

BIOLOGICAL RESULTS OF THE UNIVERSITY OF MIAMI
DEEP-SEA EXPEDITIONS. 125.

A REVISION OF THE RECENT SPECIES OF *STEPHANOCYATHUS*
(ANTHOZOA: SCLERACTINIA) IN THE WESTERN ATLANTIC,
WITH DESCRIPTIONS OF TWO NEW SPECIES

Stephen D. Cairns

ABSTRACT

Based on abundant material, four species of the genus *Stephanocyathus* are distinguished in the western Atlantic: *S. (S.) diadema* (Moseley), *S. (S.) paliferus* n. sp., *S. (S.) laevifundus* n. sp., and *S. (O.) coronatus* (Pourtalès). These four species are fully described and illustrated; their bathymetric and geographic ranges are provided. The taxonomic position of *Stephanocyathus discoides* (Moseley) is discussed.

Since Portalès's (1867, 1871, 1880) and Moseley's records, the only valid reports of *Stephanocyathus* in the western Atlantic have been the records by Keller (1975) and Erhardt (1976). As a result of an intensive trawling program, sponsored by the National Geographic Society and the University of Miami, hundreds of additional specimens of *Stephanocyathus* have been collected throughout the tropical western Atlantic. These large suites of specimens have allowed a thorough examination of morphological variation and ontogenetic change of the corallum as well as information extending geographic and depth ranges. Furthermore, the large number of specimens has permitted the differentiation of two new species, both of which are common in the West Indies. With this extensive collection, a review of the four western Atlantic species of *Stephanocyathus* is made possible.

MATERIALS AND METHODS

This study is based primarily on the corals collected by the National Geographic Society—University of Miami Deep-Sea Biology Program (1962–1974), under the direction of Drs. G. L. Voss and F. M. Bayer. It also

includes a re-evaluation of all of Portalès's specimens as well as the ATLANTIS collection, housed primarily at the Museum of Comparative Zoology. This study is part of a larger review of all western Atlantic deep-water Scleractinia (Cairns, 1976). All specimens examined in this study that were collected at GERDA, PILLSBURY, or COLUMBUS ISELIN stations will be deposited at the USNM.

The following abbreviations are used in the text: cd—calicular diameter; S_x, C_x, P_x—collective terms for the septa, costae or paliform lobes, respectively, of whatever cycle x represents; G—R/V GERDA; P—R/V PILLSBURY; BL—BLAKE; ATL—ATLANTIS; CI—R/V COLUMBUS ISELIN; UMML—University of Miami Marine Laboratory (Rosenstiel School of Marine and Atmospheric Science); BMNH—British Museum (Natural History); USNM—United States National Museum; MCZ—Museum of Comparative Zoology. Station data for the BLAKE stations are listed in Smith (1889) and for the ATLANTIS in Chace (1940). The number in parentheses following a station number indicates the number of specimens in the lot.

Suborder CARYOPHYLLIINA
Vaughan and Wells, 1943
Superfamily CARYOPHYLLIACEA
Gray, 1847

Family CARYOPHYLLIIDAE Gray, 1847
Genus *Stephanocyathus* Seguenza, 1864

Stephanocyathus Seguenza, 1864: 61.
Sabinotrochus Duncan, 1873: 320.
Stephanotrochus Moseley, 1881: 151.

Diagnosis.—Solitary, patellate, free. Costae usually present. Septa exsert, with smooth inner margins. Paliform lobes usually present on all septa. Columella trabecular, papillose or fused on surface. Eocene to Recent. 141–2195 m.

Type-species.—*S. elegans* Seguenza, 1864.

Stephanocyathus (Stephanocyathus)
diadema (Moseley, 1876)
Figures 1–2

- Ceratotrochus diadema* Moseley, 1876: 553–554.
—Thomson, 1878: 113, fig. 30.
? *Ceratotrochus discoides* Moseley, 1876: 554.
Stephanocyathus diadema: Pourtalès, 1880: 96, 104, pl. 2, fig. 1.—Moseley, 1881: 152–153, pl. 3, figs. 1a–c.—Sclater, 1886: 130.—Agassiz, 1888: 149–150.
? *Stephanotrochus discoides*: Moseley, 1881: 153–154, pl. 3, figs. 2a–c.
Not *Stephanotrochus diadema*: Jourdan, 1895: 18.—Roule, 1896: 319.—Stephens, 1909: 24.—Gravier, 1920: 43–51.—Thompson, 1931: 9.
Stephanocyathus diadema: Gardiner and Waugh, 1938: 191.—[Bayer, 1973]: illustrated on Haitian postage stamp, 1.5 gourdes.—Zibrowius, 1976: 165.
Not *Stephanocyathus diadema*: Zibrowius, Southward, and Day, 1975: 100, pl. 3, fig. F (referred to *S. moseleyanus* in notes added in proof).
Stephanocyathus diadema nobilis: Keller, 1975: 180, pl. 2, figs. 9a–b.
? *Stephanocyathus* sp. Keller, 1975: 180, pl. 2, figs. 10a–b.

