

A portable operation theatre / by G.H. Colt.

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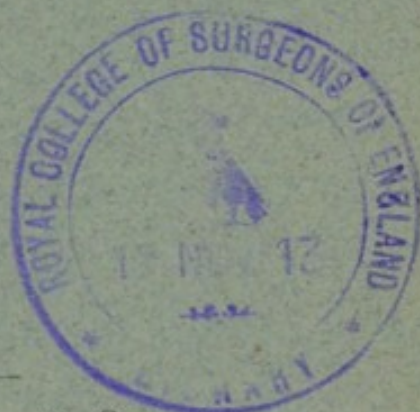
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A PORTABLE OPERATION THEATRE

BY

G. H. COLT, M.B., F.R.C.S

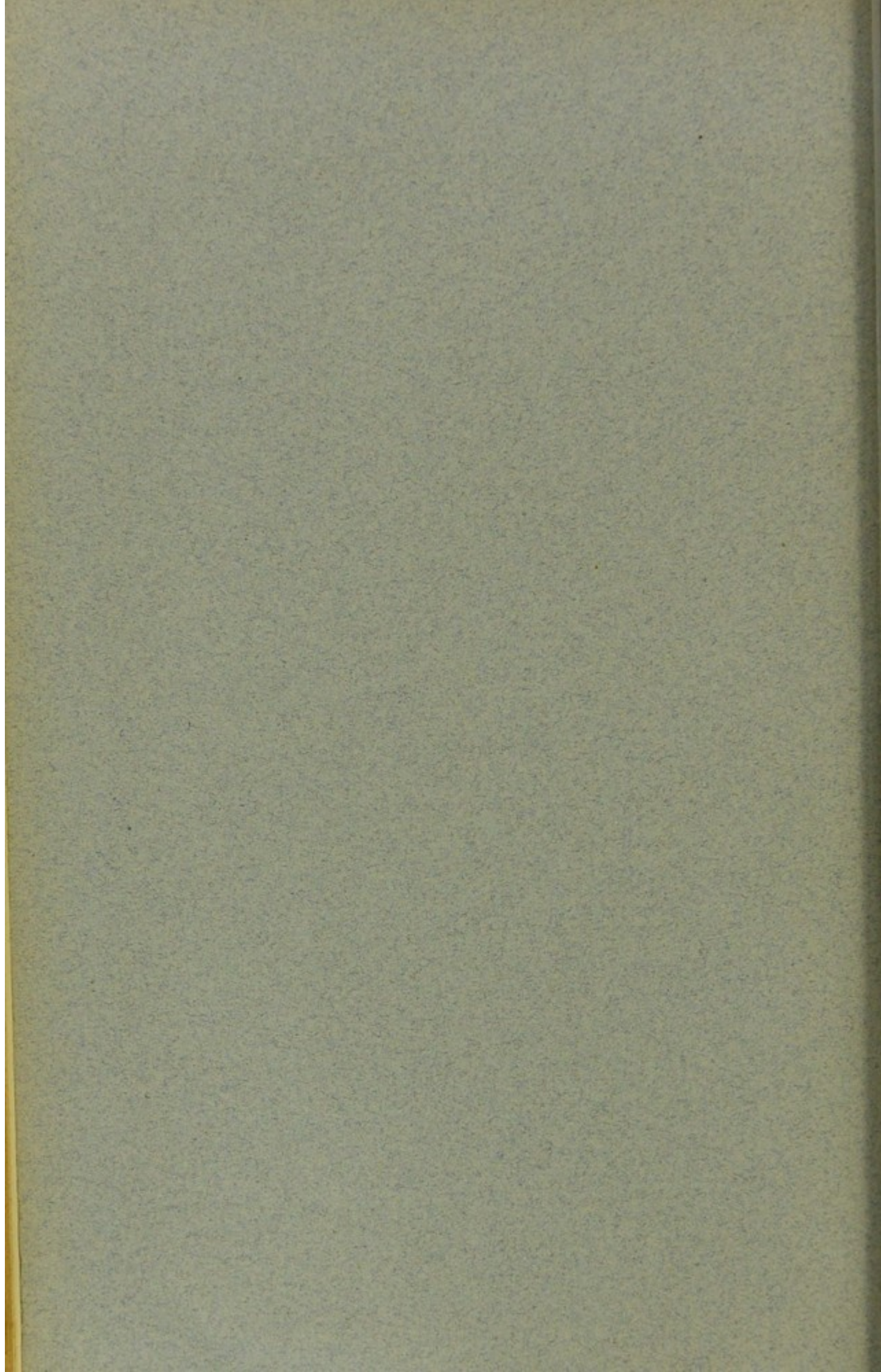
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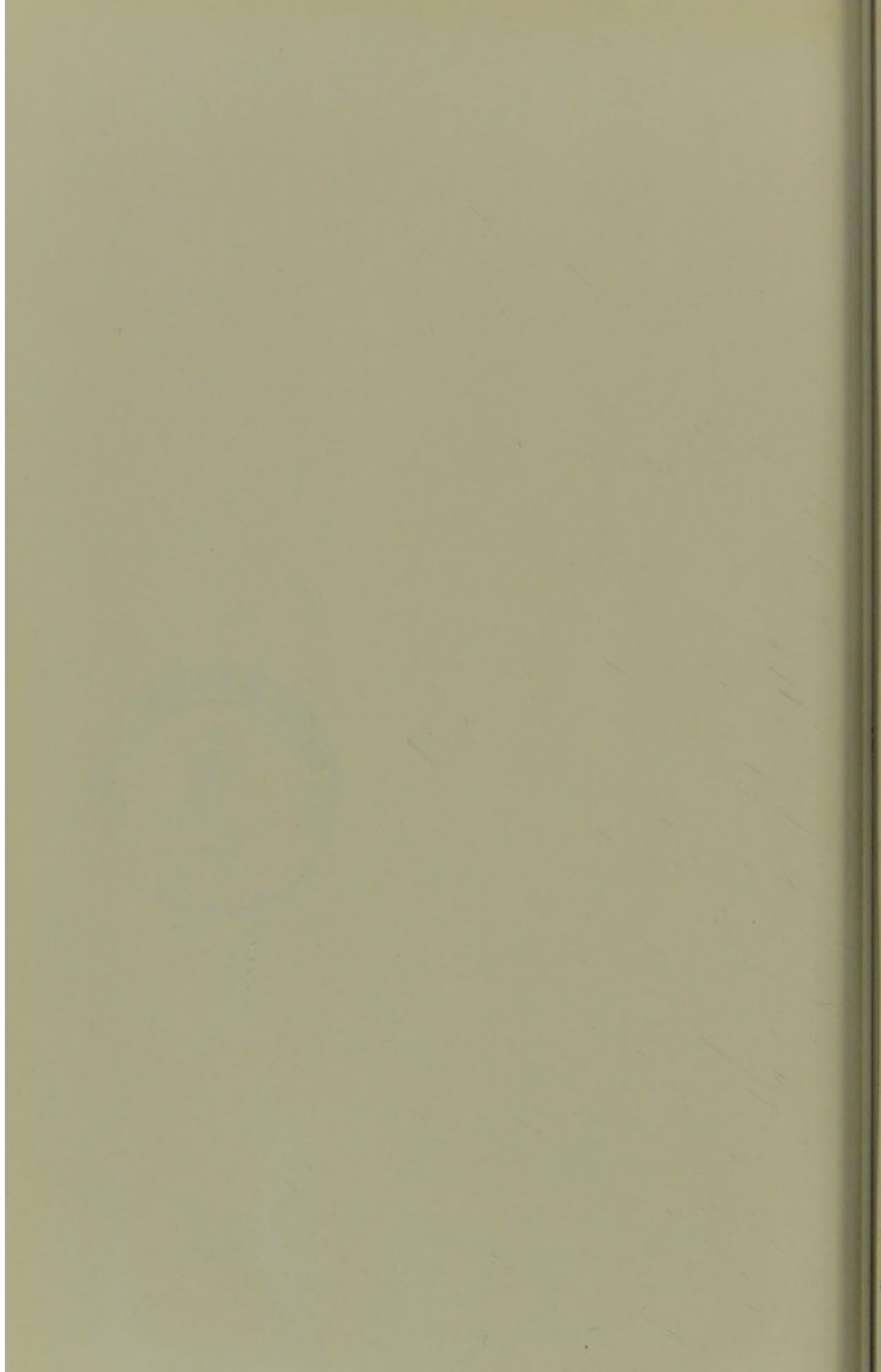
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A PORTABLE OPERATION THEATRE.

