a closed steel chamber of 200 cubic feet capacity, leaving an air suspension of droplet nuclei.[4] Following atomization, samples of the air were withdrawn through siamized tubes to two Wells air centrifuges.[5] One branch led directly to one of the centrifuges; the other branch included a small chamber enclosing a cold quartz mercury vapor lamp, by means of which the air passing to the other centrifuge could be irradiated with ultra-violet light.[6]

The virus in the material recovered from the tank was identified in three ways: (1) production of the characteristic disease in ferrets; (2) virus neutralization tests in mice before inoculation and 17 to 30 days later; (3) reinoculation of the ferrets with virus of known potency.

RESULTS

(1) All the ferrets (8) inoculated with material collected from the air within an hour after suspension contracted influenza. None of the ferrets (7) inoculated with samples collected from the tank an hour or more after suspension of the virus contracted the disease. These negative tests were in general comparable to those of shorter periods which gave positive results, but in each instance some particular condition of test differed. On the basis of this exploratory study, however, the authors do not believe that they have necessarily reached a viability end-point.

(2) Simultaneous sampling under identical conditions of air, (1) as it came from the tank and (2) after irradiation with ultra-violet light, seem to indicate a definite viricidal action of the light. In two tests, the ferrets inoculated with material recovered from unirradiated tank air, suffered a typical attack of influenza, which was confirmed by virus neutralization tests. The ferrets that received material simultaneously recovered from the air of the tank under identical conditions, except for irradiation of the air, failed to show any symptoms of influenza, and virus neutralization tests subsequently showed no development of immunity.

W. F. WELLS
H. W. BROWN
HARVARD SCHOOL OF PUBLIC HEALTH

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE APPARATUS FOR THE MAINTENANCE OF A GRADED SERIES OF CONSTANT TEMPERATURES

IN 1928 I designed and had constructed for the Zoological Laboratory of the Johns Hopkins University an apparatus by means of which a graded series of five different constant temperatures can be maintained. This apparatus has now been in operation almost continuously for seven years. It has proved to be very useful and efficient and extremely simple to operate.

It consists, in principle, of a series of compartments one above the other with a refrigerating unit in the upper one and a heating unit in the lower (Fig. 1 A). As actually constructed it consists of two series of five compartments side by side (12 x 20 x 20 inches each); a large refrigerating compartment (12 x 25 x 50 inches) above these two series and a heating compartment (9 x 25 x 50 inches) below. Each of the ten compartments contains two wire shelves, and each has a 2-inch space around it (Fig. 1 A). The refrigerating compartment has two trap doors above, the heating compartment two doors on hinges and each of the ten compartments one door on hinges. All the doors are constructed like those on household refrigerators, and each is provided with two gaskets (Fig. 1 B). Between the sheets of celotex and the wood boards and on both surfaces of the sheet cork there are layers of heavy insulating paper, not represented in the figures. The refrigerating compartment contains the low temperature coils of a household electric refrigerator, the heating compartment contains a bank of five 30-Watt lamps with an electric thermostat in series.

The temperature in the different compartments varies with that in the refrigerating and the heating compartments and that of the room. With these temperatures 2°, 30° and 20°, respectively, the temperatures in the five compartments in each of the two series are, beginning with the upper, 10°, 16°, 20°, 24° and 27°, respectively, with a variation under favorable conditions of approximately ½° in each.

The temperature of the five compartments in the series varies directly with that of the room. However, if this does not vary more than about five degrees there is, with ordinary thermometers, little if any observable variation in the temperature in the compartments, and this could be reduced by increasing the thickness of the outer walls and by using more efficient insulating material.

By changing the temperature in the refrigerating and the heating compartments practically any range of temperatures in the compartments desired can be obtained.

[4] W. F. Wells and W. R. Stone, *Am. Jour. Hyg.*, 20: 611, 1934.
[5] W. F. Wells, *Am. Jour. Pub. Health*, 23: 58, 1933.
[6] W. F. Wells and G. M. Fair, SCIENCE, 82: 280, 1935.

