

REMARKS ON THE STYLASTERINE FAUNA OF THE
WEST INDIES, WITH THE DESCRIPTION OF
STYLASTER ANTILLARUM, A NEW SPECIES
FROM THE LESSER ANTILLES
(CNIDARIA: HYDROZOA:
STYLASTERINA)

Helmut Zibrowius and Stephen D. Cairns

Abstract.—*Stylaster antillarum*, a new species of stylasterine coral from the Lesser Antilles, is described and illustrated. The 23 species of Stylasterina now known from the West Indies are listed and briefly discussed. Inaccurate distributional patterns of some of these species, usually resulting from incorrect identifications, are noted.

Introduction

Most of the information on the Stylasterina of the West Indies (between Florida, Central America and South America), comprising descriptions of species, nomenclatural changes, additional records and inventories, can be found in the following publications: Pallas (1766), Duchassaing and Michelotti (1861, 1864), Pourtalès (1867, 1868, 1871, 1874, 1878), Saville Kent (1870, 1871), Lindström (1877), Moseley (1879, 1881), Broch (1936, 1942), Boschma (1951, 1955, 1957, 1962, 1964a, 1964b, 1964c, 1965), Squires (1962), Roos (1971), Vervoort & Zibrowius (1981) and Zibrowius (in press).

Until now, stylasterine corals have been reported from the West Indies under 28 specific and one subspecific names which are listed below. Six of these species and the one subspecies are considered to be junior synonyms or dubious records, resulting in 23 valid species records (including the new species) for the area. The invalid and dubious species records are marked by an asterisk. If not otherwise indicated, the original descriptions of these species are based on material from the West Indies.

Stylaster complanatus Pourtalès, 1867

Stylaster duchassaingi Pourtalès, 1867

(new name for *Stylaster elegans* Duchassaing & Michelotti, 1864)

Stylaster echinatus Broch, 1936

Stylaster antillarum, new species

**Stylaster elegans* Duchassaing & Michelotti, 1864

(junior homonym of *Stylaster elegans* Verrill, 1864, a species from the Marshall Islands, Pacific; renamed *S. duchassaingi* by Pourtalès, 1867)

Stylaster erubescens Pourtalès, 1871

**Stylaster eximius* Saville Kent, 1871

(new name for *Stylaster elegans* Duchassaing & Michelotti, 1864; junior synonym of *S. duchassaingi*)

**Stylaster eximius* forma *atlanticus* Broch, 1936

(junior synonym of *S. duchassaingi*)

Stylaster filigranus Pourtalès, 1871

Stylaster punctatus Pourtalès, 1871

- Stylaster roseus* (Pallas, 1766)
(originally described as *Madrepora*)
- **Stylaster sanguineus* Milne Edwards & Haime, 1849
(type-locality Australia; dubious record for western Atlantic: see text)
- Allopora miniata* Pourtalès, 1868
- Stenohelia challengerii* Boschma, 1951
(new name for *Stenohelia profunda* Moseley, 1881)
- **Stenohelia maderensis* (Johnson, 1862)
(originally described as *Allopora*, type-locality Madeira, East Atlantic; dubious record for western Atlantic: see text)
- Stenohelia virginis* (Lindström, 1877)
(originally described as *Crypthelia*)
- Crypthelia peircei* Pourtalès, 1867
- **Crypthelia pudica* Milne Edwards & Haime, 1849
(type-locality Philippine Islands; dubious record for western Atlantic)
- Distichopora barbadensis* Pourtalès, 1874
- Distichopora cervina* Pourtalès, 1871
- Distichopora contorta* Pourtalès, 1878
- Distichopora foliacea* Pourtalès, 1868
- Distichopora sulcata* Pourtalès, 1867
- **Errina* (*Errina*) *aspera* (Linné, 1767)
(originally described as *Millepora*, type-locality Mediterranean; not present in western Atlantic: misidentification of Broch, 1942)
- Errina* (*Lepidopora*) *carinata* Pourtalès, 1867
(originally described as *Heliopora*)
- Errina* (*Lepidopora*) *cochleata* Pourtalès, 1867
- Errina* (*Lepidopora*) *decipiens* Boschma, 1964
- Errina* (*Lepidopora*) *glabra* Pourtalès, 1867
- Pliobothrus symmetricus* Pourtalès, 1868
- Pliobothrus tubulatus* (Portalès, 1867)
(originally described as *Heliopora*)

General remarks.—A review of the literature and a preliminary study of numerous specimens in various museum collections (National Museum of Natural History, Washington, D.C.; Yale Peabody Museum; Museum of Comparative Zoology; Muséum National d'Histoire Naturelle, Paris; Rijksmuseum van Natuurlijke Historie, Leiden; Zoologisch Museum, Amsterdam; British Museum (Natural History), London; Royal Scottish Museum, Edinburgh; Zoologisk Museum, Copenhagen; Naturhistoriska Riksmuseet, Stockholm) provide the bases for the following remarks on the synonymy and the distribution of the West Indian *Stylasterina*; however, a monographic study including a revision of all previous records is greatly needed.

