

**More Antarctic and Subantarctic Sea Anemones  
(Coelenterata: Corallimorpharia and Actiniaria)**

**Daphne Gail Fautin**

**Paper 1**

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MORE ANTARCTIC AND SUBANTARCTIC SEA ANEMONES  
(COELENTERATA: CORALLIMORPHARIA AND ACTINIARIA)

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**Abstract.** Two species of corallimorpharians and six of actinarians from Antarctic and Subantarctic seas are redescribed; taxonomic, nomenclatural, and distributional issues are discussed for each. The taxa are Corallimorphus profundus and C. rigidus (family Corallimorphidae), Isosicyonis alba (family Actiniidae), Actinostola crassicornis, Antholoba achates, Sicyonis erythrocephala, and Stomphia selaginella (family Actinostolidae) and Actinoscyphia plebeia (family Actinoscyphiidae). All were previously known from southern seas; the occurrence of I. alba south of the Antarctic Convergence is confirmed.

Subantarctic sea anemones stands at 85.

The 622 individuals studied for this report came from 113 stations. These eight species were selected for study because of their great abundance (e.g., Stomphia selaginella), distinctiveness (e.g., Actinoscyphia plebeia), or interesting biology (e.g., Isosicyonis alba). Work continues on the remaining USARP actinians.

Each species is redescribed anatomically (those better known in less detail), its cnidae are diagnosed, taxonomic/nomenclatural issues are discussed, its geographical and bathymetric ranges are given, and the material upon which my study and previous ones were based is listed. USARP material is ordered by ship, cruise, and station number; coordinates and depth of each station are provided. In the section on the distribution and size of cnidae for each species, n refers to the number of capsules measured and N is the proportion of animals examined in which the cnidae were found. Thus the numerator is the number of animals having that type of cnida and the denominator is the total number of specimens examined. Not all tissues of each specimen were studied. A proportion for N such as 2/5 may mean that only 40% of the anemones contain that type of cnida in a particular tissue, or it may imply that the cnida is rare so that there is only a 40% chance of finding it in a smear. Either way, N provides information on how much weight should be attached to each type of cnida in making taxonomic decisions. Measurements of cnidae in parentheses were of single capsules falling outside the normal range.

Once identified, the specimens were deposited in either the U.S. National Museum of Natural History (USNM) or the Department of Invertebrate Zoology, California Academy of Sciences (CAS); the number of specimens in each lot is noted following its catalog number. Discussions are illustrated with distributional charts (showing localities of USARP material only), photographs of whole animals, and figures of histological sections and cnidae from them. All data are based on preserved animals; there are no notes on color, posture, dimensions, etc. in life. Few

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Introduction

The number of species of sea anemones sensu lato (including members of orders Actiniaria, Corallimorpharia, and Ptychodactiaria in Antarctic and Subantarctic seas was recently calculated to be 94 [Dunn, 1983]. In this report on actinians and corallimorpharians, collected under the auspices of the U.S. Antarctic Research Program (USARP) and made available through the Smithsonian Oceanographic Sorting Center, I have further reduced that number. I redescribe two species of corallimorpharians, each of which had been known by two names, and six species of actinians that had gone under a total of 18 different names, many of which had not previously been considered synonymous. Currently, my list of nominal Antarctic and

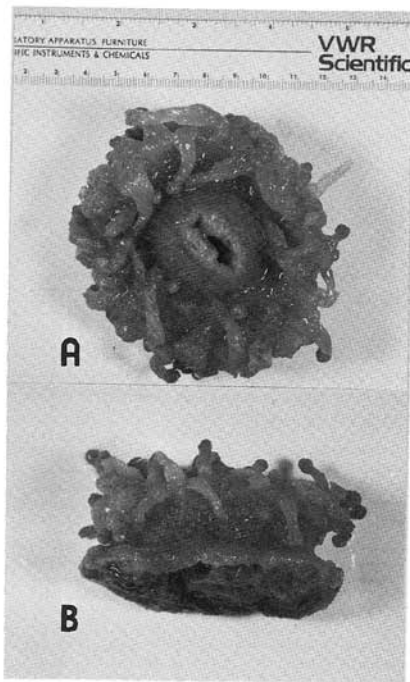


Fig. 1. Corallimorphus profundus (USNM 60645). (A) Oral disc. (B) Side.

ecological inferences can be drawn from such a collection.

Additional specimens of four species dealt with in my earlier paper on south polar sea anemones [Dunn, 1983] were found during research for this paper. They are listed here for the sake of completeness.

Order PTYCHODACTIARIA

Family PTYCHODACTIIDAE

Dactylanthus antarcticus (Clubb, 1908)

Eltanin Cruise 27  
Sta. 1953, 66°38'–36'S, 162°56'–59'E, 201–234 m, USNM 61006 (x1)

Hero Cruise 824  
Sta. 4–1, 65°13.60'–13.67'S, 64°14.72'–15.07'W, 49–58 m, USNM 60981 (x1)

Order ACTINIARIA

Family ACTINEERINIDAE

Actinernus elongatus (Hertwig, 1882)

Eltanin Cruise 12  
Sta. 991, 60°57.0'S, 56°52'W, 3018 m, USNM 61001 (x1)

Family ACTINIIDAE

Epiactis georgiana Carlgren, 1927

Eltanin Cruise 6  
Sta. 432, 62°52'–55'S, 59°27'–15'W, 884–935 m, USNM 60993 (x1)

Family CAPNEIDAE

Capnea georgiana (Cargren, 1927)

Eltanin Cruise 6  
Sta. 428, 62°41'–39'S, 57°51'–46'W, 662–1120 m, USNM 60992 (x1)

Eltanin Cruise 27  
Sta. 1905 76°28'–29'S, 167°52'–168°00'E, 741–747 m, USNM 60995 (x2)  
Sta. 1910 77°14'S, 169°08'–16'E, 930 m, USNM 60982 (x2)

Hero Cruise 824  
Sta. 24–1, 64°15.20'–14.50'S, 61°27.50'–25.90'W, 540–605 m, USNM 60994 (x8)

Order CORALLIMORPHARIA

Family CORALLIMORPHIDAE

Corallimorphus profundus Moseley, 1877

Corallimorphus profundus: Moseley, 1877, p. 300.--Hertwig 1882a, p. 24, 116, 118; 1882b, p. 28, 130, 132.--Andres, 1883, p. 278.--Hertwig, 1888, p. 2.--Cargren, 1898, p. 44.--Stephenson, 1920a, p. 183; 1922, p. 302.--Cargren, 1928, p. 128.--Cargren and Stephenson, 1929, p. 6.--Cargren, 1949, p. 13.

Corallimorphus antarcticus: Cargren and Stephenson, 1929, p. 7.--Cargren, 1949, p. 13.--Grebely, 1975, p. 3.

Description

Body form and size. Column low, cylindrical, truncate conical, or hourglass shaped (Figure 1). Diameter 20–115 mm in material examined, with length typically a half to a third oral disc diameter; oral disc as broad as or broader than base. Condition of USARP specimens poor, with reddish-brown ectoderm only in patches on tentacles and in grooves of

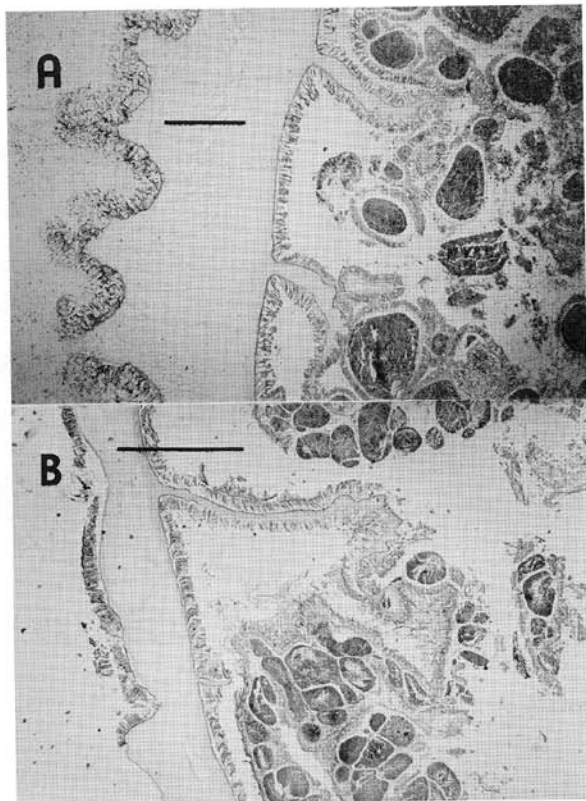


Fig. 2. Cross section through body wall and mesenteries of *Corallimorphus profundus*. Note longitudinal column furrows, fibrous mesoglea, weak retractor muscles. Scale = 1 mm. (A) Female (CAS 029181). (B) Male (USNM 60685).

oral disc and column; color mostly hyaline pink to orange due to gelatinous mesoglea through which mesenterial insertions can be seen. Longitudinal corrugations of column (more than 100 in some specimens) generally do not correspond to mesenterial insertions (Figure 2).

**Base.** Torn from many specimens; generally flat where present, with adherent large black pebbles in some individuals. Edge may be wavy but generally not (Figure 1).

**Tentacles and oral disc.** Flat or domed oral disc (Figure 1) cannot be introverted. Central mouth a slit, about a quarter oral

disc diameter in length; may be raised on cone; lips wanting (Figure 1). Tentacles taper to capitate end, most marginal; discal ones arise between margin and mouth, nearer mouth in some animals, nearer margin in others, roughly in a circle (i.e., not scattered). Marginal tentacles alternately long (those communicating with endocoels) and somewhat shorter (exocoelic ones); endocoelic tentacles up to a third as long as oral disc width (i.e., about equal to column length), in largest animal 40 mm long by 6-8 mm across base, with acrosphere 5 mm in diameter. Discal tentacles half or less as long as

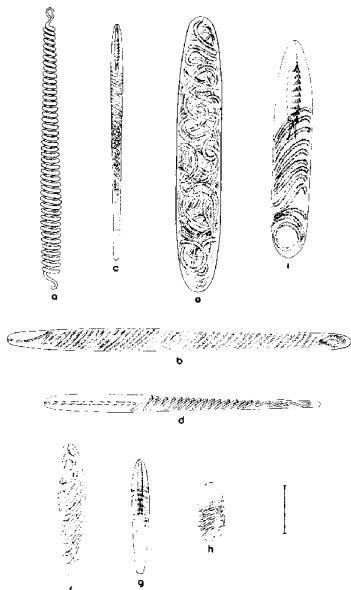


Fig. 3. Cnidae of *Corallimorphus profundus*; see text for explanation. Scale = 10  $\mu$ m for a, d, e, h; 30  $\mu$ m, for b, c, f, g, i.

marginal but equally wide; communicate with endocoels of first two or three orders; one specimen (CAS 029181) with only four discal tentacles, all on one side. Tentacles totaled 66-84; ratio of marginal to discal ones about 3.1:1 to 4.7:1.

**Mesenteries and internal anatomy.** Interior of most animals macerated. Mesenteries thin with poorly developed retractor muscles (Figure 2); number equal to that of marginal tentacles. Those of highest order sterile, all others may be fertile; sexes separate; bright yellow ova 1 mm preserved diameter. Pattern of complete mesenteries indeterminate, directives not distinguishable. Actinopharynx shallowly plicate; siphonoglyphs not seen.

Column mesoglea fibrous (Figure 2); generally thicker distally than proximally. Sphincter and basilar muscles lacking.

#### Distribution and size of cnidae (Fig. 3)

**Tentacle acrosphere**

spirocysts(a), (28.7)36.9-61.5(80.4)  $\times$  3.3-4.9  $\mu$ m, n = 33, N = 4/4

holotrachs(b), (192.7)205.0-243.5(266.5)  $\times$  (10.7)14.4-18.4(20.3)  $\mu$ m, n = 30, N = 3/4  
hoplotelic microbasic p-mastigophores(c), 126.3-223.5(241.9)  $\times$  (7.4)8.2-13.1(15.4)  $\mu$ m, n = 35, N = 3/4

microbasic b-mastigophores(d), 45.1-72.2  $\times$  3.1-4.5  $\mu$ m, n = 24, N = 4/4

**Tentacle shaft**

spirocysts(a), 32.8-48.4  $\times$  3.7-5.1  $\mu$ m, n = 22, N = 2/2

**Actinopharynx**

holotrachs(e), 54.1-79.5  $\times$  8.2-13.1  $\mu$ m, n = 28, N = 3/3

**Mesenterial filaments**

holotrachs(f), 83.6-113.2  $\times$  15.6-21.3  $\mu$ m, n = 30, N = 3/4

hoplotelic microbasic p-mastigophores(g), (52.5)55.8-73.8(81.2)  $\times$  8.0-10.5  $\mu$ m, n = 36, N = 4/4

microbasic b-mastigophores(h), (12.3)15.6-19.7  $\times$  4.1-5.7(6.8)  $\mu$ m, n = 19, N = 4/4

**Column**

hoplotelic microbasic p-mastigophores (i), 104.6-123.0  $\times$  18.5-22.6  $\mu$ m, n = 4, N = 1/1

#### Discussion

*Corallimorphus profundus* and *C. rigidus* are discussed together following the description of the latter species.

#### Material examined (Fig. 4)

##### Eltanin Cruise 7

Sta. 514, 63°21'-28'S, 44°51'-57'W, 3587-3660 m, USNM 60684 (x1)

##### Eltanin Cruise 9

Sta. 671, 54°41'-38'S, 38°38'-31'W, 320-220 m, USNM 61005 (x2)

##### Eltanin Cruise 16

Sta. 1412, 51°07'-09'S, 162°03'-01'E, 1647-1665 m, CAS 029325 (x15)

Sta. 1422, 56°19'-21'S, 158°29'E, 833-842 m, USNM 61004 (x1)

##### Eltanin Cruise 32

Sta. 2045, 76°00'-01'S, 176°48'-44'W, 566-569 m, USNM 60645 (x1)

Sta. 2079, 75°30'-32'S, 173°17'-06'W, 1320-1335 m, CAS 029400 (x1)

Sta. 2116, 73°16'-13'S, 177°05'-18'W, 1210 m, CAS 029181 (x1)

Sta. 2119, 73°05'S, 180°00'W, 567 m, CAS 021152 (x1)

##### Islas Orcadas Cruise 575

Sta. 11, 53°38'S, 38°01.8'W, 132-143 m, USNM 60685 (x4)

#### Previous records

Moseley [1877], South Pacific, 39°04'S, 105°05'W, 2025 fm [3702 m] (x1); off Chile,

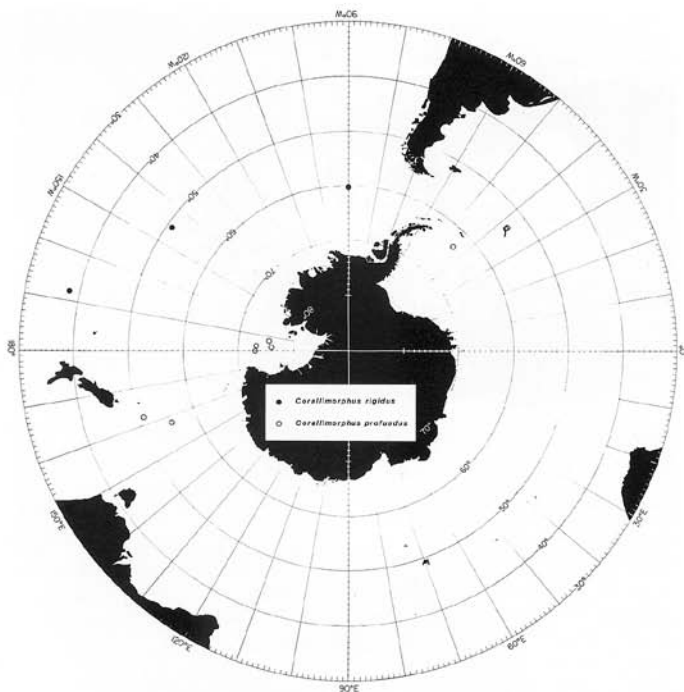


Fig. 4. Distributions of Corallimorphus profundus and Corallimorphus rigidus.

33°42'S, 78°18'W, 1375 fm [2514 m] (x1)  
 Carlgren and Stephenson [1929], off the Queen  
 Mary Coast, 65°06'S, 96°13'E, 65-325 fm  
 [119-594 m] (x1)  
 Grebelny [1975], Haswell archipelago [66°S,  
 93°E], 42-595 m (x1)

Corallimorphus rigidus Moseley, 1877

Corallimorphus rigidus: Moseley, 1877, p.  
 301.--Hertwig, 1882a, p. 20, 116; 1882b, p.  
 23, 130.--Andres, 1883, p. 277.--Hertwig,  
 1888, p. 2, 9.--Carlgren, 1898, p. 44.--  
 Stephenson, 1920a, p. 183, non p. 179; 1922,  
 p. 302.--Carlgren, 1928, p. 128.--Carlgren  
 and Stephenson, 1929, p. 5, 6, 8.--Carlgren,  
 1943, p. 4; 1949, p. 13.

Corallimorphus obtectus: Hertwig, 1888, p.  
 9.--Stephenson 1920a, p. 183; 1922, p. 302.  
 --Carlgren and Stephenson, 1929, p. 6.--  
 Carlgren, 1949, p. 13.

Corynactis sp.: Hertwig, 1888, p. 10.

Isocorallion Hertwigi: Carlgren, 1900, p. 19.

Isocorallion hertwigi: Stephenson, 1922, p.  
 302.

Chalmersia sp.: Delage and Héroulard, 1901,  
 p. 536.

