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An Annotated Checklist of Coral-Associated Bryozoans

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ABSTRACT

Bryozoans are known to be an important component of cryptic reef communities worldwide, with many species apparently circumtropical in distribution. Taxonomic work on reef bryozoans still lags behind work on their ecology. This checklist, which includes an illustration or a reference to an illustration for each species, is an attempt to assist both taxonomists and ecologists in identifying reef-associated species. To date, 284 species of bryozoans have been reported from coral substrata and/or reef environments in the following areas: Caribbean, Red Sea, East Africa, Indonesia, Great Barrier Reef, Eniwetak, Hawaii, Eastern Pacific. The majority of them (69%) are ascophoran cheilostomes. Anascan cheilostomes are also abundant (25%), while tubuliporates and ctenostomes have been recorded much less frequently. *Parasmittina, Celleporaria,* and *Rhynchozoon* are the most successful cheilostome genera in terms of number of species recorded from reefs. Most genera and many species are recorded from at least two tropical areas.

INTRODUCTION

The facts described in the following pages indicate that a checklist of coral-associated bryozoans would be useful to coral reef workers worldwide. In the next section I present such a list, compiled from the published literature and supplemented by information from my own research. From this list it is possible to draw certain conclusions about the kinds of bryozoans apt to be abundant in reef situations, and even to predict what genera are to be expected in a previously unexplored area (see Discussion). Of course, to know if the apparent broad distributions reported here are real, we need more detailed studies of species from reef environments. I hope that publication of this checklist will encourage such studies.

Bryozoans were once thought to be uncom-

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mon in reef environments (e.g., Stephenson et al., 1931; Hastings, 1932), but recent work has demonstrated the importance and ubiquity of bryozoans on coral reefs (e.g., Cuffey, 1973, 1978; Cuffey and Fonda, 1977; Cuffey et al., 1977; Jackson, 1977a, 1977b, 1984; Jackson and Winston, 1982; Schopf, 1974; Dumont, 1981). Their apparent rarity in early studies was primarily an artifact of collecting methods used. Great oceanographic expeditions like the *Siboga* Expedition (1899–1900) helped establish that bryozoans were abundant and diverse in tropical waters, where they had been supposed to be rare (Harmer, 1915), but these expeditions had no means of adequately sampling reef environments. For example, the cruise tracks of the *Siboga* covered more than 12,000 miles of the Indonesian archipelago. Collections were made at 323 stations, at depths ranging from low water to over 3000 m (Weber, 1902). Bryozoans were taken at about 134 stations (Harmer, 1915). But the *Siboga,* like most of the 19th century expeditions, was limited to depths in which the ship could pass, and to substrata from which the dredge or trawl could be recovered. The station records (in Weber, 1902) are informative. In the first third of the cruise inexperience showed. There are 16 stations where the bottom is listed as "hard—coral and stones," "coral," or "coral bottom." At those stations either the scientists could not dredge or trawl, or they attempted to do so with negative results, e.g., "tore trawl" (Sta. 47b), "broke dredge" (Sta. 65a), "dredge broken and lost" (Sta. 73). Eventually they grew wiser or more cautious about risking their equipment on the uneven surfaces of reefs, and the station list records no more disasters. Ecological data for *Siboga* stations is scanty. Bottom information and depth in the station list appears to relate to the place the ship anchored (which might or might not be the same as the bottom where they dredged or trawled). At 41 stations in depths of 150 m or less, coral or coral reef is listed in the bottom description. At many of these stations the list also notes "shore exploration" or "reef exploration." It appears that the "reef" collections were intertidal (no depth is given for these stations in the species accounts). Thus, reef-dwelling animals could have been collected only from very shallow reef-flat habitats, or by dredging, which was mainly between reefs, but offered some chance of picking up coral fragments. Moreover, it is likely that the larger pieces of coral and calcareous algae obtained went into coral or algal collections and so were never examined for bryozoans.

Other early work from areas where coral reef species might have been collected is equally disappointing. In Osburn's collections from the Tortugas (1914) shell, dock pilings, sponges, gorgonians, and crabs are the substrata most commonly cited, while the substrata listed in the collection he worked up from Curaçao reads like a list of tropical harbor trash: shells, old bottles, mangrove roots, oysters, and a few shallow back-reef coral species. Pacific reefs are no better represented. In the collections from the Great Barrier Reef reported on by Hastings (1932), only one station lists "coral fragments" and one other lists "Reef." Stephenson et al. (1931) are able to state that "bryozoans appear to be rather poorly represented in the Low Isles fauna" (even though pl. III, fig. 11 in T. A. Stephenson's 1931 paper on coral growth clearly shows an encrusting cheilostome overgrowing a young *Pocillopora* colony).

This intertidal bias prejudiced even authorities like Libby Hyman who claimed in volume 5 of *The Invertebrates* (1959) to have found "scarcely any gymnolaemates at Jamaica" (p. 422).

Though some ancient reefs had massive bryozoan components (Cuffey, 1974, 1977), with rare exceptions, Recent bryozoans are not primarily frame-builders. In open reef environments they are unable to compete for space with the more massive colonies of hermatypic corals. Most reef-dwelling bryozoans are found in cryptic habitats: on coral undersurfaces, the undersides of coral rubble, and in caves, crevices, and cavities within the reef framework. Their geological role in modern reefs appears to consist primarily of cementation and infilling of cavities (Soule and Soule, 1974; Cuffey, 1974, 1977; Choi, 1984). Ecologically, bryozoans are part of the crowded and diverse cryptic community so extensively studied on Jamaican reefs by Jackson and his associates (Jackson 1977a, 1977b, 1979b, 1984; Buss and Jackson, 1979; Jack-

son and Buss, 1975; Jackson and Winston, 1981, 1982; Palumbi and Jackson, 1982, 1983; Winston and Jackson, 1984). In this community, which is characterized by intense competition for space, bryozoans may occupy a significant percentage of that space (Jackson, 1984). This fact is significant to coral reef ecologists.

But what hampers the ecological study of reef bryozoans is a lack of taxonomic work, which has not caught up to studies on bryozoan distributions on reefs. Soule and Soule's 1973 monograph on Hawaiian smittinids set a high standard, but taxonomic work takes much time. For example, Cuffey (1973) promised systematic work on Eniwetak bryozoans, which still has not appeared. Ross (1974) mentioned a collection of over 200 species from the central part of the Great Barrier Reef, but no work has been published. Most recently, d'Hondt (1985) has pointed out that published information on bryozoans from French Polynesian reefs consists of only a few scattered records, for some of which specimens cannot be found for verification. Thus, it seemed both appropriate and useful at this intermediate stage of knowledge to compile a checklist of species recorded from reefs in the hope that this would stimulate both taxonomic and ecological work on reef bryozoans.

To attempt a checklist useful to workers worldwide would be impossible in the case of the corals themselves, for most scleractinian species are limited to a single geographic area, e.g., the Caribbean, or the Indo-Pacific. However, reef-dwelling bryozoans have much broader distributions than their substrata. Two-thirds of Caribbean reef-associated bryozoans are found in at least one of the other tropical regions. Seventeen percent appear to be truly circumtropical (Jackson et al., 1985).

This difference in distributional pattern between bryozoans and corals may relate to relative niche breadth. Many coral-reef bryozoans are also found on other calcareous substrata. Cook (1968) has pointed out how shell material, including large foraminiferan tests, provides calcareous substrata for bryozoans in deeper water, creating less discontinuity of habitat than would occur if species were limited to one kind of calcareous substratum. Not having algal symbionts, bryozoans are also less light/depth restricted. For example, at least a quarter of the Caribbean species found on reefs also occur in water deeper than 100 m (Jackson et al., 1985).

Acknowledgments

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EXPLANATION OF CHECKLIST

The checklist is divided into three sections: Anasca, Ascophora, and Tubuliporata. Within each section the species are arranged in alphabetical order by genus rather than in systematic order. Each entry consists of the following: scientific name (including author and date), figure reference (to a published illustration or to an illustration in this paper), habitat, depth range, area (the number(s) pertain to references in which the species was recorded), and (when necessary) discussion.

Sources

The primary sources used in compiling this checklist were the published checklists of reef-associated species in Dumont (1981), Cuffey and Fonda (1977), and Schopf (1974); and unpublished lists of Jamaican and Panamanian (Winston and Jackson) and Venezuelan (Gleason and Jackson) species. These were supplemented by analysis of the papers listed in the Areas and Citations section. Due to differences in the amount of taxonomic work on bryozoans in different areas, some are more thoroughly covered than others. Many other papers were examined, but could not be used either because they lacked substrata data or did not pertain to reef environments.

Name

Each species is listed by the name currently accepted for that species. Other usage is given in parentheses, or in the Discussion section. For example, what Schopf (1974) listed as *Hippoporina porcellana* is listed here under *Cleidochasma porcellanum.* If a species des-

ignation seemed doubtful, I checked the specimen, if possible, or an illustration if one was given. But since several of the sources were unillustrated checklists, it was not always possible to reach a firm conclusion. Question marks without parentheses denote the original authors' queries of assigned names. Question marks in parentheses denote my query as to the accuracy of the determination.

Illustration

The illustration(s) cited for each species are SEM photographs whenever possible; otherwise the most adequate drawing of that species is cited. Thirty-two species are illustrated in this paper. All specimens illustrated here were prepared by the methods described in Winston and Heimberg (1986). In cases where the genus is known but the species is undetermined, e.g., *Membraniporella* sp., an illustration is listed only if it appeared in the original citation.

Substrata

Unless listed as having come from a coral reef, the only occurrences that were used in the list were those in which the substratum was cited as coral, or coral rubble, or in which those were the substrata given in the station information. This eliminated some species which may actually occur on reefs; it also meant that many papers on tropical areas were almost useless—if the author did not cite the substratum on which a species was found. In Osburn's later work and in Harmer's *Siboga* monographs, substratum is seldom mentioned unless a new species is being described. A better alternative to deleting all species with unknown substrata would have been to study all the collections involved, which would enable one to distinguish, for example, whether a Canu and Bassler "nullipore" substratum was dead coral, coralline alga, gorgonian stem, etc., but this would have been an extremely time-consuming project.

Depth

I used only occurrences at 100 m or less, as this is commonly accepted as the lower limit of reef growth (Lang et al., 1975). This is a very broad definition, and specimens found in the deeper part of the range are often on ahermatypic coral (e.g., *Oculina*) or on dead subfossil or fossil reef coral remaining from a time of lower sea level. Occurrences of a species in water deeper than 100 m are not noted here (they are given for a number of the Caribbean species in Jackson et al., 1985). Depth range in this checklist refers to the depths in which the species was found in the references used here. The abbreviation "LW" is used for intertidal stations at the low water mark. If a station ran slightly over 100 m, the exact depth is given, if a reference listed a species as being found at stations ranging from 30 to 700 m, for example, I gave its range as 100+ m. When no depth was given for a reef station the abbreviation "ndg" is placed after the subheading.

Areas and Citations

Caribbean, Gulf of Mexico, Tropical West Atlantic

1. St. Croix, Schopf (1974)
2. Belize, Winston (1984)
3. Caribbean coast of Panama, Powell (1971)
4. Bahamas, Cuffy and Fonda (1977)
5. Caribbean coast of Costa Rica, Banta and Carson (1977)
6. Off N Brazil, Canu and Bassler (1928a)
7. Gulf of Mexico, Canu and Bassler (1928b)
8. Puerto Rico, Osburn (1940)
9. Tortugas, Florida, Osburn (1914)
10. Curaçao, Osburn (1927)
11. Florida Reef Tract, Choi (1984)
12. Florida, Atlantic shelf, Winston (1982)
13. Alacran Reef, Campeche Bank, Kornicker et al. (1959)
14. Jamaica, Venezuela, Panama (Winston and Jackson, unpublished data)

East Africa

15. East Africa, Brood (1976)
16. Tulear, Madagascar, Vasseur (1984)

Red Sea

17. Sudanese Red Sea, Dumont (1981)
18. South Red Sea, Powell (1967)

Indonesia

19. Harmer (1915, 1926, 1934, 1957)
20. Winston and Heimberg (1986)

Great Barrier Reef

21. Ryland (1974)
22. Hastings (1932)
23. Heron Island, Osborne (1984)

Eniwetak

24. Cuffey and McKinney (1982)

Hawaii

25. Soule and Soule (1973)
26. Canu and Bassler (1927)

Eastern Pacific

27. Pacific coast of Panama, Powell (1971)
28. Pacific coast of Costa Rica, Banta and Carson (1977)

Philippine Region

29. Canu and Bassler (1929)

CHECKLIST OF CORAL-ASSOCIATED BRYOZOAN SPECIES

Numbers under AREAS refer to references in which the species was recorded. See above.

CTENOSTOMATA

Amathia vidovici (Heller), 1867
FIGURED: Winston (1982), fig. 9. HABITAT: coral undersurfaces. DEPTH: 10 m or less. AREAS: Panama (14).

CHEILOSTOMATA (ANASCA)

Acanthocella clypeata
Canu and Bassler, 1928
FIGURED: Canu and Bassler (1928b), pl. 4, figs. 9, 10. HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11).

Aetea sica (Couch), 1844
FIGURED: Winston (1982), figs. 20, 22. HABITAT: coral. DEPTH: ndg. AREAS: Curaçao (10).

Aetea sp.
HABITAT: reef. DEPTH: ndg. AREAS: Venezuela (14). DISCUSSION: Only colony bases present.

Antropora compressa (Osburn), 1927
FIGURED: as *Membrendoecium compressum* in Osburn (1927), fig. 1. HABITAT: coral. DEPTH: ndg. AREAS: Curaçao (10).

Antropora granulifera (Hincks), 1880
FIGURED: Osburn (1950), pl. 4, fig. 5. HABITAT: reef, rubble. DEPTH: 30 m or less. AREAS: Bahamas (4); Red Sea (17).

Antropora marginella (Hincks), 1884
FIGURED: as *Membrendoecium lagunculum* in Harmer (1926), pl. IV, fig. 15. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17, 18). DISCUSSION: *Membrendoecium lagunculum* Canu and Bassler (1929), p. 96, appears to be a synonym of this species.

Antropora typica (Canu and Bassler), 1928
FIGURED: figs. 1, 2. HABITAT: reef. DEPTH: 20 m or less. AREAS: Jamaica (14).

Aplousina errans Canu and Bassler, 1928
FIGURED: Canu and Bassler (1928a), pl. 1, fig. 34. HABITAT: dead coral. DEPTH: 49 m. AREAS: off Brazil (6).

Aplousina gigantea Canu and Bassler, 1927
FIGURED: Winston (1982), fig. 34. HABITAT: *Oculina* rubble. DEPTH: 60–90 m. AREAS: Florida (12).

Beania cupulariensis Osburn, 1914
FIGURED: Marcus (1955), figs. 41–43. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Beania discodermiae (Ortmann), 1890
FIGURED: Gordon (1984), pl. II, D, E. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Beania magellanica (Busk), 1852
FIGURED: Harmer (1926), pl. XXVII, figs. 1–4. HABITAT: under reef crest boulders. DEPTH: LW. AREAS: Great Barrier Reef (23).

Beania mirabilis (Johnston), 1847
FIGURED: Harmer (1926), pl. XXXVIII, fig. 15. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Bugula dentata (Lamouroux), 1816
FIGURED: Ryland (1974), fig. 2. HABITAT: reef slope. DEPTH: sublittoral. AREAS: Great Barrier Reef (21). DISCUSSION: Ryland discusses the range of variation in this broadly distributed species.

Bugula neritina (Linnaeus), 1758
FIGURED: Winston (1982), fig. 52. HABITAT: in debris among shells and corals. DEPTH: ndg. AREAS: Curaçao (10). DISCUSSION: One of most common fouling bryozoans in warmer waters worldwide.

Bugula robusta MacGillivray, 1869
FIGURED: Harmer (1926), pl. XXXII, figs. 1–7. HABITAT: reefs. DEPTH: 54 m or less. AREAS: Red Sea (17); Indonesia (19).

Canda arachnoides Lamouroux, 1816
FIGURED: Busk (1852), pl. XXXIII. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Canda clypeata (Haswell), 1880
FIGURED: Harmer (1926), pl. XXVI, figs. 19, 20. HABITAT: spur and groove zone. DEPTH: ndg. AREAS: Madagascar (16).

Canda simplex Busk, 1884
FIGURED: Winston (1984), figs. 22–24. HABITAT: coral undersurfaces. DEPTH: 5–20 m. AREAS: Belize (2); Jamaica (14).

Caulibugula inermis Harmer, 1926
FIGURED: Harmer (1926), pl. XXX, figs. 11–13. HABITAT: coral reef. DEPTH: ndg. AREAS: Indonesia (19).

Caulibugula mortenseni (Marcus), 1925
FIGURED: Winston and Heimberg (1986), figs. 9, 10. HABITAT: coral rubble. DEPTH: 1.5–2 m. AREAS: Indonesia (20).

Caulibugula zanzibarensis (Waters), 1913
FIGURED: figs. 3, 4. HABITAT: coral reef. DEPTH: 10 m or less. AREAS: Panama (14); Indonesia (19).

Copidozoum tenuirostre (Hincks), 1880
FIGURED: Marcus (1937), pl. IX, fig. 21. HABITAT: coral rock, broken coral. DEPTH: 24–30 fm. AREAS: Gulf of Mexico (7).

Cranosina coronata (Hincks), 1881
FIGURED: Winston and Heimberg (1986), figs. 13–16. HABITAT: coral reef. DEPTH: 30 m or less. AREAS: Venezuela (14); Red Sea (17); Indonesia (19, 20); Philippines (29).

Crassimarginatella exilimargo (Canu and Bassler), 1928
FIGURED: Canu and Bassler (1928a), pl. 1, fig. 5. HABITAT: dead coral. DEPTH: 128 m. AREAS: off Brazil (6). DISCUSSION: This species is very similar to *C. tuberosa* except for a somewhat greater amount of gymnocyst.

