American Museum Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK 24, N.Y.

NUMBER 2053 OCTOBER 12, 1961

Results of the Puritan-American Museum of Natural History Expedition to Western Mexico
13. Ascophoran Cheilostomata (Bryozoa) of the Gulf of California

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INTRODUCTION

The present paper is the second of three papers describing the littoral Bryozoa (Ectoprocta) of the Gulf of California that were collected by the Puritan-American Museum of Natural History Expedition to Western Mexico. It covers the cheilostomate Ascophora and records a total of 75 species, including four new species, that represent this suborder.

The format for each species follows that used in the first report on the cheilostomate Anasca (Soule, 1959): (1) the original citation and the eastern Pacific synonymy only; (2) a brief summary of the diagnostic features; (3) Gulf of California collection data; and (4) a brief summary of prior distribution within the Gulf of California and elsewhere.

The author is again pleased to acknowledge the help of the staff of the American Museum of Natural History, particularly Dr. William K. Emerson, leader of the expedition and Chairman of the Department of Living Invertebrates. I am especially indebted to the late Mr. Harry J. Bauer of Los Angeles, California, co-sponsor of the Expedition and owner of the schooner "Puritan." The drawings of the new species are the work of Mrs. Dorothy Fisher Soule. This study was supported, in part, by a Grant-In-Aid from the Society of the Sigma Xi.

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SYSTEMATIC ACCOUNTS

SUBORDER ASCOPHORA LEVINSEN, 1909

FAMILY HIPPOTHOIDAE LEVINSEN, 1909

GENUS *HIPPOTHOA* LAMOUROUX, 1821

Hippothoa hyalina (Linné), 1767

Cellepora hyalina LINNÉ, 1767, Systema naturae, ed. 12, vol. 1, pt. 2, p. 1286.

Schizoporella hyalina, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 445.

Schizoporella hyalina, ROBERTSON, 1900, Proc. Washington Acad. Sci., vol. 2, p. 326.

Schizoporella hyalina, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 289, 290, pl. 19, figs. 43–45.

Hippothoa hyalina, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 92–94, pl. 35, figs. 5–8.

Hippothoa hyalina var. *rugosa* CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 94, pl. 35, fig. 9.

Schizoporella hyalina, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, pp. 177, 178.

Hippothoa hyalina, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 101.

Hippothoa hyalina, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser. vol. 3, p. 100.

Hippothoa hyalina, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 720.

Hippothoa hyalina, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 277, pl. 30, figs. 1–5.

Hippothoa hyalina, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 106, 107.

Colonies encrusting, the younger ones exhibiting a glassy appearance that changes to a dull white with age. Non-reproductive zooecia tapered proximally, having a convex, rounded frontal that shows a variable degree of transverse wrinkling. Narrow peripheral fenestrae present. Aperture small, rounded distally, with a distinct sinus centered on the proximal border. A delicate, slightly raised apertural rim present. Reproductive zooecia reduced in size. Globular ovicells prominent, perforate.

OCCURRENCE: Station 168,[1] off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: A widely distributed cosmopolitan species that is well represented on the Pacific coast of North America. It is most abundant in the cooler waters. This is the first record of this species from the Gulf of California.

Hippothoa divaricata Lamouroux, 1821

Hippothoa divaricata LAMOUROUX, 1821, Exposition methodique des genres de l'ordre des polypiers, p. 82, pl. 80, figs. 15, 16.

[1] For details of station data, see Emerson (1958).

Hippothoa divaricata, HINCKS, 1880, A history of the British marine Polyzoa, pp. 288–290, pl. 1, fig. 2, pl. 44, figs. 1–4.

Hippothoa divaricata, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 296, 297, pl. 21, figs. 59, 60.

Hippothoa divaricata, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 180.

Hippothoa divaricata, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 101.

Hippothoa divaricata, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 99, 100, pl. 4, fig. 36.

Hippothoa divaricata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 278, pl. 30, fig. 6.

Colonies encrusting, uniserial, with occasional lateral branching. Zooecia glassy-appearing in the young colonies, becoming an opaque white in the older. Zooecia commonly joined by a stout, tubular, proximal structure of variable length. Expanded area of each zooecium ovoid, elongated, with a convex frontal that may be wrinkled transversely. Narrow peripheral fenestrae present. Immediately proximal to the aperture in the older zooecia is a distinct umbo. Aperture rounded distally, with a prominent proximal notch. A low apertural rim is readily seen on the young zooecia. Zooecial polymorphism is less obvious than in *H. hyalina.* Many of the ovicell-bearing zooecia are smaller than the non-reproductive zooecia. Ovicells spherical, with a single, centrally located, umbonated perforation.

OCCURRENCE: Station 081, harbor, Mazatlán, Sinaloa, Mexico, 3 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 140, Marquer Bay, Carmen Island, intertidal.

DISTRIBUTION: This is a widely distributed species. On the Pacific coast of North America it ranges from Alaska to Panama. It has also been reported from the Galapagos Islands (Osburn, 1950–1953, no. 2).

Hippothoa distans MacGillivray, 1869

Hippothoa distans MACGILLIVRAY, 1869, Trans. Proc. Roy. Soc. Victoria, vol. 9, pt. 2, p. 130.

Hippothoa distans, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 450.

Hippothoa flagellum, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 278, pl. 30, figs. 7, 8.

Colonies uniserial, inconspicuously encrusting shells of mollusks. Zooecia minute, glassy to chalk white. Proximal portions of zooecia elongated, narrow, annulated. The expanded polypide containing part of each zooecium is ovoid, tapering, with a convex carinate frontal that exhibits a variable degree of transverse wrinkling. No evidence found of peripheral fenestrae. Aperture small, rounded distally, and possessing a

small, distinct, proximal notch. In the young zooecia, each aperture is enclosed in a low, thin, apertural rim. As in *H. divaricata,* zooecial polymorphism is not pronounced. Some of the zooecia with ovicells are smaller than the regular non-reproductive zooecia. Ovicells raised, globular, many with a low, centrally placed umbo that may be perforated. A few ovicells show a tendency to be carinate.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: *Hippothoa distans* is a cosmopolitan species. There are numerous records of its occurrence in tropical and warm temperate waters.

Hippothoa expansa Dawson, 1859

Hippothoa expansa DAWSON, 1859, Geol. Surv. Canada, Rept. Prog., 1858, p. 256.
Hippothoa expansa, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 279, pl. 30, fig. 9.

Colonies encrusting, composed of crowded uniserial zooecia. Young zooecia glassy; older zooecia with additional calcification assuming a dull white appearance. Zooecia ovoid, with very short, broad, proximal protuberances. Sporadic lateral branching occurs. Convex frontal area marked by coarse, transverse wrinkles. On the older zooecia may be found an umbo, located immediately proximal to the aperture. Adherent basal portion of zooecia spreading laterally, forming shelf-like peripheral expansions. No evidence of fenestrae. Aperture rounded distally and exhibiting a distinct proximal notch. Zooecial polymorphism readily discernible, with small reproductive zooecia scattered among the larger non-reproductive zooecia. Ovicells globose, carinate to a limited degree, and perforated by nine or 10 minute pores.

OCCURRENCE: Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms.

DISTRIBUTION: Originally described from the Gulf of St. Lawrence off Quebec, Canada, this species is not uncommon in the waters of northern Atlantic coast. On the Pacific coast of North America, Osburn (1950–1953, no. 2) recorded it from Point Barrow, Alaska, to southern California. A check of the Hancock Gulf of California collections revealed two previously unrecorded localities, Hancock station 632-37 off Espíritu

Santo Island, 24 fathoms, and Hancock bottom sample 270, off Angel de la Guarda Island, 14 fathoms.

GENUS *TRYPOSTEGA* LEVINSEN, 1909

Trypostega venusta (Norman), 1864

Lepralia venusta NORMAN, 1864, Ann. Mag. Nat. Hist., ser. 3, vol. 13, pp. 84, 85, pl. 10, figs. 2, 3.

Trypostega venusta, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 14, 15.

Trypostega venusta, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 720.

Trypostega venusta, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 280, 281, pl. 30, fig. 10.

Colonies form glossy white to cream-colored encrustations on shells of mollusks. Zooecia distinct, hexagonal, with a slightly raised, perforate frontal (tremocyst). Older zooecia commonly possessing a raised subapertural umbo. Aperture small, rounded distally. Proximal region of aperture possessing a distinct notch immediately below a pair of small, distinct, sharply pointed, lateral denticles. Dwarf zooecia (zooeciules) occurring at distal ends of zooecia and above distal edge of ovicells. The distal location of the dwarf zooecia in relation to the ovicells indicates that the polymorphism exhibited here is not of the reproductive type as found in the genus *Hippothoa.* Marcus (1938) and Harmer (1957) link these dwarf zooecia with the vicarious avicularia. Ovicells low, rotund, perforate, occasionally umbonate.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 133, off Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 30–32 fathoms. Station 162, off Tiburón Island, 40 fathoms.

DISTRIBUTION: While this species is found in temperate waters, the majority of the records in the literature are from tropical regions. In the eastern Pacific, Hastings (1930) noted it from Panamanian waters; Canu and Bassler (1930) recorded it from the Galapagos Islands; and Osburn (1950–1953, no. 2) gives a distribution ranging from Santa Catalina Island off southern California southward to the Galapagos Islands.

FAMILY CYCLICOPORIDAE HINCKS, 1884

GENUS *CYCLICOPORA* HINCKS, 1884

Cyclicopora longipora (MacGillivray), 1883

Lepralia longipora MacGillivray, 1883, Trans. Proc. Roy. Soc. Victoria, vol. 19, p. 135, pl. 3, fig. 18.

Cyclicopora praelonga Hincks, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 14, pp. 279, 280, pl. 9, fig. 7.

Cyclicopora longipora, Osburn, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 285, 286, pl. 32, fig. 4.

Zoaria (colonies) encrusting, frequently rising into erect, branched, cylindrical extensions. Zooecia large, distinct, essentially rectangular in shape. Frontal (tremocyst) thin, finely porous, and covered by a shining chitinous cuticle. Aperture orbicular, large, closed by a fragile operculum. No cardelles. Apertural collar insignificant, thin, low. No avicularia. Ovicells prominent, hyperstomial, globular, and finely perforate.

Occurrence: Station 131, off Carmen Island, 41–45 fathoms. Station 145, off Coronados Island, 40–45 fathoms.

Distribution: Originally described from off southeastern Australia, this species has been recovered by Osburn (1950–1953, no. 2) in material from the Galapagos Islands, the San Benito Islands, Mexico, and in the Gulf of California from off Raza Island. It is a tropical to subtropical species.

FAMILY PETRALIELLIDAE HARMER, 1957

GENUS *HIPPOPETRALIELLA* STACH, 1936

Hippopetraliella magna (d'Orbigny), 1852

Semieschara magna d'Orbigny, 1852, Paléontologie Française, terrains crétacés, vol. 5, p. 367.

Petralia japonica, Osburn, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 290, pl. 31, fig. 5.

Colonies encrusting, some multilaminar, covering small areas on shells of mollusks. Zooecia large, rectangular, rounded distally. Frontal (tremocyst) marked by many large pores. Older zooecia showing frontal area roughened and zooecial outline obscured by secondary calcification. Aperture large, rounded distally, widened proximally. Lateral walls of aperture slightly inflected; proximal wall without denticles or lyrula. Avicularia small, alongside the aperture, laterally, one to each side, or occasionally singly. Ovicells bulbous, coarsely perforate, raised only to a minor degree above level of zooecia. For further discussion, see Waters (1905), Stach (1936), and Harmer (1957).

Occurrence: Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms.

DISTRIBUTION: This species, originally described from the tropical waters of the Malacca Strait off the Malay Peninsula, has since been recovered in numerous tropical areas and a few warm temperate regions. The present record is the first from the Gulf of California.

FAMILY HIPPOPODINIDAE LEVINSEN, 1909

GENUS *HIPPOPODINA* LEVINSEN, 1909

Hippopodina californica Osburn, 1952

Hippopodina californica OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 293, 294, pl. 31, fig. 9, pl. 32, figs. 1–3.

Colonies encrusting (the Gulf of California material) on shells of mollusks. Zooecia large, rectangular, passably uniform, distinct. Frontal (tremocyst) raised, coarsely perforate, covered by a chitinous cuticle. Aperture wide, rounded distally, with a broad proximal notch. Raised apertural rim on older zooecia. Lateral denticles (cardelles) prominent on removal of operculum. No avicularia. Ovicells globose, prominent, perforate.

OCCURRENCE: Station 103, off Isla Partida, 12–13 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: Osburn's (1950–1953, no. 2) type locality for this species is in the warm temperate waters off San Pedro, California. Many of the specimens in the Hancock collection are from southern California. Osburn reported two localities in the Gulf of California: Angel de la Guarda Island and San Pedro Nolasco Island. The material from the present investigation represents a southern extension of the known range of the species.

GENUS *CYCLOPERIELLA* CANU AND BASSLER, 1920

Cycloperiella rosacea Osburn, 1947

Cycloperiella rosacea OSBURN, 1947, *in* Allan Hancock Foundation publications of the University of Southern California, no. 5, pp. 31, 32, pl. 5, figs. 1–3.

Cycloperiella rosacea, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 297, pl. 32, figs. 5–8.

