

## 7

## CORALLIMORPHARIA, ACTINIARIA AND ZOANTHIDEA

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## Abstract

The collection of sea anemones from Port Phillip, Victoria, consists of 15 species, including one corallimorpharian, 12 actinarians and two zoanthideans. Three are described as new species: *Isophellia stela* (Actiniaria: Isophellidae), *Parazoanthus lividum* (Zoanthidea: Parazoanthidae), and *Epizoanthus sabulosum* (Zoanthidae: Epizoanthidae). Ten species constitute new records for Port Phillip Bay.

## Introduction

The collection of sea anemones resulting from the Port Phillip Bay Survey apparently is by far the largest and richest ever to come from the area. Represented in the collection are one corallimorpharian, 12 actinarians (one new species), and two zoanthideans (both new species).

Five species of Actiniaria and one corallimorpharian had previously been reported from Port Phillip Bay. Haddon and Duerden (1896) described *Actiniodes spenceri*, *Sagartia carlgreni*, *Mitactis australiae*, *Mitactis similis* and *Corynactis australis*. The first is now recognized as an *Actiniogeton*, the last retains Haddon and Duerden's names, and the other three are probably synonyms of *Anthothoe albocincta*. Duerden (1895) vaguely refers to *Cystiactis tuberculosa* (now *Phlyctenactis*) from Port Phillip. Since two of these species, *Corynactis australis* and *Phlyctenactis tuberculosa*, are included in the collection under consideration, there are then 16 species known from Port Phillip Bay. For an area the size of Port Phillip, this is an average sea anemone fauna.

Of the 15 species in the 1957-1963 survey collection, the three new species plus *Epiactis australiensis*, *Phlyctenanthus australis* and *Isanemonia australis* are known only from southern Australia. Six other species had previously been reported from southern Australia:

*Corynactis australis*, *Actinia tenebrosa*, *Oulactis muscosa*, *Anthopleura aureoradiata*, *Phlyctenactis tuberculosa*, and *Anthothoe albocincta*. Three species, *Epiactis thomsoni*, *Bunodactis rubrofusca* and *Cricophorus nutrix*, were previously known only from New Zealand and, in addition to the three new species, represent new records for southern Australia (Port Phillip Bay). On the basis of the present analysis, it is apparent that the Port Phillip Bay sea anemone fauna is for the greater part related to that of New Zealand (nine species) and to a lesser extent possibly endemic (seven species). No species that might be considered subtropical appeared in the collection.

Three papers by Carlgren (1950a, 1950b, 1954), dealing with southern Australian anemones, give good accounts of several of the species included in this report. I have, therefore, simply listed these species along with references and collection data, adding comments in only a few instances.

Holotypes of the three new species described in this paper are deposited in the National Museum of Victoria.

I am indebted to Mrs Hope Macpherson Black of the National Museum of Victoria for providing the specimens and data upon which this report is based, to Mr David A. West, Department of Marine Sciences, University of Puerto Rico, Mayaguez, for the photographs, and my wife, Bertha, for lending a hand, as always where needed.

Contribution, Department of Marine Sciences, University of Puerto Rico, Mayaguez, P.R. 00708.

## Distribution of Anemones

Area	(Loc.)	Spec.	Species
5	(58)	1	<i>Oulactis muscosa</i>
	(Williamstown, intertidal)	3	<i>Oulactis muscosa</i>
6	(65)	2	<i>Parazoanthus lividum</i>
7	(123)	2	<i>Isophellia stela</i>
9	(84)	17	<i>Oulactis muscosa</i>
		11	<i>Anthopleura aureoradiata</i>
10	(12)	2	<i>Corynactis australis</i>
10	(103)	7	<i>Anthothoe albocincta</i>
12	(112)	1	<i>Corynactis australis</i>
13	(93)	3	<i>Epiactis thomsoni</i>
18	(61)	3	<i>Epiactis thomsoni</i>
19	(304)	1	<i>Corynactis australis</i>
23	(3)	7	<i>Epiactis thomsoni</i>
24	(122)	2	<i>Oulactis muscosa</i>
25	(129)	7	<i>Anthothoe albocincta</i>
27	(41)	1	<i>Epiactis thomsoni</i>
27	Point Wilson, intertidal)	20	<i>Anthopleura aureoradiata</i>
		1	<i>Oulactis muscosa</i>
29	(107)	5	<i>Anthothoe albocincta</i>
30	(280)	1	<i>Phlyctenactis tuberculosa</i>
33	(177)	1	<i>Isophellia stela</i>
42	(38)	1	<i>Oulactis muscosa</i>
		1	<i>Epiactis thomsoni</i>
		3	<i>Bunodactis rubrofusca</i>
43	(303)	3	<i>Anthothoe albocincta</i>
47	(29)	1	<i>Phlyctenactis tuberculosa</i>
55	(35)	2	<i>Epiactis australiensis</i>
55	(Morningside, intertidal)	1	<i>Epiactis thomsoni</i>
55	(Southside Schnapper Point, intertidal)	4	<i>Isaemouia australis</i>
58	(90)	1	<i>Phlyctenanthus australis</i>
58	(79)	20	<i>Actinia tenebrosa</i>
58	1 (293) colony		<i>Epizoanthus sabulosum</i>
58	(Point Lonsdale)	2	<i>Isaemouia australis</i>
59	(Quarantine Jetty, intertidal)	7	<i>Actinia tenebrosa</i>
		9	<i>Anthothoe albocincta</i>
		2	<i>Isaemouia australis</i>
59	(23)	1	<i>Epiactis thomsoni</i>
59	(24)	1	<i>Anthothoe albocincta</i>
59	(25)	1	<i>Phlyctenactis tuberculosa</i>
		2	<i>Anthothoe albocincta</i>
59	(36)	1	<i>Cricophorus nutrix</i>
		17	<i>Actinia tenebrosa</i>
59	(80)	9	<i>Anthothoe albocincta</i>
61	(37)	44	<i>Anthothoe albocincta</i>
63	(Safety Beach, intertidal)	11	<i>Oulactis muscosa</i>
69	(Rosebud, intertidal)	1	<i>Oulactis muscosa</i>
		13	<i>Anthopleura aureoradiata</i>
		8	<i>Cricophorus nutrix</i>
(Label macerated—Victoria 21/6/62)		4	<i>Anthopleura aureoradiata</i>

