

were not attached to roots. They appeared to be carefully attended by the ants which surrounded them. The larva alluded to was almost six millimetres long, was covered on the back with a thick, white, cotton-like secretion. It was also carefully attended by the ants, which were frequently observed to stroke it with their antennæ. The *Aphides* and *Cocci* were all in good condition, but without visible means of subsistence excepting the neighbouring grass-roots partially extending into the earth beneath the stones, to which it is probable they were at times transferred by their masters.—*Proc. Acad. Nat. Sci. Philad.* 1877, p. 145.

*On some Points in the Organization of the Bryozoa.*

By M. L. JOLIET.

In a preceding note (April 9, 1877) I have stated the reasons which prevented me from regarding as of a nervous nature the supposed colonial nervous system of the *Vesiculariæ*. The investigations that I have made at the Laboratory of Roscoff since the month of May enable me to extend this opinion to the entire group of the Bryozoa, and have furnished me with the following data as to the nature and function of this tissue.

The so-called colonial nervous system exists under various forms, sometimes as a branching trunk, sometimes in the form of a plexus in all the Bryozoa that I have examined; almost throughout it attains a great development, and throughout it is composed of the fusiform cells which I have noticed in *Bowerbankia imbricata*. It is in these cells that are formed the floating corpuscles ("floating-cells," "fett-kroppar" of Smitt) which float in the interior of the chambers; it is at the expense of the same tissue that the polypide with its muscles is developed; and, further, it is in its bosom that both the ova and the mother cells of the spermatozoids are formed.

By its great development, by its presence in all Bryozoa, and by its important and multiple functions, this system deserves to be regarded as a fundamental and constituent tissue of the Bryozoan, quite as essential as the endocyst, for which I propose the name of *endosarc*. In all respects the parenchyma of the stems and stolons of the *Pedicellinæ* must be assimilated to it.

The endocyst, which, as Smitt has demonstrated, is not organized, and only presents cellular structure at the peripheral extremities, is, so to speak, charged with the vegetative function—the increase of the colony by the formation of new chambers. The special function of the endosarc is to produce the polypides or the reproductive elements. It is itself derived from the endocyst by simple differentiation of the cells of the extremities in course of growth.

My researches have further enlightened me as to the signification of the brown body, as well as on the mode of fecundation of the ovum and the development of the larva in several species.

The brown body is throughout and in all cases the residue of a polypide which previously inhabited the chamber. It is formed by



coloured granules, originally contained in the hepatic cells of the stomach, to which are often added débris of alimentary matters, such as Diatomaceæ; and in *Bowerbankia imbricata* the plates and teeth of the gizzard are found in it. Incapable of budding by itself, it is, in the *Vesiculariæ*, relegated into a corner of the chamber when a new bud is developed; on the other hand, in many species (*Lepralia*, *Eucratea chelata*) it is pushed out of the zoœcium by the new polypide. For this purpose, as Repiachoff has very well observed, the young bud englobes it in a cavity which will subsequently become the stomach, then, when developed, passes it into the rectum, and, at the first expansion, rejects it by the anus.

With regard to the fecundation of the ovum, I am in a position to assert that in *Valkeria cuscuta* the ovum cannot be impregnated by the spermatozoids, which are developed at the same time in the same zoœcium and in the bosom of the same funicle; in order to its segmentation it needs the concourse of spermatozoids coming from another chamber. In fact, so long as there are spermatozoids in the zoœcium that it occupies, the ovum is only sketched out; it increases in size and shows distinctly its germinal vesicle and spot long after all the spermatozoids have been evacuated. The latter may be seen swimming actively in the surrounding water; and the mode in which their access to the ovum is facilitated is very curious. When the ovum becomes distinct the spermatozoids are quickly evacuated, the polypide which accompanied them then shrivels and becomes reduced to the state of brown body, and the chamber completely closes. The ovum therefore becomes mature in a closed zoœcium. When the moment arrives for it to be fecundated, a new bud is developed in its dwelling-place; but the polypide produced from it never attains the adult state; it has no other purpose than to reopen the chamber by developing in it a new opercular apparatus and to lend its muscles to the nascent larva. With this object, after having, notwithstanding its small size, produced all the parieto-vaginal and great retractor muscles, it is atrophied and passes behind the ovum, which, by a mechanism which it would take too long to describe here, is finally placed in its tentacular sheath, in free contact with the surrounding water and consequently with the spermatozoids. By the action of the muscles which are now attached to its envelope, the fecundated ovum, which has become a larva, moves in the chamber, absolutely as a polypide would do; it may even be carried to the entrance, in consequence of the evagination of the sheath; and it is in this way that the ciliated larva is finally evacuated.

I shall notice, in the last place, an embryo which shows that the mode of organization described by Schneider in the *Cyphonautes* is far from being an isolated fact. The embryo of *Flustrella hispida*, Redfern, is bivalved and presents a complex organization. Like the former it finally fuses completely into a mass of homogeneous protoplasm, in the midst of which the first polypide is developed!—*Comptes Rendus*, August 13, 1877, p. 406.



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