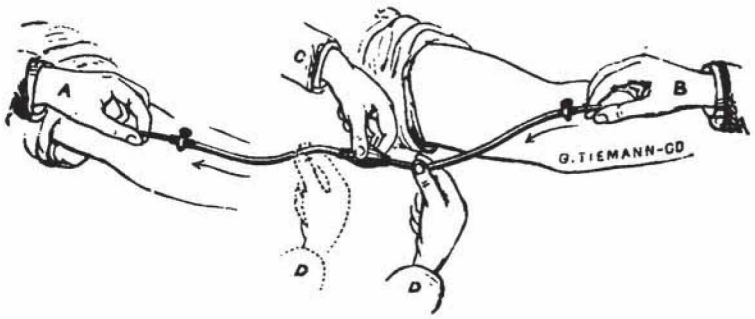
TRANSFUSION.

FIG. 210.—Aveling's Apparatus for Immediate Transfusion.



In Paper Case.....$4.50

With one Scalpel and one pair of Forceps, put up in a neat Morocco Case... 8.00

MODE OF OPERATION.

First place the Apparatus in a basin of tepid water, and while completely under the water, to fill it and ensure its cleanliness, compress the bulb until the air is expelled.

The patient having been brought to the side of the bed, and the arm bared, a fold of skin over a vein, at the bend of the arm should be raised, transfixed and divided. The flattened vein now brought into view, should be seized with a pair of fine forceps, raised while an incision is made in it, and the bevel-pointed silver tube inserted. In taking this tube out of the basin, it should be kept full of water, by placing the tip of the thumb over its larger opening. While the operator is doing this an assistant should prepare the arm of the blood-donor, as in ordinary bleeding, making an incision direct into the vein, and passing the round pointed tube into it, with its point towards the fingers. This person should then be brought to the bed-side of the patient, and seated in a chair. It is better not to secure the tubes in the veins by ligatures. *B* represents the hand of an assistant holding the efferent tube and the lips of the small wound together, and *A* shows the afferent tube secured in the same manner. The india-rubber portion of the apparatus, filled with water, and kept so by turning the cock at each end of it, is now fitted into the two tubes. The cocks are then turned straight, and the operation commenced by compressing the india-rubber tube on the efferent side *D*, and squeezing the bulb *C*; this forces two drachms of water into the afferent vein. Next shift the hand *D* to *D*, and compress the tube on the afferent side, then allow the tube to expand slowly when blood will be drawn into it from the efferent vein. By repeating this process any quantity of blood can, at any rate, be transmitted, the amount being measured by counting the number of times the bulb is emptied.

The advantages of this method of transfusing blood are :

1st. The chances of coagulation are small, because the blood is removed from the action of the living vessels for only a few seconds, and glides smoothly through the india-rubber pipe without being exposed to the air.

2d. The apparatus is effective, simple, portable, inexpensive and not likely to get out of order.

3d. The operation is safe, easy. uninterrupted, and a close imitation of nature.

F. A. Stohlmann. **Edward Pfarre.**

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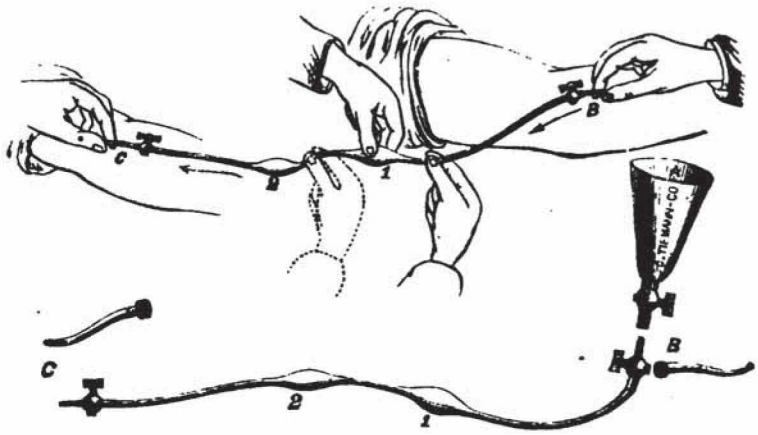
FIG. 211.—Fryer's Transfusion Apparatus.

Price....$6.50.



(*Extracted from the Medical Record, April* 15, 1874.)

