

AUSTRALASIAN ANTARCTIC EXPEDITION

1911-14.

UNDER THE LEADERSHIP OF SIR DOUGLAS MAWSON, O.B.E., B.E., D.Sc., F.R.S.

SCIENTIFIC REPORTS.
SERIES C.—ZOOLOGY AND BOTANY.

Edited by Professor T. Harvey Johnston,
University of Adelaide.

VOL. III. PART 4.

RHABDOPLEURA

BY

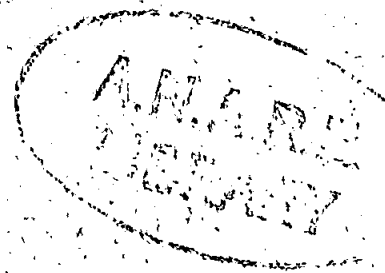
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WITH SIX TEXT FIGURES.

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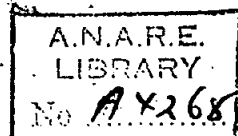
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„ 4.—RHABDOPLEURA.	By Prof. T. HARVEY JOHNSTON, University of Adelaide	0 2 6
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RHABDOPLEURA.

By T. HARVEY JOHNSTON, Professor of Zoology, University of Adelaide.

(With six text-figures.)

The debris from the dredgings of the Australasian Antarctic Expedition, 1911-1914; remaining after various organisms had been sorted out from them and distributed to specialists for report, was forwarded to me by the Trustees of the Australian Museum, Sydney, for further examination. In one of the collections (G.12424, Australian Museum), that obtained from a dredging on 12th December, 1912, during the second subantarctic cruise of the "Aurora," in 65 fathoms off Maria Island, Tasmania, a few minute fragments of a species of *Rhabdopleura* were found. The sea floor was reported to consist of mud and foraminiferal sand. In view of the special interest associated with the Pterobranchiates, an attempt was made to identify the specimens. They were not detected in any of the material remaining from the dredgings from the Antarctic coast between Commonwealth Bay (King George V Land) and Queen Mary Land—stations 1 to 12 of the Australasian Antarctic Expedition.

There are two records of *Rhabdopleura* from the Australasian seas, viz., *Rhabdopleura* sp. by Harmer (1904, 23) who referred to finding a fragment from South Australia; and *R. annulata* Norman (1912, 98), collected by the British Antarctic ("Terra Nova") Expedition from two localities (stations 90 and 91) close to the Three Kings Islands, to the north of New Zealand, in 183 and 549 metres respectively, on a rocky bottom. Norman's material was found on two small stones and on a larger stone, as well as on a lamellibranch shell, but was poorly preserved, the zooids being decomposed. Consequently only the coenoecium was described, but the account and figures are such that the species can be readily recognised.

The characters exhibited by the Tasmanian material are those of *R. annulata* whose known range is now extended from approximately 170° E., 34° S. (Three Kings) to 148° E., 42° 40' S. Harmer's Australian locality is indefinite. The late Sir Joseph Verco dredged extensively in the southern portion of St. Vincent's Gulf and the adjacent Investigator Strait and Backstairs Passage, and forwarded to Polyzoa to Harmer for identification. *Rhabdopleura* has been recorded as growing on polyzoa as well as on shells, corals and stones. I am not aware of any dredging in the deeper waters of South Australia prior to 1904, excepting that undertaken by Verco. Hence it is probable that Harmer's material came from the continental shelf in the vicinity of Kangaroo Island.

Verco also dredged off Bunbury, South-west Australia. If this supposition be correct then the species would probably be *R. annulata* and its known range would be extended considerably to the westward. Norman (1921, 101) believed that Harmer's (1905, 127, text-fig. 2) *Rhabdopleura* sp., taken by the Siboga Expedition at Station 204 in 75 to 94 metres between the islands of Wowoni and Buton off the south-east point of Celebes, belonged also to *R. annulata*. The species has been recognised by me from coenocelia dredged at two stations, No. 113 and 115, by the British, Australian and New Zealand Antarctic Research Expedition in March, 1931. They are both off the east coast of Tasmania. At Station 113 *R. annulata* was taken in the otter trawl at 122 metres, and in the Monegasque dredge at 155 to 178 metres. At Station 115 the depth was 128 metres. The former was located at 42° 40 S., 148° 27.5 E., off Maria Island; the latter at 41° 03 S., 148° 42 E. off the north-east corner of Tasmania, near Eddystone Point and not far from the entrance to Banks Strait. Both localities were recorded as having a sea floor consisting of calcareous sand with abundant polyzoa.