## Description of Species

## Order CORALLIMORPHARIA

## Family CORALLIMORPHIDAE

*Corynactis australis* Haddon and Duerden

*Corynactis australis* Haddon and Duerden, 1896: 151, Pl. 7, fig. 6-10, Pl. 8, fig. 9-10; Carlgren, 1949: 14; Carlgren, 1950b: 131.

Survey areas 10 (12) 2, 12 (112) 1, 19 (304) 1.

## Order ACTINIARIA

## Family ACTINIIDAE

*Actinia tenebrosa* Farquhar

*Actinia tenebrosa* Farquhar, 1898: 535; Stuckey, 1909c: 375, 380, Fig. 5, Pl. 23, fig. 1-2; Stuckey and Walton, 1910: 541; Stephenson, 1922: 266; Carlgren, 1924: 196, Fig. 14; Carlgren, 1949: 50; Carlgren, 1950a: 2; Carlgren, 1950b: 132; Parry, 1951: 87, 100; Carlgren, 1954: 571.

Survey areas 58 (79) 20, 59 (Quarantine Jetty, intertidal) 7, 59 (36) 17.

*Oulactis muscosa* (Drayton in Dana)

*Metridium muscosum* Drayton in Dana, 1846: 153; 1849 (atlas): 3, Pl. 5, fig. 42, 43; Dana, 1859: 12.

*Oulactis muscosa*, Milne Edwards and Haime, 1851: 12; Milne Edwards, 1857: 292; Andres, 1883: 311; Carlgren, 1949: 52; Carlgren, 1950a: 3; Carlgren, 1950b: 134, Fig. 2, Pl. 2; Parry, 1951: 87, 102.

*Oulactis plicatus* Hutton, 1879: 311; Farquhar, 1898: 527.

*Cradactis plicatus*, Stuckey, 1909c: 376, 392, Pl. 25, fig. 1-2; Stephenson, 1922: 284.

Survey areas A-5 (58) 1, 5 (Williamstown, intertidal) 3, 9 (84) 17, 24 (122) 2, 27 (Point Wilson, intertidal) 1, 42 (38) 1, 63 (Safety Beach, intertidal) 11, 69 (Rosebud, intertidal) 1.

The three largest specimens from area 63, having lengths of 25 mm and diameters of 20 and 15 mm, all have 96 tentacles and 48 pairs of mesenteries of which all were fertile except the directives and youngest eyle. The endoderm of the tentacles, oral disc and upper column is coloured dark sepia from abundant zooxanthellae. The marginal sphincter is weak and diffuse in all three area 63 specimens but in others from Anglesea the sphincter varied from weak, diffuse, to moderately strong, circumscript. Nematocysts of the marginal sphincters of the area 63 specimens were holotrichs 40-50  $\times$  4-5  $\mu$  and spirocysts, 28  $\times$  2  $\mu$ .

***Anthopleura aureoradiata* (Stuckey)**

*Bunodes aureoradiata* Stuckey, 1909a: 368, Pl. 17; Stuckey, 1909c: 376, 394.

*Anthopleura aureoradiata*, Carlgren, 1924: 208, Fig. 17; Carlgren, 1949: 54; Carlgren, 1950a: 3; Parry, 1951: 88, 104, Figs. 5-6; Carlgren, 1954: 574, Fig. 3.

Survey areas 9 (84) 11, 27 (Point Wilson, intertidal) 20, 69 (Rosebud, intertidal) 13, label macerated (Victoria 21 Feb. 62) 4.

The anemones from the lot with the macerated label were attached to the bivalve *Katylisia scalarina*. The largest specimen measured 20 mm in length by 8 mm in diameter and contained several 12 to 14-tentacled young among the mesenteries.

***Epiactis australiensis* Carlgren**

*Epiactis australiensis* Carlgren, 1950a: 5, Fig. 2; Carlgren, 1954: 576.

Survey area 55 (35) 2.

***Epiactis thomsoni* (Coughtrey)**

*Actinia thomsoni* Coughtrey, 1874: 280.

? *Actinia thomsoni*, Hutton, 1879: 313; Farquhar, 1898: 527.

*Leiotealia thompsoni*, Stuckey, 1909b: 370, Pl. 18, fig. 1-2, Pl. 19, fig. 1-3; Stuckey, 1909c: 376, 395.

*Epiactis thompsoni*, Stephenson, 1922: 274; Carlgren, 1924: 221, Fig. 25; Parry, 1951: 88, 111.

*Epiactis thomsoni*, Carlgren, 1949: 58.

Survey areas 13 (93) 3, 18 (61) 3, 23 (3) 7, 27 (41) 1, 42 (38) 1, 55 (Mornington, intertidal) 1, 59 (23) 1.