Description

Body form and size. Column low; cylindrical to truncate conical (Figure 5), with base half to two thirds oral disc diameter. Oral disc to 95 mm across in four USARP specimens; height about one third diameter. Two specimens (USNM 60698) only stiff gelatinous ghosts, lacking ectoderm and endoderm; colorless to light pink.

Base. Flat; edges may be turned under (Figure 5B).

Tentacles and oral disc. Disc flat with slightly elevated central mouth (Figure 5A) one-fifth to one-quarter as long as oral disc is wide; cannot be introverted. Stiff ten-

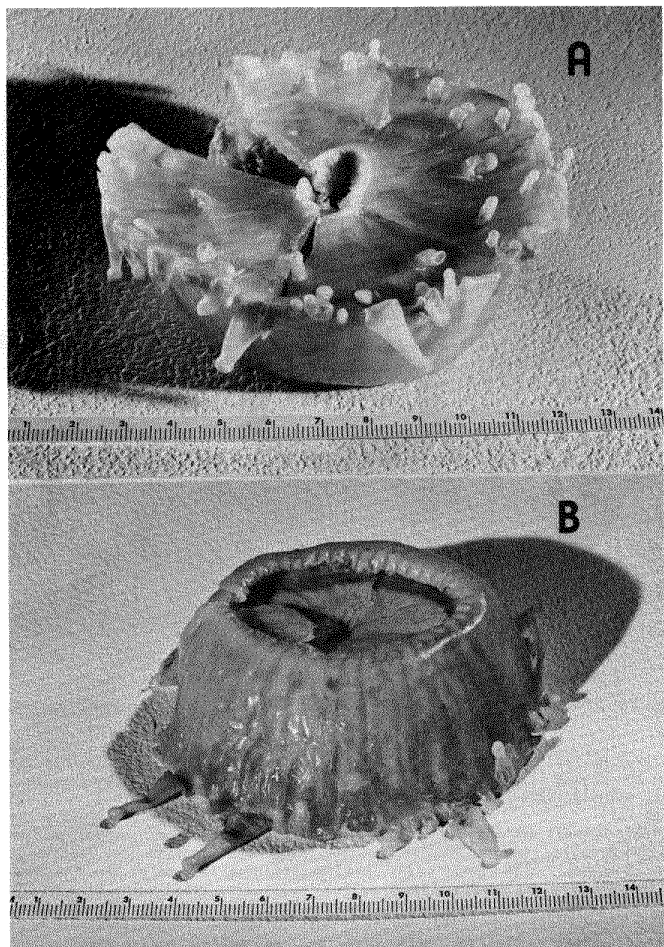


Fig. 5. *Corallimorphus rigidus* (CAS 029326). (A) Oral disc. (B) Side and pedal disc. Note mesenterial insertions showing through translucent mesoglea.

tacles taper to capitate end (Figure 5); twice as many marginal as discal ones. The 24 exocoelic marginal tentacles shortest; 12 communicating with primary and secondary endocoels longest (to about 14 mm), 12 tertiary ones of intermediate length, all to 5 mm across base;

acrospheres to 3.5 mm diameter. Discal tentacles to 9 mm long, as broad as marginal; in three cycles (Figure 5A), six communicating with primary endocoels nearest mouth (about halfway between it and margin), six secondary nearer margin, 12 tertiary nearest margin.



Fig. 6. Cross section through body wall and mesentery of *Corallimorphus rigidus* (CAS 029326). Note male gonad. Scale = 1 mm.

Mesenteries and internal anatomy. Internal structures absent or obscure except in one specimen (CAS 029326). Mesenteries thin, apparently all fertile (Figure 6); 48 (equal to number of marginal tentacles) entire length of animal. Siphonoglyphs and directive mesenteries not distinguishable; pattern of complete mesenteries could not be determined. Column mesoglea thick.

Sphincter and basilar muscles lacking.

#### Distribution and size of cnidae

Due to the absence of ectoderm and endoderm in specimens USNM 60698, cnidae were examined only in the others, which were also in poor condition, lacking column and tentacle ectoderm. They resemble their counterparts in *Corallimorphus profundus* (Figure 3).

#### Actinopharynx

holotrichs, 67.2-77.0 x 11.5-13.1  $\mu\text{m}$ , n = 11, N = 1/1

#### Mesenterial filaments

holotrichs, 50.0-76.3 x 9.1-16.2  $\mu\text{m}$ , n = 25, N = 2/2

microbasal b-mastigophores, 18.6-31.2 x 4.5-6.8  $\mu\text{m}$ , n = 30, N = 2/2

(This listing not necessarily complete.)

#### Discussion

The genus *Corallimorphus* has received considerable study. One fact uniformly agreed upon is the generally poor condition of the specimens, which has, no doubt, contributed to the taxonomic confusion. In establishing the genus, Moseley [1877] described two species, *C. profundus*, listed by Carlgren [1949] as the type, presumably because it enjoys page priority, and *C. rigidus*. Carlgren recognized, in addition, *C. antarcticus* Carlgren and Stephenson, 1929, *C. atlanticus* Carlgren, 1934, *C. ingens* Gravier, 1918, and *C. obtectus* Hertwig, 1888.

Stephenson [1920a] attempted to reconcile some Irish specimens with the species of Moseley and Hertwig through analysis of the absolute number of tentacles, paying particular attention to the discal ones, but he found it so difficult to delineate species that he [Stephenson, 1920a, 1922] thought that all may be identical. Carlgren [1928] proposed that there are two groups of *Corallimorphus*, differing not in absolute number of tentacles but in ratio of marginal to discal ones. This was not a new idea, Hertwig [1882a, b] having suggested that although the definitive number of marginal tentacles is 48 in both, *C. profundus* and *C. rigidus* can be distinguished by the fact that the latter has twice as many discal tentacles as the former. However, Carlgren [1928] confused the issue by assigning *C. rigidus* and *C. profundus* to the same group. Carlgren and Stephenson [1929] pursued this idea, dividing the four species known at the time into the *rigidus* type with a marginal to discal tentacle ratio of about 2:1 and the *profundus* type with a ratio of around 4:1.

Hertwig [1888] repudiated his earlier [Hertwig, 1882a, b] assignment to *Corallimorphus rigidus* of one specimen from Challenger station 157 (53°55'S, 108°35'E, 1950 fm), erecting a new species, *C. obtectus*, based on shape and "buckle-like thickenings which cover the insertions of the mesenteries" [Hertwig, 1888, p. 9]. Contraction can easily produce such effects, and the fact that they are associated in a single specimen gives weight to this as an explanation. The specimen in question came from an area where *C. rigidus* is known. Carlgren and Stephenson [1929] also synonymized them.

Hertwig [1888] described in detail another animal he first thought belonged to *Corallimorphus* but placed in *Corynactis* because more than one discal tentacle communicated with a single endocoel. From his exhaustive treatment, it is clear that the individual in question was abnormal. The marginal to discal tentacle ratio of 2.4:1 is no doubt so high because of the supernumerary discal tentacles. Thus it clearly belongs in the *rigidus* group.



Carlgren [1900] initially erected the new genus Isocorallion for it, calling it I. Hertwigi, which Stephenson [1922] recognized with reservation. But by 1943, when Carlgren had had the opportunity of examining additional material, he concluded that it belongs in Corallimorphus, and is likely identical with C. rigidus. Shortly after Carlgren [1900] had coined a name for the supposed new genus, Delage and Hérouard [1901] did likewise, calling it Chalmerisia.

Another reason for taxonomic confusion is that developmental anomalies are common in these animals. One of the two specimens upon which Moseley [1877] based the taxon Corallimorphus profundus had 52 marginal tentacles, and some show an excess or lack of discal tentacles [Carlgen and Stephenson, 1929; CAS 029181]. Carlgen and Stephenson erected the species C. antarcticus mostly because its tentacles were in a ratio of 3.3:1, a figure that is approached by several USARP specimens of C. profundus.

Grebely [1975] referred a single specimen with tentacles in a ratio of 4.8:1 to Corallimorphus antarcticus. Taken in the immediate vicinity of where Carlgen and Stephenson's [1929] was, there is every reason to consider them as conspecific, although their cnidae are not in perfect accord. I do not consider taxonomically significant the facts that actinopharynx holotrichs reported by Carlgen and Stephenson [1929] are somewhat smaller than those I measured in C. profundus, and that Grebely [1975] found larger tentacle microbasic b-mastigophores as well as a large pharyngeal holotrich. This may be due to small sample size but is probably attributable to variability in size of Corallimorphus cnidae, especially larger capsules [Carlgen, 1943, p. 4].

Stephenson [1920a] identified two corallimorpharians from off Ireland (51°19'N, 12°20'W, 673-720 fm (1231-1317 m)) as Corallimorphus rigidus, admitting that although clearly allied to C. rigidus, they might merit a different name. Carlgen [1928] proposed calling them C. stephensoni if, in fact, they were not identical with Gravier's [1918] C. ingens, a poorly known taxon described from nine specimens taken in the North Atlantic. Despite this, in 1934, Carlgen erected a new species of the rigidus group, C. atlanticus, based on a single specimen from 45°26'N, 9°20'W, 4700 m. Conceding the difficulty of separating species of Corallimorphus, he justified his action partly on the assertion that "C. rigidus has not been caught in the Atlantic" [Carlgen, 1934, p. 7]. Probably C. atlanticus and C. stephensoni are conspecific; clearly they closely resemble C. rigidus and may be identical with it, but until North Atlantic specimens are more thoroughly studied, it is prudent to retain a separate name for them. In his 1949 catalog, Carlgen question-

ably synonymized C. stephensoni with C. ingens but recognized C. atlanticus as distinct.

Hertwig [1888] noted that longitudinal furrows of the column correspond to position of the mesenterial insertions, whereas Stephenson [1920a, p. 184] and I found that feature to be highly variable. The pedal disc of one of Moseley's [1877] specimens of Corallimorphus profundus had its margin turned under; most USARP specimens of C. profundus had slightly flared bases, but one of C. rigidus (Figure 5B) had a pedal disc such as Moseley described (and possibly the black pebbles to which some USARP specimens were attached were manganese nodules, as Moseley reported). Similarly, it is likely that differences in discal tentacle distribution and marginal tentacle lengths of the two Corallimorphus species in the USARP collection do not apply to all specimens of each species. These taxa are very similar in all respects; only the relative number of discal tentacles, a feature sometimes obscured by developmental anomalies, and mesenterial filament cnidae (with smaller holotrichs in C. rigidus and smaller microbasic b-mastigophores in C. profundus) clearly distinguish them.

The 27 specimens of Corallimorphus profundus in the USARP collection were taken between 51° and 76°S at widely scattered localities around much of Antarctica. Their depth range was 132-3660 m. Only four specimens of the species had been recorded before, two west of South America and two in the Davis Sea. Thus the specimens reported here document the southernmost extent of the species, which has a more restricted, southerly distribution than C. rigidus. These Antarctic specimens of the two species are in reverse numerical proportion to previous records.

The four USARP specimens of Corallimorphus rigidus from the south central South Pacific, between 38° and 60°S and 90°-168°W, at depths of 531-659 and 4078-4429 m, document the southernmost occurrence of the species. It cannot, however, be said to be part of the Antarctic fauna because its range extends only to the margin of the Antarctic Convergence. Previously known specimens are almost cosmopolitan in distribution, the austral ones generally deeper than the equatorial, unlike C. profundus. Because of this wide distribution, it seems likely that at least C. atlanticus is synonymous with C. rigidus as well. The provenance of three specimens of Corallimorphus (Eltanin 7-489; USNM 61003) in such poor condition as to be unidentifiable is compatible with the range of C. rigidus (60°03'-01'S, 45°25'-18'W, 5274-5259 m).

#### Material examined (Fig. 4)

Eltanin Cruise 13  
Sta. 1127, 60°22'-21'S, 90°16'-89°52'W, 4410-4429 m, USNM 60698 (x2)

Eltanin Cruise 20

Sta. 107, 51°06'05"S, 145°03'W, 4078-4146 m, CAS 029326 (xl)

Eltanin Cruise 24

Sta. 1718, 38°27'30"S, 168°07'-04'W, 531-659 m, CAS 034760 (xl)

Previous records

Moseley [1877], Moluccas Islands, 6°[74°]21'S, 129°07'E, 1425 fm [2605 m] (xl)  
 Hertwig [1882a, b], Argentine Basin, 46°46'S, 45°31'E, 1375 fm [2514 m] (x3); South Pacific, 53°55'S, 108°35'E, 1950 fm [3565 m] (xl)  
 Hertwig [1888], off Chile, 33°31'S, 74°43'W, 2160 fm [3950 m] (xl); north of New Guinea, 1°54'N, 146°39'40"E, 150 fm [274 m] (xl)  
 Carlgren [1928], off Somaliland, 4°41.9'N, 48°38.9'E, 823 m (xl); 6°24.1'N, 49°31.6'E, 628 m (x2), 6°44.2'N, 49°43.8'E, 741 m (x2)  
 Carlgren and Stephenson [1929], Great Australian Bight, 35°55.5'S, 134°18'E, 1800 fm [3291 m] (xl)  
 Carlgren [1943], Kei Islands [6°S, 133°E], 245 m (x2); Kagoshima [31°N, 130°40'E], no depth (xl)

Order ACTINIARIAFamily ACTINIIDAEIsosicyonis alba (Studer, 1879)

Paractis alba: Studer, 1879, p. 545.--Ridley, 1882, p. 101.--Carlgren, 1898, p. 43.

Paractis Studerii: Andres, 1883, p. 271.

Isosicyonis alba: Carlgren, 1927, p. 52.--Carlgren, 1949, p. 42, 57.--Riemann-Zürneck, 1980, p. 19, 24, 32.

Description

Body form and size. Apparently always attached to fusiform shell of living gastropod (Figure 7A), covering all but parietal callus. Thus body bilaterally symmetrical, with column one fifth to two thirds as long toward front of snail from oral disc as toward rear (Figure 7B). Base to 60 mm long (along curve) and 35 mm wide; height to 10 mm. Color of preserved specimens tan or yellowish. Some with longitudinal furrows along mesenterial insertions (Figure 7B); ectoderm pebbled in appearance, being thicker in some spots (?nematocyst batteries) than others. Fosse deep.

Base. Concave, even on detached animals; mostly concentric with low column so that body is two thin sheets of tissue covering snail shell; may extend slightly beyond lip of shell. Extremely thin; mesenterial insertions visible through it.

Tentacles and oral disc. All specimens somewhat contracted, so flat oral disc with

shallow radial furrows mostly hidden but circle of tentacles visible within margin (Figure 7) and actinopharynx usually protruded at center. Tentacles cylindrical and blunt to conical and pointed, to 7 mm long and 1 mm across; inner larger than outer; typically number somewhat more than 48. Actinopharynx, oral disc, and tentacles color of column or somewhat lighter.

Mesenteries and internal anatomy. Number of mesenteries difficult to ascertain; seems about five regularly arrayed cycles in most specimens. First three cycles complete, fourth incomplete, all sterile and with filaments; highest cycle incomplete, fertile, without filaments (Figure 8). Sexes separate; sperm packets arrayed along length of gametogenic portion of mesentery (Figure 8, upper), but eggs (in all stages of development and up to 125- $\mu$ m preserved diameter) packed into short, broad gametogenic portion (Figure 8, lower). Retractor muscles weak, narrow, diffuse (Figure 8), parietobasilar muscles poorly developed.

Two symmetrical pairs of directive mesenteries attached to shallow but prolonged siphonoglyphs; directive plane generally more or less perpendicular to long axis of body. Actinopharynx with regular deep longitudinal furrows, crossed proximally by radial furrows.

Long, diffuse sphincter muscle, endomesogalear or mesoendodermal, on marginal side of deep fosse (Figure 9); unable to effect complete covering of tentacles. Longitudinal tentacle and radial oral disc muscles ectodermal (Figure 9, right), circular tentacle and oral disc muscles endodermal.

Distribution and size of cnidae (Fig. 10)

Tentacles  
 spirocysts(a), 21.1-50.8 x 2.5-5.0  $\mu$ m, n = 59, N = 7/7  
 basitrichs(b), 21.1-37.2 x 2.5-3.7  $\mu$ m, n = 14, N = 5/7  
 basitrichs(c), (45.9)49.6-75.6 x 3.1-5.2  $\mu$ m, n = 63, N = 7/7  
Actinopharynx  
 basitrichs(d), 47.1-67.0(74.4) x (3.7)4.3-5.5(6.0)  $\mu$ m, n = 47, N = 7/7  
Mesenterial filaments  
 basitrichs(b), 21.1-34.7 x 2.7-3.9  $\mu$ m, n = 37, N = 6/7  
 basitrichs(c), 40.9-59.2 x 3.7-5.2  $\mu$ m, n = 19, N = 4/7  
 microbasal b-mastigophores(e) 31.0-38.4 x 3.5-5.6 (6.0)  $\mu$ m, n = 12, N = 5/7  
 microbasal b-mastigophores(f), 52.1-65.7 x 5.2-7.4 (8.7)  $\mu$ m, n = 27, N = 6/7

Column

spirocysts(g), 33.5-67.0(78.1) x 2.5-5.0  $\mu$ m, n = 26, N = 6/7  
 basitrichs(b), 21.1-34.7 x 2.3-3.5  $\mu$ m, n = 25, N = 6/7  
 basitrichs(h), 93.0-116.6(130.2) x (4.3)4.8-6.2  $\mu$ m, n = 33, N = 7/7



Fig. 7. *Isosicyonis alba*. (A) CAS 030524, on shell. (B) CAS 030523, off shell.

#### Discussion

Studer's [1879] (not 1878 as cited by Carlgren [1949] and Riemann-Zürneck [1980]) brief original description and drawing of *Paractis alba* are diagnostic. Using Studer's single specimen, Carlgren [1927] added data on anat-

omy and cnidae. Carlgren [1949] apparently subsequently examined other, unspecified individuals from the South Shetland Islands and Palmer Archipelago [Riemann-Zürneck, 1980]. Anatomical knowledge of this species is thorough and accurate [Carlgren, 1927, 1949; Riemann-Zürneck, 1980].