The material collected by the Australasian Antarctic Expedition consists of a minute piece of a creeping stem with a tube attached, and of some small fragments of bivalve shell and calcareous polyzoa with remains of the stolon and dark brown pectocaulus present. The shell fragment was tunnelled by a boring sponge. Attached to the stolons were a few tubes (peristomes) which were empty, or contained calcareous debris, foraminifera and sponge spicules, together with rounded bodies, probably faecal pellets of *Rhabdopleura*. The peristomes arise at right angles from the creeping stem, there being no recumbent portion. They are broken, hence the full length is not known. The wall of the tubes, measured at the peristomial rings, varies between 0.017 and 0.029 mm. (average 0.022) in thickness, while the minimum thickness of the region between the rings varies between 0.005 and 0.012 mm. (average 0.0076). The rings thus project 0.0144 mm. (average) on each side from the inter-ring region. The distance between rings ranges from 0.025 to 0.040; average 0.036 mm., most of them being between 0.037 and 0.040 mm. The tubes thus have a distinctly serrated appearance when viewed in optical section. The diameter of the tube at the peristomial rings varies between 0.170 and 0.180 mm., averaging 0.176, the lumen averaging about 0.132 mm. In the fragments available the number of rings ranged between 10 and 23.

The creeping stolon varies from pale yellow-brown to deep purplish brown and pursues an unbranched course (except for the upright peristomes) in a more or less straight line, quite unlike that figured by Lankester, by Schepotieff and by van der Horst for *R. normani*. It adheres closely to the substratum, but it can be lifted off quite easily, though it breaks readily. Its diameter ranges between 0.135 and 0.240 mm. Attached to each side of it is a mass of unorganised material, pale in colour and similar to that indicated in Harmer's figure (text-fig. 2B) and probably secreted by the animal. It extends for a distance of about 0.07 mm. on each side. The tube is very thin (0.003 mm. in thickness) and its rings project very slightly, 0.002 to 0.01 (average about 0.006 mm.

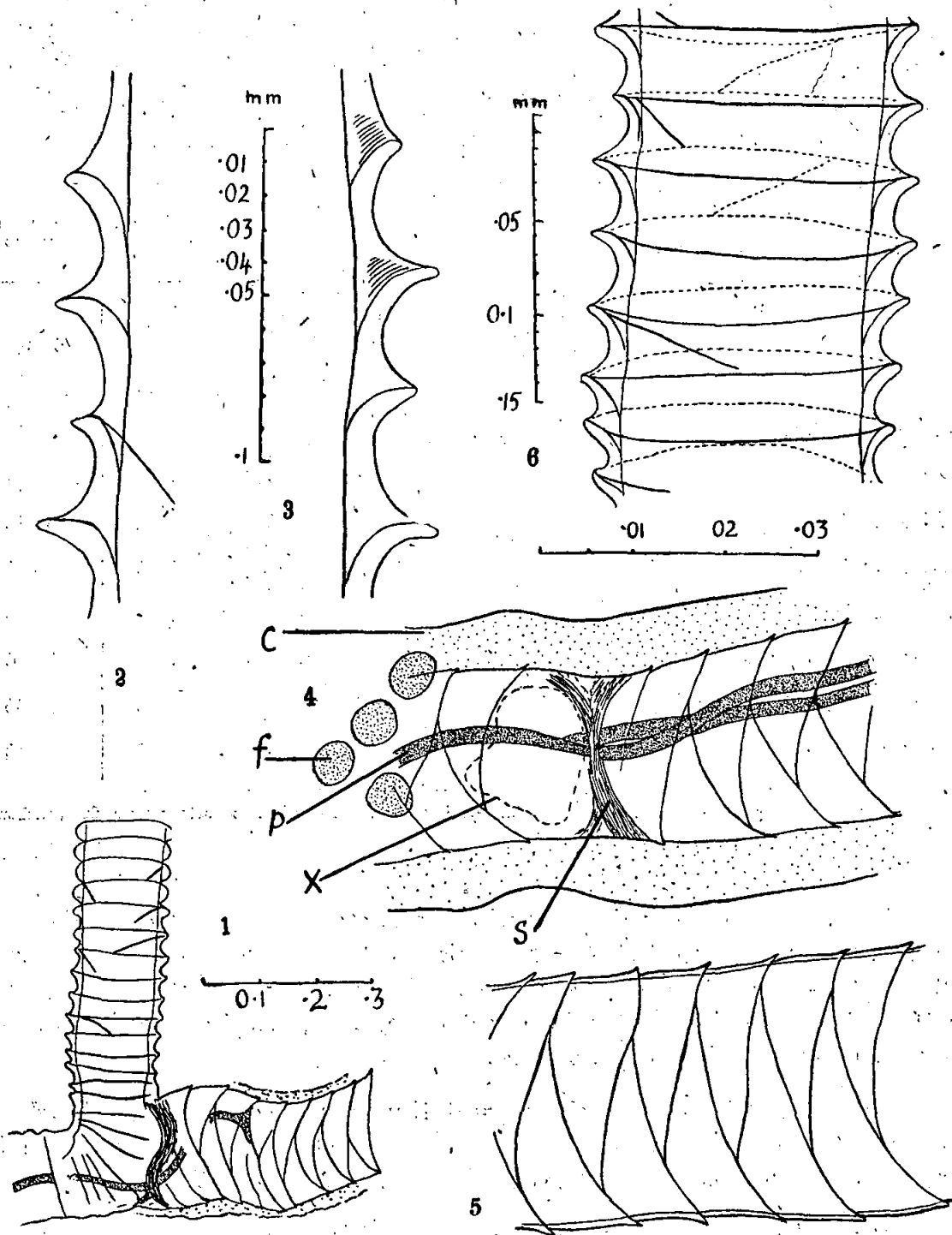


Fig. 1. Peristome and portion of stolon.