The specimens from Port Phillip agree closely with the descriptions given by Carlgren (1924) and Parry (1951). A large specimen from area 55 contained a number of 12-tentacled young in the marginal stoma.

***Phlyctenactis tuberculosa* (Quoy and Gaimard)**

*Actinia tuberculosa* Quoy and Gaimard, 1883: 159, Pl. 11, fig. 3-6.

*Cereus tuberculosus*, Milne-Edwards, 1857: 268.

*Cystiactis tuberculosa*, Haddon and Duerden, 1896: 156, Pl. 7, fig. 11, Pl. 9, fig. 1-3; Duerden, 1895: 213; Lager, 1911: 217; Stephenson, 1922: 286.

*Phlyctenactis retifera* Stuckey, 1909s: 376, 396, Pl. 26, fig. 1-2.

*Phlyctenactis morrisonii* Stuckey, 1909c: 396, Pl. 27, fig. 1.

*Phlyctenactis tuberculosa*, Carlgren, 1945: 13; Carlgren, 1949: 61; Carlgren, 1950a: 136, Fig. 6; Carlgren, 1954: 578, Fig. 8; Parry, 1951: 88, 113.

Survey areas 30 (280) 1, 47 (29) 1, 59 (25) 1.

***Phlyctenanthus australis* Carlgren**

*Phlyctenanthus australis* Carlgren, 1950b: 135, Fig. 3-5, Pl. 1; (nomen nudum) Carlgren, 1949: 61.

Survey area 58 (90) 1.

***Bunodactis rubrofusca* Carlgren**

*Bunodactis, rubro-fusca* Carlgren, 1924: 204, Fig. 15-16; Carlgren, 1949: 65.

*Bunodactis rubrofusca*, Parry, 1951: 88, 115.

Survey area 42 (38) 3.

***Isanemonia australis* Carlgren**

Pl. 9, fig. 2

*Isanemonia australis* Carlgren, 1950a: 7, Fig. 3; Carlgren, 1954: 575, Fig. 4-5.

Survey areas 55 (Southside Schnapper Point, intertidal) 4, 58 (Point Lonsdale, intertidal) 2, 59 (80) 2.

The Port Phillip Bay specimens seem to differ in several ways from the specimens described by Carlgren (1950a, 1954). It is chiefly these differences that are described here. As the species has never been illustrated, a photograph of the best preserved specimen is included (Pl. 9, fig. 2). The three largest specimens examined had column heights, oral disc diameters and pedal disc diameters, respectively and in centimeters, of 3, 3, 2; 3, 3.5, 2.5; 5, 5, 6. The tentacles numbered 140 ( $\pm 5$ ), and the longest measured 3 cm. This is certainly not consistent with Carlgren's diagnosis of the genus: 'tentacles not very numerous, of moderate length'. Although these specimens were as large or larger than Carlgren's and well-expanded, I could not detect marginal pseudospherules which the species is said to have. The entodermal sphincter muscle of the sectioned specimen is somewhat stronger than that depicted by Carlgren (1950a, Fig. 3a) but is comparable to that illustrated later by Carlgren (1954, Fig. 4). The sphincter extends for about 3 mm along the wall of the deep fosse and consists of 120 or more mesogloal pleats (300  $\mu$  high) many of which are branched. The mesogloea is fibrous and cellular throughout. The sectioned specimen is a ripe male. The numbers of mesenteries are exactly the same at the margin and base. Nematocysts examined are: spirocysts of tentacles,  $30 \times 2 \mu$ ; holotrichs of limbus,  $25-26 \times 5 \mu$ ; microbasic b-mastigophores of limbus,  $21 \times 2.5 \mu$ ; of filaments,  $35 \times 5 \mu$ ; of actinopharynx,



28-30  $\times$  4.5  $\mu$ ; of tentacles, 28-30  $\times$  3  $\mu$ ; microbasic p-mastigophores of filaments, 20  $\times$  5  $\mu$ ; of actinopharynx, 24-25  $\times$  5-6  $\mu$ .

Family ISOPHELLIDAE

*Isophellia stela* n.sp.

Fig. 1, Pl. 9, fig. 1

MATERIAL: Survey areas 7 (123) 2, 33 (177) 2.

HOLOTYPE: Nat. Mus. Vict. G1547. Three Paratypes G1548.

TYPE LOCALITY: Off Middle Brighton.

DESCRIPTION: The specimens from area 33 are both strongly contracted, and in this state both have total lengths and greatest diameters of 10  $\times$  5 mm. They are attached to tough, white fibrous material, probably a polychaete tube. The specimens from area 7 are both well expanded and have total lengths of 20 mm and greatest diameters of 7 mm.

The column is divisible into a short, distinct, clean, thin-walled scapulus and a thick-walled scapus bearing prominent tenaculi in its distal half. The contracted specimens have sand grains adhering to the tenaculi while the expanded specimens are free of sand. The columns of all specimens are constricted just above the pedal discs, this being more evident in the contracted specimens. Cinclides were not evident.

The tentacles are thin, evenly-tapered and acute. The inner are up to 6 mm in length and are twice or more the length of the outer. There are 80 ( $\pm$  2) tentacles on each of the two specimens. Considering the number of mesenteries, it is likely that the definitive number of tentacles would be 96.

Ectoderm of column 30 to 75  $\mu$  high, with a few gland cells containing neutrophilic granules but lacking mucous cells. A surface cuticle seems to be lacking even on the tenaculi.

