days and 6 years of air-drying respectively. The results of the experiments showed that glass rods, painted with the halogenated paints, after air-drying or baking for the time and temperature indicated, exerted a strong bactericidal effect upon saline suspensions of *B. typhosus,* when exposed for 6 hours at 20°C., as judged by the amount of growth on agar plates. Of the 10 commercial paints tested in the same manner, 7 were bactericidal 2 days after painting, but when tested 8 days later 9 had almost or completely lost bactericidal power; at the end of 6 weeks no appreciable germicidal property was manifested in any of them. Painted tin discs, air-dried for 2 days or 7 weeks, or baked at 100°C. for 6 hours gave results which coincided closely with those obtained with the rods.

Experiments with *Staphylococcus aureus* exposed to painted rods for 16-24 hours showed that the painted surfaces of the halogenated paints air-dried for periods up to 7 weeks, or baked at 100°C. for 45 minutes, 2 and 4 hours, were moderately but not consistently bactericidal. They were superior to the 3 commercial paints tested in comparison.

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Permeability of Germinal Vesicle of the Starfish Egg to Water.

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While an enormous amount of research has been carried out on the permeability of the external cell membrane, very little consideration has been given to the permeability of the nuclear membrane. In fact, only one paper, that of Monne[1] on diffusion of microinjected dyes from cytoplasm to nucleus, has come to our attention.

A few preliminary experiments, carried out at the end of the past season at Woods Hole, indicate the possibility of making quantitative and extended studies on the permeability to water of the nuclear membrane in permanently immature eggs of the starfish, *Asterias forbesii.* The great advantage of this cell over others

1 Monne, L., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 1197.

examined is that the nucleus is of a size sufficient to make possible fairly accurate measurements of its diameter with high dry magnification and the filar ocular micrometer. In the mature starfish egg the nucleus is of much smaller size than in the immature egg. Some of the eggs in every lot remain permanently immature and with care in selection immature eggs almost spherical in shape and with a spherical germinal vesicle may be secured.

Measurements of the swelling and shrinking of each egg were conducted separately. The egg was isolated, transferred to sea water diluted to the desired degree, and placed with a quantity of the diluted sea water in a small, closed glass chamber with optically plane faces. The temperature was about 21°C. but was not controlled. Measurements on cell and nucleus diameters were started as soon as possible after transfer to the diluted sea water, and were continued until both cell and nucleus reached an equi-

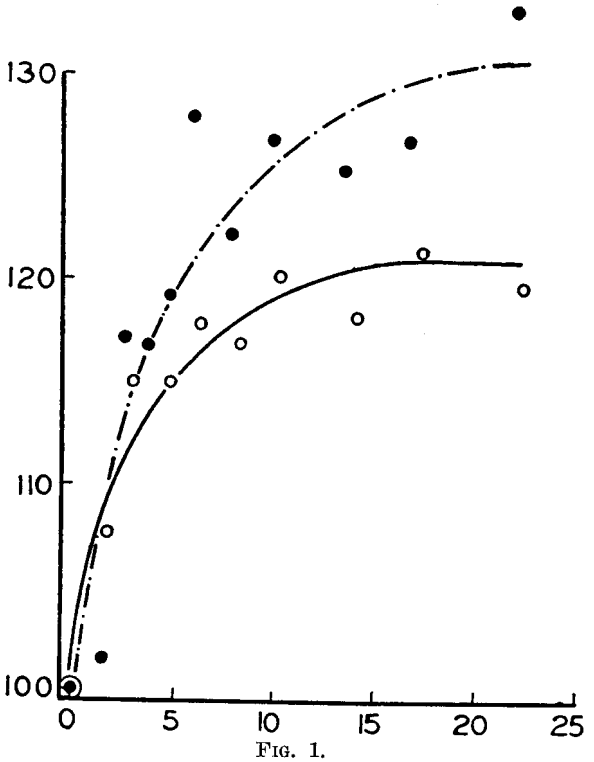

FIG. 1.

Comparison of swelling of cell and germinal vesicle of the immature starfish egg in 80% sea water. Abscissa represents time in minutes, and ordinate the percentage volume change. Open circles, cell; closed circles, germinal vesicle. Initial volume of cell 1,127,000 μ^3; initial volume of germinal vesicle, 160,300 μ^3.

librium volume, whereupon the egg was returned to 100% sea water and a new set of measurements made.

The changes in nuclear and cell volume secured for an egg placed in 80% sea water are shown in the accompanying graph, in which the average value of the equilibrium volumes attained in 100% sea water at the end of the experiment has been taken as the standard, and expressed as the 100% volume for both nucleus and cell. The advantage of this procedure is that it shows at a glance the greater percentage change in volume of the nucleus.

The inaccuracies of the present method are quite evident from the scattering of the points in the graph. However, the data shown and those secured in similar experiments demonstrate (a) that the nucleus swells and shrinks in the same sense as the cell does, and that the cell as a whole approaches an equilibrium volume more rapidly than does the nucleus (b) that the cell as a whole shows a smaller percentage increase in volume than does the nucleus (c) that both cell and nucleus shrink more rapidly than they swell. Finding (b) suggests that the germinal vesicle contains a smaller percentage of osmotically inactive material than does the cytoplasm. The more tardy approach to equilibrium volume by the nucleus is probably due in the main to the fact that the inwardly diffusing water must pass through the cytoplasm before it can enter the nucleus. Considerably more accurate data and a detailed mathematical treatment would be required to determine quantitatively the rôle played by the nuclear membrane in limiting the rate of passage of water between nucleus and cytoplasm.