Material Examined.—Types: BMNH 1880.11.25.55, syntypes (2) of *C. diadema*, 8°37'S, 34°28'W, 1234 m, CHALLENGER-120 and off Azores, 1846 m, CHALLENGER-78; BMNH 1880.11.25.56, holotype of *C. discoides*, 8°37'S, 34°28'W, 1234 m, CHALLENGER-120.—Other Material: Straits of Florida: P-636 (2), 23°54'N, 81°27'W, 1003–1336 m; G-121 (1), 23°52'N, 82°05'W, 1281 m; G-129 (6), 23°46'N, 81°15'W, 1281 m; G-370 (1), 23°54'N, 81°19'W, 1281 m; G-372 (5), 23°51'N, 81°02'W, 1107–1162 m; G-375 (4), 23°54'N, 81°27'W,

1153–1190 m; G-446 (4), 23°57'N, 82°32'W, 988–1071 m; G-448 (4), 23°54'N, 82°21'W, 620–647 m; G-858 (1), 23°56'N, 82°13'W, 969–984 m; G-859 (1), 23°54'N, 81°57'W, 1143–1200 m; G-1112 (4), 23°44'N, 81°14'W, 1244–1291 m; ATL-2995 (1).—Exuma Sound: CI-73 (1), 23°46'N, 75°41'W, 1792 m; CI-175 (1), 24°31'N, 76°18'W, 1701 m; CI-178 (1), 24°13'N, 76°06'W, 1790 m; CI-183 (1), 23°45'N, 75°39'W, 1814 m; CI-186 (5), 23°45'N, 75°42'W, 1853 m; CI-187 (10), 23°59'N, 75°49'W, 1880 m; CI-191 (6), 24°10'N, 75°56'W, 1840 m; CI-193 (1), 24°25'N, 76°11'W, 1757 m; CI-274 (2), 24°31'N, 76°17'W, 1701 m; CI-276 (3), 24°21'N, 76°10'W, 1773 m; CI-277 (1), 24°14'N, 76°06'W, 1794 m; CI-278 (22), 23°56'N, 75°58'W, 1779 m; CI-279 (41), 23°49'N, 75°49'W, 1853 m; CI-281 (8), 23°54'N, 75°29'W, 2113 m; CI-282 (38), 23°59'N, 75°46'W, 1908 m; CI-284 (10), 23°57'N, 75°59'W, 1281 m; CI-285 (4), 24°15'N, 75°54'W, 1767 m; CI-286 (28), 24°09'N, 75°54'W, 1842 m; CI-287 (26), 24°21'N, 76°01'W, 1741 m; CI-338 (10), 23°58'N, 75°48'W, 1899 m; CI-339 (11), 24°10'N, 75°54'W, 1847 m, CI-340 (4), 24°20'N, 75°58'W, 1746 m.—Antilles: P-741 (3), 11°48'N, 66°06'W, 1052–1067 m; P-748 (6), 11°25'N, 67°10'W, 1784–1867 m; P-754 (1), 11°37'N, 68°42'W, 684–1574 m; P-830 (1), 18°40'N, 65°58'W, 1446–1510 m; P-850 (2), 11°46'N, 61°30'W, 800–924 m; P-1177 (2), 19°26'N, 73°35'W, 1528–1611 m; P-1178 (10), 19°14'N, 73°14'W, 1766–1903 m; P-1197 (2), 17°34'N, 76°09'W, 1482–1504 m; P-1224 (9), 17°31'N, 77°49'W, 878–906 m; P-1262 (10), 17°21'N, 77°35'W, 805–1089 m; P-1304 (2), 17°45'N, 64°59'W, 3477–3871 m; GILLISS-31 (84), 16°58'N, 79°28'W, 1088–1116 m; BL-111 (2), BL-173 (1), ATL-3362 (1), ATL-3425 (1).—Off Colombia: P-364 (2), 9°29'N, 76°34'W, 924–950 m; P-391 (2), 10°03'N, 76°27'W, 1222–1748 m; P-413 (5), 9°02'N, 76°53'W, 952–1267 m.—Off Panama: P-337 (9), 9°51'N, 78°39'W, 1846 m; P-407 (7), 9°00'N, 77°25'W, 1158–1225 m.—Off British Honduras: BL-XVIII (2).—Off Guyana: P-672 (3), 7°37'N, 55°22'W, 1221–1336 m; P-682 (2), 7°34'N, 56°25'W, 1318–1343 m.—Off Brazil: WLADIMIR BESNARD-322 (8), 25°06'S, 43°44'W, 2040–2150 m.

Description.—The adult corallum is bowl- or saucer-shaped, free, and rests on a very small, projecting pedicel, which is its original point of attachment. Smaller coralla (less than 30 mm in ed) have a flat, very thin wall, with a deeply serrated calicular edge. The largest corallum examined measures 64.0 mm in calicular diameter and 33.5 mm in height, making it one of the largest solitary corals in the western Atlantic. About half of the coralla examined are white, while the other half are uniformly pink.

C₁ and C₂ are quite prominent, ridged, and possess up to 21 projecting teeth directed

toward the calicular edge. An average-size specimen (cd = 48 mm) possesses only 12 to 14 teeth on each costa, the first one occurring about 12 mm from the center of the base. C_3 are sometimes ridged near the calicular edge but rarely possess costal teeth. C_4 and C_5 are barely distinguishable. There is no costal granulation.

Septa are arranged in six systems and five complete cycles. The calicular edge is jagged. The theca forms an apex corresponding to every septum, the largest corresponding to the S_1 and S_2 . The S_1 , which are highly exsert, are the only independent septa. The upper, outer margin of each S_1 usually forms a large, exsert lobe, which is reduced in size just below the calicular edge by a wide notch or broad indentation. Toward the columella, the septum enlarges again as a broad paliform lobe. The S_2 are equally exsert, and almost as large; the other cycles are progressively less exsert and smaller. The inner margins of all septa follow the general shape described for the S_1 . In each system the inner edges of the two S_3 are united with the S_2 by a spongy extension of the columella. Likewise, the S_4 are connected to the S_3 and the S_5 to the S_4 at a distance progressively farther from the columella. The edges of the S_1 are entire; however, those of the higher cycle septa are irregularly dentate. The septa bear small, widely spaced, blunt granules usually oriented in rows perpendicular to the septal edge.

The columella is elliptical in shape, its longer axis aligned with two opposing S_1 . It is composed of a solidly fused granular mass, which is usually flat, sometimes concave. Calcareous deposits of the same texture extend outward from the columella into all six systems, serving to unite the inner edges of the higher cycle septa.