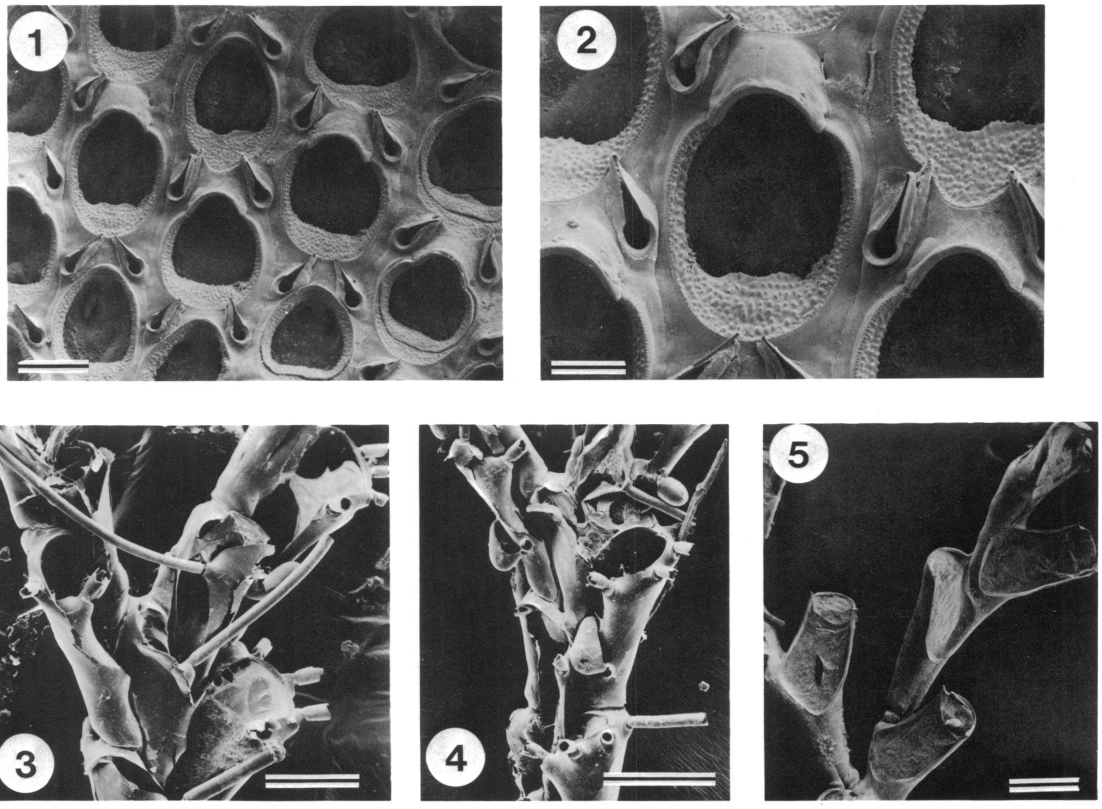
Crassimarginatella tuberosa (Canu and Bassler), 1928
FIGURED: Winston (1984), figs. 12, 13. HABITAT: coral undersurfaces. DEPTH: 5–20 m. AREAS: Belize (2).

Crateropora falcata Levinsen, 1909
FIGURED: Harmer (1957), pl. XXII, figs. 14, 15. HABITAT: coral undersurface. DEPTH: 36 m or less. AREAS: Indonesia (19).

Cribrilaria flabellifera (Kirkpatrick), 1888
FIGURED: Winston (1984), figs. 25–27. HABITAT: coral undersurfaces, coral rubble. DEPTH: 5–20 m. AREAS: Belize (2); Costa Rica (Caribbean coast) (5); Indonesia (20).

Cribrilaria innominata (Couch), 1844
FIGURED: Hayward and Ryland (1979), fig. 17. HABITAT: rubble, dead shell and coral. DEPTH: 2–100+ m. AREAS: St. Croix (1); Florida, N. of Cuba (7). DISCUSSION: Hayward and Ryland (1979) discuss this species and its confusion with *radiata*. Variation of *Cribrilaria* in the Caribbean does not fit European patterns. Several species may be involved.

Cribrilaria radiata (Moll), 1803
FIGURED: a Caribbean specimen is illustrated in Winston (1984), fig. 28. HABITAT: reefs, coral undersurfaces, coral rubble. DEPTH: 90 m or less. AREAS: Bahamas (4); Florida, off Cuba (7); Belize (2); Costa Rica (Caribbean coast) (6); Jamaica, Venezuela (14); Red Sea (17); Indonesia (19); Philippines (29). DISCUSSION: Hayward and Ryland (1979) discuss some of the taxonomic difficulties with *Cribrilaria radiata* and describe *C. radiata* sensu strictu. Specimens from Jamaica, Belize, and Venezuela differ from their description in having 5–7 (usually 7) marginal spines, and in the distinctive serrated edge of the avicularian rostrum; they probably represent an undescribed species.



Figs. 1–5. **1.** *Antropora typica,* zooids and avicularia (10-1-R25, Rio Bueno, Jamaica). Scale bar = 200 μm. **2.** *A. typica.* Scale bar = 100 μm. **3.** *Caulibugula zanzibarensis* (Galeta reef, Panama), note large avicularia. Scale bar = 200 μm. **4.** *C. zanzibarensis.* Scale bar = 200 μm. **5.** *Halophila johnstoniae* (20-1-R19, Rio Bueno, Jamaica). Scale bar = 400 μm.

Didymozoum triseriale Harmer, 1926
FIGURED: Harmer (1926), pl. XIX, fig. 1. HABITAT: reef. DEPTH: 54 m or less. AREAS: Indonesia (13).

Floridina antiqua (Smitt), 1873
FIGURED: Winston (1982), fig. 38. HABITAT: *Oculina* rubble. DEPTH: 60–90 m. AREAS: Florida (12).

Floridinella arculifera
Canu and Bassler, 1927
FIGURED: Canu and Bassler (1927), pl. II, fig. 1. HABITAT: corals. DEPTH: 91–113 m. AREAS: Hawaii (26).

Floridinella typica Canu and Bassler, 1928
FIGURED: Winston (1982), fig. 40. HABITAT: reefs, *Oculina* rubble. DEPTH: 90 m or less. AREAS: Florida (12).

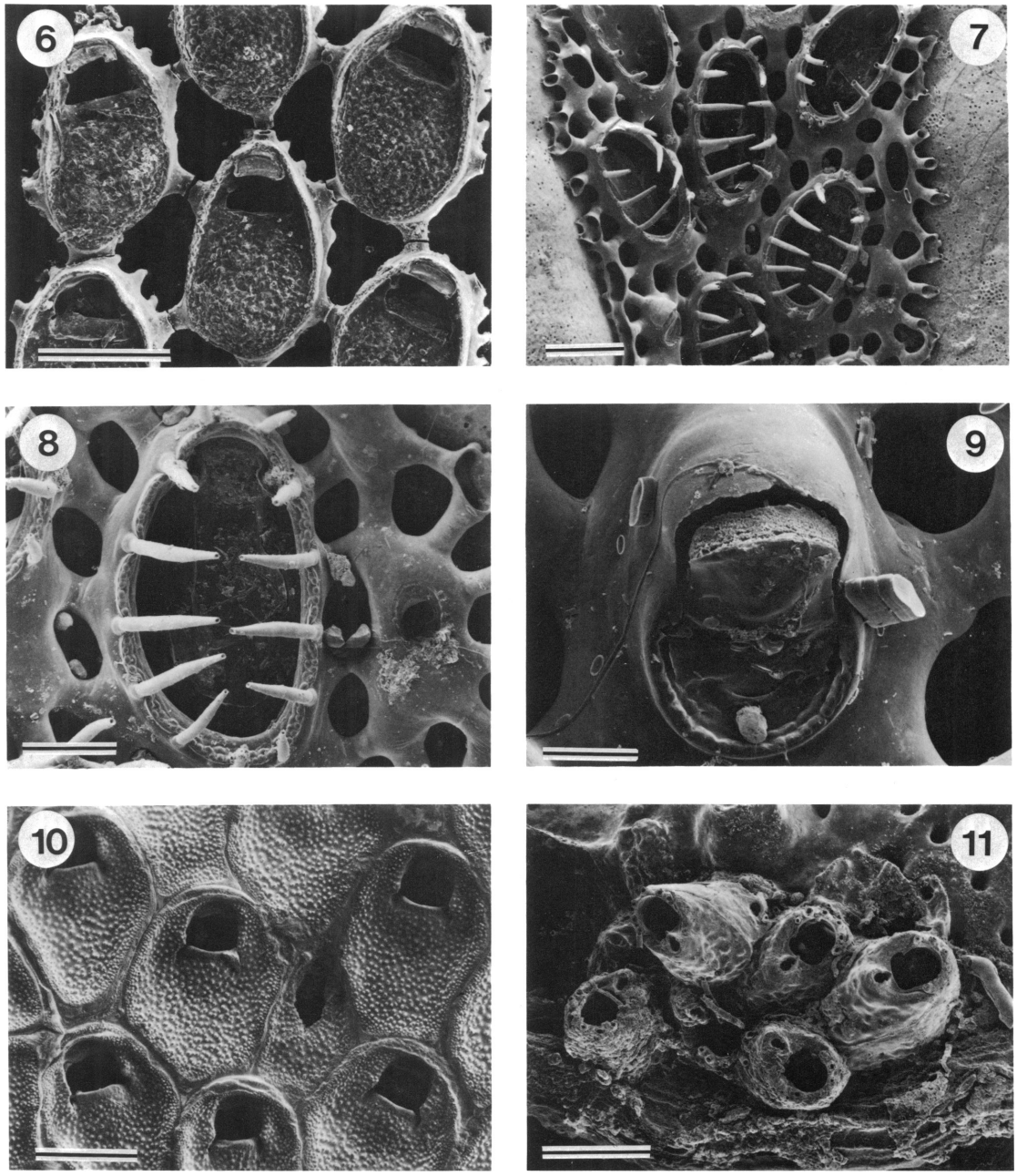
Halophila johnstonae Gray, 1843
FIGURED: fig. 5. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica, Panama (14).

Hiantopora sp.
HABITAT: forereef slope. DEPTH: ndg. AREAS: Madagascar (16).

Labioporella cornuta Harmer, 1926
FIGURED: Harmer (1926), pl. XXI, figs. 1–3. HABITAT: coral. DEPTH: 45 m. AREAS: Indonesia (19).

Labioporella crenulata (Levinsen), 1909
FIGURED: Harmer (1926), pl. XXI, figs. 1–3. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

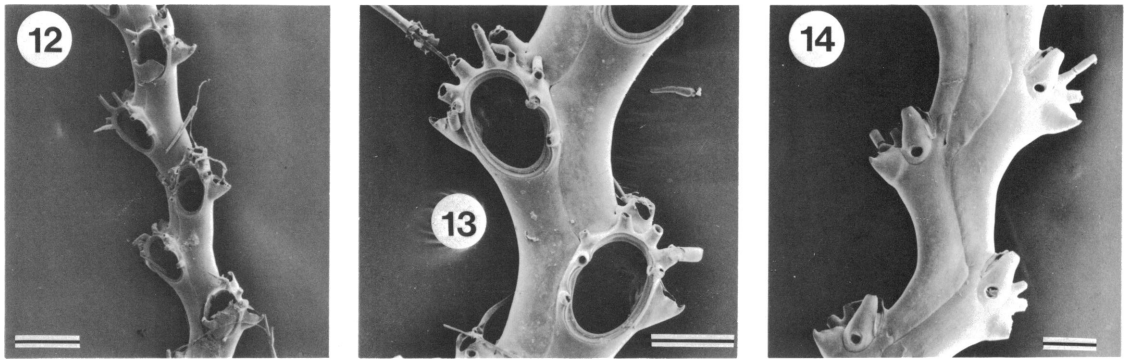
Labioporella granulosa
(Canu and Bassler), 1928
FIGURED: Winston (1984), fig. 21. HABITAT: coral undersurfaces, coral rubble, dead coral. DEPTH: 5–100 m. AREAS: Bahamas (4); Belize (2); Florida, Gulf of Mexico (7).



Figs. 6–11. **6.** *Mollia patellaria* (Priory, Jamaica). Scale bar = 200 μm. **7.** *Retevirgula tubulata* (Priory, Jamaica), portion of colony. Scale bar = 200 μm. **8.** *R. tubulata,* close-up of zooid. Scale bar = 100 μm. **9.** *R. tubulata,* close-up of avicularium. Scale bar = 40 μm. **10.** *Smittipora levinseni* (20-1-R4, Rio Bueno, Jamaica). Scale bar = 400 μm. **11.** *Aimulosia palliolata* (20-1-R15, Rio Bueno, Jamaica). Scale bar = 200 μm.

Labioporella sinuosa Osburn, 1940

FIGURED: Banta and Carson (1977), fig. 2D. HABITAT: coral rubble. DEPTH: less than 10 m. AREAS: Costa Rica (Caribbean coast) (5). DISCUSSION: May be synonymous with *L. granulosa* (see Banta and Carson, 1977).



Figs. 12–14. **12.** *Scrupocellaria pusilla* (10-1-R19, Rio Bueno, Jamaica), portion of branch. Scale bar = 200 μm. **13.** *S. pusilla,* close-up of zooids. Scale bar = 100 μm. **14.** *S. pusilla,* basal view, showing vibracular chambers. Scale bar = 100 μm.

Membraniporella aragoi (Audouin), 1826
FIGURED: Winston (1982), fig. 57. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Membraniporella sp.
HABITAT: reef. DEPTH: 20 m or less. AREAS: Venezuela (14).

Micropora coriacea (Johnston), 1847
FIGURED: Winston (1982), fig. 39. HABITAT: *Oculina* rubble. DEPTH: 60–90 m. AREAS: Florida (12).

Mollia patellaria (Moll), 1803
FIGURED: fig. 6. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Nellia tenella (Lamarck), 1816
FIGURED: Winston and Cheetham (1984), fig. 2. HABITAT: coral. DEPTH: ndg. AREAS: Curaçao (10). DISCUSSION: Often listed as *Nellia oculata*; see Cheetham (1966) for discussion and synonymy.

Nellia tenuis Harmer, 1926
FIGURED: Harmer (1926), pl. XIV, figs. 16, 17, text fig. 5. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Parellisina curvirostris Hincks, 1862
FIGURED: Winston (1984), fig. 14. HABITAT: coral undersurfaces, broken coral, coral. DEPTH: 4–113 m. AREAS: Belize (2); Jamaica (14); Panama (Pacific coast) (27); Hawaii (26); Indonesia (20).

Parellisina latirostris Osburn, 1940
FIGURED: Winston (1984), fig. 15. HABITAT: corals, coral undersurfaces, coral rubble. DEPTH: 2–90 m. AREAS: Bahamas (4); Belize (2); Florida (11, 12); St. Croix (1); Costa Rica (Caribbean coast) (5); Gulf of Mexico (13); Jamaica, Venezuela (14).

Reginella floridana (Smitt), 1873
FIGURED: Winston (1982), fig. 59. HABITAT: coral rubble. DEPTH: 90 m or less. AREAS: Florida (11, 12); Red Sea (17). DISCUSSION: Listed as *Cribrilaria floridana* in Choi, 1984.

Retevirgula tubulata (Hastings), 1930
FIGURED: figs. 7–9. HABITAT: corals, reef. DEPTH: 63 m or less. AREAS: Gulf of Mexico (7); Jamaica (14).

Scrupocellaria bertholletii (Audouin), 1826
FIGURED: Marcus (1938), pl. V, fig. 11. HABITAT: fore-reef talus. DEPTH: 18 m. AREAS: St. Croix (1).

Scrupocellaria diadema Busk, 1852
FIGURED: Harmer (1926), pl. XXV, figs. 20–25. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17); Indonesia (19).

Scrupocellaria ferox Busk, 1852
FIGURED: Harmer (1926), pl. XXV, figs. 1–6. HABITAT: coral-reef. DEPTH: ndg. AREAS: Indonesia (19).

Scrupocellaria longispinosa Harmer, 1926
FIGURED: Harmer (1926), pl. XXV, figs. 26–34. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Scrupocellaria maderensis Busk, 1860
FIGURED: Gordon (1984), pl. 12F, G. HABITAT: reef. DEPTH: ndg. AREAS: Gulf of

Mexico (13). DISCUSSION: Specimen in Kornicker collection (USNM) examined and verified.

Scrupocellaria pusilla (Smitt), 1872
FIGURED: figs. 12–14. HABITAT: fore-reef talus, coral undersurfaces. DEPTH: 2–20 m. AREAS: St. Croix (1); Jamaica, Venezuela (14).

Scrupocellaria spatulata (D'Orbigny), 1851
FIGURED: Harmer (1926), pl. XXVI, figs. 1–10. HABITAT: reef. DEPTH: 54 m or less. AREAS: Indonesia (19, 20).

Scrupocellaria sp.
HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11).

Smittipora acutirostris
(Canu and Bassler), 1928
FIGURED: Winston (1984), fig. 16. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2); Jamaica (14).

Smittipora cordiformis Harmer, 1926
FIGURED: Harmer (1926), pl. XVI, figs. 14–18. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Smittipora harmeriana
(Canu and Bassler), 1929
FIGURED: Winston and Heimberg (1986), figs. 23, 24. HABITAT: coral rubble. DEPTH: 2 m or less. AREAS: Indonesia (20).

Smittipora levinseni
(Canu and Bassler), 1917
FIGURED: fig. 10. HABITAT: coral undersurfaces, coral rubble. DEPTH: to 10+ m. AREAS: Bahamas (4); Florida, N of Cuba (7); Jamaica, Venezuela (14); Curaçao (10). DISCUSSION: Also known as *Velumella americana, Smittipora americana, Smittipora abyssicola.*

Steginoporella buskii (Harmer), 1900
FIGURED: Winston and Heimberg (1986), figs. 19–22. HABITAT: coral rubble. DEPTH: 2–3 m. AREAS: Indonesia (20).

Steginoporella magnilabris (Busk), 1854
FIGURED: Winston (1984), figs. 17, 18. HABITAT: coral undersurfaces, coral rubble (reef). DEPTH: 20 m or less. AREAS: Bahamas (4); Belize (2); Florida (11); Tortugas (9); St. Croix (1); Jamaica (14); Panama (Caribbean) (3).

Steginoporella simplex (Harmer), 1900
FIGURED: Powell (1967), pl. I, fig. 4. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17, 18).

