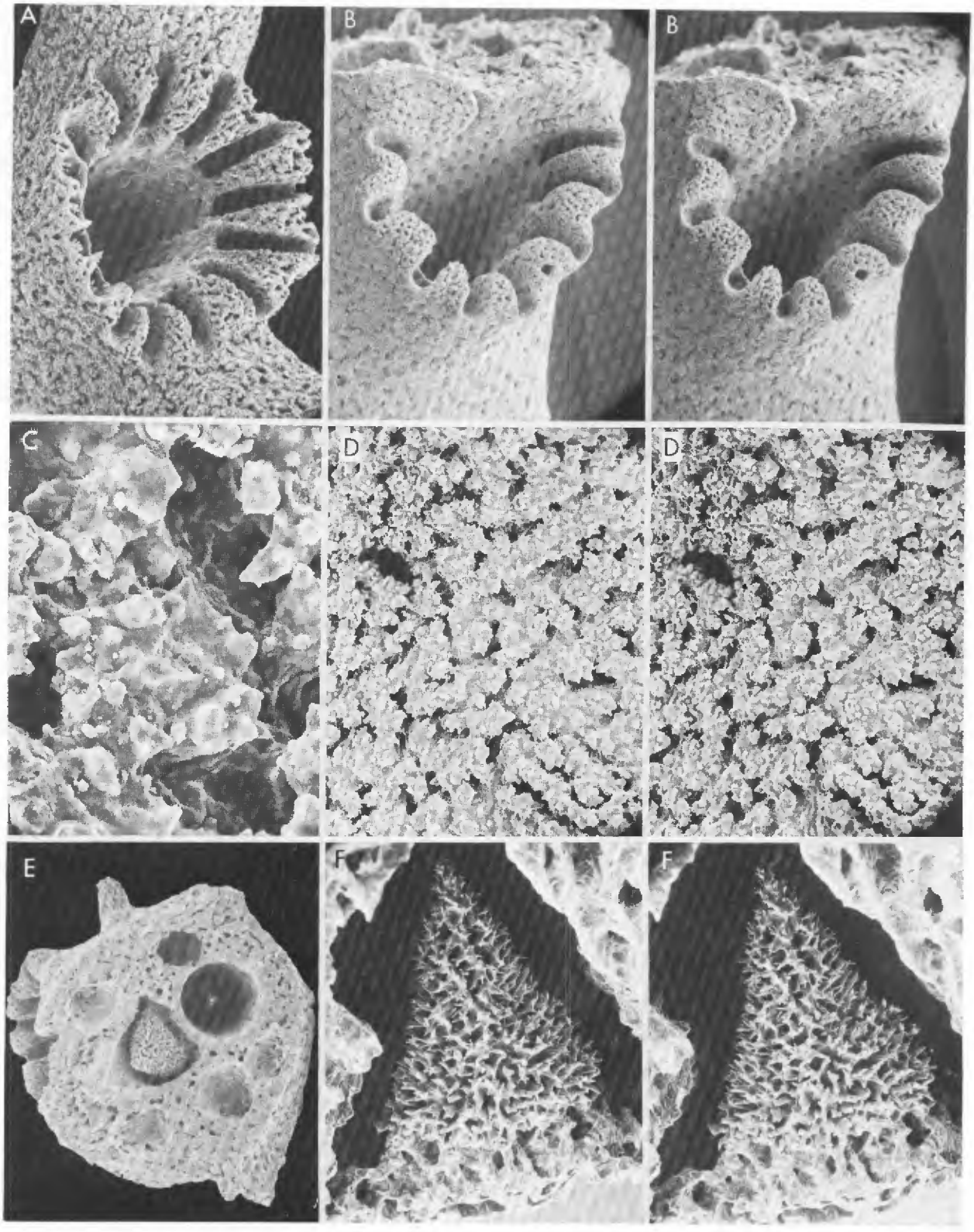


Fig. 44. Allopora profunda Moseley. A, Part of syntype from Challenger sta. 306, cyclosystem, x29; B, Eltanin sta. 1536, cyclosystem, x27, stereo pair; C, D, syntype from Challenger sta. 306, coenosteal texture, x411, x86, respectively (Figure 44D is a stereo pair); E, Eltanin sta. 1536, cross section of branch revealing gastrostyle and ampullae, x20; F, syntype from Challenger sta. 306, gastrostyle, x71, stereo pair.

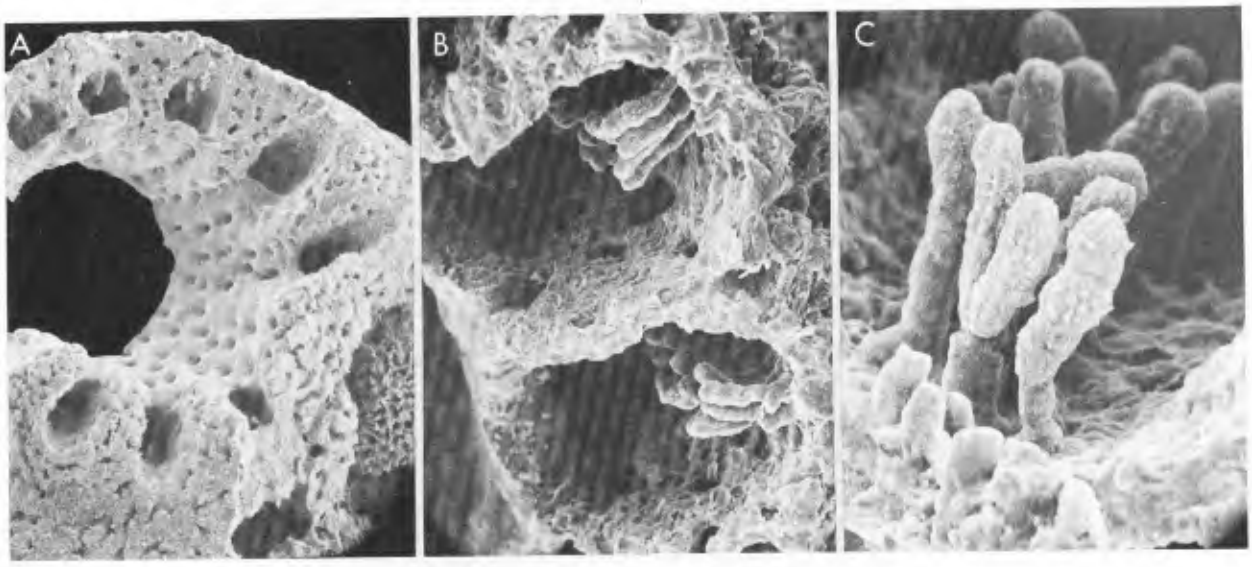


Fig. 45. Allopora profunda Moseley. A, Eltanin sta. 1536, cross section of cyclosystem revealing dactylostyles, x36; B, C, syntype from Challenger sta. 306, dactylostyles, x179, x443, respectively.

mm in diameter, and even bifurcate at various points. The worm appears to induce the anterior rectangular ridge to form as a preliminary step in tube formation.

Also, numerous specimens of the ophiuroid Astrohamma tuberculatum (Koehler) were found clinging to the branches of the specimen from Eltanin station 1593.

Discussion. Stylaster densicaulis is similar to the northwestern Atlantic S. erubescens Pourtalès, 1868, and Moseley [1876b] originally identified it as such. They are similar in growth form, presence of anterior ridges, gastrostyle shape, and texture, but S. erubescens has smaller and more complete cyclosystems (diastemas rare) and less dactylopores per cyclosystem.

Hickson and England's [1905] record is clearly a misidentification, their specimen having highly elliptical branch cross sections with sharp keels on both anterior and posterior sides.

Material examined. Eltanin sta. 740, USNM 52611, 52615; sta. 970, USNM 60019; sta. 1520, USNM 60020; sta. 1521, USNM 60018; sta. 1536, USNM 60017; sta. 1593, USNM 60016. Vema sta. 17-53, USNM 52613; sta. 17-54, USNM 60199. WH sta. 328/71, ZIZM. WS sta. 840, BM. Challenger sta. 320 (holotype). Other material: Siboga sta. 156 and 177 (ZMA Coel. 7367 and 7368), incorrectly identified as S. densicaulis by Hickson and England [1905].

Types. Holotype not designated by Moseley, so all specimens from Challenger sta. 320 examined by him considered syntypes. Deposited at BM: figured syntype [Moseley, 1881, Plate 1, fig. 5] BM 1880.11.25.175; other syntypes, BM 1880.11.25.199. Type-locality: 37°17'S, 53°52'W (off Rio de la Plata, Uruguay), 1097 m.

Distribution. Off southeastern South America from Rio de la Plata to Tierra del Fuego; Scotia Ridge to South Georgia (Map 13). Depth: 357-1244 m.

Genus Allopora Ehrenberg, 1834

Diagnosis. Colonies encrusting or arborescent, flabellate or bushy. Distal cyclosystems sometimes arranged sympodially but most cyclosystems scattered irregularly on all sides of branches. Coenosteal texture reticulate. Both gastrotyles and dactylostyles present. Ampullae usually internal or expressed only as low bulges. Type-species: Allopora oculina Ehrenberg, 1834 (= Millepora norvegica Gunnerus, 1768), by monotypy.

26. Allopora profunda Moseley, 1879
Figs. 41B, 44A-44F, 45A-45C

Allopora profunda Moseley, 1879, pp. 454-457, pl. 34, fig. 6, pl. 35, fig. 13, pl. 39, pl. 44, fig. 12; 1881, pp. 62-65, pl. 1, fig. 6, pl. 2, fig. 13, pl. 6, pl. 11, fig. 12.--Boschma, 1957, p. 27; 1960, pp. 400-406, pl. 1, text fig 1; 1966b, pp. 117, 118.--Boschma and Lowe, 1969, p. 15, pl. 5, map 3.

Not Allopora profunda; Hutton, 1904, p. 318 (= Stenohelia profunda).

Stylaster (Allopora) profundus; Boschma, 1951, p. 457.

Description. Colonies are moderately large, with uniplanar, nonanastomosing branches. The largest colony is 10 cm tall and 6.5 cm broad, with a basal branch diameter of 14.0 x 12.2 mm. Branches are round to slightly elliptical in cross section, the greater axis of the ellipse being in the plane of the fan. Distal branches are about 2 mm in diameter. There is usually a flattened worm tube found on the posterior side of every colony, which measures up to 6.2 x 3.0 mm in diameter. The tube, which sometimes bears cyclosystems, often crosses between adjacent branches, giving the effect of branch anastomosis.

The coenosteum is dense and very coarse. Coenosteal strips 50-120 μm wide are arranged in a contorted, reticulate pattern. Irregularly shaped granules about 5 μm in diameter and clusters of granules cover the coenosteum as small tubercles and hillocks, producing a very gritty texture. Dried tissue is pale yellow; bleached corallum is white.

Cyclosystems are round to slightly elliptical in cross section, 1.4-1.9 mm in diameter. On distal branches the cyclosystems are arranged in alternating fashion on the sides of branches, as in Stylaster. Away from the branch tip, additional cyclosystems are often found on the anterior and posterior sides, especially near branch axils. On thick basal branches the cyclosystems are irregularly arranged on the anterior side, the sympodial arrangement usually being completely lost. The proximal cyclosystem edge is only slightly raised above the level of the coenosteum. On the basis of 22 cyclosystems the number of catylopores per cyclosystem ranged from 9 to 20, with an average of 15.5 (σ = 2.24) and mode of 15. Diastemas are rare, even on large-diameter basal branches. Dactylotomes are about 0.11 mm wide and extend only about one tenth of the distance toward the bottom of the gastropore. At their outer margins the pseudosepta are 1-2 times thicker than the dactylotomes but taper to one half to one third of this width at their inner edges. Each dactylopore has a dactylostyle composed of a row of cylindrical to slightly clavate pillars about 75 μm tall and 17 μm wide. One abnormal dactylopore had two parallel dactylostyles.

Gastropores are round and 0.75-0.95 mm in diameter. Gastropore tubes are cylindrical, straight, and very deep, up to 3.75 mm long. There is no ring of granules or teethlike projections encircling the lower gastropore tube; the tube is smooth for its entire length. The gastrostyle is variable in shape but is usually triangular, sometimes equilateral, and laterally compressed. The range of H:W ratio is 0.90-1.6. The triangular upper part of the style is highly ornamented with a dense, thorny mat of slender spines. The spines are up to 60 μm long and 4 μm wide, often clustered and bifurcated, and arranged on underlying ridges. There is an unornamented basal pedicel, usually of smaller diameter, on which the triangular piece rests.