Discussion.—*S. diadema* is known only from the western Atlantic; however, several authors have attributed eastern Atlantic specimens to this species. In most cases the specimens in question were *S. moseleyanus*, less

often *S. crassus* and *S. nobilis* (Zibrowius, 1976). *S. diadema* is easily distinguished from all other species of *Stephanocyathus* by its prominent costal denticulation.

Both Gravier (1920) and Zibrowius (1976) considered *C. discoides* Moseley, 1876 (pl. 1, fig. 3) as a synonym of *S. diadema*. Both forms were originally collected at the same station and are very similar to one another. However, *S. discoides*, a juvenile specimen 22.3 mm in calicular diameter (not 12 mm as reported by Moseley), has a thick wall curved upward at the edges, a calicular edge only slightly serrate, and a peculiar, concave columella. The columella may fall within the range of variation for *S. diadema*, but among dozens of small *S. diadema* examined that had similar calicular diameters, all had a strongly serrate outer edge and a very thin, fragile, flat theca. For these reasons, I share Moseley's hesitation in synonymizing *S. discoides*.

Of the two syntypes of *C. diadema*, the smaller specimen from the Azores (CHALLENGER-78) is worn and broken and may not be the same species. Moseley's description is clearly based on the larger syntype (CHALLENGER-120), which is designated here as lectotype.

Type-Locality.—8°37'S, 34°28'W (off Recife, Brazil), 1234 m.

Geographic Distribution.—Western Atlantic from 32°40'N to 25°06'S, including the western Straits of Florida; Exuma Sound; Antilles; off Colombia; off Panama; off British Honduras; off Guyana; to southern Brazil.

Bathymetric Range.—924–2113 m.

***Stephanocyathus* (*Stephanocyathus*)
paliferus new species**

Figures 4–7

Not *Ceratocyathus elegans* Seguenza, 1864: 561–563, pl. 7, figs. 1a–i.

Stephanocyathus elegans: Pourtales, 1880: 103.
? Stephanocyathus nobilis: Erhardt, 1976: 59–62, pl. 1.

Material Examined.—Types: USNM 47755, holotype, G-1017, 23°58'N, 79°17'W, 554 m; USNM 45756, paratypes (13), G-1016, 23°34'N, 79°12'W, 529–543 m; USNM 45757, paratypes (2), G-694, 26°28'N, 78°40'W, 622–695 m; USNM 45758, paratypes (3), G-817, 23°50'N, 79°30'W, 508 m; USNM 45759, paratype (1), P-445, 9°02'N, 81°24'W, 338–342 m.—Other Material: Straits of Florida: G-524 (1), 26°17'N, 78°41'W, 513–715 m; G-967 (1), 24°15'N, 82°26'W, 499–503 m.—Santaren Channel: G-1012 (11), 23°35'N, 79°33'W, 508–530 m; G-1015 (1), 23°34'N, 79°12'W, 529–543 m; P-1171 (3), 23°35'N, 79°24'W, 512–525 m; ATL-2985 (3), ATL-3439 (2).—Antilles: P-753 (52), 11°19'N, 68°22'W, 384–607 m; P-861 (1), 12°42'N, 61°06'W, 18–744 m; P-889 (1), 14°04'N, 60°51'W, 371–403 m; P-984 (1), 18°26'N, 63°13'W, 393–451 m; P-1255 (2), 17°18'N, 78°32'W, 622–823 m; BL-274 (1), BL-280 (1), BL-281 (1).—Off Colombia: P-394 (1), 9°29'N, 76°26'W, 416–634 m.—Off British Honduras: P-607 (1), 18°30'N, 87°37'W, 715–787 m.—Off northeast South America: OREGON-1989 (1), 9°45'N, 59°45'W; OREGON-4226 (3), 0°18'N, 44°17'W, 274 m; OREGON-4302 (1), 7°35'N, 54°25'W, 274 m.—Off Panama: P-340 (4), 9°14'N, 77°46'W, 304–362 m.

Description.—The corallum is bowl-shaped, free, and usually has a small, low sear of attachment at the center of the base, which often incorporates a small piece of substrate into the corallum. The largest specimen examined (the holotype) measures 42.0 mm in diameter and 21.0 mm in height. The theca, even of small specimens, is moderately thick and always white.

The costae corresponding to the first two cycles of septa bear up to twelve low, blunt spines, which, in larger specimens, occur only on the lower face of the corallum, being absent from the calicular edge. Costae corresponding to the higher cycle septa are prominent only near the calicular edge, where they are rounded and slightly convex, separated

by broad, shallow, intercostal grooves; toward the apex they are indistinguishable or represented by faint lines. The calicular edge is entire, not serrated.