Steginoporella sp.
FIGURED: Winston (1984), figs. 19, 20. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2); Jamaica (14).

Synnotum aegyptiacum (Audouin), 1826
FIGURED: Winston (1982), fig. 53. HABITAT: reef. DEPTH: 20 m or less. AREAS: Curaçao (10); Jamaica (14); Indonesia (19).

Synnotum contortum Waters, 1913
FIGURED: Harmer (1926), pl. XXVII, fig. 1, text fig. 18. HABITAT: reef. DEPTH: 36 m or less. AREAS: Indonesia (19).

Thalamoporella komodoensis
Winston and Heimberg, 1986
FIGURED: Winston and Heimberg (1986), figs. 17, 18. HABITAT: coral rubble. DEPTH: 1–2 m. AREAS: Indonesia (20).

Thalamoporella mayori Osburn, 1940
FIGURED: Osburn (1940), pl. VI, figs. 46, 47. HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11).

Thalamoporella rozieri (Audouin), 1826
FIGURED: Harmer (1926), pl. XIX, figs. 3–13. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17, 18); Great Barrier Reef (22).

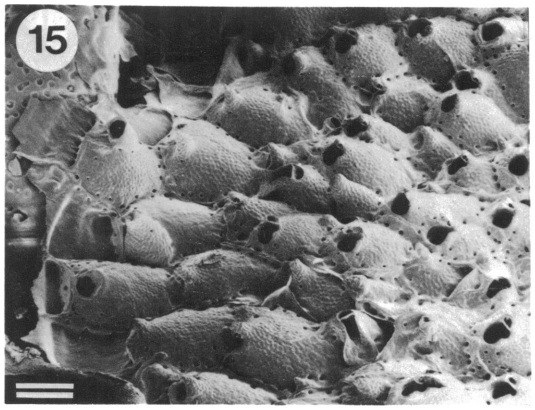
Thalamoporella stapifera Levinsen, 1909
FIGURED: Winston and Heimberg (1986), figs. 13–16. HABITAT: reef rubble, backreef. DEPTH: 2–3 cm. AREAS: Indonesia (20).

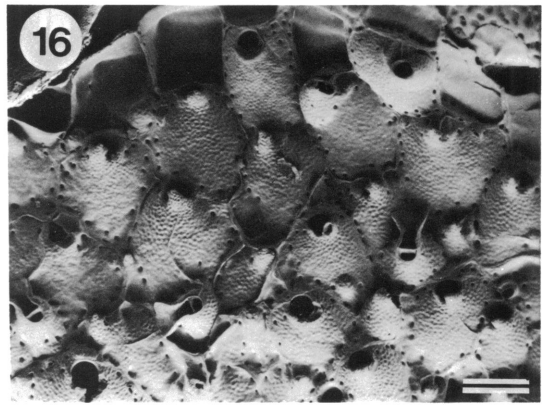
Thalamoporella tubifera Levinsen, 1909
FIGURED: Osborne (1984), fig. 2. HABITAT: undersurfaces of reef-crest boulders. DEPTH: LW. AREAS: Great Barrier Reef (23).

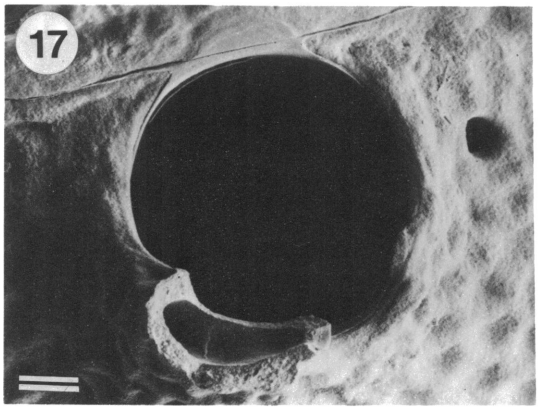
Thalamoporella sp.
FIGURED: Ryland (1974), fig. 1. HABITAT: reef. DEPTH: ndg. AREAS: Great Barrier Reef (21). DISCUSSION: According to Ryland this is an undescribed species.

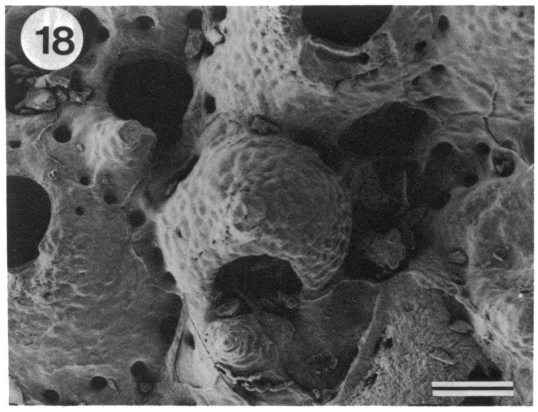
CHEILOSTOMATA (ASCOPHORA)

Aimulosia palliolata
(Canu and Bassler), 1928
FIGURED: fig. 11. HABITAT: coral under-









Figs. 15–18. **15.** *Celleporaria albirostris* (Carrie Bow Cay, Belize), growing edge in side view. Scale bar = 400 μm. **16.** *C. albirostris,* growing edge in frontal view, showing interzooidal avicularia. Scale bar = 400 μm. **17.** *C. albirostris,* ovicell. Scale bar = 100 μm. **18.** *C. albirostris,* primary orifice. Scale bar = 40 μm.

surfaces. DEPTH: 20 m or less. AREAS: Jamaica, Venezuela (14).

Aimulosia uvulifera (Osburn), 1914
FIGURED: Osburn (1914), figs. 19, 20. HABITAT: coral rubble. DEPTH: 10 m or less. AREAS: Bahamas (4).

Anarthropora monodon (Busk), 1869 (?)
HABITAT: coral and coral rubble. DEPTH: 10 m or less. AREAS: Bahamas (4). DISCUSSION: This identification seems doubtful. It may refer to *Triporula stellata.*

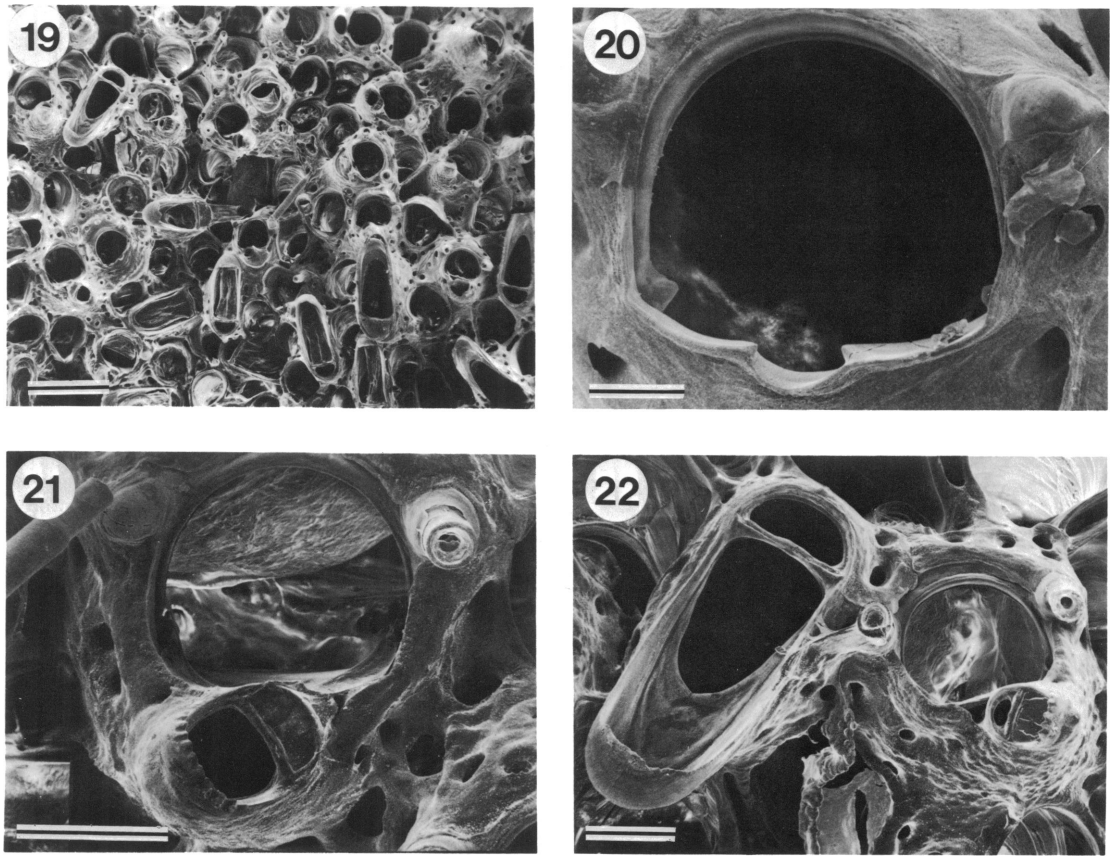
Arthropoma cecilii (Audouin), 1826
FIGURED: Gordon (1984), pl. 30A. HABITAT: coral rubble, reef. DEPTH: 30 m or less. AREAS: Bahamas (4); Jamaica, Venezuela (14); Red Sea (17).

Arthropoma circinnatum (MacGillivray), 1869
FIGURED: Wass and Yoo (1983), figs. 4, 5. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Calyptooecia insidiosa Winston, 1984
FIGURED: Winston (1984), figs. 57, 58. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2); Jamaica (14).

Calyptotheca heteroavicularia Dumont, 1981
FIGURED: Dumont (1981), fig. 1B. HABITAT: reef top. DEPTH: ndg. AREAS: Red Sea (17).

Calyptotheca nigra Dumont, 1981
FIGURED: Dumont (1981), fig. 2A. HABI-



Figs. 19–22. **19.** *Celleporaria brunnea* (Monterey, California). Scale bar = 400 μm. **20.** *C. brunnea,* primary orifice. Scale bar = 40 μm. **21.** *C. brunnea,* suboral avicularium and oral spines. Scale bar = 100 μm. **22.** *C. brunnea,* interzooidal avicularium. Scale bar = 100 μm.

TAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Calyptotheca sudanensis Dumont, 1981
FIGURED: Dumont (1981), fig. 2A. HABITAT: reef. DEPTH: 20 m or less. AREAS: Red Sea (17).

Calyptotheca tenuata Harmer, 1957
FIGURED: Harmer (1957), pl. LXVIII, figs. 16, 17. HABITAT: reef. DEPTH: 54 m or less. AREAS: Indonesia (19); Madagascar (16). DISCUSSION: Recorded as cf. *tenuata* in Vasseur (1984).

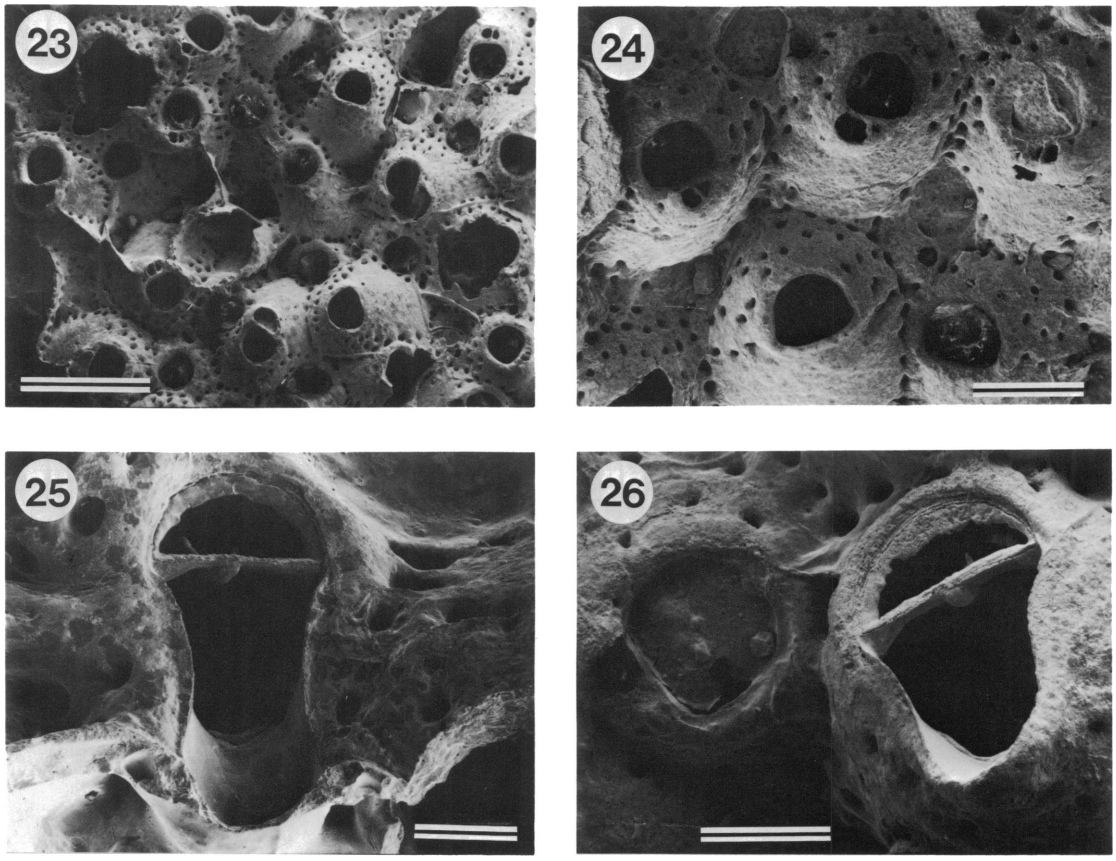
Calyptotheca wasinensis (Waters), 1913
FIGURED: Winston and Heimberg (1986), figs. 41, 42. HABITAT: reef. DEPTH: 54 m or less. AREAS: Red Sea (17); Indonesia (19, 20).

Celleporaria albirostris (Smitt), 1873
FIGURED: figs. 15–18 and Winston (1984), figs. 33, 34. HABITAT: coral undersurfaces, coral rubble, reef. DEPTH: 40 m or less. AREAS: St Croix (1); Florida (11); Tortugas (9); Bahamas (4); Gulf of Mexico (13); Jamaica (14); Belize (2); Venezuela (14); Curaçao (10).

Celleporaria aperta (Hincks), 1882
FIGURED: Winston and Heimberg (1986), figs. 79–84. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17); Indonesia (20); Jamaica (19).

Celleporaria brunnea (Hincks), 1884
FIGURED: figs. 19–22. HABITAT: broken coral. DEPTH: 12–18 ft. AREAS: Panama (Pacific coast) (3).

Celleporaria columnaris (Busk), 1881
FIGURED: Harmer (1957), pl. XLII, figs. 18–21, 33. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17); Madagascar (16).



Figs. 23–26. **23.** *Celleporaria magnifica* (Gulf of Mexico, off Tampa, Florida). Scale bar = 1 mm. **24.** *C. magnifica,* showing shape of primary orifice. Scale bar = 400 μm. **25.** *C. magnifica,* interzooidal avicularium. Scale bar = 200 μm. **26.** *C. magnifica,* interzooidal avicularium. Scale bar = 100 μm.

Celleporaria granulosa (Haswell), 1880
FIGURED: Harmer (1957), pl. XLIII, figs. 14–19. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Celleporaria intermedia
(MacGillivray), 1868
FIGURED: MacGillivray (1883), pl. 166, fig. 3. HABITAT: ?unattached. DEPTH: 14 m. AREAS: Great Barrier Reef (22). DISCUSSION: Mandibles and operculum illus. in Hastings (1932), text fig. 20.

Celleporaria labelligera Harmer, 1957
FIGURED: Harmer (1957), pl. XLII, figs. 14–17, 22, 24. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

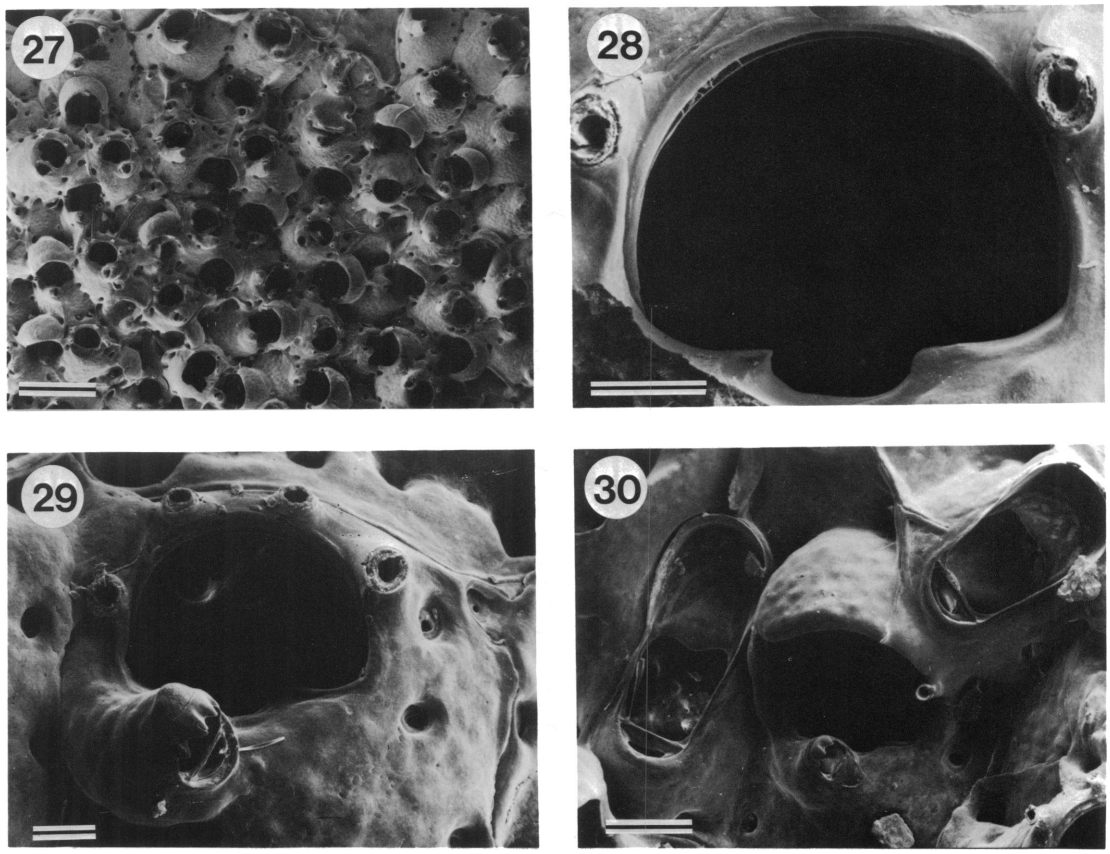
Celleporaria magnifica (Osburn), 1914
FIGURED: figs. 23–26. HABITAT: coral rock, reef. DEPTH: 55 m or less. AREAS: Gulf of Mexico (7, 13).