THE following proposal for a portable operation theatre is made tentatively, because the idea is believed to be new and the advantages it offers may not be sufficient to warrant a large outlay on experimental work. Briefly, the scheme provides a portable motor operation theatre which could be taken to the patient's house and to which he would be carried for operation, in much the same way that he would be to an ambulance, and from which he would be removed to bed at the conclusion of the operation. At present, when a journey has to be made by train and the case is one involving the use of the Trendelenburg position, a portable operation table has to be carried; this, together with the sterilizer, instruments, bowls, ligatures, anæsthetist's apparatus, and the drums containing the towels, gowns, and dressings, is troublesome luggage to transport from the surgeon's house to the train, from the train to the patient's home, and back again after the operation has been performed. At the patient's residence, a room has to be cleared, sometimes the dust is raised, and the apparatus has to be unpacked. Household arrangements are much upset, and occasionally carpets and furniture are soiled. With a portable theatre, the surgeon would be sure that the arrangements, especially as regards light, would be better than he could obtain in a house at short notice. The proceeding would, of course, not be suitable for a busy thoroughfare. If objections were urged after arrival on the ground of publicity, the necessary apparatus could be taken into the house and the operation performed as usual. In most cases, however, the facilities available would be known beforehand.

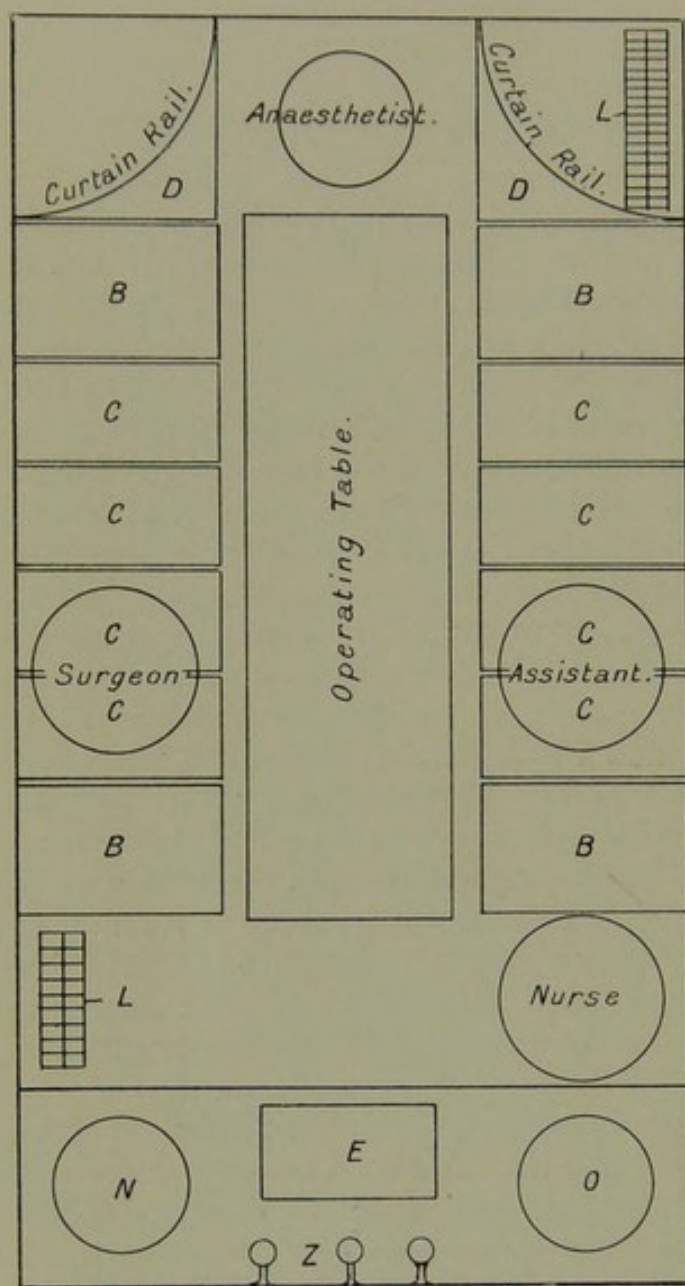
For municipal or state service, or for military work the scheme is ideal. It might not be possible, or prudent, to take the theatre to the actual scene of operations, but it could be taken fairly near, and if motor transport failed other kinds could be used, provided the body of the theatre could be detached from the wheels.

For private use the obvious objections are (1) Bad roads, (2) Publicity, (3) Excessive weight of a patient, (4) The amount of capital locked up.

It will be seen that two alternative plans are suggested, the second being a modification of the first, chiefly in respect of the interior arrangements and disposition of the furniture. The first alone is illustrated in the accompanying diagrams, but the second can easily be imagined.