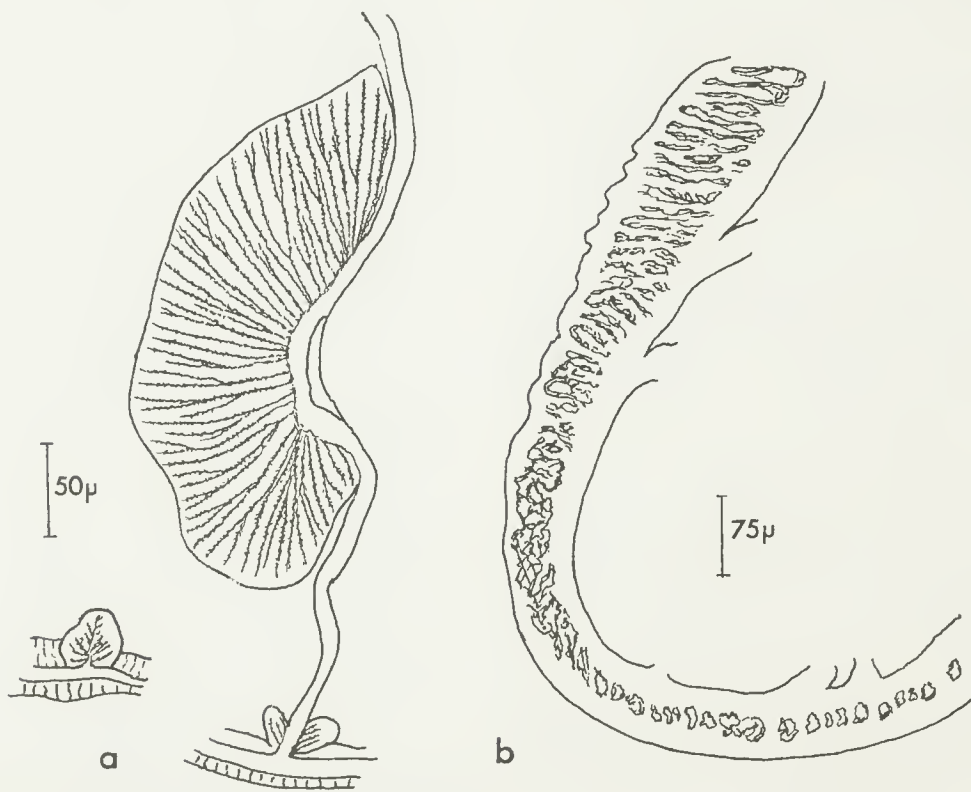


Fig. 1—*Isophellia stela* n. sp., a, second cycle macrocne and a microcne; b, marginal sphincter (only mesogloea shown).

Entoderm of the column 12 to 25  $\mu$  high, with a few gland cells and no zooxanthellae. Circular muscle layer of column folded into pleats 25  $\mu$  high near margin and diminishing to 6 to 8  $\mu$  at mid column. Radial muscles of oral disc and longitudinal muscles of tentacles ectodermal.

Mesogloea fibrous and cellular throughout, that of the mid column 12 to 40  $\mu$  thick. Marginal sphincter in the mesogloea strong, stratified near the margin and gradually becoming alveolar down the column. The sphincter, in section, is about 700  $\mu$  long by 75  $\mu$  at its greatest width. In its upper portion it occupies most of the width of the mesogloea but in its lower portion, only about one third.

Mesenteries are distinctly divisible into macrocnemes and microcnemes. Twenty-four pairs of mesenteries extend from pedal disc to oral disc. Of these the first cycle (two pairs directives) and most of the second are macrocnemes and are perfect and fertile. The retractor muscles of the second cycle mesenteries are slightly weaker than those of the first cycle. In addition, one member of each pair of second cycle mesenteries is noticeably weaker than the other and is always the same member with respect to the directive axis. In the sectioned specimens one member of a second cycle pair is an imperfect, very weak macrocneme while a member of another pair is a microcneme. The retractor muscles of the macrocnemes are very strong and of the restricted type. The stronger are made up of 40 or more high pleats of which many are branched. The parietal muscles of both macro- and microcnemes are of similar shape and strength. They are strong and are made up of six to 10 mostly unbranched pleats. The basilar muscles are weak but distinct. The micronemes, throughout most of the column length, consist of little more than parietal muscle. Twelve pairs, or a few more, run the length of the column, lack filaments and are sterile. In the region of the short scapulus there occurs part of an additional cycle of very weak micronemes (16 pairs in the sectioned specimen). This accounts for the species having more tentacles than mesenteries at the pedal disc.

The acontia are sparse and short. In cross section they are circular rather than triangular, about 150  $\mu$  in diameter, and the nematocyst tract occupies about one third of the circumference. The specimens sectioned are ripe males.

The actinopharynx is longitudinally corrugated. Its ectoderm contains very numerous, small, dark-staining nuclei and pale-staining mucous cells. There are two prominent siphonoglyphs.

*Cnidom.*: Spirocysts of tentacles 15-18  $\times$  2.5  $\mu$ , numerous. Microbasic b-mastigophores of tentacles 18-20  $\times$  2.2-5  $\mu$ , common; of column, 18  $\times$  2.5  $\mu$ , few; of actinopharynx, 30  $\times$  3  $\mu$ , numerous; of acontia, 28-32  $\times$  3-4  $\mu$ , numerous. Microbasic p-mastigophores of tentacles 17  $\times$  3  $\mu$ , few; of column, 13  $\times$  3  $\mu$ , few; of actinopharynx, 16  $\times$  4  $\mu$ , common; of filaments, 11-14  $\times$  4  $\mu$ , few; of acontia, 32  $\times$  4  $\mu$ , numerous.

