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ART. III.—*Descriptions of some American Annelida abbranchia.*

By JOSEPH LEIDY, M. D.

The worms of America, terrestrial and aquatic, have as yet received but little attention from our naturalists. The following descriptions have been taken from notes which have been in possession of the author for many months, and when leisure permits, some others will be presented.

NAIS, *Müller*.*—Opsonais, *Gervais*.† Body filiform, furnished with two rows of podal spines, and lateral setæ; no terminal appendages. Eyes two, placed upon the oral segment.—*Leidy*.

1. NAIS GRACILIS. Pl. 2, fig. 1.—Body whitish, linear, divided into fifty articulations, every one of which is provided inferiorly, on each side, with a set of four retractile podal spines slightly hooked at their free extremity. Articulations posterior to the fifth, excepting the two last, furnished on each side with a single long delicate seta, which are pretty uniform in length except the posterior five which gradually decrease to the last. Fifth articulation furnished with three setæ on each side nearly twice the length of the others. Second to the fifth articulations inclusive short. Upper lip forming a triangle with the angles truncated, bordered with short distant, stiff, cilia-like hairs. Mouth round. Eyes consisting of a black spot on each side of the oral segment. Terminal or anal segment, simple, cylindric, truncate. Intestinal canal simple, (no gizzard,) tortuous, capacious, most dilated at the seventh articulation. Ciliary movement observable in the last two segments, apparently within the termination of the intestine. Generative apparatus?

Length five lines, greatest breadth one-third the length from the head .011 in. Length of setæ of fifth articulation .018 in. to .0255 in.; length of the others average .012 in.

Animal very active, found among algæ in fresh water rivulets.

2. NAIS RIVULOSA. Fig. 2.—Body yellowish white, attenuated at the extremities, most usually in the state of division. Anterior division with twenty articulations, each furnished laterally with a fasciculus of five or six retractile podal spines, which are elongated sigmoid and terminate with a double hook, length averaging 1-250th in. Articulations posterior to the fourth furnished on each side with two moderately long setæ, about 1-75th in. in length; one of them frequently

* Die Würmer der süßen und salzigen Wassers, 1771. Diet. Univ. d'Hist. Nat. t. 8, p. 566.

† Bul. de l'Acad. royale des Sciences et Belle-lettres de Bruxelles, 1838 t. v., p. 16.

short or rudimentary. Upper lip triangular, studded with short stiff hairs. Mouth round. Eyes consisting of a pigment spot on each side of the oral segment. Anal segment rounded, furnished with short, stiff hairs. Œsophageal division of the intestine passing to the sixth articulation, where it terminates in the distinct, dilated, fusiform, commencement of the ventricular intestine. Cavity of the body, between the viscera, filled with free, floating, granular corpuscles.

In a specimen elongated to seven lines there are usually four divisions, of which there are about 3 lines to the anterior division, $\frac{3}{4}$ of a line to the second, $1\frac{1}{4}$ to the third, and 2 lines to the last. Breadth about 1-80th in.

Habitation and Remarks.—This worm is found feeding among confervæ on the soft muddy borders of clear rivulets, in the neighborhood of Philadelphia. I never found an individual which was not more or less in a state of division, in fact before the last segment is ready to separate from the parent, there are a number of narrow segments, with rudimentary podal spines and setæ, already formed at its posterior extremity, which are to become a new and distinct individual. In the average of several specimens of four lines of length when shortened, seven lines when lengthened, of four divisions, there were sixteen setigerous articulations to the anterior division, the setæ being 1-75th in. long; eight to the second, with the setæ comparatively very short, being yet quite rudimentary, and measuring from the 1-500th to the 1-200th in. long: thirteen to the third with the setæ the 1-100th in. long; and eighteen to the last, excepting those which are rudimentary of a new division of the animal posteriorly, with setæ as long as those of the first, and frequently even longer.