Stylaster elegans (name preoccupied), *Stylaster eximius*, *S. eximius* forma *atlantica* and *Stylaster duchassaingi* are all names given to the same species for which the latter name must be retained.

Stylaster complanatus has characters somewhat intermediate between typical *Stylaster* and *Stenohelia*. Here it is listed with the former genus although some authors referred it to *Stenohelia* (Saville Kent 1870; Broch 1936; Boschma 1957, 1964b,c). Broch (1936) incorrectly synonymized it with *Stenohelia virginis*.

The shallow-water specimens of *Stylaster punctatus* (which Pourtalès seemed to consider as the typical form) are identical with *Stylaster roseus*.

The new name *Stenohelia challengerii* had been introduced by Boschma (1951) for *Stenohelia profunda* Moseley, 1879, because of homonymy with *Allopora*

profunda Moseley, 1879, in case the closely related genera *Stylaster*, *Allopora* and *Stenohelia* were synonymized, as has been suggested previously by some authors. However, Boschma's later papers considered these as separate genera (a point of view now generally accepted), and therefore there was no real need for that new name.

Errina (Lepidopora) cochleata has been incorrectly described as a bryozoan, *Hornera galeata* Smitt, 1872 (see Zibrowius, in press).

Most of the West Indian species appear to be endemic to that area, or at least to a larger area in the West Atlantic, whereas only a few species are amphiatlantic. The occurrence in the eastern Atlantic of *Stylaster erubescens* (off western Brittany, between Hebrides and Faeroe, between Orkney and Faeroe, off southeast Iceland) and of *Pliobothrus symmetricus* (Hyères Banc, Azores, off western Brittany, off western Ireland, Faeroe, Norway, off southeast Iceland) is confirmed. In addition, a still unnamed species of *Crypthelia* known from the eastern Atlantic (Hyères Banc, Azores, Madeira) has been recognized among Pourtalès material from the Lesser Antilles (Museum of Comparative Zoology).

Not all indications in the literature on amphiatlantic distributions are correct. *Errina (Errina) aspera* has been reported by Broch (1942) from the West Indies (detailed origin unknown) based on a small fragment of pink *Errina* (Naturhistoriska Riksmuseet, Stockholm, No. 45). However, this is not *E. aspera*, otherwise known from the southwest Mediterranean and the eastern Atlantic, but probably an Antarctic or Subantarctic species (mislabelled), as already suggested by Boschma (1965:2). Nothing similar of authentic West Indian origin has yet been found in the various museum collections.

The case of *Stenohelia maderensis*, reported by Boschma (1964b, 1964c) from the West Indies (St. Vincent), needs further investigation.

Indications in the literature of species of even wider distribution, occurring in both the West Indies and in the Indo-Pacific, are also doubtful and are possibly all caused by mislabelling (origin confused), inversion of labels in the collections, or misidentification. This is sufficiently confirmed in some cases. For instance, *Stylaster erubescens* (?) sensu Moseley, 1881, from the Kermadec Islands, is a *Conopora* (British Museum (Nat. Hist.) 1880.11.25.178).

Typical specimens of *Stylaster sanguineus*, a pink shallow-water species well known from the central and southwest Pacific, are labelled as being from Florida in the Museum of Comparative Zoology and the Yale Peabody Museum. They may well be those mentioned by Pourtalès (1871:83) as undistinguishable from authentic Pacific specimens. A label-inversion error with specimens of the pink shallow-water species *Stylaster roseus* from the West Indies, might best explain this unusual, still unverified distribution. Furthermore, *S. roseus* is mentioned on some of the old labels, either as the original identification or as a synonym of *S. sanguineus*. Boschma (1957) reported the reverse case of *Stylaster roseus* occasionally being mentioned from the Pacific (Hawaii, Samoa).

Boschma (1957) further points out that material from the Loyalty Islands used in an anatomical study (England 1926) had erroneously been cited as *Stylaster filogranus*, the latter being a West Indian species.

A detailed study will probably confirm that the *Stylaster* from Mauritius, Indonesia, the Philippine Islands and the Sea of Okhotsk referred to as *S. eximius* (see Boschma 1957) are not only "forma" or "facies" but species distinct from

the West Indian one, for which the name *Stylaster duchassaingi* has priority over *S. eximius*. A similar result can reasonably be expected from the comparison of *Stenohelia virginis* (Lindström, 1877) with *Stylaster virginis* sensu Hickson and England, 1905, from Indonesia.