REMARKS: The specimens here identified as *Isophellia stela* resemble very closely *I. sabulosa* Carlgren (1900: 52, Pl. 1, fig. 9) from Zanzibar. An obvious difference, but one that I think may reflect environment, is the complete investment of the *I. sabulosa* scapus with sand while only the upper half of the scapus in *I. stela* is covered. A discrepancy of more importance is the apparent lack of cinclides in the Port Phillip Bay specimens. Cinclides, however, are frequently difficult to observe in many of the Isophellidac, especially so in preserved specimens. Carlgren (1928) added to the description of *I. sabulosa*. Here his text figures 68 of the sphincter, 71 of the mesentery and 72 of the parietal muscle are virtually identical to depictions of those same structures in *I. stela*. On the other hand, all types of nematocysts from *I. stela* are somewhat larger than those of *I. algoensis* Carlgren (1928). Carlgren separated *algoensis* from *sabulosa* largely on the basis of the larger nematocysts in the former species.

Primarily on the basis of the larger nematocysts in *I. stela* but also with consideration of the more tropical range of *I. sabulosa*, I consider the Port Phillip Bay specimens to represent a new species.

Family SAGARTIIDAE  
***Anthothoe albocincta* (Hutton)**

*Gregoria albocincta* Hutton, 1879: 312.

*Sagartia albocincta*, Stuckey, 1909b: 372, Pl. 20, fig. 2-3; Stuckey, 1909c: 376, 382; Stuckey and Walton, 1910: 541.

? *Actinothoe albocincta*, Carlgren, 1949: 103.

*Anthothoe albocincta*, Carlgren, 1950a: 10; Carlgren, 1950b: 142, Pl. 3, fig. 1; Parry, 1951: 89; Parry, 1952: 129; Carlgren, 1954: 584.

Survey areas 10 (103) 7, 25 (129) 7, 29 (107) 5, 43 (303) 3, 59 (80) 9, 59 (24) 1, 59 (25) 2, 61 (37) 44.

REMARKS: The Port Phillip Bay specimens agree well in anatomical features with specimens from New Zealand. However, the nematocysts, especially of the acontia, are somewhat longer in Port Phillip specimens. In New Zealand specimens they are  $50-65 \times 7 \mu$  micro-basic p-mastigophores and  $20-25 \times 2 \mu$  micro-

basic b-mastigophores while in those from Port Phillip these nematocysts are  $70-90 \times 6-7 \mu$  and  $30 \times 2 \mu$ , respectively. The p-mastigophores appear to have detachable 'darts' on the end of the shaft. This discrepancy in nematocyst sizes is also noted by Carlgren (1950a). I tend to agree with him that the observed differences, in this case, are not especially meaningful.

Family HORMATHIIDAE  
***Cricophorus nutrix* (Stuckey)**

*Sagartia nutrix* Stuckey, 1909c: 376, 382, Fig. 6, Pl. 21, fig. 1-2.

*Cricophorus nutrix*, Carlgren, 1924: 252, Fig. 44-53; Carlgren, 1949: 96; Carlgren, 1950a: 8; Parry, 1951: 89; Parry, 1952: 125; Carlgren, 1954: 582.

Survey area 59 (36) 1, 69 (Rosebud, intertidal), 8.

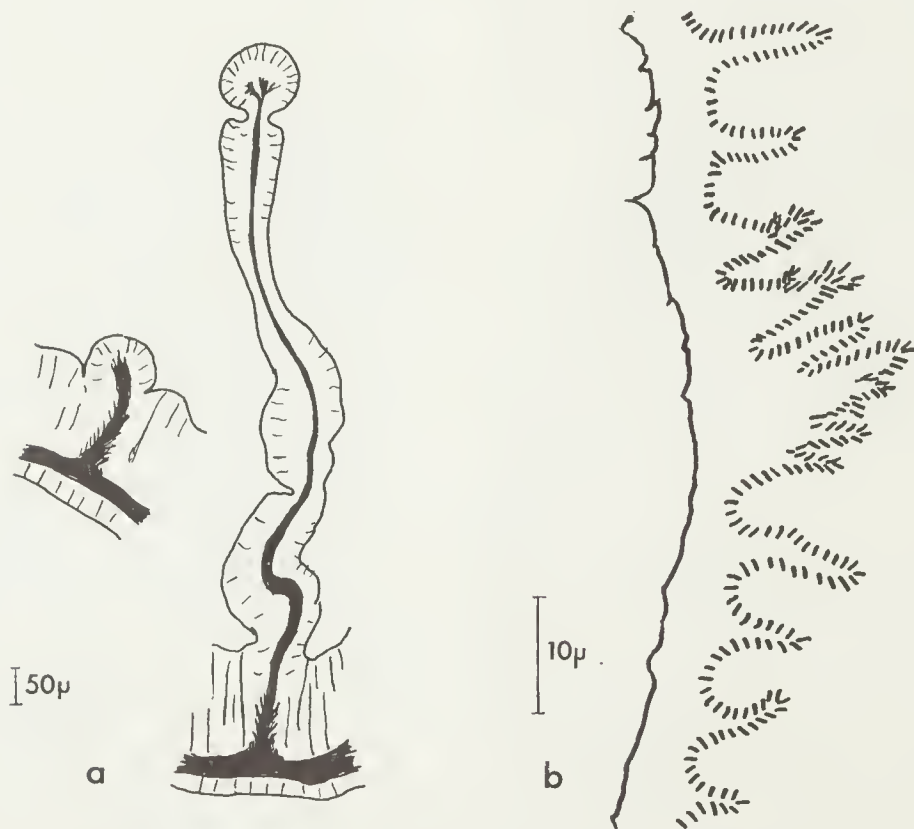


Fig 2—*Parazoanthus lividum* n. sp., a, microcneme and macrocneme; b, marginal sphincter (only mesogloea shown).



