is quite impractical on account of the time required for the coating. Furthermore, judging by the excellent results obtained without the use of paraffin it seems questionable whether a paraffin coating is necessary.

An isotonic solution of sodium citrate is used instead of the 10 per cent. solution customarily employed, since it is felt that this maintains more nearly normal conditions for the blood. The amount of sodium citrate contained in the 160 c.cm. of "isocitrate" is approximately 6 grams. No harmful effects have ever been observed from the injection of this quantity of citrate, which is very much less than the supposedly toxic dose; 0.5 per cent. citrate has been shown to be sufficient to prevent clotting when well mixed with blood. When 500 c.cm. blood are drawn into 160 c.cm. of a 3.8 per cent. solution the resulting mixture is 0.9 per cent. citrate. With 700 c.cm. blood it is 0.7 per cent. An amount of blood as large as 800 c.cm. may be taken into this amount of citrate with safety if the blood flow is well maintained and the blood and citrate are thoroughly mixed. The sodium citrate in this mixture equals 0.6 per cent. In bleeding quantities over 700 c.cm. the flow through the needle frequently begins to slow up and mixing the blood and citrate becomes more difficult.

RESULTS.

This method was used under rush conditions. Forty-four transfusions were given to 38 patients. The patients transfused were cases of haemorrhage and shock—chiefly the former. Donors were always tested beforehand for compatibility of blood. The amount of blood given in a single transfusion varied from 400 c.cm. to 700 c.cm. The average quantity was between 500 c.cm. and 600 c.cm. In cases of very marked anaemia a second transfusion was occasionally given. Briefly it may be stated that the immediate effect of citrated blood was the same as that seen after the transfusion of blood by the other methods in common use. The blood pressure increased from 20 to 40 points afterwards. On one occasion there was a rise of 50 points, after only 450 c.cm. of blood. The general improvement was maintained and increased. The patients stood operation well, and subsequent progress was fully as satisfactory as seen ordinarily following transfusion. Of the 38 cases transfused 25 were evacuated to the base in good condition, and 13 died—a mortality of 34 per cent.

No reactions of any consequence were observed. In several instances there was slight chilliness during or immediately following transfusion, which soon passed off without further discomfort. It was impossible, under the rush conditions, to keep temperature charts on the majority of the patients, but in a number of instances in which temperatures were taken no rise occurred afterwards.

ADVANTAGES.

Aside from the chief advantage of its being a "one man job," this method has several other considerations in its favour. The apparatus can be made from materials easily obtained. The technique of transfusion is simple and quickly carried out. The bleeding can be done in a conveniently arranged room outside the resuscitation ward. The blood is then carried into the ward and given at the bedside without the necessity of moving the recipient, thus avoiding injury, which is often done to the patient in shock by moving him to the operating theatre, or even on to a table near by.

SUMMARY.

The use of citrated blood for transfusion seems to fill a definite need in that the technique is relatively simple, easily acquired, and can be carried out entirely by one medical officer. Furthermore, this method obviates the necessity of having the donor and recipient together, and the blood can be given at the bedside. Stress is laid on the fact that, although the technique is apparently very simple, certain definite precautions must be observed in the handling of the blood in order to obtain good results. The chief considerations in the technique are to get the blood quickly and cleanly into the citrate, to obtain prompt and thorough mixing of the blood with the citrate, and to transfuse the blood as soon as possible after the bleeding.

An apparatus is described which can easily be constructed, and has been found to work satisfactorily. The

blood is received into isotonic sodium citrate—3.8 per cent. The amount of this solution—160 c.cm.—contains 6 grams of sodium citrate, which has no harmful effect. When a good blood flow is maintained through a needle of adequate calibre and the blood and citrate are well mixed, as large a quantity as 800 c.cm. blood may be obtained by this method.

A series of forty-four citrate transfusions were given under rush conditions at a casualty clearing station with good results. The immediate effect of the transfused blood and subsequent progress of the cases were fully as good as that seen following ordinary transfusion. No reactions of any consequence were observed.

