against the clock for the right arm,

and with it for the left; so that the plane of the loop is turned through rather more than a quarter circle. The frame is then placed in position upon the arm of a person of appropriate stature, with the joint F-A held in the hollow of the hand, and the loop c bent and manipulated so that it forms an open spiral upwards and forwards, round the back of the arm, and comes to lie against the acromion, projecting from $1\frac{1}{2}$ in. to 2 in. above it; this projecting part is bent sharply with a pair of pliers, so as to hook over the top of the shoulder-joint.

The angle E is then twisted forward, so as to lie above the insertion of the biceps with the arm bent, and finally the frame is filled in with a couple of pieces of tin cut to the required shape and bent to fit the arm. These pieces are easily secured in position by bending the edges of the tin round the wire frame; but an even better job can be made by running a little solder into these bent-over edges.

The position and size of the pieces of tin can be varied to suit the position of the wounds, or fenestra may be cut in any required position. A couple of long pieces of bandage, or, what is better, lamp-wick, are passed through the loops c and d, and the splint is carefully padded and covered with jaconet, special attention being given to covering the angle E, as this forms the lower point of fixation. The loop c, which, of course, is also padded, is secured in place over the acromion by means of the lengths of lamp-wick, additional support being gained from the wick looped through d. If these be properly secured, it will be found that a very small amount of bandaging of the upper arm will suffice to keep the bones in position, and that the patient may be allowed to get up and about at a very early stage, as the weight of the arm is a most efficient aid in keeping up extension; it is a

Tracing of radiograph to illustrate relation of acromial loop to the bony parts.

point of much importance, in order to secure this, so to arrange the arm sling as not to support the weight of the elbow too much.

In the figure the lamp-wicks are shown secured to a sort of waistcoat of stout calico, which is a good plan to

prevent the straps from pinching the opposite axilla, but it is quite easy to secure the straps from c and d by crossing them under the opposite axilla and over the shoulder.

If a number of splints are to be made, it is well worth while making a templet arm consisting of 18 in. of 4 in. round pole, into which a piece of inch plank to represent the forearm is mortised. By making the mortise 7 in. deep the templet can be adjusted to suit any stature from 5 ft. 3 in. to 6 ft. 2 in.

AN ADJUSTABLE AND STANDARDIZED SPLINT FOR THE TREATMENT OF FRACTURES.

By W. B. HAYES, M.D., M.Ch.,
SURGEON TO CO KERRY INFIRMARY.

CURRENT literature, and the large variety of apparatus exhibited at the recent exhibition at the Royal Society of Medicine, impress on one the need for improvement in the methods of overcoming the difficulties encountered in war in the treatment of compound fractures of the limbs. These difficulties have taxed the ingenuity of surgeons.

Three things have to be considered in the circumstances—the immediate treatment at the seat of war; the transport to the base hospitals, and the treatment at these hospitals.

The greatest difficulties seem to have been in connexion with the treatment of compound fractures of the lower limbs. Several essentials are required for a splint for this purpose. Simplicity and efficiency are the first requisites. The perfect splint must be capable of maintaining the limb in a fixed extension and immobilization, and it must be a skeleton splint, to facilitate dressings without disturbing the position of the splint. If to the above requirements are added adjustability, adaptability, and standardization, and the quality of being rapidly fixed, all the needs of an ideal splint are satisfied.

The Thomas splint, as advised by Mr. Robert Jones, is the simplest and most efficient that has yet been thought of, but the more elaborate and complicated the modifications of this splint, the more they are removed from simplicity and efficiency. Observation of Mr. Jones's hospital practice impresses two things on one—first, the remarkably successful results attained, and secondly, the great simplicity of the appliances used by him for that end, all elaborate and complicated apparatus being conspicuous by their absence.

I have found that the splint which I am about to describe fulfils all the requirements of a complete splint. Its ready applicability to any particular case by a simple adjustment gives it a special value under all conditions. It is practically the Thomas splint, which is made completely adaptable. It is adjustable to any size limb and can be adapted to either the right or the left side. Being made from one pattern and in one size, it is therefore standardizable. The ease of application of the splint, which takes a few minutes, is a most important matter for the consideration of the hard-worked surgeon who is obliged to cope with a rush of work. The wounded can be transported with the greatest possible comfort and safety under the circumstances. A great difficulty in the immediate treatment, and transport, of these cases is overcome by the application of this splint.

The illustrations of the splint explain its construction, and no elaborate description is needed.

The truss ring is made of malleable iron, open in front, so that by bringing the open ends together, or separating them, it can be adjusted to the required size. Two tubes are attached to the ring with sufficient play so that the ring can be altered to any angle required to suit the right

or the left side. The lower portion of the splint consists of bent rod iron; the arms of the bent iron are inserted into the corresponding tubes, and by simple telescoping can be fixed by a screw in any position required to suit the

length of the limb. Attached to the lower end of the splint there is a rest, which when turned down raises the limb to any angle required; it will be an advantage in transport, and when not required may be folded up, for it has the shape of the limb and does not interfere with the dressing.

The splint which I have attempted to describe in this short article has been examined by Mr. Robert Jones, who has been good enough to allow me to mention the fact that he personally approves of it.

A NOTE ON THE ELECTRICAL TREATMENT OF DISABILITIES DUE TO WOUNDS.

BY
JOHN J. GRACE, F.R.C.S.,
CHIEF ASSISTANT IN THE X-RAY DEPARTMENT, ST. BARTHOLOMEW'S HOSPITAL.

It is a truism to say that electricity has a very distinct and useful place in the treatment of those disabilities which follow wounds involving joints, muscles, tendons, and nerves, but it is not sufficiently recognized that the correct application of the kind of current best suited to the condition to be treated is of essential importance. It cannot, of course, be expected that surgeons, in addition to the mastery of their highly technical work, should have all the details of so rapidly advancing an art as electrotherapeutics at their finger-tips, but if the aim of electrical treatment in these injuries be kept in view, it will not be difficult to indicate to the patient the nature of the treatment he requires.

I am moved to write this owing to the considerable number of patients I have seen who have been given electric baths for local injuries to the limbs. How the passage of the constant current or the uninterrupted sinusoidal through a patient could influence such conditions for good or ill I am at a loss to imagine. Such currents often have a good general effect on metabolism. That is all. Some local effect on the molecules traversed by the current there may be; indeed, so far as the galvanic current is concerned, there is undoubtedly some effect, but while we see the results in some cases—for example, of neuralgia—we cannot say to what they are due.

When we come to consider the interrupted currents we are on much surer ground, and there is no difficulty whatever in seeing how their effects are produced.

Whether the injury has affected joints, muscles, ligaments, nerves, or all together, as is perhaps most frequently the case, the object sought is to increase the blood supply to the part, and having done that, or whilst doing it, to contract the muscles of the part so as to drive this increased supply through all the tissues. If this object be thoroughly attained, pain and stiffness will decrease, muscles which have partially lost their function will regain it, torn tendons and ligaments will heal, and the best result obtainable will be achieved in the minimum of time.

To attain these ends we have a considerable number of means at our disposal. We can bake the limb in an electric or gas oven, first wrapping it carefully in towelling to absorb the sweat which would quickly scald the skin if allowed to remain on it, or we can use the high candle-power lamp, or diathermy. As a matter of convenience I use as a rule a 3,000 candle-power lamp, giving an