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A NEW SPECIES OF DENDROSTOMA.

By H. LEIGHTON KESTEVEN.

(Plate vii., and fig. 7).

The specimens from which the following description and figures are drawn, were collected by Mr. T. Whitelegge on the beach at Balmoral, Port Jackson, in July of 1901. At the time there had been much rain and heavy storms on the coast and it is probable that the rain washing down the wooded hills carried with it a large quantity of tanin and other deleterious matters derived from vegetable refuse, and thereby poisoned the marine invertebrate fauna generally. It is to this cause that Mr. Hedley assigned the occurrence of *Solen sloanii*, in numbers on the same beach.¹ It may, therefore, be concluded that the present species lives in three or four fathoms of water.

I am indebted to Mr. Whitelegge, not only for his kindness in placing the material at my disposal, but also for assistance in working it out.

The specimens when collected were placed in spirits, and most of them exerted the whole of the introvert and extended the trunk to its fullest extent. It is such a specimen that is here described.

DENDROSTOMA DEHAMATA, sp. nov.

External characters.—Length over all 230 mm.; of introvert, 60 mm. Diameter of trunk; at anus 5 mm., a few millimetres behind the anus, 8 mm.; thence it tapers slowly to about 6 mm. in diameter just anterior to the obtuse posterior point. Diameter of introvert, 3 mm. The trunk is cylindrical, of nearly uniform diameter throughout, but tapering slightly towards the obtusely pointed extremity. Colour white, inclined to wax yellow, especially on the introvert. The length of the introvert is slightly less than a third that of the trunk, the anterior quarter of it is quite smooth, the rest bears papillæ which, anteriorly, are rather long and slender, but become shorter, stouter, and more crowded as the posterior end is reached (Pl. vii., f. 5). There are *no* hooks on the introvert (hence the name), both young and old, introverted and exerted specimens have been examined. Tentacles plumed (Pl. vii., figs. 2, 3); their arrangement is variable; there are four main stems, two of two, and two of three primary branches. In some specimens, however, the divisions between these branches ex-

¹ Hedley—Proc. Linn. Soc. N.S.W., xxiv., 1899, p. 432.

tend right down to the circum-oral muscular ridge, in which case there are eight branches arranged in groups as above. The stems are connected by a narrow filamentous flap. On the median dorsal line there is a rather broader gap between the stems than elsewhere, the flap is here inflected slightly towards the mouth, and bears longer filaments than between the other stems. The tentacles are blotched with dark brown. The mouth is not directly in the centre, but is placed somewhat towards the dorsal edge. It appears as an arcuate depression, the long axis of which is at right angles to the dorso-ventral axis of the worm; there are several puckers radiating from it. The dorsal lip, if it may be so termed, is slightly more elevated than the ventral. On the anterior end of the introvert, in the median dorsal line, and forming the posterior boundary to the sinus made by the inflection of the filamentous flap, there is a brown pigmented, elevated cap, which, although it shows no depressions or orifices on its surface, is probably the cerebral organ. (Pl. vii., fig. 4, c.g.) The anus (Pl. vii., fig. 6) is situated a little way behind the base of the introvert, the nephridial apertures being a little further back. All are of the same appearance, except that the latter are slightly the smaller. The cuticle being slightly pigmented round the orifices they are plainly discernible. The wall of the introvert is thinner and more flexible than that of the body. The cuticle of the body exhibits a slight tendency to be raised into squares, the longitudinal furrows being the most conspicuous, and is marked with semi-translucent pores. When the cuticle is stripped off these pores are seen to correspond to pelucid tubercles. These latter are doubtless the glandular bodies of unknown function, which have been described as occurring in the body walls of other *Gephyrea*. At the extreme posterior end of the trunk there is a small, smooth, yellow button.