Boschma (1964c) affirms that Moseley's (1881) two records of *Stenohelia profunda* (renamed *Stenohelia challengerii*) from the West Indies (type-locality) and the Kermadec Islands are indeed the same species. If he is correct, it would be a very unusual distribution, but it should be remembered that specimens of various zoological groups in the "Challenger" collections have confused origins. On the other hand, specimens from the Galapagos Islands originally reported as *Stenohelia profunda* by Marenzeller (1904) have been described by Boschma (1964b) as a distinct species, *Stenohelia robusta*.

World-wide, several species have probably been identified as *Crypthelia pudica*. Moseley's (1881) record of *C. pudica* from the West Indies (Sombrero) is considered with suspicion; until more detailed comparisons are made, we do not assume that it occurs both in the western Pacific (type-locality: Phillipine Islands) and in the western Atlantic.

A new species of *Stylaster*, distinct from all those previously reported from the West Indies, is described below. The unstudied material from the cruise of the United States Coast Survey steamer "Blake" in 1878/79 to the Caribbean Islands (eight stations) was discovered in the collection of the Museum of Comparative Zoology during a visit in summer, 1980. The original labels printed for that cruise read: "U.S. Coast Survey, C. P. Patterson, Supt.-Caribbean Islands exploration. U.S.C.S., S. Blake, Alex. Agassiz, 1878-79." They are marked in pencil with the station number, depth (in fathoms), and the name of the nearest island. Complementary information on the stations was obtained from Smith's compilation (1889). No preliminary identification, generic or specific, was found with the specimens. Pourtalès' (1880) report on this cruise of 1878/79 deals only with the Scleractinia and Antipatharia. He probably intended to publish a separate report on the Stylasterina, whereas his previous papers include both Scleractinia and Stylasterina.

Stylaster antillarum, new species

Figs. 1-4

Types.—The nearly complete colony from "Blake" Sta. 241 is designated as holotype. The other colonies, branches, and fragments from "Blake" stations 213, 215, 216, 218, 219, 231, and 238 are designated as paratypes. Depository: holotype and most paratypes at MCZ; two paratypes at USNM ("Blake" sta. 216, USNM 60350; "Blake" sta. 219, USNM 60349).

Description.—The "Blake" material is in good condition; all had been collected alive and then dried. For the present study it has been cleaned of the dry tissue and centenary dust with sodium hypochlorite solution.

The holotype is a regularly flabellate and moderately branched colony rising from a strong, encrusting base that is 7.5 mm wide. About 40 mm high and 39 mm wide, the holotype is the largest of the specimens from the "Blake" stations. Most of the other specimens are just branches or fragments and considerably smaller. Colonies comprising the entire base or at least the basal part of the trunk are rare. The coenosteum bears distinct, discontinuous carinae, which are most

Table 1.—*Stylaster antillarum* type-material from "Blake" cruise 1878/79.

Station	Date	Area	Coordinates	Depth	Quantity
213	12.2.1879	Martinique	14°32'38"N, 61°06'40"W	357 fm–653 m	1 branch
215	15.2.1879	St. Lucia	13°51'30"N, 61°03'45"W	226 fm–414 m	2 branches
216	15.2.1879	St. Lucia	13°51'45"N, 61°03'30"W	*153 fm–280 m	15 colonies, branches, fragments
218	15.2.1879	St. Lucia	13°49'12"N, 61°04'40"W	164 fm–300 m	1 colony, 1 branch
219	15.2.1879	St. Lucia	13°49'50"N, 61°03'50"W	151 fm–276 m	9 colonies, branches, fragments
231	20.2.1879	St. Vincent	13°12'10"N, 61°17'18"W	95 fm–174 m	1 branch
238	23.2.1879	Grenadines: Cannuan	12°46'10"N, 61°23'35"W	*126 fm–231 m	1 branch
241	24.2.1879	Grenadines: Carriacou	12°28'22"N, 61°32'18"W	163 fm–298 M	1 colony

* The original labels indicate slightly different depths, respectively 154 fathoms and 127 fathoms.

well developed near a cyclo-system, one carina corresponding to each dactylo-pore. The carinae are about 32–37 μm wide, about 64 μm tall, and variable in length, ranging from 0.1 mm to several millimeters. The distance between two adjacent carinae varies between 0.20–0.30 mm. The coenosteum lying between the carinae is usually slightly concave and is penetrated by coenosteal slits which are also aligned parallel to the carinae. The slits are variable in length, ranging from 20–80 μm , but are consistently 8–9 μm wide. Distinct, rounded coenosteal granules are not present; however, the coenosteal surface is covered by irregular deposits of approximately 3–6 \times 2–3 μm in size, particularly noticeable at the edges of coenosteal slits (Fig. 2D).

Branching is strictly in one plane as the result of simultaneous budding to the left and to the right from below the top part of older cyclo-systems. Otherwise, branches lengthen by alternate budding to the left and right. Angle of budding about 60–70°. This sympodial pattern persists even on the main branches. Cyclo-systems occur only on the lateral branch edges; the anterior and posterior sides of the colony are entirely devoid of cyclo-systems.