Celleporaria mordax (Marcus), 1937
FIGURED: figs. 27–30. HABITAT: fore-reef talus. DEPTH: 2–25 m. AREAS: St. Croix (1); Jamaica (14).

Celleporaria pigmentaria (Waters), 1909
FIGURED: Harmer (1957), pl. XLIII, fig. 8, text fig. 58. HABITAT: reef. DEPTH: 17–37 m. AREAS: Red Sea (18).

Celleporaria pilaefera
(Canu and Bassler), 1929
FIGURED: Harmer (1957), pl. XLII, fig. 25. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Celleporaria sibogae
Winston and Heimberg, 1986



Figs. 27–30. **27.** *Celleporaria mordax* (Port Royal Cays, Jamaica). Scale bar = 400 μm. **28.** *C. mordax,* primary orifice. Scale bar = 40 μm. **29.** *C. mordax,* showing suboral avicularium and oral spines. Scale bar = 40 μm. **30.** *C. mordax,* interzooidal avicularia and ovicell. Scale bar = 100 μm.

FIGURED: Winston and Heimberg, 1986, pp. 73–78. HABITAT: reef, reef-flat cavities. DEPTH: 45 m or less. AREAS: Indonesia (13, 20); Madagascar (16). DISCUSSION: The *Celleporaria fusca* of Harmer (1957) is not the species described by Busk (1854). Vasseur (1984) lists *C. fusca* from Madagascar; it seems likely this is either *C. sibogae,* or another dark-pigmented species such as *C. pigmentaria.*

Celleporaria subalba
(Canu and Bassler), 1928

FIGURED: figs. 31–35. HABITAT: white rock coral. DEPTH: 45 m or less. AREAS: Gulf of Mexico (7).

Celleporaria sp. A

FIGURED: Osborne (1984), fig. 3. HABITAT: undersurfaces of reef-crest boulders. DEPTH: LW. AREAS: Great Barrier Reef (23).

Celleporina costazii (Audouin), 1826

FIGURED: Harmer (1957), pl. LXII, figs. 1, 4–6. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Celleporina ignota (Norman), 1909 (?)

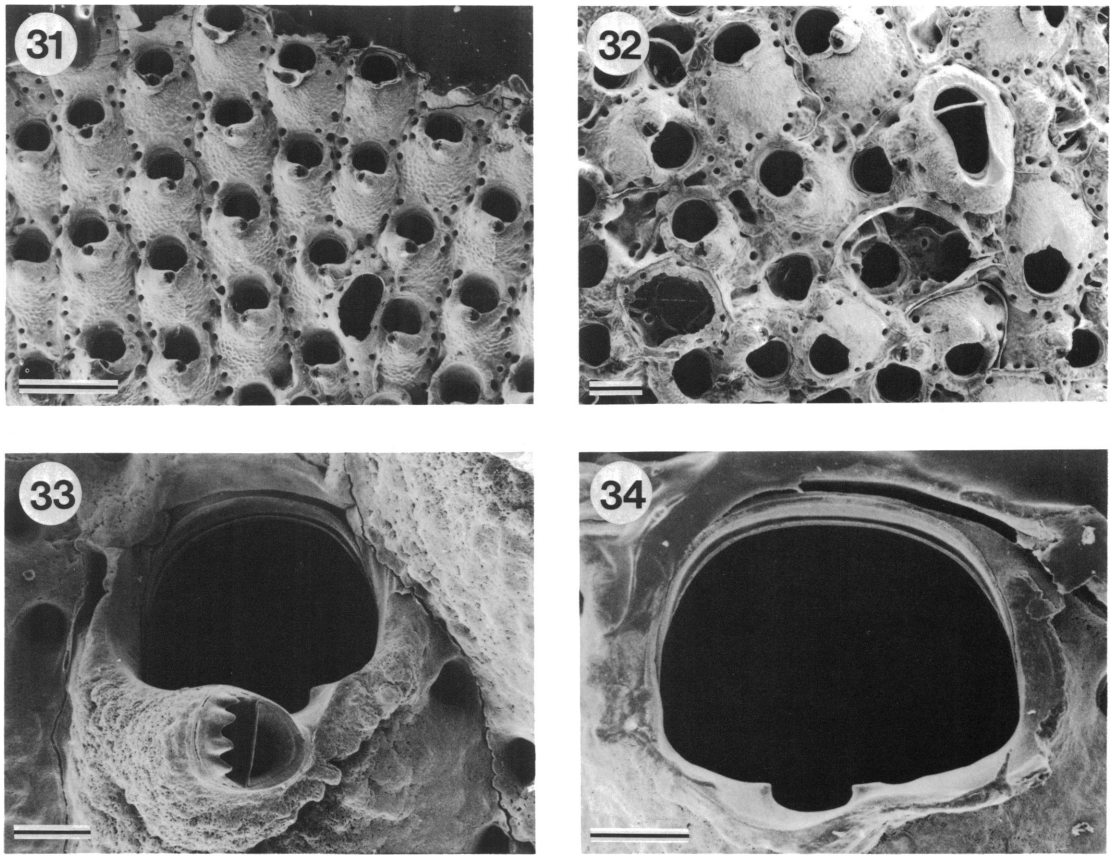
HABITAT: corals, etc. DEPTH: 11–37 m. AREAS: Puerto Rico (8). DISCUSSION: Osburn (1940) states "I cannot be sure that this is Norman's species, but it approaches it closely." He supplies no illustration.

Cheiloporina caerula
Canu and Bassler, 1929

FIGURED: Canu and Bassler (1929), pl. 54, figs. 2–4. HABITAT: coral. DEPTH: 42 m (Albatross Sta. 5145). AREAS: Philippines (290).

Chorizopora brongniartii (Audouin), 1826

FIGURED: figs. 36, 37. HABITAT: undercoral surfaces, reef. DEPTH: 30 m or less. AREAS: Red Sea (17); Jamaica, Venezuela (14).



Figs. 31–34. **31.** *Celleporaria subalba* (Discovery Bay, Jamaica), zooids at growing edge of colony. Scale bar = 400 μm. **32.** *C. subalba,* inner region of colony with frontally budding zooids and interzooidal avicularia. Scale bar = 40 μm. **33.** *C. subalba,* suboral avicularium. Scale bar = 40 μm. **34.** *C. subalba,* primary orifice. Scale bar = 40 μm.

Cigclisula areolata (Livingstone), 1926
FIGURED: Harmer (1957), pl. LXIX, figs. 19, 20. HABITAT: reef. DEPTH: ndg. AREAS: Great Barrier Reef (22).

Cigclisula occlusa (Busk), 1884
FIGURED: Harmer (1957), pl. LXIX, figs. 16–18. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17); Great Barrier Reef (21). DISCUSSION: Ryland (1974) lists this species with a question mark.

Cleidochasma contractum (Waters), 1899
FIGURED: Winston (1982), fig. 81. HABITAT: *Oculina* rubble, reefs. DEPTH: 90 m or less. AREAS: Florida (12); Jamaica, Venezuela (14).

Cleidochasma laterale Harmer, 1957
FIGURED: Harmer (1957), pl. LXXI, figs. 9–11. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Cleidochasma peristomarium (Canu and Bassler), 1929
FIGURED: Winston and Heimberg (1986), figs. 88–90. HABITAT: coral rubble, reef. DEPTH: 2 m or less. AREAS: Indonesia (20).

Cleidochasma porcellanum (Busk), 1860
FIGURED: Winston (1984), fig. 56. HABITAT: coral undersurfaces, coral rubble, *Oculina,* reefs. DEPTH: 2–90 m. AREAS: Bahamas (4); St. Croix (1); Florida (11, 12); Gulf of Mexico (7, 13); Belize (2); Jamaica, Venezuela, Panama (Caribbean and Pacific coasts) (3, 14); Red Sea (17).

Cleidochasma protrusum (Thornely), 1905
FIGURED: Harmer (1957), pl. LXXI, figs.

1–4, text fig. 112. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Codonellina anatina
Canu and Bassler, 1927
FIGURED: Soule and Soule (1973), p. 431. HABITAT: corals. DEPTH: 90–113 m. AREAS: Hawaii (26). DISCUSSION: This species is discussed by Soule and Soule (1973).

Codonellina montferrandii (Audouin), 1826
FIGURED: Gordon (1984), pl. 26A. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Coleopora americana Osburn, 1940
FIGURED: Osburn (1940), fig. 50. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica, Venezuela (14).

Coleopora corderoi Marcus, 1949
FIGURED: figs. 68, 69. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica, Venezuela (14).

Coleopora tubulosa
(Canu and Bassler), 1928
FIGURED: Canu and Bassler (1928b), pl. 24, figs. 1–6. HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11).

Coleopora verrucosa
(Canu and Bassler), 1924
FIGURED: Winston and Heimberg (1986), figs. 33, 34. HABITAT: coral rubble, reef. DEPTH: 2 m or less. AREAS: Indonesia (20)

Coleopora undescribed sp.
FIGURED: Banta and Carson (1977), fig. 6C, as *Teuchopora* undescribed sp. HABITAT: coral rubble. DEPTH: 10 m or less. AREAS: Costa Rica (Caribbean) (5). DISCUSSION: According to Banta and Carson (1977) this species may be synonymous with *Coleopora tubulosa.*

Coleopora undescribed sp.
FIGURED: fig. 70. HABITAT: coral undersurfaces. DEPTH: 20 m. AREAS: Jamaica (14).

Cosciniopsis globosa Harmer, 1957
FIGURED: Harmer, 1957, pl. LXXII, figs. 22, 26. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Cosciniopsis lonchaea (Busk), 1884
FIGURED: Harmer (1957), pl. LXXII, figs. 16, 17, 19, 20. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Crepidacantha carsioseta
Winston and Heimberg, 1986
FIGURED: Winston and Heimberg (1986), figs. 64–66. HABITAT: coral rubble. DEPTH: 2–3 m. AREAS: Indonesia (20).

Crepidacantha longiseta
Canu and Bassler, 1928
FIGURED: Winston (1984), fig. 42. HABITAT: corals, coral undersurfaces. DEPTH: 122 m or less. AREAS: Belize (2); off Cuba (7); Panama (Caribbean) (3); Venezuela (14).

Crepidacantha poissonii (Audouin), 1826
FIGURED: Harmer (1957), pl. LXVII, fig. 22. HABITAT: coral and coral rubble, reefs. DEPTH: 30 m or less. AREAS: Bahamas (4); Jamaica (14); Red Sea (17).

Crepidacantha setigera (Smitt), 1873
FIGURED: Winston (1982), fig. 68. HABITAT: *Oculina,* coral undersurfaces. DEPTH: 90 m or less. AREAS: Florida (12); Jamaica (14).

Cribellopora trichotoma (Waters), 1918
FIGURED: Gordon (1984), pl. 31A. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

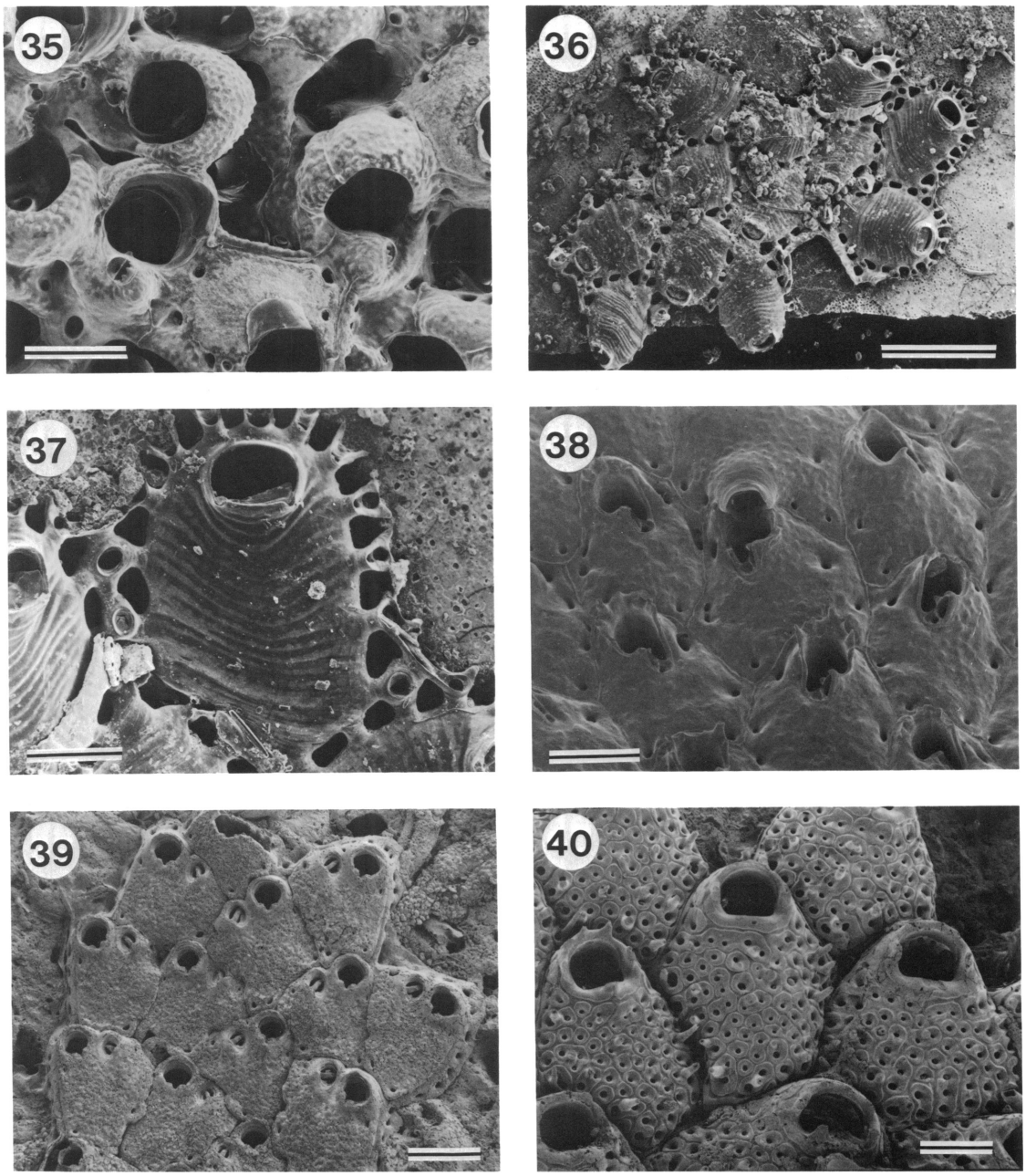
Drepanophora birbira Powell, 1967
FIGURED: Powell (1967), text fig. 2. HABITAT: reef. DEPTH: 18–37 m. AREAS: Red Sea (18).

Drepanophora incisor (Thornely), 1905
FIGURED: Harmer (1957), pl. LXX, figs. 26–28. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17, 18); Indonesia (20).

Drepanophora longiuscula Harmer, 1957
FIGURED: as *Rhynchozoon corrugatum* in Waters (1909), pl. XII, figs. 14–16. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17, 18). DISCUSSION: Harmer gave a new name to the specimen described by Waters (1909) as *R. corrugatum,* chiefly on the basis of ovicell characteristics, but did not provide a new illustration.

Drepanophora tuberculatum (Osburn), 1914
FIGURED: fig. 38. HABITAT: coral undersurfaces, coral rubble. DEPTH: 20 m or less. AREAS: Bahamas (4); Curaçao (10); Jamaica, Venezuela (14).

