This method will be applied to man as soon as opportunities present themselves.

ADVANTAGES OF THIS METHOD

The instrument I have described overcomes the difficulties experienced with the syringe-cannula method, by striking at their causes.

1. The frequent handling of the cannulas is eliminated because connections are made not directly to them but to the cock. For this reason the cannulas ought not to be dislodged.

2. Clotting is avoided because the entire system is regularly and instantly flushed with saline, and the length of time the blood is outside of the body is reduced to a minimum. In none of the animal experiments did clotting occur.

3. Only the operator handles the blood syringe. The function of the assistant is limited to the injection of saline.

4. Fewer syringes are needed. In one experiment, 800 c.c. of blood were transfused, only two syringes being used. It is advisable, however, to have about four to meet emergencies.

5. It is time-saving because it reduces the manipulations; it minimizes the time the blood is outside of the body, and it allows of the injection of saline simultaneously with the aspiration or injection of blood. When indicated, a more rapid transfusion can be done by this than by any other method. The rate of the flow can, however, be varied at will. Blood can be sent across as slowly as one wishes, because the patency of the circuits can be relied on.

I wish to express my thanks to Dr. F. S. Mandlebaum, who so generously afforded me the privileges of the pathology laboratory of the hospital, and to Drs. Shapiro, Rosenthal and E. Mayer, who were of great assistance in the animal experimentation.

Mount Sinai Hospital.

A DEVICE FOR HOLDING SOLUTION BOTTLES IN OPERATING ROOMS*

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Each bottle shown in the accompanying photographs has as its feature a combination handle and corking device which can easily be detached from the bottle and sterilized. The

Fig. 1.—Method of attaching stoppers.

Fig. 2.—Stoppers in place and bottles in use.

chief advantage, therefore, is that the handle being sterile, the surgeon or assistant may readily obtain more iodine before or during an operation without the soiling of gloves. To those using the benzoin, iodine and alcohol method of skin preparation, for which the apparatus is especially adapted, other points of advantage are quite obvious, for instance, evaporation is prevented (the handle being equipped with a spring), solutions are not wasted, bottles are not broken, and time and trouble are saved the operating room personnel.

* From the Mayo Clinic.

LABORATORY SUGGESTIONS

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EQUIPMENT FOR SEROLOGIC WORK

In performing serologic work, certain technical methods may be evolved which will be economical of both time and labor. Each worker will naturally adapt his equipment to his own needs. We have made certain adaptations which may prove useful to others.

Removing Cotton Stoppers from Pipets.—The plugging of pipet mouth-pieces with cotton is desirable in order to avoid

Apparatus for recording differential counts.

drawing fluid into the mouth and to prevent saliva from running into the pipet. The removal of these cotton plugs is often bothersome, especially when many pipets are used and have to be cleaned.

Our laboratory assistant solved the question by suggesting the use of a dentist's broach. With this fiendish instrument most of us are painfully familiar. It is merely a bit of highly tempered fine wire, roughened so that it grips whatever it touches, and is mounted in a metal handle. With it, the bits of cotton can be removed from fifty pipets in a few minutes.

Apparatus for the Inactivation of Serum.—The inactivation of specimens of blood-serum by use of heat at 56 C. (132.8 F.) is performed much more satisfactorily in a water-bath than in a dry oven. The maintenance, however, of an unprotected water-bath at 56 C. for as short a time as half an hour is not easy, even when the equipment includes a thermostat. We have found that the following adaptation saved much annoyance:

A so-called small "physician's incubator" (Bausch and Lomb Company) was secured which is built in the form of a cylinder, with the opening at the top. It is provided with a water-jacket of an ample capacity. A round basin, 3 inches high and of circumference to fit in the incubator, was made and provided with handles to facilitate lifting it in and out. A number of small cans were secured and holes were punched in the bottoms and sides so that the water would

circulate freely when they were lifted.

The large basin is brought to proper temperature outside the incubator, the small cans containing the specimen-tubes being lifted up and down to allow the water to mix freely. When the temperature is uniform throughout the bath and at the proper point, the bath is placed inside the incubator. This is prepared in advance by filling the water-jacket with hot water, between 60 and 70 C. (140 and 158 F.). We find that if the inner bath is at the correct temperature, the exact temperature of the water in the surrounding incubator does not matter greatly as long as it is hot enough to act as an insulator and prevent heat loss. The temperature of the

surrounding jacket may be kept between 55 and 65 C. (131 and 149 F.) during the day with a simple Bunsen flame.