The red-purple colonies from the Gulf of California were found encrusting mollusk shells. Zooecia large, distinct, a delicate chitinous cuticle covering a raised, perforate frontal (tremocyst). Aperture rounded distally, gently curved proximally, with slightly inflexed lateral walls. Removal of the operculum discloses the presence of lateral denticles.

Low apertural rim may be thickened and accentuated by secondary calcification. The older zooecia frequently display a low subapertural umbo. Avicularia distributed sporadically, some colonies with none to be found. When present, the avicularia are located immediately proximal to the aperture, directed obliquely towards the midline. Ovicells raised, globose, perforate. They are comparatively rare in the Gulf material. Of more than 20 colonies examined, only three possessed ovicells.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 106, off Isla Partida, 6 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 136, lagoon, Puerto Escondido, Baja California, 1 fathom. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms.

DISTRIBUTION: This is a tropical species, which was originally described from the Caribbean (see Osburn, 1947).

FAMILY UMBONULIDAE CANU, 1904

GENUS *HIPPOPLEURIFERA* CANU AND BASSLER, 1927

Hippopleurifera mucronata (Smitt), 1873

Hippothoa mucronata SMITT, 1873, K. Svenska Vetensk. Akad. Handl., new ser., vol. 11, no. 4, pp. 45, 46, pl. 8, fig. 169.

Hippopleurifera mucronata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 301–303, pl. 35, figs. 7, 8, pl. 36, fig. 1.

Colonies encrusting, ranging in color from pale orange to dark maroon-red. Zooecia large, distinct, basically ovoid in distortion-free areas. Frontal a pleurocyst, exhibiting a double row of areolar pores. Many of the older zooecia having a well-developed subapertural umbo. Aperture rounded distally, with parallel lateral walls and a small, distinct, V-shaped, proximal notch. Apertural rim reduced, bearing six short, hollow spines arranged around distal curve of aperture of non-reproductive zooecia. Frontal avicularia large, possessing a red mandible directed proximally. Ovicells large, partially immersed, umbonate, and possessing a row of peripheral pores.

OCCURRENCE: Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 095, off Espíritu Santo Island, 5–9 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 119, off San Diego Island, 10–15 fathoms.

Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: This is a tropical species, previously reported from the Gulf of California by Osburn (1950–1953, no. 2). All the stations in the Gulf of California north of Espíritu Santo Island represent an extension of range.

FAMILY SCHIZOPORELLIDAE JULLIEN, 1903

GENUS *SCHIZOPORELLA* HINCKS, 1877

Schizoporella unicornis (Johnston), 1847

Lepralia unicornis JOHNSTON, 1847, A history of British zoophytes, ed. 2, vol. 1, pp. 320, 321, pl. 57, fig. 1.

Schizoporella unicornis, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 317, 318, pl. 37, figs. 1, 2.

The color range of the colonies encrusting mollusk shells is from a pale violet to a very light tan. Zooecia distinct, rectangular to hexagonal. Frontal (tremocyst) weakly raised, coarsely perforate, covered by a thin, chitinous cuticle. Aperture rounded distally, with a distinct rounded notch centered on proximal rim. Older zooecia with a low, subapertural umbo. Avicularia showing diversity in incidence and location. On some zooecia they are completely absent. Many zooecia have a single avicularium situated alongside the aperture, with its pointed mandible directed obliquely forward. In some specimens a zooecium displays two avicularia, one on each side of the aperture, directed forward. Ovicells, rare on the Gulf of California material, are prominent, globose, and perforate.

OCCURRENCE: Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 096, off Espíritu Santo Island, 10–24 fathoms. Station 107, off Isla Partida, 5–6 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 150, off San Marcos Island, 5–7 fathoms. Station 151, off San Marcos Island, 10–11 fathoms.

DISTRIBUTION: On the Pacific coast of North America this species is an inhabitant of warm temperate and tropical waters. It has been reported from temperate waters of the Atlantic and the tropical waters of the Caribbean and the southwest Pacific. There is no previous report from the Gulf of California.

Schizoporella trichotoma Waters, 1918

Schizoporella trichotoma WATERS, 1918, Jour. Linnean Soc. London, Zool., vol. 34, p. 19, pl. 2, figs. 1–4.

Schizopodrella trichotoma, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 720, 721, pl. 11, figs. 58, 59.

Schizoporella trichotoma, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 318, 319, pl. 37, fig. 3.

Colonies encrusting mollusk shells. Zooecia distinct, ovoid. Frontal (tremocyst) raised, possessing numerous stellate pores. Aperture rounded distally, with a well-defined, V-shaped, proximal notch. Apertural rim raised. No avicularia. Ovicells large, perforate, with radial ridges.

OCCURRENCE: Station 107, off Isla Partida, 5–6 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 145, off Coronados Island, 40–45 fathoms.

DISTRIBUTION: This is a tropical species, originally described from the Cape Verde Islands. In the eastern Pacific Hastings (1930) and Osburn (1950–1953, no. 2) recorded it from the Galapagos Islands. Osburn also noted two occurrences in the Gulf of California: at Raza Island and Angel de la Guarda Island. A third specimen from station 1738–49, Espíritu Santo Island, has been found in the Hancock collections.

Schizoporella inarmata (Hincks), 1884

Schizoporella linearis, Hassall, form *inarmata* HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 4, vol. 13, p. 212.

Schizoporella linearis Hassall, subsp. *inarmata,* ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, p. 291, pl. 20, fig. 48.

Schizoporella linearis Hassall var. *inarmata,* C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser. vol. 1, p. 178.

Schizopodrella linearis (Hassall) var. *inarmata,* C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 102.

Schizopodrella linearis (Hassall), 1841, var. *inarmata,* C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 104.

Schizoporella linearis var. *inarmata,* OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 319, 320, pl. 37, figs. 4, 5.

Schizoporella linearis inarmata, SOULE AND DUFF, 1957, Proc. California Acad. Sci., vol. 29, no. 4, pp. 110, 111.

Colonies forming cream-colored to tan encrustations on mollusk shells. Zooecia irregular, ovoid to rectangular, distinct, with a finely perforate frontal (tremocyst). Frontal covered by transparent chitinous cuticle. Aperture rounded above, with prominent, wide, U-shaped notch proximally. Older zooecia, with heavier calcification, possessing subapertural umbo. Apertural rim devoid of spines. No avicularia. Ovicells,

very rare on the Gulf of California material, large, partially immersed, globose, finely perforate.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: Originally described from the Queen Charlotte Islands, this species has since been reported from numerous localities in cool temperate, warm temperate, and tropical waters from British Columbia to Costa Rica. Osburn (1950–1953, no. 2) reported one locality in the Gulf of California: Raza Island (bottom sample 275, depth 40 fathoms).

Schizoporella cornuta (Gabb and Horn), 1862

Reptescharellina cornuta GABB AND HORN, 1862, Jour. Acad. Nat. Sci. Philadelphia, new ser., vol. 5, pt. 2, pp. 147, 148, pl. 20, fig. 31.

Schizoporella biaperta, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, pp. 445, 446.

Schizoporella biaperta, HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, pp. 57, 58, 211, 212.

(?) *Schizoporella biaperta,* ROBERTSON, 1900, Proc. Wassington Acad. Sci., vol. 2, p. 326.

Schizoporella biaperta, ROBERTSON, 1908, (*partim*), Univ. California Publ. Zool., vol. 4, no. 5, pp. 287, 288, pl. 19, fig. 41.

Stephanosella biaperta, CANU AND BASSLER, 1923, (*partim*), Bull. U. S. Natl. Mus., no. 125, pp. 99–101, pl. 16, figs. 4–8.

Schizoporella biaperta, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 177.

Stephanosella biaperta, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 102.

Stephanosella biaperta, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 104.

Stephanosella biaperta, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 721.

Schizopodrella (*Stephanosella*) *biaperta,* CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 16, 17, pl. 2, figs. 1, 2.

Schizoporella cornuta, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 320, 321, pl. 37, figs. 9–11.

Schizoporella cornuta, SOULE AND DUFF, 1957, Proc. California Acad. Sci., vol. 29, no. 4, pp. 109, 110.

Colonies encrusting rock and mollusk shells. Zooecia distinct, ovoid to rectangular. Frontal (tremocyst), raised, finely perforate, covered by a thin chitinous cuticle. Aperture rounded distally, with a conspicuous, V-shaped, proximal notch. Apertural rim (peristome) present. No umbo. Avicularia latero-apertural, with mandibles directed distally. Ovicells abundant on Gulf of California material, globose, partially immersed. Frontal portion circular, flattened, marked by distinctive radial grooves.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 093, San Lorenzo Reef, San Lorenzo Channel, 2 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 163, off Tiburón Island, 50 fathoms.

DISTRIBUTION: This is an abundant species in the eastern Pacific waters, ranging from Alaska to the Galapagos Islands.

Schizoporella dissimilis Osburn, 1952

Schizoporella dissimilis OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 321, 322, pl. 37, figs. 12, 13.

Colonies encrusting shells of mollusks. Zooecia ovoid, tapering, distinct. Frontal (tremocyst) finely perforate, covered by thin cuticle. Aperture rounded distally, with wide, U-shaped, proximal notch. Small avicularia distally directed, flanking aperture. Occasional small frontal avicularia oriented distally, proximally, or obliquely, depending on amount of distortion of colony in that area. Ovicells globular, immersed, with a flattened, semicircular, frontal area exhibiting radial striations.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms.

DISTRIBUTION: At the present time the known distribution of this species is confined to the Galapagos Islands and the Gulf of California. Osburn (1950–1953, no. 2) reported one locality in the Gulf of California at Pulpito Point, Baja California, which remains the northern record for the species. For the moment, this must be considered a tropical species.

GENUS *DAKARIA* JULLIEN, 1903

Dakaria ordinata (O'Donoghue and O'Donoghue), 1923

Schizoporella ordinata C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 180, pl. 3, fig. 25.

Dakaria ordinata, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 103.

Dakaria ordinata, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 107.

Dakaria ordinata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 327, 328, pl. 57, figs. 10, 11.

Colonies encrusting, or rising into elongated cylindrical expansions. Zooecia rectangular to hexagonal, with obscure boundaries. Frontal (tremocyst) coarsely perforate, covered by thin cuticle. Aperture rounded distally, with shallow, rounded, proximal notch. No avicularia. Ovicells spherical, somewhat immersed, perforate, with circular frontal area extending to apertural region.

OCCURRENCE: Station 119, off San Diego Island, 10–15 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms.

DISTRIBUTION: This species was originally described from the waters off British Columbia. The range was greatly extended by Osburn (1950–1953, no. 2) southward to the Tanner Bank off southern California. The present study extends the species into the Gulf of California. The Hancock collections reveal a previously unreported specimen from the Galapagos Islands (Hancock station 147–34, Albemarle Island, 30 fathoms).

Dakaria sertata Canu and Bassler, 1930

Dakaria sertata CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 17, 18, pl. 2, figs. 3–6.

Dakaria sertata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 329, pl. 57, figs. 12, 13.

Colonies encrusting. Zooecia distinct, rectangular, with swollen, finely perforate frontal (tremocyst). Aperture wide, rounded distally, with a shallow, proximal notch. Apertural rim thin, slightly raised. Proximal peristome with many small tubercles. No avicularia. Ovicells globose, partially embedded, perforate. No frontal striae.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms.

DISTRIBUTION: Although this species was originally described from the Galapagos Islands, the work of Marcus (1937) has extended its range to the waters of Santos Bay, Brazil. Osburn (1950–1953, no. 2) reported it from Southern California to the Galapagos, in the Gulf of California at

Isla Partida, Raza Island, and San Esteban Island. It is warm temperate to tropical in its known distribution.

GENUS *SCHIZOMAVELLA* CANU AND BASSLER, 1917

Schizomavella auriculata (Hassall), 1842

Lepralia auriculata HASSALL, 1842, Ann. Mag. Nat. Hist., vol. 9, p. 411.

Schizoporella auriculata, ROBERTSON, 1908, Univ. Calif. Publ. Zool., vol. 4, no. 5, p. 286, pl. 19, fig. 39.

Schizoporella auriculata, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, pp. 176, 177.

Schizomavella auriculata, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 104, 105.

Schizomavella auriculata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 331, pl. 38, figs. 1–5.

Colonies encrusting mollusk shells. Zooecia small, rectangular, with indistinct outlines. Frontal (tremocyst) raised, finely perforate, covered by a thin, chitinous cuticle. Aperture small, ovoid, wider than long, with a shallow proximal notch. Avicularia small, distally directed, located on centrally placed, low, subapertural umbo. Ovicells prominent, globular, perforate.

OCCURRENCE: Station 093, San Lorenzo Reef, San Lorenzo Channel, 2 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: This species has been recovered from temperate and tropical waters. The known geographical range in the waters of the eastern Pacific was from Oregon to Isla Partida in the Gulf of California (Osburn, 1950–1953, no. 2). A specimen from bottom sample 406, Galapagos Islands, in the Hancock collections, represents a substantial extension of the range to the south.

GENUS *ARTHROPOMA* LEVINSEN, 1909

Arthropoma circinata (MacGillivray), 1869

Lepralia circinata P. H. MACGILLIVRAY, 1869, Trans. Proc. Roy. Soc. Victoria, vol. 9, pt. 2, p. 134.

Arthropoma circinata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 334, 335, pl. 38, fig. 4.

Colonies encrusting mollusk shells. Zooecia distinct, ovoid to hexagonal, with some variation in size. Frontal convex, with two rows of peripheral pores around imperforate central area and covered by thin cuticle.

