

ules; whilst the germinal vesicle exhibits considerable elasticity when pressure is removed, and will not burst till the last moment, if we may so express it, and then very suddenly, as if it had sustained great tension in some kind or other of restraining envelope.

There remains but one question to answer respecting the granular period in the growth of the yolk, before we arrive at the turning point, which reveals to us an entirely new and important feature in the life of the egg, namely, the formation of genuine yolk cells. How constant are the denser rings (Pl. 8, fig. 18a) of granular matter, already mentioned above, which may be seen in eggs of about $\frac{1}{16}$ of an inch in diameter? It is not yet possible to answer definitely this question; but this much is certain, that such phases are so frequently met with as to warrant the conclusion that they are to be considered as the prevailing state of the egg at this age. The granules of the rings are rather coarse, but not darkly outlined (Pl. 8, fig. 18b) nor irregularly shaped as heretofore, and the lighter circles exhibit only the faintest traces of minute, dot-like particles. In eggs considerably larger than this, (Pl. 8, fig. 19b,) we may meet with two rings of similar structure, (fig. 19,) separated by corresponding clear spaces.

SECTION III.

DEVELOPMENT OF THE YOLK CELLS.

Formation of the Ectoblast. Thus far we have considered the yolk as a whole. We now proceed to describe its cellular development.¹ The first change noticeable

¹ Thus far we have employed, in our descriptions of the egg and its contents, the nomenclature generally in use to designate its different parts, and those of the cell. But this nomenclature, framed to express particular views respecting the mode of formation and the functions of these parts, is completely theoretical in its meaning. It appears desirable, therefore, now that we are about to consider more fully the origin and successive growth of the yolk cells, to discard every technical expression which may imply a theory, and to adopt such only as designate the natural relations of the objects under consideration, especially since the views to which we have arrived cannot be reconciled with the theories which

the current nomenclature is intended to express. For instance, in the case of a nucleolated cell, the outer envelope is described as formed *around* a nucleus, in which latter the nucleolus is developed. The outer cell membrane would thus inclose, at a later time, a mass accumulated around a *nucleus* already formed, as its name implies, and the nucleolus would be developed *within* the nucleus. For similar reasons we shall, hereafter, also avoid the expressions "parent and daughter cells." But, whatever be the mode of origin of cells and of their parts, there is, in a perfect cell, an outer envelope, containing another vesicle, in which is seen another smaller body. These parts are therefore designated in the sequel