These cases are interesting from the fact that cerebrospinal meningitis in adults is at present more common in England than it generally is, but whether these cases in infants are infectious is doubtful. It will be best, however, in the future to treat them as possibly infectious and isolate them in a fever hospital. None of these patients had any nasal discharge, except two cases, in whom it came on just before death.

ALUMINIUM SKELETON SPLINTS IN THE TREATMENT OF COMPOUND FRACTURES.

BY

C. MAX PAGE, M.S., F.R.C.S.,
CAPTAIN, R.A.M.C. (S.R.)

THE value of skeleton splints in the treatment of gunshot fractures has been recently pointed out by Mr. Robert Jones and others. Their virtue is determined by the self-contained nature of the extension which they render possible, and by the ready adaptability of the slings which hold the limb in position.

The general adoption under active service conditions of these splints is bound to be difficult, since, as usually described, they must be manufactured to measure by an instrument maker.

I have found that from the aluminium splinting contained in the regulation field fracture box substitutes for any such splint can be readily contrived. The malleability of the material renders splints made from it more adaptable to present conditions than are those of wrought iron.

I will describe two splints in detail—one, a modified Thomas's knee splint, the other an arm splint, suitable for fractures of either upper or lower arm. These two splints alone suffice for the treatment of about 80 per cent. of fractures of the extremities that are met with. For special cases similar splints can be contrived from the same material.

Modified Thomas's Knee Splint: Scope and Advantages.

This splint is most satisfactory for any fracture in the lower two-thirds of the femur, for injuries of the knee-joint, or fractures of the tibia and fibula, where extension and free access to wounds is required. The splint can be applied at a clearing station, and is adequate for the treatment of the case till union of the fragments has taken place.

The conclusions in these notes have been arrived at chiefly from the treatment of cases of fracture of the femur. As a standard of comparison I would say that I had previously treated this type of injury with various forms of long outside splint—including the adjustable type with a perineal ring—Hodges's splint and interrupted plaster-of-Paris splinting. The points in favour of a splint of this modified Thomas's type are as follows:

1. The splint can be applied to the limb, without an anaesthetic if need be, whatever the degree and stage of swelling.
 2. The slings can be arranged or the side pieces bent so that any sized wound can be easily dressed without disturbing the patient's comfort.
 3. The splint maintains constant fixed extension on the fragments. Transport is thus without discomfort, and night starting-pains are abolished.
 4. The patient is free to move his body in any direction. Movement of the body does not affect the injured leg. The patient can be rolled on his side and dressed by one person. The ordinary slipper bed-pan can be comfortably used. The fragments are pulled and constantly kept with their long axes in the natural line of the limb. Though there may remain some flexion of the fragments, the ultimate shortening need be very slight if the extension be kept adjusted.
- In general the independence and comfort of the patient in one of these splints is remarkable, if comparison be made with his state when he is fixed to any form of long

outside splint. Nursing and transport are correspondingly easy.

Preparation of the Splint.

The measurements required are (A) from the tuber ischii to the point of the heel; (B) an oblique from the tendon of the adductor longus an inch below its origin, passing behind the limb, to the upper margin of the great trochanter of the femur.

The splint is made from two U-shaped pieces of aluminium splinting as usually supplied (length 60 in.) (Fig. 1). The convexity of one U is bent to form the hip crutch, which will be of the size of measurement B. For manipulating the splinting a large screw wrench (as supplied with the ambulance carriages) will be found most useful. The other piece of splint is bent symmetrically to form a stirrup. This stirrup should be formed with a slight concavity downwards (not shown in Fig. 1), in order to keep the extension strap in place.

The crutch of the upper U is padded with tow and covered with jaconet. When the splint is wanted, the two U sections are joined together with aluminium ribbon, so as to give a length from the margin of the crutch to the stirrup of 4 in. to 6 in. more than measurement A. Slings of linen or other firm material are then attached to the inner limb of the splint at such levels as to support the leg but not to interfere with dressings. A triple fold of jaconet will be found a useful form of sling near a wound. Fixation of the slings can be effected by safety-pins.

Application of the Splint.

An ordinary extension attachment is first fixed to the leg. I have found that a four-tailed extension bound in place with two or three plaster-of-Paris bandages gives good results. The

Fig. 1.—Modified Thomas's knee splint. The arches of aluminium ribbon here shown should be replaced by webbing and buckle in the case of the transverse to the crutch, and by fabric slings below.

Fig. 2.—The modified knee splint applied.

bandage is carried over the heel and instep as well as the leg; this checks the formation of any pressure sore, and as long as the plaster remains rigid prevents any give in the extension.

Fig. 3.—The knee splint applied. The patient has been rolled on his side to show how well the limb is supported in this position.

