conventional outer covering, and the moral nature is laid bare. You will see depths of selfishness and, on the other hand, supreme sacrifice of self for others, such as no other calling will reveal to you. You are entering upon the most altruistic of professions, one in which the best efforts of its members are directed toward the physical and moral betterment of the race. If philanthropy be evinced in deeds of practical beneficence towards the race, then Jenner, Pasteur, Koch, Reed, to mention a few names only, have been the greatest of all philanthropists. This form of philanthropy is open to *you*, there are numbers of questions awaiting solution by *you*, and the knowledge which *you* may give the world may be of inestimable benefit. The world knows as the philanthropist only him who gives money out of his superabundance, which is, after all, a most uncertain way of conferring benefit, but the only one which is open to many, and which most of us think is not availed of to a sufficient degree. However, you need not concern yourself about this form of philanthropy, for it is almost impossible that it should come in your way to exercise it. You must make up your mind in the beginning that your life is going to be arduous, that there are few prizes, that the road to even that degree of financial success which will enable you to establish a home and family in comfort is now and is becoming increasingly difficult. One of the reasons for this is that disease as it affects the masses is being recognized as the chief of the social problems. This recognition is seen in the growing provision of hospitals and dispensaries, in the pure food laws, in the wider extension and increased efficiency of the work of boards of health. Such work will not diminish, but will increase. Tuberculosis is being more and more removed from exclusive medical care, and the success which has attended the modern methods of caring for it will be extended to other disease. The medical inspection of schools and factories are social measures and diminish the importance of your efforts, which concern chiefly disease in the individual. This is an age in which increased efficiency of effort is being sought in every direction, and there is a great loss of effort in the practice of medicine. In spite of all this, one of your duties will be to so educate the public with which you come in contact, in knowledge of disease and of the factors causing it, that social measures can be made more effective. As an offset to the fewer individual patients which the future will bring, there will be increased demand for physicians employed in a public capacity, an increasing number of medical positions in institutions of various sorts will have to be filled.

In your outlook on life be optimistic. There may be some germ of truth in the idea that optimists, like poets, are born and not made, but optimism is more easily attained than is the poetic faculty. A man is an optimist or a pessimist according to his vision, for, contrary to the adage which implies a distrust in vision, "Things are always as they seem." If you do not possess optimism, acquire it, for there can be moral as

well as religious conversion. There is much good in the world, rather more than evil, but possibly not so obvious without vision trained to recognize the good. You can go through life with the environment of a stony desert, or you can walk through green fields, and hear babbling brooks and the songs of birds and the voices of children at play, and rest in the shade of mighty trees by the banks of rivers, all depending on whether you see good or evil.¹ Do not be afraid of the future; trust your own powers. It is a great thing to know, and you may accept it, for it is true, that success comes to the individual who under all circumstances does his best; and one will always do his best in that work which gives him the most joy in the doing. There is no criterion for success and reward, for both depend upon the point of view. There is an abundance of work to do, and room in the world and food and water and raiment for the honest worker, and the greatest happiness lies in work.

"Little do ye know your own blessedness; for to travel hopefully is a better thing than to arrive, and the true success is to labour." — R. L. S., "El Dorado."

THE TECHNIC OF TRANSFUSION.

BY EDWARD H. RISLEY, M.D., AND FRITZ C. IRVING, M.D., BOSTON.

(From the Laboratory of Surgical Research, Harvard Medical School, 1911-1912.)

So much work has been done within the past three years on the technic of transfusion of blood, and so many clever and useful devices invented, with the aim of simplifying the technic for the general surgeon, that it seemed advisable to the authors to go very carefully over this work and to make, if possible, a final determination of that method which, under all general conditions, would be most simple and most likely to be uniformly successful. The devices have been numerous and some have presented unusually attractive features, but most of them are open to the objection that in one way or the other they are too complicated. The operation of transfusion to be uniformly successful and not undertaken with hesitation must be done by a method which is simplicity itself, and not by a method which requires unusual skill. As conditions are to-day, it is only performed successfully by men with especial skill in this line. To be a therapeutic measure of the greatest success, it should be able to be readily accomplished by any operator.