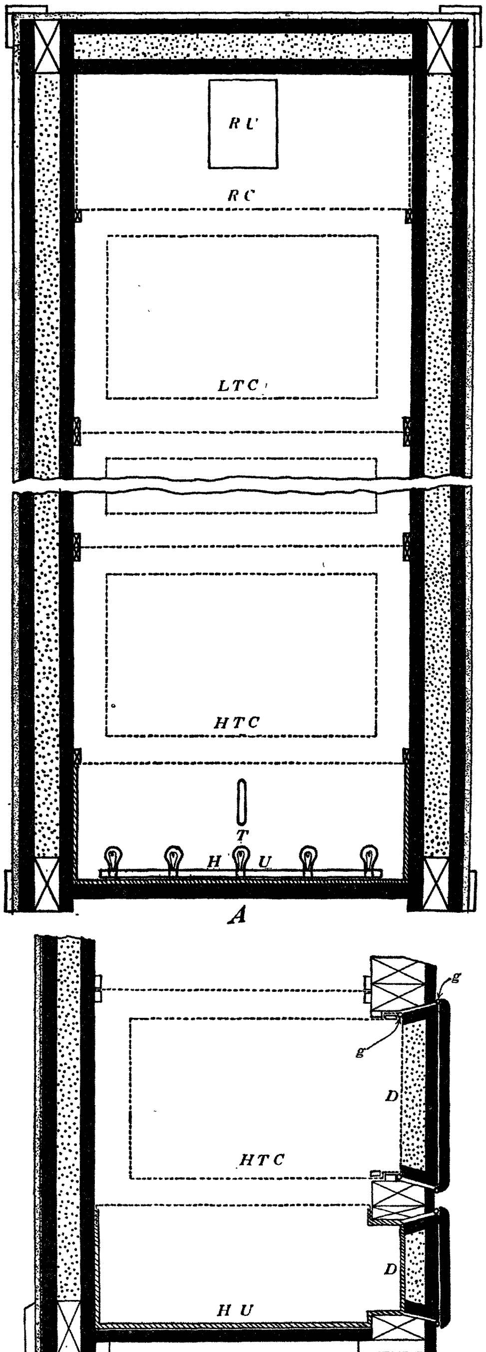

FIG. 1. Apparatus used to maintain a series of constant temperatures. A, optical section as seen from in front (middle portion omitted); B, optical section as seen from the side (upper portion omitted); heavy black lines, wood boards $\frac{5}{8}$ inch thick; fine stipple, celotex sheet $\frac{1}{2}$ inch thick; X, wood frame; coarse stipple, sheet cork 2.5 inches thick; cross hatch, asbestos board $\frac{1}{4}$ inch thick; broken lines, 14 oz. hard red copper sheet; H U, heating unit; T, electric thermo regulator; H T C, high temperature compartment; L T C, low temperature compartment; R C, refrigerating compartment; R U, refrigerating unit; D, door; g, gasket.

The apparatus was built by the university carpenter and plumber. It cost complete approximately $600. That was in 1928. The cost would now be considerably less, and this could be reduced by reducing the size and the number of compartments.

It would be advantageous to have the height of the heating and the refrigerating compartment the same as that of the other compartments and to have side doors of the same size on all, with the view of using the heating and the refrigerating compartments, as well as the other compartments, for experimental purposes.

S. O. MAST

THE JOHNS HOPKINS UNIVERSITY

A NEW COVER FOR CULTURE JARS

IN some water-culture experiments with seedlings, recently carried out at the University of Pennsylvania, the tall 500-ml Pyrex beakers used as culture jars were fitted with a new form of cover that has advantages over covers previously used for such experiments. As shown in the accompanying figure, these were Pyrex Petri-dish covers, perforated and annealed by the university glass-blower. The size and number

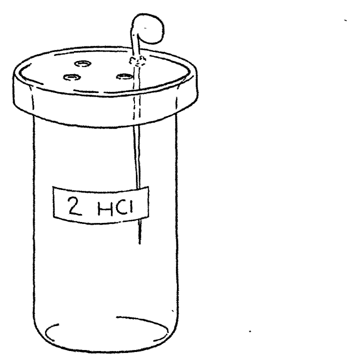

FIG. 1. Culture jar with glass top and one seedling in place.

of holes were determined by the size and number of seedlings to be used. Cotton was sometimes used where the seedling passed through the perforation, to aid in supporting the plant in an upright position. Convenient to handle and easily cleaned, these covers support no bacterial growth, and they practically prevent contamination of the culture solution.

RUTH BEALL

LANCASTER, PA.

A LABORATORY SUGGESTION

THE slightly greasy film of dirt which microscopic slides acquire after having been put away for several months can be very easily removed with "Windex," a preparation sold for washing windows.

JOHN FRANKLIN HUBER

UNIVERSITY OF MICHIGAN