Order ZOANTHIDEA  
 Family PARAZOANTHIDAE  
*Parazoanthus lividum* n.sp.

Fig. 2, Pl. 9, fig. 4

MATERIAL: Survey area 6 (off Williamstown 29/6/58) 2 specimens.

HOLOTYPE: Nat. Mus. Vict. G1549.

PARATYPE: G1550.

TYPE LOCALITY: Off Williamstown, Vict.

DESCRIPTION: The zoanthids in both lots are on the sponge *Spirasterella* sp. According to Dr Patricia Berquist, the zoanthid is dull bluish-grey and the sponge, yellow ochre. In preservative the zoanthids of one lot are yellow ochre while in the other they are a pale violet-brown. The pieces of sponge are rather well covered by several colonies of zoanthids which consist of two to more than 100 polyps per colony. For the most part the coenenchyme, flattened, band-like and two to 4 polyps wide, meanders in the depressions between nodules on the sponge surface. However, at the distal end of the sponge the coenenchyme is sheet-like and almost completely caps the rounded end of the sponge. In the proximal region of the sponge the colonies are small and separate. The largest opened polyp measures 2 mm in diameter and extends 1 mm above the surface of the coenenchyme. Some of the closed polyps are flush with the surface of the coenenchyme while most appear as hemispheres. The polyps are close together, many with their margins touching. Small polyps are interspersed randomly among large ones. Incrustation consists of fine, uniform-sized grains of quartz and calcareous sand plus a few sponge spicules. It is moderately dense on the polyps, sparse in the middle of the coenenchyme band, and virtually absent along the edges of coenenchyme. The ridges of the scapulus number to 16 and are distinct in semi-open or open polyps. The tentacles number to 29.

Marginal sphincter is entodermal, occupying the entire length of the scapulus (about 120  $\mu$  long). It consists of 10 to 12 pleats of which the highest is about 20  $\mu$ . The mesogloea in this area is about 6  $\mu$  thick.

Mesenteries number to 29 in large specimens with 16 being macrocnemes and 13, micro-

nemes. The retractor muscles of macrocnemes are very weak and consist of a thin sheath of fibres without underlying mesogloea pleating. The filaments are of typical shape, are ciliated, contain numerous nematocysts as well as acidobasophilic gland cells. The parietal portions of the macrocnemes, with respect to the appearance of the mesogloea and muscle fibres, are very similar to microcnemes. Here the mesogloea is thick (25  $\mu$ ) and the muscle fibres are borne on low mesogloea pleats. The microcnemes extend out from the column mesogloea a distance equal to or slightly greater than the thickness of the column entoderm (about 125  $\mu$ ). All specimens sectioned lacked discernible gonads.

The actinopharynx is longitudinally corrugated. The siphonoglyph is shallow but distinct. The hyposulcus is slightly shorter and indistinct.

The mesogloea is acellular and in the column contains incrustation and lacunae with entodermal cells. A distinct encircling sinus was not apparent but some of the cords of entodermal cells could have been part of such a sinus.

The ectoderm of the column is disrupted by the incrustation. Intact portions (about 30  $\mu$  thick) contain numerous holotrichs and also acidobasophilic gland cells.

The entoderm contains zooxanthellae in abundance as well as acidobasophilic gland cells.

Cnidom: Spirocysts of tentacles, 15-20  $\times$  3  $\mu$ , numerous. Microbasic b-mastigophores of tentacles, 16-17  $\times$  2-2.5  $\mu$ , common; of actinopharynx, 18-21  $\times$  2.5-3  $\mu$ , common. Microbasic p-mastigophores of tentacles, 15  $\times$  3-4  $\mu$ , common; of filament, 15-19  $\times$  4  $\mu$ , common. Holotrichs of filaments, 22-25  $\times$  10-12  $\mu$ , few; of column ectoderm, 20-25  $\times$  10  $\mu$ , numerous.

REMARKS: Only *Parazoanthus capensis* Duerden (1907: 180, Pl. 11) from South Africa seems sufficiently close to *P. lividum* to warrant close comparison. Carlgren (1938: 95, Fig. 48, Pl. 1, fig. 4) has given further details of this species. First, *P. capensis* occurs on a different species of sponge, is pale yellow in-

stead of bluish-grey, and the colonies seem never to have as many polyps as the majority of colonies of *P. lividum*. The polyps of *P. capensi* are twice the size of those of *P. lividum* and have 14 scapular ridges instead of 16. The nematocysts of *P. capensis* are in general 2-4  $\mu$  longer than in *P. lividum*. In view of these discrepancies and the geographic separation of the two species, I consider the Port Phillip Bay specimens a new species.

Family EPIZOANTHIDAE

***Epizoanthus sabulosum* n.sp.**

Fig. 3, Pl. 9, fig. 3

Survey area 58 (293) 1 colony.

HOLOTYPE: Nat. Mus. Vict. G1551.

TYPE LOCALITY: Point Lonsdale, Vict.