A few remarks on the Transfusion of Blood, with a modification of the Apparatus of Aveling.

By B. E. FRYER, M. D., Surgeon U. S. Army.

To show that the subject of transfusion is one which a large portion of the profession has not yet fully weighed the importance of, nor realized the fact that this measure can frequently be made applicable in cases which are now quietly otherwise yielded to death, we have only to call attention to the rarity of reported instances in which the operation has been taken advantage of, and refer to the many obvious ones in which it should be made available. Even in threatening dissolution from the direct loss of blood,—such as from wounds of large vessels, from prolonged epistaxis, or, in probably one of the most frequent opportunities met with, from hemorrage, post-partum, where the restoration of blood by transfusion has been, so to say, legitimatized—but few of us are prepared for the emergency, or if prepared, do promptly act and give the then almost only chance of life.

We will briefly state the kind of cases in which it has occurred to us that transfusion should be had recourse to without hesitation, and they may be conveniently noted under two heads.

We would include in the *first* class those cases in which a copious blood-loss has occurred and immediate death is threatened. As is well known, it is in these mainly that the measure has been applied. It might well be tried in cases of injury accompanied by a more moderate hemorrage, and where it is necessary to do an important surgical operation, and this operation is delayed (often disastrously) for a reaction by ordinary means. Moreover, it should be done before or after necessary surgical measures in the asthenic patients, in order to avoid pyæmia and its allied evils, especially in operations where the peritoneum is involved. After labor, too, where hemorrage may have been great, but not enough to threaten immediate death, it should be done to avoid septicæmic difficulties. For that depression from the loss of blood, &c., is a most direct cause of pyæmia and its pathological associates, those of us who have had to treat large numbers of gunshot and other injuries, and to operate in these cases, where hemorrage and other depressing causes had done sad havoc, well know.

But we have in the *second* class a larger number of cases—diseases both acute and chronic—and here we more commonly meet with opportunities. In such, transfusion has scarcely been thought of; but it is in these, too, it ought to be, and will be, we think, taken advantage of. Of the acute cases we refer to, those in which natural nutrition is for the time suspended, either from a direct lesion of the blood-making system in one or more of its divisions, or is indirectly affected in consequence of some profound systemic impression, where if we can but bridge over a short period by keeping life's machinery going, we may ultimately bring about a restoration of the healthy nutrition process, and thus save life. To particularize: acute gastric troubles, giving excessive and continuous vomiting; acute diarrhœas and dysenteries; in peritoneal inflammations, in some of the low forms of fevers where waste is excessive and the absorption of nourishment *nil*. In cholera it should be done more generally than it has been. It might be tried, too, in some of the acute diseases of young children, particularly in those which give convulsive movements and convulsions proper, and which often indicate to us diminished blood-supply to the brain, and tell us that death may come before the return of the natural food absorption can again put the nerve-centres *quietly* at work.

In chronic cases where the blood-making is reduced or nearly destroyed, we might often prolong life by transfusion. Such cases are not frequent, though we need not enumerate them. We might well apply the measure even in some cases of phthisis pulmonalis.

In regard to the fluid to be transfused. As is well known, human blood is that to be most desired, after this the blood of some of the lower animals may be selected. Dr. Hodder, of Canada, threw into the veins of some of his cholera patients fresh milk, and with excellent results. The writer has experimented with milk injections in the veins of dogs, and though the experiments have not been completed as to a test of the nourishing effects of the milk so given, no bad symptoms have become apparent. If it can be satisfactorily proved, that milk may be safely and generally used in transfusion, and with the desired result, a great advance will be made in the matter, it being nearly always obtainable, while many of the difficulties and inconveniences in the use of blood will be avoided. A saline solution (such as that of Mr. Little*) should be tried to save life, if nothing else is at hand.

The instruments for transfusion are, as is well known, quite numerous, and while many of them are very good, we believe that of Aveling, for immediate transfusion, to be probably the simplest, safest, and most easy of application. We have lately modified it by adding another bulb to the tube, and by having both tube and bulbs cast of the rubber into one piece. By the additional bulb we can save time in doing the operation, and can keep the blood moving along the tube almost continuously. In having the tube and bulbs in one, we do away with the metal portion which couples them in Aveling's apparatus, and we thereby diminish the risk of blood

* Mr. Little's solution is composed of chloride of sodium, 60 grs.; chloride of potassium, 8 grs; phosphate of soda, 3 grs.; carbonate of soda, 20 grs.; water, 20 ounces

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lodging and coagulating; while we can, if necessary, compress the whole apparatus more completely. As in Dr. Aveling's instrument, there are no valves. The inner wall of the whole apparatus is perfectly smooth, and we have had the opening from tube to bulbs made a gradual slope, thus altogether doing away with corners in which the blood might be arrested and form a clot.