Aperture rounded distally, proximal border straight, provided with deep, V-shaped notch. Distal apertural rim bearing six short, hollow spines. No avicularia on Gulf of California material (two large and five small colonies). Semilunar subapertural umbo present. Reproductive zooecia possessing a globular, imperforate ovicell and having apertural spines reduced to four in number.

OCCURRENCE: Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms.

DISTRIBUTION: Originally described from Victoria, Australia, this species has since been reported from several localities in the western Pacific and Indian Ocean (Harmer, 1957). In the eastern Pacific the geographical range is from off southern California to Colombia. Osburn (1950–1953, no. 2) recorded it from Raza Island and San Esteban Island in the Gulf of California. It is a warm temperate to tropical species.

GENUS *ESCHARINA* MILNE-EDWARDS, 1836

Escharina vulgaris (Moll), 1803

Eschara vulgaris var. *a* MOLL, 1803, Eschara ex zoophytorum seu phytozoorum, p. 55, pl. 3, figs. 10a, 10b.

Schizolavella vulgaris, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 108, 109, fig. 16a-h, pl. 35, fig. 10.

Schizolavella vulgaris, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 335, pl. 38, fig. 13.

Colonies unilaminar, encrusting shells of mollusks. Zooecia distinct, ovoid. Frontal (tremocyst) convex, granulated, with single row of peripheral pores, covered by thin, chitinous cuticle. Aperture rounded distally, with straight proximal border having a U-shaped notch. Distal apertural rim bearing three short, hollow spines. Avicularia bilateral, flanking aperture, elongated slender mandible directed distally. Ovicells globose, imperforate. Reproductive zooecia devoid of apertural spines.

OCCURRENCE: Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station144, off Coronados Island, 13–16.5 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This species has been recovered from temperate and tropical waters of the Atlantic. In the eastern Pacific the only locality recorded up to the present time is the Gulf of California. Osburn (1950–1953, no. 2) had specimens from Angeles Bay, Baja California, near Angel de la Guarda Island, and San Francisco Island, a small island just south of San José Island, near Bahia de La Paz.

GENUS *STYLOPOMA* LEVINSEN, 1909

Stylopoma informata (Lonsdale), 1845

Cellepora informata LONSDALE, 1845, Quart. Jour. Geol. Soc. London, vol. 1, pp. 505, 506, text figs. a, b.

Stylopoma spongites, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 721.

Stylopoma informata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 336, 337, pl. 38, figs. 11, 12.

Colonies forming extensive unilaminar or multilaminar encrustations on shells of mollusks. Zooecia rectangular, with raised, finely perforate frontal (tremocyst), which with age attains a granular appearance. Thin chitinous cuticle covering frontal. Aperture ovoid, a little wider than long, rounded distally, with comparatively straight proximal border possessing a deep, slit-like notch. Avicularia small, variable in occurrence. Younger zooecia with one or two small avicularia flanking aperture, the mandible directed distally. Older zooecia having, in addition, one or two frontal avicularia with mandibles directed laterally or proximally. Ovicells immense, globular, completely encompassing the zooecial aperture.

OCCURRENCE: Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 095, off Espíritu Santo Island, 5–9 fathoms. Station 096, off Espíritu Santo Island, 10–24 fathoms. Station 107, off Isla Partida, 5–6 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 127, off Monserrate Island, 5 fathoms. Station 134, Salinas Bay, Carmen Island, 5–8 fathoms. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 147, off Pulpito Point, Baja California, 0.5–2 fathoms. Station 155, San Carlos Bay, Sonora, 1–2.5 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 172, Puerto Refugio, Angel de la Guarda Island, 16–18 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This tropical species was previously known in the eastern Pacific from the Galapagos Islands (Hastings, 1930; Osburn, 1950–1953, no. 2). However, the present study extends the geographical range into the Gulf of California and the bathymetric range to a depth of 40 fathoms.

GENUS *GEMELLIPORIDRA* CANU AND BASSLER, 1927

Gemelliporidra aculeata Canu and Bassler, 1928

Gemelliporidra aculeata CANU AND BASSLER, 1928, Proc. U. S. Natl. Mus., vol. 72, art. 14, p. 102, text figs. 17f, 17g, pl. 9, fig. 5.

Zoaria encrusting mollusk shells and other bryozoans. Medium-sized zooecia, glossy, irregularly arranged, moderately distinct. Zooecial outline irregularly elongate, elliptical. Frontal (tremocyst) raised and perforated by many small pores. Aperture spherical, rounded distally, with a pair of small, lateroproximal cardelles that set off a shallow, proximal indentation. Apertural collar low and thickened. Operculum with peripheral muscle attachments. Interzooecial avicularia large, sparsely distributed over the zoaria. Each with elongated, narrow, proximally directed mandible. Ovicells globose, perforate, partially embedded.

OCCURRENCE: Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: Originally described from off of Miami, Florida (Canu and Bassler, 1928), and later found in the waters off Puerto Rico (Osburn, 1940), this species must be considered tropical. This record from the Gulf of California is the first report of its presence in eastern Pacific waters.

GENUS *HIPPODIPLOSIA* CANU, 1916

Hippodiplosia insculpta (Hincks), 1882

Schizoporella insculpta HINCKS, 1882, Ann. Mag. Nat. Hist., ser. 5, vol. 10, pp. 251, 252.

Schizoporella insculpta, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 447, pl. 17, figs. 5, 5a.

Schizoporella insculpta, ROBERTSON, 1900, Proc. Washington Acad. Sci., vol. 2, p. 326.

Schizoporella insculpta, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 290, 291, pl. 20, figs. 46, 47.

Schizoporella insculpta, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, pp. 178, 179.

Schizoporella insculpta, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 102.

Schizoporella insculpta, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 103.

Hippodiplosia insculpta, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 341, 342, pl. 40, figs. 1, 2.

Hippodiplosia insculpta, SOULE AND DUFF, 1957, Proc. California Acad. Sci., vol. 29, no. 4, pp. 111, 112.

Colonies encrusting mollusk shells and the stripes of algae. Zooecia distinct, rectangular. Frontal (tremocyst) raised, perforate, covered by a

transparent, chitinous cuticle. Aperture circular, with a pair of lateral denticles. Subapertural umbo present, with a concave distal surface. No avicularia. Ovicells prominent, globular, imperforate, with weak radial striations.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 129, off Monserrate Island, 3 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 150, off San Marcos Island, 5–7 fathoms. Station 151, off San Marcos Island, 10–11 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: In the eastern Pacific, this species ranges from the cool temperate waters of Oregon to the tropical waters of Costa Rica. Osburn (1950–1953, no. 2) recorded one locality in the Gulf of California: an Albatross station off Ceralvo Island.

FAMILY HIPPOPORINIDAE OSBURN, 1952

GENUS *CLEIDOCHASMA* HARMER, 1957

Cleidochasma porcellana (Busk), 1860

Lepralia porcellana BUSK, 1860, Quart. Jour. Micros. Sci., vol. 8, pp. 283, 284, pl. 31, fig. 3.

Lepralia cleidostoma, HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, p. 212.

Hippoporina porcellana, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 721, 722.

Hippoporina cleidostoma, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 18, 19.

Hippoporina porcellana, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 344, 345, pl. 41, figs. 1–3.

Colonies forming unilaminar or multilaminar encrustations on mollusk shells. In young colonies, and on the periphery of older ones, zooecia distinct, ovoid, or hexagonal. In older areas and in many multilaminar colonies, zooecia irregular and indistinct. Frontal (olocyst) moderately granular, with four, five, six, or seven small, widely spaced, peripheral pores. Aperture elongate, keyhole shaped, rounded distally, lateral walls constricted near proximal rim by denticles. Avicularia small, subapertural, directed laterally, often absent. Ovicells spherical, partially embedded, imperforate. The very young zooecia at the outer edge of a colony possess three slender, elongated spines arising from the distal apertural rim.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 096, off Espíritu Santo Island, 10–24 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, intertidal. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms.

DISTRIBUTION: The geographical range for this species in eastern Pacific waters is from the Queen Charlotte Islands to Peru, in temperate and tropical areas. This record is the first for the Gulf of California.

Cleidochasma contracta (Waters), 1899

Lepralia contracta WATERS, 1899, Jour. Roy. Micros. Soc. London, p. 11, pl. 3, figs. 4–6.

Perigastrella contracta, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 722, pl. 11, fig. 60.

Hippoporina contracta, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 346, 347, pl. 41, figs. 4, 5.

Colonies extensive, encrusting the shells of mollusks. Zooecia ovoid or hexagonal, zooecial outlines well defined only in youngest portions of colony. Frontal (olocyst) granular, imperforate except for 10 to 12 moderately large, peripheral pores. Aperture elongated, keyhole shaped, rounded distally, with lateral denticles and a narrowed, rounded, proximal portion. On protected portions of a colony, many of the zooecia possessing four to six elongated, slender spines arising from distal wall of aperture. Avicularia variable in morphology: some small, with ovate, blunt mandibles, others large, with elongated mandibles, frequently flanking apertural region. Ovicells globular, with a thin, poorly mineralized, elliptical frontal.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 134, Salinas Bay, Carmen Island, 5–8 fath-

oms. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 147, off Pulpito Point, 0.5–2 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: In the eastern Pacific this species is known only from tropical waters. This record is the first for the Gulf of California.

GENUS *HIPPOPORELLA* CANU, 1917

Hippoporella gorgonensis Hastings, 1930

Hippoporella gorgonensis HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 723, 724, pl. 12, figs. 62–72, pl. 17, figs. 119, 121.

Hippoporella gorgonensis, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 348, 349, pl. 45, figs. 10–12.

Hippoporella gorgonensis, SOULE AND DUFF, 1957, Proc. California Acad. Sci., vol. 29, no. 4, pp. 112, 113.

Colonies encrusting mollusk shells. Young zooecia distinct, ovoid, the zooecial margins becoming obscured with additional calcification. Frontal (pleurocyst) smooth in young zooecia, provided with 10 to 12 small, marginal pores. Aperture "lepralioid," narrowest distally, gradually widening proximally to area of a pair of small lateral denticles. Older zooecia with prominent subapertural three-pronged umbos. Avicularia variable, apertural and frontal. Ovicell small, globular, imperforate, in some specimens with a small umbo.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 103, off Isla Partida, 12–13 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 140, Marquer Bay, Carmen Island, intertidal. Station 147, off Pulpito Point, Baja California, 0.5–2 fathoms. Station 150, off San Marcos Island, 5–7 fathoms. Station 151, off San Marcos Island, 10–11 fathoms. Station 159, off Tiburón Island, 10 fathoms.

DISTRIBUTION: This species was originally described by Hastings (1930) from Colombia, Panama, and the Galapagos. Osburn (1950–1953, no. 2) extended the distribution to the warm temperate waters off southern California. There is one previous report (Osburn, 1950–1953, no. 2) from the Gulf of California (Angel de la Guarda Island).

GENUS *AIMULOSIA* JULLIEN, 1888

Aimulosia uvulifera (Osburn, 1914)

Lepralia uvulifera OSBURN, 1914, Papers Tortugas Lab., Carnegie Inst. Washing-

ton, vol. 5, p. 210, figs. 19, 20.

Aimulosia uvulifera, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 352, 353, pl. 45, figs. 16, 17.

Colonies forming modest encrustations on shells of mollusks. Zooecia small, distinct in younger areas of colonies. Frontal (pleurocyst) raised, smooth, with a series of eight to 12 small, marginal pores. Aperture rounded at both distal and proximal borders, with relatively straight lateral walls and a pair of small lateral denticles. On distal apertural rim of young zooecia, six elongated spines. Flanking proximal quarter of aperture on many zooecia, a pair of slender, erect processes. Majority of zooecia possessing a subapertural umbo that may be tall, trifid or short, rudimentary. On some zooecia a small, oral avicularium, directed distally, may replace one or both of the smaller erect processes. In some specimens a frontal avicularium directed obliquely or proximally arising from base of large umbo. Ovicells globose, imperforate, frequently provided with a distinct papillate umbo.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 095, off Espíritu Santo Island, 5–9 fathoms. Station 107, off Isla Partida, 5–6 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 151, off San Marcos Island, 10–11 fathoms.

DISTRIBUTION: Originally described from the Tortugas Islands, Florida, by Osburn (1914), this species was subsequently found in Puerto Rico and other areas of the Caribbean. In the eastern Pacific, Osburn (1950–1953, no. 2) reported it from the Galapagos and the tropical waters off Costa Rica and southern Mexico. The present record is the first time this species has been recovered from the Gulf of California, where it was found only as far north as San Marcos Island. It is a tropical species.

Aimulosia palliolata (Canu and Bassler), 1928

Lepralia palliolata CANU AND BASSLER, 1928, Proc. U. S. Natl. Mus., vol. 72, art. 14, pp. 109, 110, fig. 20d, pl. 12, fig. 11.

Aimulosia palliolata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 353, 354, pl. 42, figs. 9–11.

Colonies encrusting shells of mollusks. Zooecia small, distinct in young areas of colonies, outlines obscured by additional mineralization in the older. Frontal (pleurocyst) raised, granular, possessing small marginal pores. Aperture bell-shaped, rounded distally, becoming widest in proximal area. Small lateral denticles present. Distal apertural rim bearing six short, hollow spines. Subapertural umbo thin, raised, curving, wall-like. Avicularia scarce on Gulf of California material, subapertural, partially enclosed by flattened, flaring umbo. Ovicells prominent, globose, imperforate, smooth.