Drepanophora verrucosa
Winston and Heimberg, 1986

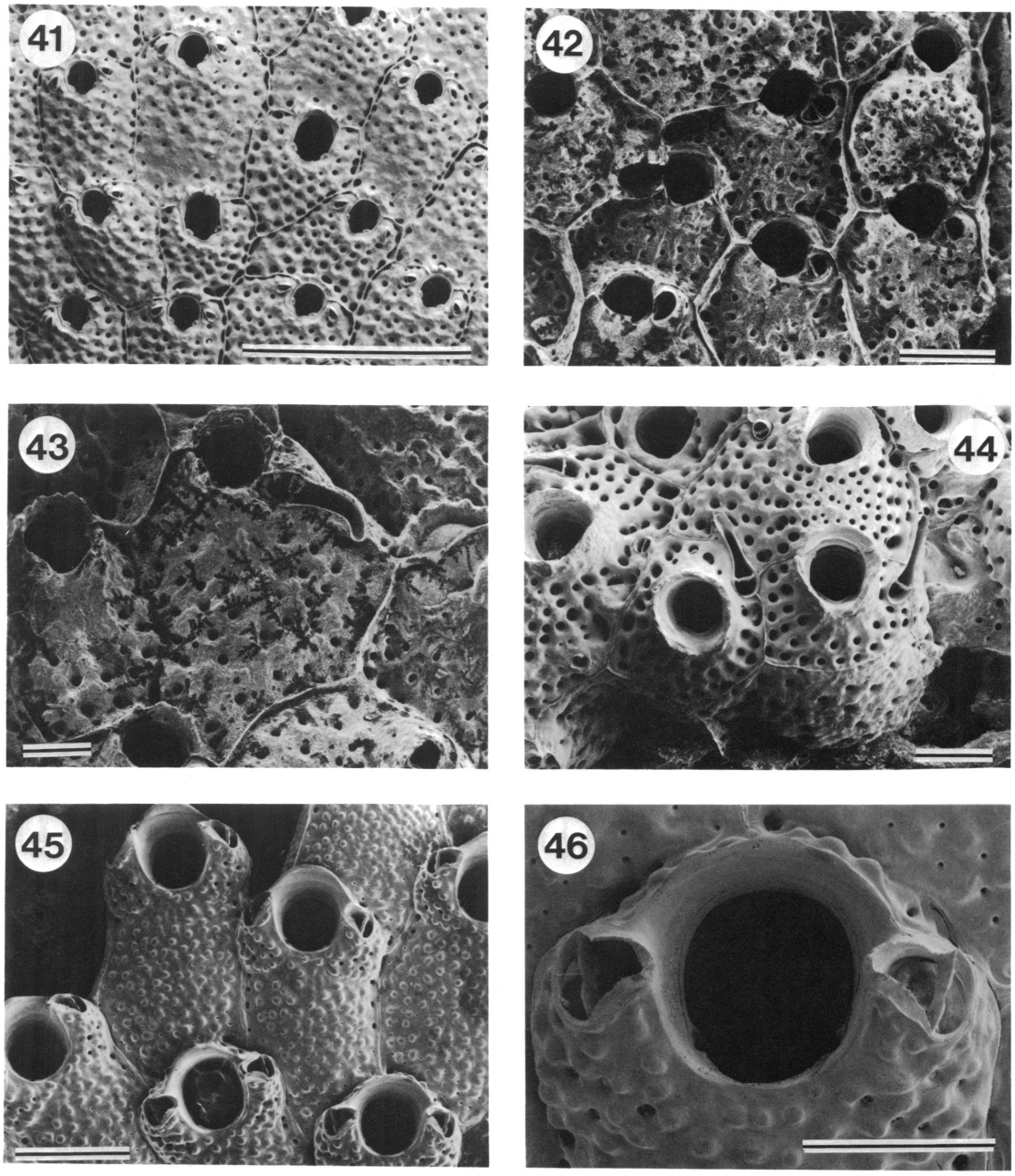


Figs. 35–40. **35.** *Celleporaria subalba,* ovicelled zooids. Scale bar = 200 μm. **36.** *Chorizopora brogniartii* (Priory, Jamaica), young colony. Scale bar = 400 μm. **37.** *C. brogniartii,* close-up of zooid. Scale bar = 100 μm. **38.** *Drepanophora tuberculatum* (10-3-R3, Rio Bueno, Jamaica). Scale bar = 200 μm. **39.** *Escharina porosa* (10-1-R24, col. #2, Rio Bueno, Jamaica). Scale bar = 400 μm. **40.** *Exechonella antillea* (10-1-R8, Rio Bueno, Jamaica). Scale bar = 400 μm.

FIGURED: Winston and Heimberg (1986), figs. 103–106. HABITAT: coral rubble. DEPTH: 2–3 m. AREAS: Indonesia (20).

Emballotheca pacifica Harmer, 1957

FIGURED: Harmer (1957), pl. LXVII, figs. 3–5. HABITAT: coral. DEPTH: 91–113 m.



Figs. 41–46. **41.** *Gemelliporidra magniporosa* (10-1-R22, Rio Bueno, Jamaica). Scale bar = 1 mm. **42.** *G. multilamellosa* (Galeta reef, Panama). Zooids with ovicells and ovoid avicularia. Scale bar = 400 μm. **43.** *G. multilamellosa,* showing longer curved avicularia. Scale bar = 200 μm. **44.** *G. typica* (20-1-R15, Col. #1, Rio Bueno, Jamaica). Scale bar = 400 μm. **45.** *Gephyrophora rubra* (Rio Bueno, Jamaica). Scale bar = 400 μm. **46.** *G. rubra,* close-up of orifice. Scale bar = 200 μm.

AREAS: Hawaii (26). DISCUSSION: Harmer (1957) put Canu and Bassler's (1927a) *Mucronella? quadrata* in synonymy with his new species.

Escharina pesanseris (Smitt), 1873

FIGURED: Winston (1984), figs. 53–55. HABITAT: coral undersurfaces, coral rubble, *Oculina.* DEPTH: 113 m or less. AREAS: Flor-

ida (12); Bahamas (4); Belize (2); Jamaica, Venezuela (14); Red Sea (17); Hawaii (26).

Escharina porosa (Smitt), 1873
FIGURED: fig. 39. HABITAT: coral undersurfaces, coral, coral rubble. DEPTH: 56 fm or less. AREAS: Florida, Gulf of Mexico (7); Costa Rica (Caribbean) (5); Jamaica, Venezuela (14).

Escharoides coccinea Abildgaard, 1806 (?)
FIGURED: Hayward and Ryland (1979), fig. 24. HABITAT: coral. DEPTH: 10 m or less. AREAS: Bahamas (4). DISCUSSION: This identification seems doubtful, since Hayward and Ryland describe *E. coccinea* as a boreal species. Perhaps the specimen belongs to the species recently described by Dumont (1981).

Escharoides costifer (Osburn), 1914
FIGURED: Winston (1982), fig. 61. HABITAT: reef. DEPTH: ndg. AREAS: Gulf of Mexico (13). DISCUSSION: Listed as *E. costifera.* This species usually occurs on algae.

Escharoides longirostris Dumont, 1981
FIGURED: Dumont (1981), fig. 1A. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Euthyrisella clathrata (Harmer), 1902
FIGURED: Harmer (1902), pl. 16, figs. 18–31. HABITAT: reef slope. DEPTH: sublittoral. AREAS: Great Barrier Reef (21). DISCUSSION: Listed as *Euthyricella* in Ryland (1974).

Exechonella antillea (Osburn), 1927
FIGURED: fig. 40, and Winston (1982), fig. 60. HABITAT: corals, coral undersurfaces, coral rubble, reef. AREAS: Bahamas (4); Florida (11); Jamaica (14); Puerto Rico (8); Red Sea (17).

Exechonella brasiliensis
Canu and Bassler, 1928
FIGURED: Winston and Heimberg (1986), figs. 26, 27. HABITAT: coral rubble. DEPTH: 1.5–2 m. AREAS: Indonesia (20).

Exechonella discoidea
Canu and Bassler, 1929
FIGURED: Canu and Bassler (1929), pl. 20, figs. 5, 6. HABITAT: reef. DEPTH: 30 m or less. AREAS: Red Sea (17).

Exechonella tuberculata
MacGillivray, 1883
FIGURED: Gordon (1984), pl. 23D. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Fenestrulina harmeri
Winston and Heimberg, 1986
FIGURED: Winston and Heimberg (1986), figs. 67, 68. HABITAT: coral rubble. DEPTH: 1.5–2 m. AREAS: Indonesia (20).

Gemelliporidra belikina Winston, 1984
FIGURED: Winston (1984), figs. 51, 52. HABITAT: coral undersurfaces. DEPTH: 5–10 m. AREAS: Belize (2).

Gemelliporidra magniporosa
(Canu and Bassler), 1923
FIGURED: fig. 41. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Gemelliporidra multilamellosa
(Canu and Bassler), 1923
FIGURED: figs. 42, 43. HABITAT: coral, coral undersurfaces (reef). DEPTH: 10 m or less. AREAS: Panama (Caribbean) (14).

Gemelliporidra typica
(Canu and Bassler), 1927
FIGURED: fig. 44. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Gephyrophora rubra Osburn, 1940
FIGURED: figs. 45, 46. HABITAT: undercoral surfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Gigantopora fenestrata (Smitt), 1873
FIGURED: as *Stenopsis fenestrata,* Canu and Bassler (1928b), pl. 14, figs. 9, 10. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Gigantopora pupa Jullien, 1903
FIGURED: Gordon (1984), pl. 26F. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Gigantopora spiculifera
Canu and Bassler, 1927
FIGURED: Harmer (1957), pl. LX, figs. 10, 11. HABITAT: corals. DEPTH: 91–113 m. AREAS: Hawaii (26).

Hemismittoidea corallinea
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 1A–D. HABITAT: corals and black coral. DEPTH: 3–46 m. AREAS: Hawaii (25).

Hippaliosina acutirostris
Canu and Bassler, 1929
FIGURED: Harmer (1957), pl. LXXII, figs. 1–5. HABITAT: reef. DEPTH: 5–33 m. AREAS: Red Sea (18).

Hippaliosina rostrigera (Smitt), 1873
FIGURED: Winston (1982), fig. 65. HABITAT: coral, *Oculina* rubble. DEPTH: 15–90 m. AREAS: Florida (12); Tortugas (9); Gulf of Mexico (7).

Hippopetraliella dorsiporosa (Busk), 1884
FIGURED: Harmer (1957), pl. XLV, figs. 1–3. HABITAT: Spur and Groove Zone. DEPTH: ndg. AREAS: Madagascar (16).

Hippopetraliella magna (d'Orbigny), 1852
FIGURED: Harmer (1957), pl. LV, figs. 5, 6. HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18).

Hippopetraliella sp.
HABITAT: fore-reef slope. DEPTH: ndg. AREAS: Madagascar (16).

Hippopleurifera belizae Winston, 1984
FIGURED: Winston (1984), figs. 29, 30. HABITAT: coral undersurfaces. DEPTH: 5–10 m. AREAS: Belize (2).

Hippopodina feegeensis (Busk), 1884
FIGURED: Winston and Heimberg (1986), figs. 28–30. HABITAT: coral rubble, coral undersurfaces, reef. DEPTH: 54 m or less. AREAS: Florida (11); Bahamas (4); St. Croix (1); Belize (2); Costa Rica (Caribbean) (5); Gulf of Mexico (13); Jamaica, Venezuela (14); Red Sea (17, 18); Indonesia (19, 20); Great Barrier Reef (21, 23).

Hippopodinella adpressa (Busk), 1854 (?)
FIGURED: Powell (1967), pl. 13, figs. d, e, text fig. 93. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17, 18). DISCUSSION: According to Dumont (1981) Powell's specimens do not belong to Busk's species.

Hippoporella gorgonensis Hastings, 1930
FIGURED: Osburn (1952), pl. 45, figs. 10, 11. HABITAT: broken coral, coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica (14); Panama (Pacific coast) (3).

Hippoporella multidentata
(Thornely), 1905
FIGURED: Harmer (1957), pl. LXXII, figs. 9–12. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Hippoporella rimata Osburn, 1952
FIGURED: Osburn (1952), pl. 45, figs. 6, 7. HABITAT: broken coral. DEPTH: 12–18 ft. AREAS: Panama (Pacific coast) (3).

Hippoporella spinigera (Phillipps), 1899
FIGURED: Harmer (1957), pl. LXXII, fig. 13. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Hippoporidra sp. A and B (?)
HABITAT: fore-reef talus. DEPTH: 2–4 m. AREAS: St. Croix (1). DISCUSSION: Specimens not in Schopf collection at USNM, thus identifications could not be verified.

Hippoporina pertusa (Esper), 1796
FIGURED: Winston (1984), figs. 39, 40. HABITAT: coral undersurfaces. DEPTH: 15 m. AREAS: Belize (2). DISCUSSION: Caribbean specimens probably do not belong to the European species (see Winston, 1984).

Hippoporina verrilli
Maturo and Schopf, 1968
FIGURED: Winston (1982), fig. 69. HABITAT: coral. DEPTH: 10 m or less. AREAS: Bahamas (4).

Hippothoa flagellum Manzoni, 1870
FIGURED: Winston (1982), fig. 84. HABITAT: *Oculina* rubble. DEPTH: 40–90 m. AREAS: Florida (12).

Hippothoa sp.
HABITAT: reefs. DEPTH: 20 m or less. AREAS: Venezuela (14).

Iodictyum buchneri Harmer, 1934
FIGURED: Harmer (1934), pl. XXXV, figs. 1–5. HABITAT: reef. DEPTH: ndg. AREAS: Indonesia (19).

Iodictyum sp.
HABITAT: reef slope. DEPTH: sublittoral. AREAS: Great Barrier Reef (21). DISCUSSION: Found at Heron Island by Ryland (1974).

Lagenipora verrucosa
Canu and Bassler, 1928
FIGURED: Canu and Bassler (1928b), pl. 21, figs. 5–8. HABITAT: corals. DEPTH: 33–56 fm. AREAS: Florida, north of Cuba (7).

Margaretta buski Harmer, 1957
FIGURED: figs. 47, 48. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica, Panama (Caribbean) (14).

Margaretta gracilior (Ortmann), 1892
FIGURED: Harmer (1957), pl. LV, figs. 23–28. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17); Indonesia (19).

Margaretta opuntioides (Pallas), 1766
FIGURED: Harmer (1957), pl. LV, figs. 1, 2, 4, 5. HABITAT: reef. DEPTH: ndg. AREAS: Indonesia (19).

Margaretta tenuis Harmer, 1957
FIGURED: Harmer (1957), pl. LV, figs. 13–18. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Margaretta triplex Harmer, 1957
FIGURED: Winston and Heimberg (1986), figs. 70–72. HABITAT: coral undersurfaces, outer reef flat; reef. DEPTH: intertidal. AREAS: Indonesia (19, 20); Great Barrier Reef (21).

Microporella ciliata (Pallas), 1766
FIGURED: Hayward and Ryland (1979), fig. 95. HABITAT: corals, coral undersurfaces, coral rubble. DEPTH: 40 m or less. AREAS: Florida (11); Tortugas (9); Gulf of Mexico (7); Curaçao (10). DISCUSSION: *Microporella ciliata* is considered by Hayward and Ryland (1979) to be a temperate boreal species. It has been listed from many other localities including the Caribbean, but only further study will show which, if any, of those specimens are *ciliata* and which belong to other species.

Microporella mayensis Winston, 1984
FIGURED: Winston (1984), figs. 59, 60. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2).

Microporella orientalis Harmer, 1957
FIGURED: Gordon (1984), pl. 39C. HABITAT: reefs. DEPTH: 33 m or less. AREAS: Red Sea (17, 18).

Microporella umbracula (Audouin), 1826
FIGURED: fig. 49. HABITAT: coral rubble, coral undersurfaces, *Oculina*. DEPTH: 90 m or less. AREAS: Florida (12); Jamaica (14); Panama (Pacific coast) (3).

Mucropetraliella echinata
(Canu and Bassler), 1929
FIGURED: Harmer, 1957, pl. XLVI, figs. 14–16, text fig. 62F. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Mucropetraliella loculifera Harmer, 1957
FIGURED: Harmer (1957), pl. XLVI, figs. 3–7. HABITAT: Spur and Groove Zone. DEPTH: ndg. AREAS: Madagascar (16).

Mucropetraliella philippinensis
(Canu and Bassler), 1929
FIGURED: Harmer (1957), pl. XLV, figs. 19–21. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Mucropetraliella robusta
(Canu and Bassler), 1929
FIGURED: Harmer (1957), pl. XLVI, fig. 13, text fig. 65. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Mucropetraliella thenardii (Audouin), 1826
FIGURED: Harmer (1957), pl. XLVI, figs. 10–12, text figs. 62, 64. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Parasmittina alanbanneri
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 3A–C. HABITAT: coral. DEPTH: 3–26 m. AREAS: Hawaii (25).

Parasmittina areolata
(Canu and Bassler), 1927
FIGURED: Soule and Soule (1973), fig. 4E–G. HABITAT: coral, coral undersurfaces. DEPTH: 3–100+ m. AREAS: Belize (2); Jamaica (14); Hawaii (25, 26). DISCUSSION: This species may be found to be synonymous with *P. spathulata* once a thorough comparative study has been made (see Soule and Soule, 1973; Winston, 1984).

Parasmittina circularis
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 4A–D. HABITAT: ? coral (no substratum given). DEPTH: 3–120 m. AREAS: Hawaii (25).

Parasmittina crosslandi (Hastings), 1930
FIGURED: Soule and Soule (1973), fig. 2E,

F. HABITAT: broken coral. DEPTH: 18 ft. AREAS: Panama (Pacific coast). (3). DISCUSSION: See Soule and Soule (1973) for discussion of this species.

Parasmittina decorata
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 6A–C. HABITAT: coral and black coral. DEPTH: 3–120 m. AREAS: Hawaii (25).

Parasmittina egyptiaca (Waters), 1909
FIGURED: Harmer (1957), pl. LXIV, figs. 21, 22, 29–31. HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18).

Parasmittina glomerata (Thornely), 1912
FIGURED: Harmer (1957), pl. LXIV, figs. 18–20. HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18).

Parasmittina hastingsae
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 9C, D. HABITAT: ? coral (no substratum given). DEPTH: 3–15 m. AREAS: Hawaii (25); Indonesia (20).

Parasmittina iloensis
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 10A–F. HABITAT: coral. DEPTH: 3–12 m. AREAS: Hawaii (25).

Parasmittina kauaiensis
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 9A, B. HABITAT: ? coral (no substratum given). DEPTH: 6–16 m. AREAS: Hawaii (25).

Parasmittina labellum
(Canu and Bassler), 1928
FIGURED: as *Smittina labellum* Canu and Bassler (1928b), pl. 15, figs. 1–4. HABITAT: coral. DEPTH: 102 m or less. AREAS: Florida, Gulf of Mexico (7).

Parasmittina leviavicularia
Soule and Soule, 1973.
FIGURED: Soule and Soule (1973), fig. 7E–G. HABITAT: coral. DEPTH: 3–110 m. AREAS: Hawaii (25).

Parasmittina marsupialis (Busk), 1884
FIGURED: Soule and Soule (1973), fig. 7C, D. HABITAT: coral. DEPTH: 8–23 m. AREAS: Hawaii (25).

Parasmittina munita (Hincks), 1884
HABITAT: coral and coral rubble. DEPTH: 10 m or less. AREAS: Bahamas (4). DISCUSSION: Marcus (1937) describes and figures a *Smittina trispinosa* (Johnst.) var. *munita* (Hincks) which may be the species meant here.

Parasmittina parsevaliformis
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 8A–F. HABITAT: ? coral (no substratum given). DEPTH: 6–26 m. AREAS: Hawaii (25).

Parasmittina parsevalii (Audouin), 1826
FIGURED: Winston and Heimberg (1986), figs. 55–58. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17, 18); Indonesia (20).

Parasmittina parviuncinata
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 5D–F. HABITAT: ? coral (no substratum given). DEPTH: 2–14 m. AREAS: Hawaii (25).