Internal Characters.—Internally the body wall is light yellow smooth, and glistening. The brain and circumoesophageal nerve ring are buried in the integument of the circumoral muscular sheath, the brain being directly beneath the pigmented cap previously mentioned. The ventral nerve cord is of the usual type, its retaining muscles are not appreciably longer in the introvert than in the body. The two retractor muscles (Pl. vii., fig. 1, r.m.), are inserted in the body wall about one-third from the posterior end. For the posterior one-sixth of their length they are separate, thence to the oesophageal sheath they are joined by a thin elastic membrane. The anterior fused portion or oesophageal sheath is about 5 mm. long. Where they are joined by the membrane, they are divided from one another ventrally by a deep groove the sides of which are in contact; dorsally they form a rather broad gutter, down the middle of which,

with slightly undulating course, the oesophagus or foregut runs. In the sheath this latter is contracted so as to be X shaped in transverse section. The fore-gut (Pl. vii., fig. 1, oes.), after leaving the abovementioned gutter proceeds down to about half-way between the insertion of the retractor muscles and the end of the trunk, thence it turns suddenly forward, reaches the spiral on about a level with the insertion of the muscles, and passes forward to the anterior end of the spiral, along the dorsal face thereof. The anterior end of the mid-gut or intestinal spiral (Pl. vii., fig. 1, int. sp.) is placed a little in advance of the insertion of the retractor muscles, the posterior end, almost at the base of the body cavity. Anteriorly the spiral is tightly wound, posteriorly only loosely so. The rectum (Pl. vii., fig. 1, rect.) proceeds in a straight course from the anterior end of the spiral to the anus, the position of which has already been described. The rectum and spiral are of about equal length, and together they are equal to about five-sixths of the length of the body cavity. The digestive canal is kept in position by the following muscles. For the whole length of the gutter it is firmly attached to the membrane connecting the retractor muscles. The loop of the fore-gut extending towards the posterior end of the cavity is kept in position by two fine thread-like muscles (Pl. vii., fig. 1, mes. mes.); these arise from the body wall half-way between the end of the loop and the end of the body cavity, one of them is inserted into the descending arm of the loop a little in advance of the end, where the second is inserted. The anterior end of the spiral is prevented from moving forward by two spindle-shaped muscles (Pl. vii., fig. 1, sp. m. sp. m.). The first of these arises from the base of the left retractor muscle, and proceeding round the left side of the spiral, giving some fine threads thereto in its course, it is inserted in the dorsal side of the rectum just anterior to the spiral. The second arises a little anterior to, and underneath the right retractor, and passing round the right side of the spiral, is inserted in the rectum beside the first. These muscles cannot be traced along the rectum, but it is probable that they are scattered through its wall, and that the fine muscular membrane which with the body wall forms an elongate triangular pocket (Pl. vii., fig. 1, mus. poc.) at the anterior end of the rectum, is really their segregation and amplification. The spiral is bound together by very fine muscular threads. The posterior spindle muscle is absent, and the spiral is entirely free. The contractile vessel is slender, its diverticula short, clustered on the dorsal side of the descending arm of the oesophageal loop. The two brown segmental organs are long; rather more than one-third the length of the body cavity; slender and free. They are provided with thick, muscular walls just inside the orifices.

Comparative. — The present is the sixth and much the largest species of the genus. The only two with which it need be compared are *D. blandum*, Sel. and de Man, and *D. signifer*, Sel. and de Man.² From them it differs to a greater or lesser extent in the following particulars:—They are smaller, possessed of introvert hooks, their spirals are retained in position by muscles differently arranged and placed. The rectum and “brown-tubes” in the new species are proportionately longer, also its retractor muscles are not separate for so large a proportion of their length. Finally, if the descriptions given are complete, neither of the two species mentioned have the muscular pocket at the anterior end of the rectum nor the peculiar cerebral organ (?) which occurs in *D. dehamata*.

Type to be presented to the Australian Museum.

Some of the specimens are swollen and club-shaped posteriorly. This leads me to suggest that they bury themselves by the same mechanism as do some bivalve Molluscs; e.g., *Solen* that is, by swelling the posterior end, already slightly buried, and then sending the swelling forward. I have attempted to explain my meaning diagrammatically by the accompanying text figure.

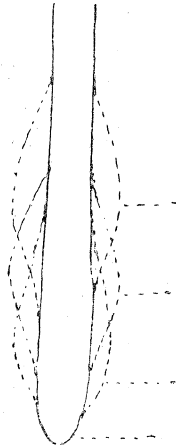


FIG. 7.

