

animal seizes the penis of the male between its cirri and drags it inside its valves, where it retains it, unless the latter, as is often the case, penetrates thither by itself. The animals remain in this way, pressed one against the other, producing little movements of contraction. Emission takes place, and the sperm is always deposited, in the form of a gelatinous mass, beneath the ovigerous frenum on each side of the body. On each occasion that I noticed it it was the smaller animal of the two that played the part of the male.

If there are several specimens of *Lepas* or *Balanus* whose spermatozoa are ripe surrounding another individual which is ready to be fertilized, it is not unusual to see several of them participating in the fertilization of the same individual.

Another phenomenon is frequently witnessed which is strange enough to be worthy of mention. Two *Balani* (*B. tintinnabulum*) are attached to the same fragment of rock, both of small size, and both with the cirri extended in the same direction. The hindermost one wishes to fertilize its neighbour: it tries, but its penis is too short and cannot reach as far as the orifice of the chamber in order to deposit its sperm there. Then, by a simple process which might be termed ingenious, it turns abruptly in its chamber about three quarters round, and thus diminishing the space which separates them by the length of the orifice of the chamber, it is able to succeed in fertilizing its neighbour.

From these facts, and others which cannot find a place in this note, we must conclude that the ordinary mode of fertilization in the Cirrhipedes is reciprocal. When this method is rendered impossible, by various circumstances, more especially by the fixation of the animals, self-fertilization may also take place.

There is no actual copulation, but merely approximation of the sexes and deposition of fertilizing matter in the neighbourhood of the oviferous females.

It was impossible to determine the existence of reciprocal fertilization in *Pollicipes*; I am inclined to believe that in this case there is only simple self-fertilization.—*Comptes Rendus*, t. cxiii. no. 20 (Nov. 16, 1891), pp. 706-708.

On the Embryogeny of Sagitta. By M. S. JOURDAIN.

Observations made on the development of *Sagitta* have led me to differ from Kowalewsky and Bütschli in my conception of the formation of the archenteric cavity, which appears in these animals at the *gastrula* stage. According to the naturalists mentioned, this cavity, which is simple at first, should divide at its anterior region into three lobes, while preserving its simplicity in its posterior portion. The lateral lobes of the tripartite region would constitute the general body-cavity; the median lobe would form the digestive canal of the perfect animal. This view appears to me to be erroneous.

The archenteric cavity, open behind at the blastopore, which occupies the region of the future anus, gives rise not to the general

cavity (*partim*), but really to the digestive canal. Consequently, the lining of the portion enclosed by embol  represents not mesoblast, but hypoblast.

According to this, the development of the digestive canal must be understood to proceed as follows:—At the oral pole of the ovum there appears a depression, which is clothed by the epiblast which is driven inwards. This depression, becoming deeper, pushes back the subjacent layer, that is to say the hypoblast, which yields and becomes eaten away after a certain time. In this way a communication is established between the hypoblastic cavity and the exterior, by the medium of a permanent mouth. As a matter of fact the archenteron does appear trilobed in front, but the lobes belong to the digestive canal. Later on, the lateral lobes commence to degenerate and disappear. Then the blastopore closes, and the anus is formed in its vicinity.

At the same time as the atrophy is taking place in the lateral lobes of the archenteron, a delamination sets in between the epiblast and hypoblast, and a mesoblastic cavity is formed, which will subsequently become the general body-cavity of the animal.

In proportion as the posterior portion of the embryo increases in size, the separation between the two layers increases, and there is constituted posteriorly a spacious cavity, traversed by two mesenteric bands, of mesoblastic origin, which attach the digestive canal to the somatic walls. These mesenteries are finally absorbed in the posterior region of the body, where the somatic cavity is single in the adult.

On the sides of the terminal intestine cellular proliferations arise at an early period, whence are derived the male and female organs. The latter, therefore, are not developed, as has been asserted, in the cavity of the intestine, but outside it, in the space resulting from the delamination of the epiblast and hypoblast, of which we have spoken above. We found it impossible to determine with certainty the part played by each of these two layers in the formation of the genital glands, and consequently to discover whether  douard van Beneden's theory is here confirmed.

We have nothing to add to what has been stated as to the mode of formation of a cephalic and somatic section of the general body-cavity.

We ascertained that the musculature, which is tolerably complex in the cephalic region, is derived from the mesoblast of the corresponding division.

We were not able to study in sufficient detail the development of the nervous system. Nevertheless, from the ensemble of our observations upon the embryogeny of *Sagitta*, we suspect that this type is not so distant from the Vertebrates as is generally supposed.

Sagitta, the Ascidians, and *Amphioxus* appear to us to constitute a special group, in which we observe the appearance of the earliest lineaments of the Vertebrates, and which, for this reason, we might designate by the title "Prevertebrates."—*Comptes Rendus*, t. cxiv. no. 1 (Jan. 4, 1892), pp. 28, 29.



Jourdain, Sylvain. 1892. "On the embryogeny of Sagitta." *The Annals and magazine of natural history; zoology, botany, and geology* 9, 415–416.

<https://doi.org/10.1080/00222939208677353>.

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