Ampullae are not prominent and are visible at the surface only as slight swellings. Both female and male ampullae are elliptical in cross section, about 0.69 mm and about 0.41 mm in greater diameter, respectively.

Discussion. Although very similar to Stylaster, A. profunda is placed in Allopora on the basis of its tendency to have some cyclosystems on both the anterior and the posterior faces. Because of its distal, sympodial cyclosystem arrangement it is easily distinguished from A. robusta and A. eguchii but is quite similar to Stylaster densicaulis. Distal branches of these two species are sometimes difficult to distinguish; furthermore, they are sometimes collected at the same station. If the cyclosystem arrangement is not apparent on a distal branch, S. densicaulis can be distinguished by (1) its larger, superficial ampullae, (2) its inner ring of granules in the lower gastropore tube, (3) its noncompressed gastrostyles, and (4) its cyclosystems, which usually develop diastemas distally and thereby have fewer dactylopores per cyclosystem.

Material examined. Eltanin sta. 1536, USNM 62571. Challenger sta. 306, BM 1880.11.25.174 (lectotype); sta. 320, BM 1880.11.25.198 (paralectotypes).

Types. Moseley [1879] stated that A. profunda was 'procured only once' from Challenger station 320; however, his description and figures are clearly based on a specimen from Challenger station 306 [see Boschma, 1960]. According to the International Code of Zoological Nomenclature [Stoll et al., 1964, article 72b], the type-series 'consists of all the specimens on which its author bases the species, except any that he ... expressly excludes from it.' Since Moseley clearly based his description on the specimens from Challenger station 306, his lack of citation of this station being an oversight, this specimen [Moseley, 1881, Plate 1, fig. 6] must be considered as a syntype and the logical choice for the lectotype. The type-locality is Rio de la Plata, Uruguay (1097m), and Golfo de Peñas, Chile (631 m).

Distribution. Off Rio de la Plata, Uruguay; off South Georgia; off southwestern Chile (Map 14). Depth: 631-1097 m.

27. Allopora eguchii Boschma, 1966
Figs. 41C, 46A-46G, 47A-47C

Allopora bithalamus; Eguchi, 1964, pp. 7-9, pl. 1, figs. 1a-1d.
Allopora eguchii Boschma, 1966b, pp. 109-112, 117, pl. 1, figs. 6-8, text figs. 1-2.
--Boschma and Lowe, 1969, p. 15, pl. 5, map. 3.

Description. Colonies are flabellate and densely branched. Branch anastomosis is common but invariably induced by polychaete worm tubes, which bridge adjacent branches. The flattened worm tubes, about 3.6 x 2.2 mm in diameter, occur only on the posterior side. Branches are round in cross section, tapering to a distal diameter of 2.0-2.5 mm. The largest colony (Figure 41C) is 8.5 cm tall and 8.0 cm wide, with a basal branch diameter of 17.1 x 7.5 mm.

The coenosteum is dense and white to light

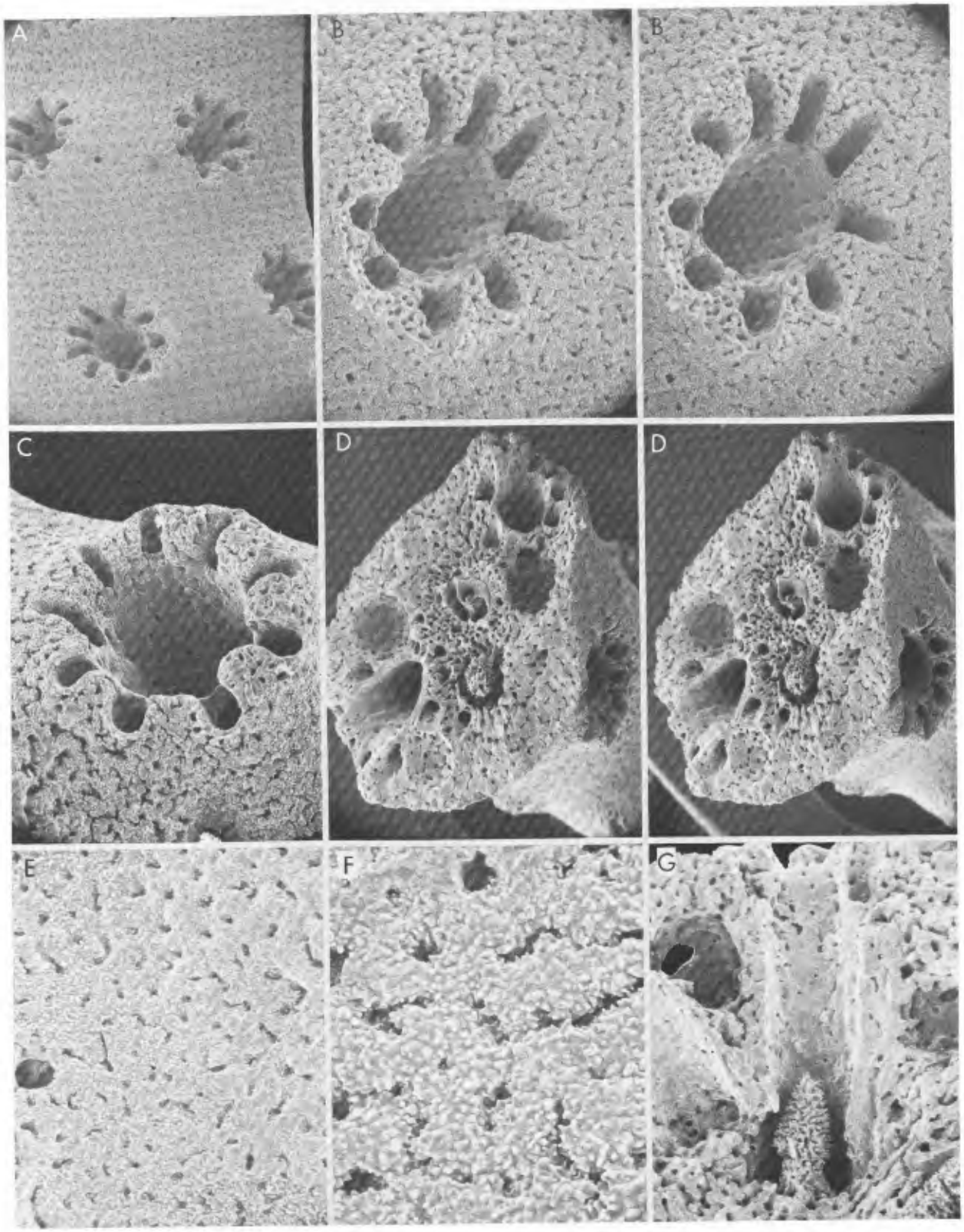


Fig. 46. Allopora eguchii Boschma from Eltanin sta. 1411. A, branch segment with four cyclosystems, x15; B, C, cyclosystems, x37, x42, respectively (Figure 46B is a stereo pair); D, cross section of branch revealing gastrostyle and ampullae, x19, stereo pair; E, F, coenosteal texture, x71, x171, respectively; G, gastrostyle and gastropore tube, x32.

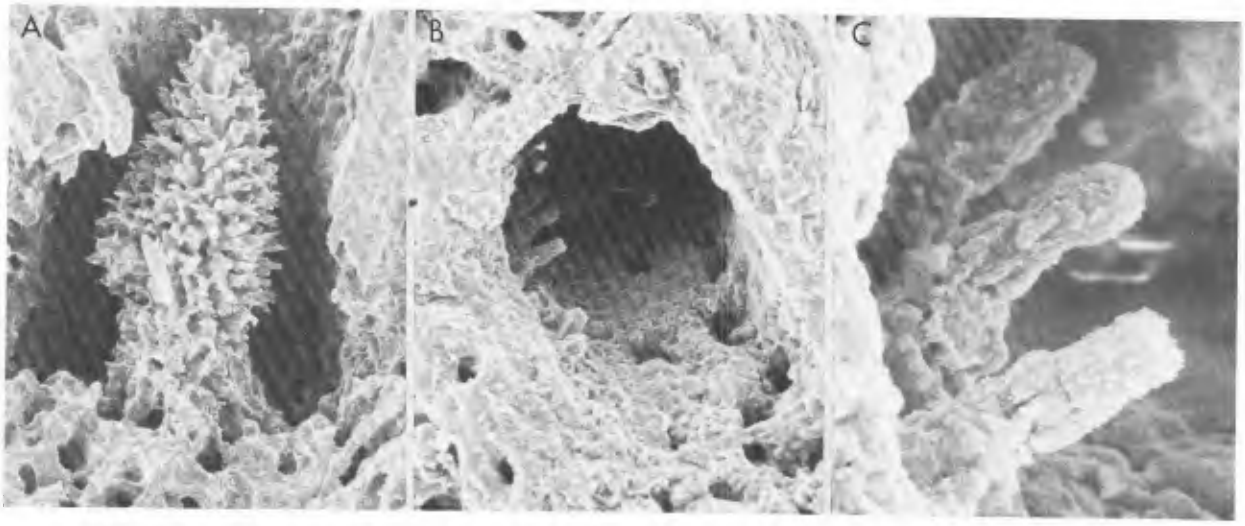


Fig. 47. Allopora eguchii Boschma from Eltanin sta. 1411. A, gastrostyle, x80; B, C, dactylostyle, x179, x893, respectively.

gray. The coenosteal texture is reticulate, composed of many very short, often round, slits, which delimit poorly defined, flat coenosteal strips 50-80 μm wide. The coenosteum is covered by numerous irregularly shaped granules 3.5-10 μm in diameter, which give the surface a gritty texture.

Cyclosystems are round, 1.05-1.40 mm in diameter, and usually raised above the branch surface about 1 mm. They are uniformly distributed on the branch but usually do not occur on the polychaete tube; thus more cyclosystems face anteriorly than posteriorly. Only on the narrowest of branch tips do the cyclosystems alternate from side to side, as in Stylaster. On the basis of 31 cyclosystems from specimens from Eltanin station 1411 the range of dactylopores per cyclosystem is 6-10, with an average of 8.42 (σ = 0.99) and mode of 8. However, specimens reported previously show a range of 5-16, with slightly higher averages. No double-styled cyclosystems were seen. Dactylotomes are 0.10-0.16 mm wide but only extend about one sixth to one fifth of the distance to the bottom of the gastropore. Pseudosepta are 1-2 times the width of the dactylotomes; diastemas are rare. Deep within the dactylopores are feeble dactylostyles, each composed of a line of widely spaced, blunt pillars, about 45 μm tall and 14 μm in diameter.