Well-developed young distal and peripheral cyclo-systems are long, cylindrical structures, circular in cross section, except distally, where they are compressed in the flabellar plane. They are about 3.2–3.6 mm high and 0.9 mm in diameter at the base. The thickness of the wall of a cyclo-system is about 0.2 mm, and the lesser axis of the distal part of a cyclo-system is about 0.9–1.0 mm, the greater axis, 1.2–1.3 mm. Older cyclo-systems are not much taller but do become pronouncedly thicker (thickening of the wall), becoming proportionally more compressed at the top (lesser axis 1.0 mm, greater axis up to 1.6 mm). Initial stages of new cyclo-systems start as low annular ridges, 0.7 mm wide, below the tops of older ones.

Seen from the anterior and posterior sides of the colony, the top of the cyclo-system is distinctly flabellate with a rounded outline, the pseudosepta and dactylo-pore openings near the greater (longitudinal) axis being much lower than those near the lesser (transverse) axis. Adjacent to the greater axis the dactylo-pores



Fig. 1. Types of *S. antillarum*: A, Holotype colony from "Blake" sta. 241, MCZ, $\times 2.0$; B, Branchlet of holotype with prominent ampullae and circular depressions left by ruptured ampullae, $\times 6.3$; C, Detail of paratype colony from "Blake" sta. 216, MCZ, with ampullae occurring singly or in pairs below the flared top of the cyclosystems, $\times 6.3$; D, paratype colony from "Blake" sta. 219, MCZ, with large acrothoracic cirriped crypt in the fractured base, $\times 4.3$.