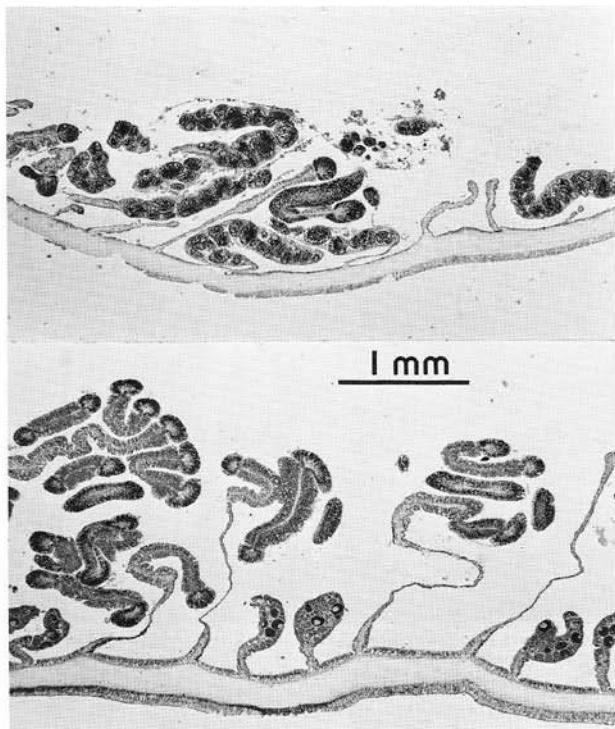


Fig. 8. Cross section through body wall and mesenteries of *Isosicyonis alba*. (top) Male (CAS 030526). (bottom) Female (CAS 030524).

The snail to which these anemones are apparently always attached in life was identified by Barry Roth (California Academy of Sciences) as *Provocator* sp. V. Cosel identified those carrying Riemann-Zürneck's [1980] southwestern Atlantic specimens of *Isosicyonis alba* as *P. corderoi*, but Roth found that in some respects the USARP specimens did not fit that species. Since the anemone nearly covers the snail shell to which it is attached, only one actinian occurs per gastropod. Whether this relationship is obligate for either partner and whether they interact are issues that should be investigated [see also Riemann-Zürneck, 1980].

One of the most striking anatomical features of *Isosicyonis alba* is its unusually large column basitrichs, although those re-

corded by Carlgren [1927] and Riemann-Zürneck [1980] were not as long as those I found. The mesenterial filament and actinopharynx basitrichs of USARP specimens were also somewhat larger than had previously been reported. Riemann-Zürneck [1980] did not find small tentacle nor column basitrichs (Figure 10b), nor large mesenterial filament basitrichs (Figure 10c); I saw no spirocysts in the actinopharynx, as she did, and cnidae she referred to as *p*-mastigophores, I perceived as *b*-mastigophores (Figure 10e), but it is obvious that we were dealing with the same type of nematocyst.

Most minor points of disagreement seem to hinge upon the range of variability in *Isosicyonis alba*. Riemann-Zürneck [1980] found longitudinal column furrows to be shallower

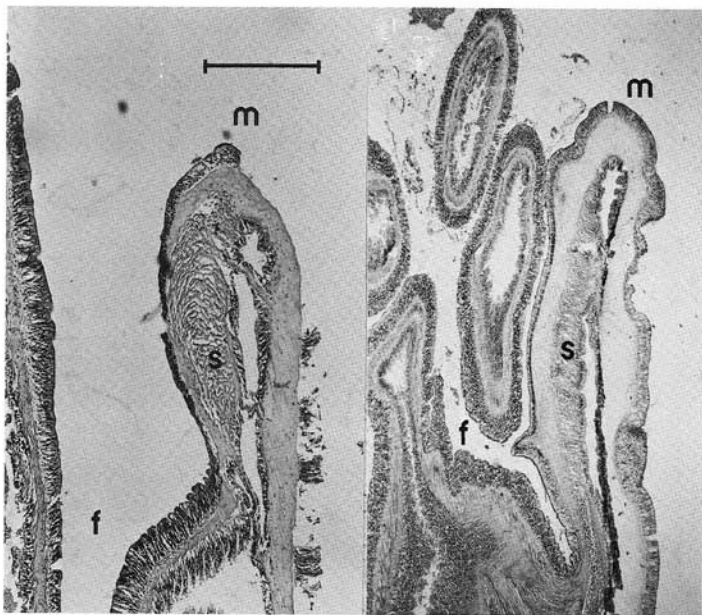


Fig. 9. Longitudinal section through margin (m) of *Isosicyonis alba* showing spincter muscle (s) and fosse (f). Left: CAS 030526, scale = 400  $\mu$ m. Right: CAS 030524, scale = 1 mm.

than figured by Studer [1879]; in my experience they can be quite pronounced (Figure 7B). Carlgren [1949, p. 56] described the sphincter of young animals as "aggregated endodermal" and those of adults as "chiefly mesogleal," whereas Riemann-Zürneck [1980] found just the reverse. USARP specimens tend to support the latter viewpoint, although none had a sphincter that was as endodermal in nature and projected as far into the gastrovascular space as that figured by Riemann-Zürneck [1980, Plate II, Figure 1]. The precise nature of this muscle, which is an important systematic feature, must be resolved in order to assign *Isosicyonis* to the proper higher taxon [Riemann-Zürneck, 1980].

The USARP specimens confirm that *Isosicyonis alba* ranges into the Antarctic. Riemann-Zürneck [1980] expressed some doubt about this, since the provenance of Carlgren's [1949] specimens was only implied. Indeed, the majority of those that I examined were taken among the islands at the end of the

Antarctic Peninsula, as Carlgren's seem to have been. However, two were found in the Ross Sea and vicinity, where *I. alba* was previously unknown. The depth of USARP specimens agrees with the known bathymetric range of the species.

#### Material examined (Fig. 11)

- Eltanin Cruise 12
- Sta. 1082, 60°50'-52'S, 42°55'-56'W, 298-302 m, USNM 60980 (x1)
- Eltanin Cruise 27
- Sta. 1873, 72°10'-11'S, 171°22'-16'E, 448-454 m, CAS 030966 (x1)
- Sta. 1877, 72°18'-19'S, 170°26'-25'E, 143-146 m, USNM 60978 (x1)

- Eltanin Cruise 32
- Sta. 2099, 77°02'S, 166°44'-50'W, 408-415 m, CAS 030965 (x1)

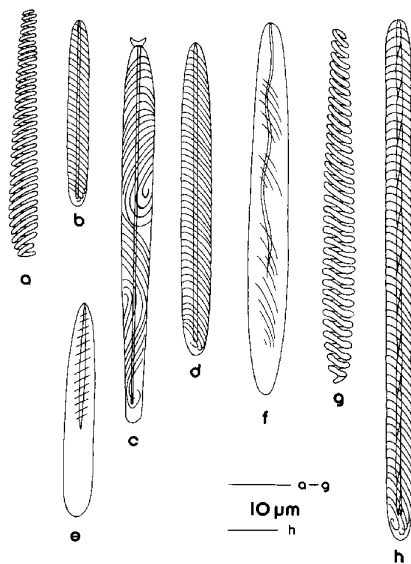


Fig. 10. Cnidae of *Isosicyonion alba*; see text for explanation.

Islas Orcadas Cruise 721

- Sta. 703, 62°16.7'–17.5'S, 58°34.0'–34.6'W, 38–74 m, USNM 60965 (x3)  
 Sta. 704, 62°17.5'–17.9'S, 58°34.6'W, 55–78 m, USNM 60967 (x4)  
 Sta. 747 and 847 (mixed lot), 64°46'20"–47'30"S, 64°04'03"–07'12"W, 55–94 m, USNM 60987 (x10)  
 Sta. 843, 64°47.5'S, 64°07.1'–07.2'W, 107 m, USNM 60960 (x1)  
 Sta. 848, 64°47.4'S, 64°06.9'W, 94–165 m, USNM 60979 (x1)  
 Sta. 941, 64°47.3'S, 64°07.4'–06.1'W, 90 m, USNM 60972 (x3), USNM 60973 (x5)  
 Sta. 1063, 62°19.0'S, 59°11.4'W, 44 m, USNM 60975 (x1)  
 Sta. 1070, 64°47.7'S, 64°07.4'W, 100 m, USNM 60974 (x7)

Islas Orcadas Cruise 731

- Sta. 1823, 64°47'14"–27"S, 64°07.20'–06.75'W, 90–110 m, USNM 60966 (x13)

Islas Orcadas Cruise 812

- Sta. 2–2, 64°50'07"–30"S, 64°27'15"–28'10"W, 150–190 m, CAS 030525 (x2)

Islas Orcadas Cruise 876

- Sta. 121, 64°47'S, 43°40'W, 616–642 m, CAS 030523 (x7)

Hero Cruise 824

- Sta. 5–1, 65°54.5'S, 65°17.50'W, 246–270 m, USNM 60971 (x6), USNM 60983 (x5)  
 Sta. 9–1, 66°07.70'S, 66°35.50'W, 140–210 m, USNM 60986 (x1)  
 Sta. 12–1, 65°14.29'–15.30'S, 64°12.35'–13.90'W, 270–320 m, USNM 60988 (x2)  
 Sta. 13–1, 65°14.00'S, 64°12.00'W, 310–360 m, USNM 60984 (x4)  
 Sta. 14–1, 64°48.63'–48.20'S, 64°04'W, 70–150 m, CAS 030526 (x3)  
 Sta. 24–1, 64°15.20'–14.50'S, 61°27.50'–25.90'W, 540–605 m, USNM 60968 (x14)  
 Sta. 27–1, 64°29.50'S, 62°29.80'W, 110–132 m, USNM 60969 (x6)  
 Sta. 28–1, 64°14.20'–13.80'S, 62°35.10'–34.10'W, 70–98 m, USNM 60977 (x1)  
 Sta. 32–1, 64°37'–38'S, 62°50.8'–51.6'W, 640–670 m, CAS 030524 (x2)  
 Sta. 39–1, 64°47.45'–47.98'S, 64°11.38'–11.95'W, 226–265 m, USNM 60970 (x4), USNM 60985 (x1)  
 Sta. 40–1, 64°48.42'S, 64°07.00'W, 75–110 m, USNM 60989 (x1)

Previous records

- Studer [1879], east of Patagonia, 60 fm [110 m] (x1)  
 Ridley [1882], Trinidad Channel, Chile [49°55'S, 75°10'W], 60 fm [110 m] (x2)  
 Carlgren [1949], South Shetland Islands, Palmer Archipelago [61°–65°S, 54°–63°W], 109–383 m (x?)  
 Riemann-Zürneck [1980], various localities in the southwest Atlantic, 37°–51°S, 54°–62°W, 80–800 m (x39)

Family ACTINOSTOLIDAE

Actinostola crassicornis (Hertwig, 1882)

- Dysactis crassicornis: Hertwig, 1882a, p. 39; 1882b, p. 44; 1888, p. 17.—McMurrich, 1893, p. 168.—non Rees, 1913, p. 382.—Carlrgen, 1921, p. 229.  
Actinostola crassicornis: Carlrgen, 1898, p. 31, 44.—Stephenson, 1920b, p. 557.—Pax, 1923, p. 26.—Carlrgen, 1927, p. 63; 1949, p. 78.—Riemann-Zürneck, 1971, p. 160, 161; 1978a, p. 65.  
Actinostola excelsa: McMurrich, 1893, p. 170.—Carlrgen, 1898, p. 45.—Stephenson, 1920b, p. 557.—Riemann-Zürneck, 1971, p. 161; 1978a, p. 75.  
Actinostola pergamentacea: McMurrich, 1893, p. 171.—Carlrgen, 1898, p. 45.—Stephenson, 1920b, p. 557.—Riemann-Zürneck, 1971, p. 161; 1978a, p. 75.

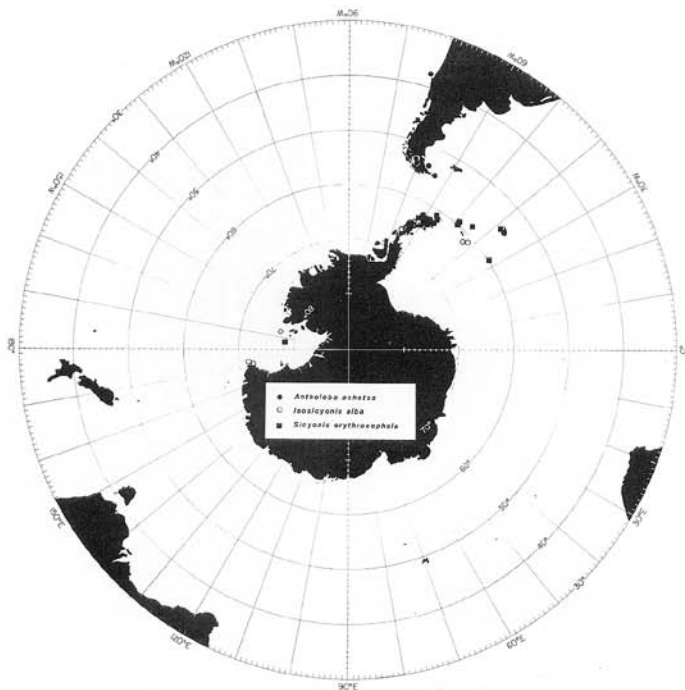


Fig. 11. Distributions of *Isosicyonis alba*, *Antholoba achates*, and *Sicyonis erythrocephala*.

- Actinostola intermedia*: Carlgren, 1898, p. 31.--Pax, 1923, p. 26.--Carlgren, 1927, p. 58; 1949, p. 78; 1959, p. 29.--Riemann-Zürneck, 1971, p. 161; 1978a, p. 75, 80, 81.
- Actinostola chilensis*: McMurrich, 1904, p. 247.--Clubb, 1908, p. 4.--Stephenson, 1920b, p. 557.
- Catadiomene intermedia*: Stephenson, 1920b, p. 558.
- Actinostola clubbi*: Carlgren, 1927, p. 66; 1949, p. 78.--Riemann-Zürneck, 1978a, p. 75, 82.

#### Description

**Body form and size.** Column cylindrical, not uncommonly to 125 mm long (Figure 12). Mesoglea moderately thick (to 6 mm at mid-column) but not stiff, so many USARP specimens flattened or distorted. Hyaline/gelatinous

nature of some probably an effect of preservation. Column ectoderm sloughed in many, the only remnants in irregular, shallow grooves; column otherwise smooth. In well-expanded specimens, diameter of oral disc considerably greater than that of column/pedal disc, but most USARP specimens moderately contracted with diameter of oral and pedal discs roughly equal to column length; column may narrow in middle. Rare animals totally introverted; most with at least central tuft of tentacles visible.

**Base.** Flat to concave; rim may be pulled in; edge wavy to smooth. Ectoderm brown with irregular shallow wrinkles or grooves along mesenterial insertions.

**Tentacles and oral disc.** In expansion, flat oral disc radially furrowed along mesenterial insertions; lips conspicuous; mouth length as much as a third of disc diameter. Tentacles occupy outer half to third, regu-

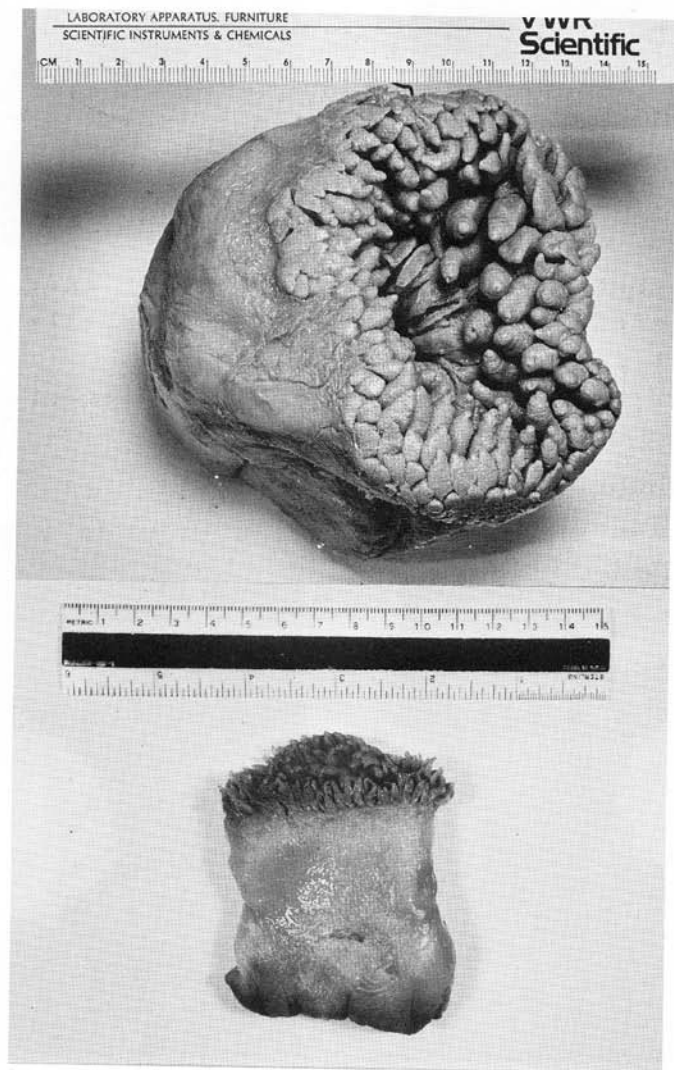


Fig. 12. Actinostola crassicornis. (top) CAS 029665. (bottom) CAS 029328.