¹ On critically reading this, the writer feels that some further elucidation is necessary. Of course, it is possible for a man to create about himself a fool's paradise in which he may dwell in happy contentment. He can quickly create such an environment by well-selected stages of alcoholic intoxication. The great trouble comes with the voluntary selection of optimism as a career. To most men, evil becomes deterrent by its exhibition in others. Thus, to the pure in heart, vice by demonstration is made abhorrent; to earnest, sober men, drunkenness is unattractive, and an agent at times so useful as is alcohol may be totally condemned. Although some may temporarily cover themselves with a cloak of optimism, using it as the wolf used the sheep skin, the only genuine and constant optimists are the beneficiaries of a protective tariff, syphilitics in the early stages of general paralysis, some successful clinicians, who turn to financial use their God-given intuitions of disease, and some presidents of colleges. The revelations of optimism which one gains from these sources makes the state of mind seem unattractive. But on the other hand if the world as seen seems good don't change your glasses.

For our work dogs have been used, because the arteries and veins more nearly approximate the human in size, and in very small dogs vessels the caliber of those liable to be encountered in infants are to be found.

In previous blood vessel work by one of us (E. H. R.) the same question was discussed and the conclusions arrived at by Hubbarb and Kimp-ton,* as to the efficiency of the Elsberg cannula were agreed with.

The present work has also shown that, in so far as purely mechanical metal devices go, this admirable little adjustable cannula is still the best. It far surpasses the original and modified Crile cannulae and any of the many devices invented by other ingenious workers.

Among these may be mentioned:

(1) The modified Crile cannula of Buerger or Burnheim, with the long handle for convenience in handling and the three equi-distant prongs over which the vessel walls could be hooked and held. (Fig. 1.)

(2) The dogs' carotid proposed by Frank of New York, and discussed in a previous paper (E. H. R.)* which gives great length of connecting surface and room in which to work, and which is entirely feasible but not possible to have on hand at a minute's notice without considerable previous preparation.

(3) The modified Crile cannula of Hepburn, which has a perforated plate attached to the cannula, through which the stay sutures are threaded and securely tied and adjusted.

(4) The male and female hemicylinders with spring arms and fixation posts of Janeway, which insures the proper apposition of intima to intima and should be easy of application. (Fig. 2.)

(5) And the similar but less easily applied cannulae of Soresi. (Fig. 3.)

All these devices have several definite objections:

Difficulty to sterilize, and requirement of especial skill in manipulation. They must be made by skilled instrument workers at considerable cost and cannot be quickly and easily adjusted. Each, it is true, has definite points in its favor, but on the other hand has equally marked points of disadvantage and we are sure can all be discarded for what we believe we have demonstrated is the safest and simplest and most reliable method, namely, that with glass tubes.

So simple is the manufacture, preparation by paraffine coating and use of these glass tubes that we do not hesitate to recommend them as being far ahead of any of the other more complicated devices proposed, but also by far the most satisfactory for all around transfusion work, either by the artery-to-vein or vein-to-vein method, both for adults and infants, and for the experienced as well as inexperienced operator. A nest of tubes can be blown in a very short time by any one used to glass blowing, or even by the inexperienced; the paraffine mixture, which consists of paraffine 2 parts, petrolatum 2 parts and

stearin 1 part, can be obtained at any drug store, and if this, with the tubes, is kept in a small copper box, the tubes can always be on hand for immediate use.