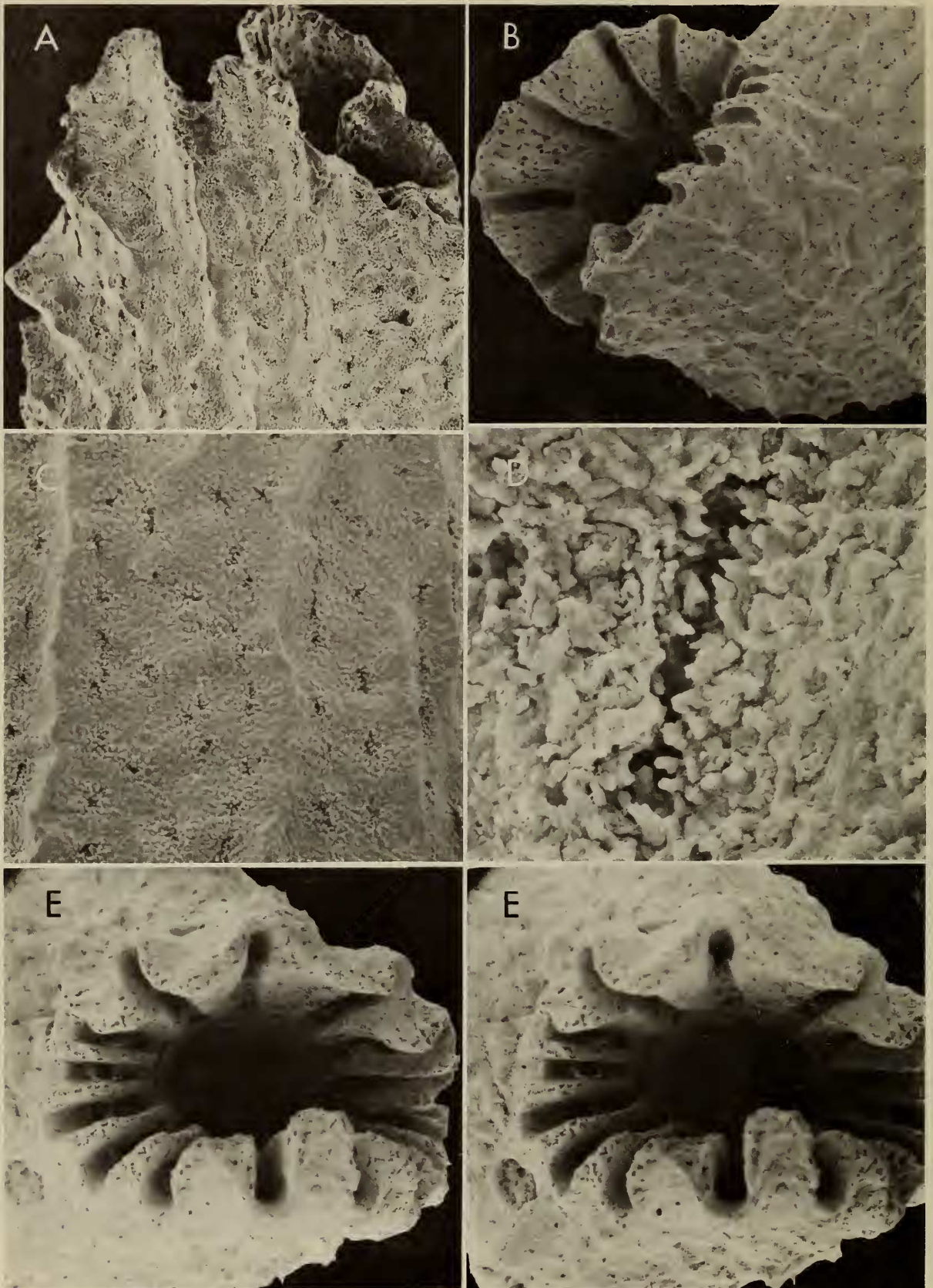


Fig. 2. Paratypes of *S. antillarum* from "Blake" sta. 216, USNM 60350: A-B, Lateral and oblique views of cyclosystems and coenosteal ridges, one ridge corresponding to each dactylopoire, $\times 44$, $\times 34$, respectively; C, Coenosteal texture, $\times 106$; D, Coenosteal slit, $\times 640$; E, Oral view of cyclosystem with 15 dactylopores, $\times 50$, SEM stereomicrographs.

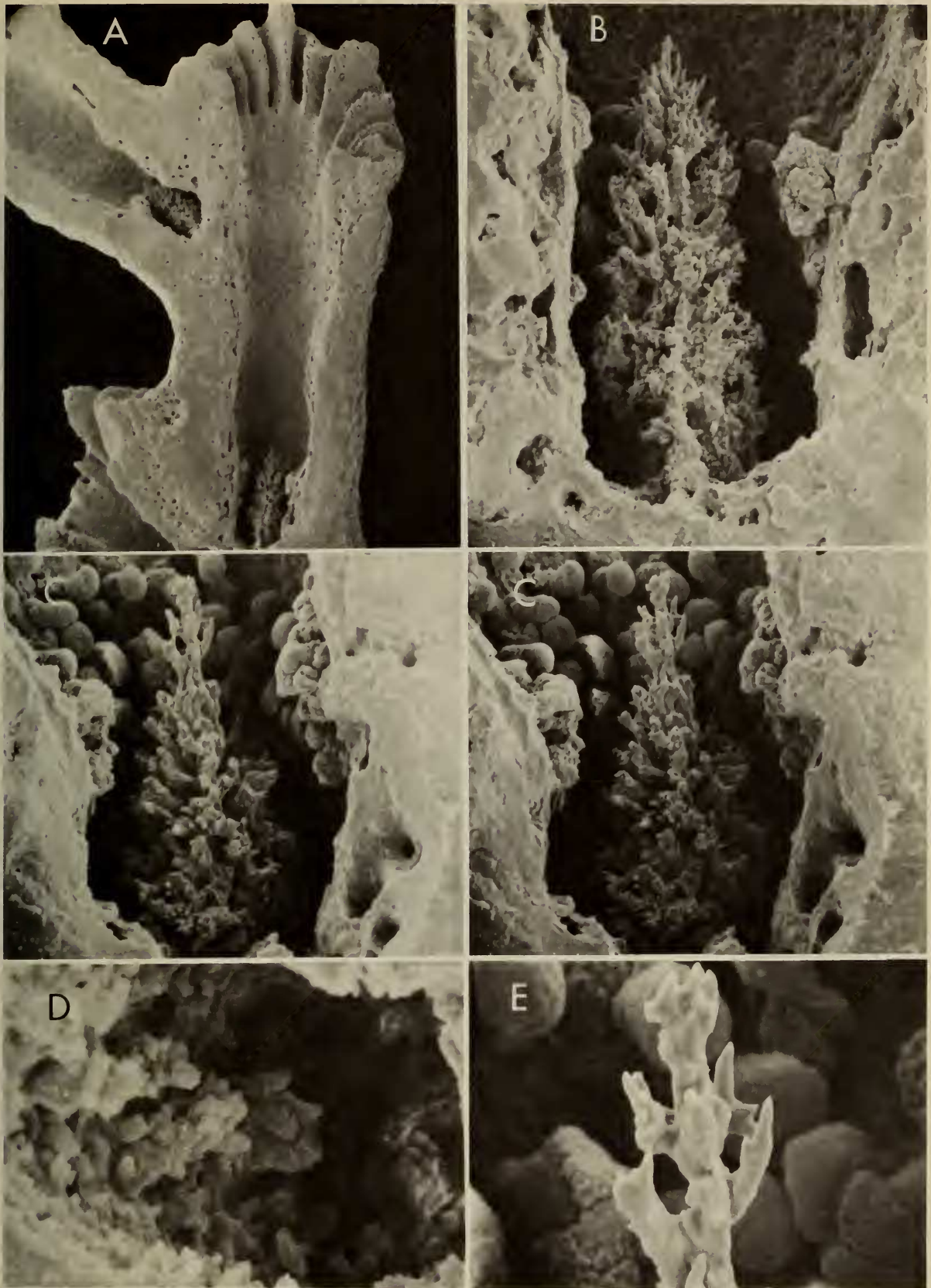


Fig. 3. Paratypes of *S. antillarum*: A, "Blake" sta. 216, longitudinal section of gastropore revealing gastrostyle, $\times 24$; B, Gastrostyle of figure 3A, $\times 110$; C, "Blake" sta. 219, USNM 60349 gastrostyle and inner ring of granules, $\times 110$, SEM stereomicrographs; D, "Blake" sta. 216, dactylostyle, $\times 680$; E, Gastrostyle tip of fig. 2C, $\times 340$.