OCCURRENCE: Station 081, harbor, Mazatlán, Sinaloa, Mexico, 3 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms.

DISTRIBUTION: This is apparently a rather rare tropical species that was originally described from the Straits of Florida by Canu and Bassler (1928). Osburn (1950–1953, no. 2) recovered it from the Gulf of California at Angel de la Guarda Island and in the Galapagos from Wenman Island.

GENUS *HIPPOMONAVELLA* BASSLER, 1934

Hippomonavella longirostrata (Hincks), 1882

Schizoporella longirostrata HINCKS, 1882, Ann. Mag. Nat. Hist., ser. 5, vol. 10, p. 251.

Schizoporella longirostrata, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 447, pl. 17, fig. 4.

Schizoporella longirostrata, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 291, 292, pl. 20, fig. 49.

Schizoporella longirostrata, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 178.

Schizomavella longirostrata, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 109, 110, pl. 35, fig. 11.

Schizomavella longirostrata, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, pp. 102, 103.

Schizomavella longirostrata, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 105, 106.

Hippomonavella longirostrata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 365, 366, pl. 43, figs. 1–3.

Colonies encrusting, fragmentary. Zooecia rectangular, possessing raised, roughened, imperforate frontal (pleurocyst). Each zooecium with from 15 to 20 small marginal pores. Aperture rounded distally, with moderately straight, slightly flaring, lateral walls and very shallow, rounded

notch. Lateral denticles small. Owing to the fragmentary nature of our specimens, the colonies show no young zooecia with apertural spines. Avicularia large, located laterally, immediately proximal to the aperture, the long, pointed mandible directed proximally. Ovicells large, globular, perforate.

OCCURRENCE: Station 162, off Tiburón Island, 40 fathoms.

DISTRIBUTION: This species is known to range from the Queen Charlotte Islands southward to Cedros Island and the northern part of the Gulf of California.

GENUS *STEPHANOSELLA* CANU AND BASSLER, 1917

Stephanosella vitrea Osburn, 1952

Stephanosella vitrea OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 369, 370, pl. 42, figs. 6–8.

Colonies forming single or multilaminar encrustations on mollusk shells. Zooecia rectangular to polyhedral, distinct only in younger portions of colony. Frontal (olocyst) raised, with 10 to 15 moderately large, marginal pores and numerous scattered, smaller perforations. In younger zooecia frontal smooth, glassy, becoming roughened with additional mineralization. Aperture rounded distally, with distinct notch on midline of proximal border. One or two apertural avicularia, directed distally, and a large frontal avicularium, with the mandible directed laterally or proximally oblique. Ovicell globose, partially immersed, with a circular, radially striated area covering most of top surface.

OCCURRENCE: Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 134, Salinas Bay, Carmen Island, 5–8 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This is a warm temperate to tropical species, known from Southern California to the Galapagos Islands. Osburn (1950–1953, no. 2) recorded a specimen of this species from Isla Partida in the Gulf of California.

FAMILY MICROPORELLIDAE HINCKS, 1879

GENUS *MICROPORELLA* HINCKS, 1877

Microporella ciliata (Pallas), 1766

Eschara ciliata PALLAS, 1766, Elenchus zoophytorum, p. 38.

Microporella ciliata, HINCKS, 1880, A history of the British marine Polyzoa, pp. 206–210, pl. 28, figs. 1–8.

Microporella ciliata, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 443.

Microporella ciliata, C. H. AND E. O' DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 173.

Microporella ciliata, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 119, 120, pl. 20, figs. 1–6, pl. 36, figs. 4, 5.

Microporella ciliata, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 103.

Microporella ciliata, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 110, 111.

Microporella ciliata, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 727.

Microporella ciliata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 377, pl. 44, fig. 1.

Microporella ciliata, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 114–116.

Colonies encrusting, cream to white in color. Zooecia rectangular to ovoid, distinct. Frontal (tremocyst) raised, finely perforate, with 10 to 12 larger marginal pores. Secondary mineralization roughening frontal surface. Aperture rounded distally, with relatively straight proximal border. Distal rim low, bearing four to seven erect, slender, hollow spines. Lunate ascopore on midline, proximally removed a short distance from aperture. Avicularia prominent, single or paired, laterally placed, directed obliquely outward. Their mandibles elongate, slender, sharply pointed. Ovicells globular, perforate, may be roughened by secondary mineralization.

OCCURRENCE: Station 076, north side, Olas Atlas Bay, Mazatlán, Sinaloa, Mexico, intertidal. Station 078, north side, Olas Altas Bay, Mazatlán, Sinaloa, Mexico, intertidal. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 103, off Isla Partida, 12–13 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 158, off Tiburón Island, 1–3 fathoms. Station 161, off Tiburón Island, 30–32 fathoms.

DISTRIBUTION: On the Pacific coast of North America, *Microporella ciliata* is found from the cool temperate waters off Oregon to the tropical waters off Panama and the Galapagos Islands.

Microporella californica (Busk), 1856

Lepralia californica BUSK, 1856, Quart. Jour. Micros. Sci., vol. 4, p. 310, pl. 11, figs. 6, 7.

Lepralia californica, HINCKS, 1880, A history of the British marine Polyzoa, p. 209.

Microporella ciliata form *californica,* HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 444, pl. 17, fig. 3.

Microporella californica, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian

Biol., new ser., vol. 1, p. 174.

Microporella californica, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 123, 124, pl. 36, figs. 8–10.

Microporella californica, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 103.

Microporella californica, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 111.

Microporella ciliata var. *coronata,* MARCUS, 1939, Bol. Fac. Fil. Cien. Letras, vol. 13, Zool. no. 3, pp. 146, 147, pl. 10, fig. 17.

Microporella californica, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 381, 382, pl. 44, fig. 2.

Microporella californica, SOULE AND DUFF, 1957, Proc. California Acad. Sci., vol. 29, no. 4, p. 116.

Colonies encrusting shells of mollusks. Zooecia ovoid, primarily distinct. Frontal (tremocyst) raised, perforate. On midline, proximal to aperture, a prominent umbo. Aperture rounded distally, with straight proximal border. From distal apertural rim arise four to six strong, elongate, hollow spines. Ascopore lunate, located between aperture and umbo. Avicularia paired, rarely single, flanking ascopore, with long, triangular mandibles directed obliquely forward. Ovicell globular, perforate.

OCCURRENCE: Station 147, off Pulpito Point, Baja California, 0.5–2 fathoms. Station 154, San Carlos Bay, Sonora, Mexico, intertidal.

DISTRIBUTION: In eastern Pacific waters, this species has been recorded from British Columbia to the Galapagos Islands, represented in cool temperate, warm temperate, and tropical waters. Osburn (1950–1953, no. 2) reported its occurrence from San Esteban Island in the Gulf of California. A second specimen has been found in the Hancock collections from Bahia Carrizal, Guaymas, Sonora, Mexico, collected by E. Yale Dawson.

Microporella marsupiata (Busk), 1860

Lepralia marsupiata BUSK, 1860, Quart. Jour. Micros. Sci., vol. 8, p. 284, pl. 31, fig. 4.

Microporella marsupiata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 382, 383, pl. 44, fig. 6.

Colonies encrusting mollusk shells. Zooecia ovoid, distinct. Frontal (tremocyst) raised, perforate, provided with bow-shaped umbo. Aperture rounded distally, with straight, proximal border. Distal apertural wall bearing five or six stout, hollow spines, which have, on some colonies, a dark brown or black basal band. Ascopore lunate, surrounded by curvature of umbo. Avicularia single or paired, located beside ascopore, laterally, with setose mandibles directed obliquely forward. Ovicells globose, finely perforate.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms.

Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 129, off Monserrate Island, 3 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms.

DISTRIBUTION: Essentially an inhabitant of tropical waters, this species has not been recorded previously from the Gulf of California. Coronados Island is the northernmost limit of its known geographical range.

Microporella pontifica Osburn, 1952

Microporella pontifica OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 383, 384, pl. 44, fig. 5.

Colonies encrusting mollusk shells. Zooecia ovoid, polyhedral, distinct. Frontal (tremocyst) smooth, finely perforate, younger specimens showing series of larger marginal pores. Aperture rounded distally and with a straight proximal border. On non-reproductive zooecia, the distal apertural wall exhibiting four to six short, hollow spines. Ascopore small, lunate. Avicularia single, located laterally, proximal to ascopore, with elongated, lanceolate mandible directed obliquely. Ovicells globose, perforate, fused to raised apertural wall, which embraces the ascopore, and may form a delicate bridge across ovicell opening and apertural field.

OCCURRENCE: Station 120, off San Diego Island, 25–40 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms.

DISTRIBUTION: This is a tropical species that was previously recorded in the Gulf of California by Osburn (1950–1953, no. 2) from San Francisco Island and Agua Verde Bay, Baja California. Coronados Island, stations 144 and 145 are, so far, the northern record of this species.

Microporella gibbosula Canu and Bassler, 1930

Microporella gibbosula CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 20, 21, fig. 4b, pl. 3, figs. 1, 2.

Microporella gibbosula, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 386, pl. 44, fig. 9.

Colonies encrusting rock and mollusk shells. Zooecia ovoid to hexagonal, distinct. Frontal (tremocyst) raised, finely perforate. Aperture small, rounded distally, with straight proximal border. Arising from distal apertural wall are from five to seven short, hollow spines. Ascopore small, lunate. Avicularia small, lateral, located proximal to ascopore, the setose mandible directed laterally. Ovicells globose, prominent, perforate.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 127, off Monserrate Island, 5 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 164, off San Esteban Island, 3.25 fathoms.

DISTRIBUTION: This species was originally described from the Galapagos Islands. Its geographical range was extended by Osburn (1950–1953, no. 2) as far north as Agua Verde Bay in the Gulf of California (Hancock bottom sample 298). The material in the present study represents a still further geographical extension, northward to Tiburón Island in the Gulf of California.

Microporella coronata (Audouin), 1826

Flustra coronata AUDOUIN, 1826, *in* Savigny, Description de l'Egypte, histoire naturelle, vol. 1, pt. 4, p. 239, pl. 9, fig. 6.

Flustra umbracula AUDOUIN, 1826, *in* Savigny, Description de l'Egypte, histoire naturelle, vol. 1, pt. 4, p. 239, pl. 9, fig. 7.

Microporella ciliata var. *coronata,* HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 727, 728.

Microporella coronata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 386, 387, pl. 45, fig. 1.

Colonies encrusting mollusk shells. Zooecia ovoid, distinct. Frontal (tremocyst) raised, perforate, provided with a low umbo on midline below aperture. Aperture rounded distally, with straight proximal border. Distal apertural wall bearing four to six short, hollow spines. Ascopore lunate. Avicularia usually paired, flanking ascopore, their distally directed, thin, spear-shaped mandibles terminating in a hooked tip. Ovicells globose, perforate, with a narrow, lip-like projection extending over apertural area.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 127, off Monserrate Island, 5 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms.

DISTRIBUTION: Originally described from the Red Sea, *Microporella coronata* has a wide distribution in tropical waters. In the eastern Pacific it has been reported from Panama (Hastings, 1930) and the Gulf of California (Osburn, 1950–1953, no. 2).

Microporella cribrosa Osburn, 1952

Microporella cribrosa OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 380, 381, pl. 44, fig. 3.

Microporella californa, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 281, 282, pl. 18, figs. 32–34.

Colonies encrusting mollusk shells and algae. Zooecia ovoid, with indistinct outlines, except in youngest areas of colony. Frontal (tremocyst) raised, perforate, roughened, with distinct low umbo on midline below aperture. Aperture rounded distally, with a straight proximal border. The distal apertural rim may show from four to six sturdy, hollow, erect spines that are capable of becoming long in areas of the colony protected from erosion. Large ascopore located on midline between aperture and umbo protected by perforated "sieve-plate." Avicularia single or paired, flanking ascopore, their thin, pointed mandibles directed obliquely forward. Ovicells globose, perforate, capped by a distinct umbo.

OCCURRENCE: Station 160, off Tiburón Island, 20–22 fathoms.

DISTRIBUTION: The collection by the "Puritan" is the first recovery of this species from the Gulf of California. Previously, its known geographical range was from northern California southward to Guadalupe Island off the central part of Baja California.

GENUS *FENESTRULINA* JULLIEN, 1888

Fenestrulina malusi (Audouin), 1826

Cellepora malusii AUDOUIN, 1826, *in* Savigny, Description de l'Egypte, histoire naturelle, vol. 1, pt. 4, p. 239, pl. 8, fig. 8.

Cellepora californiensis GABB AND HORN, 1862, Jour. Acad. Nat. Sci. Philadelphia, new ser., vol. 5, pt. 2, p. 130, pl. 19, fig. 12.

Microporella Malusii, HINCKS, 1883, Ann. Mag. Nat. Hist., ser. 5, vol. 11, p. 444.

Microporella Malusii, HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, p. 57.

Microporella malusi, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 282, 283, pl. 18, figs. 35, 36.

Microporella malusii, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 174.

Fenestrulina malusi, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 115–117, fig. 19a-j, pl. 36, figs. 2, 3.

Fenestrulina malusii var. *umbonata,* C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 103.

Fenestrulina malusii, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 109.

Fenestrulina malusii var. *umbonata* C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 109, 110, pl. 5, fig. 45.