With this apparatus, from forty to forty-five specimens may be inactivated at one time, if need be. Our experience has been that the temperature in the central enclosed bath remains constant for from thirty to sixty minutes without any attention whatever, and so proves somewhat of a labor-saving device. The cost of the apparatus is inconsiderable.

APPARATUS FOR RECORDING DIFFERENTIAL COUNTS

For use in making differential blood counts we have improvised a contrivance of a small wooden box made to hold upright four counting machines, on which may be recorded the number of the most prevalent types of leukocytes. The forms occurring in smaller proportions can be remembered without being recorded. With this scheme, it is not necessary to use the eyes for recording, and the total of each class is in plain view at any time.

LABORATORY BURNER

A tin can with diameter less than 3 inches is used. In the bottom three or four circular holes are made for air intakes. A microburner is placed inside the can and the rubber tubing is carried out through one of the openings. Slides to be stained may be placed across the top and the stain may be allowed to simmer. The can serves both as a support for the slide and as a shield against air-currents in case the burner is used in front of an open window.

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A PROCEDURE MINIMIZING THE DIFFICULTIES OF TRANSPLANTATIONS OF A GONOCOCCUS CULTURE

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One who handles gonococcus cultures is familiar with the uncertain viability of the organism. To safeguard a culture, the ordinary practice is to grow it on ascites-agar and to transplant at intervals of twenty-four to forty-eight hours. Outside of large laboratories, with a corps of special assistants, this becomes burdensome and expensive.

About nine years ago, while inoculating a horse to produce antigonococcic serum, and while handling numerous gonococcus cultures, I hit on a method of reducing the frequency of subcultures. By its use I found it possible to increase the interval between transplantations from seven to fourteen days, or even longer, using a solid culture medium as a substratum. The details are as follows:

Löffler's blood serum mixture of the usual formula, with bouillon neutralized according to the prevailing standard, constitutes the culture medium. It has happened in my work that horse's serum (the vehicle generally employed in commercial biologic laboratories) formed the basis, though the blood serum of cattle probably would answer equally well. It is preferable to have the test-tube slant of Löffler's medium with its original condensation water. If perchance this condensation water is lost, it may be replaced by the requisite amount of ordinary bouillon (standard neutralization). The transplantation, after one or more subcultures on ascites-agar, is effected by the platinum loop, sowing directly into the pool of condensation water, or bouillon replacing the condensation water; but not, as by the usual custom, of rubbing the inseminated loop over the surface of the slant. With its condensation water thus impregnated, the tube of Löffler's medium is capped to prevent evaporation, and without undue agitation set in the incubator. After a period generally not more than forty-eight hours, it will be found that a transparent, glistening, colorless line of culture appears above the condensation water, and by a process resembling the "creeping of salts" in strong saline solutions, it will be seen that this line of culture slowly but steadily ascends the surface of the slant, continuing for seven, ten, fourteen or even more days. From this mounting line of culture, further transplantations may be effected at a convenient interval, the length of which may be ascertained for a given gonococcus strain after a few experiments.

INTERRUPTED CAST FOR COMPOUND FRACTURES

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An infected compound fracture presents to us a problem difficult in its nature. The presence of pus demands, above all, frequent dressings after complete drainage has been established. If the dressings are not changed frequently, the wound remains bathed in pus. The phagocytic cells of the freshly-exuding lymph are constantly battling against odds and their energies wasted. The value of frequent dressings can not be over-emphasized; in fact, our aim should be the maintenance, if possible, of a pus-free wound. On the other hand, firm union of the fragments demands well-secured, correct apposition. This would seem to interdict frequent changes of dressings with the movements involved. This objection is real if the ordinary splints applicable to simple fractures are used. No matter how carefully handled, each

Author's interrupted cast for compound fractures, with detail of hoop-iron brace.

loosening and readjustment of splints endangers the apposition. A further objection is that each change of dressings necessitates the presence of the surgeon at the bedside.

Coincident with the increased speed in transportation and modern machinery has come a rapid increase in the number of this class of cases. The problem of maintaining absolute cleanliness and correct apposition must be solved. Malunion or no union, bone necrosis, even sacrificed limbs, are the dire results of unsuccessful treatment.

In my own work I have found the device here presented indispensable in handling cases of this class. The illustration is for the common fracture of the lower leg but the idea can be modified for other situations. It consists simply of a plaster cast built in two sections. The two sections are joined into a rigid unit by three metals bent in the shape illustrated and embedded equidistant from each other in the sections of plaster. These metals may be strips of brass, iron or steel (I have used all three). By using three strips, sufficient rigidity is obtained if they are $\frac{1}{8}$ inch thick and $\frac{3}{4}$