are closely spaced, separated by very distinct lamellar pseudosepta; adjacent to the lesser axis they are widely spaced, separated by thick pseudosepta which are less prominent and more flattened toward the gastropore tube. Upper rim of cyclo-system crenulate; upper part of outside surface carinate, with carinae corresponding to dactylopores and depressions to pseudosepta.

Dactylopores are deep, narrow pits parallel to the central gastropore tube, separated from the latter by a thin wall except at the upper part where the narrow slit-like dactylotomes permit open communication. The gastropore tube is cylindrical, up to 3 mm long, and about 0.40–0.43 mm in diameter. The basal 0.5 mm of the tube, the gastrostyle chamber, is narrower, usually only 0.3 mm in diameter. At the boundary of the gastrostyle chamber with the larger, upper part there is a distinct ring of granules, the ring being about 0.2 mm thick. The granules are thick and blunt, about 50 μm tall and 35–40 μm thick, and are closely spaced, often fusing. This ring of granules further constricts the gastropore tube to a diameter of about 0.20–0.25 mm.

Gastrostyles are conical to bullet-shaped, up to 0.55 mm tall and 0.20 mm wide. Height : width ratios of those styles measured ranged from 2.67–2.90. The style occupies the lower 15–19% of the gastropore tube, the delicate tip usually extending just above the ring of blunt granules. Styles are highly sculptured with spines which are particularly well developed at the tip where they measure up to 36 μm long and 8.5 μm wide (Fig. 3E). No ridges are present on the styles.

Dactylostyles are very poorly developed, composed of small, irregular, angular deposits measuring about $15 \times 5 \mu\text{m}$. These deposits are usually fused in a line forming the dactylostyle.

The number of dactylopores varies from 10 to 18 in the 200 cyclo-systems examined in detail; 14 dactylopores per cyclo-system is both the median and the mode, 14.35 is the average.

Dactylopores per cyclo-system	10	11	12	13	14	15	16	17	18
Number of cyclo-systems	7	9	16	28	44	40	31	17	8

The ampullae are prominent outgrowths on both the anterior and posterior sides of the colony, located just below the flared top of the cyclo-system, at the same level from which the younger cyclo-systems bud. They measure up to 0.57 mm tall and 0.61 mm broad. Ampullae occur singly or in pairs and the same cyclo-system may have ampullae on both its anterior and posterior sides. Their roughly hemispherical shapes are obscured by irregular crests and small knobs. Some ampullae have a tiny pore near the base, probably an efferent duct. Rather frequently ampullae are ruptured, leaving a circular depression.

Remarks.—Cavities caused by acrothoracic cirripeds are present in the base of two colonies, one from “Blake” sta. 216, the other from “Blake” sta. 219. No other symbionts are known from *Stylaster antillarum*.

Discussion.—The combination of characters described above distinguishes *S. antillarum* from all previously described species of *Stylaster* (see Boschma 1957; Vervoort & Zibrowius 1981). As far as could be deduced from the literature, only *Stylaster multiplex* Hickson & England, 1905, and *Stylaster crassior* Broch, 1936, show some resemblance to *S. antillarum*, mainly by the somewhat elongate tops of their cyclo-systems. However, comparison with *S. multiplex* (type-material from Indonesia) and *S. crassior* (from the Comoros, “Le Suroit” cruise, Ben-