Fenestrulina malusi, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 387, 388, pl. 45, fig. 3.

Colonies encrusting shells of mollusks. Zooecia ovoid, hexagonal, distinct. Frontal (tremocyst) raised, smooth, pierced by numerous stellate pores. Aperture large, semicircular, distal border rounded, proximal border straight. Distal apertural rim bearing four to six short, hollow

spines, best seen on young zooecia. No avicularia. Ascopore moved proximally to a more central location, so that two, three, and in some specimens four rows of tremopores occur between it and the aperture. The umbo distinguishing the variety *umbonata* of O'Donoghue is a characteristic of dubious value. It occurs on some zooecia and not on others of the same colony. Ovicells globose, imperforate except for a single row of marginal pores.

OCCURRENCE: Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 161, off Tiburón Island, 30–32 fathoms.

DISTRIBUTION: *Fenestrulina malusi* is of world-wide geographical distribution in temperate and tropical waters. In the eastern Pacific, it occurs from Oregon southward to the Galapagos Islands. One point in Osburn's (1950–1953, no. 2) statement of the geographical distribution must be corrected. He says (p. 388), "At intermediate points it was found at Clarion Island, west of Mexico and at several stations within the Gulf of Mexico." I am certain that he meant to write "the Gulf of California." A check of Osburn's records shows that he found *F. malusi* at Angel de la Guarda Island (bottom samples 268, 270, 271), at Tepoca Bay, Sonora, Mexico (1078–40), and at Gonzaga Bay, Baja California (1064–40).

FAMILY SMITTINIDAE LEVINSEN, 1909

GENUS *PORELLA* GRAY, 1848

Porella porifera (Hincks), 1884

Porella marsupium form *porifera* HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, pp. 50, 51, pl. 4, fig. 4.

Porella marsupium var. *porifera,* C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, pp. 182, 183.

Smittina porifera, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 147, pl. 38, fig. 9.

Cystisella aviculifera CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 152, pl. 38, fig. 8.

Smittina marsupium var. *porifera,* C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, p. 115.

Porella porifera, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 395, 396, pl. 46, figs. 9–11.

Porella porifera, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, p. 119.

Colonies encrusting. Zooecia distinct in most recently developed areas of colony, variable in shape from ovoid to rectangular. Frontal (pleurocyst) raised, smooth, imperforate except for a series of small marginal pores. Aperture rounded distally, with weakly curved proximal border. On young, non-reproductive zooecia, distal apertural rim bearing four

thin, elongate, hollow spines. Suboral avicularium chamber on each zooecium extending laterally, frequently exhibiting six prominent pores. Bluntly triangular mandible of suboral avicularia directed distally. Additional avicularia variable in location, in some cases wanting over large areas of colony. There is some difference of opinion as to the location of these avicularia. Osburn (1950–1953, no. 2) states that they are found "near the proximal end of the frontal." Canu and Bassler (1923) refer to them as "distal orbicular avicularia." An examination of the material from the Gulf of California shows all three authors to be correct. Some zooecia possess avicularia in the proximal portion of the frontal, as illustrated by Osburn (1950–1953, no. 2, pl. 46, fig. 9). Other zooecia of the same colony have two or three apertural avicularia around the distal rim of the aperture as described and illustrated (1923, pl. 38, fig. 8) by Canu and Bassler and by Osburn (1950–1953, no. 2, pl. 46, fig. 11). Ovicells globose, imperforate.

OCCURRENCE: Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 147, off Pulpito Point, Baja California, 0.5–2 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms.

DISTRIBUTION: This species is found in temperate and tropical waters. In the eastern Pacific its geographical range is from Oregon to Costa Rica. It has not been previously reported from the Gulf of California.

Porella rogickae, new species

Figure 1

DIAGNOSIS: Zoaria encrusting, figure unilaminar. Zooecia distinct, small, ovoid. Frontal (pleurocyst) slightly inflated, imperforate, with the exception of six to eight marginal pores (areolae). Median umbo low, with a small oral avicularium and an avicularium chamber with four marginal pores. Primary aperture with low lyrula. Apertural collar thin, well developed. Ovicells hyperstomial, imperforate, with distinct, ovoid, depressed, frontal area.

DESCRIPTION: Zoaria (colonies) hyaline, forming extensive unilaminar encrustations on mollusk shells. Zooecia distinct, quincuncially arranged. Small ovoid zooecia measuring from 380 to 410 microns in length and from 265 to 285 microns in width. Young zooecia bearing two elongated, slender, hollow oral spines on laterodistal rim of aperture. Frontal (pleurocyst) slightly inflated, imperforate, smooth except for six to eight moderately large, marginal pores (areolae). Immediately below apertural open-

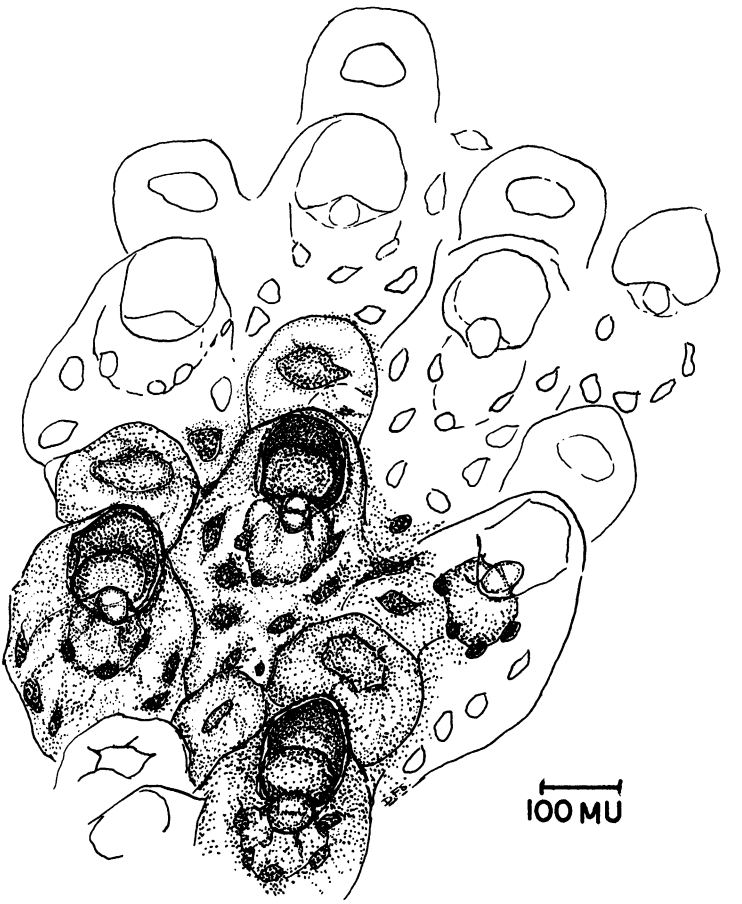

FIG. 1. *Porella rogickae,* new species.

ing, a low umbo capped by prominent avicularium chamber with small, proximally directed, oral avicularium. Each avicularium chamber exhibiting four marginal pores. No frontal avicularia. Primary aperture, deeply immersed, rounded distally and having on its proximal border a low median lyrula. Lateral cardelles poorly developed. Apertural collar tall, thin, particularly well formed on lateral aspects of aperture. Ovicells globose, hyperstomial, imperforate, each exhibiting on its frontal surface a distinct, depressed, ovoid area. Incineration shows this frontal area to be calcified and devoid of pores.

Porella rogickae in morphological features is close to *Porella columbiana*

O'Donoghue and O'Donoghue, 1923. *Porella columbiana* has smooth, unmarred, globose ovicells, and its avicularium chambers show three poorly defined, marginal pores.

In recognition of her many excellent contributions to our knowledge of the bryozoans, this species is dedicated to Dr. Mary D. Rogick.

HOLOTYPE: Allan Hancock Foundation number 141, Allan Hancock Foundation, University of Southern California, Los Angeles, California.

PARATYPE: In the American Museum of Natural History.

TYPE LOCALITY: Puritan-American Museum of Natural History Expedition, station 161, off Red Bluff, south side of Tiburón Island, latitude 28° 45′ 30″ N., longitude 112° 24′ 00″ W., 30–32 fathoms, coarse sand, "Puritan" dredge, May 18, 1957.

OCCURRENCE: Station 88, Los Frailes Bay, Baja California, 7–9 fathoms. Station 89, Los Frailes Bay, Baja California, 20–40 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

GENUS *SMITTINA* NORMAN, 1903

Smittina landsborovi (Johnston), 1847

Lepralia Landsborovii JOHNSTON, 1847, A history of the British zoophytes, ed. 2, p. 310, pl. 54, fig. 9.

Smittia landsborovi, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, p. 305, pl. 23, fig. 74.

Smittia landsborovii, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, pp. 184, 185.

Smittina landsborovii, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 104.

Smittina landsborovii, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 112, 113.

Smittina landsborovi, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 400, 401, pl. 47, figs. 1, 2.

Smittina landsborovi, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 119, 120.

Colonies encrusting mollusk shells. Zooecia large, ovoid to rectangular. Frontal (tremocyst) swollen, coarsely porous, devoid of an umbo. Aperture large, rounded distally, with broad, median tooth projecting from midline. Apertural collar high, delicate, merging on midline with base of suboral avicularium. Suboral avicularia small and possessing short, blunt mandibles directed proximally. Ovicells globular, perforate, and may be partially obscured by secondary mineralization.

OCCURRENCE: Station 114, Amortajada Bay, San José Island, 22–25

fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 138, off Puerto Escondido, Baja California, 18–20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 163, off Tiburón Island, 50 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This is a cosmopolitan species. In the waters of the eastern Pacific, the known geographic range is from Alaska to the Galapagos Islands.

Smittina maccullochae Osburn, 1952

Smittina maccullochae OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 405, 406, pl. 48, figs. 5, 6.

Porella collifera, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 148, 149, pl. 38, figs. 10–15.

Smittina maccullochae, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 120, 121.

Colonies encrusting mollusk shells. Zooecia large, irregularly ovoid, with raised, coarsely porous frontal (tremocyst). Aperture large, with conspicuous lyrula and elevated apertural collar. Small subapertural avicularia, each with a proximally directed mandible, numerous. Ovicells moderate in size, globular, perforate.

OCCURRENCE: Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 163, off Tiburón Island, 50 fathoms.

DISTRIBUTION: The specimens of *Smittina maccullochae* in the Puritan collection represent a significant southern extension of the distribution of this species. The species was described by Osburn (1950–1953, no. 2) from the warm temperate waters off southern California, and its known distribution was restricted to the channel islands and a few stations off the mainland. There is no prior record of its occurrence in the Gulf of California.

GENUS *SMITTOIDEA* OSBURN, 1952

Smittoidea prolifica Osburn, 1952

Smittia reticulata, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, p. 306, pl. 23, figs. 75, 76.

Smittoidea prolifica OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 408, 409, pl. 48, figs. 7, 8.

Colonies encrusting blades of marine algae and shells of mollusks. Zooecia ovoid, small, distinct. Frontal (pleurocyst) smooth, raised, bounded by single row of 16 to 18 peripheral pores. Aperture rounded, with a single median tooth, the lyrule. Apertural collar raised, bearing on its distal rim four slender, erect, hollow spines, proximally encompassing the avicularium. Small subapertural avicularia, with short, blunt mandibles, abundant. Ovicells prominent, large, globose, perforate.

OCCURRENCE: Station 145, off Coronados Island, 40–45 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This species was originally described from the waters off southern California (Osburn, 1950–1953, no. 2). With no previous record in the Gulf of California, the Puritan collection marks a considerable extension of the known geographic range and provides a new southerly record (station 145). It is warm temperate to tropical in range.

Smittoidea reticulata (MacGillivray), 1842

Lepralia reticulata J. MACGILLIVRAY, 1842, Ann. Mag. Nat. Hist., vol. 9, pp. 467, 468.

Non Smittia reticulata, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, p. 306, pl. 23, figs. 75, 76.

Smittina reticulata, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, p. 27.

Smittoidea reticulata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 409, 410, pl. 48, figs. 9, 10.

Colonies encrusting mollusk shells. Zooecia small, ovoid to hexagonal, distinct. Frontal (pleurocyst) raised, smooth, with single row of 18 to 22 peripheral pores. Aperture rounded, possessing prominent median lyrule. Apertural collar thin, raised, bearing on its distal rim four erect, hollow spines. Subapertural avicularia free of apertural collar. Each avicularium provided with sharply pointed mandible, directed proximally. Ovicells globular, perforate.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: Originally described from the waters off the coast of Aberdeenshire, Scotland (MacGillivray, 1842), *S. reticulata,* while not abundant, apparently has a wide geographic distribution. Osburn (1950–1953, no. 2) recorded it from the Galapagos Islands, as did Canu

and Bassler (1930), and from two localities in the Gulf of California: Isla Partida and Raza Island.

GENUS *PARASMITTINA* OSBURN, 1952

Parasmittina trispinosa (Johnston), 1825

Discopora trispinosa JOHNSTON, 1825, Edinburgh Phil. Jour., vol. 13, p. 222.

Lepralia trispinosa, BUSK, 1855, *in* Carpenter, Catalogue of . . . Mazatlan Mollusca . . . in the British Museum, p. 3.

Lepralia trispinosa, BUSK, 1856, Quart. Jour. Micros. Sci., vol. 4, p. 178.

Smittia trispinosa, HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, pp. 51, 361, 362.