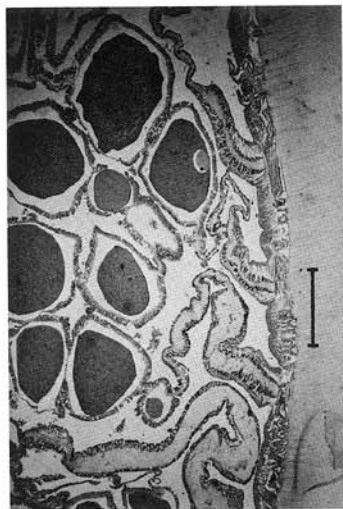


Fig. 13. Cross section through body wall and mesenteries of female *Actinostola crassicornis* (CAS 029330); scale = 500  $\mu$ m.

larly arrayed in distinct cycles; up to 260 counted; ectoderm of tentacles and oral disc pinkish to reddish brown, same color as that of column. Tentacles have terminal pore, lack thickenings; conical, with blunt or nipplelike end; stubby with longitudinal and/or circumferential furrows if contracted, slimmer and smoother if not (Figure 12). Inner ones to 20 mm long by 10 mm across base; outer ones less robust (e.g., 6 x 2 mm, 4 x 3 mm) to so tiny that they are difficult to distinguish. In contracted individuals, tentacles may be so compacted that their radial diameter is greater than that concentric with oral disc; completely retracted animals rare.

**Mesenteries and internal anatomy.** Mesenteries of primary and secondary cycles complete and sterile; distalmost portion of tertiary ones may also join actinopharynx; those of third and fourth cycles fertile; fifth-order ones fertile proximally or sterile; all with filaments. Mesenteries of sixth cycle present in some large animals, sterile and lacking filaments. *Actinostola* rule conspicuous, especially in higher orders. Mesenteries thinner proximally than distally, where added; generally somewhat fewer at base than number of tentacles. Retractor muscles weak and diffuse with short lamellae (Figure 13);

parietobasilar muscles wide and with free flap near base, narrowing distally. Large marginal and oral stomata not evident in all individuals. Sexes separate; developing ova to more than 500  $\mu$ m preserved diameter, some with trophonemata. Young brooded internally by females; one individual 40 mm long and wide contained 14 juveniles ranging from 2.5 to 15 mm in diameter/length.

Actinopharynx orangish or white (generally color of oral disc and tentacles); one quarter to two thirds length of body; longitudinal furrows of variable depth; two symmetrical, very prolonged siphonoglyphs the same color as or lighter than rest of gullet, each connected to pair of directive mesenteries.

Tentacle longitudinal and oral disc radial muscles mesogleal (Figure 14); oral disc musculature discontinuous across mesenterial insertions. Tentacle circular and oral disc circumferential muscles endodermal.

Long sphincter reticulate mesogleal (Figures 15 and 16); meshes of equal or unequal size densest near endoderm; faintly or strongly longitudinally striate (Figure 15). Fills half to most of margin along endoderm; narrow proximally, hugging endoderm; broader in larger animals.

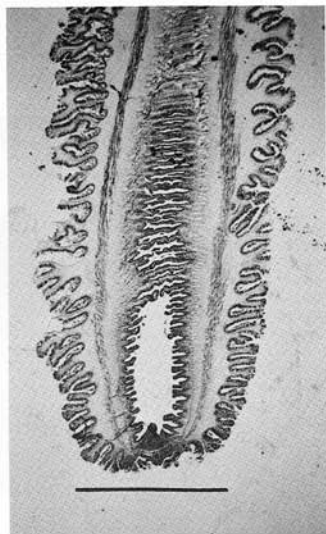


Fig. 14. Longitudinal section through tentacle of *Actinostola crassicornis* (CAS 029330); scale = 2 mm.

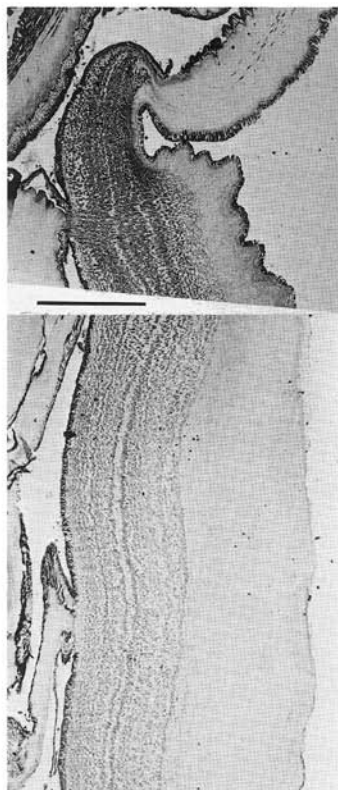


Fig. 15. Longitudinal section through mesogleal sphincter of *Actinostola crassicornis* (CAS 029330); ectodermal side at right; scale = 1 mm.

Distribution and size of cnidae (Fig. 17)  
Tentacles

- spirocysts(a), 27.1-76.3 x 2.7-5.6  $\mu$ m, n = 172, N = 13/13  
 basitrichs(b), 23.0-43.5 x 2.3-3.7  $\mu$ m, n = 190, N = 13/13  
 microbasic p-mastigophores(c), 18.9-27.3 x 3.3-4.9  $\mu$ m, n = 45, N = 6/13 (in distal portion only)  
 microbasic b-mastigophores(d), 33.6-55.8 x 5.7-8.4(9.0)  $\mu$ m, n = 48, N = 8/13 (in distal portion only)

Actinopharynx

- basitrichs(e), 20.5-36.1 x 2.3-3.9  $\mu$ m, n = 118, N = 13/13  
 microbasic p-mastigophores(f), 18.9-27.9 x 3.3-5.7  $\mu$ m, n = 72, N = 12/13

Mesenterial filaments

- basitrichs(b), (18.6)19.7-33.6 x 2.1-4.7  $\mu$ m, n = 89, N = 11/14  
 microbasic p-mastigophores(f), 19.7-28.7 x 3.5-6.0  $\mu$ m, n = 97, N = 14/14

Column

- basitrichs(g), 17.2-27.9(30.3) x 2.5-3.3  $\mu$ m, n = 87, N = 10/10

The size range in any individual is generally considerably less than that given. Smaller individuals tend to have smaller tentacle cnidae. Spirocysts and basitrichs are usually smaller in the proximal than in the distal portion of a tentacle. There is no difference in the cnidae of inner and outer tentacles. Some column smears contained a few spirocysts.

Discussion

*Actinostola crassicornis* is among the best known of Antarctic actinians, probably because of abundance and size. Hertwig's [1882a, b] original description of *Dysactis crassicornis* was comprehensive and accurate. Indeed, he

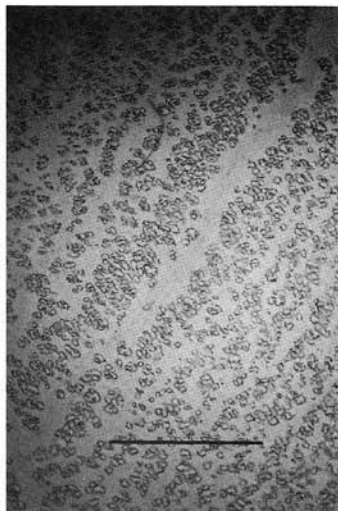


Fig. 16. Detail of section through mesogleal sphincter of *Actinostola crassicornis* (CAS 029330); scale = 250  $\mu$ m.

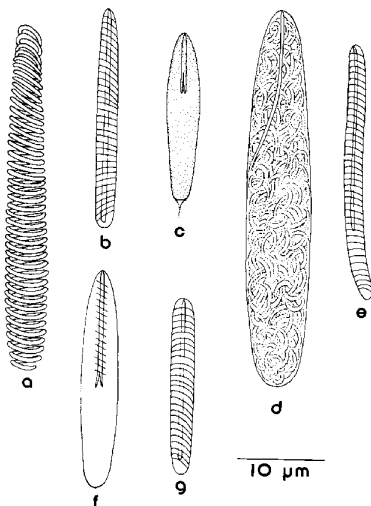


Fig. 17. Cnidae of *Actinostola crassicornis*; see text for explanation.

examined the species especially thoroughly, noting particularly histological features, because his specimens were large and well preserved. He first reported that tentacle pores were lacking, but later [Hertwig, 1888] found them in an additional specimen. My anatomical findings agree with those of Riemann-Zürneck [1978a] as well. Discrepancies between her cnida data and mine may be explained by the wider geographic origin of the USARP specimens as compared with those taken by the Walther Herwig. I found tentacular microbasal p-mastigophores in some animals, my size ranges were generally greater than hers, and she found two classes of mesenterial filament basitrichs whereas I found a continuum that spanned the two.

McMurrich [1893] distinguished his species *Actinostola excelsa* and *A. pergamentacea* from one another partly on the basis of sphincter strength, that of the latter being weaker. This was probably due to the specimens of *A. pergamentacea* being about half as large as those of *A. excelsa*. I agree with Riemann-Zürneck [1978a] in synonymizing these taxa with *A. crassicornis*. The rationale for her [1978a] decision is unclear; in 1971, she had regarded the type specimens and nematocyst measurements of the two species as unknown. I examined McMurrich's specimens (*A. excelsa* is USNM 17780 and 17781; *A. pergamentacea* is USNM 17779) and found them to conform in anatomy

and cnidae to USARP specimens of *A. crassicornis*.

In his original description of *Actinostola chilensis*, McMurrich [1904] opined that *A. excelsa* and *A. intermedia* represented the same species as his new one. Carlgren [1927] convincingly synonymized *A. chilensis* with *A. intermedia*, and suspected *A. excelsa* to be an additional synonym. His nematocyst data for *A. crassicornis* and *A. intermedia* agree well with mine, as do his later [Carlgren, 1959] figures for *A. intermedia*. Thus data on anatomy and cnidae support uniting these four nominal species. Riemann-Zürneck [1978a] distinguished *A. intermedia* from *A. crassicornis* mainly on filament cnidae; as stated above, my data erase those distinctions.

I am unclear as to why Carlgren [1927] considered the specimens Clubb [1908] had called *Actinostola chilensis* to belong to a new species, which he named *A. clubbi*. Cnidae conform to those of *A. crassicornis*. The adventitious tentacle nematocysts were probably merely adherent, only seemingly incorporated due to poor preservation.

McMurrich [1893] identified seven specimens collected off the coast of Ecuador as *Actinostola callosa*. However, he suggested in the body of the paper, then averred in the appendix, that *A. callosa* and *Dysactis crassicornis* were synonymous. Carlgren [1927] believed the two species distinct. He examined McMurrich's Albatross specimens, deciding that "McMurrich's description of *Actinostola callosa* (1893) partly refers to Hertwig's species [*A. crassicornis*]" [Carlgren, 1927, p. 65]. Although the few cnida data he gave correspond to what I found for *A. crassicornis*, I am unwilling to make an identification without studying the specimens myself. Riemann-Zürneck [1978a] believed that McMurrich [1893] used *A. callosa* partly as a synonym of *A. crassicornis*. It is clear, however, that the specimen discussed by Rees [1913] as "*Actinostola callosa*=*Dysactis crassicornis*" was actually one of *Antholoba achates* [see also Riemann-Zürneck, 1978a].

Carlgren [1898, 1927] noted small basal tentacle swellings and four cycles of complete mesenteries in *Actinostola intermedia*. The former feature prompted Stephenson [1920b] to create the genus *Catadiomene* for that species and two others. Carlgren [1927] noted that the inner tentacles of *A. crassicornis* may have weak thickenings. McMurrich [1893] found four complete cycles of mesenteries in *A. pergamentacea*. Thus it is likely that the tentacles of some specimens may have basal swellings and that at least some mesenteries of the fourth cycle may be complete in some specimens of *A. crassicornis*. McMurrich's [1904] single specimen of *A. chilensis* was clearly abnormal in being a hermaphrodite.

The remaining austral species of *Actino-*

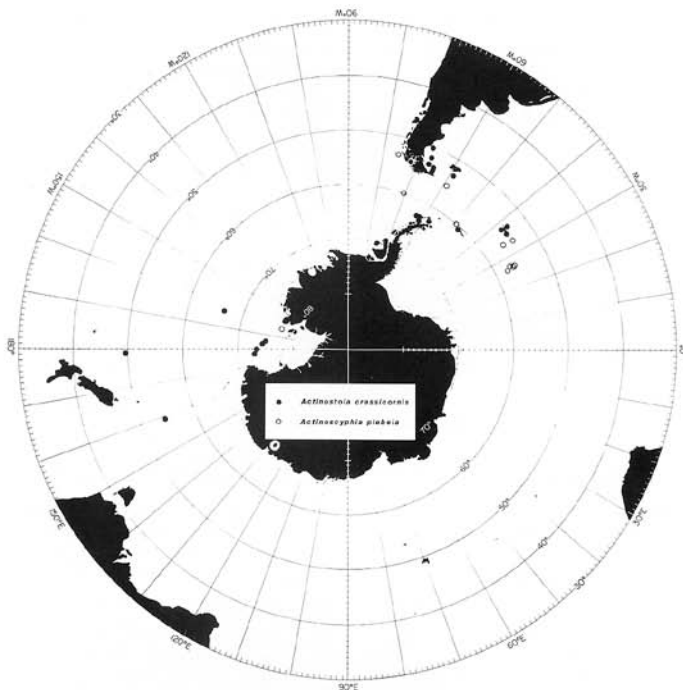


Fig. 18. Distributions of *Actinostola crassicornis* and *Actinoscyphia plebeia*.

*stola* listed by Carlgren [1949] are *A. georgiana* and *A. kerguelensis*. The cnidae of *A. georgiana* agree with those presented here for *A. crassicornis*; these anemones brood internally and otherwise resemble *A. crassicornis*. Carlgren [1927] separated the two because of the relationship between tentacles and mesenteries. Further study is required to ascertain whether they should be synonymized. Cnidae of *A. kerguelensis*, as reported by Carlgren [1928], clearly separate that species from *A. crassicornis*. Anatomy of *Paractinostola capensis* Carlgren, 1928, called *A. capensis* by Riemann-Zürneck [1978a], clearly distinguishes it from *A. crassicornis* despite similar cnidae measurements.

Most specimens of *Actinostola crassicornis* in the USARP collection were taken south of the Antarctic Convergence. Their range extends in the southwestern Atlantic from east of the South Orkney Islands west to Tierra del Fuego and a third of the way around the con-

tinent from just north of Macquarie Island into the Ross Sea. Most occurred at depths of 100-500 m, with a range 30 to 2060 m. Thus these specimens extend somewhat the geographic and bathymetric ranges known for the species. Many lots contained both large and very small specimens; it is likely that the latter had been brooded by the former and that some large anemones still contain offspring so that there are actually more than 253 USARP specimens.

#### Material examined (Fig. 18)

##### Eltanin Cruise 5

Sta. 217, 54°22'-23'S, 64°42'-52'W, 106-110 m, CAS 031102 (x15)

Sta. 222, 53°15'-24'S, 66°51'-30'W, 79-80 m, USNM 60792 (x84)

##### Eltanin Cruise 6

Sta. 339, 53°05'-08'S, 59°31'-24'W, 512-586 m, USNM 60647 (x3)

