

part of the colony may bring forth sexual cells, and that the elements of the two germinal layers (endoderm and ectoderm) may become transformed in one instance into male, in another into female, sexual cells.

So indefinite and independent of law is all this, that Weismann has been almost led to conclude that in the lowest Metazoa—the bilaminar Cœlenterata—no functional separation of the germinal layers has taken place such as we find in the higher Metazoa; that in those lowest forms both germinal layers possess the faculty of differentiating sexual cells out of their own elements, while it is in the higher Metazoa that this faculty has for the first time become concentrated on one of their three germinal layers.

At the same time it must be borne in mind that the part of the colony, as well as the special germinal layer in which the sexual cells originate, is fixed for each species.

Weismann has further pointed out that it is never cells already histologically differentiated which are transformed into sexual cells, but only those of young tissue, which are to a certain extent embryonal, or of no determinate external character.

Another fact of great importance, which seems to have been fully established by the researches of Weismann, relates to the manner in which the sexual cells which have originated elsewhere reach the gonophore in which they are to pass through further stages of development. These researches place it beyond doubt, that the sexual cells are carried into the gonophore, not by mere physical pressure, but that they wander from their place of birth by their own proper movements, such as might exist in amœboid protoplasm masses. In this way they move from place to place among the cells of the endoderm and ectoderm, and even pass from one layer into the other by actually perforating the mesosarc which separates these two layers from one another.

Shortly after arrival in the sedentary gonophore, whether this be a medusoid or a simple sporosac, the sexual elements—egg-cells or spermatozoa—are found accumulated round the spadix where they are retained by the *perigonium* or sac formed by the more external parts of the gonophore.¹ It is here that, in at least the great majority of cases, the influence of the male element is exerted on the egg-cells, but by what channel the spermatozoa gain access to them has not yet been satisfactorily determined.²

¹ The perigonium in the sporosac consists simply of the ectodermal coat which before the intervention of the sexual cells lay close upon the spadix, while in the medusoid it consists not only of this coat but of layers which correspond to those which form the umbrella of a Medusa.

² Under the name of *Hydrella ovipara*, Goette (*Zool. Anzeiger*, 1880) has noticed a minute Hydroid, of which he obtained a single specimen at Naples, and which would seem to be nearly allied to *Halecium*. In the atrophied and disintegrated cœnosarc of the stem were several nucleated cells, which he regards as eggs, and as no gonophores were present in the specimen, he believes that this Hydroid offers an instance of direct sexual reproduction without the formation of special generative zooids.

It is possible that Goette's interpretation may be the right one, and that here as in *Hydra* no true gonophores are developed; but when we bear in mind the very general presence of eggs in the Hydroid cœnosarc, as proved by the researches of Weismann, and the fact that in *Hydrella* the supposed egg-cells are irregularly scattered in the atrophied cœnosarc without any tendency to the localisation which we find in *Hydra*, we can scarcely avoid regarding the absence of a gonosome in the specimen as depending on the season of the year, on age, or on abnormal conditions, and cannot but