Smittia trispinosa, ROBERTSON, 1900, Proc. Washington Acad. Sci., vol. 2, p. 327.

Smittia trispinosa, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 302, 303, pl. 22, figs. 68–70.

Smittia trispinosa, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 185.

Smittina trispinosa, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 105.

Smittina trispinosa, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 113, 114.

Smittina trispinosa, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 27–29, pl. 4, figs. 1–5.

Smittina trispinosa, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 726, pl. 11, fig. 55.

Parasmittina trispinosa, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 412–414, pl. 49, figs. 7, 8.

Parasmittina trispinosa, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 121, 122.

Zoaria (colonies) forming extensive single or multiple-layered encrustations on shells of mollusks. Zooecia large, irregular in shape, with a roughened frontal (pleurocyst) which exhibits a row of moderately large, peripheral pores. Apertures circular to ovoid, each with distinct median tooth, the lyrule, on proximal border. Apertural collar thin, high in areas of zoarium protected from erosion, bearing on its distal rim three erect, slender, hollow spines. Avicularia diversified. Along one side of aperture, frequently a large avicularium possessing elongated, elevated, triangular mandible, distally directed. Sparsely scattered over frontal area are smaller avicularia, variously oriented, with mandibles that may be acute or blunt. Ovicells protuberant, swollen, perforate frontal surface flattened to a limited degree.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 138, off Puerto Escondido, Baja California 18–20 fathoms. Station 139, off Puerto Escondido, Baja

California, 40–46 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: *Parasmittina trispinosa* is a cosmopolitan species, ranging from the arctic to the tropics. On the west coast of America it is found from Point Barrow, Alaska, to the Galapagos Islands (Osburn, 1950–1953, no. 2).

Parasmittina californica (Robertson), 1908

Mucronella californica ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 308, 309, pl. 23, fig. 80.

Parasmittina californica, OSBURN, 1952 *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 415, 416, pl. 51, figs. 8–11.

Parasmittina californica, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, p. 122.

Characteristics of zoaria, zooecia, and ovicells like those given for *P. trispinosa.* The distinction between this species and *Parasmittina trispinosa* (Johnston) found in the eastern Pacific is subtle. Osburn (1950–1953, no. 2) relied heavily on the placement of the large or "giant" avicularia. Giant avicularia directed laterally in *P. californica,* not elevated, mandible tip frequently curved and distal to the aperture. In *P. trispinosa* it is directed distally, elevated, the mandible tip flanking or even proximally oriented in relation to the aperture. Usually, *P. californica* has many small frontal avicularia, some directed distally, others laterally, scattered over the frontal.

The characters mentioned above, however, do not always hold. In the Puritan collection and in the Hancock collection are numerous specimens of *P. trispinosa* with giant avicularia possessing curved mandibles that embrace the aperture distally, or examples of *P. californica* with distinctly elevated giant avicularia.

A detailed study of the *P. trispinosa* complex is indicated. It seems likely that *P. californica* is another of the many variations of *P. trispinosa.*

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 162, off Tiburón Island, 40 fathoms.

DISTRIBUTION: This species was originally described from the waters off southern California by Robertson (1908). Its geographical range was extended to the Galapagos Islands by Osburn (1950–1953, no. 2),

who also reported one locality, Isla Partida, from the Gulf of California. In the Hancock collection from the Gulf of California, specimens previously unreported from Raza Island, bottom sample 275, 40 fathoms, have been found. The geographic range is from warm temperate to tropical waters.

Parasmittina crosslandi (Hastings), 1930

Smittina crosslandi HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 726, 727, pl. 13, figs. 75–79, pl. 17, fig. 122.

Smittina trispinosa, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 27–29, pl. 4, figs. 1–5 (in part).

Parasmittina crosslandi, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 418, pl. 48, fig. 12.

As pointed out by Osburn (1950–1953, no. 2), the zoaria (colonies) of this species show a variation in appearance that ranges from simple, unilaminar encrustations to large, cylindrical, erect expansions. Zooecia distinct, irregular in morphology, moderate in size. Each frontal (pleurocyst) possessing a row of peripheral pores. Aperture rounded, with distinct median denticle (lyrule). Apertural collar well described by Hastings (1930) as "spout-shaped." Avicularia of various sizes, with mandibles directed proximally. Numerous giant avicularia, proximally directed, arising along one side of aperture. Ovicells globose, prominent, perforated by many small pores.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 093, San Lorenzo Reef, 2 fathoms. Station 102, off Ballena Island, 1.25–2 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 124, off San Marcial Rock, between Point San Marcial and Aqua Verde Bay, Baja California, 1–3 fathoms. Station 127, off Monserrate Island, 5 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 138, off Puerto Escondido, Baja California, 18–20 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 150, off San Marcos Island, 5–7 fathoms. Station 151, off San Marcos Island, 10–11 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 162, off Tiburón Island, 40 fathoms.

DISTRIBUTION: *Parasmittina crosslandi* appears to be a tropical species, occurring only as far north as Tiburón Island in the Gulf of California.

Parasmittina fraseri Osburn, 1952

Parasmittina fraseri OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 419, 420, pl. 49, fig. 15.

Colonies encrusting. Zooecia small, distinct only in younger portions of zoaria. Frontal (pleurocyst) provided with row of marginal pores. Aperture rounded, bearing on proximal border a broad, median lyrule. Apertural collar raised, partially obscuring view of lyrule. Avicularia small, inconspicuous, scattered over frontal. Occasional large, frontal avicularia. Ovicells diminutive, immersed, regularly perforate.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 129, off Monserrate Island, 3 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 159, off Tiburón Island, 10 fathoms.

DISTRIBUTION: Originally described from Clarion Island, Mexico, by Osburn (1950–1953, no. 2), this species ranges from San Benito Island off Baja California southward to Ecuador and must be considered primarily a tropical species. It has not been previously reported in the Gulf of California.

GENUS *MUCRONELLA* HINCKS, 1877

Mucronella major (Hincks), 1884

Mucronella spinosissima form *major* HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, pp. 53–55, 213, pl. 3, fig. 3.

Phylactella spinosissima var. *major,* CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, pp. 170, 171, pl. 39, figs. 8, 9.

Mucronella major, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 438, 439, pl. 52, figs. 4, 5.

Zoaria (colonies) forming conspicuous encrustations on mollusk shells. Zooecia moderately large, distinct, irregular in outline. Frontal (pleurocyst) convex, perforate. Apertures rounded, each bearing on its proximal wall a large, median denticle or lyrule. Apertural collar thin, high, surmounted by crown of eight to 10 erect, hollow spines. Spines apparently delicate and best seen in areas of zoaria protected from wear. Proximal portion of apertural collar exhibiting low umbonate projection. Avicularia absent. Ovicells globose, smooth, and perforate, as is the frontal.

OCCURRENCE: Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 163, off Tiburón Island, 50 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms.

DISTRIBUTION: This species was originally described from the Queen Charlotte Islands by Hincks (1884). Its geographic distribution was greatly extended by Osburn (1950–1953, no. 2). It is presently known from the Queen Charlotte Islands, British Columbia, southward to the Galapagos. It ranges from cool temperate to tropical waters. This is the first report of its occurrence in the Gulf of California.

FAMILY ADEONIDAE BUSK, 1884

GENUS *REPTADEONELLA* BUSK, 1884

Reptadeonella violacea (Johnston), 1847

Lepralia violacea JOHNSTON, 1847, A history of the British zoophytes, ed. 2, pp. 325, 326, pl. 56, fig. 9.

Adeona violacea, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 728.

Adeona violacea, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 441, 442, pl. 58, figs. 6, 7.

Colonies forming dark purple encrustations on mollusk shells and calcareous algae. Zooecia regular in arrangement, distinct, swollen, 345 to 460 microns long, 260 to 340 microns wide. Frontal (pleurocyst) with a row of peripheral pores (areolae). Frontal pores lacking. Aperture small, 70 microns long, 105 microns wide, rounded, with a low apertural collar. Near center of frontal a moderately large, crescent-shaped ascopore. Each zooecium has on the midline between the ascopore and the aperture an avicularium, with its acute mandible directed distally. Gonozooecia marked by a distinctly larger aperture.

OCCURRENCE: Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 115, off Amortajada Bay, San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms.

DISTRIBUTION: In eastern Pacific waters the distribution of this species is primarily tropical. In the Gulf of California Osburn (1950–1953, no. 2) reported it from Angel de la Guarda Island, and Hastings (1930) notes the species, in a British Museum collection, from Mazatlán. In the Hancock collection is one specimen from Isla Partida that has not been previously reported.

Reptadeonella hymanae, new species

Figure 2

DIAGNOSIS: Zoaria encrusting. Zooecia irregularly oriented, variable in outline. Frontal with a prominent circular ascopore. Aperture oval, with

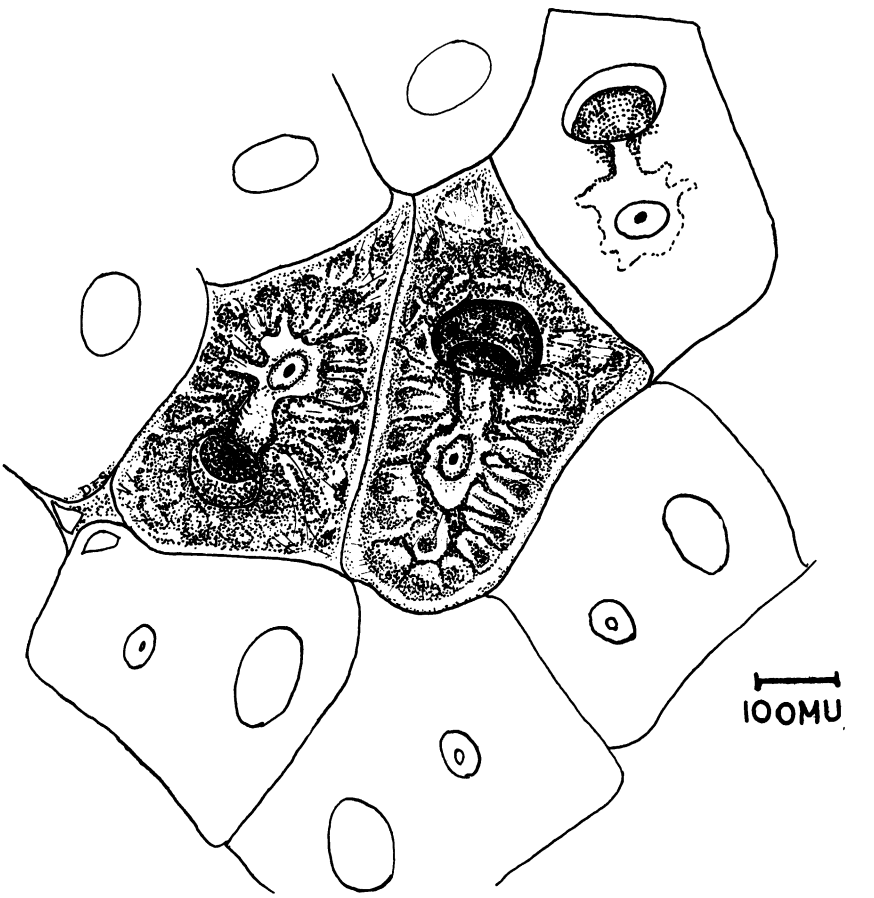

FIG. 2. *Reptadeonella hymanae,* new species.

thin apertural collar slightly raised. No avicularia.

DESCRIPTION: Zoaria unilaminar or multilaminar, ash-gray to iridescent purple in color, forming small, rounded, dome-like, or occasionally flattened, spreading encrustations on rock, coralline algae, or mollusk shells. Irregularly arranged zooecia of moderate size, ranging from 350 to 565 microns in length, and 230 to 345 microns in width. Zooecial outlines varied, rectangular to rhomboid, distinct. Frontal (pleurocyst), covered by a thin, pigmented, chitinous cuticle, thick, raised, roughened, and pierced by prominent circular ascopore. Frontal (pleurocyst) exhibiting several (six to eight) "frontal pores" that do not penetrate the cuticle, as well as 20 to 25 small peripheral areolae that are connected by tubules to

the interzooecial communication pores. In the immature zooecia, the "frontal pores" are lacking, being, possibly, the product of advancing mineralization. Aperture ovoid, wider than long, measuring 85 to 92 microns in length and 115 to 126 microns in width. Apertural collar low, thin to moderately thickened in older zooecia. No avicularia. Reproductive zooecia (gonozooecia) enlarged, swollen, distinguished by an expanded aperture.

Reptadeonella hymanae in lacking avicularia and possessing a circular ascopore is easily distinguished from the two eastern Pacific representatives, *R. violacea* (Johnston) and *R. tubulifera* (Canu and Bassler), both of which have crescent-shaped ascopores and avicularia. *Reptadeonella plagiopora* (Busk), *R. joloensis* (Bassler), and *R. flagellifera* Harmer all possess avicularia as well as rounded ascopores.

This species is dedicated to Dr. Libbie H. Hyman of the American Museum of Natural History.

HOLOTYPE: Allan Hancock Foundation number 142, Allan Hancock Foundation, University of Southern California, Los Angeles, California.

PARATYPE: In the American Museum of Natural History.

TYPE LOCALITY: Puritan-American Museum Expedition, station 89, Los Frailes Bay, Baja California, latitude 23° 21′ N., longitude 109° 50′ W., 20–40 fathoms, fine sand, Puritan dredge, April 19, 1957.