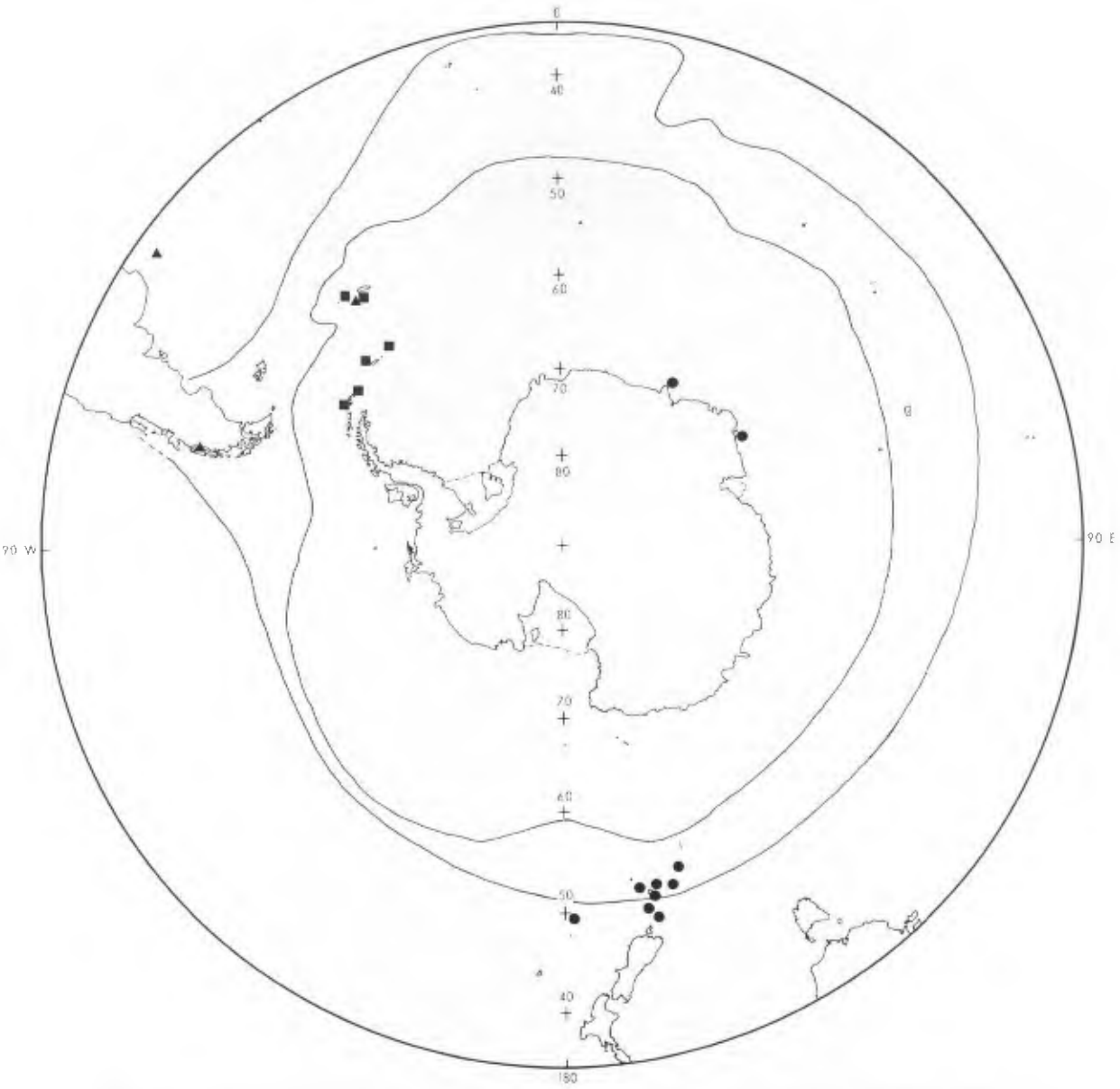
Gastropores are round, 0.34-0.59 mm in diameter and up to 2.4 mm deep. Gastropore tubes are straight and cylindrical, having numerous deep, sometimes linearly arranged pores 26-34 μm in diameter. The gastrostyle occupies the lower one quarter to one third of the pore and is quite variable in shape, ranging from tall and slender (lanceolate) to short and squat [see Boschma, 1966b, Figure 2d]. H:W ratios range from 1.2 to 2.5. The illustrated style (Figure 47A) is 0.66 mm tall and 0.26 mm wide. Gastrostyles are ornamented from base to tip with long, slender spines (e.g., 68 μm long, 7 μm wide), which are often fused together at their bases.

Ampullae are entirely internal with no superficial indication of their presence. Round to elliptical cavities, up to 0.68 mm in greater diameter, occur just beneath the branch surface. No ruptured ampullae were seen, and no sexual dimorphism was noted.

Remarks. Two species of commensal polynoid polychaetes were identified from specimens collected at Eltanin station 1411: Malmgreniella dicirra Hartman and specimens of an undescribed genus and species (M. Pettibone, personal communication, 1981). Malmgreniella dicirra is known from several other Antarctic stylasterines, but the undescribed polynoid is thus far known only from A. eguchii.

Discussion. Allopora eguchii is easily distinguished from A. robusta in size, colony shape, color, coenosteal texture, and many other characters. It most closely resembles the South African species A. bithalamus (Broch, 1936) (see Boschma [1966b, pp. 110-111] for a detailed comparison), differing primarily in gastrostyle structure.

The average number of dactylopores per cyclosystem, reported as 10.87 by Eguchi [1964], 9.57 by Boschma [1966b], and 8.42 herein, is assumed to reflect population differences and is not important at the specific level. The specimens from Eltanin station 1411 tended toward a bimodal distribution, having either 8 or 10 dactylopores per cyclosystem.



Map 14. Distribution of Allopora eguchii (circles), A. robusta (squares), and A. profunda (triangles).

Material examined. Eltanin sta. 1411, USNM 60096. NZOI sta. A-744, A-745, D-17, D-37, D-39, D-145, D-149, D-153, D-176 (all deposited at NZOI). BANZARE sta. 34, RMNH 13911, RMNH 13901 (paralectotype).

Types. Lectotype (figured fragment [Boschma, 1966b, Plate 1, figs. 6 and 8]) and five paralectotypes [Boschma, 1966, Plate 1, fig. 7] designated by Vervoort and Zibrowius [1981]. All from BANZARE sta. 34 and deposited at RMNH: lectotype, Coel. 13753; paralectotypes, Coel. 13901. Type-locality: 66°21'S, 58°50'E (off Cape Boothby, Kemp Coast, Antarctica), 603 m.

Distribution. Off Riiser-Larsen peninsula (Cape Cook) and Cape Boothby, Antarctica; Macquarie Ridge; New Zealand Plateau including Auckland Island and Antipodes Islands (Map 14). Depth: 124-830 m, the deeper records from the Antarctic coast.

28. Allopora robusta, n. sp.
Figs. 41D, 48A-48G

Allopora robusta Lowe, 1967, pp. 37-42, pl. 2, figs. a, b, text figs. 4a-4e (unpublished manuscript name).

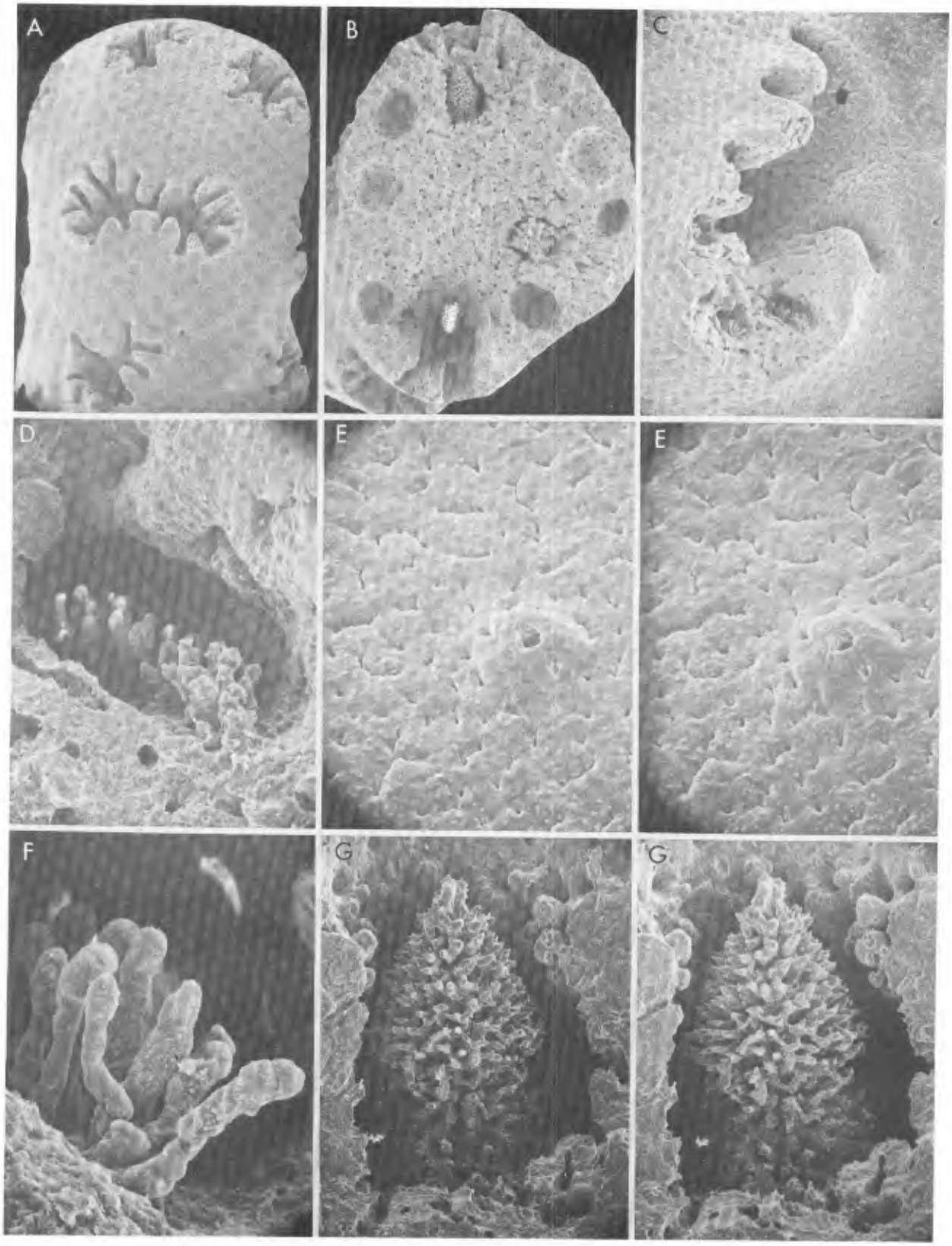


Fig. 48. Paratypes of Allopora robusta, n. sp. from Eltanin sta. 993. A, branch tip with a double cyclosystem, x14; B, cross section of branch revealing gastrostyles and numerous ampullae, x17; C, damaged cyclosystem revealing dactylostyles, x36; D, F, dactylostyle, x200, x471, respectively; E, male ampulla, x116, stereo pair; G, gastrostyle, x93, stereo pair.

Allopora n. sp. Boschma and Lowe, 1969, p. 15, pl. 5, map 3.

Description. Colonies are small, more or less uniplanar, and sparsely branched. Among the colonies examined, none had more than three successive branch bifurcations. Branches do not anastomose and are round in cross section, tapering gradually to a rounded tip, about 3.6 mm in diameter. The largest colony, a broken fragment, is 4.0 cm tall and has a basal branch diameter of 7.8 mm. Colonies are attached to small to large pebble-sized rocks by a nonexpansive, thick base.

The coenosteum is usually light pink; however, worn and slender branches are sometimes white or gray. The coenosteum is dense and, in fresh specimens, porcelaneous. The surface texture is reticulate, produced by short, discontinuous slits, which border coenosteal strips 60-75 μm in diameter. The coenosteum is covered by low, rounded granules 4.5-7.0 μm in diameter. Scattered over the surface of some colonies are shallow, concave depressions 0.28-0.41 mm in diameter and about 0.08 mm deep, the function of which is unknown.

Cyclosystems are round, 1.0-1.6 mm in diameter, and distributed uniformly on the branches, without an indication of posterior and anterior sides. The pseudosepta of the cyclosystems are usually flush with the branch surface, but sometimes, especially toward the base of the colony, the entire cyclosystem or just the proximal edge is raised as much as 1 mm above the surface. Toward the base, cyclosystems become nonfunctional, being filled in with coenosteum. On the basis of 35 cyclosystems the range in number of dactylopores per cyclosystem is 5-11, with an average of 7.57 (σ = 1.33) and mode of 7. In some rare cases a double cyclosystem occurs as an elongate ring of 12-16 dactylopores enclosing two gastrostyles and presumably two gastrozooids. The dactylotomes are 65-100 μm wide and extend about half of the distance to the bottom of the gastropore. The interspaced pseudosepta are 1-5 times the width of the dactylotomes; usually, the one on the distal edge is the broadest, forming a diastema of variable width. Viewed from above, the cyclosystem with its radiating dactylopores appears stellate. Each dactylopore bears a dactylostyle, composed of a row of slender, closely spaced, cylindrical pillars, each independently attached to the outer wall of the tube. These pillars are 50-75 μm tall and 10-27 μm in diameter, the smallest pillars being uppermost in the dactylopore tube. Pillars are bluntly tipped, sometimes clavate or bifurcate, and often crooked.

Gastropores are round, 0.40-0.51 mm in diameter, with the gastrostyle occupying the lower half of the tube. As in S. densicaulis, there is a ring of coarse granules within the tube at the level of the gastrostyle tip, producing a constriction of the tube at this level. Gastrostyles are tall and robust; the illustrated style (Figure 48G) measures 0.58 mm tall and 0.31 mm wide (H:W ratio of 1.87). The style is highly ornamented from base to tip with thick, elongate spines up to 54 μm long. These spines often fuse into clusters, and each individual spine often bifurcates at its tip.