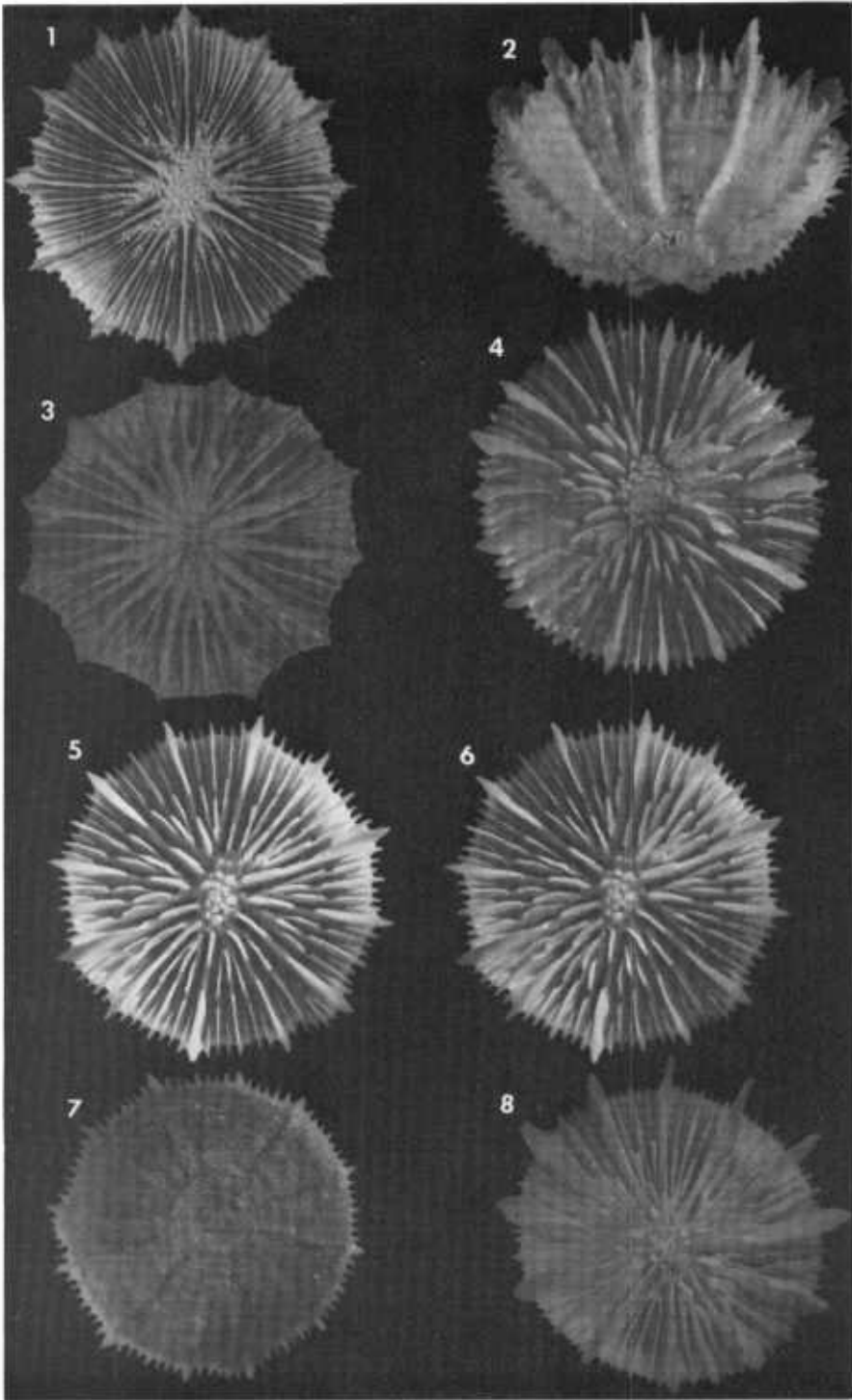
Septa are arranged in six systems and five cycles, but the last cycle is never complete. The holotype has 90 septa; however, two other coralla 32.0 and 40.0 mm in calicular diameter have 94 septa. The S_1 are the largest septa, most exsert, and independent of the others. The S_2 are only slightly less exsert; the higher cycle septa are progressively smaller. The rudimentary S_5 are very small, thin, and do not unite with the S_4 . The inner edges of all septa, except the S_5 , are straight and entire. The septa and paliform lobes bear numerous fine, close-set granules, which are very low and blunt.

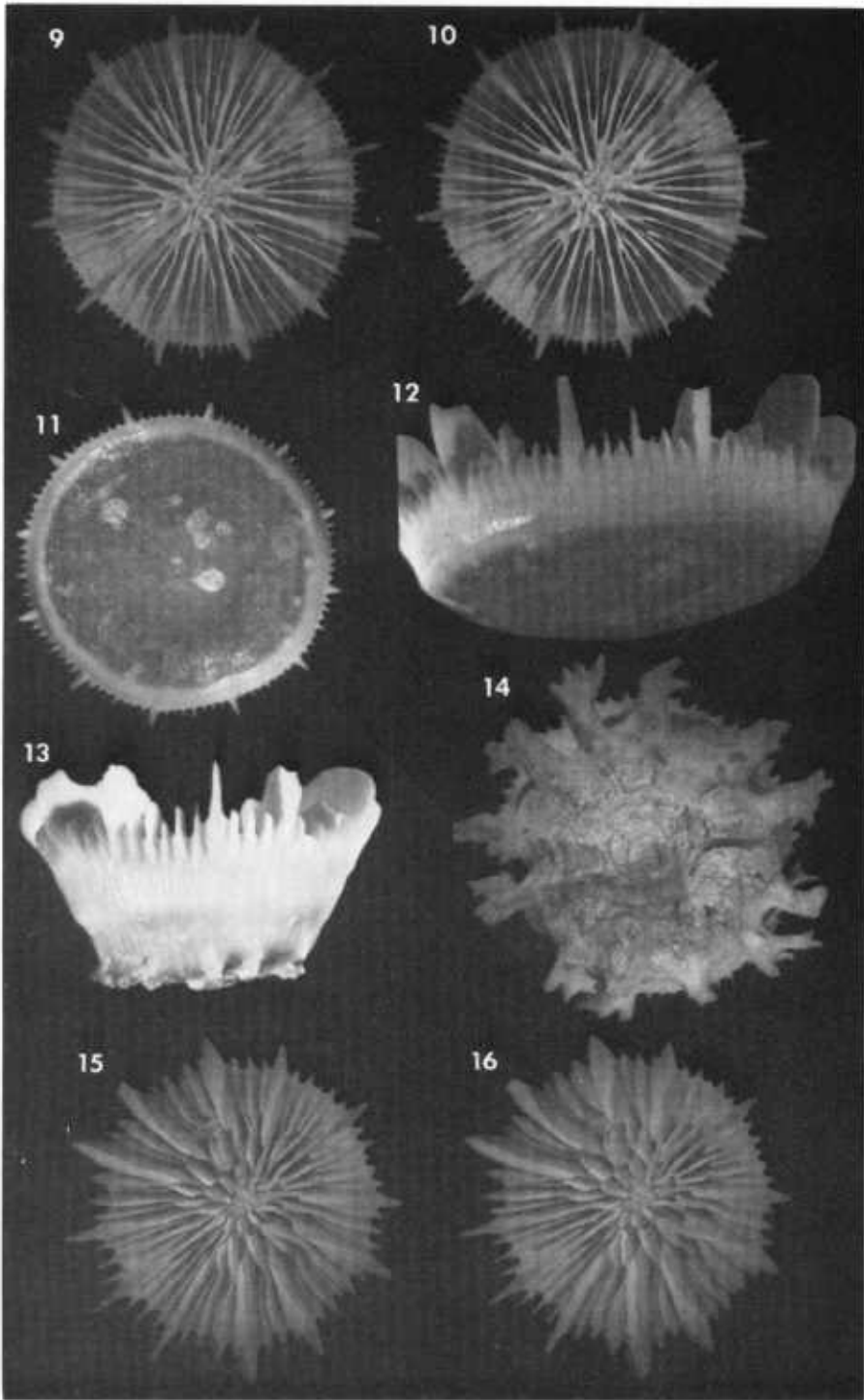
Each septum but those of the last cycle bears a large paliform lobe, which is compressed in the plane of the septum. Each lobe is separated from its septum by a deep but broad notch, which becomes deeper and narrower in the higher cycle septa. P_1 and P_2 extend to the columella; however, P_2 are usually slightly larger. P_3 , about the same size as the P_2 , are slightly recessed from the columella. P_4 , equal in size to the P_1 , are recessed even farther from the columella. Within each system, the P_4 unite with the P_3 and the P_3 with the P_2 by a solid fusion of their lower, lateral edges.