PRISTINA, *Ehrenberg*. (Symbolæ Physicæ.) Labio superiore in proboscidem stiliformem longissime producto et angustato, molli, (barbato).*

3. PRISTINA LONGISETA, † *Ehrenb.* Fig. 3.—Body whitish, linear, composed of sixteen elongated articulations, all, with the exception of the first, furnished upon each side inferiorly with a set of eight, retractile, uncinated, podal spines, every one also supplied upon each side with three very long setæ: those of the second articulation twice the length of the others: those of the last two articulations often two or only one on each side, and comparatively short. Upper lip elongated into a long bent, probosciform process, which is soft, and bordered and studded with short, distant, stiff hairs. Eyes none. Mouth triangular. Alimentary canal consisting of a narrow

* Further in the Diet. Univ. Hist. Nat. t. 8, p. 568. “Pristina, *Ehren.* Des soies laterales assez longues; des crochets ventraux; ocelles nuls; la lèvre supérieure prolongée en une trompe filiforme garnie de soies.”

† I regard this as the *P. longiseta* of Ehrenberg, because in a note to the characters of the genus *Pristina*, in the *Symbolæ Physicæ*, he describes a species, which as far as the description goes, corresponds with it. “*Pristina longiseta* internoscitur; setis ternis, fasciculorum pari secundo longissimo, proboscidem superante, uncinis septinis aut octonis.”

tortuous œsophagus passing as far back as the commencement of the seventh articulation, where it terminates in a cordiform expansion of the ventricular intestine; the latter moderately tortuous and capacious. Anal articulation cylindrical, obtusely rounded, and studded with short, stiff hairs. Generative apparatus occupying the third to the sixth articulation.

Length 1 line; greatest breadth 1-150th in. Length of oral articulation with labial prolongation 1-83d in. Setæ of second articulation 1-33d in. long; the others averaging 1-75th in. long.

Habitation and Remarks.—Found with the preceding. This animal is very active in its movements; it is abundant in its peculiar localities, and is usually found in the state of multiplication by division. When the posterior division is almost perfected, it is nearly as long and has as many articulations as the anterior, and from the oral articulation the labial prolongation appears as a rounded antero-lateral projection, (fig. 3, a.)

In a wineglass of water containing some fine dirt and algæ, in which were preserved for several months a considerable number of *Pristina longiseta*, I frequently noticed, in the dirt, minute eggs, which I supposed to belong to this animal. They were white, oval, always isolated, measured 1-133d in. long by 1-130th broad, and were surrounded by a tough mucoid substance.

STREPHURIS,* *n. g.*—Podal spines alternating with setæ, in two rows. Upper lip moderately projecting. Girdle well marked. Number of articulations not over seventy. No muscular stomach. Blood bright red.

4. STREPHURIS AGILIS. Figs. 4 to 7.—Body soft, filiform, acute anteriorly, increasing in thickness to the girdle, which is placed posterior to the ninth articulation, gradually decreasing in breadth posteriorly. Tegument faintly reddish, transparent, through which is seen the large red dorsal and ventral vessel, with the white or brown, tortuous intestine. Articulations pretty uniformly seventy in number, supplied on each side inferiorly with a fasciculus of retractile podal spines, alternating with setæ three times the length of the former. Fasciculi anterior to the girdle consisting of four podal spines and three setæ; posterior, of two or three podal spines and one or two setæ. Podal spines elongated sigmoid, bifid at the free extremity, 1-229th to 1-200th in. long. Setæ simple, stiff, 1-114th to 1-55th in. long. Upper lip triangular, furnished with very short straight hairs. Mouth triangular. Œsophageal division of the intestine passing as far as the sixth articulation. Oral segment 1-57th in. long. Anal articulation cylindrical, furnished with short, stiff hairs, 1-178th in broad. Generative apparatus complete.

* Στρεφω torqueo; et ουρα.

Length 1 to $1\frac{3}{4}$ inches, greatest breadth at girdle $\frac{1}{3}$ of a line, posteriorly $\frac{1}{6}$ of a line.

Habitation and Remarks.—Found in the soft muddy bottom of shallow ditches in the vicinity of Philadelphia. It is a very beautiful and graceful form. When not elongated to the greatest extent, the median vessels with the white intestine (when empty) form three spirals, which through the transparent skin have a very pleasing effect. The anterior tip is whitish, the tail end yellowish. It moves with great ease through the mud, and very frequently is found buried in the latter for the anterior two-thirds of its length, with the tail end protruding vertically above the surface, which it keeps in constant vibrating motion like the *Saenuris variegata*, Hoffm.* When disturbed it disappears or withdraws the tail with astonishing rapidity. In the spring of the year it deposits in the mud whitish, compressed oval sacs, from half a line to a line in length, with a short tubular prolongation at each end, containing from twelve to eighteen oval eggs about $\frac{1}{70}$ th in. long.