In his “List of the Invertebrate Fauna of Port Jackson” Mr Whitelegge enumerated six species of *Gephyrea*; the work which has been done since that has rendered the list incomplete. I therefore give the following:—

² Selenka and de Man in Semper—Reisen. Arch. Philip., iv., 1883, Sipunculiden, pp. 85-86.

³ Whitelegge—Proc. Roy. Soc. N.S.W., xxiii., 1889, pp. 211-212.

GEPHYREA.

ORDER, SIPUNCULOIDEA.

PHYSCOSOMA JAPONICA, Grube.

- P. japonica*, Grube, Schles. Ges. Vaterlandische Cultur. Breslau, 54 Jahr. 1877, p. 73; Selenka, Chall. Rep., Zool., xiii., 1885, p. 21; Selenka in Semper, Reis. Arch. Philip., iv., 1883, Sipunculiden, p. 76, pl. ii., f. 18, 19, pl. x., f. 145-46.

SIPUNCULUS AUSTRALIS, Keferstein,

- S. australis*, Kef., Nach. K. Ges. Wiss. Gottingen; 1865, p. 197-98; Selenka, *loc. cit.*, p. 90, pl. xiii., f. 180-82.

SIPUNCULUS MUNDANUS, Sel. & Bulow.

- S. mundanus*, Sel. & Bul., Selenka, *Loc. cit.*, p. 108, pl. xiii., f. 174.

The locality, "Sow and Pigs Bank (1 exemplars aus dem Britischen Museum)" seems to have puzzled the authors of this species, for it was omitted from their table of Geographical Distribution. I have not seen the species, but the locality in full is doubtless Sow and Pigs Reef, Port Jackson, New South Wales.

SIPUNCULUS, sp.

- Sipunculus*, sp., Whitelegge, Proc. Roy. Soc. N.S.W., xxiii., 1889, p. 212.

DENDROSTOMA SIGNIFER, Sel. and de Man.

- D. signifera*, Sel. and de Man, Selenka *Loc. cit.*, p. 86, pl. ii., f. 21, pl. xi., f. 163-169.

DENDROSTOMA DEHAMATA, Kesteven.

- D. dehamata*, Kestv. *ante*.

ORDER ECHIUROIDEA.

THALASSEMA, sp.

- Thalassema* sp., Whitelegge, *Loc. cit.*, p. 211.

BONELLIA VIRIDIS, Roland. ?

- B. viridis*, Roland, Mem. R. Acad. Sci. Torino, 1821, p. 539
Lacaz-Duthiers, Ann. Sci. Nat. (4), x., 1858, p. 49-110
Haswell, Proc. Linn. Soc. N.S.W., x., 1886, p. 331.

Since it has become usual to include *Phoronis* in works on Gephyrea, the two following references may not be out of place.

PHORONIS AUSTRALIS, Haswell.

- P. australis*, Haswell, *Loc. cit.*, vii., 1883, p. 606; Benham, Quart. Journ. Micro. Sci., xxx., 1889, pp. 125-158.

PHORONIS PSAMMOPHYLA, Cori. ?

