

tenacity, holds together for a while longer, but finally disintegrates and discloses its mode of origin in the immense number of minute, faint granules, identical in appearance with the extruded ones, which are dancing about in zigzag. At times a granular structure, giving to the wall the appearance of a cellular membrane on a very minute scale,¹ may be detected, even before it has lost its consistency.

As the egg grows larger, the dark outline decreases in thickness, and the contents become less oily and more transparent, till at last, when it is about $\frac{1}{8000}$ of an inch in diameter, a well defined wall discloses itself under the guise of a thin pellicle (Pl. 8, fig. 1, *f*, *g*).

The study of a series of eggs,² such as have just been presented,—in which at first no wall is visible, then faint indications of a superficial change appear, in which a gradual differentiation of the parietal from the more internal substance ensues, and the finally well established separation of the two is unmistakable, the latter, the internal, inclosed by the former, which presents itself as a sharply pronounced, extremely tenuous envelope,—leaves no doubt that the egg-cell wall has an origin totally external to all that which is inclosed in it at the time it becomes visible. Whether this wall has arisen by a gradual change in the density of the superficial particles, or by original deposition in its present form, it is impossible to determine; but this much is demonstrated, that at least a small portion of the egg elements exists before its wall has become established, and that this wall, far from being the nidus in which its contents are developed, is more probably the offspring of what it incloses. It would be more proper, perhaps, and nearer the true nature of the operation, to say that the yolk membrane arises synchronically with the concretion of the original yolk particles, as a denser exterior stratum, which, subsequently becoming

¹ Indeed, it is no exaggeration to say, that such is essentially a cellular membrane; for as cells originally are what we have designated as granules, and cells unite to compose a membrane, why may not granules, cells, combine to make a wall around a certain substance? In some respects it is only a matter of size, after all; put on the higher powers of the microscope, and the granules may appear so large that they would be called cells by every observer; and what are minute cells under three hundred diameters, are, to the eye, mere granules with thirty or forty diameters.

² In order to preserve the natural relations which exist between the many isolated figures drawn to illustrate the structure of the eggs of different stages of development, it has been necessary to adopt a very

peculiar mode of numbering and lettering the figures. Yet, as it is not possible to describe at once all the different features which these figures are intended to bring before the eye, it may facilitate the understanding of the following pages, if the reader will first make himself familiar with the arrangement of the Plates 8, 9, and 9a, by studying the explanation which accompanies them. The student already familiar with Embryology may also read with advantage, Section 5 of this Chapter, before any other.

In the quotations, the reader ought to mark carefully the difference between the letters following the figures without comma, which indicate the whole figure, and those following a comma and are referred to in italics, which designate the individual illustrations belonging to the same objects.