DESCRIPTION: The single lot of zoanthids from area 58 were on a delicate, branching sponge about 8 cm high. The several colonies on

the sponge take the form of tight clusters of up to 6 polyps. Interspersed among these are single polyps. There is a total of about 100 polyps on the sponge. None of the polyps is expanded. The largest of the least contracted polyps is 4 m high and a greatest diameter of 3 mm. The coenenchyme is flattened and scarcely exceeds the circumference of the polyp's base. Both the polyps and coenenchyme are densely incrustated with quartz sand grains. The scapular ridges number to 15, are prominent and are heavily incrustated. Tentacles number to 30 in large polyps.

Marginal sphincter muscle in the mesogloea, alveolar, the 16 to 18 alveoli situated about mid mesogloea. The sphincter is moderately strong, about 200  $\mu$  long in section.

The mesenteries number to 30 of which 15 are macrocnemes and 15 are microcnemes. The macrocnemes bear filaments and are fertile. The specimens sectioned are female.

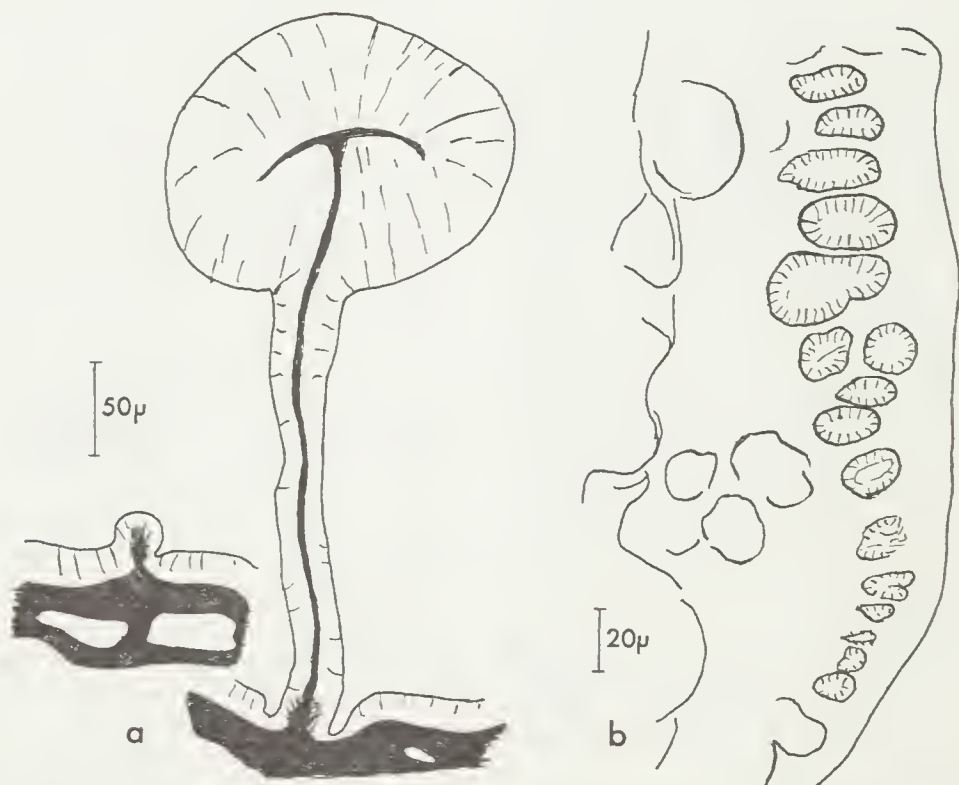


Fig. 3—*Epizoanthus sabulosum* n. sp., a, microcneme and macrocneme; b, marginal sphincter (only mesogloea shown).



The musculature of the macrocnemes is extremely weak and consists of only a thin layer of fibres against the mesogloea lamella. The mesogloea in the parietal part of the mesenteries is about three times as thick as the rest of the mesentery lamella and is pleated against the parietal muscle. The microcnemes are similar in shape and size to the thickened parietal portions of the macrocnemes. The filaments on the macrocnemes are of typical shape in sections but are exceptionally thick.

The actinopharynx is longitudinally corrugated. A distinct siphonoglyph and an indistinct hyposuleus are present.

The mesogloea of the column is thick and contains much incrustation as well as isolated nests of ectodermal cells and acido- and basophilic gland cells.

The ectoderm of the column is greatly interrupted because of the dense incrustation but where present is up to  $25\ \mu$  thick.

The entoderm contains numerous zooxanthellae, a feature unusual for members of this genus.

**Cnidom:** Spirocysts of tentacles  $15-22 \times 2.5-3\ \mu$ , numerous. Microbasic b-mastigophores of tentacles  $16-20 \times 2\ \mu$ , few; of actinopharynx,  $16 \times 2.5\ \mu$ , few. Microbasic p-mastigophores of filaments  $16 \times 4\ \mu$ , common. Holotrichs of column  $15-20 \times 8-10\ \mu$ , few.

**REMARKS:** Of the 17 species of *Epizoonthus* known from the Pacific and Indian Oceans, nine species are free-living, four form carcinoecia, two are symbionts of gastropods, and two are symbionts of *Hyalonema*. Many of these species can be eliminated from consideration solely on the basis of their geographical and/or bathymetrical range or their growth form. I have not exhaustively compared all other species but I cannot find in my collection or in the literature any species of *Epizoonthus* that is similar enough to the Port Phillip species to warrant a detailed comparison. The Port Phillip species seems to be unique from the standpoint of the type of sponge on which it is found, its occurrence in shallow water, its size, number of septa, and in its possession of zooxanthellae.