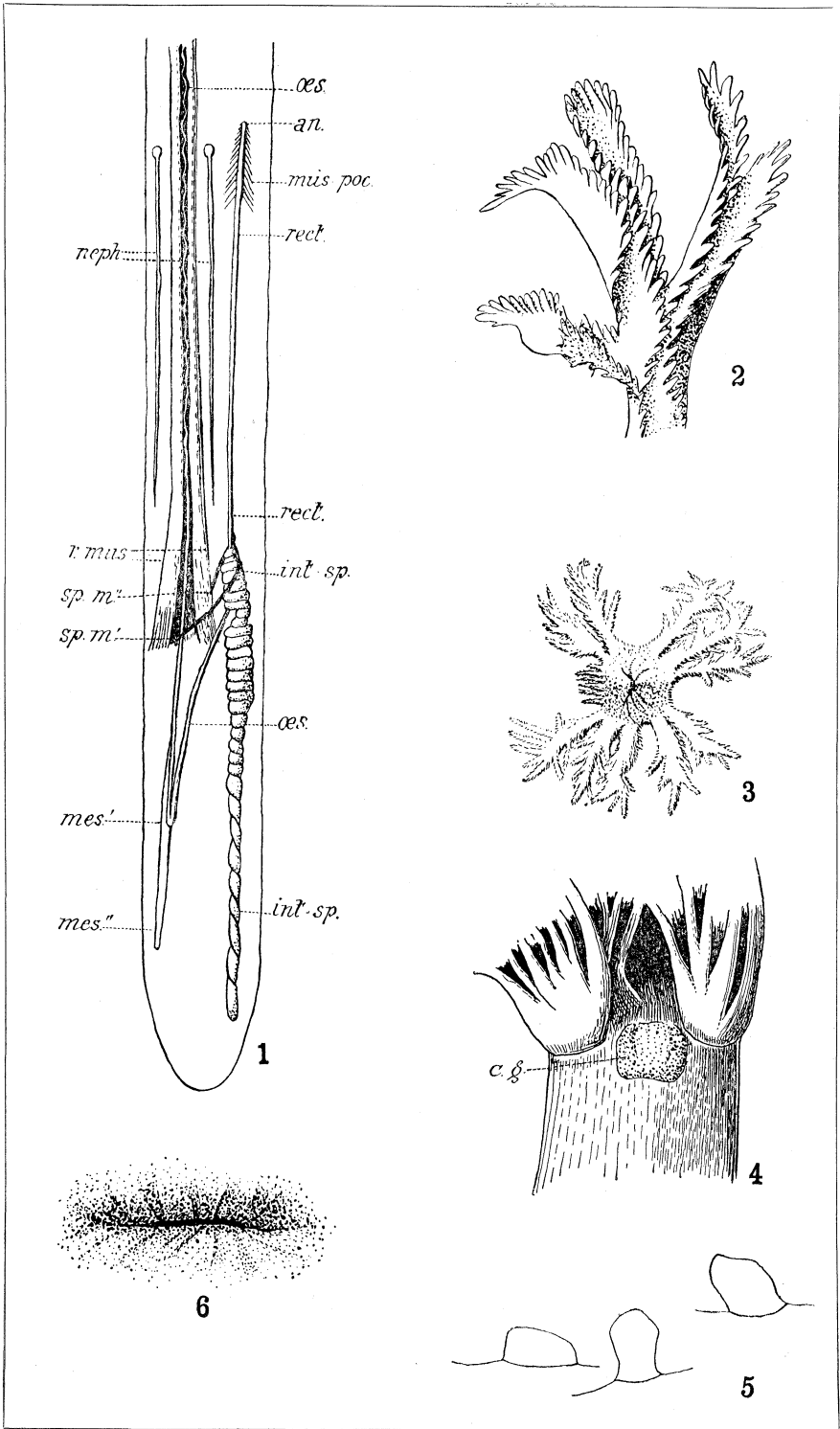
- P. psammophyla*, Cori., Zeits. Wiss. Zool., li., 1891, pp. 480-568; Haswell, *Loc. cit.*, (2), vii., 1892, p. 341.

EXPLANATION OF PLATE VII.

Dendrostoma dehamata, Kestv.

- Fig. 1. The organs in the body cavity. *Neph.* segmentle organs; *r. mus.* retractor muscles; *sp. m'. sp. m''*. left and right spindle muscles; *mes'. mes''*. muscles retaining oesophageal loop; *int. sp.* intestinal spiral; *oes.* oesophagus; *rect.* rectum; *mus. poc.* muscular pocket; *an.* anus. The nerve cord being of the usual type has been omitted.
- Fig. 2. One tentacular arm.
- Fig. 3. Anterior end showing mouth and arrangement of the tentacles.
- Fig. 4. Anterior dorsal end of introvert showing the cerebral organ [?] *c.g.*
- Fig. 5. Papillæ from base of introvert.
- Fig. 6. Anus.

(Figure 1 reduced; figures 2-6 enlarged.)



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