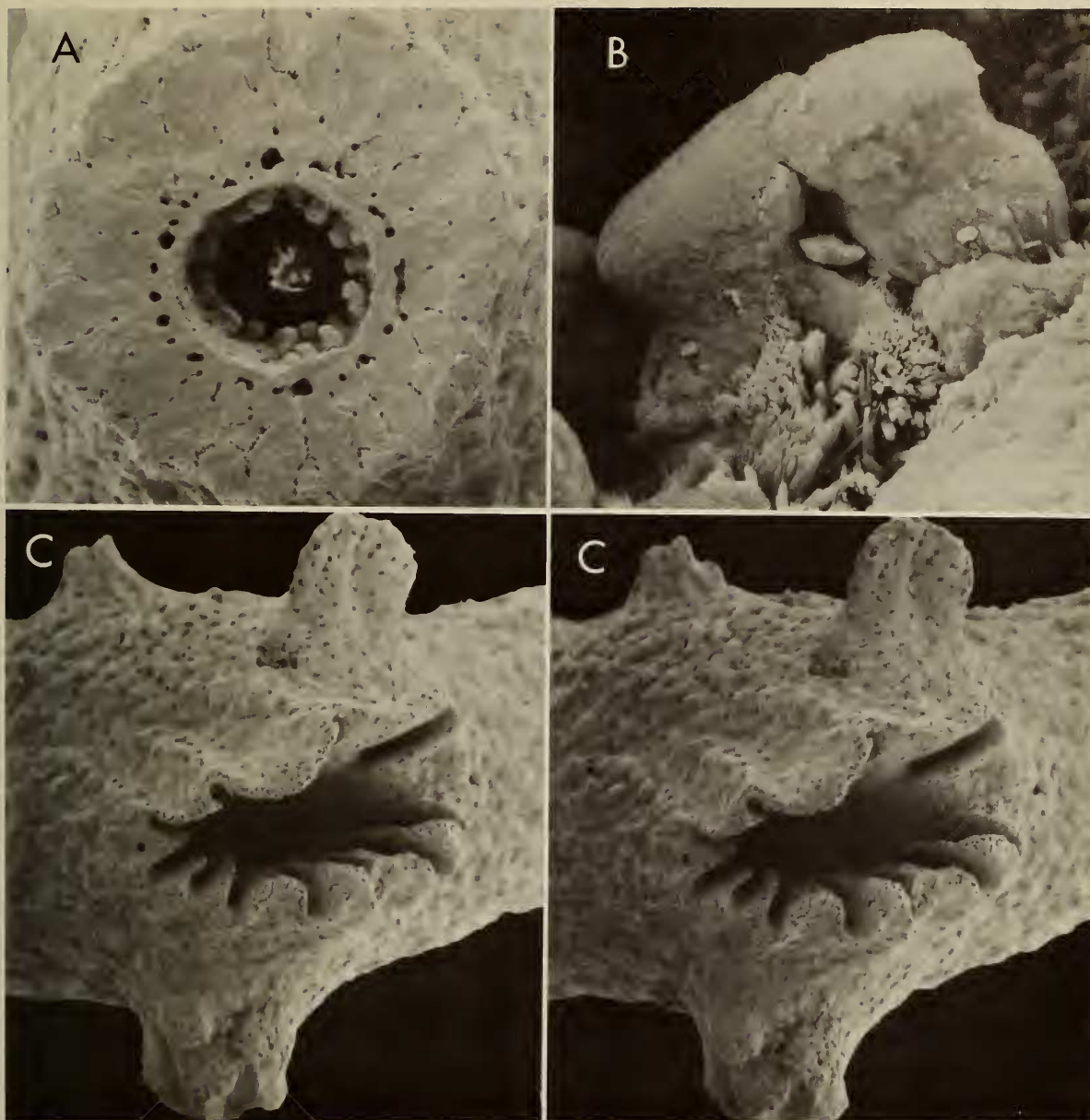


Fig. 4. Paratypes of *S. antillarum* from "Blake" sta. 216, USNM 60350: A, Cross section of gastropore tube just above ring of granules; gastrostyle tip in center; rudimentary dactylopore tubes encircle gastropore, $\times 50$; B, Two fused granules from the ring of granules of fig. 4A, $\times 680$; C, cyclosystem flanked by irregularly shaped ampullae, $\times 30$.

thedi, 1977; the type-material from Mauritius was not available) indicates that these forms, similar to each other, differ considerably from the West Indian species. The tops of their cyclosystems are not as prominent or flabellate as in *S. antillarum*, and their dactylopores and pseudosepta are more uniformly spaced. Other differences concern the depth of the gastropore tube, the surface structure of the branches, and the ampullae.