Parasmittina raigiformis
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 9F,G. HABITAT: mostly on coral. DEPTH: 3–21 m. AREAS: Hawaii (25).

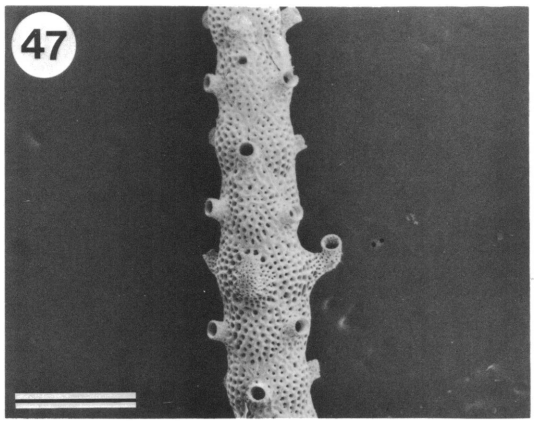
Parasmittina raigii (Audouin), 1826
FIGURED: Harmer (1957), pl. LXV, figs. 1–3. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

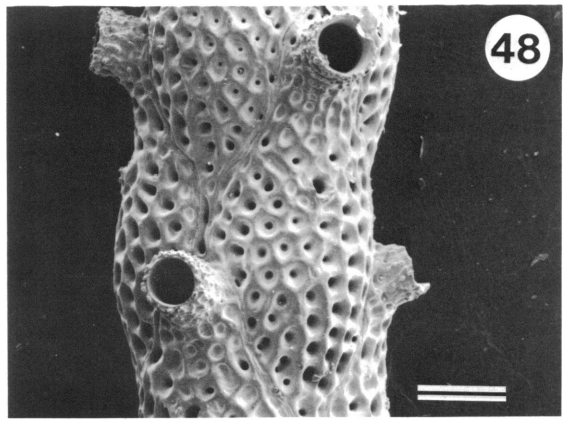
Parasmittina serrula
Soule and Soule, 1973
FIGURED: Winston (1984), fig. 45. HABITAT: coral undersurfaces, coral. DEPTH: 3–100+ m. AREAS: Gulf of Mexico (13); Belize (2); Jamaica (14); Hawaii (25).

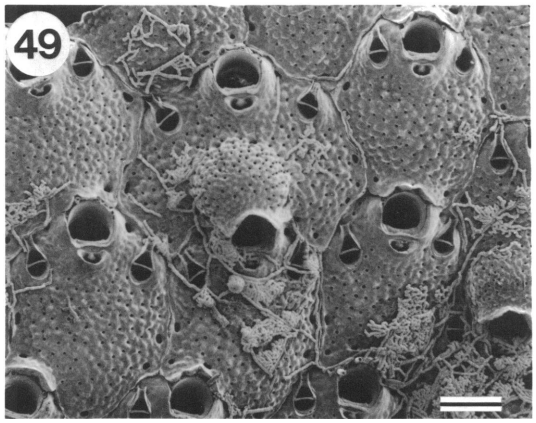
Parasmittina signata (Waters), 1889
FIGURED: Winston and Heimberg (1986), figs. 51–54. HABITAT: coral. DEPTH: 10 m or less. AREAS: Bahamas (4); Indonesia (20).

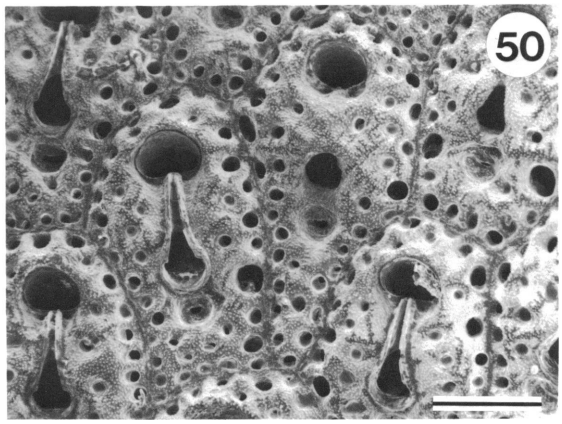
Parasmittina spathulata (Smitt), 1873
FIGURED: Winston (1982), fig. 70. HABITAT: fore-reef talus, coral, *Oculina* rubble. DEPTH: 2 to 90 m. AREAS: Florida (12); St. Croix (1); Curaçao (10). DISCUSSION: See under *P. areolata.*

Parasmittina trispinosa (Johnston), 1838 (?)
HABITAT: fore-reef talus, reef. DEPTH: 2–4 m, ndg. AREAS: St. Croix (1); Gulf of Mexico









Figs. 47–50. **47.** *Margaretta buski* (10-1-R8, Rio Bueno, Jamaica), portion of branch. Scale bar = 1 mm. **48.** *M. buski,* close-up of zooids. Scale bar = 200 μm. **49.** *Microporella umbracula* (20-2-R12, Rio Bueno, Jamaica). Scale bar = 200 μm. **50.** *Reptadeonella bipartita* (10-1-R25, Rio Bueno, Jamaica). Scale bar = 200 μm.

(13). DISCUSSION: *Parasmittina trispinosa* has been reported from many localities; the name seems to have been commonly used for any *Parasmittina* species with three oral spines. *Parasmittina trispinosa* Johnston (Hayward and Ryland, 1979, fig. 42) is, according to Hayward and Ryland, a cool temperate species found in the Eastern Atlantic and Western Mediterranean. Caribbean reports probably refer to one or more other species. For example, part of *Parasmittina trispinosa* (Johnston) in Kornicker, 1959 (13) is *P. serrula,* part belongs to unidentified species.

Parasmittina tropica (Waters), 1909

FIGURED: Gordon (1984), fig. 35D. HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18). DISCUSSION: Harmer's illustrations seem to include several species, including *P. serrula* (see Soule and Soule, 1973, p. 389).

Parasmittina uncinata
Soule and Soule, 1973

FIGURED: Soule and Soule (1973), fig. 5A–C. HABITAT: coral. DEPTH: 3–52 m. AREAS: Hawaii (25).

Parasmittina spp.

HABITAT: undercoral surfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Parasmittina spp.

HABITAT: coral rubble (reef). DEPTH: 40 m or less. AREAS: Florida (11).

Petraliella bisinuata (Smitt), 1873

FIGURED: Harmer (1957), pl. XLIV, figs.

6, 7, 12, 14, 15. HABITAT: coral, coral undersurfaces. AREAS: Gulf of Mexico (7); Venezuela (14).

Petraliella chuakensis (Waters), 1913
FIGURED: Winston and Heimberg (1986), figs. 31, 32. HABITAT: coral rubble. DEPTH: 1.5–2 m. AREAS: Indonesia (20).

Pleurocodonellina lahainae
Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 12A–E. HABITAT: coral. DEPTH: 15 m. AREAS: Hawaii (25).

Psilopsella uniseriata
Canu and Bassler (1927)
FIGURED: Canu and Bassler (1927b), pl. 57, figs. 1–3. HABITAT: corals. DEPTH: 42–44 m. AREAS: Philippines (29).

Reptadeonella bipartita
(Canu and Bassler), 1928
FIGURED: fig. 50. HABITAT: coral undersurfaces, fore-reef talus. DEPTH: 20 m or less. AREAS: St. Croix (1); Puerto Rico, Jamaica (14).

Reptadeonella costulata
(Canu and Bassler), 1928
FIGURED: Winston (1984), figs. 31, 32. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2); Jamaica (14).

Reptadeonella hastingsae
Cheetham and Sandberg, 1964
FIGURED: Winston (1982), fig. 63. HABITAT: *Oculina* rubble. DEPTH: 60–90 m. AREAS: Florida (12). DISCUSSION: listed as *R. costulata* in Winston (1982).

Reptadeonella joloensis (Bassler), 1936
FIGURED: Harmer (1957), pl. LIV, figs. 1–3, text fig. 86A–C. HABITAT: reef. DEPTH: ndg. AREAS: Great Barrier Reef (21).

Reptadeonella violacea (Johnston), 1847 (?)
HABITAT: coral rubble, coral. DEPTH: 40 m or less. AREAS: Bahamas (4); Florida (11); Panama (Pacific coast) (3). DISCUSSION: None of these records can refer to *Reptadeonella violacea,* which is an Eastern Atlantic and Mediterranean species. They could be any one of several other species including *R. costulata* and *R. bipartita.*

Reteporella graffei (Kirchenpauer), 1869
FIGURED: Harmer (1934), pl. XXXV, figs. 12–15, pl. XXXVIII, figs. 13–15, text figs. 25E, 31, 32. HABITAT: coral boulder undersurfaces. DEPTH: intertidal to 16 m. AREAS: Great Barrier Reef (21, 22).

Reteporellina denticulata (Busk), 1884
FIGURED: Harmer (1934), pl. XXXV, figs. 21–23, pl. XXXVIII, figs. 27–32, text figs. 25D, 33. HABITAT: reef, reef slope. DEPTH: intertidal? to sublittoral. AREAS: Great Barrier Reef (21); Indonesia (19).

Reteporellina evelinae Marcus, 1955
FIGURED: figs. 51–53. HABITAT: undercoral surfaces. DEPTH: 20 m or less. AREAS: Panama (Caribbean) (14).

? *Rhamphostomella* sp.
FIGURED: Banta and Carson (1977), fig. 9E, F. HABITAT: coral rubble. DEPTH: 10 m or less. AREAS: Costa Rica (Caribbean) (5).

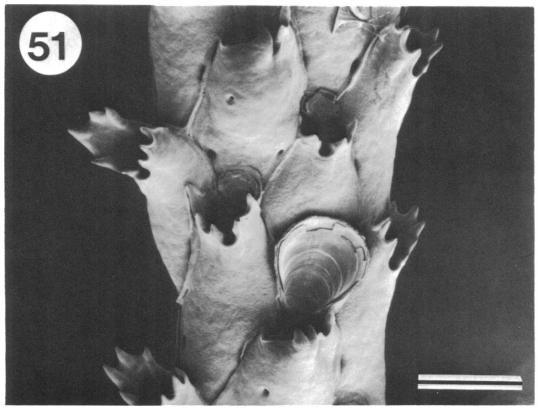
Rhynchozoon detectum Harmer, 1957
FIGURED: Winston and Heimberg (1986), figs. 99–102. HABITAT: reefs, undersurfaces of reef crest boulders. DEPTH: 30 m or less. AREAS: Red Sea (17); Great Barrier Reef (23); Indonesia (20).

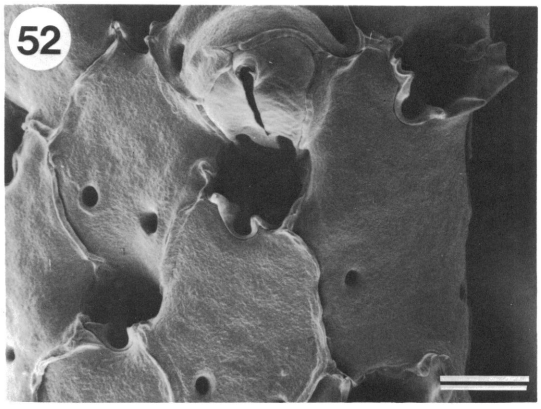
Rhynchozoon globosum Harmer, 1957
FIGURED: Harmer (1957), pl. LXX, figs. 1–5. HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18).

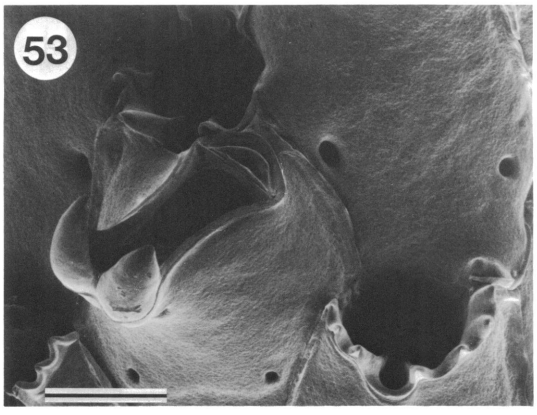
Rhynchozoon larreyi (Audouin), 1826
FIGURED: Harmer (1957), pl. LXX, figs. 12, 16–20. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17); Madagascar (16).

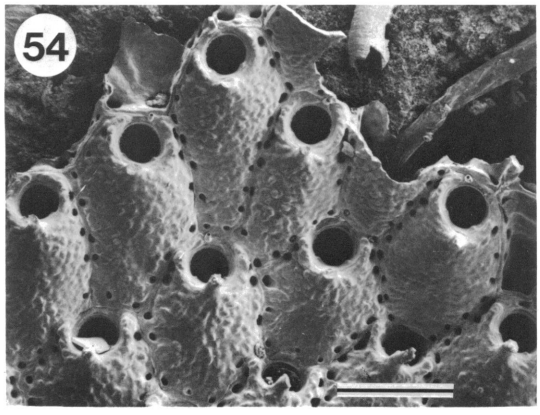
Rhynchozoon phrynoglossum Marcus, 1937
FIGURED: Marcus (1937), figs. 61, 61A. HABITAT: fore-reef talus. DEPTH: 2–4 m. AREAS: St. Croix (1).

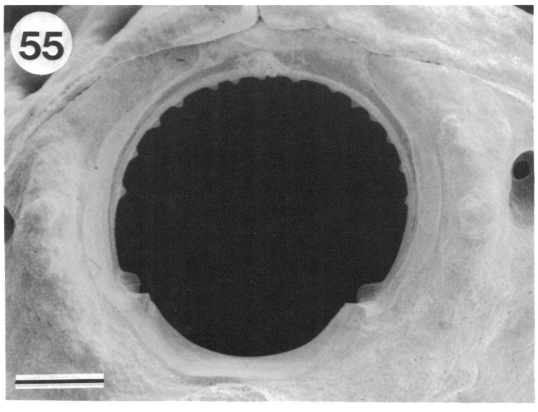
Rhynchozoon rostratum (Busk), 1856
FIGURED: Winston and Heimberg (1986), figs. 95–98. HABITAT: coral rubble, coral, reef. DEPTH: 40 m or less. AREAS: Florida (11); Bahamas (4); Gulf of Mexico (13); Panama (Pacific coast) (3); Indonesia (20). DISCUSSION: Banta and Carson (1977) discuss some of the taxonomic difficulties with this species which is similar to the Caribbean species called *verruculatum.* Further study may see many rec-

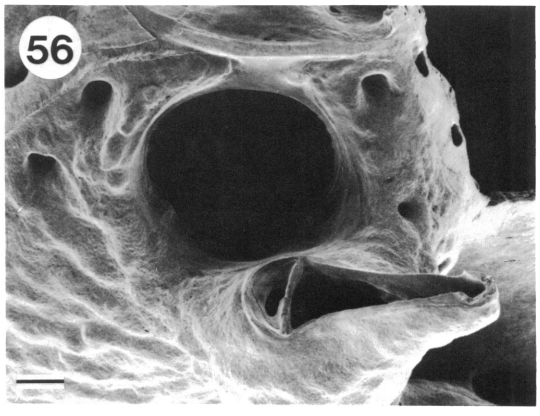






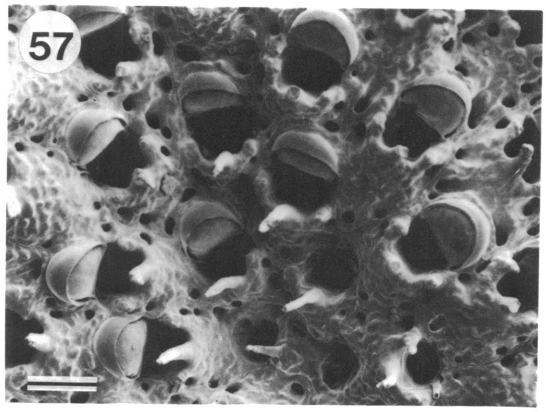


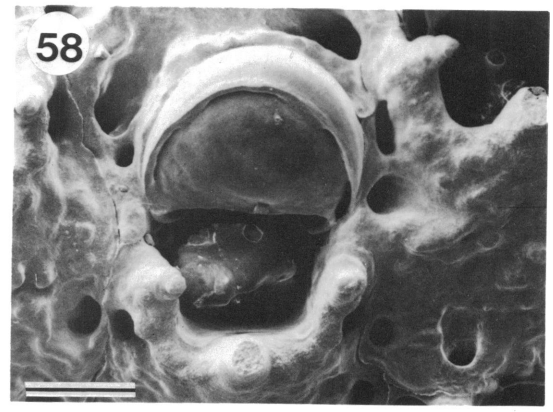


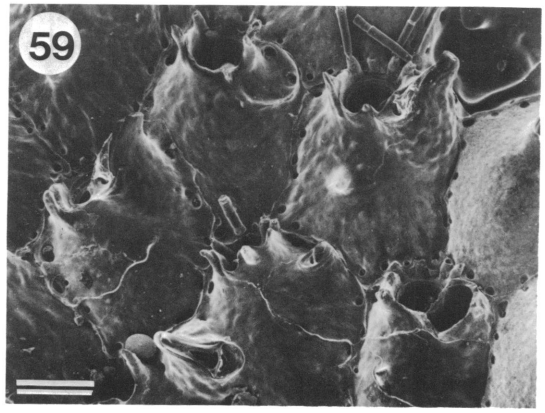


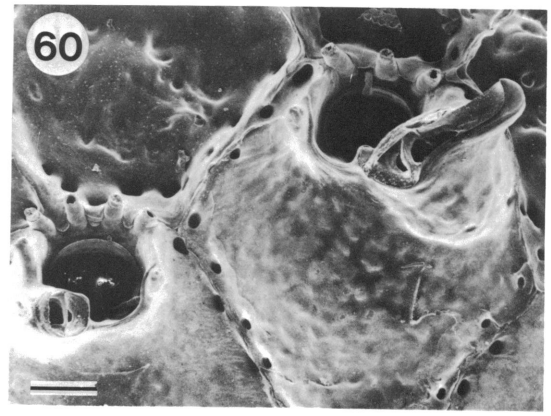
Figs. 51–56. **51.** *Reteporellina evelinae* (Galeta reef, Panama). Scale bar = 200 μm. **52.** *R. evelinae,* close-up of ovicelled zooid. Scale bar = 100 μm. **53.** *R. evelinae,* interzooidal avicularium. Scale bar = 100 μm. **54.** *Rhynchozoon spicatum* (Pear Tree Bottom, Jamaica), zooids at growing edge of colony. Scale bar = 400 μm. **55.** *R. spicatum,* primary orifice. Scale bar = 40 μm. **56.** *R. spicatum,* orifice and avicularium. Scale bar = 40 μm.