DESTRUCTION OF NITS OF THE CLOTHES LOUSE BY SOLUTIONS OF CRESOL-SOAP EMULSION AND LYSOL.

BY

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THESE experiments were carried out with a view to assisting officers in charge of baths and wash-houses where the clothes of infected troops are treated in order to rid them of lice. From conversations with officers in charge of these establishments it appears that a precautionary measure frequently employed is to steep infected garments in a vat containing solutions of cresol-soap emulsion. There exists, however, some uncertainty as to the strength of the solution and period of immersion necessary to destroy the nits of *Pediculus humanus*. In this connection it may be pointed out that overlapping methods of disinfection should if possible be avoided in the interests of economy. Hot water or dry heat at 55° C. destroys both nits and active lice within thirty minutes, even when protected by a covering of khaki cloth; while, if the temperature is raised to 60° C., fifteen minutes suffice. If at any period during the process of washing or drying garments they are subjected to the temperatures and periods above given, chemical solutions are unnecessary; if, on the other hand, the garments are steeped in effective chemical solutions, then it is unnecessary to use temperatures so high as those mentioned for washing or drying.

In utilizing the results of the present experiments for practical disinfection it must be borne in mind that solutions of both cresol-soap emulsion and lysol degenerate in their effectiveness for the destruction of bacteria in relation to the organic matter with which they become charged during use, and it is probable that a somewhat similar fall in their effectiveness for the destruction of nits may occur. It has not been possible, so far, to ascertain if this probable drop in efficiency occurs, owing to our lack of knowledge of the exact condition of use. If samples of solutions actually employed could be forwarded to the Lister Institute, with the necessary data as to strength and the relations of quantity of fluid and period of use, and the number of garments treated, it would be possible to carry out the experiments necessary to obtain information on this point.

METHOD OF TEST.

Pieces of army shirt flannel on which numerous nits had been laid were immersed in the solutions for the periods shown in the accompanying tables; they were then taken out, and the superfluous fluid removed by placing on filter paper for a few minutes. After this they were placed in small entomological boxes lined with a strip of dry flannel, and carried in a thin cotton bag, suspended from the neck between skin and shirt, to incubate.

On examination of the tables it will be noted that the lysol (crude carbolic acid and soft soap emulsion) solutions are decidedly more effective than the cresol-soap emulsion solution at the higher temperature but less so at 32° F. Why this should be the case is not evident. The difference

TABLE I.—Mortality of Nits of *Pediculus humanus* due to Immersion in Watery Solutions of Liquor Cresoli Saponatus Fortis.

Temperature and Period of Immersion.	Strength of Solution.	No. of Eggs.	No. Hatched.	No. Died while Hatching.	Percentage Mortality.
	Percent.				
Temp. 60-65° F.	2.0	94	3	7	97
5 minutes	1.5	51	26	9	49
	1.0	69	37	10	46
	0.5	46	41	2	11
	0.2	79	64	2	19
20 minutes	2.0	106	Nil	—	100
	1.5	82	1	—	99
	1.0	93	5	4	95
	0.5	68	24	10	65
	0.2	37	30	3	19
20 minutes	2.0	68	Nil	—	100
45 minutes	1.5	92	Nil	—	100
2 hours	1.0	64	Nil	—	100
2½ hours	0.5	99	Nil	—	100
22 hours	0.2	90	Nil	—	100
Temp. 48° F.	2.0	95	Nil	—	100
20 minutes	1.5	104	Nil	—	100
Control*		85	66	1	23
Temp. 32° F.	2.0	137	1	1	99.3
20 minutes	1.5	123	Nil	—	100
Control*		51	46	—	10

* The controls were exposed to the temperature, but not immersed.

TABLE II.—Mortality of Nits of *Pediculus humanus* due to Immersion in Watery Solutions of "Lysol" (equal parts of Crude Carbolic Acid and Soft Soap).

