further consideration of his case and may present any evidence or information which he may wish to have considered. The particularity with which he may be informed of the contents of the reports in the Department's file depends, of course, upon the source and classification of such reports but it is usually possible to inform him in a general way of the nature of the evidence and the information upon which he has been refused a passport. Any new evidence or information which the applicant may submit is referred to the officers who first examined the case for evaluation and expression of opinion as to whether a passport may be issued. The Department cannot violate the confidential character of passport files by making public any information contained therein.

9. The Secretary of State has the authority to establish any administrative procedures respecting passports which he may deem appropriate. These procedures are under constant review and a continuing effort is made to see that they are fair and efficient. There is a board in the Passport Division for questions of loss of nationality. The consultations between officers of the Passport Division and officers of other divisions of the Department and with the Foreign Service abroad, in effect, constitute in a given case a most fair and comprehensive board of review action in the denial of a passport in the interests of the United States.

An Improved Lyophilizer[1]

THE lyophilization of bacterial cultures is a common laboratory practice. The apparatus, however, is often inefficient, fragile, and costly. We have tried several designs and have finally developed a type that is highly efficient, very sturdy, and inexpensive (Fig. 1).

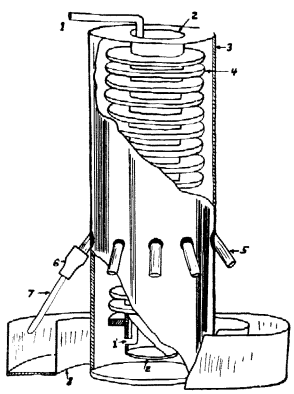

FIG. 1.

In essence, it is a metal Dewar flask with 24 nipples (5), ½″ × 2″, welded to the sides for the attachment of culture-drying vials. A steel pipe (2), 23″ × 3″, was welded in the center of a 24″ × 7½″ tank. Before the pipe was attached, metal fins ¼″ × 1½″ were welded to the inside of the tank. The vacuum exhaust pipe (1), ½″ × 23″, which was attached to the inside of the condenser pipe (2), acts as a second trap, removing any moisture before it reaches the vacuum pump.

[1] Published with approval of the director, Wyoming Agricultural Experiment Station, as Journal Paper No. 17.

It is important that all joints be welded and not brazed, if all leaks are to be eliminated. If brass parts are used throughout, brazing is permissible.

Ethyl alcohol or a 50% ethylene glycol–water mixture is used as a carrier in the condenser chamber (2) with a dry-ice refrigerant. The doughnut-shaped pan (8), a separate unit 22″ OD by 12″ ID, is constructed to conform to the tank shape (3). The pan (8) is then filled with ethylene glycol. The glass culture tubes (7) are connected to the metal nipples (5) by means of heavy rubber vacuum tubing (6).

The dimensions given are not critical but have been found satisfactory. Efficiency of this design lies in the great condenser surface and the short distance from condenser to culture tubes.

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Sterilization of Pyrogen-Free Injections in Fenwal Bottles

STEAM under pressure is usually employed to sterilize material for injection not injured by moisture and the temperature required. But when applied to material in Fenwal bottles[1] or containers not hermetically sealed, this process is unsatisfactory. There is a source of contamination that has been neglected.

At the beginning of sterilization, the temperature of the material is raised by the heat conducted through the container wall to 100° C. As a result, the air and water vapor inside the container increase in pressure and blow off continuously through the vent in the cap. No obvious drawback is seen here. During the change of temperature from 100° C to 120° C the steam pressure outside increases and remains greater than that of the gas mixture inside the container. Consequently, the steam outside will continuously enter the container and condense therein. For example, if a 1000-cc Fenwal bottle is used and 3 or 4 min are needed for the temperature to rise from 100° C to 120° C the total heat required will be 20,000 calories. The heat conducted through the wall[2] is at most 1000 calories. The greater amount of heat, therefore, must come from the condensation of steam, which is calculated to be at least 35 g. It is this amount of condensate that may spoil the material destined for injection.

To avoid contamination of the pyrogen-free solutions in Fenwal bottles during sterilization the following three processes are recommended:

Method I. Use the autoclave with the author's device (SCIENCE, **113**, 488 [1951]). Heat the solutions by free-flowing steam to a temperature of 100° C within

[1] Supplied by the Macalaster Bicknell Company, Cambridge, Mass.

[2] Calculated from the equation $H = \frac{kA(t_1 - t_2)}{d}$, where H = heat transmitted per sec, k = heat conductivity of glass = 0.0020, A = area = 400 cm², $t_1 - t_2$ = temperature difference, d = thickness = 0.2 cm.