- Sta. 370, 53°54'-55'S, 64°36'-52'W, 104-115 m, CAS 029328 (x9)  
 Sta. 426, 62°27'-34'S, 57°58'-49'W, 809-1116 m, CAS 030952 (x2)  
 Sta. 437, 62°50'-51'S, 62°40'-35'W, 40-30 m, USNM 60641 (x1)  
 Sta. 444, 62°56'-59'S, 62°02'-04'W, 732-750 m, USNM 60646 (x2)
- Eltanin Cruise 11
- Sta. 962, 53°56'-55'S, 71°15'-12'W, 256-320 m, CAS 030256 (x12)  
 Sta. 966, 53°40'-41'S, 66°20'-19'W, 81 m, USNM 60990 (x5)  
 Sta. 974, 53°32'-34'S, 64°57'-55'W, 119-124 m, CAS 031130 (x79)
- Eltanin Cruise 12
- Sta. 1084, 60°22'-23'S, 46°50'-52'W, 298-403 m, CAS 029665 (x4)  
 USNM 60642 (x3)
- Eltanin Cruise 16
- Sta. 1417, 54°24'-25'S, 159°01'-00'E, 79-93 m, CAS 031103 (x1)
- Eltanin Cruise 27
- Sta. 1930, 74°19'-20'S, 176°39'-34'W, 831-836 m, CAS 029327 (x2)  
 Sta. 1954, 66°34'-33'S, 163°01'-55'W, 322-337 m, USNM 60640 (x1)
- Eltanin Cruise 32
- Sta. 2005, 73°02'S, 176°54'-50'E, 864-870 m, USNM 60644 (x2)  
 Sta. 2108, 74°55'-57'S, 174°12'-16'W, 2022-2060 m, CAS 030956 (x2)  
 Sta. 2119, 73°05'S, 180°00'W, 567 m, USNM 60643 (x1)  
 Sta. 2141, 49°40'-31'S, 178°52'-54'E, 86-95 m, CAS 029330 (x4)
- Islas Orcadas Cruise 575
- Sta. 14, 53°41.8'S, 37°57.2'W, 144-150 m, CAS 029329 (x1)  
 Sta. 26, 54°43.1'S, 36°49.3'W, 188-192 m, CAS 030955 (x1)  
 Sta. 101, 54°14.1'S, 37°54.2'W, 164-183 m, CAS 030257 (x1)
- Hero Cruise 702
- Sta. 450, 50°06'S, 67°04'W, 86 m, CAS 030957 (x17)
- Hero Cruise 824
- Sta. 24-1, 64°15.2'-14.5'S, 61°27.5'-25.9'W, 540-605 m, USNM 60991 (x1)
- Previous records
- Hertwig [1882a, b], 53°38'S, 70°56'W, 10-15 fm [18-27 m] (x1); 52°20'S, 68°00'W, 55 fm [101 m] (x4)
- Hertwig [1888], 52°20'S, 68°00'W, 55 fm [101 m] (x2)  
 McMurrich [1893], 48°37'S, 65°46'W, 58 fm [106 m] (x1); 51°34'S, 68°00'W, 50.5 fm [92 m] (x2); 45°22'S, 64°20'W, 51.5 fm [94 m] (x5)  
 Carlgren [1898], Cape St. Vincent, Magellan Straits [52°47'S, 70°26'W], 150 fm [274 m] (x1)  
 McMurrich [1904] Calbuco, Chile [7~42°S] 16-20 fm [29-37 m] (x1)  
 Clubb [1908], 67°21'46"S, 155°21'10"E, 254 fm [465 m] (x5)  
 Carlgren [1927], Burdwood Bank [53°45'S, 61°10'W], 137-150 m (x5)  
 Carlgren [1959], several localities in coastal Chile, 41°36'-41°51'S, 25-278 m (x20)  
 Riemann-Zürneck [1978a], many localities in the southwest Atlantic, 30°-55°S, 52-69°W, 34-1220 m (x129)
- Antholoba achates (Drayton in Dana, 1846)
- Actinia achates: Drayton in Dana, 1846, p. 142.--Dana, 1849, Plate 3, Figure 28; 1859, p. 9.--Cargren, 1898, p. 42.  
Actinia reticulata: Couthouy in Dana, 1846, p. 144.--Dana, 1849, Plate 4, Figure 31; 1859, p. 10.  
Actinia fuegiensis: Couthouy in Dana, 1846, p. 145.--Dana, 1849, Plate 4, Figure 32; 1859, p. 10; Carlgren, 1898, p. 43.  
Sagartia fuegiensis: Gosse, 1855, p. 274; 1860, p. 38, 39.  
Sagartia Achates: Gosse, 1855, p. 274.  
Sagartia reticulata: Gosse, 1855, p. 274.  
Metridium Achates: Milne-Edwards, 1857, p. 254.  
Metridium reticulatum: Milne-Edwards, 1857, p. 255.--Verrill, 1869, p. 479.  
Discosoma fuegiensis: Milne Edwards, 1857, p. 257.--Andres, 1883, p. 285.--pars McMurrich, 1893, p. 200.--Cargren, 1898, p. 45.--Pax, 1923, p. 26; pars Carlgren, 1934, p. 5.  
Actinoloba reticulata: Gosse, 1860, p. 24.--Andres, 1883, p. 140.  
Actinoloba Achates: Gosse, 1860, p. 24, 39.  
Cereus fuegiensis: Verrill, 1869, p. 480, 567.  
Antholoba reticulata: Hertwig, 1882a, p. 47, 116; 1882b, p. 58, 130.--McMurrich, 1893, p. 164.--Cargren, 1898, p. 29, 44, 45.--Stephenson, 1920b, p. 554.--Cargren, 1921, p. 184.--Pax, 1923, p. 26.  
Actinoloba achates: Andres, 1883, p. 181.  
Actinobopsis reticulata: Verrill, 1869, p. 144.  
Antholoba achates: McMurrich, 1904, p. 250.--Cargren, 1927, p. 56; 1934, p. 6; 1939, p. 795; 1945, p. 16; 1949, p. 85.--Parry, 1952, p. 124.--Cargren, 1959, p. 28.--Carter Verdeilhau, 1965, p. 134, 152, 153, 154.--Stotz Uslar, 1977, p. 61.--Sebens and Paine, 1979, p. 222, 223, 228, 229, 234.--Stotz, 1979, p. 181.--Riemann-Zürneck, 1980, p. 28.  
Actinostola callosa: Rees, 1913, p. 382.

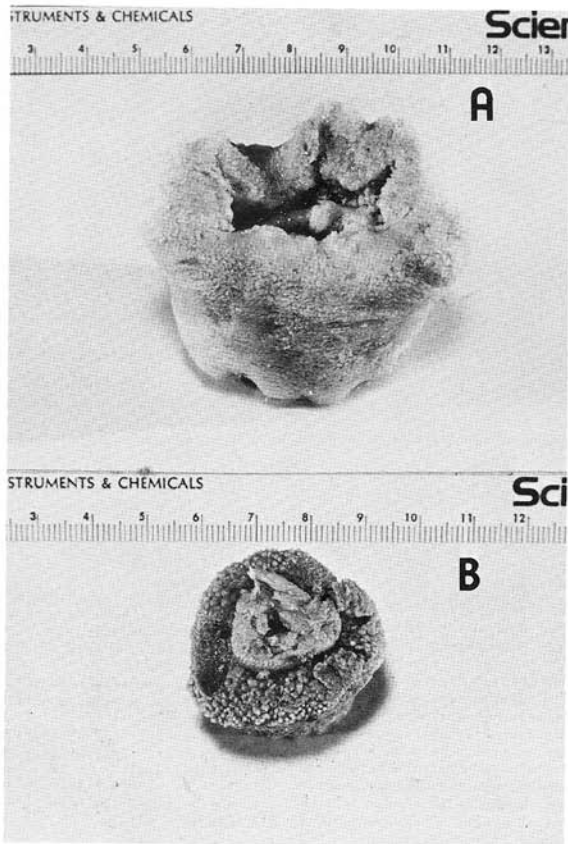


Fig. 19. *Antholoba achates*. (A) CAS 029639. (B) CAS 029640.

#### Description

**Body form and size.** Column cylindrical, typically wider at distal end than proximal (Figure 19A); length highly variable from less than 10 mm to more than 50 mm; pedal disc diameter may be less than column length or considerably more; oral disc of expanded specimens to 50 mm. Grey to dirty white column of intact animal appears fuzzy (Figure 19A), which may give the illusion of verrucae, or produced into flaps of unspecialized ectoderm and mesoglea; ectoderm sloughed in many USARP

specimens, revealing thick white mesoglea that is typically reticulate or honeycombed (like tripe); mesenterial insertions not visible where ectoderm eroded.

**Base.** Generally scalloped along edge, which may be pulled under base (Figure 19A); flat or concave, probably dependent upon substratum to which had been attached. Narrower than oral disc in most animals but equal in some. Mesenterial insertions visible through pedal disc where ectoderm eroded.

**Tentacles and oral disc.** Oral disc much broader than column, typically undulate,



Fig. 20. Cross section through body wall and mesenteries of *Antholoba achates* (CAS 029639).

giving impression of being lobed (Figure 19); in contraction, marginal portion folded over central (Figure 19A) rather than being drawn in evenly from edge, emphasizing "lobate" condition. Outer half completely covered with globose or blunt to pointed digitiform tentacles (Figure 19B); tentacles sparser in immediately circumoral area, where radially furrowed disc exposed; central, lipped mouth on cone, generally gaping open to expose actinopharynx (Figure 19B). Central tentacles longer than peripheral ones that merge imperceptibly into rugose upper column; most 1-2 (rarely 3) mm across base and 1-6 (rarely 10) mm long, with terminal pore that may not be evident; over 100 counted in animal 13 mm across oral disc, several hundred estimated in average-sized anemone; may be so crowded that compressed laterally. Oral disc, lips, tentacles, and actinopharynx same color as column in preserved material.

**Mesenteries and internal anatomy.** Only one tentacle communicates with each intermesenterial space. Mesenteries far more numerous at margin than proximally; those of highest orders very thin, narrow; two symmetrical pairs of directives; small marginal stomata. Retractor muscles, at least of lower orders, diffuse, moderately well developed (Figure 20). Interior of most USARP specimens macerated so details difficult to ascertain.

One individual, 50 x 55 mm across base, 30

mm long, and 65 x 30 mm across oral disc, was brooding seven young internally; largest was 10 mm in length and oral disc diameter with slightly smaller base; smallest measured slightly less than 6 mm across oral disc, 4 mm across pedal disc, and 5 mm long, had about 70 tentacles covering oral disc from margin to edge of gaping mouth.

Deeply sulcate actinopharynx less than half column length; two prolonged, symmetrical siphonoglyphs attach to directive mesenteries. Longitudinal tentacle muscles ectodermal. Circular endodermal column muscles strong (Figure 20). Very long but weak mesogleal sphincter of uniform width for much of length (Figure 21); tapers near base on endodermal edge of mesoglea; width difficult to estimate because ectoderm and even mesoglea eroded in many specimens but seems to vary from one fifth to one half mesoglea width.

#### Distribution and size of cnidae (Fig. 22)

##### Tentacles

spirocysts(a), 21.1-39.7 x 2.5-3.7  $\mu$ m, n = 46, N = 5/5

basitrichs(b), 16.1-24.8 x 2.3-3.5  $\mu$ m, n = 35, N = 4/5

basitrichs(c), 27.9-34.7 x 2.7-3.7  $\mu$ m, n = 36, N = 5/5

##### Actinopharynx

basitrichs(d), 24.8-33.6 x (2.5)3.1-3.9  $\mu$ m, n = 61, N = 6/6

microbasic p-mastigophores(e), 24.8-28.5 x (4.1)4.8-5.2(6.0)  $\mu$ m, n = 21, N = 3/6

##### Mesenterial filaments

basitrichs(f), 18.9-24.8 x 2.3-3.1  $\mu$ m, n = 11, N = 3/4

microbasic p-mastigophores(f), 21.1-28.5 x 3.9-5.2  $\mu$ m, n = 38, N = 4/4

##### Column

basitrichs(g), 12.4-23.6 x 1.9-3.5  $\mu$ m, n = 81, N = 5/5 (smaller ones concentrated at proximal end)

#### Discussion

*Antholoba achates* has been the subject of considerable study and confusion, as is evident from its long list of synonyms, due to its shallow and widespread occurrence and its resemblance to other anemones. Milne-Edwards [1857] allied the two nominal species *Actinia achates* and *Actinia reticulata* with *Merridium* due to the common attribute of a "lobed" oral disc, while ascribing *Actinia fuegiensis* to *Discosoma* owing to its many small tentacles. In erecting a new genus for Couthouy's *Actinia reticulata* [in Dana, 1846], Hertwig [1882b, p. 53] recognized "the probability that animals which resemble each other externally may differ essentially in their internal organization."

His thorough redescription agrees in most

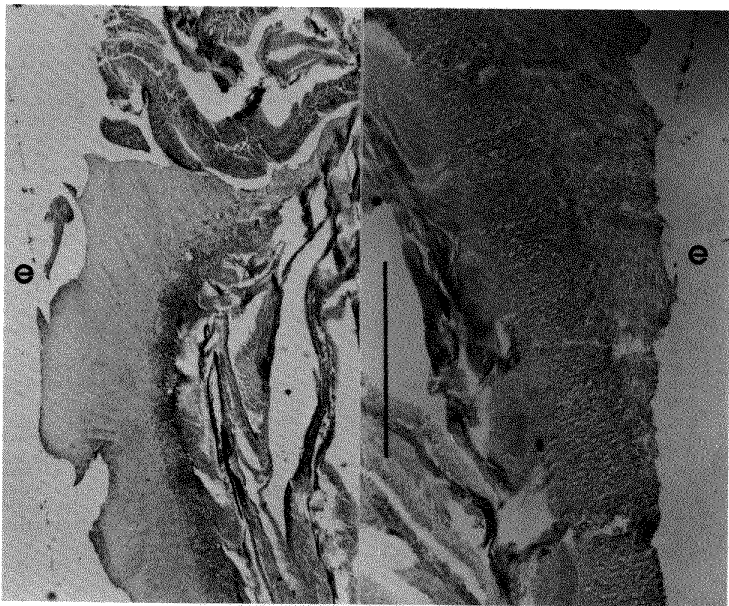


Fig. 21. Longitudinal sections through distal parts of long mesogleal sphincters of two specimens of *Antholoba achates* (CAS 029639); e is ectodermal side; scale = 1 mm for left side, 500  $\mu$ m for right side.

particulars with my findings. I concur with McMurrich [1904] that Hertwig [1882a, b] probably overstated the number of tentacles ("several thousand") by an order of magnitude, although Stotz Uslar [1977] placed it between 1000 and 1500. The issue of "papillae," which are simply raised portions of the body wall (encompassing mesoglea and unspecialized ectoderm) between depressions, continues to be debated [e.g., see Carter, 1965]. *Actinia reticulata* was named for this feature, which was well described in Couthouy's notes [Dana, 1846]. Verrill [1869] attributed the reticulations to incomplete expansion, but Couthouy emphasized that they disappear in contraction, when the body wall becomes rugose. McMurrich [1904] noted that both color and reticulation of *Antholoba achates* are variable. McMurrich's report on 35 Chilean specimens was accurate and comprehensive. Rees' [1913] description was so accurate that her specimen is easily identifiable as *An. achates*, despite her efforts to reconcile her findings with what was known of *Actinostola callosa* and "*Dysactis*" *crassicornis*. Carlgren's [1927]

findings agree with mine in all respects except that he apparently concentrated his examination in the central part of the body, thereby missing the highest order of mesenteries. Recent studies on morphology, reproduction, ecology, and geography, based on living animals in Chile [Carter Verdelhan, 1965; Stotz Uslar, 1977; Stotz, 1979; Sebens and Paine, 1979] make this probably the best known species in the USARP collection.

I have examined specimens identified variously as *Antholoba achates* and *A. reticulata* by O. Carlgren (USNM 17777 from Patagonia) and J. P. McMurrich (USNM 17809 from Patagonia, USNM 17810 from Chile, and USNM 17811 from the Galapagos) that are identical in cnidae and anatomy to the USARP specimens. Based on the literature, *Antholoba achates* has three [Rees, 1913; McMurrich, 1904; Stotz Uslar, 1977] or four [Carlgren, 1898, 1927] cycles of complete mesenteries. At least some individuals are hermaphroditic [Carlgren, 1898, 1927; Stotz Uslar, 1977]. Disagreement about the existence of oral and/or marginal stomata is probably due to variability in the animals.



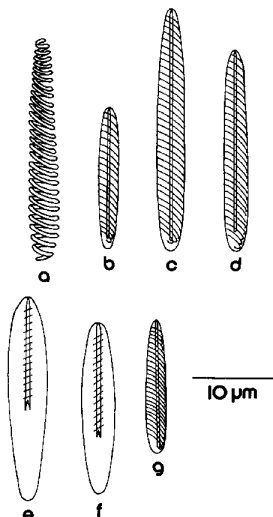


Fig. 22. Cnidae of *Antholoba achates*; see text for explanation.

Carlgrén's [1927, 1945] cnidae figures accord well with mine. Carter Verdeilhan's [1965] data are incomplete and her measurements seem to be somewhat small. Stotz Uslar [1977] found two sizes of actinopharyngeal basitrichs (very similar to the two in the tentacles) and recognized in the filaments an additional large, broad basitrich (b-rhabdoid).

*Actinia reticulata* Couthouy in Dana, 1846 is type species of *Antholoba* by monotypy [Hertwig 1882a, b]. McMurrich's [1904] actions as first reviser made the valid name for this taxon *Antholoba achates* (Drayton in Dana, 1846).

*Actinia fuegiensis* Couthouy in Dana, 1846 is an additional synonym of *Antholoba achates*. Its type locality, Orange Harbor, Tierra del Fuego, is the same as that of *Actinia reticulata*, and Couthouy's habitus notes on the two nominal species are very similar. McMurrich's [1893] report on four specimens of "*Discosoma fuegiensis*" dealt with two species (the specimens were reexamined by Carlgrén [1934]). The two expanded anemones on which McMurrich based his original description (prominent lips, lobed margins, numerous short tentacles) were *Antholoba achates*. The sections of endodermal sphincter and possibly mesenterial retractor illustrated by McMurrich were from the other species, identified by Carlgrén [1934] as

*Isotealia* sp., at least one specimen of which was conical in shape, being completely retracted. The 11 USARP specimens from *Islas Orcadas* Cruise 575, station 2, appeared superficially similar, being of uniform size and all having peeling greyish ectoderm (or none at all). Only five were actually *Antholoba achates*. All of the six completely retracted, conical or cylindrical specimens had endodermal sphincters and moderate numbers of relatively long, tapering tentacles. Cnidae and pattern of complete/fertile mesenteries further distinguished the two taxa. Cnidae agreed with Carlgrén's [1934] figures for *Isotealia* sp. Stotz [1979] explained the restriction of *Antholoba achates* to shaded or subtidal areas by their inability to contract fully for prolonged periods and by the small volume of water that they retain because they cannot assume a dome shape.

Internal brooding was first reported in Couthouy's original description of *Actinia reticulata*. USARP specimens were collected from within the known range of *Antholoba achates*. Although there is no evidence of it from the USARP specimens, *Antholoba achates* apparently occurs more often on mollusc shells (inhabited by hermit crabs or the shell's own maker) than on rock substrata [McMurrich, 1904; Carter Verdeilhan, 1965; Stotz Uslar, 1977; Sebens and Paine, 1979].