Temperature and Period of Immersion.	Strength of Solution.	No. of Eggs.	No. Hatched.	No. Died while Hatching.	Percentage Mortality.
	Percent.				
Temp. 60-65° F.	2.0	120	Nil	Nil	100
5 minutes	1.5	121	Nil	1	100
	1.0	82	2	6	98
	0.5	79	52	7	34
	0.2	89	70	2	21
20 minutes	2.0	89	Nil	Nil	100
	1.5	82	Nil	Nil	100
	1.0	72	Nil	1	100
	0.5	103	46	8	55
	0.2	94	60	8	34
Temp. 48° F.	2.0	96	Nil	—	100
20 minutes	1.5	102	Nil	1	100
Temp. 32° F.	2.0	127	1	—	99.2
20 minutes	1.5	99	7	2	93

in the latter case is not great, and may possibly be largely, if not entirely, a matter of chance, dependent upon uncertainty of action at low temperatures.

An interesting feature of the series is the regular rise in the percentage of lice which die while hatching as the action of the solutions become less fatal up to a mid point, when it again declines to a minimum in proportion as the hatching ceases to be checked owing to the weakness of the solutions. It is a matter of question whether death during escape from the egg is due to the action of the fluids on the eggshell, or to a want of robustness in the larvae.

The evidence as a whole seems to establish the fact that steeping for twenty minutes in a 2 per cent. solution, either lysol or the cresol soap, is quite effective provided the temperature is not below 50° F.

A PLACARD is to be posted in the offices of town and country clerks in the State of New York stating that no marriage licence will be issued until both parties make the following statement on oath: "I have not to my knowledge been infected with any venereal disease, or if I have been so infected within five years, I have had a laboratory test made within that period which shows that I am now free from infection from any such disease."

SOME SIMPLE HOT AIR APPLIANCES FOR FIELD UNITS.

By LIEUT.-COLONEL C. MAX PAGE, R.A.M.C., S.R.

THE rapid transference of the wounded from such organizations as regimental aid posts and advanced dressing stations to the active surgical centre at the casualty clearing station is one of the principal problems which confronts medical units in the forward areas. During this period of transport the main difficulty with which the medical officer has to contend is shock; and once the wounds have been protected and any fractures satisfactorily splinted, his efforts are directed to keeping up or improving the general condition of the patients. The maintenance of body heat plays a most important part in this respect, and is a matter which, if neglected at this stage, may prejudice the whole later course of the case by leaving the man unfit for the essential operation at the casualty clearing station. Various schemes to this end are already in use, but I think it is worth while to describe some apparatus which has proved of practical value in dealing with the problem. More elaborate and capacious plant can be designed on the same principles under stationary conditions, when time and labour are of less account. That described below is essentially portable, and can be made up by any practical man from material ready to hand.

The first need is for some means by which a constant supply of dry and warm blankets and pyjamas can be maintained, and for this purpose a blanket drying chamber is used.

Blanket Drying Chamber.

The apparatus consists of a frame 32 in. square built of 3 in. by 2 in. wood. Two sides are tenoned and the others morticed (Fig. 1); on one face of the two morticed sections

FIG. 1.—Plan of blanket rack, 32 in. square. The main frame is made of 3 in. by 2 in. wood. The central rails form a continuous length of wire or cord wound through the slots in the side members. The outer rail is made of wire or standard splinting.

are cut, at regular intervals, twelve slots half through the wood and wide enough to take ordinary telephone wire. The frame is carried as a bundle of sticks. For use they are fitted together to form a square frame. This is kept firm by lacing with a continuous cord or wire around the slots to form the rack, as shown in the drawing. The wood should be so cut that there is a ½ in. projection of the tenoned and morticed ends; a groove is cut in the middle of these projections and another wire passed round the whole frame through them to form a surrounding rail; if preferred, this rail can be made of aluminium or steel splinting (from fracture box).

To form a drying chamber the frame is suspended by cords in a horizontal position (or supported on a light stand) about 5 ft. from the ground. Blankets folded to fit are hung over the surrounding rail and fixed with a few pins. These blankets are so arranged as to form four complete sides of a box (with blanket walls). The floor will form the bottom, and another folded blanket is placed over the rack, after objects to be dried have been hung on the wires, to form the top.

Two Beatrice stoves, with a simple tin baffle plate to protect the flame, are put on the floor inside the box as the