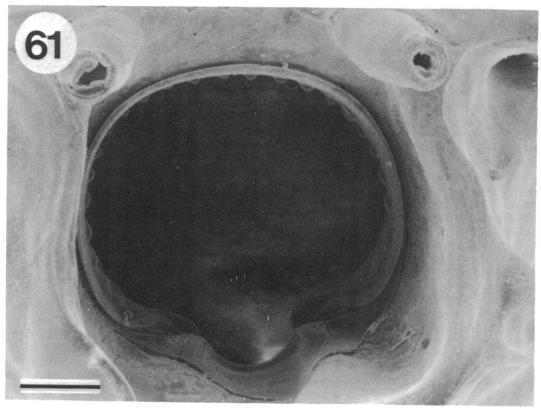
ords of *verruculatum* synonymized under *rostratum.* However, the species described by Busk from Mazatlan does appear to be a valid species (see Winston and Heimberg, 1986).

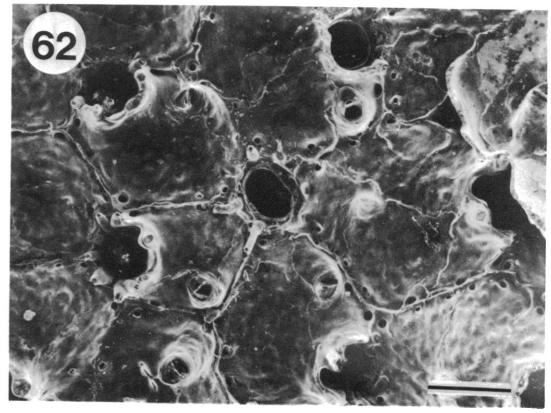












Figs. 57–62. **57.** *Rhynchozoon spicatum,* ovicelled zooids. Scale bar = 200 μm. **58.** *R. spicatum,* close-up of ovicell. Scale bar = 100 μm. **59.** *R.* sp. (Galeta reef, Panama), zooids near growing edge. Scale bar = 200 μm. **60.** *R.* sp., avicularium. Scale bar = 100 μm. **61.** *R.* sp., primary orifice. Scale bar = 40 μm. **62.** *R.* sp., ancestrular region. Scale bar = 200 μm.

Rhynchozoon solidum Osburn, 1914

FIGURED: Osburn (1914), figs. 10–12. HABITAT: coral and rubble. DEPTH: 10 m or less. AREAS: Bahamas (4).

Rhynchozoon spicatum Osburn, 1952

FIGURED: figs. 54–58. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Rhynchozoon tuberosum
Canu and Bassler, 1927
FIGURED: Canu and Bassler (1927a), pl. VII, fig. 5. DEPTH: 91–113 m. AREAS: Hawaii (26).

Rhynchozoon tubulosum (Hincks), 1880
FIGURED: Gordon (1984), pl. 52, figs. C–E. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Rhynchozoon verruculatum (Smitt), 1873
FIGURED: Winston (1984), figs. 61–64. HABITAT: coral undersurfaces, coral rubble. DEPTH: 20 m or less. AREAS: St. Croix (1); Belize (2); Jamaica (14); Costa Rica (Caribbean) (5); Indonesia (20).

Rhynchozoon sp.
FIGURED: figs. 59–62. HABITAT: coral undersurfaces. DEPTH: 10 m or less. AREAS: Panama (Caribbean) (14). DISCUSSION: This may be an undescribed species.

Rhynchozoon sp.
HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Venezuela (14).

Robertsonidra argentea (Hincks), 1881
FIGURED: Powell (1967), pl. 2, fig. 10. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17, 18). DISCUSSION: The generic placement of this species is discussed by Powell (1967).

Savignyella lafontii (Audouin), 1826
FIGURED: Winston (1982), fig. 62. HABITAT: reef. DEPTH: ndg. AREAS: Indonesia (19).

Savignyella otophora (Kirkpatrick), 1890
FIGURED: Harmer (1957), pl. LI, figs. 19, 20. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Schizobrachiella convergens Harmer, 1957
FIGURED: Harmer (1957), pl. LXXIV, fig. 20. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Schizomavella auriculata (Hassall), 1842 (?)
HABITAT: coral. DEPTH: 10 m or less. AREAS: Bahamas (4). DISCUSSION: Probably not the species of Hassall, which Hayward and Ryland (1979) consider a temperate-boreal European species.

Schizomavella australis (Haswell), 1880
FIGURED: Harmer (1957), pl. LXVI, figs. 5, 9. HABITAT: reef. DEPTH: 5–33 m. AREAS: Red Sea (18).

Schizomavella inclusa (Thornely), 1906
FIGURED: Winston and Heimberg (1986), figs. 43, 44. HABITAT: coral rubble, reef. DEPTH: 2 m or less. AREAS: Indonesia (20).

Schizomavella punctigerum
(MacGillivray), 1883
FIGURED: figs. 63, 64. HABITAT: coral undersurfaces, reef. DEPTH: 45 m or less. AREAS: Jamaica, Venezuela (14); Indonesia (19). DISCUSSION: Gordon (1984) has placed this species in *Schizomavella* rather than *Arthropoma.*

Schizomavella sinapiformis Harmer, 1957
FIGURED: Harmer (1957), pl. LXVII, fig. 8. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Schizoporella cornuta
(Gabb and Horn), 1862
FIGURED: Winston (1982), fig. 74. HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11); Bahamas (4).

Schizoporella errata (Waters), 1879
FIGURED: Hayward and Ryland (1979), fig. 68. HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11); Bahamas (4).

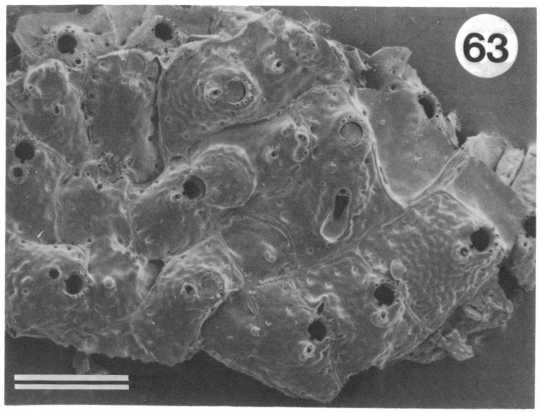
Schizoporella floridana Osburn, 1914
FIGURED: Winston (1982), fig. 75. HABITAT: coral rock, corals. DEPTH: 38 m. AREAS: Gulf of Mexico (7); Curaçao (10).

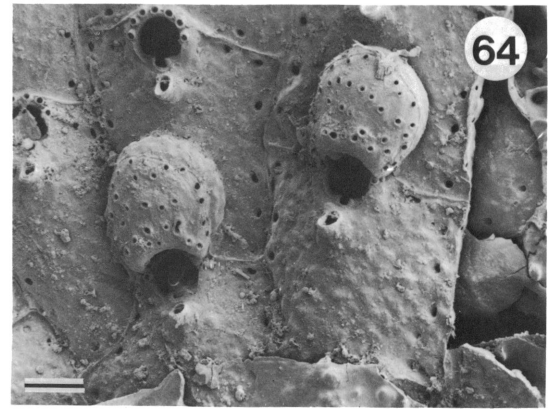
Schizotheca fissa (Busk), 1856
FIGURED: Hayward and Ryland (1979), fig. 16. HABITAT: coral rubble. DEPTH: 10 m or less. AREAS: Bahamas (4).

Scorpiodinopora bernardii (Audouin), 1826
FIGURED: (as *Stephanosella bernardii*) Harmer (1957), pl. LXXIV, figs. 21–23. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

Semihaswellia sinuosa
Canu and Bassler, 1928
FIGURED: Canu and Bassler (1928b), pl. 15, figs. 1–4. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Jamaica (14).

Sinupetraliella litoralis (Hastings), 1932
FIGURED: Harmer (1957), pl. XLV, figs. 11–13. HABITAT: under dead coral. DEPTH: intertidal to 16 m. AREAS: Great Barrier Reef (22). DISCUSSION: Described by Hastings as *Petralia litoralis.*





Figs. 63, 64. **63.** *Schizomavella punctigerum* (10-1-R23, Rio Bueno, Jamaica). Scale bar = 400 μm. **64.** *S. punctigerum,* ovicelled zooids. Scale bar = 100 μm.

Smittina kukiula Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 11E–G. HABITAT: coral, coral undersurfaces. DEPTH: 20 m or less. AREAS: Hawaii (25); Venezuela (14).

Smittina nitidissima (Hincks), 1880
FIGURED: Harmer (1957), pl. LXIII, figs. 7–10, as *Smittina maleolus.* HABITAT: reefs. DEPTH: 33 m or less. AREAS: Red Sea (17). DISCUSSION: Cook (1968) has synonymized this species with *S. malleolus* (Hincks, 1884b).

Smittina protecta (Thornely), 1905
FIGURED: Harmer (1957), pl. LXIV, figs. 12–17. HABITAT: fore-reef slope. DEPTH: ndg. AREAS: Madagascar (16).

Smittoidea levis (Kirkpatrick), 1890
FIGURED: Harmer (1957), pl. LXIII, figs. 1–5. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17). DISCUSSION: Soule and Soule (1973) discuss Harmer's (1957) definition of *S. levis,* which probably includes several species.

Smittoidea pacifica Soule and Soule, 1973
FIGURED: Soule and Soule (1973), fig. 1F–I. HABITAT: coral, coral undersurfaces. DEPTH: 40 m or less. AREAS: Venezuela (14); Hawaii, Galapagos (25). DISCUSSION: This species include some specimens called *S. levis* by Harmer (see Soule and Soule, 1973).

Stylopoma duboisii (Audouin), 1826
FIGURED: Winston and Heimberg (1986), figs. 45–47. Ovicell figured in Osborne (1984), fig. 5. HABITAT: coral boulder undersurfaces; reefs. DEPTH: intertidal to 37 m. AREAS: Red Sea (17, 18); Indonesia (20); Great Barrier Reef (21, 23).

Stylopoma spongites (Pallas), 1766
FIGURED: Winston (1984), figs. 49,50. HABITAT: coral undersurfaces, coral, coral rubble, *Oculina* rubble, reefs. DEPTH: low water to 90 m. AREAS: Bahamas, St. Croix (1); Belize (2); Gulf of Mexico (4, 7, 13); Florida (11, 12); Tortugas (9); Jamaica (14).

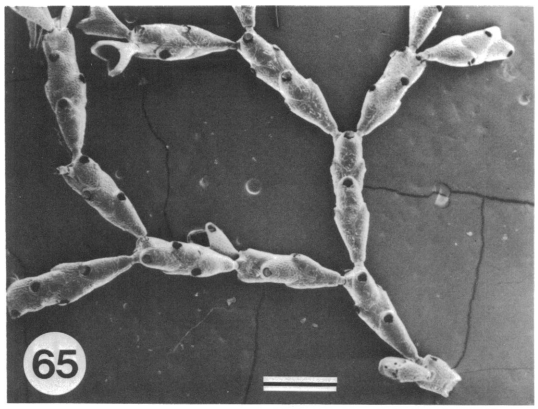
Stylopoma viride (Thornely), 1905
FIGURED: Winston and Heimberg (1986), figs. 48–50 HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18); Madagascar (16); Indonesia (19, 20).

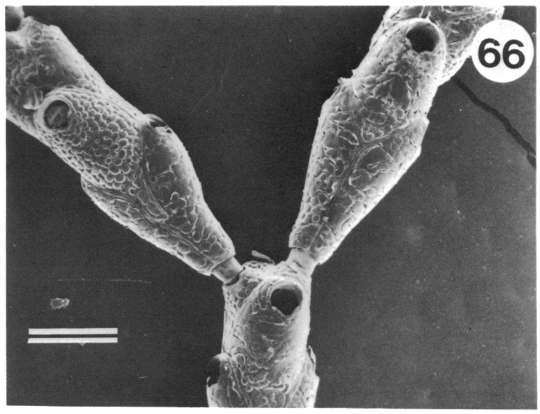
Tetraplaria dichotoma (Osburn), 1914
FIGURED: figs. 65–67. HABITAT: reef, coral undersurfaces. DEPTH: ndg. AREAS: Gulf of Mexico (13); Panama (Caribbean) (14).

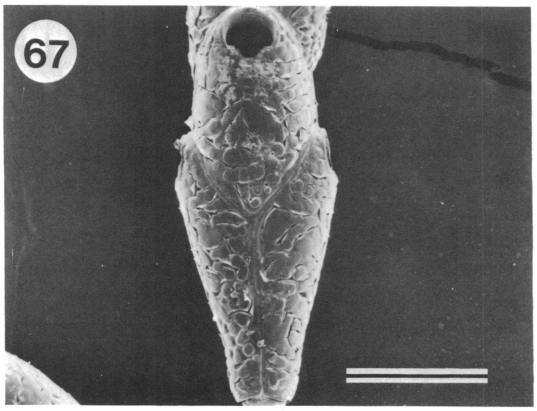
Thornleya ceylonica (Thornely), 1905
FIGURED: Harmer (1957), pl. LXXII, figs. 15–17, text fig. 117. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17).

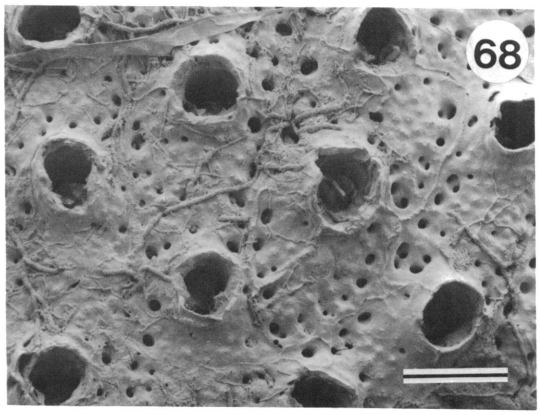
Trematooecia aviculifera
(Canu and Bassler), 1923
FIGURED: Winston (1984), figs. 65, 66. HABITAT: coral rubble, coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2); Jamaica, Venezuela, Panama (Caribbean) (3, 14); Costa Rica (Caribbean) (5).

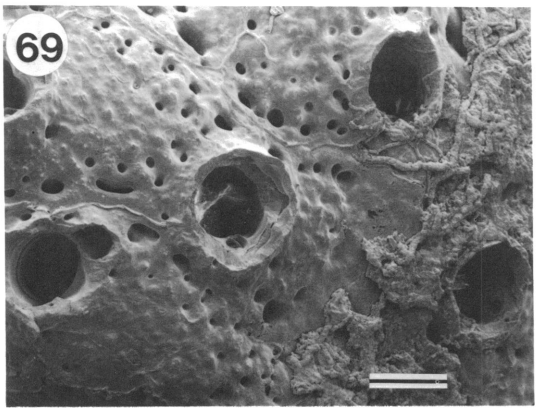
Trematooecia turrita (Smitt), 1873
FIGURED: Winston (1984), figs. 67, 68.

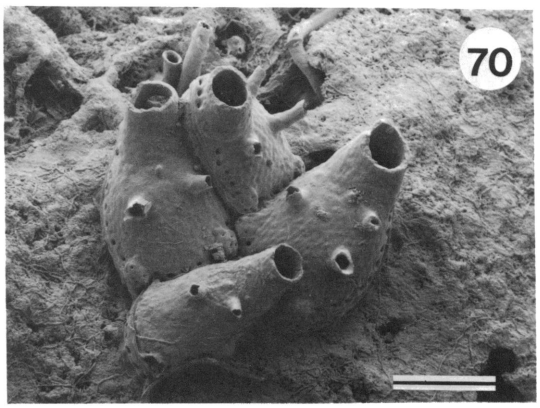












Figs. 65–70. **65.** *Tetraplaria dichotoma* (Galeta reef, Panama). Scale bar = 1 mm. **66.** *T. dichotoma,* branch bifurcation. Scale bar = 400 μm. **67.** *T. dichotoma,* close-up of zooid. Scale bar = 400 μm. **68.** *Coleopora corderoi* (10-1-R24, Rio Bueno, Jamaica). Scale bar = 400 μm. **69.** *C. corderoi.* Scale bar = 200 μm. **70.** *C.* sp. (Rio Bueno, Jamaica), young colony. Scale bar = 400 μm.

HABITAT: coral rubble, coral undersurfaces, *Oculina* rubble. AREAS: Florida (11, 12); Tortugas (9); Belize (2); Jamaica, Venezuela, Panama (Caribbean) (3, 14); Costa Rica (Caribbean) (5); Curaçao (10); Gulf of Mexico (7); Red Sea (17).

Tremogasterina mucronata (Smitt), 1873
FIGURED: Winston (1984), figs. 35, 36. HABITAT: coral undersurfaces, coral rubble. DEPTH: 10 m or less. AREAS: Belize (2); Gulf of Mexico (13); Costa Rica (Caribbean coast) (5); Jamaica, Venezuela (14).

Tremogasterina robusta (Hincks), 1884
FIGURED: Cook (1977), pl. 5E. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17, 18). DISCUSSION: Redescribed by Powell and Cook (1967).

Tremogasterina spathulata
(Canu and Bassler), 1929
FIGURED: Cook (1977), fig. 8A. HABITAT: reefs. DEPTH: 37 m or less. AREAS: Red Sea (17, 18). DISCUSSION: The species is discussed by Cook (1977).

Tremoschizodina lata Smitt, 1873
FIGURED: Winston (1982), fig. 64. HABITAT: corals. DEPTH: 62–117 m. AREAS: Florida, Gulf of Mexico (7).

