

On *Exogone* (*Exotokas*, *Ehlers*) *gemmafera*, *Pagenst.*

By M. C. VIGUIER.

In the course of some investigations upon the Annelida of the Bay of Algiers I have met with some interesting types upon which M. Pagenstecher long ago published a curious memoir *. Upon a Syllidian of very small size, to which he gave the name of *Exogone gemmafera*, this naturalist found a series of young animals which he believed to be inserted above each parapodium in the middle region of the worm. The specimen which presented this appearance being destitute of the bundles of long capillary setæ which ordinarily distinguish the sexual generation in the annelids of this group, M. Pagenstecher concluded that it belonged to the agamic generation, and that the larvæ originated from buds developed on the spot. He was confirmed in this idea by the observation of three examples with long setæ, one of which bore ova in the manner already known, and which he thought to represent the sexual generation. To make up for the insufficiency of his own observations, M. Pagenstecher interpreted the previous observations of (Ersted and Krohn in accordance with his theory. The former had taken the animals with long setæ for the males and the others for the females in his *E. naidina*. The second, in his *Syllis pulligera* (*Syllides pulliger*, Clap.), had seen capillary setæ in females still carrying their ova in the cavity of the segments, and thought that in those which carried larvæ the long setæ had disappeared at the time of the hatching of the ova. Both were supposed to have had before them gemmiparous animals without recognizing their true nature. As to the position of the larvæ, it is dorsal according to Krohn and Pagenstecher, ventral according to (Ersted.

At Algiers it is easy to find the type described by M. Pagenstecher; and although the figures that he has published are defective, it is impossible not to recognize that we have to do with the same species. However, we do not find indicated the absence of dorsal cirri upon the second normal segment. Moreover, in the description of the setæ which compose a parapodium, the two different setæ are indicated as *below* the three similar ones. This shows us that the author took the belly for the back, and the ventral cirri, which in fact are not deficient in the second parapodium, for the dorsal cirri. The latter, which are very small, will no doubt have escaped the notice of the author, who does not mention ventral cirri. Further, Ehlers ('Borstenwürmer'), who separates *E. gemmafera* from *Exogone* because of the presence in it of tentacular cirri, and refers it to his genus *Exotokas*, places in the character of the latter genus "*Bauchcirren fehlen.*" It is difficult to distinguish between the dorsal and ventral surfaces if we only examine the animal flattened in a compressorium.

* "Untersuchungen über niedere Seethiere aus Cette: I. *Exogone gemmafera* und einige verwandte Syllidien," Zeitschr. für wiss. Zool. Bd. xii. p. 267.

Krohn no doubt committed the same error. The larvæ are certainly on the ventral side, as Örsted saw in his *E. naidina*.

I have frequently met with *E. gemmifera*, male and female, in a state of sexual maturity. No error was possible; and in both I have found individuals with long setæ and others which were destitute of them. I know very well that it is said these setæ may become detached in the natatory movements of the animal, and I have seen specimens in which this had probably taken place. But when all the segments are absolutely destitute of setæ doubt is no longer possible, and the more because we observe no trace of the implantation-sacs of the capillary seta. Thus the principal reason which guided M. Pagenstecher disappears. The following is the course of development:—We see an ovum originate at the posterior surface of each dissepiment, starting from the tenth segment (the last three or four segments remaining free), on each side of the median line and below the intestine. The two ova remain always alone in the segment, as indicated by Claparède in his *Pædophylax*, which is perhaps identical; they enlarge until they press the intestine upwards and meet in the median line. Sometimes one of them passes in front of the other, and, their envelopes being very flexible, they mould themselves upon the anfractuositities of the cavity of the segment. After deposition the ovum is attached by a very distinct peduncle to the base of the ventral cirrus. The line of separation is easily seen when the animal is observed from the side and without compression. The ovum is deposited before any segmentation has taken place. The segmentation appears to be very regular; and all the ova pass through the same phase nearly at the same time. As these little annelids die very quickly in captivity, a great number of individuals are necessary in order to observe the successive phases. In the last stage observed in the egg the segmentation was complete, and the ovoid larvæ showed the buccal orifice distinctly. They exactly filled the envelope; and it is no doubt their increase in size that causes its rupture. The larvæ are already naked at the moment when they present the form of an ovoid mass with clear ectodermic cells and strongly coloured endodermic spherules, without the least trace of transverse division. The endodermic mass is cordately emarginate on the side towards the mouth.