OCCURRENCE: Station 87, Pulmo Reef, Baja California, 2–4 fathoms. Station 89, Los Frailes Bay, Baja California, 20–40 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 123, Aqua Verde Bay, Baja California, 1–3.25 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 134, Salinas Bay, Carmen Island, 5–8 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 147, off Pulpito Point, Baja California, 0.5–2 fathoms. Station 151, off San Marcos Island, 10–11 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 172, Puerto Refugio, Angel de la Guarda Island, 16–18 fathoms.

FAMILY RETEPORIDAE SMITT, 1867

GENUS *RETEPORELLINA* HARMER, 1933

Reteporellina bilabiata Osburn, 1952

Reteporellina bilabiata OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 445, 446, pl. 53, figs. 11–14.

Zoaria (colonies) erect, branching, not fenestrated, zooecia opening on only one surface. Zooecia elongate, distinct, arranged in alternating series of four to six, occasionally more, rows. Apertural collar long, tubular, open proximally to form deep secondary sinus. Frontal smooth, imperforate except for six peripheral pores, covered by a thin, chitinous cuticle. A frontal avicularium may be found situated on the midline near the lower end of a zooecium, its pointed mandible directed proximally. Dorsal avicularia, variously oriented, possessing a sharply pointed mandible. Ovicells scattered, scanty on Gulf of California material, low, bulbous, and exhibiting longitudinal, slit-like opening on midline.

OCCURRENCE: Station 89, Los Frailes Bay, Baja California, 20–40 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 139, off Puerto Escondido, Baja California, 40–46 fathoms.

DISTRIBUTION: The type locality for this species is off Raza Island, Gulf of California. Osburn (1950–1953, no. 2) also had material from Magdalena Bay on the Pacific coast of Baja California. In the Hancock collection are two additional, previously unreported localities: Hancock station 171-34, Chatham Island, Galapagos, 35–40 fathoms; and Hancock station 427-35 Cupica Bay, Colombia, intertidal. The species is tropical.

Reteporellina denticulata gracilis Osburn, 1952

Reteporellina denticulata var. *gracilis* OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 446, 447, pl. 53, figs. 8–10.

Zoaria (colonies) erect, slender. Zooecia in linear series of three, alternate, distinct. Frontal level, finely granular, and provided with two, occasionally three, small pores. Frontal covered by a thin, chitinous cuticle. Aperture immersed. Apertural collar tall, thin, exhibiting a secondary sinus. Scattered umbonate suboral avicularia large. Minute interzooecial avicularia possessing a blunt, rounded mandible. Dorsal avicularia also with a rounded mandible. Ovicells spherical, each with a median longitudinal slit.

OCCURRENCE: Station 89, Los Frailes Bay, Baja California, 20–40 fathoms. Station 90, off Ceralvo Island, 2–3.5 fathoms.

DISTRIBUTION: This species was previously recorded from the Galapagos Islands to Costa Rica by Osburn (1950–1953, no. 2). The present report is the first of its presence in the Gulf of California. It is a tropical species.

GENUS *PHIDOLOPORA* GABB AND HORN, 1862

Phidolopora labiata Gabb and Horn, 1862

Phidolopora labiata GABB AND HORN, 1862, Jour. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 5, pp. 138, 139, pl.19, fig. 21.

Retepora pacifica ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 310, 311, pl. 24, figs. 81–84.

Phidolopora pacifica, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 154, pl. 39, figs. 1–7.

Retepora pacifica, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, p. 189.

Phidolopora pacifica, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 106.

Phidolopora pacifica, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, pp. 118, 119.

Phidolopora pacifica, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 448, 449, pl. 53, figs. 1, 2.

Phidolopora labiata, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 124, 125.

Zoaria erect, retiform, rising from a rounded base that is adherent to the substrate. Zoarial fenestrae ovoid. Zooecia opening on one surface irregular in shape as well as indistinct in outline. Aperture rounded, with notch on proximal border of apertural collar. Aperture of young zooecia may be flanked by erect, elongated, slender, hollow spines, one or two on each side. Frontal avicularia large, erect, directed proximally. Large dorsal avicularia sparsely present at base of fenestrae. Ovicells globose, eminent, with a median protuberance extending proximally.

OCCURRENCE: Station 120, off San Diego Island, 25–40 fathoms. Station 131, off Salinas Bay, Carmen Island, 41–45 fathoms. Station 132, off Salinas Bay, Carmen Island, 14–30 fathoms. Station 133, off Salinas Bay, Carmen Island, 20 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 163, off Tiburón Island, 50 fathoms.

DISTRIBUTION: In the eastern Pacific the geographical range of this species is from Puget Sound to the Galapagos Islands. Osburn (1950–1953, no. 2) reported it from Aqua Verde Bay to Angel de la Guarda Island in the Gulf of California.

GENUS *RHYNCHOZOON* HINCKS, 1895

Rhynchozoon rostratum (Busk), 1855

Lepralia rostrata BUSK, 1855 *in* Carpenter, Catalogue of . . . Mazatlan Mollusca . . . in the British Museum, p. 4.

Lepralia rostrata, BUSK, 1856, Quart. Jour. Micros. Sci., vol. 4, pp. 178, 179.

Rhynchozoon rostratum, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 728, 729, pl. 14, figs. 84, 85, 93–96.

Rhynchozoon rostratum, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 456–458, pl. 54, figs. 1–3.

Colonies forming prominent encrustations on mollusk shells. Zooecia of modest size, swollen, distinct only in young zoaria or on margins of older zoaria. Depending on the degree of calcification, as many as 12 peripheral pores can be readily determined. Secondary calcification altering zooecial appearance with irregular ridges and protuberances. Aperture wide, its proximal border bearing a distinct sinus. Below the aperture a large portion of the frontal may be occupied by a protuberant avicularian chamber that possesses a hooked rostrum and mandible. Smaller frontal avicularia haphazardly oriented. Ovicells immersed, exhibiting a distinct, semicircular, frontal area and peripheral pores.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 098, San Gabriel Bay, Espíritu Santo Island, 1–1.5 fathoms. Station 104, off Isla Partida, 13 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 127 off Monserrate Island, 3 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 147, off Pulpito Point, Baja California, 0.5–2 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 163, off Tiburón Island, 50 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms.

DISTRIBUTION: In the Atlantic and the Pacific *Rhynchozoon rostratum* is an inhabitant of tropical and warm temperate waters. In the eastern Pacific it ranges from the Galapagos Islands to the waters off southern California. Two previous localities were recorded by Osburn (1950–1953, no. 2) from the Gulf of California: off Angel de la Guarda Island, and Aqua Verde Bay, Baja California.

Rhynchozoon grandicella Canu and Bassler, 1923

Rhynchozoon grandicella CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 156, pl. 47, figs. 7, 8.

Rhynchozoon grandicella, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 459, 460, pl. 54, figs. 7, 8, 11.

Zoaria encrusting mollusk shells. Zooecia large, distinct, with convex frontal (pleurocyst) and 10 to 12 marginal pores. Aperture large, wide, with weak sinus in proximal border. Projecting over the apertural area is a large avicularium, possessing a long, triangular, hooked mandible

directed laterally. Smaller frontal avicularia, with triangular mandibles, distributed irregularly. Many zooecia possessing spine-like process arising from frontal and extending over apertural area. This process is especially prominent on zooecia lacking avicularia. Some zooecia, in areas of the colony protected from erosion, showing a pair of small spines flanking the aperture. Ovicells prominent, globose, partially embedded, possessing a semicircular area on the frontal area.

OCCURRENCE: Station 116, off San José Island, 36.5–40 fathoms. Station 131, off Carmen Island, 41–45 fathoms. Station 139, off Puerto Escondido, Baja California, 40–46 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 151, off San Marcos Island, 10–11 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 163, off Tiburón Island, 50 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: Originally described from the Pleistocene of southern California, this species has been reported by Osburn (1950–1953, no. 2) from the waters of southern California southward to the San Benito Islands off the west coast of Baja California, Mexico.

FAMILY CHEILOPORINIDAE BASSLER, 1936

GENUS *HIPPOPODINELLA* BARROSO, 1924

Hippopodinella adpressa (Busk), 1854

Lepralia adpressa BUSK, 1854, Catalogue of marine Polyzoa in the British Museum, pt. 2, p. 82, pl. 102, figs. 3, 4.

Lepralia adpressa, BUSK, 1855, *in* Carpenter, Catalogue of . . . Mazatlan Mollusca . . . in the British Museum, p. 5.

Lepralia adpressa, BUSK, 1856, Quart. Jour. Micros. Sci., vol. 4, p. 178.

Hippopodinella adpressa, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 729.

Hippopodinella adpressa, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 467, pl. 57, fig. 6.

Hippopodinella adpressa, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, p. 126.

Zoaria encrusting mollusk shells and sea-urchin spines. Zooecia distinct, diamond-shaped, moderately convex. Frontal (tremocyst) coarsely perforate. Aperture elongated, bell-shaped, with distinct cardelles near the rounded, proximal rim. Young zooecia possessing a very thin, low, apertural collar, which thickens and becomes raised in the older, well-calcified zooecia. Ovicells endozooecial.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 123, Aqua Verde Bay,

Baja California, 1–3.25 fathoms. Station 138, off Puerto Escondido, Baja California, 18–20 fathoms. Station 140, Marquer Bay, Carmen Island, intertidal. Station 150, off San Marcos Island, 5–7 fathoms. Station 151, off San Marcos Island, 10–11 fathoms. Station 155, San Carlos Bay, Sonora, Mexico, 1–2.5 fathoms. Station 158, off Tiburón Island, 1–3 fathoms. Station 159, off Tiburón Island, 10 fathoms.

DISTRIBUTION: This species has previously been recorded from only one locality in the Gulf of California (Angel de la Guarda Island), by Osburn (1950–1953, no. 2). Its known range in the eastern Pacific is from the Gulf of California southward to Costa Rica, Panama, the Galapagos Islands, Ecuador, and Chile (Osburn, 1950–1953, no. 2; Hastings, 1930).

GENUS *WATERSIPORA* NEVIANI, 1895

Watersipora cucullata (Busk), 1854

Lepralia cucullata BUSK, 1854, Catalogue of marine Polyzoa in the British Museum, pt. 2, p. 81, pl. 96, figs. 4, 5.

Lepralia atrofusca BUSK, 1855, *in* Carpenter, Catalogue of . . . Mazatlan Mollusca . . . in the British Museum, p. 3.

Lepralia atrofusca, BUSK, 1856, Quart. Jour. Micros. Sci., vol. 4, p. 178.

Watersipora cucullata, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 729, 730, pl. 15, figs. 97–104.

Watersipora cucullata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 472, 473, pl. 56, figs. 1–5.

Colonies forming dark brown to black encrustations on rock, mollusk shells, and other bryozoans. Zooecia distinct, rectangular, large, varying in length from 1040 to 1500 microns and in width from 575 to 700 microns. Frontal (tremocyst) convex, finely perforate, covered by thick, opaque, chitinous cuticle (ectocyst). Aperture large, ranging from 275 to 320 microns in width and from 250 to 280 microns in length. Resembling an inverted pear, the aperture is swollen and rounded distally, and has a wide, U-shaped, proximal sinus that is set off by a pair of prominent lateral condyles. No avicularia. Ovicells endozooecial.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 172, Puerto Refugio, Angel de la Guarda Island, 16–18 fathoms.

DISTRIBUTION: This species is world-wide in tropical and subtropical waters and occurs in the eastern Pacific from the Galapagos Islands to the Gulf of California.

Watersipora nigra (Canu and Bassler), 1930

Pachycleithonia nigra CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 25–27, fig. 6, pl. 4, figs. 9–13.

Watersipora cucullata, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 729, 730, pl. 15, fig. 101 (in part).

Watersipora cucullata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 472, 473, pl. 56, figs. 3, 5 (in part).

Zoaria (colonies) darkly pigmented, brown to black in color, encrusting rock and mollusk shells. Zooecia small to moderate in size, ranging from 675 to 890 microns in length and from 370 to 460 microns in width. Frontal (tremocyst) coarsely perforate, covered by a pigmented, chitinous cuticle. Aperture small, 185 to 205 microns in width and 160 to 180 microns in length. It is rounded distally, with the proximal rim arching forward in a sharp curve just below the lateral condyles. Apertural rim low distally, frequently rising to a modest umbo in mid-proximal area. Avicularia not present. Ovicells endozooecial.

OCCURRENCE: Station 076, Olas Altas Bay, Mazatlán, Sinaloa, Mexico, intertidal. Station 078, Olas Altas Bay, Mazatlán, Sinaloa, Mexico, intertidal. Station 084, Los Frailes Bay, Baja California, intertidal. Station 101, Isla Partida, intertidal. Station 109, San Francisco Island, intertidal. Station 125, Monserrate Island, intertidal. Station 129, off Monserrate Island, 3 fathoms. Station 136, lagoon, Puerto Escondido, Baja California, intertidal. Station 140, Marquer Bay, Carmen Island, intertidal. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 143, Coronados Island, intertidal. Station 153, San Carlos Bay, Sonora, Mexico, intertidal.

DISTRIBUTION: This species was originally described from the Galapagos Islands by Canu and Bassler (1930). Its range is now extended into the Gulf of California. It is apparently a tropical species.