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Literature Cited

- Boschma, H. 1951. Notes on Stylasterina (Hydrocorallia).—Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C)54(5):451–458.
- . 1955. The specific characters of the coral *Stylaster roseus*.—Deep-Sea Research 3, Supplement:134–138.
- . 1957. List of the described species of the order Stylasterina.—Zoologische Verhandelingen, Leiden 33:1–72.
- . 1962. Notes on the Stylasterine coral *Allopora miniata*.—Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C)65(3):195–204, pl. 1–2.
- . 1964a. *Errina (Lepidopora) decipiens*, a new Stylasterine coral from the West Indies.—Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C)67(2):55–63, pl. 1.
- . 1964b. On the Stylasterina of the genus *Stenohelia*.—Proceedings Koninklijke Nederlandse Akademie van Wetenschappen (C)67(2):64–73, pl. 1–2.
- . 1964c. Further notes on the Stylasterine corals *Stenohelia challengerii* and *Stenohelia maderensis*.—Proceedings Koninklijke Nederlandse Akademie Wetenschappen (C)67(2):78–84, pl. 1–2.
- . 1965. Further notes on *Stylaster roseus* (Pallas). I & II.—Proceedings Koninklijke Nederlandse Akademie Wetenschappen (C)68(2):229–250, pl. 1–4.
- Broch, H. 1936. Untersuchungen an Stylasteriden (Hydrokorallen). Teil 1.—Skrifter utgitt av Det Norske Videnskaps-Academi i Oslo, I Mat.-Naturv. Klasse, 8:1–103, pl. 1–13.
- . 1942. Investigations on Stylasteridae (Hydrocorals).—Skrifter utgitt av Det Norske Videnskaps-Academi i Oslo, I Mat.-Naturv. Klasse, No. 3:1–113, pl. 1–6.
- Duchassaing, P., and J. Michelotti. 1861. Mémoire sur les coralliaires des Antilles.—Mémoires de l'Académie des Sciences de Turin (2)19:279–365, pl. 1–10.
- . 1864. Supplément au mémoire sur les coralliaires des Antilles.—Mémoires de l'Académie des Sciences de Turin (2)23:97–206, pl. 1–11.
- England, H. M., 1926. Development of the gonophores of the Stylasteridae.—Proceedings of the Zoological Society of London (1926):265–283.
- Hickson, S. J., and H. M. England. 1905. The Stylasterina of the Siboga expedition.—Siboga-Expeditie 8:1–26, pl. 1–3.
- Lindström, G. 1877. Contributions to the actinology of the Atlantic Ocean.—Kongliga Svenska Vetenskaps-Akademiens Handlingar, Stockholm 14(2):1–26, pl. 1–3.
- Marenzeller, E. von. 1904. Stein- und Hydro-korallen.—Bulletin of the Museum of Comparative Zoology 43(2):75–87, pl. 1–3.
- Moseley, H. N. 1879. On the structure of the Stylasteridae, a family of the Hydroid stony corals.—Philosophical Transactions of the Royal Society of London 169, 1878:425–503, pl. 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.—Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–1876. Zoology 2:1–248, 32 pl.
- Pallas, P. S. 1766. Elenchus zoophytorum . . . Hagee Comitum xvi-28-451 pp.
- Pourtalès, L. F. de. 1867. Contributions to the fauna of the Gulf Stream at great depths.—Bulletin of the Museum of Comparative Zoology 1(6):103–120.
- . 1868. Contributions to the fauna of the Gulf Stream at great depths (2^d series).—Bulletin of the Museum of Comparative Zoology 1(7):121–142.
- . 1871. Deep-sea corals—Illustrated Catalogue of the Museum of Comparative Zoology 4:1–93, pl. 1–8.
- . 1874. The zoological results of the Hassler Expedition. Deep-sea corals.—Illustrated Catalogue of the Museum of Comparative Zoology 8:33–49, pl. 6–9.
- . 1878. Report on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico, by the U.S. coast survey steamer "Blake." Corals.—Bulletin of the Museum of Comparative Zoology 5(9):197–212, pl. 1.
- Roos, P. J. 1971. The shallow-water stony corals of the Netherlands Antilles.—Studies on the Fauna of Curaçao and other Caribbean Islands 37(130):1–108, pl. 1–53.

- Saville Kent, W. 1870. On a new genus of Madreporaria or stony corals (*Stenohelia*).—Annals and Magazine of Natural History, London (4)5:120–123.
- . 1871. On some new and little-known species of Madrepores, or stony corals, in the British Museum collection.—Proceedings of the Zoological Society of London (1871):275–286, pl. 23–25.
- Smith, S. 1889. Lists of the dredging stations of the U.S. Fish Commission, the U.S. Coast Survey, and the British steamer Challenger, in North American waters, from 1867 to 1887, together with those of the principal European government expeditions in the Atlantic and Arctic Oceans.—United States Commission of Fish and Fisheries, Report for 1886:873–1017, maps.
- Smitt, F. A. 1872. Floridan Bryozoa collected by Count L. F. de Pourtalès. Part I.—Kungliga Svenska Vetenskaps-akademiens Handlingar, Stockholm 10(11):1–20, pl. 1–5.
- Squires, D. F. 1962. Additional Cretaceous and Tertiary corals from New Zealand.—Transactions of the Royal Society of New Zealand 88(4):133–150, 4 pls.
- Vervoort, W., and H. Zibrowius. 1981. Annotations on H. Boschma's work on Hydrocorals (Mil-leporina, Axoporina, Stylasterina) with additions to his list of the described species of Stylasterina.—Zoologische Verhandelingen, Leiden 181:1–40.
- Zibrowius, H. in press. Identification des pretendus Bryozoaires ("*Hornera*") de Smitt et de Calvet a des Hydrocoralliaires Stylasterina.—Bulletin Muséum National d'Histoire Naturelle, Paris.

(HZ) Station Marine d'Endoume, Marseille 13007, France; (SDC) Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.