The columella is elongated along an axis defined by two opposing S_1 . It is composed of numerous distinct pillars, which usually remain individualized but sometimes become fused into a more solid structure. The columellar elements are basally fused among themselves and to the adjacent P_1 and P_2 . Rarely the columella is absent.

→

Figures 1–8. 1, *Stephanocyathus (S.) diadema*: P-338, cd = 59.5 mm; 2, *Stephanocyathus (S.) diadema*: G-858, cd = 44.4 mm; 3, *Stephanocyathus discoides* (holotype): Challenger-120, cd = 22.3 mm, BMNH 1880.11.25.56; 4, *Stephanocyathus (S.) paliferus* (paratype): G-694, cd = 31.7, USNM 45757; 5–6, *Stephanocyathus (S.) paliferus* (holotype): G-1017, cd = 42.0 mm, stereo pair, USNM 45755; 7, Same specimen, base; and 8, *Stephanocyathus (S.) laevifundus* (holotype): G-293, cd = 38.0 mm, USNM 45751.





Discussion.—Pourtalès (1880) referred three specimens belonging to this species to Seguenza's (1864) *Ceratocyathus elegans*, a fossil species from Messina, Italy, which it does resemble. However, because none of Seguenza's type-material is known to exist (Chevalier, 1961), the geologic age of his material is controversial (Pliocene, Quaternary?) and since Seguenza's eight figures leave room for doubt, I choose to employ *S. paliferus* as the name for the Recent western Atlantic species.

S. paliferus is easily distinguished from the six other Atlantic *Stephanocyathus*: *S. nobilis* (Moseley, 1873); *S. moseleyanus* (Sclater, 1886); *S. crassus* (Jourdan, 1895); *S. diadema* (Moseley, 1876); *S. discoides* (Moseley, 1876); and *S. laevifundus*, n. sp., by its very distinct paliform lobes and its well individualized columellar elements. It is given the name *paliferus* because of its distinctive paliform lobes.

Type-Locality.—23°58'N, 79°17'W (Santaren Channel, Bahamas), 555 m.

Geographic Distribution.—Straits of Florida; Santaren Channel; Antilles; off Colombia; off Panama; off British Honduras; off northeast South America to the Amazon River (0°18'N, 44°17'W).

Bathymetric Range.—274–715 m.

***Stephanocyathus (Stephanocyathus) laevifundus* new species**

Figures 8–12

Not *Ceratocyathus variabilis* Seguenza, 1864: 563–564, pl. 7, figs. 2a–f.

Stephanocyathus variabilis: Pourtalès, 1880: 104, pl. 2, fig. 2.

Material Examined.—Types: USNM 45751, holotype, G-293, 25°05'N, 79°21'W, 840–842 m; USNM 45752, paratypes (19), G-293; UMML 8: 278, paratype (1), G-293; USNM 45754, paratypes (27), G-109, 25°03'N, 79°45'W, 824 m; USNM 45753, paratype (1), P-407, 9°00'N, 77°25'W, 1158–1225 m.—Other Material: G-31 (1), 25°40'N, 79°55'W, 311–329; G-103 (9), 25°17'N, 79°40'W, 824 m; G-143 (1), 24°28'N, 80°12'W, 805 m; G-149 (2), 25°25'N, 79°18'W, 770 m; G-182 (3), 27°55'N, 78°40'W, 860–897 m; G-221 (1), 24°21'N, 80°35'W, 586–604 m; G-223 (11), 24°18'N, 80°29'W, 897–915 m; G-233 (2), 25°40'N, 79°21'W, 403–421 m; G-298 (12), 25°55'N, 79°27'W, 650–677 m; G-299 (1), 26°12'N, 79°31'W, 641 m; G-354 (1), 25°39'N, 79°32'W, 805–830 m; G-357 (16), 25°28'N, 79°31'W, 842 m; G-382 (25), 26°10'N, 79°37'W, 686–699 m; G-872 (3), 24°21'N, 80°10'W, 841–847 m; G-980 (1), 24°28'N, 80°29'W, 920 m; G-1107 (8), 24°05'N, 81°20'W, 851–933 m; G-1340 (1), 26°05'N, 79°43'W, 604–657 m; P-881 (16), 13°21'N, 61°03'W, 576–842 m; P-1187 (3), 18°17'N, 75°07'W, 1034 m; C1-210 (3), 24°05'N, 81°22'W, 858 m; BL-214 (1), BL-218 (2).