The size of the theatre inside is: Length 9 ft. 6 in., width 5 ft., height 7 ft., but experience may lead to slight alterations in these dimensions. Ventilation is by windows and an electric fan. The floor is mounted on the chassis as low as is consistent with rapid transit and the regulation width between the wheels. If necessary, some of the floor space at the sides may be taken up for this purpose, as is done in an ambulance. The portion of the floor between the door and the

central support of the operation table, measuring 3 ft. 6 in. long by 4 ft. 6 in. wide, is recessed 3 in. deeper than the rest. This space is filled by a double sliding piece which can be pulled out and let down to form a sloped



Scale $\frac{1}{2}$ inch to 1 Foot.

FIG. 1.—GROUND PLAN.

B. Large flap tables. C. Small flap tables.
D. Anaesthetist's tables. E. Sterilizer. L. Radiators.
N. Hot sterilized water. O. Cold sterilized water.
Z. Various fittings.

ascent to the theatre 6 ft. long and 4 ft. 6 in. wide, and is provided with central supports and side braces. The walls are finished outside to resemble the body of a motor car or, for military purposes, "Red Cross." Inside they are lined with a thin layer of sheet asbestos, "Poilite," or other suitable material, enamelled white. The space between is lightly packed with asbestos wool, and all pipes and cables are carried in it. All are in duplicate, and by means of detachable panels can be easily reached should they become deranged. There are two windows of frosted glass in each side wall. Each is 2 ft. 6 in. long and 1 ft. 3 in. wide, and extends upwards from a spot 4 ft. from the floor. Each is supported below by a lazy-tongs spring and has a handle near the top. There is also a window at each end. The roof is raised in the middle line and slopes to each side to provide for water draining off both from the outside and the inside. The greater portion of the roof is constructed of plain frosted glass electro-welded by the "Luxfer" process. It carries five electric lights, arranged two over each end of the table and one in the middle. The last is always present, but Osram burners being used for the other four, they are removed for travelling and placed in position when required for use. The wiring is in duplicate. Electricity is supplied from a double set of accumulators connected with a dynamo worked from the engine.

The operation table is mounted on a fixed central support with oil-pump mechanism for raising and lowering. The head end is towards the front of the car. The height for ordinary work is assumed to be 3 ft. A canvas stretcher and poles are provided, and a piece of webbing with buckle to prevent the knees

of the patient from moving during the induction of anæsthesia. The supports for the head and foot of the table are fixed to the base of the central support, and each is adjustable by a sliding rod and clamp tube as in Paul's table, or by other suitable means. The anæsthetist's stool is fixed to the floor by fly-screws for travelling.

The walls are fitted with tables which, when not in use, can be closed up flat on their hinges against the walls, and are held in this position by spring clips and rubber dams. When in use they are lowered, and a central support in each fits