On April 2d, 1849, while walking in the outskirts of the city, I noticed in a shallow ditch numerous reddish patches of from one to six inches square, which supposing to be a species of alga, I stooped to procure some, when to my surprise I found them to consist of millions of the tails of *Strephuris agilis*, all in rapid movement. The least disturbance would cause a patch of six inches square so suddenly to disappear, that it resembled the movement of a single body. My friend Dr. Bridges informs me, a few years since he met with a similar instance of such an astonishing multitude of these worms.

The curious movement of the tail I suppose to be secondary to respiration. Upon it I have frequently noticed numerous bunches of a sessile species of *vorticella*.

AEOLOSOMA, *Ehrenberg*.†—Corpus filiforme, molle, distincte articulatum; singuli articuli setarum fasciculis utrinque barbati; ocelli nulli; os anticum inferum, labio dilatato, proteiforme superatum; anus terminalis; corpus globulis, læte rubris, internis ubique variegatum.

5. AEOLOSOMA VENUSTUM. Figs 8 to 12.—Body compressed, colorless, variegated with red spots, broad, proteiform, of eight articulations, the posterior seven of which are furnished with a pair of infero-lateral fasciculi of setæ, each consisting of four, unequal and simple, the longest longer than the breadth of the body, the shortest not equal to the breadth. No setæ to the oral segment. Upper lip very large, sub-oval. Anal segment broad, obtusely rounded. Intestine simple, capacious. Generative apparatus?

* Gruby, Archiv für Naturgeschichte, 1844. B. 1, S. 211.

† Symbolæ Physicæ.

When moderately elongated 1-40th in. Found among confervæ upon which it feeds, in fresh water ditches in the suburbs of Philadelphia.

Remarks.—This American species of *Aeolosoma* approaches the *A. quaternarium* of Ehrenberg; it is much smaller and has longer setæ. The red spots everywhere dotting the inner surface of the covering, gives it a beautiful appearance. It is not so active in its movements as the preceding worms, and appears to be more aquatic in its habits.

The mouth is surrounded in the greater part of its circumference by a strong muscular lower lip in the form of the letter U, with the arms presenting forward and in some degree approached to each other. When closed the sides of the lower lip approximate each other in such a manner that the interstice of the mouth appears as an inverted T, (fig. 10.) The mouth opens into a wide but short pharynx, which latter, as well as the inferior surface of the upper lip, is furnished with vibrillæ. These appear not to have been noticed by Ehrenberg in his observations, for he makes no mention of their existence in the account of the animal. The under surface of the lower lip, as well as the lining of the pharynx, is composed of hexagonal cells, (fig. 11) into which the brick red globular bodies enter as nuclei. The vibrillæ fringe the edges of these cells, and in their movement produce a current in the water towards the mouth, and are therefore an important agent in obtaining the food of the animal. The intestine is simple, moderately tortuous, irregular, and capacious, especially at the middle. The latter was generally found filled with green confervæ.

The brick red globules variegating the posterior part of the body, appear to be coloured nuclei (fig. 12) in the muscular bands of the tegument. The median vessels which convey colorless blood are very distinct.

ENCHYTRÆUS, *Henle*.*—Stacheln in 4 Reihen zu 3 und 4, pfriemförmig. Oberlippe nicht rüselförmig, wenig vortretend. Gürtel schwach abgesetzt, Vulva undeutlich. Zahl der Ringe nicht über 70. Kein Muskelmagen. Hellgelbes Blut. *Hoffmeister*.†

6. ENCHYTRÆUS VERMICULARIS, *Henle*.‡ *Lumbricus?* *Müller*.§—Body yellowish white, fifty-six to sixty-five articulations, generative apparatus complete, perforations in the eleventh articulation, girdle inconspicuous or absent. Podal setæ three to five in each fasciculus. Intestine capacious, no gizzard.

Length five to eight lines, breadth $\frac{1}{4}$ a line. Found under damp decaying logs, etc., in the woods near Philadelphia.

