

it moves about as a free larva in the surrounding water. It would seem to be about this time that the mesosarc shows itself as a very fine structureless membrane between the endoderm and ectoderm. To the larva thus formed, Dalyell, by whose observations it was first made known, has given the name of "planula."<sup>1</sup> The planula is still a completely closed sac. After enjoying for a time its free locomotive life it loses its cilia and fixes itself by one end—the aboral pole. A delicate chitinous pellicle, the foundation of the perisarc, is excreted over a greater or less extent of its surface; the free or oral pole becomes perforated by a mouth round which a circle of tentacles has become developed. The larva may now be recognised as the primordial hydranth of the colony, and it only remains for this to become complicated by the budding of other hydranths and of the sexual zooids in order that it may attain the condition of the fully developed dendritic colony.

The mode of formation of the planula now described is in its essential features that which has shown itself in all Gymnoblasic and Calyptoblastic Hydroids in which a planula has been noticed, and subjected to sufficiently careful observation, with the exception of *Eucope polystyla*, one of the Campanularians, in which Kowalevsky has described a somewhat different process.<sup>2</sup> According to this observer the ovum as the result of segmentation becomes converted into a blastosphere with a large central segmentation cavity, in the walls of which only a single layer is present. From the inner surface of the walls, cells are now budded off, and these fill the segmentation cavity with a solid cellular mass which represents the endoderm. The original single layer forms the ectoderm, and becomes clothed with cilia. In the endodermal mass a slit-like cavity—the primitive gastric cavity—now shows itself, and thus completes the formation of the planula stage of the larva.

We know as yet very little of the development of those Medusæ which pass to their adult state directly from the egg without the intervention of a polypoid trophosome (see above, p. xxix). The researches of Metchnikoff<sup>3</sup> have shown that in at least two of these, *Polyxenia leucostyla* and *Æginæta flavescens*, the segmentation of the ovum results in the formation of a solid morula, from which a peripheral layer is differentiated by delamination as an ectoderm, which becomes clothed with vibratile cilia. In the central or endodermal cell-mass of the body thus formed the primitive gastral cavity makes its appearance, and soon opens externally by the formation of a mouth. On two opposite points the body becomes extended into a solid tentacle, and two other similar tentacles subsequently make their appearance in a median plane at right angles to that of the former, so that the symmetry, at first bilateral, becomes radial. Between the ectoderm and endoderm a clear gelatinous layer is excreted, and this rapidly increasing in volume while the larva assumes a more lenticular form, becomes the gelatinous umbrella of the

<sup>1</sup> Sir J. Graham Dalyell, *Rare and Remarkable Animals of Scotland*, London, 1847.

<sup>2</sup> Observations on the Development of Cœlenterata, *Trans. Friends Nat. Hist., Anthropol. and Ethnogr. Moscow*, 1873 (Russian).

<sup>3</sup> Studien über die Entwicklung der Medusen und Siphonophoren, *Zeitschr. f. wiss. Zool.*, Bd. xxxiv. p. 1074.