When it is desired to use them, the tubes may be boiled up with the operator's instruments in a separate cloth, the paraffine next heated to boiling in the copper box over a flame, the tubes dipped into the hot paraffine, taken out with forceps and tilted back and forth to allow the excess of paraffine to run off, thus coating them very thinly, both inside and out. Any excess at the end of the tube is touched off with sterile gauze and the tube is then ready for use. This particular paraffine mixture does not fleck off or crack, and blood can be run through it for at least one-half hour without any signs of clotting. The tubes are easily cleaned after using by boiling and shaking out the excess of paraffine over a flame, or if a clot sticks in the tube, after it has been laid aside, this can be digested out with a solution of pancreatin and carbonate of soda or with antiformin, or, as we have recently discovered, can be easily cleaned out with the ordinary tobacco pipe cleaner. The accompanying plate shows the variety and actual sizes of tubes used (Figs. 4 and 6), the longer and smaller caliber tubes being more desirable for infant work. (Admirably described by Vincent in *American Journal of Diseases of Children*, 1911, 1, 376.)

The authors were particularly interested in the question of the feasibility of vein-to-vein transfusion and have become thoroughly convinced, by repeated trials, of not only its great simplicity, but its entire efficaciousness. To work with the external jugulars of dogs, with the great disadvantage of the intervening head and shoulders, is not easy, but in spite of these disadvantages, and the fact that here, unlike the human arm, no tourniquet could be applied to aid the flow of venous blood from the donor, the transfusion took place very easily, steadily and with no clotting or other untoward results. The flow is rather less rapid, but except in the very greatest emergencies, due to great loss of blood, this would not stand as an objection, since with the use of the tourniquet the flow can be made fast enough for practical purposes. And even in the greater emergencies, when greatest speed is required, we feel sure that the rapidity with which two veins can be hitched up would offset the more rapid flow of arterial blood, which in turn is offset by the greater delay in getting out and hitching up the artery. We have not yet had opportunity to try this on the human being, but the ease and speed with which it can be done in the dog and the satisfactory rate of flow convinces us of its feasibility. It has the distinct advantage in that it is practically always easy to find two accessible veins in the arm which can be secured with a minimum amount of trauma to the arm and hence lessen danger of sepsis and the sacrifice of a radial artery. After hitching the tubes to the artery or vein a little blood may be allowed to run through to push out the air before hitching up to the vein, or the

* See Bibliography.

tubes may be previously filled with salt solution. The latter is probably the safest method as it eliminates a chance of clot formation previous to starting the transfusion. The entrance of a tube full of air into a vein, however, has repeatedly been proved to be entirely harmless in dogs. Considerable amounts of air have been purposely driven into veins and no untoward results have followed. Of course it is best to avoid this if possible. The ordinary technic of preparing the recipient's vein is to dissect it out, cut it across and, by means of the little vessel hooks, insert the cannula. This is often difficult, as

opposite end to which a syringe can be attached. They advocate a bulb holding 300 ccm. and attached to it a large 100 ccm. Porges syringe.

Fig. 5 shows a bulb holding 50 ccm., a modification and simplification of the David-Curtis bulb, which we have used with great ease and success. The technic is as follows:

One small teat is put into a slit in the donor's vein, the other into a slit in the recipient's vein. A serrefine clamp is applied to the latter's vein and a tourniquet to the donor's arm near the shoulder. Blood will then flow slowly into the bulb, which has been previously sterilized by

bits of adventitia get in the way, or the vein collapses and retracts so that the opening is hard to find. We consider that a nick in the vein large enough to admit the tip of the cannula, the cut edges being steadied by the hooks or two stay sutures of fine silk, is better technic. In this way the vein is held in place and the end is unable to retract and get away from the operator and the technic is much simplified.

The authors also became interested in the ingenious device of David and Curtis, of Chicago.* This consists of a glass bulb with two teat-like ends drawn out like small cannulae for insertion into each vein and a nozzle or prolongation at the

boiling and coated inside with paraffine, but the flow can be greatly hastened without danger of clotting by exerting slight suction in the bulb by means of any large syringe attached to the bulb by a rubber tube. When the syringe needs re-adjusting the rubber tube is compressed till the syringe is taken off, adjusted and reconnected (by a non-sterile assistant if necessary). When the bulb is nearly full of blood the serrefine is removed from the recipient's vein and placed on that of the donor and the blood forced by means of the syringe from the bulb into the recipient's vein. The only precaution necessary is to be careful not to force the last cubic centi-