The splint is then slipped under the leg and the crutch pushed against the tuber ischii; the crutch is moulded to fit the thigh firmly at this level, and then fixed by buckle and webbing passing across in front of the limb. Extension is then applied by a strap passed from the loop and round the stirrup. The slings are passed under the leg and made fast to the outer limb of the splint with safety-pins, in such a way that the limb lies evenly in the middle of the splint (Fig. 2).

The extension is then tightened up and a few straps are applied over all to keep the leg firm at times when the patient may be rolled on his side (Fig. 3).

In the first weeks of the treatment of compound injuries any accessory splints will be found merely an encumbrance. When the wounds are in a satisfactory state they can be applied if the fragments do not fall into good position.

After-Treatment.

When the patient is in bed the splint can be conveniently hung from a cradle. For transport the stirrup of the splint should be raised on a small sandbag, so that the leg remains slung in the splint.

The extension must be kept taut. A regulation screw tourniquet, in place of a strap, gives a very excellent method of applying traction (Fig. 4). The crutch will probably want re-covering with jaconet every two or three weeks.

The two parts exposed to friction are the skin over the tuber ischii and (if the extension slips) the skin over the tendo Achillis. No soreness should result if the buttocks are kept clean. If plaster-of-Paris is used as recommended for attaching the extension, pressure is evenly distributed over the foot, and no sore will form.

If the position of the fragments should render some flexion at the knee and hip joints desirable, the splint can

Fig. 4.—Knee splint, in use for a case of fractured tibia and fibula. The foot piece was fitted to control a tendency of the foot to rotate. Note screw tourniquet extension on stirrup.

be bent into a form like a Hodgen. The self-contained extension will still operate to a sufficient degree.

The Arm Splint.

The Thomas's knee splint may be adapted to the upper extremity, and is most useful in treating severe compound injuries of the upper extremity, but is only suitable for use when the patient is lying in bed. The arm splint I have used is bent at a right angle, and is therefore more compact and suitable for transport.

This splint is adapted for the treatment of fractures of the lower two-thirds of the humerus, injuries of the elbow, and fractures of the forearm.

It is made from one full length piece of aluminium, and is completed by a short piece. The figure sufficiently shows its form (Fig. 5). This type is suitable for either

Fig. 5.—Arm splint. The axillary strap is covered by rubber tubing. The long white belt passes round under the opposite axilla. The hand padding is in position for supination of forearm.

side and for any fracture below the upper third of the humerus. The projection beyond the hand is only wanted for applying extension in forearm cases.

The shoulder arch of the splint may be padded by slipping a stout piece of rubber tubing over it. Rubber tubing covers

Fig. 6.—Arm splint applied (diagrammatically). The prolongation in front of the hand is only of use in cases of fracture of the forearm where extension is required.

in the same way the axillary strap, which is attached to two rings made of aluminium ribbon. This strap bears on the two axillary folds, and exerts no pressure on the vessels. The pad for the hand is fixed to the upper limb of the splint if it is desired to put the arm up in supination, to the lower if in the prone position.

For fractures of the humerus long axis extension is obtained as follows: After the shoulder piece has been strapped in place the hand is fixed to its pad, traction just below the elbow to the lower convexity of the splint is made by a belt of webbing or elastic; a short length of Martin's bandage is useful. In Fig. 6 extension is diagrammatically applied with a narrow band of webbing. A piece of composition splinting supplied in the field fracture box is useful if placed on the upper surface of the forearm in order to distribute the pressure.

For fractures of the forearm the humerus is fixed to the posterior limb of the splint, and extension maintained from the extremity of the splint through the plastic loop fixed to the wrist and hand.

A modification of this splint which often proves useful is the substitution of a crutch under the arm for the arch passing over the shoulder. The crutch is kept in place by two straps or bands—one passed over the shoulder, the other passed round the body and under the axilla of the opposite side.

I am indebted to my commanding officer, Major A. F. Steele, for permission to publish these notes.

THE TREATMENT OF MALIGNANT DISEASE BY X RAYS:

ITS PRESENT LIMITATIONS, AND THE LINES UPON WHICH THEY MAY BE OVERCOME.*

By J. A. CODD, M.D.,
WOLVERHAMPTON.

THE selective action of x rays and radium on cancer and sarcoma cells has been a matter of controversy. But though some extravagant claims may have been made, the fact remains that radium and x rays destroy malignant cells and leave healthy adult cells relatively intact. This is simply an inverse way—and perhaps an awkward way—of expressing the relative vulnerability of the cells. We administer strychnine or physostigmine, and find that these drugs in a widely different way act on the anterior cornual cells of the spinal cord, and leave the other cells of the body comparatively unaffected. We administer atropine and find it acts on the acini of the mammary and salivary glands, the centre for and the fibres of the sphincter iridis, and a few other cells, but leaves the others intact. It is not unusual to speak of these drugs as having

* Read before the Staffordshire Branch of the British Medical Association February 25th, 1915.