There is strong sexual dimorphism. Female ampullae are expressed as low bulges in the coenosteum, 1.0-1.6 mm in diameter. Few ruptured female ampullae were seen. Male ampullae are barely distinguishable from the surface, expressed as small mounds 0.12-0.40 mm in diameter, about 54 μm tall, and usually having a small irregular pore about 30 μm in diameter at the apex. Beneath each mound is an elliptical, internal cavity up to 0.63 x 0.60 mm in diameter.

Discussion. Among the flabellate species of Allopora, which are discussed by Boschma [1964b], A. robusta is most similar to the South African species A. subviolacea Kent, 1871. Lowe [1967, p. 42] compares the two species, and Boschma [1966a] discusses A. subviolacea. Points of similarity include colony and branch shape, cyclosystem diameter, number of dactylopores per cyclosystem, and gastrostyle shape and size. Allopora subviolacea differs in its purple coenosteum, consistently elevated cyclosystems, and lack of any trace of a diastema.

The specimens from the two stations off South Georgia and Shag Rocks (Eltanin sta. 684, Discovery sta. 160) differ from the types in having more slender branches and a white coenosteum. Because these specimens may represent a different species, they are not included in the type-series.

Etymology. The specific name robusta (Latin: hard and strong) alludes to the stout, thick branches.

Material examined. Types. Eltanin sta. 684, USNM 60095. Discovery sta. 160, BM 1977.8.10.7.

Types. Holotype: Eltanin sta. 1081, USNM 60200. Paratypes: Eltanin sta. 1081, USNM 52640; sta. 993, USNM 52637-52639, RMNH Coel. 14.116; sta. 1084, USNM 60246. Discovery sta. 170, BM 1977.8.10.3. Type-locality: 60°35'S, 40°44.3'W (Scotia Ridge east of South Orkney Islands), 631-641 m.

Distribution. Scotia Ridge from off Gibbs Island, South Shetland Islands to Black Rocks (west of South Georgia) (Map 14). Depth: 177-631 m.

Genus Calyptopora Boschma, 1968

Diagnosis. Colonies arborescent and flabellate, with anastomosing branching.

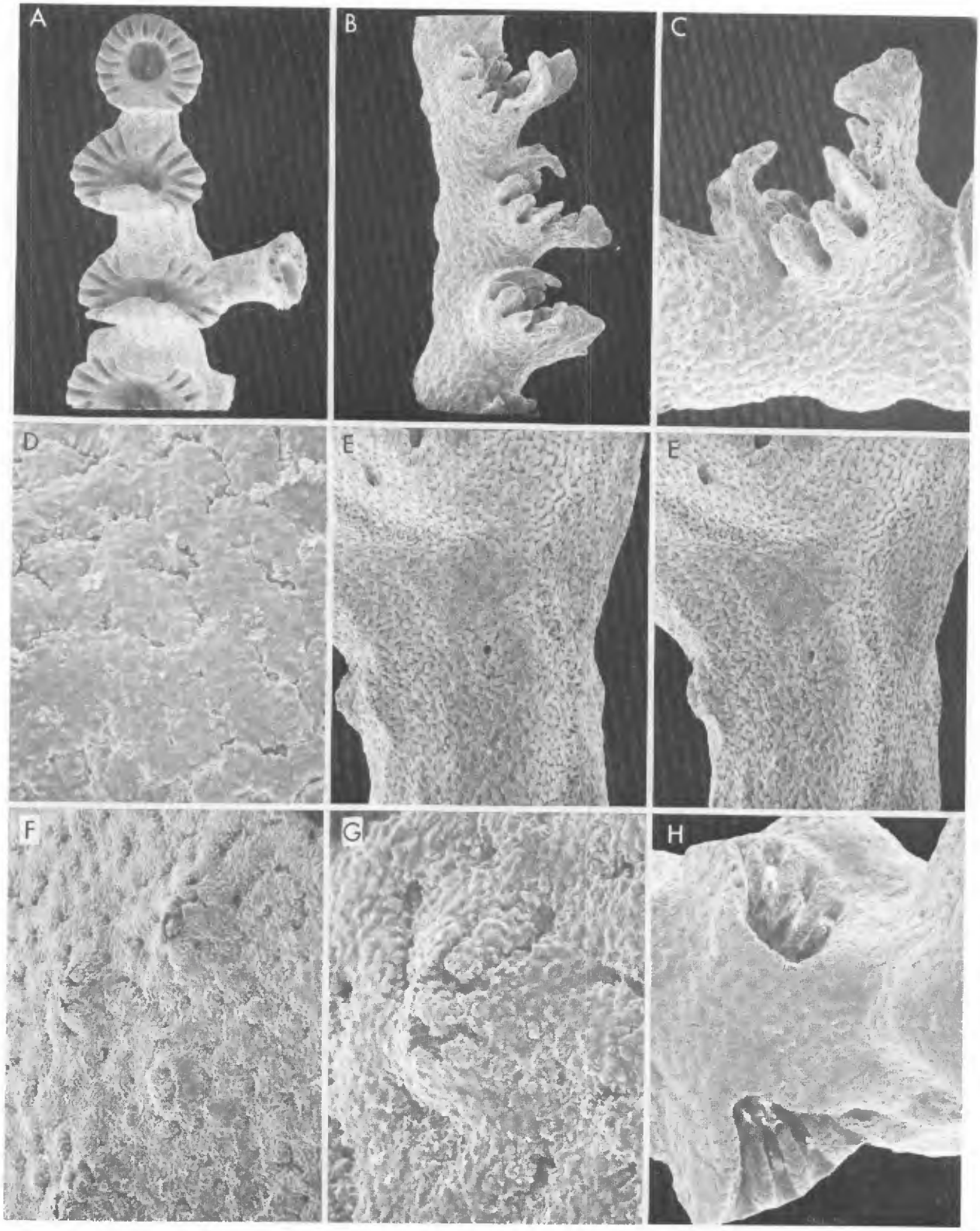


Fig. 49. Calyptopora reticulata Boschma. A, Eltanin sta. 1991, branch tip showing progressive development of lids away from tip, x14; B, C, Eltanin sta. 2143, branch segment with highly exsert lids and pseudosepta, x16, x30, respectively; D, Eltanin sta. 1851, coenosteal texture, x164; E, same station, carinae on posterior side of branch, x29, stereo pair; F, G, Eltanin sta. 1991, perforate coenosteal mounds, x79, x214, respectively; H, Eltanin sta. 1851, cyclosystem with fused lids, x41.

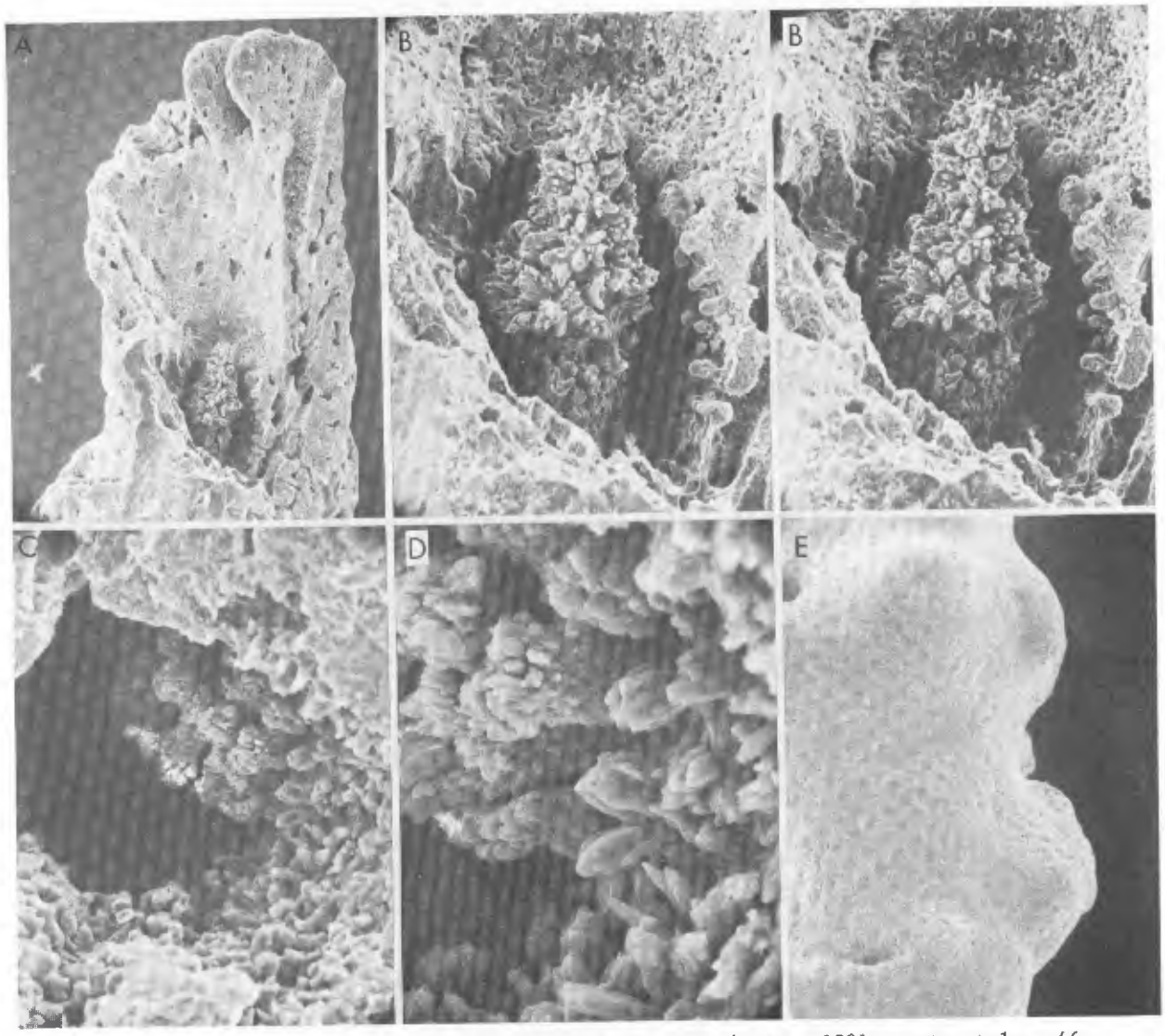


Fig. 50. Calyptopora reticulata Boschma. A, B, Eltanin sta. 1991, gastrostyle, x46, x143, respectively (Figure 50B is a stereo pair); C, D, Eltanin sta. 2143, dactylostyle, x414, x1000, respectively; E, Eltanin sta. 1851, ampullae, x31.

Cyclosystems on anterior side, each partially covered by one or more fixed lids of variable size. Coenosteal texture reticulate. Both gastrostyles and dactylostyles present. Type-species: Calyptopora reticulata Boschma, 1968, by original designation.

29. Calyptopora reticulata Boschma, 1968
Figs. 41E, 49A-49H, 50A-50E

Calyptopora reticulata Boschma, 1968a, pp. 102-108, pls. 1-3, text figs. 1, 2; 1968c, pp. 315-320.

Description. Colonies are large and flabellate, with massive main branches but slender, delicate side and terminal branches. Basal branches are up to 2.3 x 1.9 cm in diameter, whereas terminal branchlets are sometimes less than 1 mm in diameter. The tallest colony (holotype) is 17 cm high; the widest colony (Eltanin sta. 1851) is 20 cm broad. Branches are round to slightly elliptical in cross section; however, the posterior sides of distal branches are often carinate, the ridge being as high as 1.5 mm. Rarely, the anterior side is also carinate. Large- and intermediate-sized branches anastomose, forming a reinforced reticulate fan, but the small lateral branchlets rarely contact one another.

The coenosteum is dense, sometimes porcelaneous, and white; dried tissue is light

gray or light yellow. The coenosteal texture is very similar to that of Allopora eguchii: short slits delimit irregularly granulated strips of coenosteum. Scattered over the coenosteum, and particularly abundant on the larger basal branches, are round to elliptical mounds 0.14-0.20 mm in diameter and about 0.05 mm tall. The top of each mound is perforated by one or two irregular slits, sometimes contiguous with the coenosteal slits. According to Boschma [1968b] these are nematopores.