#### Material examined (Fig. 11)

- Eltanin* Cruise 5  
Sta. 211, 37°28'–29'S, 73°49'–48'W, 192–296 m, USNM 60780 (x18)  
Sta. 222, 53°15'–24'S, 66°51'–30'W, 79–80 m, USNM 60781 (x4)

- Islas Orcadas* Cruise 575  
Sta. 2, 54°39.7'S, 37°24.1'W, 182–327 m, CAS 029639 (x5)

- Hero* Cruise 712  
Sta. 33, 54°04.9'S, 63°52'W, intertidal, USNM 60783 (x3)

- USARP Stations  
69–11, 53°30'48"U, 70°50'30"W, intertidal, CAS 029640 (x2)  
69–25, 53°51'32"S, 70°25'52"W, 2–9 m, USNM 60782 (x3)

#### Previous records

- Dana [1846], East coast of Patagonia, 30 fm [55 m] (?); Orange Harbour, Tierra del Fuego, [~55°S, 69°W], intertidal (?)  
McMurrich [1893], 40°03'S, 58°56'W, 52 fm [95 m] (x2)  
Hertwig [1882a, b], 52°20'S, 68°00'W, 55 fm, [101 m] (x3)  
McMurrich [1893], Port Otway, Patagonia,

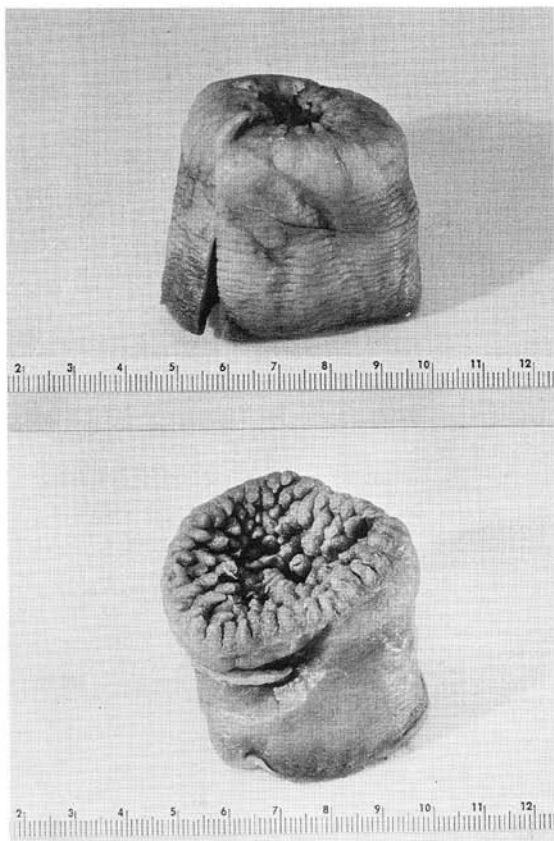


Fig. 23. *Sicyonis erythrocephala* (CAS 029436); note shallow, irregular furrows.

[~53°30'S, 74°W], littoral (x2); Lota, Chile [37°07'S, 73°10'W], littoral (x1); Charles Island, Galapagos [1°20'S, 90°28'W], littoral (x1)  
 Carlgren [1898], Peru, Chile, Tierra del Fuego, East Patagonia, no depths given for some, others 4-8 fm [7-15 m] (x27)  
 McMurrich [1904], various localities in Chile, from Iquique [20°19'S], to Punta Arenas [53°10'S, 70°56'W], to 30 m (x35)  
 Rees [1913], King George's Bay, West Falkland Islands [51°30'S, 60°30'W], drifted ashore (x1)  
 Carlgren [1927], Falkland Islands [51°30'S,

60°W], littoral to 12 m (x6)  
 Carlgren [1939], Stanley Harbor, Falkland Islands [51°45'S, 57°56'W], no depth (x2); 51°40'S, 57°51'W, 6 fm [11 m] (x1)  
 Farry [1952], off Hauraki Gulf, New Zealand [36°35'S, 175°05'E], "deep water" (x?)  
 Carlgren [1959], various localities in Chile from 32°S to 53°S, intertidal to 60 m (x76)

*Sicyonis erythrocephala* (Pax, 1922)

*Cymbactis erythrocephala*: Pax, 1922, p. 81; 1923, p. 11, 25, 26; 1926, p. 60, 61.

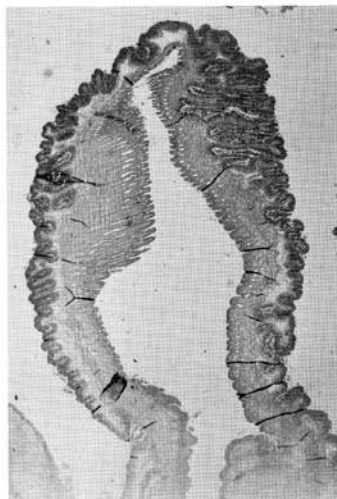


Fig. 24. Longitudinal section through tentacle of *Sicyonis erythrocephala* (CAS 029437) illustrating mesogleal longitudinal musculature except at tip. Magnification equal to that of Figure 27A.

*Sicyonis erythrocephala*: Carlgren, 1927, p. 57; 1949, p. 81.

*Sicyonis aurora*: Carlgren and Stephenson, 1929, p. 19.--Carlgren, 1949, p. 81.

*Sicyonis antarctica*: Carlgren, 1939, p. 795; 1949, p. 81.

#### Description

**Body form and size.** Column cylindrical (Figure 23), sometimes with circumferential constriction, so hourglass shaped, or tapering slightly toward basal end; those examined mostly 50-60 mm long and nearly as wide (but as small as 10 mm across). Body wall smooth except for shallow, irregular furrows; few specimens retain brownish or reddish brown ectoderm, most only in shallow wrinkles near pedal end; column white to pinkish in absence of ectoderm.

**Base.** Brown; 30-50 mm typical diameter; shallow radial furrows in some. May be pulled up so lowermost column contracted beneath and around flat or concave pedal disc.

**Tentacles and oral disc.** In expansion, oral disc somewhat wider than column; radially furrowed along mesenterial insertions; lips

present; same color as tentacles. Margin contracted in many USARP specimens, hiding disc and most tentacles; outermost (exocoelic) tentacles generally visible, however, because oral disc cannot be completely involuted. Tentacles pink to tan; cover much of disc in well defined cycles; stout; rugose with longitudinal and circumferential grooves, probably due to contraction; bluntly digitiform; terminal pore may be conspicuous. These features especially obvious in inner tentacles which are larger (to 15 mm long and 4-5 mm basal diameter) than marginal ones (rarely more than 3-5 mm long and 1-2 mm across base); some tentacles thickened on aboral side at base, particularly outermost ones. Circular tentacle muscles endodermal; mesogleal longitudinal musculature lacking at tip (Figure 24), typically equally developed all around. Oral disc circular muscles endodermal; mesogleal radial musculature (Figure 25) disrupted at mesenterial insertions.

One animal had 96 tentacles; another with 48 tentacles had 90 mesenteries at proximal end; and another with 188 mesenteries at base had 87 tentacles.

**Mesenteries and internal anatomy.** Mesenteries hexamerally arrayed; some of highest seem to follow *Actinostola* rule. Those of first two orders complete and sterile; those of third order also sterile with some members attached to actinopharynx (one mesentery of pair may be perfect, other not); all with filaments; oral but no marginal stomata perceived. Highest cycle mesenteries fertile, lack filaments, present only in proximal half to two thirds. If there are five cycles, fourth-order mesenteries may be sterile and have filaments or be fertile and lack them. As many as six cycles observed, with up to three fertile. Dioecious; ova of preserved specimens bright yellow, somewhat more than 1 mm diameter.

Retractor muscles diffuse, with intermediate length lamellae, most of which have short side branches (Figure 26). Parietobasilar muscles strong but developed only at proximal end; lack free flap. Two pairs of directive mesenteries attached to two deep, symmetrical siphonoglyphs. Actinopharynx deeply sulcate, half column length at most; siphonoglyphs generally hardly longer but may be prolonged.

Mesogleal sphincter short to moderately long, not strong; hugs endodermal side; tapers gradually from distal end where it occupies less than half column width to merge imperceptibly with endodermal column musculature (Figure 27A); dense meshwork rather than scattered lenticles (Figure 27); rarely weakly longitudinally striate. Mesoglea fibrous, especially toward distal end (Figure 27); thick distally, thinning proximally.

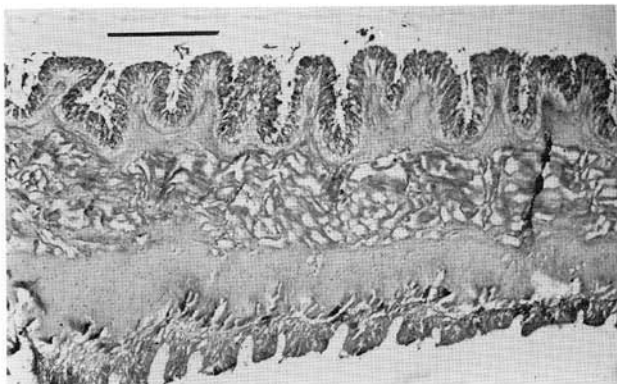


Fig. 25. Radial section through oral disc of *Sicyonis erythrocephala* (CAS 029437); ectoderm at top. Note strong mesogleal radial musculature; scale = 250  $\mu$ m.

Distribution and size of cnidae (Fig. 28)

Tentacles

spirocysts(a), 26.2-59.9(69.7)  $\times$  2.7-4.9  $\mu$ m,  
n = 67, N = 8/8

basitrichs(b), (24.7)27.9-38.5(41.0)  $\times$  2.5-

3.9  $\mu$ m, n = 72, N = 8/8 (may be smaller  
toward base)

Actinopharynx

basitrichs(c), (24.6)26.2-42.6  $\times$  2.5-3.9  $\mu$ m,  
n = 69, N = 8/8

microbasic p-mastigophores(d), (23.8)26.2-  
36.1  $\times$  3.9-6.2  $\mu$ m, n = 34, N = 7/8

Mesenterial filaments

basitrichs(e), 13.1-19.7  $\times$  2.3-3.1  $\mu$ m, n =  
16, N = 5/7

microbasic p-mastigophores(d), (19.7)22.1-  
33.6  $\times$  (3.5)4.1-6.2  $\mu$ m, n = 62, N = 7/7

Column

spirocysts(f), 28.7-56.6  $\times$  2.7-3.9  $\mu$ m, n =  
7, N = 3/5

basitrichs(g), (17.2)18.0-24.6  $\times$  2.5-3.5  $\mu$ m,  
n = 41, N = 5/5

One specimen had microbasic b-mastigophores  
(about 41-49  $\times$  4.7-5.7  $\mu$ m) in its tentacles.  
In all other respects it conformed to other  
specimens of *Sicyonis erythrocephala*, none of  
which contained such cnidae.

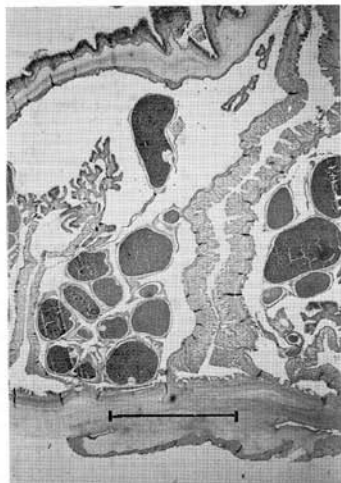


Fig. 26. Cross section through body wall and mesenteries of female specimen of *Sicyonis erythrocephala* (CAS 029437); scale = 2 mm.

Discussion

The 113 specimens of this species in the USARP collection clearly belong to the genus *Sicyonis* despite their apparent inability to contract completely [cf. Carlgren, 1949]. The four austral species of *Sicyonis* are *S. crassa* Hertwig, 1882a, b, type species by monotypy; *S. erythrocephala* (Pax, 1922); *S. aurora* Carlgren and Stephenson, 1929; and *S. antarctica* Carlgren, 1939.

The single known specimen of *Sicyonis crassa*, taken by the HMS *Challenger* [BM(NH) 1889.11.25.23] is very flattened and its ten-

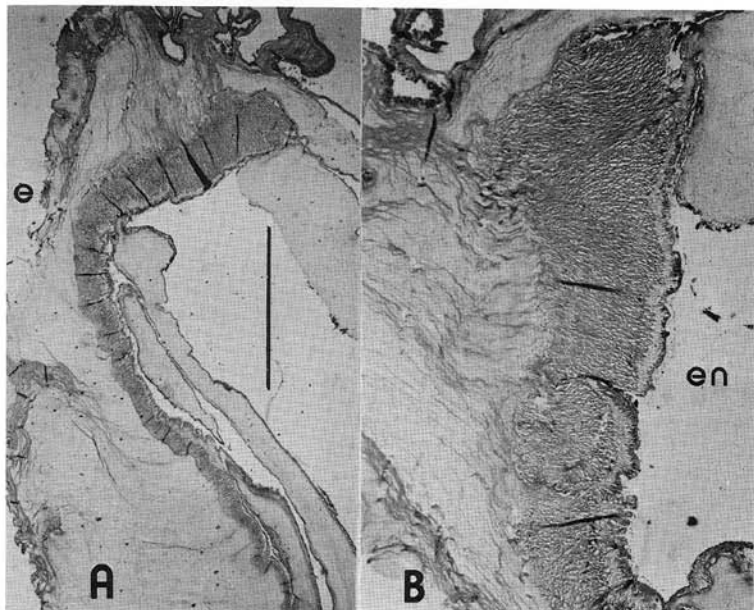


Fig. 27. Longitudinal sections through mesogleal sphincter of one specimen of *Sicyonis erythrocephala* (CAS 029437); note fibrous mesoglea. (A) The e is ectodermal side; scale = 2 mm. (B) Detail of distal end; en is endodermal side; scale = 875  $\mu$ m.

tacle pores gape open; it looks just like Hertwig's [1882a, b, Plate IV, Figure 4] drawing of it, although it is now much dissected. Despite its ectoderm and endoderm being considerably eroded, I was able to measure some cnidae, as follows.

#### Tentacles

spirocysts, 24.7-53.3 x 3.1-5.0  $\mu$ m, n = 5

basitrichs, 33.5-34.7 x 3.1-3.7  $\mu$ m, n = 7

#### Actinopharynx

basitrichs, 24.8-31.0(32.2) x 2.7-3.5  $\mu$ m, n

= 14

#### Mesenterial filaments

basitrichs, 17.4-21.1 x 2.5-2.7  $\mu$ m, n = 6

basitrichs, 29.8-34.7(39.7) x 3.3-5.0  $\mu$ m, n

= 6

microbasic p-mastigophores, 26.0-34.7 x 3.7-6.0  $\mu$ m, n = 19

Repeated efforts failed to reveal microbasic p-mastigophores in the actinopharynx, and the large mesenterial filament basitrichs were present in two separate smears. Thus despite many similarities between Hertwig's [1882a, b]

description of *S. crassa* and my findings, even making allowances for the poor condition of the original specimen, the USARP specimens cannot be reconciled with the type species of *Sicyonis*.

*Cymbactis erythrocephala* was described by Pax [1922, 1923] in only the most general terms, but the description contained notes on color in life. Carlgren [1927], after re-examining Pax' material, provided more details and concluded that the species actually belongs to *Sicyonis*. His nematocyst and other data agree well with my findings.

*Sicyonis aurora*, as described by Carlgren and Stephenson [1929] from a single specimen, fits the USARP anemones perfectly. Carlgren's [1939] description of *S. antarctica* also accords well with this material, the sphincter illustration (Figure 5) looking just like my Figure 27B, and the cnidae measurements agreeing almost exactly (data on mesenterial filament basitrichs seem to have been inadvertently omitted). Carlgren explicitly distin-

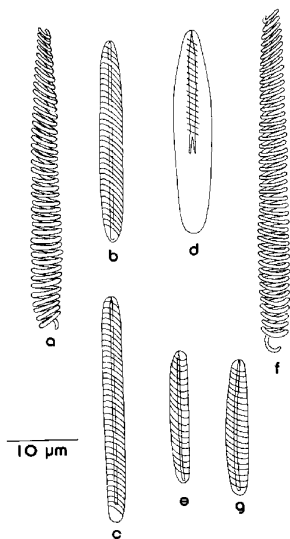


Fig. 28. Cnidae of *Sicyonis erythrocephala*; see text for explanation.

gushed his new species from *S. erythrocephala* solely on the basis of two classes of cnidae from one specimen of each species. In fact, his figures span the range I found for the eight USARP specimens from which I gathered cnida data.

All three nominal species synonymized here were described as having basal thickenings on the aboral side of their tentacles. Based on USARP anemones, this feature appears variable: some, all, or no tentacles of an animal may exhibit this trait. Probably related to this is the degree to which longitudinal tentacle musculature is differentially developed on oral and aboral sides; in unthickened tentacles, development appears to be uniform, whereas in thickened ones it is greater on the oral side.

The alcohol in which specimens of *Sicyonis erythrocephala* were preserved is frequently darkly colored.

The 113 specimens I examined came from depths shallower (261-270 m) and greater (3867 m) than had previously been known for *Sicyonis erythrocephala*. Based on these specimens and the five previously known, representatives of the species probably occur all around Antarctica and range as far north as 42°S.