Remarks.—I have not access to Henle's description of *E. vermicularis*, but from what

* Müll. Archiv, 1837, S. 74. Arch. für Naturgesch, 1833, B. 2, S. 344.

† Arch. für Naturgesch. 1843, B. 1, S. 186.

‡ Ibid. S. 193. § Ibid. S. 194.

I can gather from the account of this worm in Wiegmann's report on the *Annulata* in the *Archiv für Naturgeschichte*, year 1838, volume 2, page 344, and the description of Hoffmeister in the same work, year 1843, volume 1, p. 193, the above characterized worm is probably the same.

7. *ENCHYTRAEUS SOCIALIS*. Figs. 13 to 15.—Body opalescent white, translucent, permitting the generative organs and the course of the intestine to be seen through the tegument, anteriorly moderately attenuated and terminating by a triangular upper lip, posteriorly cylindrical. Anal segment cylindrical, truncated. Articulations not over fifty-two, twelve anterior to the girdle, which latter is well marked. Podal spines five to seven in each fasciculus, simple. Mouth triangular, œsophagus passing to the eighth articulation, intestine simple, or frequently presenting the appearance of an oblate spheroidal gizzard in the eighth articulation. Generative apparatus perfect.

Length 5 to 10 lines, breadth at girdle 1-56th in. More common than the other species, usually found in considerable numbers under the bark of damp decaying stumps of trees, or under the bark of decaying portions of living trees quite near the ground, in all the forests of eastern Pennsylvania.

Remarks.—This species of *Enchytraeus* although quite as long as the first, has a smaller number of articulations. The podal spines in each fasciculus in this species are more than are called for in the genus of Henle, although they have the same form: simple, divergent, and with a short transverse manubrium at the origin for muscular attachment. They are usually in fasciculi of six, the central ones shorter than the outer; anterior to the girdle, many of the fasciculi have seven spines, and at the posterior part of the body they have but five. The spines average the 1-333d of an inch long. The œsophagus is narrow and delicate to the eighth articulation, where it joins either the dilated commencement of the ventricular intestine, or an oblate spheroidal contraction of the same very much like a gizzard in appearance. At first I thought the animal possessed a true muscular gizzard, but in more than half the number of individuals examined, there was nothing existing but a dilatation of the ventricular intestine with a thickening of the parietes, extending from within the eighth articulation to the commencement of the girdle; at other times there was an appearance of a distinct gizzard, and a dilated thickened appearance after it to the girdle, as represented in Plate 2, and in the fewest number of instances the oblate spheroidal contraction alone existed; but in all cases that portion of the intestine extending from within the eighth articulation to the girdle is strongly muscular, and may subserve the purpose of a gizzard. Within the girdle the intestine is narrow, posterior to it, it is moderately tortuous, irregular, and capacious.

In both species of *Enchytraeus* the intervals of the body between the viscera and integument are occupied by free, floating, granular, lenticular corpuscles, (fig. 15,) each possessing a minute nucleus. The same kind of corpuscles exist in many other worms, entozoa,* etc., and may probably serve the same purpose as the blood corpuscle, although they are not their homologues.

Both species of *Enchytraeus* are infested with a species of *Leucophrys*, (figs. 17a, b,) occasionally in large numbers. From the ruptured integument of *E. socialis*, I saw, in several instances, several hundred issue. It is hemi-elliptical in outline, measures 1-300th in. long by 1-1000th in. broad, and is probably the same species as that found in *Lumbricus terrestris*. It is frequently observed in all stages of division, the resulting individuals measuring one-half the length of the full grown.

LUMBRICULUS, Gruby.†—Corpus quasi teres, hyalinum, acicularum geminarum seriebus 4 armatum. Intestinum rectum, per totum fere longitudinem sacculis digitatis, vas dorsale ramis amplis, contractilibus iis respondentibus, dilatatum. Cingulum nullum.

8. **LUMBRICULUS LIMOSUS.** Fig. 16.—Body nearly cylindrical, acute anteriorly, pretty uniform posteriorly; color yellowish, translucent, with the dorsal and ventral vessel presenting a rich scarlet hue; the anterior five or six articulations bordered by bluish black, central part of the body iridescent blueish. From one hundred and seventy to two hundred and twenty four articulations. Girdle none. Ninth articulation with two perforations. Generative apparatus extending as far back as the twentieth articulation. Podal spines in four rows, two in each fasciculus, of a long sigmoid form, becoming abruptly narrowed at the distal extremity and terminating in a double unguis, 1-145 in. long. Upper lip triangular, 1-40th in. long from the mouth, which latter is round. Gizzard none.