Cyclosystems are round, elliptical, or irregular in cross section, ranging from 0.9 to 1.6 mm in diameter, and are concentrated on the anterior sides of distal branches, few occurring on the posterior side of the colony or on large-diameter branches. On distal branches they are usually linearly arranged but may also be alternately staggered, somewhat as in Stylaster. The number of dactylopores per cyclosystem ranges from 3 to 17, depending on the age of the system and the relative sizes of the diastema and lid. Sixteen cyclosystems chosen from the penultimate position on distal branches averaged 11.3 dactylopores per cyclosystem, with a rather high σ of 2.27. Dactylotomes are about 0.07-0.12 mm wide and usually extend less than or equal to one quarter of the distance down the gastropore tube. Pseudosepta are about the same width as the dactylotomes, those of deepwater specimens being highly exsert. There is usually a diastema of 50°-70° arc associated with the distal edge of the cyclosystem, adjacent to the ascending branch. When a cyclosystem is at a branch axil, there are sometimes two diastemas, one associated with each ascending branch. Across from the diastema, on the proximal edge of the cyclosystem, there is usually a well-developed fixed lid. The expression of the lid is quite variable, ranging from one or two broadened pseudosepta, to a slightly exsert pseudoseptum, to a broad, elongate lip covering part of the cyclosystem. Sometimes the distal diastema also develops into a small lid, and occasionally, the two lids join and fuse over the cyclosystem (Figure 49H). Several degrees of lid development are usually seen on a distal branch, the least developed lids being on the distalmost cyclosystems (Figure 49A). Contrary to Boschma's [1968a] original description, well-developed dactylostyles are present, consisting of two or three adjacent rows of closely spaced pillars. The pillars (Figures 50C and 50D) are squat, about 24 μm tall by 16 μm wide, slightly clavate, and composed of large angular crystals.

Gastropores are round, about 0.42 mm in diameter, and relatively deep. The upper three quarters of the gastropore tube is a bulbous cavity, which gradually diminishes basally to a constriction about 0.26 mm in diameter, below which is a short extension containing the gastrostyle. The inner wall of the upper gastropore tube is relatively smooth and punctate, whereas that of the lower cavity bears large, coarse granules up to 38 μm tall and 45 μm in diameter. The style is spindle shaped, the tip rising just above the tube constriction. The illustrated style (Figure 50B) is 0.33 mm tall and 0.14 mm wide (H:W = 2.4); however, H:W ratios range from 1.3 to 2.9. Styles are ornamented from base to tip with clusters or tufts of tall, angular spines.

Female ampullae are hemispherical and prominent, 0.65-1.06 mm in diameter. Some ampullae, presumably those about to release their planulae, develop a small, truncated lateral tube about 0.20 mm in diameter, which is concave on the distal end. Often the concave end is an open pore. Male ampullae are smaller, 0.49-0.61 mm in diameter, and less prominent. They occur in great numbers on the outside of the worm tubes. Aside from the pore in the lateral tubes of the female ampullae, no ampullae were found in the ruptured condition.

Remarks. A commensal polynoid polychaete, Malmgreniella dicirra Hartman, induces C. reticulata to form flattened tubes about 3.0 x 2.2 mm in diameter. The tubes occur on the anterior and/or posterior sides of the colony.

Discussion. Calyptopora reticulata is easily differentiated from the only other species in the genus, C. pachypoma (Hickson and England, 1905) from the Philippines [see Boschma, 1968c].

The discovery of dactylostyles in C. reticulata increases its resemblance to Stenohelia. Both genera have anteriorly directed cyclosystems, both gastrostyles and dactylostyles, and similar colony shapes, the only difference being the cyclosystem lid. Those specimens of C. reticulata that have no lids, or only very poorly developed lids, are indistinguishable from Stenohelia. Further study of both genera is needed to determine whether they should be synonymized.

Material examined. Eltanin sta. 1412, USNM 60014; sta. 1414, USNM 60012; sta. 1416, USNM 60013; sta. 1423, USNM 60011; sta. 1851, USNM 60008; sta. 1852, USNM 60015; sta. 1991, USNM 60010; sta. 2143, USNM 60009. NZOI sta. A-745, A-910 (deposited at the NZOI).

Types. Holotype: NZOI sta. F-132. NZOI H-48. Paratypes split between NZOI and RMNH: those at RMNH, Coel. 13754 A and B; NZOI, P-100 [Vervoort and Zibrowius, 1981]. Type-locality: 49°59'S, 177°32'E (off the Antipodes Islands), 1335 m.

Distribution. Macquarie Ridge; Campbell Plateau; off Antipodes Islands, Bounty Islands, and Chatham Island (Map 13). Depth: 349-2010 m.

Zoogeographic Analysis

Some areas of the Southern Ocean have been well sampled, such as the western Ross Sea and the Burdwood Bank; however, most of the vast Antarctic-Subantarctic region has been poorly and erratically sampled, particularly the Weddell Sea, Amundsen Sea, entire eastern hemisphere coast of continental Antarctica, and most of the islands and seamounts. Furthermore, several stylasterine species from this area are known from only one or two records, and several unique specimens (probably new species) have not been discussed in this paper pending the collection of additional specimens. For these reasons, any distributional pattern or list of species for a geographic area will be incomplete or based on an extrapolation. Nonetheless, it is possible to make some preliminary generalizations about patterns of distribution and regional affinities on the basis of an analysis of the USARP specimens and a reevaluation of previously reported specimens.

For this analysis the zoogeographic divisions and terminology of Hedgpeth [1969] is used (see Map 15). To summarize, the Antarctic region is the area inside the Antarctic Convergence, including South Georgia, Bouvetøya, and Heard Island. The Subantarctic boundary follows the Subtropical Convergence only partially and includes Magellanic South America, Falkland Islands, Tristan da Cunha Group, Discovery Seamount, Gough Island, Prince Edward Islands, Îles Crozet, Îles Kerguelen, Macquarie Ridge, southern Campbell Plateau, and numerous seamounts in the South Pacific.

Patterns of Distribution

Among the 29 species of Stylasterina known from the Antarctic-Subantarctic region, certain patterns of distribution occur (Table 1), all of which are shared with one or more other groups of benthic invertebrates. The patterns are as follows:

I. Endemic to Antarctic region.
  - A. Circumpolar.
  - B. Restricted to Scotia subregion.
  - C. Restricted to South Georgia district.

II. Widespread throughout Antarctic and Subantarctic regions.

III. Endemic to Subantarctic region.
  - A. Restricted to area south of New Zealand.
  - B. Restricted to southern South America (Magellanic subregion).
    1. Magellanic subregion (sensu stricto).
    1'. Magellanic subregion and South America north to Uruguay.
    2. Magellanic subregion and South Georgia.
    2'. Magellanic subregion and South Georgia and eastern South America north to Uruguay.

IV. Southern Ocean islands (including seamounts).

Only six species are endemic to the Antarctic region. Lepidopora acrolophos is known only from South Georgia (pattern IC), Allopora robusta is known only from the Scotia subregion (pattern IB), and the remaining four species are essentially circumpolar (pattern IA). The species that best typify the circumpolar distribution are Errina fissurata and E. laterorifa.

Two species, Errina labiata and Conopora pauciseptata, are widespread in, but restricted to, the Antarctic-Subantarctic region. This is a common pattern among benthic invertebrates (pattern II) and is illustrated by Dell [1972, Text Figure 3].

Five species are found primarily in the Subantarctic region of the Campbell Plateau, 'Bounty Platform,' and Macquarie Ridge south of New Zealand (pattern IIIA). Although the Antipodes Islands and Bounty Islands (Bounty Platform) are just north of the Subantarctic region, as illustrated by Hedgpeth [1969], there is strong evidence to suggest that at a depth of 500-1000 m they should be considered as part of the Subantarctic. For example, all seven species of stylasterines found on the Subantarctic Campbell Plateau and six of the seven species known from the Macquarie Ridge are also present on the Bounty Platform. Two of the five species having pattern IIIA also occur near or on the Antarctic continental slope (Lepidopora sarmentosa and Allopora eguchii).

Four species have distributions confined to the Magellanic subregion of South America (pattern IIIB1); this pattern is typified by Errina antarctica. Two other species are known from the Magellanic subregion but also have records at 650-1100 m off northeastern Argentina (pattern IIIB1'). Five other stylasterines and many other benthic invertebrate groups, such as the Scleractinia, Echinoidea, and Ascidiacea, have a similar distribution, or a variation of it consisting of a more widespread distribution within the Antarctic but still having their northern limit in relatively deep water near the delta of the Río de la Plata. On the basis of this evidence it is suggested that at slope depths (600-1100 m) the Magellanic subregion should be considered to extend as far north as 35°-37°S on the eastern coast of South America. Although this may vary from the boundary of the littoral biogeographic province, it should be remembered that the biogeographic boundaries of the faunas of different bathy-

Map 15. Locator map indicating boundaries of Antarctic and Subantarctic regions [after Hedgpeth, 1969].

metric ranges may not, and probably should not, coincide [Kusakin, 1967].

Another instance where littoral biogeographic boundaries are often crossed by slope depth benthic invertebrates is the distributional pattern including the Magellanic subregion and South Georgia (pattern IIIB2). These 'crossover' distributions (crossing over the Antarctic Convergence) consist of primarily Magellanic species which have colonized the closest island 'downstream,' the zoogeographically transitional island of South Georgia, but which have extended no farther into the Antarctic region. This pattern is very common among most benthic invertebrate groups and is shared by two species of stylasterines. If the Magellanic subregion is extended to Rio de la Plata, as previously discussed, another three species can be included in the crossover group (pattern IIIB2').

Two species should be mentioned here which do not fit neatly into any of the previously described patterns. (1) Sporadopora dichotoma

TABLE 1. Geographic Distribution of Antarctic and Subantarctic Stylasterina

	Subantarctic													Antarctic								Depth Range, m	Distribution Pattern[j]
	Western South America (35°45°S)	Eastern South America (35°45°S)	Western South America (45°55°S)[a]	Eastern South America (45°53°S)[a]	Tierra del Fuego and/or Islas de los Estados[a]	Falkland Islands and/or Burdwood Bank[a]	Tristan da Cunha and/or Gough Island	Îles Crozet	Îles Kerguelen	Antarctic and Subantarctic Seamounts[b]	Macquarie Ridge[c]	Campbell Plateau[d]	Bounty Platform[e]	Chatham Island and/or Chatham Rise	South Georgia and/or Shag Rocks	South Orkney Islands	South Shetland Islands	Western Antarctic Peninsula to Ross Sea[f]	Ross Sea[g]	Ross Sea to Weddell Sea[h]	Weddell Sea and Eastern Antarctic Peninsula[i]	Heard Island	Balleny Islands		
Sporadopora																							
1. S. dichotoma	x				x	x									x		x						250-1498	IIIB2'[k]
2. S. granulosa					x	x									x								357-1874	IIIB2
Lepidopora																							
3. L. sarmentosa										x		x	x										915-1647	IIIA
4. L. acrolophos															x								659-686	IC
Errinopsis																							
5. E. reticulum					x	x																	250-771	IIIB1
6. E. fenestrata										x													280-340	IV
Cheiloporidion																							
7. C. pulvinatum	x				x																		642-1137	IIIB1'
Errina (Errina)																							
8. E. antarctica		x	x	x	x											x	x		x	x			18-771	IIIB1
9. E. fissurata																	x	x			x	x	146-796	IA
10. E. kerguelensis								x	x														91-512	IV
11. E. laterorifa																	x	x	x	x		x	91-1772	IA