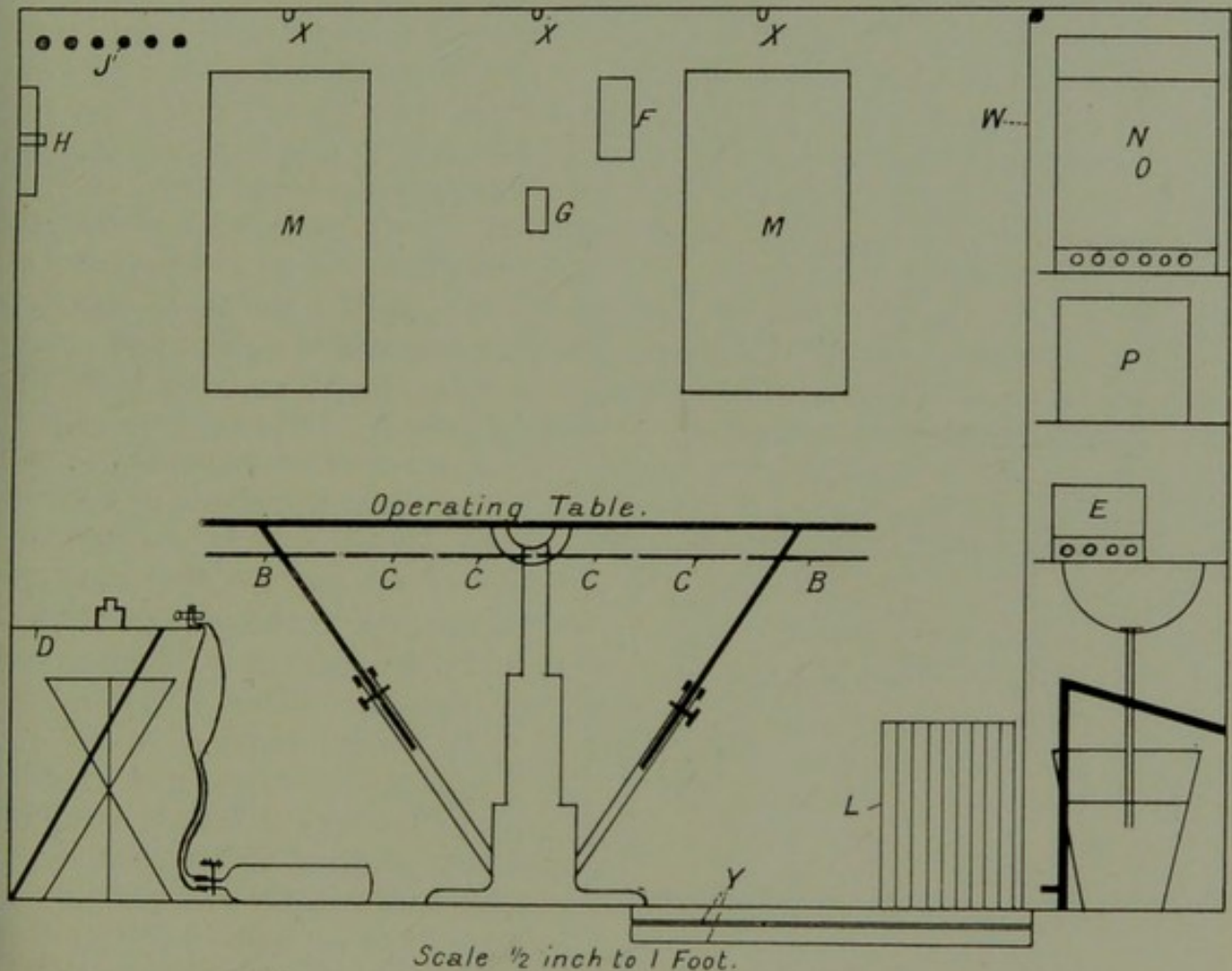


FIG. 2.—SIDE VIEW.

B. Large flap tables. C. Small flap tables. D. Anæsthetist's tables. E. Sterilizer. F. Irrigator. G. Wall plugs and switches. H. Fan. J. Coat pegs. L. Radiator. M. Windows. N. O. Sterilized water. P. Drums. W. Roller blind. X. Electric light. Y. Sloping ascent.

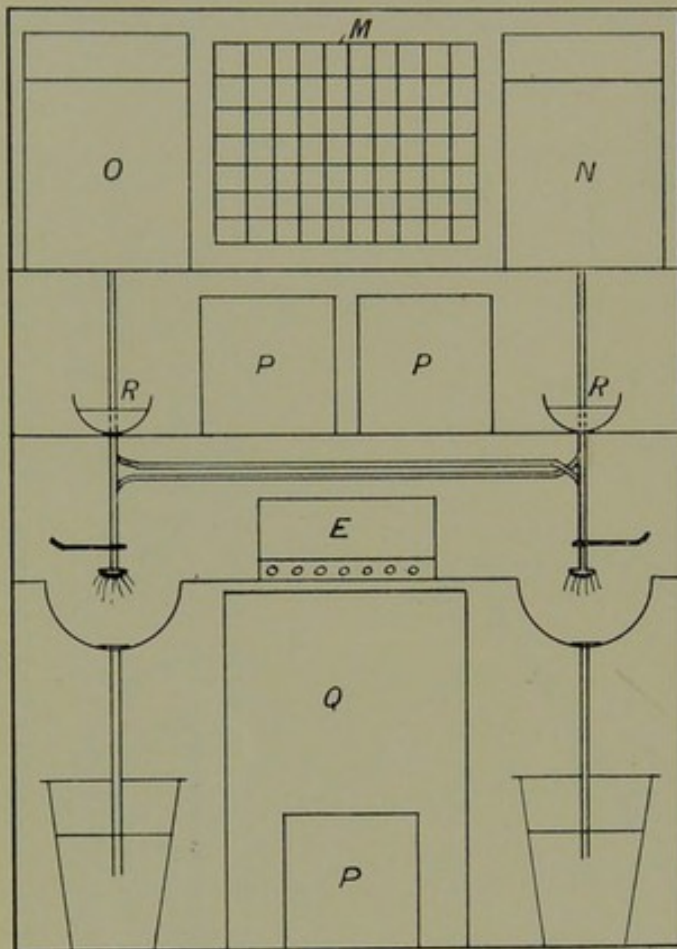
into a cup formed in the angle between the wall and the floor. Twelve of these tables are provided for the operator and his assistant, six on each side. Each when lowered projects 1 ft. 6 in. from the wall. The four end ones are each 12 in. wide, and the others 9 in. wide. All are the same height, the tops being 33 in. from the floor. It will be seen at once that, by bringing the tables into combination any desired accommodation may be obtained, according to the position of the operator and his assistant. If necessary, a bridge table may be placed across the patient from a table on one side to one on the other. The anæsthetist is