#### Material examined (Fig. 11)

- Eltanin Cruise 4  
Sta. 138, 62°00'–05'S, 61°09'–08'W, 1437 m, CAS 029434 (x4)
- Eltanin Cruise 6  
Sta. 413, 62°07'–08'S, 55°58'–56°05'W, 1113–1153 m, CAS 029436 (x5)  
Sta. 426, 62°27'–34'S, 57°58'–49'W, 809–1116 m, CAS 029437 (x2)  
Sta. 428, 62°41'–39'S, 57°51'–46'W, 662–1120 m, USNM 60787 (x7)  
Sta. 430, 62°38'–41'S, 59°37'–23'W, 681–1409 m, USNM 60786 (x13)  
Sta. 432, 62°52'–55'S, 59°27'–15'W, 884–935 m, USNM 60785 (x7)  
Sta. 444, 62°56'–59'S, 62°02'–04'W, 732–750 m, USNM 60789 (x1)
- Eltanin Cruise 7  
Sta. 480, 58°06'–10'S, 44°56'–47'W, 2800 m, USNM 60790 (x1)  
Sta. 545, 60°02'–59°55'S, 49°14'W, 3819–3876 m, CAS 030953 (x7)  
Sta. 549, 58°57'–59°00'S, 49°05'–12'W, 3867 m, USNM 60791 (x1)

- Eltanin Cruise 12  
Sta. 991, 60°57'–54'S, 56°52'–58'W, 2672–3020 m, USNM 60788 (x1)  
Sta. 997, 61°44.3'S, 55°56.1'W, 768 m, USNM 60784 (x46)  
Sta. 1058, 59°50'–52'S, 32°27'–23'W, 355–360 m, CAS 029438 (x1)

- Eltanin Cruise 32  
Sta. 2065, 78°23'S, 173°06'–02'W, 473–475 m, CAS 029433 (x1)

- Islas Orcadas Cruise 75  
Sta. 93, 54°38.8'S, 38°51.3'W, 261–270 m, CAS 029435 (x2)

#### Previous records

- Pax [1922, 1923], 70°10'S, 80°50'W, 460 m (x2)  
Carlgren and Stephenson [1929], off Maria Island, Tasmania [42°35'S, 148°00'E], 1300 fm [2378 m] (x1)  
Carlgren [1939], 71°22'S, 16°34'W, 1410 fm [2578 m] (x2)

#### Stomphia selaginella (Stephenson, 1918)

- Cymbactis selaginella: Stephenson, 1918, p. 3, 36.--Carlgren, 1921, p. 211.  
Stomphia selaginella: Stephenson, 1920b, p. 559.--Pax, 1923, p. 12, 25; 1926, p. 4, 51, 61.--Carlgren, 1928, p. 253, 261, 262.--Carlgren and Stephenson, 1929, p. 22.--Carl-

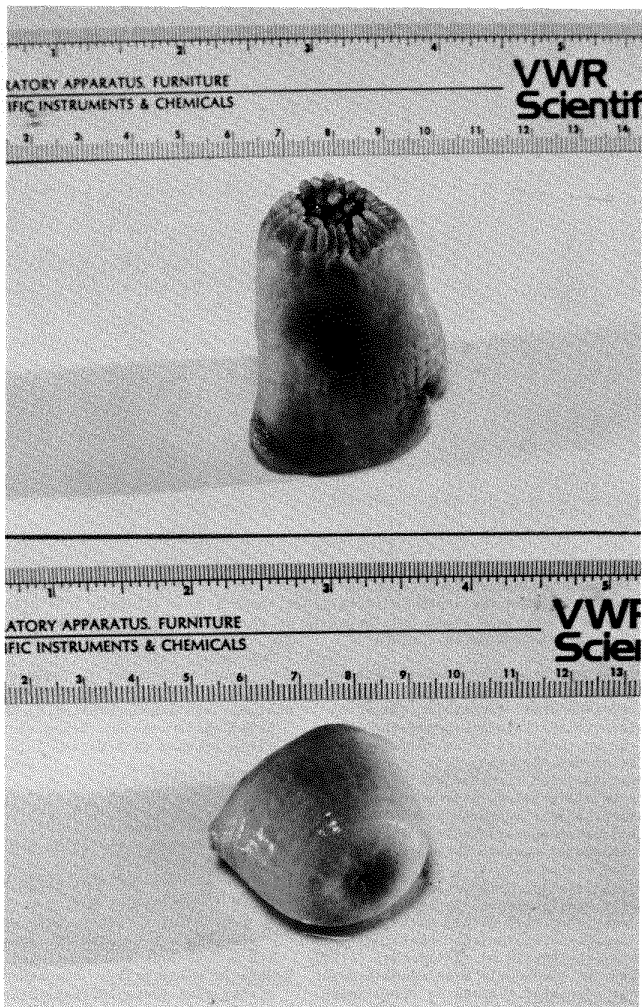


Fig. 29. *Stomphia selaginella* (USNM 60655).

gren, 1939, p. 795; 1949, p. 79.--Grebely, 1975, p. 9.

*Cymbactis frigida*: Pax, 1922, p. 80; 1926, p. 4, 5, 32, 51, 61.

#### Description

**Body form and size.** Column of some expanded specimens cylindrical, of others narrowing distally. Most bluntly pyramidal to bell-shaped or domed with tentacles mostly to completely introverted (Figure 29). Length 15-50 mm, mostly 30-40 mm; pedal disc diameter typically somewhat less than length; oral end usually narrower than basal. Column ectoderm mostly to completely sloughed in specimens examined; remnants of thin, pinkish-brown or reddish-brown ectoderm most common in creases near proximal end. Mesenterial insertions generally visible through smooth, thin mesoglea that gives preserved animals hyaline white color. In contracted specimens, distal-most part of column (which may be introverted) arrayed in narrow, shallow, sharp, longitudinal wrinkles arising both from and between tentacles, to accommodate narrowing diameter.

**Base.** Flat in most specimens; convex in some. Rarely, center projected nipplelike; two specimens with regularly spaced, conical indentations 2 mm across, 1 mm or less deep, spaced 2-5 mm apart, embossed on pedal disc. Thin brown ectoderm generally intact. Mesenterial insertions visible as light radial lines in areas where ectoderm sloughed.

**Tentacles and oral disc.** Tentacles occupy periphery of oral disc. In central part, mesenterial insertions visible; some animals also have furrows concentric with mouth. Mouth up to half as long as oral disc is across; generally round; flanked by lips. Ectoderm and color like those of tentacles.

Tentacles stout, conical, pointed (Figure 29); of equal thickness throughout. Typically inner tentacles 5-10 mm long by 2 mm across at base, outer ones up to half as large, mere bumps in some individuals; very stubby in strongly contracted animals. Ectoderm may be longitudinally and/or circumferentially furrowed; if both, reticulate in appearance; but ectoderm sloughed in many specimens. Generally tentacles having ectoderm yellowish, those lacking it pinkish-tan. Counted 57-80 tentacles; most animals with 64-68.

Tentacle longitudinal muscles mesogleal (Figure 30). Radial oral disc muscles mesogleal, reticular, poorly developed, or absent where mesenteries insert on disc.

**Mesenteries and internal anatomy.** Primary and secondary mesenteries, numbering 16 (15 in one anemone) pairs, complete and sterile; tertiary mesenteries incomplete and fertile; mesenteries of higher orders present only proximally, usually sterile, may lack filaments. Highest mesenteries, usually of fourth cycle,



Fig. 30. Longitudinal section through tentacle of *Stomphia selaginella* (CAS 028987). Note large mesogleal longitudinal muscle bundles. Scale = 500  $\mu$ m.

may not all develop simultaneously, so fewer than twice the number of tentacles (e.g., 115 and 68). In most, equal number proximally and distally; however, fifth cycle can arise (one anemone had 64 tentacles and 168 mesenteries at its limbus). Two members of each pair equally developed.

Retractor muscles strong, diffuse, arising immediately beside column wall; lamellae with short side branches, giving them the distinctive appearance that led Stephenson [1918] to name the species after club moss (Figure 31). Mesenterial filaments may be pinkish-tan. Parietobasilar muscles not evident in section. Oral but no marginal stomata.

Sexes separate; trophonemata associated with developing eggs (Figure 31B). Young brooded internally by females; one bell-shaped contracted individual 30 mm in length and diameter contained six young with oral disc diameters ranging from 3 to 6 mm; the pedal disc of each was produced into a cone.

Actinopharynx half to two thirds length of



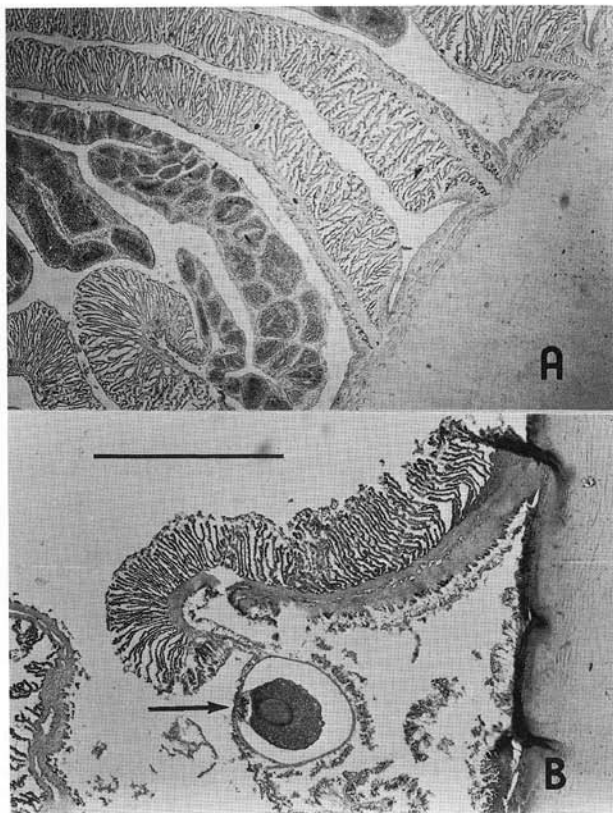


Fig. 31. Cross sections through mesenteries and body wall of *Stomphia selaginella*. (A) Male (CAS 028987); note circular column muscles; scale = 1 mm. (B) Female (USNM 60657); trophonema associated with developing oocyte indicated by arrow; scale = 200  $\mu$ m.

body; may be dark violet or brown; regularly and shallowly furrowed, with two symmetrical, shallow, white, slightly elongate siphonoglyphs that are attached to directive mesenteries.

Sphincter muscle mesogleal, very long, adjacent to endoderm (Figure 32). Mostly or completely fills margin, but narrows short distance proximally. May be longitudinally striate.

Endodermal circular column musculature well-developed (Figure 31).

#### Distribution and size of cnidae (Fig. 33)

##### Tentacles

- spirocysts(a), 23.8-57.4 x 2.5-4.9  $\mu$ m, n = 102, N = 14/14
- basitrichs(b), (18.0)19.7-28.7 x (1.8)2.3-3.3  $\mu$ m, n = 85, N = 14/14
- hoplotelic microbasic b-mastigophores(c), (34.4)37.7-50.0 x (4.9)5.3-7.0(7.6)  $\mu$ m, n = 44, N = 12/14
- Actinopharynx
- basitrichs(d), 18.0-33.6(36.1) x 2.3-3.3(3.7)  $\mu$ m, n = 92, N = 13/14

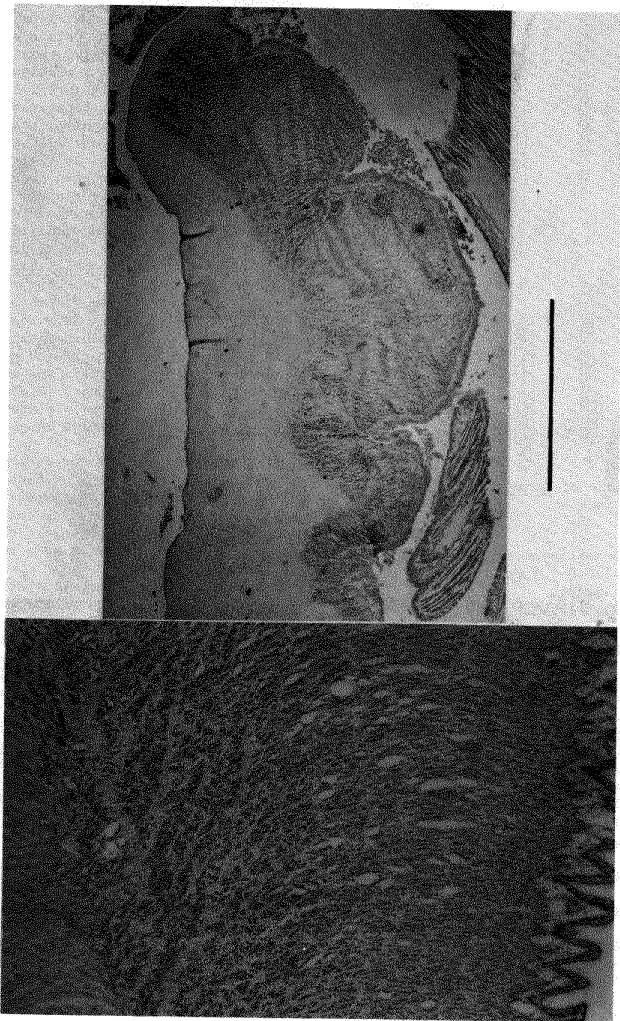


Fig. 32. Longitudinal sections through mesogleal sphincter muscles of two specimens of Stomphia selaginella (CAS 028987); endodermal side at right; scale = 1 mm for upper photo, 250  $\mu\text{m}$ , for lower photo.

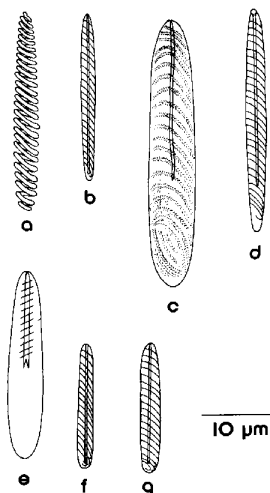


Fig. 33. Cnidae of *Stomphia selaginella*; see text for explanation.

- microbasitrichs (a), (21.3)23.0-29.5 x (3.1)3.9-5.5  $\mu$ m, n = 58, N = 12/14  
 Mesenterial filaments  
 basitrichs (f), (13.9)14.8-20.5(24.6) x 2.1-3.3  $\mu$ m, n = 30, N = 8/12  
 microbasitrichs (g), (18.0)18.9-27.9 x (3.1)4.1-5.7  $\mu$ m, n = 79, N = 12/12  
 Column  
 spirocysts (a), 29.5-48.4 x 3.1-4.1  $\mu$ m, n = 14, N = 2/4  
 basitrichs (g), (15.6)17.2-24.6 x 2.3-3.3  $\mu$ m, n = 37, N = 4/4

In some individuals, actinopharynx basitrichs seem divisible into two populations, one shorter than 20  $\mu$ m and one longer than 25  $\mu$ m. In most, however, there is a complete continuum of size.

#### Discussion

My findings are in excellent accord with what is known of *Stomphia selaginella*. Grebelny's [1975] cnida data are incomplete and differ slightly, but those of Carlgren and Stephenson [1929] agree completely with the data presented here. Stephenson [1918, 1920b] and Carlgren and Stephenson [1929] reported that the youngest mesenteries may follow the *Actinostola* rule. Some individuals that I examined suggested that as well, but it is not obvious. Pax [1922] found the two mesenteries of each pair to be equally developed.

Stephenson's [1918] original description is thorough and accurate. He noted and figured the two extremely different appearances these anemones can assume, one rather stiff, the other flaccid. Presumably, this is due to variability in state of expansion and in fixation. I, too, initially attributed these animals to separate taxa. Stephenson [1918] found no mesenterial stomata; they were obscure or absent in some USARP specimens. Pax [1922] was the first to find young being brooded internally; Carlgren and Stephenson [1929] remarked on their conical shape.

The nipplelike prolongation in the center of the pedal disc of some individuals, noted by Stephenson [1918] in the original description, suggests that *Stomphia selaginella* may swim. During swimming by other species of *Stomphia*, the pedal disc "forms a narrow cone" [Robson, 1966, p. 347]. Swimming in *Stomphia*, accomplished through column flexion, is generally provoked by contact with potential predators such as asteroids and nudibranchs [Robson, 1966] or congeners [Siebert, 1973]. Distributions of putative predators [Robson, 1966] extend into the known range of *S. selaginella*.

The conical indentations on the pedal discs of two individuals must have been caused by the surface to which the anemones were attached. They are so evenly spaced and of such uniform size as to suggest the causative object was an animal, such as a snail with a papillate shell.

The 212 specimens from 41 stations make *Stomphia selaginella* one of the most numerous in the USARP collection. They were collected in about equal numbers on opposite sides of Antarctica. In the Ross Sea, they occurred from 324 to as much as 1674 m, and in the southwest Atlantic, near the South Orkney and South Shetland Islands, they were taken from as little as 128 to perhaps as much as 1120 (certainly 801) m. *Stomphia selaginella* had previously been collected from these areas as well as off Wilkes Land, although some USARP specimens came from much greater depths than had been known for the species.

#### Material examined (Fig. 34)

##### Etanin Cruise 6

- Sta. 428, 62°41'-39'S, 57°51'-46'W, 662-1120 m, USNM 60671 (x3), USNM 60997 (x12)  
 Sta. 432, 62°52'-55'S, 59°27'-15'W, 884-935 m, USNM 60996 (x2)  
 Sta. 439, 63°51'-50'S, 62°38'-35'W, 128-165 m, USNM 60664 (x2)

##### Etanin Cruise 12

- Sta. 997, 61°44'-46'S, 55°56'-54'W, 769 m, CAS 028988 (x16)  
 Sta. 1003, 62°41'S, 54°43'W, 210-220 m, CAS 029049 (x1)



Fig. 34. Distribution of *Stomphia selaginella*.