12. E. gracilis							x		x	x				x	x	x		x	x				218-1226	IA
13. E. boschmai														x		x	x		x				100-659	IA
14. E. cheilopora										x	x	x											371-659	IIIA
Errina (Inferiolabiata)																								
15. E. echinata		x				x																	357-1647	IIIB1'
16. E. labiata		x			x	x			x			x		x	x	x		x	x	x		x	87-2100	II
17. E. lowei		x			x	x			x					x									250-960	IIIB2'
18. E. fascicularis					x	x				x	x	x		x									540-2010	IIIA, IIIB2
'Errina'																								
19. 'E.' cyclopora						x																	1647-2044	IIIB1
Errinopora																								
20. E. cestoporina					x	x																	357-384	IIIB1
Adelopora																								
21. A. pseudothyron						x			x														298-915	IV
Conopora																								
22. C. pauciseptata			x		x	x			x	x	x	x		x	x	x			x	x			216-2355	II
Crypthelia																								
23. C. fragilis									x	x	x	x											1336-2305	IIIA
24. C. formosa					x	x								x									483-1841	IIIB2
Stylaster																								
25. S. densicaulis		x			x	x								x									357-1244	IIIB2'
Allopora																								
26. A. profunda		x	x											x									631-1097	IIIB2'
27. A. eguchii										x	x	x							x				124-830	IIIA
28. A. robusta														x	x	x							177-631	IB
Calyptopora																								
29. C. reticulata										x	x	x	x										349-2010	IIIA
Total	0	7	3	1	12	14	0[l]	2	1	8	7	7	8	1	13	5	8	2	4	7	2	1	3		

[a]Part of the Magellanic subregion.
[b]Eltanin stations 254 (considered Subantarctic), 1343-1346, 1521, 1691, 1857, 17-5, 25-325, 25-326; Discovery Seamount.
[c]Hjort Seamount, Macquarie Island, and high ground between Macquarie Island and South Island, New Zealand [Brodie and Dawson, 1965].
[d]Includes Auckland Island and Campbell Island.
[e]Includes Antipodes Islands and Bounty Islands.
[f]From 55°W to 140°W, including offshore islands.
[g]From 140°W to 170°E, including Scott Island.
[h]From 170°E to 10°W, including Balleny Islands.
[i]From 10°W to 55°W.
[j]See text for key.
[k]Also occurs at South Shetland Islands.
[l]One species present: Errina (Errina) sp., see text.

has a IIIB2' pattern, as just described, but also occurs off the South Shetland Islands. (2) Errina fasciculatis is a typical Magellanic crossover but is also found south of New Zealand, combining patterns IIIB2 and IIIA.

Finally, three species have insular Southern Ocean distributions (pattern IV): two (Adelopora pseudothyron and Errinopsis fenestrata) are known only from seamounts, and Errina kerguelensis is known only from off islands.

Regional Affinities

Antarctic. Eighteen species of Stylasterina are known from the Antarctic region: six are endemic, six are Magellanic crossovers, two are widespread throughout the Antarctic-Subantarctic region, two are restricted to south of New Zealand, one is insular, and one is known from the South Shetland Islands to Uruguay. Therefore the percentage of endemic species is 33.3. Dell's [1972] analysis of Boschma and Lowe's [1969] data resulted in a higher percentage (41.67%) for the endemic Antarctic stylasterines. If endemism is calculated according to the method of Cailleux [1961], which excludes the Magellanic crossovers from the total Antarctic fauna, a value of 54.5% (6 of 11) results. This is consistent with values for other closely related benthic invertebrate groups, such as the Antarctic Scleractinia, 53.3% [Cairns, 1982a] and Antarctic hydroids, 55% [Cailleux, 1961].

The stylasterine fauna of the South Georgia district is very diverse, reflecting its transitional position between the Antarctic and Subantarctic regions. Six of its 13 species are Magellanic crossovers, three are endemic to the Antarctic, two are widespread in the Antarctic-Subantarctic region, one is endemic to South Georgia, and one is known from the South Shetland Islands to Uruguay. On the basis of surface water temperatures and its position south of the Antarctic Convergence, South Georgia is clearly within the Antarctic region. Although its surface waters are about 4°C colder than those of Burdwood Bank, the water a 1000 m is only about 0.61°C colder [Deacon, 1937], probably a negligible temperature barrier for corals. Other factors to consider with regard to colonization of species from South America to South Georgia are the duration of the planula larval stage and water current velocities. The widest channel that is deeper than 1000 m occurring between Burdwood Bank and Shag Rocks is 330 n. mi. (607 km) across. Assuming a current velocity of 0.11 kn (5.5 cm/s), it would take 12.5 days for a planula to make the transit [Lowe, 1967]. Very little is known about larval longevity, but Fritchman [1974] found that planulae of Allopora petrographa that did not settle within 18 hours after release did not develop.

Three species are known from the Balleny Islands, one from Heard Island, and none from Bouvetøya. Although 5-13 species are known from the islands of the Scotia Ridge, none are known from the relatively recently formed South Sandwich Islands.

Subantarctic. The greatest number of stylasterine species in the Antarctic-Subantarctic region occurs in the Magellanic subregion (16 species), 15 of which are found in the relatively small area between Tierra del Fuego and Burdwood Bank. Only one species is known from Tristan da Cunha (Errina labiata sensu Moseley, 1881 (Challenger station 135); = Errina gracilis sensu Boschma, 1964d; = E. (E.) sp. herein), but is has not been well described or, as yet, correctly identified and therefore is not included in Table 1 or in the zoogeographic analysis. Two species are known from Îles Crozet, only one from Îles Kerguelen, and none from the Prince Edward Islands.

Nine stylasterine species are known from the Subantarctic region south of New Zealand (Campbell Plateau, Bounty Platform, Macquarie Ridge), seven or eight of these nine occurring in each area. Five of the nine are endemic to this region; the others are widespread throughout the Antarctic and/or Subantarctic.

Eight species are known from seamounts scattered throughout the Antarctic and Subantarctic region. Two are endemic to seamounts, two are widespread throughout the region, two are characteristic of the New Zealand Plateau, one is endemic to the Antarctic region, and one is primarily Magellanic. Three of these species, plus an unidentified Stylaster, are known from the deepwater South Pacific coral bank described by Cairns [1982a].

TABLE A1. Station List

Station	Latitude, S	Longitude	Depth, m	Date
		USNS Eltanin		
217	54°22-23'	64°42-52'W	106-110	Sept. 23, 1962
219	55 47-52	66 17-24 W	115	Sept. 23, 1962
222	53 15-24	66 51-30 W	79-80	Sept. 27, 1962
254	59 49-46	68 52-53 W	512-622	Oct. 10, 1962
339	53 05-08	59 31-24 W	512-586	Dec. 3, 1962
369	54 04-01	63 35-44 W	247-293	Dec. 12, 1962
370	53 54-55	64 36-52 W	104-115	Dec. 12, 1962
377	53 57-58	55 54-52 W	1879-1886	Dec. 21, 1962
415	62 42-41	56 10-12 W	406-465	Jan. 2, 1963
418	62 39-40	56 10-08 W	311-426	Jan. 2, 1963
494	60 42-41	42 50-44 W	1226	Feb. 19, 1963
499	62 06	45 08-10 W	485	Feb. 20, 1963
556	51 53	56 40 W	849-869	March 14, 1963
671	54 41-38	38 38-31 W	220-320	Aug. 23, 1963
678	54 49-48	38 01 to 37 53 W	732-814	Aug. 24, 1963
684	54 55	38 05-07 W	595-677	Aug. 25, 1963
732	53 36	36 51-54 W	220-265	Sept. 12, 1963
740	56 06-07	66 19-30 W	384-494	Sept. 18, 1963
958	52 56	75 00 W	92-101	Feb. 5, 1964
960	52 40-36	74 58-55 W	64	Feb. 6, 1964
969	54 56-59	65 03-06 W	229-265	Feb. 10, 1964
970	54 59 to 55 03	64 53-50 W	586-641	Feb. 11, 1964
974	53 32-34	64 57-55 W	119-124	Feb. 12, 1964
980	52 30-31	67 14 W	82	Feb. 14, 1964
992	61 19-21	56 28-27 W	403	March 13, 1964
993	61 25	56 30-32 W	300	March 13, 1964
1067	59 57	34 41-33 W	1098-1153	April 8, 1964
1081	60 35-34	40 44 W	631-641	April 13, 1964
1084	60 22-23	46 50-52 W	298-403	April 15, 1964
1088	60 49-48	53 28-30 W	587-589	April 17, 1964
1089	60 47-48	53 30-31 W	641	April 17, 1964
1343	54 50	129 50-48 W	567-604	Nov. 7, 1964
1345	54 50-51	129 48-46 W	915-1153	Nov. 7, 1964
1346	54 49-50	129 48-46 W	549	Nov. 7, 1964
1411	51 00-01	162 01 E	333-371	Feb. 8, 1965
1412	51 07-09	162 03-01 E	1647-1665	Feb. 8, 1965
1414	52 17-22	160 40-34 E	659-798	Feb. 9, 1965
1416	53 45	159 09-00 E	787-842	Feb. 9, 1965
1419	54 32-31	159 02-01 E	494-714	Feb. 10, 1965
1422	56 19-21	158 29 E	833-842	Feb. 12, 1965
1423	56 21-23	158 28 E	1574-1693	Feb. 12, 1965
17-5	52 10	142 10-06 W	2304-2328	March 21, 1965
21-282	53 04-09	75 43-49 W	1896-1920	Jan. 5, 1966
21-283	53 13-16	75 41 W	1500-1666	Jan. 5, 1966
21-288	52 52-56	75 18-23 W	119-329	Jan. 6, 1966
1520	54 07-10	52 00-08 W	1244-1771	Jan. 30, 1966
1521	54 09-07	52 08-17 W	419-483	Jan. 30, 1966
1536	54 29-31	39 22-19 W	659-686	Feb. 8, 1966
1545	61 04-07	39 55-42 W	2355-2897	Feb. 11, 1966
1592	54 43-45	55 30-37 W	1647-2044	March 14, 1966
1593	54 43-42	56 37-39 W	339-357	March 14, 1966
1594	54 41	56 59 to 57 03 W	70	March 14, 1966
1596	54 39	57 09-12 W	124	March 14, 1966
1691	53 56	140 19-17 W	362-567	May 14,1966
25-325	46 00	83 59-58 W	742	Oct. 9, 1966
25-326	46 04-06	83 55 W	298	Oct. 9, 1966
1851	49 40	178 53-54 E	476-540	Jan. 3, 1967

TABLE A1. (continued)

Station	Latitude, S	Longitude	Depth, m	Date
		USNS Eltanin (cont.)		
1852	49 40-38	178 56-57 E	952-1336	Jan. 3, 1967
1857	64 10-12	177 35-34 E	1211-1336	Jan. 8, 1967
1870	71 17-16	171 33-29 E	659-714	Jan. 14, 1967
1873	72 10-11	171 22-16 E	448-454	Jan. 14, 1967
1875	72 32	171 26-28 E	329-337	Jan. 15, 1967
1877	72 18-19	170 26-25 E	143-146	Jan. 15, 1967
1878	72 57-58	171 35-38 E	573-576	Jan. 15, 1967
1924	75 10-11	176 13-07 W	728-732	Jan. 27, 1967
1925	75 09-07	175 58-51 W	1382-1405	Jan. 27, 1967
1931	73 56	178 56 W	399-401	Jan. 29, 1967
1933	73 22	177 37-41 E	465-474	Jan. 30, 1967
1946	67 29-32	179 55-57 W	1080	Feb. 2, 1967
1952	66 40-39	162 48 E	150-157	Feb. 5, 1967
1953	66 38-36	162 56-59 E	201-234	Feb. 5, 1967
1975	54 30-28	159 00 E	443-549	Feb. 15, 1967
1981	47 21-18	147 52-51 E	910-915	Feb. 24, 1967
1991	54 39-44	170 22-25 E	1860-1940	Jan. 2, 1968
1995	72 03-04	172 38-06 E	344-348	Jan. 10, 1968
1996	72 05	172 08-09 E	348-352	Jan. 10, 1968
1997	72 00-01	172 28-33 E	523-530	Jan. 10, 1968
1999	71 58-57	174 24-25 E	1772-1775	Jan. 11, 1968
2005	73 02	176 54-50 E	864-870	Jan. 12, 1968
2007	73 05-06	173 59 to 174 05 E	339-343	Jan. 12, 1968
2021	73 49-50	178 13-14 W	495-503	Jan. 15, 1968
2022	73 51	178 15 W	485	Jan. 15, 1968
2026	75 03-04	176 37 W	801	Jan. 16, 1968
2080	75 50-52	173 08 W	468-474	Jan. 31, 1968
2081	75 55	173 17 W	476	Jan. 31, 1968
2092	76 00-06	168 49-39 W	526	Feb. 3, 1968
2093	76 07	168 37 W	514	Feb. 3, 1968
2095	76 04-05	164 46-51 W	513-550	Feb. 3, 1968
2097	76 08-10	165 04-10 W	494-498	Feb. 4, 1968
2119	73 05	180 00	567	Feb. 11, 1968
2123	72 28-26	175 26-28 E	548-565	Feb. 12, 1968
2143	49 51	178 35-34 E	2010-2100	Feb. 26, 1968
5765	76 07	170 12 W	571-587	Feb. 10, 1972
		ARA Islas Orcadas (Cruise 575)		
8	53 35.8	37 35.2 W	254-366	May 11, 1975
11	53 38.0	38 01.8 W	132-143	May 12, 1975
12	53 38.2	37 54.7 W	130-137	May 13, 1975
17	53 36.0	38 03.0 W	122-124	May 14, 1975
34	54 41.6	34 51.1 W	563-598	May 19, 1975
35	54 46.8	34 21.7 W	960-991	May 20, 1975
82	55 29.0	35 20.5 W	413-462	June 6, 1975
90	54 50.6	37 23.8 W	223-227	June 7, 1975
91	55 00.6	37 42.6 W	494-501	June 7, 1975
102	53 27.1	42 39.2 W	371-424	June 11, 1975
		R/V Hero		
693-11	54 18	59 30 W	88	Aug. 1, 1969
695-209	50 36.6	75 42 W	73	Oct. 28, 1969
702-470	53 39.4	70 55.0 W	82	April 26, 1970
715-683	54 49.5	64 56.4 W	179	Oct. 14, 1971
715-855	54 27	64 10 W		Oct. 20, 1971
715-856	54 34	64 10 W	73	Oct. 20, 1971