Description.—The corallum is discoidal, with a flat or slightly concave base; less commonly it is shaped like a shallow bowl with a gently curved base. The apex of the base is usually blunt, rarely projecting, and never incorporates any of the substrate. The largest corallum examined measures 46.0 mm in calicular diameter and 17.0 mm in height. The corallum is always white. The base is smooth, sometimes glossy, with only faint lines representing costae radiating from the apex. Only rarely are the C₁ and C₂ slightly ridged near the upturned edge of the base. Very low, rounded granules are barely distinguishable on the base and do not alter the smooth texture. The calicular margin is not serrate as in *S. diadema*.

Septa are arranged in six systems and five cycles; a complete fifth cycle is often present in specimens measuring only 25 mm in calicular diameter. S₁ and S₂ are equal in size and highly exsert. The higher cycle septa

←

Figures 9–16. 9–10, *Stephanocyathus (S.) laevifundus* (holotype): G-293, cd = 38.0 mm, stereo pair, USNM 45751; 11, Same specimen, base; 12, Same specimen, side; 13, *Stephanocyathus (O.) coronatus*: P-892, cd = 31.4 mm; 14, *Stephanocyathus (O.) coronatus*: ATL-2992A, specimen showing extreme development of costal spines, deposited at MCZ; and 15–16, *Stephanocyathus (O.) coronatus*: P-892, cd = 31.4 mm, stereo pair.

are progressively smaller and much less exsert. The S_1 and S_5 are the only independent septa; each S_1 reaches the columella by a large paliform lobe, whereas the S_5 are rudimentary, reaching the columella as very low ridges. The remaining septa are joined to one another within each system by the inner edges of their paliform lobes: the P_4 to the P_3 and the P_3 to the P_2 . The inner edges of all septa, except the S_5 , are straight and entire. The septa and lobes bear numerous, close-set, low, blunt granules, which are arranged in rows perpendicular to their edges. Near their edges they sometimes fuse to form low, close-set, parallel ridges.

All but the last cycle of septa bear paliform lobes, each of which is separated from its corresponding septum by a shallow, broad indentation. P_1 are the largest lobes, closest to the columella and sometimes thickened on their axial margin. Two of the six S_1 , those aligned on the axis, always bear smaller lobes than the four lateral S_1 , lending an increased bilateral symmetry to the corallum. The remaining three cycles of paliform lobes are progressively smaller, farther away from the columella and usually more acute.

The columella is elongated in the axis defined by two opposing S_1 and variable in structure. It is often a low, solidly fused mass but it also can be composed of small, individualized pillars that are united at their bases.

Discussion.—Although very similar, and perhaps identical, *S. laevifundus* is not referred to the Italian fossil species *Ceratocyathus variabilis* Seguenza, 1864, for reasons previously discussed for *S. paliferus*. *S. laevifundus* is also very similar to the eastern Atlantic *S. moseleyanus* (Selater, 1886). The most consistent difference between the two is that *S. moseleyanus* always bears several small teeth on the outer edges of the larger septa (S_1 , S_2 , S_3), while the outer edges of *S. laevifundus* are always smooth. Other more variable differences between the two are that *S. laevifundus* has broader P_1

and P_2 , a smaller maximum calicular diameter (46 vs. 60 mm) and a shallower bathymetric range (300–1158 vs. 1000–2000 m).

The specific name *laevifundus* refers to the smooth bases of the specimens, which are usually glossy and without costal spines.

Type-Locality.— $25^{\circ}05'N$, $79^{\circ}21'W$ (northern Straits of Florida), 840 m.

Geographic Distribution.—Straits of Florida; off southwest Haiti; Lesser Antilles (Windward Islands); off Panama.

Bathymetric Range.—300–1158 m.

Subgenus *Odontocyathus* Moseley, 1881

Odontocyathus Moseley, 1881: 148.

Diagnosis.—Like the nominal subgenus but with basal part of one or two cycles of costae (C_1 and C_2) produced into stout spines or tubereles. Neogene to Recent. 366–1575 m. Type-species: *Platyrochus coronatus* Pourtalès, 1867.

Stephanocyathus (*Odontocyathus*)
coronatus (Portalès, 1867)
Figures 13–16

Platyrochus coronatus Portalès, 1867: 114.

Trochocyathus ? *coronatus*: Portalès, 1871: 14–15, pl. 6, fig. 16.—Moseley, 1876: 550–551.—Portalès, 1880: 96, 106.

Odontocyathus coronatus: Moseley, 1881: 148–151, pl. 2, figs. 4ab, 5ab, text-fig.

Stephanocyathus (*Odontocyathus*) *coronatus*: Gardiner & Waugh, 1938: 191.—Zibrowius, 1976: 165.

Stephanocyathus (*Odontocyathus*) sp. Keller, 1975: 179.