The instrument of Aveling is intended for immediate transfusion. We have added a glass vessel which can be fitted to the tube, and the whole then used as a mediate transfuser if desired. The accompanying cut gives a good representation of the apparatus.

The manner of using the instrument is very similar to Aveling's. The canula marked *B* is placed in the giver's vein, that marked *C* in the vein of the receiver. The tube and bulbs having been filled with warm water, or better, with Mr. Little's saline solution (also warm), are now adjusted to the canulæ and the blood allowed to flow into the apparatus. The canula being steadied by an assistant, the tube is to be nipped tightly between the fingers, close to the giver's or efferent end, and then the bulb marked 1 is to be compressed, and the blood of course forced on towards the receiver. While this bulb is still held compressed, the tube at the giver's side is to be relaxed, and that portion of it between the bulbs is to be nipped; bulb 1 is relaxed, and No. 2 compressed and held; then the tube at the receiver's side is to be seized and held to prevent regurgitation, and the whole apparatus allowed to refill. The same operation to be repeated till sufficient blood is transfused. As suggested by Dr. Aveling, a few drops of ammonia solution may be injected into the bulbs now and then, by a fine-pointed hypodermic syringe, in order to more effectually prevent coagulation. It will be found that considerable force is necessary in sending blood or other fluids into the veins. This we discovered while doing transfusion twice in a case after hemorrage from gunshot injury, and we have also found it in our experiments on the lower animals. It is a fact that we have not seen noted in connection with transfusion, and one well worth remembering.

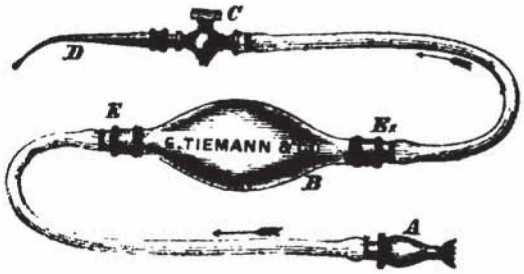
In order to use the apparatus as a mediate transfuser, the vessel marked *A* in the cut receives the blood, the tube is to be applied, and the instrument used as before directed. If the blood is not defibrinated and strained, three or four drops of ammonia solution to each ounce are added, in order to avoid coagulation.

The instrument is made by Messrs. GEORGE TIEMANN & Co., 67 Chatham Street, New York.

We would suggest to those who may become interested in transfusion, that though the operation is a simple one, it requires care, and it should first be practised once or twice on the lower animals; no difficulty will then be had in doing it on man when occasion requires.

FIG. 212.—Garrigue's Mediate Transfusion Apparatus.

Price.....$4.00.



Draw eight or ten ounces of blood from a healthy person into a clean vessel, whilst it is accumulating whip it with a silver fork, a stick of wood or a bunch of straw, then strain it through a piece of cleanly washed linen into a vessel placed within another containing warm water (about 105 C.) Warm the syringe, put the suction end *A* into the blood, compress the bulb, and when it flows through the canula, turn the stopcock *C*.

Having bared the patient's arm, raise a fold of skin over a vein at the bend of the elbow, divide it and pass a probe or thread under the vein thus brought into view. This is now held with a pair of forceps or tenaculum and an incision made with a lancet or pair of fine pointed scissors, carefully avoiding to wound its posterior wall. Now introduce the canula *D*, open the stopcock and inject slowly.

The bulb contains about three fluid drachms, but by moderate compression about two only are expelled. In most cases it suffices to inject from four to six ounces. If resistance, not due to external pressure be felt, or dyspnœa, or any other untoward symptom appear, the operation has to be interrupted or ended. Dress the wound as after phlebotomy.

After use, the instrument must be thoroughly cleansed, which is best done by separating all the parts and washing them in warm water.

F. A. Stohlmann. **Edward Pfarre.**