

AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Harrison, Launzelot, 1928. On the genus *Stratiodrillus* (Archiannelida: Histriobdellidae), with a description of a new species from Madagascar. *Records of the Australian Museum* 16(2): 116–122. [24 January 1928].

doi:10.3853/j.0067-1975.16.1928.783

ISSN 0067-1975

Published by the Australian Museum, Sydney

nature culture **discover**

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ON THE GENUS *STRATIODRILUS* (*Archiannelida*:
Histriobdellidæ), WITH A DESCRIPTION OF
A NEW SPECIES FROM
MADAGASCAR.

BY

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(Figures 1-3.)

GENERAL.

THE genus *Stratiodrilus* was established by the late Professor W. A. Haswell, F.R.S.,¹ for the reception of a species of Histriobdellid found upon fresh-water crayfishes in Tasmania. Subsequently² Haswell described a second species from the common spiny crayfish of New South Wales, *Astacopsis serratus*. Amongst some papers which came into my hands after Professor Haswell's death was a letter from Dr. E. H. Cordero of Monte Video, which recorded the finding in 1921 at two different localities in Uruguay of a species of *Stratiodrilus* upon a fresh-water Anomurous Decapod, *Æglea laevis*. Dr. Cordero enclosed a camera outline of this species, which I have redrawn and reproduce here as Fig. 3. Quite recently my colleague Miss Lucy M. Wood, B.A., who is working upon the Temnocephaloidea, obtained through the kindly interest of M. Nettement, Consul-General for France in Australia, and of the Governor-General of Madagascar, a number of individuals of the Madagascar crayfish, *Astacoides madagascariensis*. On examining the precipitate at the bottom of the bottles in which these animals were contained, I found, as I had hoped and expected, a species of *Stratiodrilus* present in very considerable numbers. This is described below. It may be presumed that these animals came from the gill-chambers of the crayfish, although I was not able to find any in that situation, all having apparently dropped to the bottom after being killed by the formalin in which the hosts were preserved.

The range of *Stratiodrilus* is thus extended from Australia to South America on one hand and to Madagascar on the other, and this fact induces me to prophesy with some confidence that the genus will yet be found upon the crayfishes *Parastacus* in South America and *Paranephrops* in New Zealand. These discoveries strengthen the argument which I have used on two previous

¹ Haswell.—On a New Histriobdellid, Quart. Journ. Micro. Sci., xliii, 1900, pp. 299-335.

² Haswell.—Notes on the Histriobdellidæ, *id.*, lix, 1913, pp. 197-226.

occasions³ as to the southern crayfish and their parasites demanding former land connections between Australia, Madagascar and South America.

A further point of interest arises in regard to the distribution of the Histriobdellidæ as a whole. There are but two genera, *Histriobdella*, with a single species, found upon the European marine lobster, *Nephrops norvegicus*, and *Stratiodrillus*, found upon fresh-water Decapods, principally crayfish. The latter genus is much more highly organized and specialized than the former, though the two are obviously closely related. So long as *Stratiodrillus* was known only by two closely allied species from Australia, no conclusions could justifiably be drawn from this relationship. But the range of the genus has here been extended to become coincident with that of the Parastacid crayfishes of the southern hemisphere, and it is found associated with fresh-water Decapods in three widely separated southern land masses.

It seems reasonable to conclude that *Stratiodrillus* comes of marine ancestors, and that it, or an ancestral form of it, lived upon the marine forerunner of the Parastacid crayfishes. The transition to fresh-water conditions must have taken place once, and once only, upon a single land mass, for, even if it be argued that there were several migrations of marine Decapods carrying Histriobdellid parasites from the sea to the fresh waters of widely separated southern lands, these could not have received fresh-water Temnocephaloid parasites, which again must have had common origin on a single land mass. The association of the Parastacid crayfish with two unrelated parasitic groups, one probably of marine origin, the other giving no evidence of such an origin, seems to me to demand conclusively that there should have been land connections between Madagascar, Australia, New Zealand and South America in past time. Wegener gives the most plausible suggestion, and I have discussed this elsewhere.⁴ A difficulty would arise in connection with the absence of crayfishes from Africa, and it must be supposed that Madagascar had no land connection with Africa after it had received its crayfishes from the east.

Finally, since a marine Histriobdellid occurs in European waters, why is there none of this group upon the Potomobiid crayfishes of the northern hemisphere? Possibly they are there, but have not been searched for and found. It is also possible, however, that the northern crayfishes were forced into a transition into fresh waters which was too rapid to allow so delicate a creature as a Histriobdellid to adjust itself to the change, while, perhaps, with the Parastacids the change was more gradual. Much of the fresh-

³ Harrison.—The Migration Route of the Australian Marsupial Fauna, *Austr. Zoologist*, iii, 8, 1924, p. 261. Crucial Evidence for Antarctic Radiation, *American Naturalist*, lx, 1926, pp. 374-383.