Material Examined.—Types: MCZ 2769, holotype, $30^{\circ}41'N$, $77^{\circ}03'W$, 841 m.—Other Material: Blake Plateau: G-182 (6), $27^{\circ}55'N$, $78^{\circ}40'W$, 860–897 m; G-187 (1), $27^{\circ}14'N$, $77^{\circ}47'W$, 715–796 m; G-403 (3), $27^{\circ}49'N$, $78^{\circ}50'W$, 824 m; G-674 (1), $27^{\circ}52'N$, $78^{\circ}32'W$, 911 m.—Straits of Florida: G-93 (2), $25^{\circ}03'N$, $79^{\circ}45'W$, 733 m; G-131 (1), $24^{\circ}11'N$, $80^{\circ}57'W$, 733–787 m; G-143 (1), $24^{\circ}28'N$, $80^{\circ}12'W$, 805 m; G-375 (1), $23^{\circ}54'N$, $81^{\circ}27'W$, 1153–1190 m; G-448 (1), $23^{\circ}54'N$, $82^{\circ}21'W$, 620–647 m; G-872 (1), $24^{\circ}21'N$, $80^{\circ}10'W$, 841–847 m; G-1111 (1), $23^{\circ}52'N$, $80^{\circ}42'W$, 1080–1089 m; ATL-2990B (3), ATL-2991 (16), ATL-2992A (3), ATL-2994 (2), ATL-2995 (3), ATL-3454 (1),

ATL-3457 (3), ATL-3470 (1).—Antilles: P-741 (1), 11°48'N, 66°07'W, 1052–1067 m; P-754 (1), 11°37'N, 68°42'W, 684–1574 m; P-830 (3), 18°40'N, 65°58'W, 1446–1510 m; P-846 (1), 11°38'N, 60°37'W, 659–1126 m; P-892 (4), 14°17'N, 61°45'W, 1116–1354 m; P-954 (1), 16°55'N, 62°43'W, 686–1043 m; P-1187 (10), 18°17'N, 75°07'W, 1034 m; P-1262 (4), 17°21'N, 77°35'W, 805–1089 m; GILLISS-31 (4), 16°58'N, 79°28'W, 1088–1116 m; BL-141 (1), BL-175 (2), BL-185 (1), BL-XI (1), ATL-3366 (11), ATL-3367 (2), ATL-3369 (4), CHALLENGER-24 (5).—Off British Honduras: P-607 (2), 18°30'N, 87°37'W, 715–787 m.

Description.—The corallum has a nearly horizontal base, which, at its center, bears a small raised scar of attachment in the form of a pedicel. At a basal diameter between 12–18 mm the wall rises vertically, forming an angle of 60–80° with the plane of the base. The largest corallum examined measures 34.5 mm in calicular diameter, 25.0 mm in basal diameter and is 35.0 mm in height. On the base, the C_1 and C_2 bear three to four spines, which are progressively larger toward the edge. At the edge of the base each of the twelve costae bears a massive, elongate tubercle, sometimes very irregular in shape, measuring up to 9 mm in length. These 12 tubercles project outward, forming an expanded base of support. The theca is usually smooth, without evidence of costae or granulation. However, one worn specimen revealed flat, unequal costae (C_1 and C_2 wider than C_{3-5}), covered by a fine granulation and separated by shallow, narrow intercostal striae.

Septa are arranged in six systems and five cycles, but the last cycle is never complete; 72 septa seem to be the maximum number. S_1 and S_2 are the largest septa, equal in size and highly exsert. The higher cycle septa are progressively smaller and much less exsert. The inner edges of all septa are straight and entire. The septal faces are covered by numerous, small, low granules arranged in poorly defined rows perpendicular to the septal edge.

Each septum, except the S_5 , has a distinct paliform lobe, which is separated from it by a deep but broad notch. P_1 and P_2 , which are equal in size, are the smallest and lowest

lobes closest to the columella. They are extremely variable in shape, often tall and rounded, standing well above the columella and encircling it, but sometimes elongate and pointed, overhanging the columella. In the extreme case, they can be quite long, slender and pointed, indistinguishable from the columellar elements. Finally, especially in small coralla, the upper edges of the P_1 and P_2 can be horizontal, merging directly with the columella, all at the same level. P_3 are two to three times larger, terminating higher in the fossa, and are recessed from the columella. They are connected to the columella by a smaller, much lower lobe, which terminates at the level of the columella. When two S_5 flank an S_4 , the S_4 bears a paliform lobe of equal size and height to that of the P_3 , but slightly more recessed from the columella. The P_4 do not reach the columella; instead, their inner edges are loosely joined to the inner edges of the P_3 . When an S_4 is not flanked by two S_5 , it remains quite small, rudimentary toward the base, and bears only a slight, sometimes dentate, elevation of the septa about halfway to the base.

The columella is small, elongate and quite variable from one specimen to another. It is often composed of several poorly individualized, stout rods, which are strongly fused basally, surrounded by the P_1 and P_2 and the inner lobes of the P_3 . Sometimes it occurs as a low, level, spongy mass or, at the other extreme, as long, slender, contorted rods.

Discussion.—*S. coronatus* is very distinctive; the only species that resembles it is the eastern Atlantic *S. nobilis*, which is very similar in shape and septal arrangement but lacks the prominent costal spines and paliform lobes. There are at least two other Recent species belonging to the subgenus *Odontocyathus*, both of which are confined to the Indo-west Pacific: *S. (O.) spiniger* Marenzeller, 1888, and *S. (O.) ixine* Squires, 1958.

Type-Locality.—30°41'N, 77°03'W (Blake Plateau, off northern Florida), 841 m.

Geographic Distribution.—Off Florida (to 30°41'N, 77°03'W); Straits of Florida; Antilles; off British Honduras.

Bathymetric Range.—608–1170 m.