Sta. 1058, 60°50'-52'S, 32°27'-23'W, 650-659 m, USNM 60669 (x2)  
 Sta. 1082, 60°50'-52'S, 42°55'-56'W, 298-302 m, USNM 61000(x1)  
 Sta. 1084, 60°22'-23'S, 46°50'-52'W, 298-403 m, CAS 028992 (x3)

Eltanin Cruise 22

Sta. 1581, 56°19'-20'S, 27°29'-28'W, 148-201 m, CAS 028990 (x1)

Eltanin Cruise 27

Sta. 1869, 71°16'S, 171°45'-35'E, 1565-1674 m, CAS 029638 (x1)  
 Sta. 1889, 75°00'S, 169°28'-26'E, 324-329 m, CAS 028991 (x1)  
 Sta. 1924, 75°10'-11'S, 176°13'-07'W, 728-732 m, USNM 60650 (x35)

Eltanin Cruise 32

Sta. 1997, 72°00.2'S, 172°28.2'E, 523-528 m, CAS 028987 (x9)

Sta. 2009, 73°00'S, 171°46'-40'E, 580 m, USNM 60665 (x4)  
 Sta. 2012, 73°59'-58'S, 170°51'-58'E, 589-608 m, CAS 030527 (x1)  
 Sta. 2016, 73°58'-59'S, 176°11'-16'E, 581-586 m, USNM 60654 (x2)  
 Sta. 2026, 75°06'-04'S, 176°37'W, 801 m, USNM 60652 (x37)  
 Sta. 2029, 75°00'S, 176°42'-40'E, 335-338 m, CAS 028995 (x4)  
 Sta. 2034, 74°32'S, 168°13'-16'E, 888-892 m, USNM 60998 (x2)  
 Sta. 2039, 76°00'S, 172°04'E, 565-569 m, USNM 60668 (x1)  
 Sta. 2041, 75°58'-59'S, 178°10'-18'E, 513-517 m, USNM 60660 (x1)  
 Sta. 2045, 76°00'-01'S, 176°48'-44'W, 566-569 m, USNM 60653 (x4)  
 Sta. 2063, 78°17'S, 177°58'-55'W, 636-637 m, USNM 60693 (x2)  
 Sta. 2065, 78°23'S, 173°06'-02'W, 473-475 m, USNM 60655 (x19)

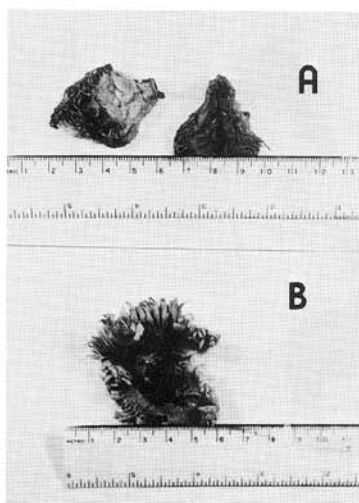


Fig. 35. *Actinoscyphia plebeia*. (A) CAS 028765; note folded oral discs. (B) CAS 029628.

- Sta. 122, 61°20.2'S, 44°25.5'W, 274-285 m, USNM 60657 (x1)  
 Sta. 129, 60°56.9'S, 44°36.2'W, 225-234 m, CAS 028994 (x1)

Hero Cruise 721

- Sta. 1084, 67°04.6'-02.3'S, 69°21.7'-51.8'W, 460-500 m, USNM 60999 (x1)

Hero Cruise 824

- Sta. 5, 65°04.87'-54.48'S, 65°19.16'-19.85'W, 246-270 m, USNM 60658 (x1)

Previous records

- Stephenson [1918], 74°25'S, 179°03'E, 158 fm [289 m] (x5); 77°13'S, 164°18'E, 207 fm [379 m] (x1); 77°05'S, 164°17'E, 140 fm [256 m] (x1)  
 Pax [1922, 1926], 66°02'S, 89°38'E, 380 m (x1)  
 Carlgren and Stephenson [1929], 65°55'S, 145°21'E, 318 fm [582 m] (x6); 66°44'S, 97°28'E, 358 fm [655 m] (x1); 65°06'S, 96°13'E, 325 fm [594 m] (x3); 65°20'S, 95°27'E, 240 fm [439 m] (x1); 65°42'S, 92°10'E, 60 fm [110m] (x1)  
 Carlgren [1939], South Orkney Islands [60°S, 45°W], 5-10 fm [9-18 m] (x1)  
 Crebelny [1975], Haswell archipelago [66°S, 93°E], no depth (x3); Sandefjord Bay [60°37'S, 45°03'W], South Orkney Islands, 20-50 m (x12)

- Sta. 2075, 76°25'S, 170°24'-32'W, 568 m, USNM 60651 (x10)  
 Sta. 2080, 75°50'-52'S, 173°08'W, 468-474 m, USNM 60667 (x2)  
 Sta. 2082, 75°50'-51'S, 173°08'W, 476 m, USNM 60666 (x3)  
 Sta. 2085, 77°32'-31'S, 172°32'-23'W, 468-482 m, USNM 60659 (x1)  
 Sta. 2088, 76°58'-59'S, 171°07'W, 430-433 m, CAS 028986 (x7)  
 Sta. 2099, 77°02'S, 166°44'-50'W, 408-415 m, USNM 60663 (x2)  
 Sta. 2101, 77°42'-44'S, 167°44'-39'W, 547-552 m, USNM 60661 (x1)  
 Sta. 2104, 77°33'-31'S, 163°02'-05'W, 606-638 m, CAS 028989 (x4)  
 Sta. 2123, 72°28'-26'S, 175°26'-28'E, 548-565 m, USNM 60662 (x1)

Islas Orcadas Cruise 575

- Sta. 11, 53°38.0'S, 38°01.8'W, 132-143 m, USNM 60690 (x5)  
 Sta. 71, 56°22.7'S, 27°22.7'W, 130-241 m, USNM 60670 (x1)  
 Sta. 73, 56°16.0'S, 27°30.0'W, 208-375 m, USNM 60656 (x3)

Islas Orcadas Cruise 876

- Sta. 121, 61°47.0'S, 43°40.0'W, 616-642 m, CAS 028993 (x2)



Fig. 36. Cross section through body wall and mesenteries of *Actinoscyphia plebeia* (CAS 029628). Scale = 500  $\mu$ m.

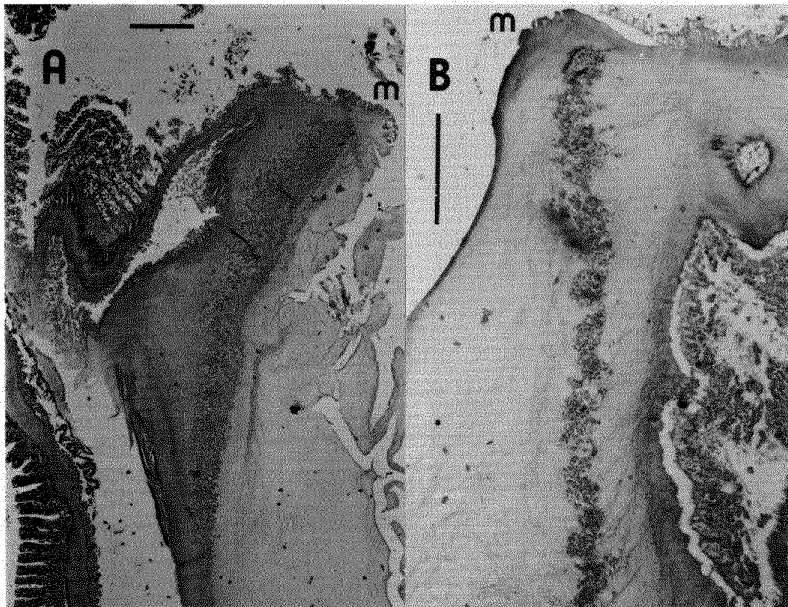


Fig. 37. Longitudinal sections through mesogleal sphincter of *Actinoscyphia plebeia*. (A) CAS 028763; exterior of animal at right. (B) CAS 029628; exterior of animal at left. The m is margin; scale = 500  $\mu$ m.

Family ACTINOSCYPHIIDAE

*Actinoscyphia plebeia* (McMurrich, 1893)

*Actinernus plebeius*: McMurrich, 1893, p. 166.

--Doumenc, 1975, p. 182.

*Actinoscyphia plebeia*: Stephenson, 1920b, p. 541.--Carligen, 1949, p. 84.--Doumenc 1975, p. 187; Riemann-Zürneck, 1978b, p. 146.

**Description**

**Body form and size.** Oral disc 35-50 mm across, much larger than pedal disc. Column devoid of ectoderm in most individuals; color of well-preserved specimens white; exposed mesoglea may be dirty grey; rare animals with easily deciduous cuticlelike layer. May be as long as oral disc is wide but generally only half that. Some specimens crumbly/brittle.

**Base.** Generally elongate (up to 25-30 mm long), often appearing as if it had been wrapped around a small cylindrical object. Thin, golden-brown chitinous material closely

applied to pedal disc of most specimens, apparently secreted by it.

**Tentacles and oral disc.** Oral disc flat, not lobed, with deep radial furrows along mesenterial insertions (Figure 35B). Mouth round to oval, a third to a quarter disc diameter, with lips. In some specimens, half of oral disc folded over onto other or the two halves raised to meet one another, much like a Venus Flytrap plant (Figure 35A). Oral and pedal discs may be folded in different planes.

Tentacles, which taper to sharp point or filament, arise at edge of disc, one communicating with each exocoel and endocoel (Figure 35B); largest ones, up to 12 mm long by 1-2 mm diameter at base, somewhat arad of slightly smaller ones. Generally 120-140 tentacles; thickenings on aboral side of bases run onto upper column. Oral disc and tentacles with light yellow to reddish-brown ectoderm.

**Mesenteries and internal anatomy.** Mesenteries very thin (Figure 36), all except directives and some or all of highest order (generally sixth) may be fertile; only primary

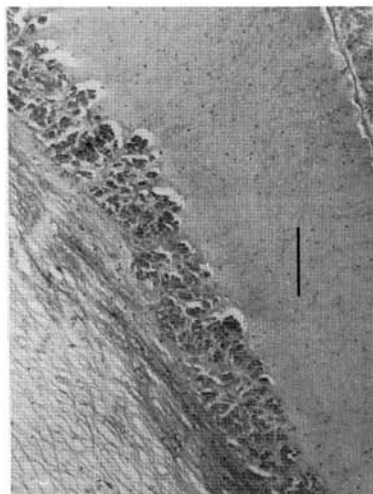


Fig. 38. Detail of *Actinoscyphia plebeia* sphincter (CAS 029628). Fibrous mesoglea is on ectodermal side of sphincter. Scale = 25  $\mu$ m.

mesenteries complete; all with filaments. Members of each pair equally developed; mesenteries added from distal end. Retractor muscles short and weak; parietobasilar muscles poorly developed. Sexes separate. Two long, symmetrical siphonoglyphs attached to two pairs of directive mesenteries; actinopharynx may be brown or reddish.

Weak mesogleal sphincter moderately long; in center of marginal mesoglea, approaching endoderm proximally (Figure 37A); generally broader at distal end (Figure 37) but may be narrow throughout, consisting of single column of muscle-filled cavities (Figure 37B; McMurrich [1893, Figure 43]); meshlike in some individuals. Column mesoglae thick (up to 4 mm), thicker yet immediately proximal to each aboral tentacle bulge; gelatinous in some specimens; outer part with circumferential fibers, inner part homogeneous (Figures 37 and 38). Tentacle longitudinal muscles mesoectodermal, circular muscles endodermal (Figure 39).

#### Distribution and size of cnidae (Fig. 40)

##### Tentacles

- spirocysts(a), 23.0-45.9(49.2)  $\times$  3.1-5.5  $\mu$ m,  
n = 45, N = 6/6  
spirocysts(b), (31.2)33.6-73.8  $\times$  4.7-11.5  
 $\mu$ m, n = 49, N = 6/6

basitrichs(c), (13.9)15.6-20.5  $\times$  2.1-2.9  $\mu$ m,  
n = 25, N = 5/6 (concentrated nearer the  
base)

basitrichs(d), 23.0-34.4  $\times$  3.7-4.9  $\mu$ m, n =  
37, N = 4/5 (concentrated nearer the tip)

holotrichs(e), 27.1-41.8  $\times$  4.3-5.7  $\mu$ m, n =  
49, N = 6/6

##### Actinopharynx

basitrichs(d), 24.6-35.3  $\times$  3.3-4.9  $\mu$ m, n =  
36, N = 4/4

microbasic p-mastigophores(f), 29.5-  
35.3(40.2)  $\times$  4.1-5.3  $\mu$ m, n = 16, N = 3/4

##### Mesenterial filaments

basitrichs(c), 15.6-19.7  $\times$  2.3-3.3  $\mu$ m, n =  
28, N = 4/5

basitrichs(d), 27.9-39.4  $\times$  4.1-4.9(5.5)  $\mu$ m,  
n = 19, N = 3/5

microbasic p-mastigophores(f), 25.4-32.8  $\times$   
4.1-5.1  $\mu$ m, n = 28, N = 4/5

#### Discussion

McMurrich's [1893] original description of *Actinernus plebeius*, based on a single poorly preserved specimen, is very accurate. The holotype, USNM 17789, is the same dirty grey color as some USARP specimens.

This genus has been poorly known due to a dearth of material. With the aid of deep-water photographs and recently collected specimens, Riemann-Zürneck [1978b] redescribed *Actinoscyphia saginata* and *A. aurelia* from the North Atlantic. She resurrected Stephenson's [1920b] family Actinoscyphiidae, correctly recognizing that these anemones do not belong in the Actinostolidae, where Carlgren [1949] had placed them. Only in the possession of mesoectodermal longitudinal tentacle muscles, rather than ectodermal ones, does *A. plebeia* depart from Stephenson's [1920b] and Riemann-Zürneck's [1978b] definitions. This is a minor matter, easily remedied by rephrasing to include that possibility.

Doumenc [1975] questioned whether *Actinernus plebeius* might be synonymous with the North Atlantic species *Actinoscyphia saginata*. Data from USARP specimens and from Riemann-Zürneck's [1978b] redescrptions prove that the species are distinct. *Actinoscyphia plebeia* is slimmer and has an upper column that is less lumpy than either of its North Atlantic congeners. The small basitrichs of *A. saginata* tentacles are smaller than those of *A. plebeia*, and the former lacks large basitrichs in its mesenterial filaments. These cnidom differences as well as others distinguish *A. aurelia* from *A. plebeia*.

Doumenc [1975] and Riemann-Zürneck [1978b] referred to the oral disc of *Actinoscyphia* as bilobate. In *A. plebeia*, at least, it is not divided morphologically, being flat and circular in well-expanded specimens. Rather, the bilobate appearance is caused by the oral disc's folding against itself, presumably for

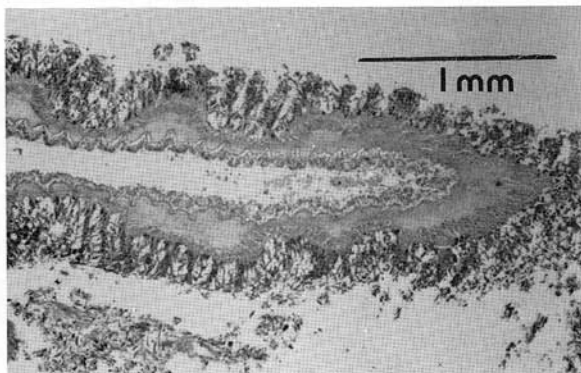


Fig. 39. Longitudinal section through tentacle of Actinoscyphia plebeia (CAS 029628).

feeding [Riemann-Zürneck 1978b]. Actinoscyphia plebeia superficially resembles Actinernus elongatus (Hertwig 1882a, b), which adopts a similar Venus Flytrap stance, occurs at similar depths (indeed, the two have been taken at the same station), and, perhaps as a result of its deep occurrence, is in poor condition when collected [Dunn, 1983].

The 18 USARP specimens from 11 stations are the only examples of Actinoscyphia known aside from the holotype. All but two came from 2000-4000 m, deeper than any species of Actinoscyphia has been taken previously. The two other specimens were from typical depths for the genus [Carlgren, 1949; Rowe, 1971; Riemann-Zürneck, 1978b]. Perhaps not coincidentally, the shallowest specimen came from the furthest south; it was also the only one from the Ross Sea. The others were taken a quarter of the way around Antarctica, in the southwest Atlantic and through the Drake Passage, barely into the Pacific. Type locality of the species is off the coast of central Chile.

Material examined (Fig. 18)

Eltanin Cruise 5

Sta. 305, 59°59'-58'S, 70°43'-32'W, 2782-2827 m, USNM 60677 (x1)

Eltanin Cruise 6

Sta. 353, 55°15'-18'S, 58°55'-58'W, 3514-3642 m, CAS 029629 (x3)

Eltanin Cruise 7

Sta. 545, 60°02'-59°55'S, 49°14'W, 3819-3876 m, CAS 028763 (x1)

Eltanin Cruise 9

Sta. 722, 56°04'-00'S, 33°59'-57'W, 3138-3239 m, USNM 60674 (x3)

Sta. 723, 54°00'-05'S, 33°40'-43'W, 2663-2718 m, USNM 60676 (x1)

Eltanin Cruise 21

Sta. 283, 53°13'-16'S, 75°41'W, 1500-1666 m, USNM 60675 (x1)

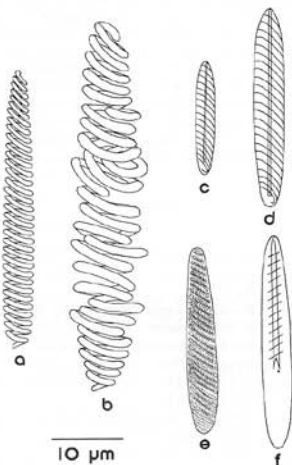


Fig. 40. Cnidae of Actinoscyphia plebeia; see text for explanation.



Eltanin Cruise 32

Sta. 2104, 77°33'-31'S, 163°02'-05'W, 606-638 m, CAS 028764 (x1)

## Islas Orcadas Cruise 575

Sta. 51, 57°22.6'S, 26°34.0'W, 2248-2402 m, CAS 028765 (x2)  
 Sta. 63, 56°29.5'S, 26°46.9'W, 2248-2387 m, CAS 029628 (x1)  
 Sta. 75, 56°03.5'S, 26°58.3'W, 2128-2161 m, CAS 029627 (x1)  
 Sta. 81, 56°29.5'S, 28°01.1'W, 2384-2402 m, USNM 60695 (x3)

Previous record

McMurrich [1883], 38°08'S, 75°53'W, 677 fm, [1238 m] (x1)

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