

geographically, and reference is thus facilitated. It is mentioned that many changes take place each year, and every effort has been made to ensure accuracy. Telephone numbers are given, and there is also a statement of the services which each institution is prepared to render; in some cases nurses are available for outside work.

## Preparations and Appliances

### RAPID RADIOGRAPHY FOR THE SMITH-PETERSEN OPERATION

Mr. ROBERT G. W. OLLERENSHAW (Manchester) writes:

It is probably safe to say that at the present time 95 per cent. of fractures of the neck of the femur are being treated by one or other modification of the Smith-Petersen nailing operation. This entails scrupulously careful checking of the position of the guide-wire. It is essential to take at least two films, and it may be necessary to take several more before the ideal position of the guide-wire is achieved. In most hospitals the films, taken by a portable outfit in the theatre, are carried some distance for processing, and in many cases, even when one of the modern high-speed developers is used,

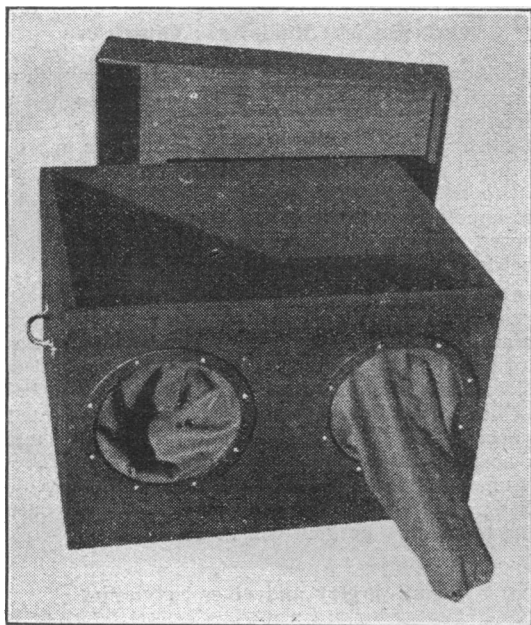


FIG. 1.—Portable dark-room.

an interval of at least fifteen minutes may elapse before the wet films are returned to the operating theatre. If this period of waiting has to be repeated two or three times it involves a long and tiresome delay both for the staff and for the patient. By using the method here described it has been found possible to produce an entirely adequate film in one minute. An ordinary portable developing box is a great time-saver, but if it is to contain three dishes each large enough for a film twelve inches by ten inches, for developer, water, and fixative, it is bound to be unwieldy, and, moreover, it is only too easy to get the film into the wrong dish when working by touch alone. It occurred to us that, since the only requirements are a bony outline and the shadow of the wire, no fine detail being needed, some modification of the old "while-you-wait" process would solve all the problems, since it involves only one dish and can be made to work extremely fast. On these lines, therefore, we have evolved the developer formula given below. The ammonia of the old method had to be eliminated, since it was strong enough to

make the atmosphere of the theatre unpleasant, and other modifications were involved to suit the x-ray emulsion. At normal theatre temperature development and fixation are complete in one minute. The film only requires washing to be reasonably permanent, but in practice this point is unimportant, since it is rarely necessary to preserve these intermediate films. Having reduced the process to this degree of simplicity, the production of a portable dark-room is easy. Our pattern consists of a box, 18 inches by 18 inches by 24 inches, fitted with light-tight drop-on lid, and with two 8-inch armholes in the front. To these holes are fitted sleeves of green felt (an opaque type is essential) 16 inches long, with elastic round the cuff. The sleeves are clamped to the box by plywood rings, ensuring a light-tight joint. Internally, the box has a 10-inch shelf extending from the back and resting loose on battens half-way up the sides of the box. Running fore and aft across the middle of the floor is a strip

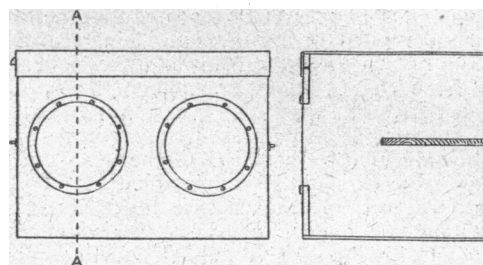


FIG. 2.—Front elevation and section through AA.

of wood 1/8 inch thick, across which the dish is balanced, and which then acts as a rocker-bar. Any competent joiner can build the outfit for twenty to thirty shillings. It should be blacked internally, and fitted with handles as shown in Fig. 1.

In use the cassette is placed on the shelf, open side to the front, and the lid closed. The operator's hands are placed in the sleeves, and these are invaginated into the box. He opens the cassette, slides the film round the edge of the shelf into the dish, and rocks it with a finger at each end. The rocker-bar not only makes this easy but, by limiting the excursion of the dish, makes the outfit almost non-spillable. After removal of the finished film the loose shelf allows the dish to be removed and emptied. Owing to the fact that fixation is proceeding at the same time as development, and is therefore tending to reduce density, we find it best to double the normal exposure time for the tube in use. The developer does not keep too well when mixed, and for that reason we keep it as three components, given below. Mixing for use only takes a few seconds. Our experiments have been made with the Ilford improved fast film, double-coated.

#### Formulae

A. Sodium sulphite (anhydrous)	..	..	..	100 grammes
(or crystalline, 200 grammes)				
Sodium carbonate (anhydrous)	..	..	..	60 grammes
(or crystalline, 160 grammes)				
Sodium hydroxide (stick)	..	..	..	50 grammes
Water to	..	..	..	1,000 ml.
B. Sodium thiosulphate (crystalline)	..	..	..	375 grammes
Water to	..	..	..	1,000 ml.
C. Hydroquinone	..	..	..	30 grammes
(Conveniently kept weighed out and wrapped as powders.				
Store in an airtight tin.)				

For use, dissolve the hydroquinone in 200 ml. of hot water, and add 400 ml. each of A and B; mix well. This keeps for about two days when mixed. Any fine precipitate of sulphur may be disregarded.

While the fundamental ideas are nearly as old as photography itself, we feel that this application of them to modern needs should be of some value. A Smith-Petersen pin was introduced satisfactorily at Salford Royal Hospital about two weeks ago, using the technique described above and with the Hey Groves direction finder, in twenty-three minutes.