⁴ Harrison.—The Composition and Origins of the Australian Fauna, with Special Reference to the Wegener Hypothesis. Presidential Address to Section D, *Austr. Assoc. Adv. Science*, Perth, 1926 (in the press).

water fauna of eastern Europe is a relict marine fauna, and the Potamobiids may have originated in the same way. It does not seem probable, moreover, that this group is in any way ancestral to the Parastacids. It is more likely that they have been derived from similar, or even the same, marine ancestors, under different conditions and in different places.

SYSTEMATIC.

Genus STRATIODRILUS *Haswell.*

Stratiodrillus Haswell, Quart. Journ. Micr. Science, xliii, 1900, p. 300.

Histriobdellids with head, five body-segments, and an imperfectly segmented tail region. The head bears a median and two pairs of lateral tentacles, and a pair of retractile anterior limbs. The body bears three pairs of lateral cirri, and, in the male, a pair of retractile claspers. The posterior limbs carry a pair of posterior cirri. Cirri and tentacles usually two-jointed.

Genotype:—*S. tasmaniensis* Haswell.

Key to Species of *Stratiodrillus*:

- A. Lateral cirri bifurcated at tips; masticating apparatus large, 0.17 to 0.185 mm. in length *S. haswelli*. *n. sp.*
- AA. Lateral cirri not bifurcated.
 - B. Lateral cirri not two-jointed; masticatory apparatus small, 0.10 to 0.11 mm. in length *S. sp.* (Uruguay).
 - BB. Lateral cirri two jointed.
 - C. Posterior limb cirrus two-jointed; masticatory apparatus medium, 0.14 mm. long *S. novæ-hollandiæ*
 - CC. Posterior limb cirrus simple; masticatory apparatus 0.12 mm. long *S. tasmanicus*

STRATIODRILUS TASMANICUS Haswell.

Stratiodrillus tasmanicus Haswell, Quart. Journ. Micro. Sci., xliii, 1900, p. 300, Pl. xiv, fig. 1; *id.*, Parker and Haswell, Text-book of Zoology, 2nd Edit., Vol. i, p. 338, fig. 275, 3rd Edit., Vol. i, p. 331, fig. 280; London, Macmillan, 1910 and 1921.

Length 1 mm. to 1.5 mm. Masticating apparatus 0.12 to 0.13 mm. This species is fully described and figured by Haswell (*loc. cit. sup.*). It is very closely allied to that which follows, the principal differences being that in *S. tasmanicus* the masticatory apparatus is proportionately shorter, and that the cirri of the posterior appendages are simple, and not two-jointed.

Hosts:—*Astacopsis franklinii* Gray, and *A. franklinii*, var. *tasmanicus*, Erichson, Tasmania.

STRATIODRILUS NOVÆ-HOLLANDIÆ *Haswell.*

(Figure 1.)

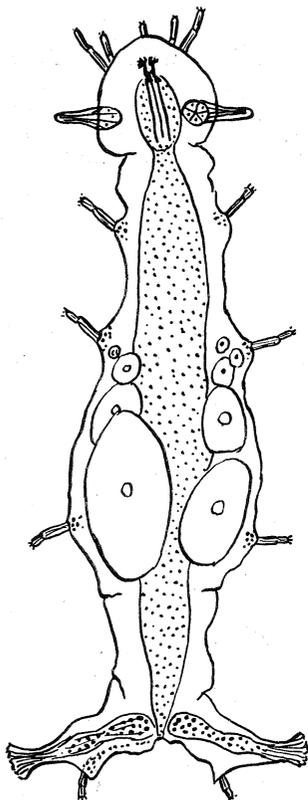


Fig. 1.—*Stratiodrillus novæ-hollandiæ* Haswell, ♀.

Stratiodrillus novæ-hollandiæ Haswell, Quart. Journ. Micro. Sci., lix, 1913, p. 199.

Length 1 mm. to 1.5 mm. Masticating apparatus 0.14 mm. As this species has not been figured, I give a figure of the female. The male differs only in the possession of a pair of retractile claspers on the fourth body segment, and in the organs of reproduction. It is probable that Haswell's description of the nephridia is far from complete. He based his observations to a large extent upon ciliary movement in the lumina in the living animal. From the appearances in a single mounted individual (out of a very considerable number) which has for an unknown reason taken up stain in the lumina of the tubules, these are seen to ramify extensively, and to end in many fine branches in certain positions. It is hoped to re-examine this matter at a later date.

Host:—*Astacopsis serratus* Shaw, New South Wales.

STRATIODRILUS HASWELLI, *sp. nov.*

(Figure 2.)

Length 0.7 to 0.9 mm. Masticatory apparatus 0.17 to 0.19 mm. The three pairs of lateral cirri bifurcated at the tips, with a minute sensory papilla in the angle. There is, in addition to the usual two-jointed cirrus of the posterior limbs, a small undivided cirrus on the postero-lateral margin. The penis of the male differs from that of the two previous species by being more solid at the base, and by having but a single projecting process (Fig. 2*c, d*) in place of three. The masticatory apparatus is built on precisely the same pattern, but is remarkably more robust for so small a species. The general arrangement of the internal organs is the same, with

the exception that the ganglia of the nerve cord are not so massive, and tend to be divided into two lateral masses of nerve cells rather than a single solid aggregate. Figure 2a represents the female, and 2b the male.