TABLE A1. (continued)

Station	Latitude, S	Longitude	Depth, m	Date
		R/V Hero (cont.)		
715-863	54 29	64 00 W	104	Oct. 22, 1971
715-864	54 34-37	64 00 to 63 57.5 W	87	Oct. 22, 1971
715-865	54 39	64 00 W		Oct. 22, 1971
715-870	54 33-35	64 00-01 W	84	Oct. 24, 1971
715-873	54 34	65 50 W	118	Oct. 26, 1971
715-874	54 39	63 50 W	135-137	Oct. 26, 1971
715-875	54 55-54	64 00 to 63 53 W	771-903	Oct. 27, 1971
715-879	54 50	63 50-51 W	342-353	Oct. 28, 1971
715-881	54 46.9	64 04 W		Oct. 29, 1971
715-882	54 50.1	64 10.0 W	76	Oct. 29, 1971
715-887	54 55.0	64 20.4 W	283-292	Oct. 30, 1971
715-893	54 55.6-54.8	64 21.8-19.0 W	303-358	Nov. 2, 1971
715-894	54 55	64 20-18 W	263-285	Nov. 2, 1971
715-895	54 59.9	64 50.0-47.5 W	438-548	Nov. 3, 1971
715-896	54 55	64 30.0-29	138-142	Nov. 3, 1971
715-903	54 34	64 40 W	84-85	Nov. 6, 1971
715-905	54 44.3	64 40.2 W	84-85	Nov. 6, 1971
715-907	54 34	64 30 W	73-76	Nov. 7, 1971
721-725	62 20	59 13-12 W	328-420	Dec. 26, 1971
731-1884	65 06.7	65 00.7 W	220-270	March 3, 1973
731-1940	64 56	63 43 W	220-270	March 9, 1973
		USS Atka (Deep Freeze III)		
23	72 06	172 15 E	392	Jan. 12, 1958
		USS Burton Island (Deep Freeze III)		
592-3	72 08	172 10 E	433	Jan. 13, 1958
		USS Edisto (Deep Freeze IV)		
14-TD2	71 50	15 50 W	1006-1189	Jan. 18, 1959
38-TR21	63 23	60 36 W	424	April 10, 1959
		Yelcho		
2-7	64 48	65 16 W	582	March 4, 1962
2-8	64 52	65 47 W	218	March 4, 1962
		USCGC Eastwind (Cruise 66)		
6	64 50-51	63 12-14 W	283	Jan. 29, 1966
32	63 58	53 10 W	549	Feb. 14, 1966
35	62 12	54 25 W	417	Feb. 16, 1966
		R/V Vema		
14-13	54 13	60 44 W	119	Feb. 12, 1958
14-T15	52 56	66 49 W	86	Feb. 20, 1958
14-16	52 22	65 45 W	116	Feb. 20, 1958
14-19	52 41	59 09 W	108	Feb. 22, 1958
15-98	54 24	63 29 W	198	March 3, 1959
15-102	52 53.3	65 35 W	108	March 5, 1959
15-107	54 10.2	65 57.5 W	101	March 6, 1959
15-112	56 40	67 26 W	134	March 13, 1959
15-PD10	56 39.2	66 52.7 W	1137	March 13, 1959
17-53	55 20	65 50 W	1185	May 4, 1961
17-54	55 19.5	65 49 W	1274	May 5, 1961
17-57	54 57	63 04 W	1895-1904	May 8, 1961
17-59	54 53.5	60 26.5 W	426-432	May 10, 1961
17-61	54 44	55 39 W	1814-1919	May 11, 1961

TABLE A1. (continued)

Station	Latitude, S	Longitude	Depth, m	Date
		R/V Vema (cont.)		
17-64	51 08	54 22 W	1512-1518	May 13, 1961
17-65	50 18	54 11 W	1498-1501	May 14, 1961
17-RD14	38 58	55 17 W	595-642	June 19, 1961
		NZOI		
A-449	77 05	177 12 E	354	Jan. 11, 1959
A-454	75 56	176 30 W	809-895	Jan. 14, 1959
A-455	74 22	178 35 W	134-332	Jan. 15, 1959
A-463	72 20	174 50 E	457-460	Jan. 21, 1959
A-464	73 20	174 00 E	361-376	Jan. 22, 1959
A-465	72 55	175 30 E	391	Jan. 22, 1959
A-521	73 54	177 44 W	546-569	Feb. 4, 1959
A-526	74 07	177 41 W	451-455	Feb. 7, 1959
A-527	74 10	178 17 W	331-352	Feb. 7, 1959
A-744	49 36.7	178 48.1 E	360	Nov. 9, 1962
A-745	49 36.7	178 50.5 E	399	Nov. 9, 1962
A-910	43 04	178 39 W	549	Sept. 13, 1963
D-17	52 31	160 31 E	124	April 23, 1963
D-37	51 58	165 28 E	289	May 7, 1963
D-39	50 58	165 45 E	549	May 7, 1963
D-145	48 42	167 27 E	366	Jan. 14, 1964
D-149	49 10.5	166 51 E	454	Jan. 14, 1964
D-176	51 06	167 48.5 E	216	Jan. 21, 1964
D-216	67 14.6	164 04.5 E	371	March 10, 1964
E-179	73 37	170 00 E	280	Jan. 16, 1965
E-180	73 12	169 45 E	190	Jan. 17, 1965
E-205	67 30	164 20 E	218-227	Jan. 31, 1965
E-207	67 30	164 20 E	267	Jan. 31, 1965
E-209b	66 41.0	162 57.0 E	190	Feb. 2, 1965
E-212b	66 57	163 14 E	91	Feb. 2, 1965
E-213b	66 28	162 30 E	435	Feb. 7, 1965
E-218	66 28-50	162 30-20 E	146	Feb. 8, 1965
E-224	66 31.2	162 27.0 E	199	Feb. 12, 1965
E-225	66 31.0	162 26.0 E	209-218	Feb. 12, 1965
F-81	49 32	167 01 E	401	Jan. 14, 1965
F-103				
		Walther Herwig		
142/71	42 06	57 55 W	708-765	Jan. 4, 1971
328/71	42 52	58 38 W	1200	Jan. 22, 1971
329/71	41 13	56 51 W	1250	Jan. 22, 1971
19/76	54 49	57 52 W	230-250	Nov. 27, 1975
		Marion Dufresne		
03-26-64CP17	46 24	51 59 E	180	April 20, 1974
03-28-71CP19	46 18.1	51 29 E	400	April 22, 1974
04-C24-DR58	50 04.0	68 29.0 E	195	Feb. 25, 1975
		RRS Discovery		
160	53 43	40 57 W	177	
170	61 25.5	53 46.0 W	342	Feb. 23, 1927
		RSS William Scoresby		
228	50 50	56 58 W	229-236	June 30, 1928
246	52 25	61 00 W	208-267	
840	53 52	61 49.3 W	368-463	Feb. 6, 1932

Acknowledgments. I would like to thank H. Zibrowius (Station Marine d'Endoume, Marseille) for his detailed notes on stylasterine collections in European museums and for his helpful comments on this paper. I am also grateful to F. M. Bayer (USNM) and my father, E. J. Cairns, for their careful editing of the manuscript, and to my wife, Peggy, for her editing, proofreading, and typing. I would like to acknowledge and thank Marian Pettibone and Maureen Downey (both USNM) for their identifications of the commensal polychaetes and the ophiuroids, respectively. The SEM was done with the assistance of Walter R. Brown, Susann Braden, and Mary Jacque Mann. The following people have generously loaned me specimens used in this study: W. Vervoort (RMNH), E. W. Dawson (NZOI), P. F. S. Cornelius (BM), M. van Praët (MNHNP), C. Kessler (MCZ), R. W. M. van Soest (ZMA), J. Van Goethem (Institut Royal des Sciences Naturelles de Belgique, Brussels), H. S. Feinberg (AMNH), and K. W. Petersen (Zoologisk Museum, Copenhagen). The timely cooperation received from all of these curators is gratefully appreciated and has made this paper a more meaningful revision. The Marion Dufresne specimens were collected with the financial support of Terres Australes et Antarctique Françaises. This work was supported by the Smithsonian Oceanographic Sorting Center's (SOSC) Cooperative Systematics and Analyses of Polar Biological Materials program (National Science Foundation grant DPP 76-23979). I thank B. Landrum and G. Hendler (both SOSC) for making the USARP specimens available to me and for supplying additional data on the collection. I gratefully acknowledge the administration of the Smithsonian Institution and USNM for allowing me to pursue this study at the USNM in the capacity of a research associate.

References

Bellisio, N. B., R. B. Lopez, and A. Torno
1979 Peces marinos patigonicos, 279 pp. Ministerio de Economia, Buenos Aires, Argentina.

Boschma, H.
1951 Notes on Stylasterina (Hydrocorallia). Proc. K. Ned. Akad. Wet., Ser. C, 54(5):451-458, 2 figs.
1953 The Stylasterina of the Pacific. Zool. Meded. Leiden, 32(16):165-184.
1956 Milleporina and Stylasterina. In R. C. Moore (Ed.), Treatise on invertebrate paleontology. Part F. Coelenterata, pp. F90-F106, figs. 75-85. University of Kansas Press, Lawrence.
1957 List of the described species of the order Stylasterina. Zool. Verh. Leiden, 33:1-72.
1960 Notes on the stylasterine coral Allopora profunda Moseley. Proc. K. Ned. Akad. Wet., Ser. C, 63(3):400-407, 1 pl., 1 fig.
1963a On the stylasterine genus Errina, with the description of a new species. Proc. K. Ned. Akad. Wet., Ser. C, 66(4):331-344, 1 pl., 1 fig.
1963b Errina (Lepidopora) diffusa, a new stylasterine coral from South Africa. Proc. K. Ned. Akad. Wet., Ser. C, 66(5):391-396, 1 pl., 3 figs.
1964a Errina (Lepidopora) decipiens, a new stylasterine coral from the West Indies. Proc. K. Ned. Akad. Wet., Ser. C, 67(2):55-63, 1 pl., 4 figs.
1964b The stylasterine coral Allopora divergens. Proc. K. Ned. Akad. Wet., Ser. C, 67(3):109-118, 1 pl., 3 figs.
1964c Notes on the stylasterine coral Errina macrogastra. Proc. K. Ned. Akad. Wet., Ser. C, 67(5):281-286, 1 pl., 2 figs.
1964d Notes on the stylasterine coral Errina labiata. Proc. K. Ned. Akad. Wet., Ser. C, 67(5):287-300, 2 pls., 4 figs.
1965a On the supposed specific differences between Errina antarctica (Gray) and Errina moseleyi (Ridley). Proc. K. Ned. Akad. Wet., Ser. C, 68(1):8-18, 2 pls., 5 figs.
1965b Errina carnea, a new stylasterine coral from the Antarctic. Proc. K. Ned. Akad. Wet., Ser. C., 68(1):19-24, 1 pl., 1 fig.
1966a Notes on the stylasterine coral Allopora subviolacea Kent. Proc. K. Ned. Akad. Wet., Ser. C, 69(3):267-272, 1 pl., 2 figs.
1966b Stylasterina. Rep. BANZ Antarct. Res. Exped., Ser. B., 9(2):109-120, 1 pl., 4 figs.
1967 Comments upon Hickson's notes on Stylasterina in the collection of the Paris Museum. Proc. K. Ned. Akad. Wet., Ser. C, 70(3):324-337, 2 pls., 3 figs.
1968a Calypotopora reticulata n. g., n. sp., a stylasterine coral from deep water in the New Zealand region. Proc. K. Ned. Akad. Wet., Ser. C, 71(2):99-108, 3 pls., 2 figs.
1968b Errina sarmentosa, a new stylasterine coral from deep water in the New Zealand region. Proc. K. Ned. Akad. Wet., Ser. C, 71(3):203-208, 1 pl., 2 figs.
1968c Notes on the stylasterine coral Calyptopora pachypoma (Hickson and England). Proc. K. Ned. Akad. Wet., Ser. C, 71(4):315-320, 1 pl., 2 figs.