ACKNOWLEDGMENTS

I would like to thank the following people who have generously extended to me the use of their collections and facilities or loaned me specimens used in this study: Dr. Dennis M. Opresko (MCZ), Dr. P. F. S. Cornelius (BMNH), Mr. G. Testa (Musée Océanographique, Monaco), and particularly Dr. G. L. Voss (Rosenstiel School of Marine and Atmospheric Science, University of Miami). I would also like to thank Dr. Helmut Zibrowius (Station Marine d'Endoume) for his helpful advice and reference collection and Drs. F. M. Bayer and J. W. Wells for their advice and help.

This is a scientific contribution from the Rosenstiel School of Marine and Atmospheric Science of the University of Miami.

LITERATURE CITED

- Agassiz, A. 1888. Three cruises of the BLAKE. Volume 2, chapter 21. Bull. Mus. Comp. Zool. 15: 148–156, text-figs. 462–481.
- [Bayer, F. M. 1973.] Marine invertebrate postage stamps. République d'Haiti, set of eight colored illustrations.
- Cairns, S. D. 1976. Review of the deep-water ahermatypic corals (Scleractinia) of the tropical western Atlantic. Ph.D. Dissertation, Univ. of Miami. 316 pp., 35 pls.
- Chace, F. A. 1940. The ATLANTIS expedition to the West Indies in 1938 and 1939, under the joint auspices of the University of Havana and Harvard University, List of stations. Contributions from the Woods Hole Oceanographic Institution, 274: 1–8.
- Chevalier, J. P. 1961. Recherches sur les Madréporaires et les formations récifales du Miocène de la Méditerranée occidentale. Mém. Soc. géol. Fr. (N.S.) 40 (93): 1–562, pl. 1–26.
- Erhardt, H. 1976. La existencia del coral *Stephanocyathus nobilis* (Moseley, 1881) en la costa de la península Guajira. Una demostración primaria para la costa atlántica de Colombia. Mitt. Inst. Colombia-Alemán Invest. Cient. 8: 55–62, 1 pl.
- Gardiner, J. S., and P. Waugh. 1938. The Flabellid and Turbinolid corals. JOHN MURRAY Exped. Sci. Rep. 5(7): 167–202, 7 pls., 6 text-figs.
- Gravier, C. 1920. Madréporaires provenant des campagnes des yachts "Princesse-Alice" et "Hirondelle II" (1893–1913). Rés. Camp. Sci. Prince de Monaco 55: 1–123, 16 pls.
- Jourdan, E. 1895. Zoanthaires provenant des campagnes du yacht "l'Hirondelle." Rés. Camp. Sci. 8: 1–36, 2 pls.
- Keller, N. B. 1975. Ahermatypic Madreporarian corals of the Caribbean Sea and the Gulf of Mexico. Trudy Inst. Okeanol. 100: 174–187, 2 pls.
- Moseley, H. N. 1876. Preliminary report to Professor Wyville Thomson . . . on the true corals dredged by the H.M.S. CHALLENGER in deep water between the dates Dec. 30th, 1870, and August 31st, 1875. Proc. Roy. Soc. London, 1876: 544–569, 1 fig.
- . 1881. On the deep-sea Madreporaria. Rep. Sci. Res. Voy. Challenger, Zoology, 2, Part 3: 127–208, 16 pls., 21 text-figs.
- Portalès, L. F. 1867. Contributions to the fauna of the Gulf Stream at great depths. Bull. Mus. Comp. Zool. 1: 103–120.
- . 1871. Deep-sea corals. Illustr. Cat. Mus. Comp. Zool. 4: 93 pp., 8 pls.
- . 1880. Reports on the results of the dredging . . . by the "Blake." Report on the Corals and Antipatharia. Bull. Mus. Comp. Zool. 6: 95–120, 3 pls.
- Roule, L. 1896. Coelentérés. Rés. Sci. Camp. "Caudan," 2: 299–323.
- Sclater, W. L. 1886. On a new Madreporarian coral of the genus *Stephanocyathus* from the British seas, with notes on its anatomy. Proc. Zool. Soc. London, 1886: 128–136, pls. 12–14.
- Seguenza, G. 1864. Disquisizioni paleontologiche intorno ai corallarii fossili delle rocce terziarie del distretto di Messina. Mem. Reale Acad. Sci. Turin, Série 2, 21: 399–560, 15 pls.
- Smith, S. 1889. List of dredging stations occupied by the U.S. Coast Survey steamers "Corwin," "Bibb," "Hassler," and "Blake" from 1867 to 1880. Rep. Commr. 1886, U.S. Bur. Fish. Rep., pp. 871–1017.
- Stephens, J. 1909. Alcyonarian and Madreporarian corals of the Irish coasts. Fisheries, Ireland, Sci. Invest. 1907, 5: 1–28, 1 pl.
- Thompson, J. A. 1931. Alcyonarians and solitary corals. Rep. Sci. Res. "Michael Sars" North Atlantic Deep-Sea Exped. 1910, 5: 1–10, 2 pls.
- Thomson, C. W. 1878. The voyage of the "Challenger." Vol. 2, The Atlantic. Harper and Brothers, New York. 340 pp., 62 figs., pls. 15–42.

Zibrowius, H. 1976. Les Scléactiniaires de la Méditerranée et de l'Atlantique nord-oriental. Thèse Univ. Aix-Marseille, No. d'Enregistrement au CNRS: A.O.11515. 302 pp. 106 pls.

———, E. C. Southward, and J. H. Day. 1975. New observations on a little-known species of *Lumbrineris* (Polychaeta) living on various cnidarians, with notes on its recent and fossil

scleractinian hosts. *J. Mar. Biol. Ass. U.K.* 55: 83-108, 4 pls., 1 text-fig.

DATE ACCEPTED: October 4, 1976.

ADDRESS: *Department of Invertebrate Zoology, National Museum of Natural History, Washington, D.C. 20560.*