Triphyllozoon benemunitum Harmer, 1934
FIGURED: Harmer (1934), pl. XXXV, figs. 25, 26, pl. XXXIX, figs. 20–26, text fig. 28. HABITAT: coral fragments. DEPTH: 6 m. AREAS: Great Barrier Reef (22).

Triphyllozoon hirsutum (Busk), 1884
FIGURED: Harmer (1934), pl. XXXV, fig. 24, pl. XXXVI, fig. 1, pl. XXXIX, figs. 1–4. HABITAT: reef. DEPTH: 54 m or less. AREAS: Indonesia (19).

Triphyllozoon philippense (Busk), 1884
FIGURED: Harmer (1934), pl. XXXV, figs. 27, 28, pl. XXXIX, figs. 5–9. HABITAT: cavities of inner slope (lagoon). DEPTH: ndg. AREAS: Madagascar (16).

Triphyllozoon tricuspidatum
(Harmer), 1933
FIGURED: as *Retepora monilifera* var. *umbonata* in MacGillivray (1885), Dec. X, pl. 97, figs. 1–3. HABITAT: coral undersurfaces. DEPTH: 28–34 m. AREAS: Eniwetak reefs (24).

Trypostega venusta (Norman), 1864
FIGURED: Winston (1984), figs. 37, 38. HABITAT: coral undersurfaces, *Oculina* rubble. DEPTH: 5–90 m. AREAS: Florida (12); Tortugas (9); Belize (2); Jamaica, Venezuela (14); Red Sea (17).

Vitticella longicaudata Harmer, 1957
FIGURED: Harmer (1957), pl. L, figs. 10, 18. HABITAT: reef. DEPTH: 54 m or less. AREAS: Indonesia (19).

Watersipora edmondsoni
Soule and Soule, 1968
FIGURED: Winston and Heimberg (1986), figs. 38–40. HABITAT: coral rubble. DEPTH: 2–3 m. AREAS: Hawaii, Indonesia (20).

Watersipora subovoidea (d'Orbigny), 1852
FIGURED: as *Watersipora* "*subovoidea* fide Harmer," Winston and Heimberg (1986), figs. 35–37. HABITAT: reefs. DEPTH: 30 m or less. AREAS: Red Sea (17); Indonesia (20). DISCUSSION: Soule and Soule (1975) discuss taxonomic problems in *Watersipora*. The illustration given conforms to Harmer's concept of *subovoidea*, but more than one species may occur in the Indo-Pacific area.

Watersipora subtorquata (d'Orbigny), 1852
FIGURED: as *Watersipora subovoidea* in Winston (1984), fig. 66. HABITAT: under coral boulders, reef. DEPTH: intertidal, ndg. AREAS: Great Barrier Reef (21). DISCUSSION: The specimen illustrated seems to fit *W. subtorquata* as defined by Soule and Soule (1974). Ryland reported this species in Australia, but did not illustrate it.

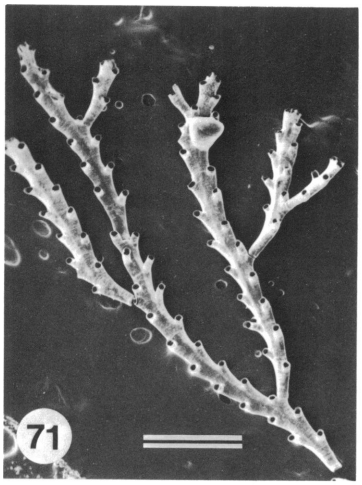
TUBULIPORATA

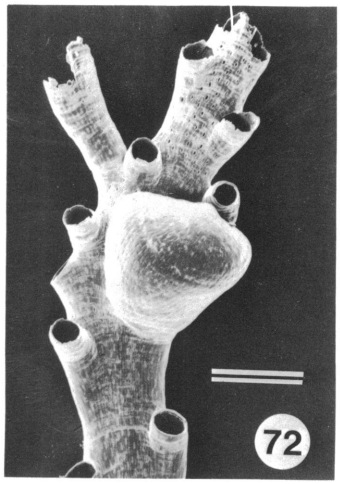
Crisia elongata Milne-Edwards, 1838
FIGURED: figs. 71–73. HABITAT: coral fragments, undercorals, outer reef slopes. DEPTH: 16–120 m. AREAS: East Africa (15); Great Barrier Reef (22).

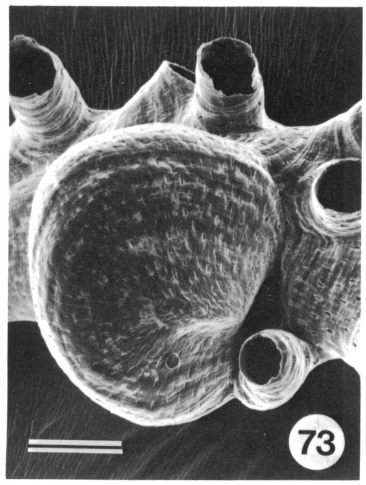
Crisina radians (Lamarck), 1816
FIGURED: Brood (1976), fig. 15H–J. HABITAT: coral fragments, coral undersurfaces, outer reef slope. DEPTH: 16–100 m. AREAS: East Africa (15); Great Barrier Reef (22). DISCUSSION: *C. watersi* of Borg from Zanzibar is considered a synonym by Brood.

Disporella fimbriata (Busk), 1875
FIGURED: Winston (1984), figs. 3, 5, 7. HABITAT: coral undersurfaces. DEPTH: 5–20 m. AREAS: Belize (2); Jamaica (14).

Disporella sibogae Borg, 1944
FIGURED: Brood (1976), fig. 17A–C.







Figs. 71–73. **71.** *Crisia elongata* (Galeta reef, Panama). Scale bar = 1 mm. **72.** *C. elongata* zooids and gonozooid. Scale bar = 200 μm. **73.** *C. elongata,* opening of gonozooid. Scale bar = 100 μm.

HABITAT: undercorals. DEPTH: 5–120 m. AREAS: East Africa (15).

Disporella sp.
HABITAT: fore-reef talus. DEPTH: 2–4 m. AREAS: St. Croix (1).

Harmelinopora plana Brood, 1976
FIGURED: Brood (1976), figs. 5N, 6, 8F. HABITAT: undercorals. DEPTH: 5 m. AREAS: East Africa (15).

Idmonea murogensis Brood, 1976
FIGURED: Brood (1976), fig. 9F, H–J. HABITAT: undercorals. DEPTH: 5 m. AREAS: East Africa (15).

Lichenopora intricata (Busk), 1856
FIGURED: Osburn (1953), pl. 76, figs. 5–9. HABITAT: broken coral. DEPTH: 4 m. AREAS: Panama (Pacific coast) (3).

Lichenopora novae-zelandiae (Busk), 1875
FIGURED: Brood (1976), fig. 17H, I. HABITAT: undercorals. DEPTH: 5–100+ m. AREAS: East Africa (15).

Lichenopora radiata (Audouin), 1826 (?)
HABITAT: coral rubble. DEPTH: 40 m or less. AREAS: Florida (11). DISCUSSION: Since no types exist for the species described by Audouin (1826) from the Red Sea, the identity of *Lichenopora radiata* remains problematic. It is probably distinct from the British species described by Hincks as *L. radiata.* However, examination of Red Sea *Lichenopora* specimens in the collection of the British Museum (Nat. Hist.) showed that several species exist in the region, any one of which could be that described by Audouin.

Lichenopora violacea
Canu and Bassler, 1927
FIGURED: Winston (1984), figs. 4, 6, 8, 9. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize, Jamaica (2, 14).

Lichenopora sp.
HABITAT: fore-reef talus. DEPTH: 2–4 m. AREAS: St. Croix (1).

Nevianopora pulcherrima
(Kirkpatrick), 1890
FIGURED: Brood (1976), fig. 12H, L. HABITAT: coral undersurfaces. DEPTH: 20–100+ m. AREAS: East Africa (15).

Proboscina robusta Canu and Bassler, 1928
FIGURED: Winston, 1984, fig. 2. HABITAT: coral undersurfaces. DEPTH: 20 m or less. AREAS: Belize (2).

Pustulopora danziensis Brood, 1976
FIGURED: Winston (1984), fig. 1. HABITAT: coral undersurfaces. DEPTH: 5–15 m. AREAS: Belize (2); East Africa (15).

Pustulopora delicatula Busk, 1875
FIGURED: Brood (1976), fig. 13E, F. HAB-

ITAT: outer reef slope. DEPTH: 50–100+ m. AREAS: East Africa (16).

Stomatopora papillosa Brood, 1976

FIGURED: Brood (1976), fig. 9B, E. HABITAT: coral undersurfaces. DEPTH: 5 m. AREAS: East Africa (16).

DISCUSSION

Jackson (1979a) identified six basic morphological strategies of sessile organisms: runners, sheets, plates, vines, and trees, and the conditions under which each morphology might flourish. Succession experiments in Jamaican cryptic reef environments (Jackson, 1977a) showed that early dominance by solitary organisms was followed by increasing dominance by sheet- and mound-shaped colonial animals, like those that dominate the natural undercoral community there.

In all studies of reef-associated bryozoans, encrusting two-dimensional, sheetlike forms (e.g., *Stylopoma, Reptadeonella*) are most abundant. Moundlike, frontally budding forms (e.g., *Celleporaria*) are also common. Most of them are firmly cemented to the coral substratum (Soule and Soule, 1974), but at least two families (Beaniidae and Petraliidae) form mats loosely attached to the substratum by radicles. Some primarily encrusting species (e.g., *Steginoporella, Thalamoporella*) can also form foliose plates. This often occurs in response to the threat of overgrowth by a competitor.

Vinelike forms include the flexible and/or jointed tufts of crisiid cyclostomes and various cheilostomes (e.g., *Nellia, Scrupocellaria, Canda, Margaretta,* etc.). Rigid "trees" are found among the Sertellidae and a few other ascophoran families. These projecting forms seem in general to be less numerous than encrusters in reef environments. Cuffey (1973) found tuftlike cheilostomes and cyclostomes to be sparsely scattered over reef biotopes at both Eniwetak and Bermuda, while sertellids occurred rarely in deeper reef habitats at Eniwetak and were absent from Bermuda reefs. In Jamaican cryptic environments vinelike colonies of *Halophila johnstoniae* and the loosely attached flexible fans of *Canda simplex* were the most common nonencrusting cheilostomes. Other branching species, e.g., *Synnotum aegypticum* and *Semihaswellia sinuosa* occurred rarely.

Sertellids seem less common on Caribbean than on Indo-Pacific reefs. However, on Galeta reef in Panama, one species, *Reteporellina evelinae,* was common under corals and occasionally growing out in the open in depths of 5–17 m. Galeta Reef had an abundance of cryptic vine and treelike forms, including *Margaretta buski* and *Arborella dichotoma,* as well as *Canda* and *Halophila,* on coral undersurfaces and overhanging ledges of steep walls. Colonies of *Caulibugula zanzibarensis* were not cryptic; the delicate colonies, up to 10 cm in height, grew upright on the open reef surface attached to coral heads. Bracket-shaped colonies of *Gemelliporidra multilamellosa* and ruffled platy colonies of *Steginoporella buski* were abundant under ledges in 10 m depth (Winston, unpublished data). The reason for the abundance of tree and platelike forms here is still unknown, but could relate to predation levels, or nutrient regime.

Runners, with colonies committed to a fugitive strategy (Buss, 1979; Jackson, 1979a), are represented on reefs by cyclostomes (e.g., *Stomatopora, Proboscina, Idmonea*) and by aeteid cheilostomes. In the Jamaican and Belizean sites studied they appear to be rare. They are often found on secondary bare space, e.g., bivalve shells and serpulid tubes, rather than directly on coral undersurfaces (Buss, 1979). They may also persist on undercoral surfaces dominated by calcareous algae, rather than by encrusting sponges or cheilostomes. On these surfaces their colonies are often buried, but for their peristomes, in the surrounding algal crust. Cuffey (1973) found that idmoneid cyclostomes were quite frequent on the leeward ocean shore environment at Eniwetak and less common elsewhere, while at Bermuda they were rare on the ledge flats and lagoonal patch reefs.

A final category consists of species whose strategy might be described as pseudosolitary (Winston, 1985). On reefs this includes lichenoporid and (at least some) pustuloporid cyclostomes. Their colonies (in the same size range as small tubeworms) are short-lived, reaching a finite adult size, with a single feeding current, and often a single brood chamber for the whole colony. *Lichenopora* and *Disporella* species are discoid; the basal wall of

TABLE 1
Genera with Greatest Number of Species Reported from Reefs[a]

Genus	No. species	More than 1 trop. area
Antropora	3	+
Canda	3	+
Caulibugula	3	+
Cribrilaria	3+	+
Labioporella	3 or 4	+
Scrupocellaria	7	+
Smittipora	4	+
Steginoporella	4	+
Thalamoporella	5	+
Calyptotheca	5	+ (not Carib.)
Celleporaria	14	+
Cleidochasma	5	+
Coleopora	5	+
Crepidacantha	4	+
Drepanophora	5	+
Exechonella	4	+
Gemelliporidra	4	− (only Carib.)
Hippoporella	4	+
Margaretta	5	+
Microporella	4	+
Mucropetraliella	5	+
Parasmittina	23–24	+
Reptadeonella	4+	+
Rhynchozoon	11–12	+
Schizomavella	3–4	+
Schizoporella	3	+
Smittina	3	+
Stylopoma	3	+
Tremogasterina	3	+
Triphyllozoon	4	− (not Carib.)
Watersipora	3+	+
Lichenopora	3–4	+

[a] Only named or clearly distinct species were counted for this table.

TABLE 2
Species Most Commonly Reported from Coral Substrata and/or Reefs

Species	No. citations	More than 1 trop. area
Cranosina coronata	4	+
Cribrilaria flabellifera	3	+
Cribrilaria radiata	9	+
Labioporella granulosa	3	− (Carib.)
Parellisina curvirostris	3	+
Parellisina latirostris	7	− (Carib.)
Reginella floridana	3	+
Smittipora levinseni	5	− (Carib.)
Steginoporella magnilabris	7	− (Carib.)
Synnotum aegyptiacum	3	+
Arthropoma cecilii	3	+
Celleporaria aperta	3	+
Celleporaria albirostris	8	− (Carib.)
Cleidochasma porcellanum	10	+
Crepidacantha longiseta	4	− (Carib.)
Crepidacantha poissonii	3	+
Drepanophora tuberculatum	3	− (Carib.)
Escharina pesanseris	6	+
Exechonella antillea	5	+
Hippopodina feegeensis	13	+
Microporella ciliata (?)	4	− (Carib.)
Parasmittina areolata	7 (incl. *spathulata*)	+
Parasmittina parsevalii	3	+
Parasmittina serrula	4	+
Rhynchozoon rostratum	4	+
Rhynchozoon verruculatum	4	− (Carib.)
Stylopoma duboisii	4	+
Stylopoma spongites	9	− (Carib.)
Stylopoma viride	5	+
Thalamoporella rozieri	3	+
Trematooecia aviculifera	5	− (Carib.)
Trematooecia turrita	10	+
Trypostega venusta	5	+

the colonies is attached to the coral with its circular outer margin often raised like a saucer to prevent overgrowth. *Pustulopora* colonies are erect. At Eniwetak, lichenoporid cyclostomes occurred only on lagoonal pinnacle reefs. In Bermuda they were quite common, especially on the ledge flats (Cuffey, 1973). In other Caribbean reefs they are commonly encountered on coral undersurfaces and rubble, though never in large numbers.

The records collected in the checklist show for which genera the largest number of species have been reported from reef environments. Table 1 lists all genera represented by at least three species. In terms of number of species *Parasmittina* (23 species), *Celleporaria* (14 species), and *Rhynchozoon* (11–12 species) are by far the most successful genera. None of these are limited to reef environments. In fact, they all contain species best characterized as opportunistic, or fouling, species noted from man-made substrata: ships, concrete pilings, and artificial reefs, as well as coral (see Soule and Soule, 1973, for habitats of *Parasmittina* species). In Jamaican studies, colonies of these genera were much more abundant on panels than in the natural undercoral community, although in terms of

numbers of species they are important on Jamaican reefs (Winston and Jackson, unpublished data). Unlike the species commonly thought of as foulers, members of these groups are not necessarily poorly calcified or ephemeral. *Celleporaria* species employ frontal budding to produce massive, multilayered colonies that discourage overgrowth.

Colonies of *Parasmittina, Drepanophora,* and *Rhynchozoon* species often undergo heavy secondary calcification, which, in addition to irritating taxonomists by greatly changing specimens' appearance, may enable such species to survive abrasion by grazers (e.g., urchins, damselfish, and mollusks) in shallow reef environments (Best and Winston, 1984; Winston and Jackson, 1984). Ristedt and Schumacher (1985) have recently described the success of one such species, *Rhynchozoon larreyi* in spatial competition with other sessile organisms in Red Sea coral communities. In this environment *R. larreyi* may be aided by the presence of a mutualistic hydroid, *Zanclea* sp., which offers the bryozoan protection from foulers and predators.

Scrupocellaria follows *Rhynchozoon* with seven species, while several genera, *Thalamoporella, Calyptotheca, Cleidochasma, Drepanophora, Margaretta,* and *Mucropetraliella* have five species. Of the 32 genera listed, only one, *Gemelliporidra* is limited to Caribbean reefs. Two other genera, *Calyptotheca* and *Triphyllozoon,* are not known from the Caribbean, although they, like the remaining genera in the table, occur in at least two tropical regions.

Table 2 shows the most commonly occurring species, based on this checklist—those reported in at least three sources. Because of the predominance of Caribbean sources, this list is biased toward Caribbean species, but it does give some idea of abundance. Of the species occurring in more than one area, *Hippopodina feegeensis* leads the list (13 citations). It is followed by *Cleidochasma porcellanum* (10), *Trematooecia turrita* (10), and *Cribrilaria radiata* (9).

The most commonly cited Caribbean species are *Stylopoma spongites* (9), *Celleporaria albirostris* (8), *Parellisina curvirostris* (7), *Steginoporella magnilabris* (7), *Trematooecia aviculifera* (5), and *Smittipora levinseni* (5). It should be noted that all but *Cleidochasma porcellanum* are species whose colonies may occupy large areas of undercoral surface.

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