## References

- ANDRÉS, A., 1883. Le Actinie. *Mem., Atti della R. Accad. del Lincei, Rome*, Ser. 2, 14: 211-673.
- CARLSEN, O., 1900. Ostafrikanische Actinien gesammelt von Herrn Dr. F. Stuhlmann 1888 und 1889. *Jahrb. der Hamburg. Wissensch. Anstalten* 17 (2): 1-124.
- , 1924. Actiniaria from New Zealand and its Subantarctic Islands. Papers from Dr. Th. Mortensen's Pacific Expedition, 1914-1916, No. 21. *Vidensk. Medd. fra Dansk Naturh. Foren. København* 77: 179-261.
- , 1928. Actiniaria der Deutschen Tiefsee-Expedition. *Wiss. Ergeb. der Deutschen Tiefsee-Exped. auf dem Dampfer "Valdivia" 1898-1899*, 22 (4): 125-266.
- , 1938. Some South African Actiniaria and Zoantharia. *K. Svenska Vet. Akad. Handl.* 17 (3): 1-148.
- , 1945. Further contributions to the knowledge of the cnidom in the Anthozoa especially in the Actiniaria. *Lunds Univ. Arsskrift N. F.* (2), 41 (9): 1-24.
- , 1949. A survey of the Ptychodactylaria, Corallimorpharia and Actiniaria. *K. Svenska Vet. Akad. Handl.*, Ser. 4, 1 (1): 1-121.
- , 1950a. Actiniaria and Zoantharia from South Australia. *K. Fyslogr. Sällsk. i Lund Förhandl.* 20 (10): 1-15.
- , 1950b. Corallimorpharia, Actiniaria and Zoantharia from New South Wales and South Queensland. *Arkiv. f. Zool.* 1 (10): 131-146.
- , 1954. Actiniaria and Zoantharia from South and West Australia with comments upon some Actiniaria from New Zealand. *Arkiv f. Zool.*, ser. 2, 6 (34): 571-595.
- COUGHTRY, M., 1875. Description of a new species of Actinia. *Trans. N.Z. Inst.* 7: 280.
- DANA, J. D., 1846 (text), 1849 (atlas). *Zoophytes. U.S. Exploring Expedition (during the years 1838-1842) under the command of Charles Wilkes, U.S.N.* 7: 1-740. Philadelphia.
- , 1859. Synopsis of the report on zoophytes of the U.S. Exploring Expedition around the world under C. Wilkes, U.S.N. Commander, in the years 1838-1842. New Haven. vi. + 172 pp.
- DUERDEN, I. E., 1895. On the genus *Alcia* (*Cladactis*), with an anatomical description of *A. costae* Ponce. *Ann. Mag. nat. Hist.*, Ser. 6, 15 (87): 213-218.
- , 1907. A new species of *Parazoanthus*. *Rec. Albany Mus.* 2: 180.
- FARQUHAR, H., 1898. Preliminary account of some New Zealand Actiniaria. *J. Linn. Soc. (Zool.)* 26: 527-536.
- HADDON, A. C., and I. E. DUERDEN, 1896. On some Actiniaria from Australia and other districts. *Trans. Roy. Dublin Soc., N.S.*, 6 (pt. 6): 139-172.
- HUTTON, F. W., 1879. The sea anemones of New Zealand. *Trans. N.Z. Inst.* 11: 308-314.
- LAGER, E., 1911. Actiniaria. In Miemelsen, W., and R. Hartmeyer: *Die Fauna Südwest-Australiens, Ergebnisse der Hamburger südwest-australischen Forschungsreise 1905*, 3 (pt. 8): 215-249. Jena.
- MILNE EDWARDS, H., 1857. *Histoire naturelle des Corallaires*, vol. 1. Librairie Encyclopédique de Rorer, Paris, viii + 326 pp.

- MILNE EDWARDS, H., and J. HAIME, 1851. *Monographie des Polypiers Fossiles des Terrains Palaeozoïques précédée d'un Tableau Général de la Classification des Polpes*, vol. 5. Paris.
- PARRY, G., 1951. The Actiniaria of New Zealand, pt. 1. *Rec. Cant. Mus.* 6 (1): 83-119.
- , 1952. The Actiniaria of New Zealand, pt. 2. *Rec. Cant. Mus.* 6 (2): 121-141.
- QUOY, J. R. C., and J. P. GAIMARD, 1833. *Zoologie. Voyage de découvertes de l'Astrolabe pendant les années 1826-1829 sous le commandement de M. J. Dumont d'Urville*. Paris. Vol. 4, 390 pp., with folio atlas of 26 pl, 414 figs.
- STEPHENSON, T. A., 1922. On the classification of Actiniaria, 3. *Quart. J. Micr. Sci.* 66: 247-319.
- STUCKEY, F. G. A., 1909a. Notes on a New Zealand actinian, *Bunodes aureoradiata*. *Trans. N.Z. Inst.* 1908 (new issue) 41: 367-369.
- , 1909b. On two anemones found in the neighbourhood of Wellington—*Leiothealia thompsoni* and *Sagartia alboncincta*. *Trans. N.Z. Inst.* 1908 (new issue) 41: 370-374.
- , 1909c. A review of the New Zealand Actiniaria known to science, together with a description of twelve new species. *Trans N.Z. Inst.* 1908 (new issue) 41: 374-398.
- STUCKEY, F. G. A., and C. L. WALTON, 1910. Notes on a collection of sea anemones. *Trans. N.Z. Inst.* 1909 (new issue) 42: 541-542.