Figs. 2, 3. Views of edges of peristome in optical sections.

Figs. 4, 5. Views of stolon; fig. 4 is drawn to the scale immediately above it; fig. 5 is drawn to the same scale as fig. 6.

Fig. 6. Peristome—c, material bordering lateral margins of stolon; f, faecal pellets (?) of *Rhabdopleura*; p, pectocaulus; s, septum; x, opening indicating position from which a peristome has been torn out.

and very acutely forwards from the surface. The distance between rings is 0.035 to 0.080 mm. The sutures are quite differently arranged from those of the upright tubes and meet at an angle of about 30° and exhibit a well-marked zig-zag appearance. The very dark brown pectocaulus is an obvious feature in the specimen and has a diameter of 12 to 20 μ . The septum at the junction of the upright and creeping portions of the coenocidium is arranged and shaped like that figured by Norman (1921, fig. 4).

	Siboga specimen (Harmer).	New Zealand (Norman).	Tasmania (Johnston)†.
Number of rings in peristome	13-15	9-47	10-23
Inner diameter of peristome	175-210 μ	160-200	132 (average).
Thickness of wall of peristome at middle of a tube ring	7.5-11.5 μ	9-13	5-12
Average distance between rings	50 μ *	50	36 (25-40)
Maximum external diameter of ring	200 μ *	265	170-180
Maximum thickness of peristomial wall	25 μ *	30-60	17-29
Projection of peristomial rings from inner wall of tube	25-30 μ *	30-50	20-25
Diameter of pectocaulus	20-22 μ	27-34	12-20
Distance between rings of stolon	44 μ *	120	35-80
Diameter of stolon	200 μ *	200**	130-240

† All measurements and drawings of the Tasmanian specimens were made whilst the latter were in fluid, without a cover glass.

* Calculated from Harmer's text figure.

** Calculated from Norman's figures.

The validity of the various "species" of *Rhabdopleura* has been questioned by Schepotieff (1906) and Broch (1927) who considered that they all belonged to *R. normani* Allman, though the former described a new species, *R. striata*, from the coast of Ceylon in 1909. As Bergersen and Broch's recent monograph (1932) is not accessible, their view on this question is not known to me.

Harmer and Norman considered that there were several species, though the latter compared especially *R. normani* and *R. annulata*, while Harmer recognised that his fragments from the East Indies differed from *R. normani*, which he also figured.

It may be noted that peristomes of the Tasmanian *R. annulata* when mounted in lactophenol under a cover glass changed their form under the light pressure, losing their markedly serrated margin and becoming very similar to *R. normani*, as figured by Harmer (1905) and Norman (1921). The zooid of *R. annulata* has not been described, but in view of the marked difference in the branching of *R. normani* and in the relative length of that portion of the recumbent stem which is continuous with the upright tube and is separated

from the rest of the stolon by a septum in that species, as figured by Lankester (1884, pl. 37, 39) and Ridewood (1907, 13), there seems to be little doubt that the two are quite distinct. The Siboga specimens, as figured by Harmer, may belong to *R. annulata*. Broch's unfigured account does not allow comparison of the Antarctic material with either species.

The most northerly record of the genus is that for *R. normani* found amongst polyzoa from West Greenland by Norman (1903, 101, footnote). The most southerly point is Gauss Station, 66° 2' S., 89° 38' E. in 350 metres at a temperature —1.84° C. and an average salinity 34.3 parts per thousand. The locality lies a little to the north of the Antarctic Circle and to the westward of Drygalski Island, off Kaiser Wilhelm Land. This material consisted of two detached fragments without zooids and was identified by Broch (1927, 468) as *R. normani*, this investigator agreeing with Schepotieff's view (1906) that there was only one species belonging to the genus. The next southerly record is that reported by Fowler (1904) who recognised *R. normani* amongst the Challenger material from Tristan d'Acunha (38° S., 12° W.) in the South Atlantic, though Harmer (1905, 128) expressed a doubt as to the correctness of the identification. Norman (1921, 98) re-examined the specimens and tentatively assigned them to that species. The newly recorded Tasmanian localities (for *R. annulata*) lie further to the south than Tristan d'Acunha.

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