Host:—*Astacoides madagascariensis* Milne Edwards, Madagascar.

Types:—Holotype ♂ and allotype ♀ in the Australian Museum, Sydney, registered numbers W2464 and W2465 respectively.

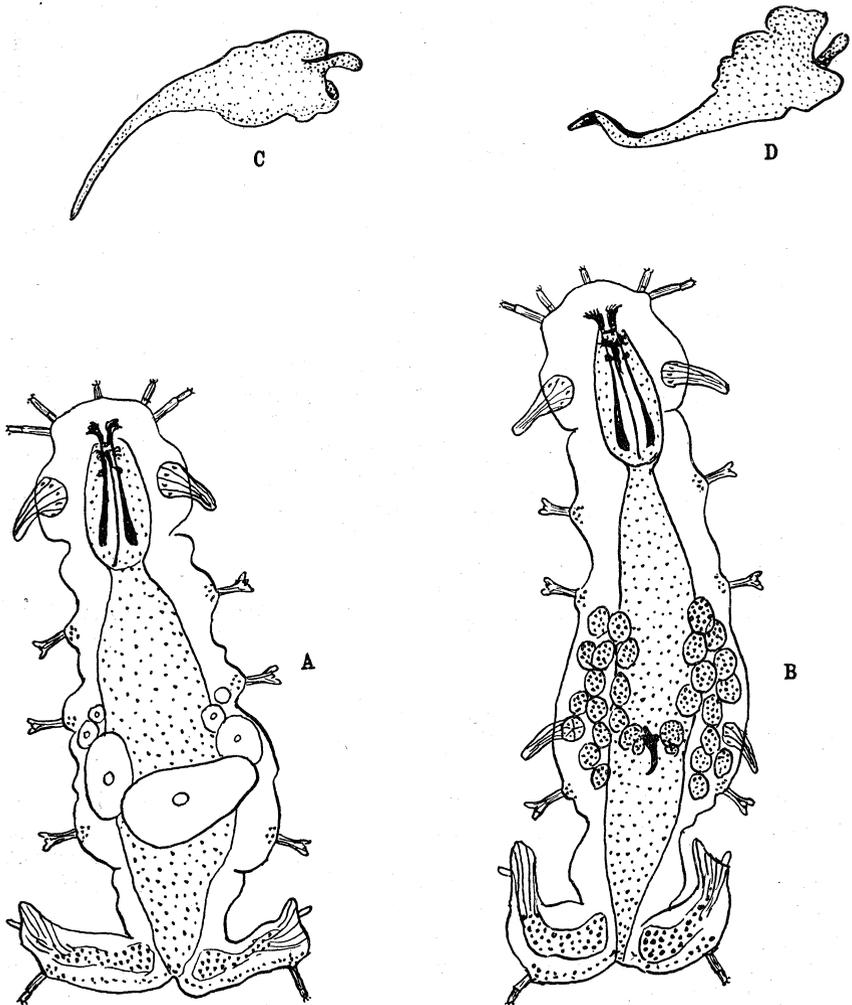


Fig. 2.—*Stratiodrilus haswelli* Harrison: A, ♀; B, ♂; C and D, aspects of the penis.

The species is named in honour of the late Professor Haswell, founder of the genus, who took a keen interest in these curious small animals.

STRATIODRILUS *sp.*

(Figure 3.)

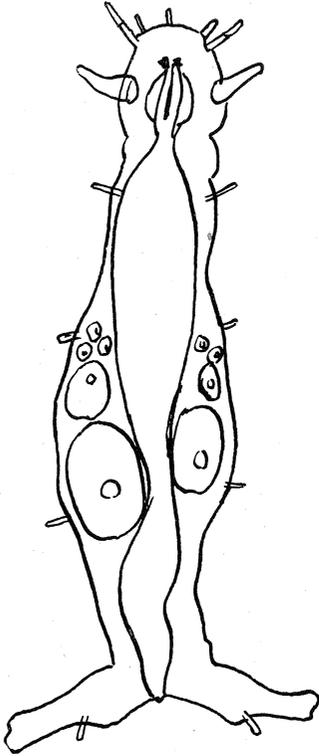


Fig. 3.—*Stratiodrillus* sp.
from Uruguay.

This is the species mentioned above as having been discovered by Dr. E. H. Cordero in Uruguay. A camera outline of a female, 1.4 mm. in length, accompanied Dr. Cordero's letter. Calculated in proportion to this length, the masticatory apparatus would measure 0.107 mm. I have reproduced the sketch to show conclusively that the animal is undoubtedly a species of *Stratiodrillus*. It differs from *S. novæ-hollandiæ*, so far as one may judge from a mere pencil outline, which was not meant to be diagnostic, in having the three median tentacles of the head and the lateral and posterior cirri simple, not two-jointed.

Host:—*Æglea lavis* Latr.
(Brachyura Anomura), Uruguay.

I have included a reference to this species without consulting Dr. Cordero, of whose whereabouts I am ignorant, since zoogeographically it is important.