laboratory by Mundell, Fong and Strietmann with essentially the same results. We do not know at this time what the substance is in ultrafiltrates of susceptible bacterial cultures which, when added to phage, apparently results in the production of more phage. However, a considerable mass of experimental data leads to the conclusion that normal bacterial cells produce some sort of a phage-precursor which is converted into phage by phage itself. A detailed description of such properties of the precursor as we have been able to determine will appear in another paper.

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"Glandular" Cells in the Pars Nervosa and Stalk of the Hypophysis.

I. GERSH. (Introduced by Carl G. Hartman.)

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This note summarizes the results of an investigation of the possible glandular nature of the parenchymatous cells of the pars nervosa of the hypophysis. Functional histological analysis in rats of various ages under experimental conditions leads to the conclusion that these cells produce and secrete anti-diuretic substance for the control of the water metabolism of the animal.

This "glandular" cell has been seen in the pars nervosa of almost every class of mammals, and of pigeons and chickens. The cell is distinguished by the presence of granules or of lipoid droplets which were first seen in fresh mounts. The inclusions fill the cytoplasm, and extend out into the cell processes. These intracellular elements are of approximately the same size in any one cell, though they may vary somewhat in size in adjacent cells. Histochemical analysis of the droplets or granules shows that in the rat they are rich in neutral unsaturated fats; no other lipoids have been identified. In some other animals, the granules contain no visible lipoids. The inclusions are preserved best by Maximow's fluid in the mouse and white rat.

The characteristic features of the glandular cell appear very early in the rat's embryonic life, being easily recognizable in a 23 mm. embryo. The number and size of the cells and of their inclusion bodies increase throughout life to become most prominent in rats 2½ years old. The cells are distributed more or less evenly in the pars nervosa except at its junction with the hypophyseal stalk;

there they are closer together. They are more widely separated and smaller in the remaining portion of the stalk than in the glandular portion.

In any particular adult gland the glandular cells vary greatly in size. In spite of appreciable fluctuations in both their number and size in untreated rats of the same age, the cells fall into and form a "normal" range of variation. Fluctuations within this normal range have been correlated with dietary water intake in a manner which can be controlled experimentally. When rats are placed for 1-8 days on a dry diet containing 5% water, the glandular cells appear in greater number and in larger size than in control rats which have free access to water. When such dehydrated rats then have access to water for as short a time as one day, the number and size of differentiated cells revert to the normal range of untreated rats. A similar though less marked hypertrophy accompanies parturition. There is thus in the rat a correlation of cellular activity and morphology with a hypersecretion of the antidiuretic and perhaps also the oxytocic substances.

Not all the glandular cells in the pars nervosa are differentiated or characterized by their content of intracellular inclusions. Many are relatively undifferentiated. These may be transformed rapidly during hyperplasia under conditions such as those described above, to the more differentiated form. The two varieties of cells vary inversely in number.

The glandular cells are supplied with nerve fibers which sweep in bundles down the hypophyseal stalk. The nerve fibers and their endings on and around the special cells have been demonstrated by Dr. C. M. Brooks and the author. Evidence is accumulating in this laboratory that these are the cells affected by stalk (nerve) section, and that they degenerate in severe experimental diabetes insipidus induced by such section. There is evidence also that recovery from a "temporary" diabetes insipidus is accompanied by a transformation of the unaffected cells in the hypophyseal stalk into the more differentiated type.