Boschma, H., and T. P. Lowe
1969 Distribution of selected groups of marine invertebrates in waters south

of 35°S latitude: Stylasterina. Antarct. Map Folio Ser., 11:14-15, pl. 5. American Geographical Society, New York.

Broch, H.
1935 Einige Stylasteriden (Hydrokorallen) der Ochotskischen und Japanischen See. Explor. Mers Russes, 22:58-60.
1936 Utersuchungen an Stylasteriden (Hydrokorallen). Skr. Norske Vidensk. Akad., 8:103 pp., 13 pls.
1942 Investigations on Stylasteridae (Hydrocorals). Skr. Norske Vidensk. Akad., 3:1-113, 6 pls., 38 figs.
1947 Stylasteridae (Hydrocorals) of the John Murray Expedition to the Indian Ocean. Scient. Rep. John Murray Exped. 1933-34, 8(2):305-316, pl. 1.
1951a Stylasteridae (Hydrocorals) from the southern seas. Discovery Rep., 26:33-46, pls. 2-4, 12 figs.
1951b Some nomenclatural corrections to the "Investigations on the Stylasteridae (Hydrocorals)" 1942. Zool. Meded. Leiden, 31(12):125-127.

Brodie, J. W., and E. W. Dawson
1965 Morphology of North Macquarie Ridge. Nature, 207(4999):844-845, 1 fig.

Cailleux, A.
1961 Endemicité actuelle et passée de l'Antarctiqué. C. R. Somm. Seanc. Soc. Biogeogr., no. 332-334:65-71.

Cairns, S. D.
1979 The deep-water Scleractinia of the Caribbean Sea and adjacent waters. Stud. Fauna Curaçao, 57(180):341 pp., 40 pls.
1982a Antarctic and Subantarctic Scleractinia. In L. S. Kornicker (Ed.), Biology of the Antarctic seas XI, Antarct. Res. Ser., 34(1):1-74, 18 pls.
1982b A new subfamily of operculate stylasterine (Coelenterata: Hydrozoa) from the Subantarctic. J. Nat. Hist., 16(1):71-81, 22 figs.

Dall, W. H.
1884 On some Hydrocorallinae from Alaska and California. Proc. Biol. Soc. Wash., 2:111-115.

Deacon, G. E. R.
1937 The hydrology of the Southern Ocean. Discovery Rep., 15:124 pp., 44 pls.

Dell, R. K.
1972 Antarctic benthos. Adv. Mar. Biol., 10:1-216.

Eguchi, M.
1964 A study of Stylasterina from the Antarctic Sea. JARE Scient. Rep. Tokyo, Ser. E, no. 20:1-10, 2 pls.

Ehrenberg, C. C.
1834 Die Corallenthiere des rothen Meeres physiologisch untersucht und systematisch verzeichnet. Phys. Abh. K. Akad. Wiss. Berl., 1832:225-380.

Fenninger, A., and G. Flajs
1974 Zur Mikrostruktur rezenter und fossiler Hydrozoa. Biomineralization Res. Rep. 7:69-99, 10 pls.

Fisher, W. K.
1931 California hydrocorals. Ann. Mag. Nat. Hist., Ser. 10, 8:391-399, pls. 15-16.
1938 Hydrocorals of the North Pacific Ocean. Proc. U.S. Natn. Mus., 84(3024):492-554, pls. 34-76.

Fritchman, H. K.
1974 The planula of the stylasterine hydrocoral Allopora petrographta Fisher: Its structure, metamorphosis and development of the primary cyclosystem. Proc. Int. Coral Reef Symp. 2nd, 2:245-258, 27 figs.

Gray, J. E.
1831 Description of a new genus (Stylaster) of star-bearing corals. Zool. Miscellany:36-37. London.
1835 [Characters of two new genera of corals, Errina and Anthopora.] Proc. Zool. Soc. Lond.:85-86.
1847 An outline of the arrangement of stony corals. Ann. Mag. Nat. Hist., Ser. 1, 19:120-128.
1872a Thouarella antarctica, from the Falkland Islands. Ann. Mag. Nat. Hist., Ser. 4, 9:482.
1872b Notes on corals from the South and Antarctic seas. Proc. Zool. Soc. Lond., 1872:744-747, pls. 62-64.

Gunnerus, J. E.
1768 Om nogle Norske Corallen. K. Norske Vidensk. Selsk. Skr., 4:38 pp.

Hall, M. A.
1898 Stylasteridae from the Victorian Tertiaries. Proc. R. Soc. Vict., 10:175-179.

Hedgpeth, J. W.
1969 Distribution of selected groups of marine invertebrates in waters south of 35°S latitude: Introduction to Antarctic zoogeography. Antarct. Map Folio Ser., 11:1-9, 14 figs. American Geographical Society, New York.

Hickson, S. J.
1892 Note on the female gonophores of Errina labiata. Zool. Anz., 15:237-238.
1912a On the Hydrocoralline genus Errina. Proc. Zool. Soc. Lond., 1912:876-896, pls. 94-96.
1912b Notes on some Stylasterina in the Muséum d'Histoire Naturelle de Paris. Bull. Mus. Hist. Nat. Paris, no. 7:461-466, pl. 8.

Hickson, S. J., and H. M. England
1905 The Stylasterina of the Siboga Expedition. Siboga Exped., 5(19) Monogr. 8:26 pp., 3 pls.
1909 The Stylasterina of the Indian Ocean. Trans. Linn. Soc. Lond., Ser. 2, 12:345-354, pl. 44.

Hutton, F. W.
1904 Index Faunae Novae Zealandiae. London.

Kent, W. S.
1871 On some new and little-known species of Madrepores, or stony corals, in the British Museum Collection. Proc. Zool. Soc. Lond., 1871:275-286, pls. 34-76.

Kusakin, O. G.
1967 Fauna of Isopoda and Tanaidacea in the coastal zones of the Antarctic and Subantarctic waters. Biol. Rep. Sov. Antarct. Exped. (1955-1958), 3:220-389. (Translated from Russian by Israel Program for Scientific Translations, Jerusalem, 1968).

Linnaeus, C.
1767 Systema naturae...I, 2. Ed. 12, pp. 533-1327.

Lowe, T. P.
1967 A comparative study of stony hydroids, order Stylasterina, of southern South America and adjacent Antarctic regions. M. S. thesis, vi + 116 pp., 9 pls., 15 figs. George Washington Univ., Washington, D.C.

Milne Edwards, H., and J. Haime
1849 Mémoire sur les polypiers appartenant à la famille des Oculinides, au groupe intermédiaire des pseudastréides et à la famille des Fongides. C. R. Seanc. Acad. Sci. Paris, 29:67-73.
1850 A monograph on the British fossil corals. 1. Introduction. i-lxxxv. Palaeontographical Society, London.

Moseley, H. N.
1876a Preliminary report to Professor Wyville Thomson, F.R.S., director of the civilian staff, on the true corals dredged by H.M.S. 'Challenger' in deep water between the dates Dec. 30th, 1870, and August 31st, 1875. Proc. R. Soc., 24:544-569, 1 fig.
1876b Preliminary note on the structure of the Stylasteridae, a group of stony corals which, like the Milleporidae, are Hydroids, and not Anthozoans. Proc. R. Soc., 25:93-101.
1879 On the structure of the Stylasteridae, a family of the hydroid stony corals. Phil. Trans. R. Soc., 169(2):425-503, pls. 34-44.
1881 Report on certain Hydroid, Alcyonarian, and Madreporarian corals procured during the voyage of H.M.S. Challenger, in the years 1873-1876. Part 1. On the Hydrocorallinae. Rep. Scient. Results Challenger Zool., 2:11-101, 209-230, pls. 1-14.

Naumov, D. V.
1960 Hydroids and Hydromedusae of the USSR. Keys to the fauna of the USSR, no. 70, 660 pp., 30 pls. 463 text figs. Academy of Sciences of the USSR, Moscow. (Translated from Russian by Israel Program for Scientific Translations, Jerusalem, 1969.)

Niino, H.
1958 On the bottom deposits of the sea around Cape Cook, Prince Harald Coast, Antarctica. J. Tokyo Univ. Fish., Spec. Ed., 1(2):250-257, 2 pls.

Pallas, P. S.
1766 Elenchus Zoophytorum, xvi + 28 + 451 pp. Hague-Comitum, The Hague.

Pourtalès, L. F.
1867 Contributions to the fauna of the Gulf Stream at great depths. Bull. Mus. Comp. Zool. Harv., 1(6):103-120.
1868 Contributions to the fauna of the Gulf Stream at great depths. (Second series.) Bull. Mus. Comp. Zool. Harv., 1(7):121-141.
1871 Deep-sea corals. Ill. Cat. Mus. Comp. Zool. Harv., 4:1-93, 8 pls. (Also published as Mem. Mus. Comp. Zool. Harv., 2.)

Ridley, S. O.
1881 Account of the zoological collections made during the survey of the H.M.S. "Alert" in the Straits of Magellan and on the coast of Patagonia. X. Coelenterata. Proc. Zool. Soc. Lond., 1881:101-107, pl. 6.

Sorauf, J. E.
1974 Observations on microstructure and biocrystallization in Coelenterates. Biomineralization Res. Rep., 7:37-55, 10 pls.

Squires, D. F.
1962 Additional Cretaceous and Tertiary corals from New Zealand. Trans. R. Soc. N. Z., 1(9):133-150, 4 pls.

Stokes, C.
1847 Remarks on some corals obtained from great depths in the Antarctic Ocean, in a letter from Charles Stokes to Captain Sir James C. Ross. In J. C. Ross. A voyage of discovery and research in the southern and Antarctic regions during the years 1839-43, vol. 1, Appendix IV, pp. 334-338, London.

Stoll, N. R., et al. (Eds.)
1964 International Code of Zoological Nomenclature adopted by the XV International Congress of Zoology, xix + 176 pp. International Trust for Zoological Nomenclature, London.

Studer, T.
1878 Übersicht der Steinkorallen aus der Familie der Madreporaria aporosa, Eupsammina und Turbinarina, welche auf der Reise S.M.S. Gazelle um die Erde gesammelt wurden. Mber. K.

Preuss. Akad. Wiss. Berl., 1877:625-655, pls. 1-4.

Vervoort, W., and H. Zibrowius
1981 Annotations on H. Boschma's work on hydrocorals (Milleporina, Axoporina, Stylasterina), with additions to his list of the described species of Stylasterina. Zool. Verh. Leiden, no. 181:40 pp.

von Marenzeller, E.
1903 Madreporaria und Hydrocorallia. Result. Voyage S.Y. Belgica, 7:1-7, 1 pl.

Weill, R.
1934 Contribution à l'étude des Cnidaires et leur nématocystes. Trav. Stn. Zool. Wimereux, 10-11:1-701.

Zibrowius, H.
1981 Associations of Hydrocorallia Stylasterina with gall-inhabiting Copepoda Siphonostomoidea from the south-west Pacific. 1. On the stylasterine hosts, including two new species, Stylaster papuensis and Crypthelia cryptotrema. Bijdr. Dierk. Amsterdam, 51(2):268-286.