These larvæ, which are very convex on the back, show at their free extremity three small scarcely perceptible ectodermic buds, representing the first traces of the tentacles; two other exactly similar buds, situated at the other extremity, will become the anal cirri, which, in the course of their development, pass over on each side of the ventral cirrus of the mother. The point of fixation of the larva is therefore exactly that of the egg. When it becomes detached we do not see the peduncle described by Pagenstecher, but a slight impression at the level of the anus, which perhaps acts as a sucking-disk. The young larvæ enlarge regularly, and do not begin to bear setæ until there are already four or five segments between the head and the anal segment. Thus, just as in the *Autolytus* investigated by A. Agassiz, there is no development of cinctures of

large cilia. And here even the fleece of fine cilia which the last-named author found in the *Autolyti*, and which may be of some use to them as the larvæ are free in the maternal sac, is not developed, the movements of the mother rendering the presence of a locomotive apparatus in the young animal of no use.

I have gone into some details upon this type because it is the one that has served as the foundation of the theory of lateral buds. Such an exception to the general rule, according to which buds are produced in the longitudinal direction in free animals, would have been very difficult to interpret; and it was received with much reserve. M. Mecznikow will not decide upon it; Claparède declared it to be *improbable*; and I only find M. Vaillant who accepts it without hesitation, and cites it in support of another still more singular notion which does not seem to have had a better fate. I do not think, however, that any one has combatted M. Pagenstecher's theory by the actual investigation of his type; but for this I cannot answer in the present state of the University Library of Algiers, and it is a point which I shall look to in the memoir which I propose to devote to this annelid and other allied types. I have not, in fact, confined myself to the investigation of *E. gemmifera*; and I have been able to reexamine all the types spoken of by the German author. In his *E. Martinsi* particularly, which M. Ehlers regards as a true *Syllis*, and which is undoubtedly the *Sphærosyllis pirifera* of Claparède, I have met with males and females of the two forms, with and without long setæ.

This *E. Martinsi* cannot be separated from *E. gemmifera*, and, like it, shows the absence of the dorsal cirrus on the second parapodium. If it is really the *Sphærosyllis* of Claparède, this character escaped the notice of the Genevan naturalist. It would thus be probable that *E. gemmifera* would enter into his genus *Pædophylax*. — *Comptes Rendus*, March 12, 1883, p. 728.

On the Parasites of Anodonta fluviatilis.

Prof. Leidy directed attention to a basketful of living freshwater mussels, *Anodonta fluviatilis*.

The mussels are infested by many water-mites creeping about among the gills. The young of the same, in various stages, were observed imbedded in the mantle. The mite appears to be identical with the species *Atax ypsilophorus*, which is a parasite of the common freshwater mussel (*Anodonta cygnea*) of Europe. It was discovered and described just 100 years ago under the name of *Acarus ypsilophorus* by Dr. Christophori Gottlieb Bonz (Nova Acta Phys. Med. Acad. C. L. C. Nat. Cur., Nuremberg, 1783, p. 52, tab. i. figs. 1-4). It is described and figured by Pfeiffer with the name of *Limnochares anodontæ* (Naturg. deutscher Land und Süßwasser-Mollusken, 1821, Taf. i. fig. 12), by Dr. Karl Ernst v. Baer under the name of *Hydrachne concharum* (Nova Acta, Bonn, 1826, p. 590, Taf. xxix. fig. 19), by P. J. van Beneden (Mém. de l'Acad. R. des Sciences de



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