provided with tables similar to the operator's, one on each side, but of a different size, and the tops are 26 in. from the floor. He is also provided with a series of spring clips holding metal cases for his bottles. The gas cylinders are placed under his right-hand table, and securely fixed to the floor for transit.

The warming of the theatre and entire apparatus is by superheated steam, generated near the engine by means of a petrol vapour or other burner and boiler. It is possible that the makers of the car would advise the use of steam throughout, i.e., the employment of a steam car. It seems to me that steam would be better

than electricity for heating purposes. A naked light cannot be employed inside the theatre because of the production of phosgene gas from the chloroform vapour, and because of the risk of explosion when open ether is used.

In the first scheme the rear part of the car for a length of 1 ft. 6 in., and for its whole width, is detachable like a door, and swings out on hinges securely built into the frame. The handle to open it is a wheel, and can be operated either from within or without. It is so devised that before the door can be opened a wheel must be lowered on to the ground to support the weight at the handle end of the door. This wheel is normally carried some 9 in. off the ground, and is raised and lowered by rack-work. When it is at its lowest point, spurs attached to the rack-work register with slots in the side of the car and allow the door to be opened. Just before this is done the spurs are turned so as to engage corresponding slots in the door and fix the supporting wheel



Scale $\frac{1}{2}$ inch to 1 Foot.

FIG. 3.—END PLAN.

E. Sterilizer. *M.* Window. *N.* Hot sterilized water. *O.* Cold sterilized water. *P.* Drums. *Q.* Stores. *R.* Hand lotion.

to it in its lowest position. The fittings attached to the door are shown in *Fig. 3*. When the door is open they are hidden by a roller blind. The steam pipes are hinged to correspond with movements of the door in the same way that they are hinged to a movable radiator.

Sterile water is prepared and allowed to cool in the sterilizer provided. Sterile hot water is prepared on the journey, and the instruments are boiled then or after arrival. Drums of dressings, etc., are shipped before starting. All vessels likely to contain water are divided up inside, so as to "baffle" movement during transit, and all articles or fittings likely to rattle are secured by spring clips and rubber dams.

The alternative arrangement consists in placing the apparatus shown in *Fig. 3*, at the driver's end of the car, replacing the special door previously described by two ordinary doors, and having the foot of the operation table towards the front of the car. This is the arrangement of choice, and is much the better mechanically speaking, but it might result in the patient's head being unduly lowered after an operation for peritonitis. It seems to me that this objection could be overcome, and that it will only arise if the distance between the floor of the car and the ground is greater than is usual in an ambulance.

It is proposed that the car shall carry, in addition to the chauffeur, the surgeon and his assistant, the anæsthetist, and a nurse. The four last mentioned would sit on collapsible chairs, which are folded and removed before the operation. On arrival, the chauffeur would select the most convenient spot for the car, open the door, fold and remove the chairs and let down the sloping ascent. He and the assistant would take the stretcher to the room of the patient, who would be placed on it with his body and face covered. He would be carried down and placed in the theatre. The poles would be removed, the sloping ascent replaced, the door closed and bolted, and the roller blind drawn up. The strap would be adjusted across the patient's knees, and the anæsthetic commenced. The surgeon and all concerned would remove their coats and hats and place them in the recess for the purpose. They would wash up, put on their gowns, etc., and get into position. The flap tables suitable to the case would then be lowered, covered with sterile towels, and in a few minutes the operation could be commenced. When completed, the reverse process would be carried out, and, if necessary, the theatre disinfected by means of a formalin vapour lamp.

At first sight there appears to be no obvious difficulty in carrying out this invention, and it is hoped that a surgeon, the nature of whose practice warrants the experiment, will see his way to make use of it.

