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Annals and Magazine of Natural History: Series 4

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/tnah10>

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Published online: 16 Oct 2009.

To cite this article: E. Ray Lankester B.A. Oxon (1869) X.—On the existence of distinct larval and sexual forms in the gemmiparous Oligochætous worms , Annals and Magazine of Natural History: Series 4, 4:20, 102-104, DOI: [10.1080/00222936908696007](https://doi.org/10.1080/00222936908696007)

To link to this article: <http://dx.doi.org/10.1080/00222936908696007>

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X.—On the Existence of distinct Larval and Sexual Forms in the Gemmiparous Oligochaetous Worms. By E. RAY LANKESTER, B.A. Oxon.

IN the 'Quarterly Journal of Microscopical Science' for July I have described the sexual form of *Chaetogaster Limnæi*, which differs from the gemmiparous larvæ abounding throughout the year on the *Limnæus* and *Planorbis* in the fact that the number of setæ in each fasciculus is doubled, that there are sixteen pairs of abdominal fasciculi instead of three or four to each individual, that gemmiparity is discontinued, and that a new pair of fasciculi develops between the cephalic and first abdominal pair of fasciculi, four setæ of which on either side are not uncinated and bifid at the apex, but stunted club-shaped organs. These I call "genital setæ." In studying the generative organs of *Naïs serpentina*, which swarms in a very filthy pond on Hampstead Heath, which has furnished me with *Lumbriculus*, *Limnodrilus* (new species), *Enchytræus* (new species), and two other species of *Naïs*, I have observed a somewhat similar change and development of "genital setæ," which do not appear to have been known to Carter (who described the "spermatology" of a species of *Naïs* in this Journal in 1858), nor to the late Jules d'Udekem (in his description of *Stylaria*); nor have they been mentioned by M. Edouard Claparède, to whom, however, I dare say they are known, since he has studied a species of *Naïs*, but, I believe, has not published the description of it among his other invaluable contributions to this branch of zoology. I therefore conclude that these modified setæ and their position are unrecorded hitherto.

In *Naïs serpentina* and other species of *Naïs*, five pairs of ventrally placed fasciculi succeed to the mouth, indicating a pharyngeal region. There are no dorsal setæ in this region. Immediately after the fifth pair the intestine commences; that is to say, the alimentary canal is contracted and its walls are covered by a layer of coarse cells—the so-called hepatic tunic. Corresponding to the sixth pair of ventral fasciculi is a pair of dorsal setæ, thick, short, and awl-shaped in *N. serpentina*; these continue thenceforward, along the body, with the ventral setæ. The bristles of the ventral setæ are curved, with a hooked bifid apex; two, with a growing third, is the usual number in a fasciculus. When the generative organs commence their development, the distance between the fourth and fifth ventral fasciculi enlarges very considerably, and a new pair of fasciculi makes its appearance, placed a little nearer the middle line, and therefore closer together, than the other fasci-

culi. The bristles in these new fasciculi are shorter and stouter than those of the normal ventral fasciculi, and *are not bifid* at the apex; they are three in number in each fasciculus, rarely four. At the same time that these make their appearance, the normal ventral fasciculi acquire another bristle in each, making thus three, with a growing fourth, or even four complete, instead of two and three. The *genital setæ* which thus develop in the new genital segment are placed close to the orifices of the male generative glands, the duct connected with them being simple and unciliated. In front of the fourth pair of ventral fasciculi are two orifices corresponding well in position with the genital setæ and their orifices; and these open into very large sacs, containing flat rhombic crystals and curiously coiled fibrous whips and spermatozoa—the seminal receptacles. The clitellus, which, as all know who have studied the Oligochæta, is the most obstructive institution on account of its opacity, extends from the fourth to the seventh fasciculus (not counting the genital fasciculus in the numbering).

I do not wish now to give a detailed account of the generative organs of *Nais*, which I hope shortly to publish elsewhere; but I desire to call attention to this development of a *new segment* between the larval fourth and fifth fascicular segments, and provided with fasciculi carrying a special form of genital setæ. For the greater part of the year these worms, like *Chaetogaster*, reproduce gemmiparously under a certain well-known form; suddenly gemmiparity ceases, and a new development, of which there was no previous indication, takes place: a new segment, a new integral factor of the worm, makes its appearance with a new form of setæ; the setæ in the normal fasciculi also increase in number. This is not the mere growth of generative organs occurring in due order of development, but is really more strictly comparable to cases of metamorphosis, the gemmiparous form being a larva, as the agamogenetic *Cecidomyia* is a larva, and the sexual form the perfect or imaginal condition. Very few of the immense numbers of gemmiparously produced *Naidæ* or *Chaetogastres* ever proceed to acquire the perfect form,—*Chaetogaster Limnæi* only in October apparently, *Nais serpentina* in June, but perhaps also at other seasons.

There is, as far as I know, nothing described comparable to this development of a new segment and of genital setæ in the other Oligochæta; but, on inquiry, indications of it may hereafter be found. The setæ in the region of the clitellus in *Limnodrilus*, in *Tubifex*, in *Clitellio*, and others remain normal, or drop out and are not replaced.

Among Polychætous Chætopoda the Syllidæ present very remarkable differences between the gemmiparous and sexually reproducing conditions, to which the cases here described make a small approach.

*Chatogaster Linnæi.**Nais serpentina.*

a. Normal uncinata setæ; b, genital setæ.

XI.—On the Early Stages in the Development of *Phyllodoce maculata*, Johnston. By W. C. M'INTOSH, M.D., F.R.S.E., F.L.S.

[Plate VI.]

PROFESSOR SARS seems to have been amongst the first to notice the young of *Phyllodoce**, although he was unaware of the group of Annelids to which his young forms belonged. At the end of his paper on the development of *Polynoë cirrata*, Linn. (*Harmothoë imbricata*), he mentions that he had also found, off the Norwegian coast, in February and March, globules composed of irregularly rolled mucous ribands, which adhered to *Zostera marina* and *Fucus vesiculosus* at the depth of some feet. These mucous masses with their grass-green ova in all probability refer to the species hereafter to be described. He observed that the young, on their exit from the egg, had a central cirlet of cilia and two kidney-shaped eyes of a bright-red colour. He does not mention a mouth, but states that the anus is at the posterior end of the body, and more visible than in the young of *Polynoë*. His figure is somewhat small and indistinct, but it would appear to repre-

* Wiegmann's Archiv, 1845, and Ann. Nat. Hist. 1845, vol. xvi. p. 187.