Length from two to four inches, breadth two-fifths of a line.

Habitation and Remarks.—This beautiful and very active worm is found under stones, dead leaves, and fragments of wood on the muddy borders of creeks and rivulets around Philadelphia. It undoubtedly belongs to the genus characterized by Gruby, but is much longer than the *Lumbriculus variegatus*, Gruby. It exhibits the same regular maculations in each articulation, mentioned by Gruby‡, dependant upon lateral cœcal diverticula of the blood vessels. I counted as many as fifteen of these alternately dilating and contracting vascular cœca, on each side of an articulation. The podal spines (fig. 16, a.) are of the same form as those depicted by Gruby in the Archiv für Naturgeschichte, Tab. vii. fig. 2, c. A little distance from the origin of each pair of podal spines, there is always to be found a pair of

* Müller, Zoolog. Dan. V. ii. p. 39. *Echinorhynchus anguillæ*. "Vagina totum corpus occupans corpuseulis linearibus, ovalibus, et suborbicularibus repleta est."

† Arch. f. Naturg. 1844. B. 1, S. 211.

‡ Ibid. S. 208.

ungues or rudimental podal spines, (fig. 16, *b.*) and in the posterior part of the body of large individuals, these are frequently nearly as much developed as the others, and there then appears to be eight rows of two each, or rather four rows of four each.

This worm is infested with extraordinary numbers of a large species of *Leucophrys*. In several instances I saw several thousands issue from wounds made through the muscular investment of the body. The species differs in form from any of those which I know of, and may be characterized as follows :

LEUCOPHRYS CLAVATA, *Leidy*. Figs. 18, 19.—Body colorless, clavate, very obliquely and concavely truncated anteriorly ; posteriorly attenuated, rounded or acute ; granulo-striated ; with usually six to eight large vacuola.

Length from 1-200th in. to the 1-100th in.; breadth 1-857th to 1-545th in.

When in a state of division, the posterior part does not present the characteristic truncation until separated from the parent or anterior division.

REFERENCES TO THE FIGURES OF PLATE II.

All the objects have been magnified and viewed by transmitted light.

Fig. 1. *Nais gracilis*: *a.* anterior portion, *b.* middle, *c.* posterior.

Fig. 2. A podal spine of *Nais rivulosa*.

Fig. 3. *Pristina longiseta*: *a.* developing upper lip of the posterior division; *b.* side view of the upper lip.

Fig. 4. Oral articulation of *Strephuris agilis*.

Fig. 5. Anal do. do.

Fig. 6. Fasciculus of podal spines and alternating setæ anterior to the girdle of do.

Fig. 7. do. posterior to the girdle of do.

Fig. 8. *Aeolosoma venustum*. The arrows indicate the course of the currents produced by the vibrillæ.

Fig. 9. Side view of mouth of do. and course of currents.

Fig. 10. Lower lip closed.

Fig. 11. Vibrillated cells from upper lip.

Fig. 12. Three transverse muscular bands exhibiting the relative connection of the red spots.

Fig. 13. *Enchytraeus socialis*: *a.* gizzard-like contraction of the ventricular intestine; *b.* orifice in the girdle.

Fig. 14. A podal spine of *E. socialis*: *a.* spine, *b.* muscles, *c.* integument. When the anterior muscle contracts, the spine is retracted forwards, with the point projecting backwards; the posterior muscle produces a reverse action, and when both contract, the spine is protruded.

Fig. 15. Free, lenticular corpuscles of the general cavity of the body.

Fig. 16. Podal spines of *Lumbriculus limosus*: *a.* perfected pair, *b.* rudimentary.

Fig. 17. *Leucophrys* from *Enchytraeus socialis*: *a.* full grown individual, *b.* in the state of division; the lower part has allowed the escape of a globule of sarcous matter from the endosmosis of water.

Fig. 18. *Leucophrys clavata*.

Fig. 19. Outlines of do.: *a.* in the state of division, *b.* various forms assumed in its movements.

