mune animals; (4) that no immunity results from the injection of neutralized virus.

[1] Olitsky, P. K., Traum, J., and Schoening, H. W., *J. Am. Vet. Med. Assn.*, 1926, lxx, 147; Olitsky, P. K., *J. Exp. Med.*, 1927, xlv, 969.

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Mechanism of the Inhibition of Bacteriophagy by Agar or Gelatin.

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It has been stated that an increase in the concentration of gelatin or agar in the medium tends to inhibit the lysis of bacteria by bacteriophage. d'Herelle explains this action on the assumption that the excess of gelatin or agar inhibits the normal growth of *Bacteriophagum intestinale* by interfering with the free diffusion of the products of its metabolism.[1] This explanation is not acceptable so long as there exists no satisfactory evidence of the metabolic activity of bacteriophage. Our recent studies have shown that lysis of bacteria may be the direct result of rupture of the bacterial cells due to increased uptake of water from the medium.[2] If this is true, inhibition of lysis in the presence of high concentrations of agar or gelatin in the medium may result from a competition for water between the medium and the bacteria.

Petri plates containing nutrient medium of different concentrations of agar or gelatin were seeded with susceptible bacteria and subsequently minute droplets of bacteriophage were deposited at different places on the seeded surface. The plates were allowed to dry for one hour under porous clay covers both before and after deposition of phage, in order to prevent its spreading. Contact impressions were taken at regular intervals on coverslips from the spots on which phage was deposited.

Macroscopic observation of the plates showed that lysis of bacteria occurred only in the plates containing low concentrations of agar or gelatin (1 to 2% and 15 to 25% respectively). The plates containing 4% agar, as well as those containing 50% gelatin, showed, on the contrary, a marked increase in the density of bacterial growth on the spots where phage was deposited, from which it was concluded that phage exerted a stimulating effect on the

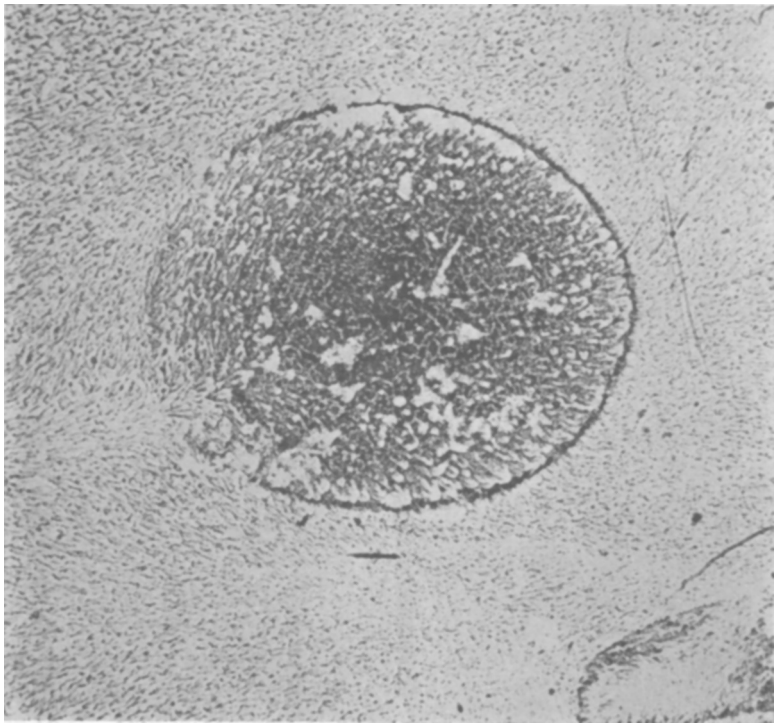

FIG. 1.

growth without causing lysis. (See Fig. 1.) Microscopic examination of stained contact impressions showed that previous to lysis, the bacteria underwent marked swelling on the media of lower concentration, while on the media of higher concentration, they remained unchanged.

The conclusion we draw from these effects is that an excess of agar or gelatin inhibits lysis of bacteria by preventing water from entering and disrupting bacterial cells.

[1] d'Herelle, "Bacteriophage and Its Behavior," Williams and Wilkins, Baltimore, 1926, p. 89.

[2] Bronfenbrenner, J., Muckenfuss, R. S., and Hetler, D. M., *Am. J. Path.*, 1927, iii, 562.