meter of blood out of the bulb lest air be forced into the vein, which may do no harm but which on general principles is undesirable. This small 50 ccm. bulb is much easier to handle than one of larger capacity and there is no contra-indication to refilling the bulb as many times as is necessary to get the desired amount of blood. Clotting does not occur and the method has the great advantage that the exact amount of blood transfused can be measured. The authors were greatly pleased and rather surprised at the perfect ease and simplicity of this method and recommend it highly, especially in any experimental work in which it is desired to know the exact amount of blood given. (Note: The bulb can be easily blown at a very moderate cost by any glass blower. Ours were made by the Staniford Glass Company, 40 Hanover Street.) Another fairly accurate method of measuring the amount of blood transfused is that advocated by Deavor,* who allows a certain number of beats of the artery to spurt into a graduate and noting the amount given by that number of beats. When the artery and vein are hitched up a count of the donor's pulse is kept and the amount of blood transfused thus estimated. Various authors consider that it is seldom safe or necessary to transfuse more than 300 ccm. of blood at one time.

We have also investigated the feasibility of the method proposed by Hartwell* and modified later by Deavor,* or that of doing transfusion without the aid of either cannulæ or clamps. With a layout consisting only of two pairs of forceps, a pair of scissors and a knife, we have done transfusions with little difficulty. The vein must be cut across and can be kept open by means of thin stay sutures. The artery can be easily controlled by finger and thumb pressure of the operator while connecting the vessels. There are two distinct disadvantages to this method which make it undesirable as a routine. The first is that at least two or two and one-half inches of both artery and vein must be dissected up and made free in order to give length enough for connection and for invagination of the artery into the vein to prevent back flowing, which takes place very readily with any slight bending of the vein. The second objection is the difficulty of controlling this back flow. It is done by applying a hemostat sidewise to the redundant wall of the vein over the artery, but is hard to apply so as to stop all back flow. We would not hesitate to do a transfusion, however, with the limited layout mentioned above, and would expect success.

SUMMARY.

(1) Practically all of the previously advocated instruments and devices for transfusion of blood are either too complicated or require too much skill in manipulation or manufacture and are not suited alike to all cases.

(2) The use of paraffine-coated glass tubes, as advocated by Brewer and Leggett, and later by Vincent, is the easiest and simplest method

and most likely to succeed in all classes of cases.

(3) The glass bulb of David and Curtis is also extremely simple, safe and affords accurate measurement of the blood transfused.

(4) It is possible to do transfusion without cannulæ or clamps or any mechanical aids, provided enough length of artery and vein are dissected out.

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THE OPERABILITY OF CEREBRAL ENDOTHELIOMA, WITH THE REPORT OF A SUCCESSFUL CASE.

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No one familiar, either practically or through the literature, with the surgery of intracranial growths need be reminded that completely successful cases are rare. It was recognized long ago that theoretically perhaps 10% of these growths are operable, but in practice the successful cases are reduced to a minimum on account of failure to recognize and localize them, failure to operate, failure to find or, if found, to remove, to say nothing of death or inability of the brain perfectly to recover function, after operation.

The form of new growth offering the best chance for successful removal and perfect recovery is the endothelioma. Unfortunately, however, the very factors that contribute to this result render this form of tumor the most elusive from a diagnostic point of view; these factors are lack of pressure symptoms and lack of symptoms pointing to disintegration of brain tissue. It is particularly important, then, that the general practitioner as well as the surgeon and the neurologist become familiar with this tumor and bear it in mind in case of continuous and increasing cerebral symptoms, such as epileptiform attacks, even though the eyegrounds and intellect be clear, the sight and other functions of the brain unimpaired, headache and vomiting slight or absent and the general condition good.

Endothelioma has been well described by Blackburn (Intracranial Tumors among the Insane, 1902). In twenty-eight cerebral tumors found at autopsy in the Government Hospital for the Insane, he found seventeen cases of endothelioma. Practically all of them apparently would have offered sufficient promise of