A SIMPLE APPARATUS FOR ADMINISTERING
SALVARSAN INTRAVENOUSLY

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The intravenous method of administering salvarsan has come to be generally adopted as best and most efficient, but under the most favorable circumstances is rather troublesome. Anything which may contribute toward simplifying the methods will be most welcome.

I have devised a gravity apparatus which has some advantages in simplicity and cost over many others that have been described and it permits the introduction of salt solution both before and after the salvarsan is injected without any change in the connections. This apparatus has been successfully used in administering the drug in a good many cases at the Rhode Island Hospital and is now used by most of the operators there in preference to the syringe.

No provision is made for keeping the solutions at blood temperature during the administration. The fluid, however, is kept warm until ready to pour into the bottles. No discomfort to the patient has been noticed, though at times I have known the temperature of the fluid to be below 37 C.

This apparatus, as seen in the accompanying illustration, consists of two bottles and connections. The bottles are graduated upward from the neck (as the bottles are to be inverted), beginning at a point where the stopper ends in the neck of the bottle. One glass tube is inserted through the rubber stopper to within a quarter of an inch of the bottom of the bottle, to give vent. Another glass tube is inserted through the other hole in the cork to the internal surface of the stopper and allowed to protrude externally 2 inches. To the glass tubing protruding from the stoppers, a rubber tubing about 6 inches in length is attached. Thumb stop-cocks or metal clips are attached to the tubing. The distal ends of the tubing are attached to the Y-shaped glass tube. To the other end of the Y, rubber tubing is attached. Any convenient length may be used, preferably about a foot and a half. A thumb stop-cock or metal clip is attached to this tube. To the distal end of this rubber tube a glass tube about 3 inches in length is attached. A small piece of rubber tubing must also be attached to the needle which is to be inserted into the vein.

Gravity apparatus for the intravenous administration of salvarsan.

TECHNIC OF THIS METHOD

The whole apparatus is wrapped in towels (the bottles in one towel, the stopper and tubing in another) and sterilized. The apparatus, which consists of a square piece of board to which are attached two metal spring clamps, is hung on the head of the bed. The table is covered by a sterile sheet.

The salvarsan is mixed in a graduated cylinder in the usual way, warm sterile water and salt solution being used. The amount to be given is then poured into one of the bottles, and 0.9 per cent. salt solution is poured into the other bottle. The three thumb stop-cocks are closed. The rubber stopper is inserted into the bottle and the thumb held firmly over the air-vent on the stopper while the bottle is inverted and placed in the holder.

The holder of the salt-solution bottle is at a higher elevation than the one which holds the salvarsan bottle. The reason for this will be seen below.

The stop-cock on the tube below the salt-solution bottle and the stop-cock below the salvarsan bottle are opened. The salt solution runs by gravity through the tubing and forces the air into the salvarsan bottle. A few cubic centimeters of salt solution are allowed to flow until all the bubbles are out of the tube; then the thumb-clamp below the salvarsan bottle is shut off. The thumb-clamp below the Y is opened, the salt solution permitted to flow out, and the whole system is clear of air. The thumb-clamp below the Y is shut off.

The needle is inserted into the vein and when the blood flows freely from the tube the thumb-clamp below the Y is opened and while the salt solution is flowing the glass tube is inserted into the rubber tube attached to the needle. The salt solution is allowed to run into the vein until the operator is sure that the needle is in the vein. If the needle is not in the vein or the vein has been "buttonholed" a tumor mass will form by infiltration of the salt solution in the tissues around the vein. The salt solution is shut off, the other stop-cock opened, and the salvarsan flows into the vein.

As soon as the salvarsan reaches the level of the stopper, the cock is pinched off. The fluid should not be permitted to disappear below the glass tube protruding from the stopper. The salt solution is allowed to flow again until all the salvarsan is flushed out of the tubing into the vein, and while the salt solution is flowing the needle is pulled from the vein.

ADVANTAGES OF THE APPARATUS

1. The cost is low and the apparatus can be improvised by anyone.
2. It is practically a closed system. The vent in the rubber stopper is for all practical purposes a negligible quantity.
3. The flow of saline and salvarsan into the venous system is regular, steady and uninterrupted.
4. It can be manipulated by one person.
5. It is durable and not easily broken.
6. Air bubbles can be quickly and easily excluded from the system.

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Pleasant Environment for the Tuberculous.—It is not difficult to make segregation of the tuberculous attractive. And, as part of the successful treatment of those segregated, it is necessary that it should be attractive. Real out-of-door life is well established as the basis of effective treatment, and it is not difficult to picture an out-of-door existence in a properly planned environment.—Urie in *Jour. Outdoor Life*.