GENUS *HIPPALIOSINA* CANU, 1918

Hippaliosina rostrigera (Smitt), 1873

Escharella rostrigera SMITT, 1873, K. Svenska Vetensk. Akad. Handl., new ser., vol. 11, no. 4, p. 57, pl. 10, figs. 203–205.

Hippaliosina rostrigera, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 729.

Hippaliosina rostrigera, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 475, pl. 56, fig. 9.

Zoaria encrusting mollusk shells and other bryozoans. Zooecia modest in size, distinct, each with roughened frontal (pleurocyst) bounded by row of peripheral pores. Aperture ovoid, with proximal rim the same width

as, or slightly wider than, distal. In proximal half of aperture a pair of cardelles projecting in and downward from lateral walls. Apertural rim low. Avicularia paired, flanking distal half of aperture, their mandibles curving towards the midline. Ovicells endozooecial.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 127, off Monserrate Island, 5 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This tropical species, originally described from waters off Florida (Smitt, 1873), has been taken previously only at a few stations in the tropical Pacific (Hastings, 1930; Osburn, 1950–1953, no. 2).

FAMILY CREPIDACANTHIDAE LEVINSEN, 1909

GENUS *CREPIDACANTHA* LEVINSEN, 1909

Crepidacantha poissoni (Audouin), 1826

Flustra Poissonii AUDOUIN, 1826, *in* Savigny, Description de l'Egypte, histoire naturelle, vol. 1, pt. 4, p. 240, pl. 10, figs. 5^1, 5^2.

Crepidacantha poissonii, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 33, 34, pl. 5, fig. 5.

Crepidacantha poissoni, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 478, 479, pl. 58, fig. 2.

Zoaria encrusting mollusk shells and rock. Zooecia small, distinct, irregularly diamond-shaped. Frontal (tremocyst) raised, glassy in young zooecia, bounded by row of marginal pores. Aperture elongate, rounded distally, laterally compressed in area of cardelles. Proximal portion of the aperture expanded to each side, with a faintly arched proximal border. Apertural rim poorly developed. Just behind aperture a pair of avicularia bearing thin, elongated mandibles directed inward. On well-preserved young zoaria, each zooecium has 12 delicate, slender, marginal spines radiating outward, regularly spaced about the distal end. Ovicells globose, a slightly flattened area on the top bounded by a circlet of small pores.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 133, off Carmen Island, 20 fathoms. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 144,

off Coronados Island, 13–16.5 fathoms. Station 161, off Tiburón Island, 30–32 fathoms.

DISTRIBUTION: This species is known to range in warm temperate to tropical waters of the Pacific from Santa Barbara Island, off southern California, to the Galapagos. Osburn (1950–1953, no. 2) reported two occurrences in the Gulf of California: San Esteban Island and Angel de la Guarda Island.

Crepidacantha setigera (Smitt), 1873

Escharella setigera SMITT, 1873, K. Svenska Vetensk. Akad. Handl., new ser., vol. 11, no. 4, p. 58, pl. 10, fig. 206.

Crepidacantha setigera, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 479, pl. 58, fig. 1.

Zoaria encrusting rock and mollusk shells. Zooecia small, distinct, bounded by row of minute marginal pores. Each zooecia bearing 12 slim, marginal spines, radiating outward, surrounding distal border. Aperture elongate, rounded distally, laterally compressed in area of cardelles, curved, but not expanded proximally. Avicularia paired, flanking aperture, with elongated setose mandibles, directed proximally. Ovicells globose, frequently umbonate.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms.

DISTRIBUTION: The present record is the first of the occurrence of *C. setigera* in the Gulf of California. Osburn (1950–1953, no. 2) recorded it from the Galapagos Islands and off the coast of Costa Rica. It is known from the tropical waters of the Gulf of Mexico (Smitt, 1873).

FAMILY LAGENIPORIDAE JULLIEN, 1883

GENUS *LAGENIPORA* HINCKS, 1877

Lagenipora punctulata (Gabb and Horn), 1862

Entalophora punctulata GABB AND HORN, 1862, Jour. Acad. Nat. Sci. Philadelphia, new ser., vol. 5, pt. 2, art. 3, p. 171, pl. 21, fig. 61.

Lagenipora spinulosa HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, p. 57, pl. 3, fig. 4, pp. 210, 211, pl. 9, fig. 4 (in part).

Lagenipora spinulosa, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 283, 284, pl. 18, fig. 37 (in part).

Tubucellaria punctulata, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 170, pl. 40, figs. 1–4.

Lagenipora erecta C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, no. 10, pp. 175, 176, pl. 3, fig. 22.

Lagenipora erecta, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 106.

Lagenipora erecta, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, no. 3, p. 120.

Lagenipora punctulata, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 485, 486, pl. 60, figs. 1, 2.

Lagenipora punctulata, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, pp. 126, 127.

Zoaria (colonies) erect, cylindrical, branching. Zooecia flask-like, distinct. Frontal (tremocyst) coarsely perforate. Aperture elongate, expanded distally, gradually narrowing to wide proximal notch just beneath pair of weak cardelles. Apertural collar tubular, distinctly ribbed, each collar bearing at its apex a pair of small avicularia of which the mandibles are directed laterally. Ovicells prominent, globular, possessing semi-lunate frontal area that is finely perforate.

OCCURRENCE: Station 088, Los Frailes Bay, Baja California, 7–9 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 127, off Monserrate Island, 5 fathoms. Station 128, off Monserrate Island, 5–6 fathoms. Station 129, off Monserrate Island, 3 fathoms. Station 131, off Carmen Island, 41–45 fathoms. Station 139, off Puerto Escondido, Baja California, 40–46 fathoms. Station 140, Marquer Bay, Carmen Island, intertidal. Station 143, Coronados Island, intertidal. Station 144, off Coronados Island, 13–16.5 fathoms. Station 146, Ildefonso Island, intertidal. Station 149, San Marcos Island, intertidal. Station 154, San Carlos Bay, Sonora, Mexico, intertidal. Station 160, off Tiburón Island, 20–22 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 163, off Tiburón Island, 50 fathoms. Station 164, San Esteban Island, intertidal. Station 167, off Angel de la Guarda Island, 15–17 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: *Lagenipora punctulata* (Gabb and Horn), 1862, is a species that is abundantly represented from northern California south to the Galapagos Island in waters ranging from cool temperate to tropical. Osburn (1950–1953, no. 2) noted its abundance in the Gulf of California, a fact well borne out by the Puritan collection.

Lagenipora spinulosa Hincks, 1884

Lagenipora spinulosa HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, p. 57, pl. 3, fig. 4, pp. 210, 211, pl. 9, fig. 4 (in part).

Lagenipora spinulosa, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 283, 284, pl. 18, fig. 37 (in part).

Lagenipora spinulosa, CANU AND BASSLER, 1923, Bull. U. S. Natl. Mus., no. 125, p. 171, pl. 40, fig. 7.

Lagenipora spinulosa, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, no. 10, p. 175.

Lagenipora spinulosa, C. H. AND E. O'DONOGHUE, 1925, Trans. Puget Sound Biol. Sta., vol. 5, p. 106.

Lagenipora spinulosa, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, no. 3, p. 120.

Lagenipora spinulosa, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 730, 731.

Lagenipora spinulosa, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 487, 488, pl. 59, fig. 6.

Colonies comparatively small, encrusting algae, shells of mollusks, and other bryozoans. Zooecia flask-shaped, distinct, with frontal (tremocyst) perforate. Aperture ovoid, narrowed proximally to form a wide sinus just below a pair of small cardelles. Apertural collar tall, tubular, feebly ribbed, topped by a corona of four to six elongated, hollow, spine-like processes, and flanked by a pair of small avicularia that may be raised above the rim of the collar. Ovicells on apertural collar located about halfway between apex and frontal. They are globular, each possessing a semilunar frontal area that is finely perforated.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 124, east of San Marcial Rock, between Point San Marcial and Aqua Verde Bay, Baja California, 1–3 fathoms. Station 125, Monserrate Island, intertidal.

DISTRIBUTION: This species was originally described from the Queen Charlotte Islands (Hincks, 1884). Its distribution has been gradually traced southward to southern California (Robertson, 1908), the Gulf of California (Osburn, 1930–1953, no. 2), and the Galapagos Islands (Hastings, 1930). The range, therefore, of *L. spinulosa* is from cool temperate to tropical waters. Osburn (1950–1953, no. 2) records it from Angel de la Guarda Island in the Gulf of California.

Lagenipora socialis Hincks, 1877

Lagenipora socialis HINCKS, 1877, Ann. Mag. Nat. Hist., ser. 4, vol. 20, p. 215.

Lagenipora socialis, C. H. AND E. O'DONOGHUE, 1923, Contrib. Canadian Biol., new ser., vol. 1, no. 10, p. 175.

Lagenipora socialis, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, no. 3, p. 120.

Lagenipora socialis, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 488, pl. 60, figs. 3, 4.

Colonies small, encrusting stipes of marine algae and mollusk shells. Flask-shaped zooecia small, distinct, with perforate frontal (tremocyst). Aperture oval, with proximal notch below inconspicuous lateral cardelles. Apertural collar tube-like, longitudinally ribbed, with proximal rim distinctly flared. Rim of apertural collar flanked by two minute avicularia, with their mandibles directed laterally. Ovicells on distal side of apertural collar, globular, each with a large, perforate, semicircular, frontal area.

OCCURRENCE: Station 144, off Coronados Island, 13–16.5 fathoms. Sta-

tion 161, off Tiburón Island, 30–32 fathoms.

DISTRIBUTION: Originally described from the waters off the British Isles (Hincks, 1877), this species has since been reported from British Columbia (O'Donoghue and O'Donoghue, 1923, 1926) and from southern California to Santa Maria Bay on the Pacific coast of Baja California (Osburn, 1950–1953, no. 2). This is the first report of its occurrence in the Gulf of California. In the Hancock collections, however, a previously unreported specimen from east of San José Island in the Gulf of California, Albatross station 3005, has been found.

Lagenipora hippocrepis (Busk), 1855

Lepralia hippocrepis BUSK, 1855, *in* Carpenter, Catalogue of . . . Mazatlan Mollusca . . . in the British Museum, p. 4.

Lepralia hippocrepis, BUSK, 1856, Quart. Jour. Micros. Sci., vol. 4, p. 177, pl. 8, figs. 2a, 2b.

Costazia hippocrepis, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 731, pl. 15, figs. 105–107.

Lagenipora hippocrepis, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 489, pl. 60, figs. 5, 6.

Zoaria encrusting shells of mollusks and marine algae. Zooecia flask-shaped, medium in size, distinct, with a perforate frontal (tremocyst). Aperture ovoid, with weak lateral cardelles and a broad proximal sinus. Apertural collar elongate, raised, with distinct longitudinal ridges. Avicularia small, paired, on or raised above rim of apertural collar, their mandibles directed laterally. Globular ovicells, distally located at the base of the apertural collar, with perforate, semicircular, frontal area.

OCCURRENCE: Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 109, San Francisco Island, intertidal. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 112, Amortajada Bay, San José Island, 0.5–2.25 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 125, Monserrate Island, intertidal. Station 143, Coronados Island, intertidal. Station 154, San Carlos Bay, Sonora, Mexico, intertidal.

DISTRIBUTION: Originally described from Mazatlán, Mexico, this species has since been recovered from the Galapagos (Hastings, 1930; Osburn, 1950–1953, no. 2), and off southern California (Osburn, *op. cit.*). The present report is the first of its occurrence in the Gulf of California.

Lagenipora lacunosa Bassler, 1934

Lagenipora verrucosa CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 35, 36, pl. 6, fig. 1.

Lagenipora lacunosa BASSLER, 1934, Jour. Washington Acad. Sci., vol. 24, no. 9, p. 408.

Lagenipora lacunosa, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 490, 491, pl. 59, fig. 10.

Zooaria encrusting mollusk shells. Zooecia large, less distinct in outline, and not obviously flask-shaped. Frontal (tremocyst) raised, coarsely perforate. Aperture large, ovoid, with small lateral cardelles and wide proximal sinus. Apertural collar very low, slightly elevated above level of frontal, each collar bearing a pair of small avicularia with their mandibles directed laterally forward. Globose ovicell situated at base of apertural collar, with a large, finely perforate, semilunar, frontal area.

OCCURRENCE: Station 176, Olas Altas Bay, Mazatlán, Sinaloa, Mexico, intertidal. Station 087, Pulmo Reef, Baja California, 2–4 fathoms.

DISTRIBUTION: This species was originally described from the Galapagos Islands (Canu and Bassler, 1930; Bassler, 1934). The range of this species was greatly extended by Osburn (1950–1953, no. 2) from Ecuador to San Miguel Island off Santa Barbara, California. In the Gulf of California Osburn (*op. cit.*) reported this species from Aqua Verde Bay, Baja California, San Esteban Island, and Guaymas, Sonora, Mexico.

FAMILY CELLEPORIDAE BUSK, 1852

GENUS *SCHISMOPORA* MACGILLIVRAY, 1888

Schismopora anatina (Canu and Bassler), 1930

Osthimosia anatina CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 42, 43, pl. 7, figs. 4–8.

Schizmopora anatina, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 493, 494, pl. 62, figs. 5, 6.

Colonies cylindrical, branching, arising from a small circular base. Zooecia medium in size, irregularly oriented, with indistinct boundaries except in younger areas at tips of branches. Frontal (olocyst) raised, smooth, bounded by a row of small, evenly spaced, elliptical, peripheral pores. Aperture longer than wide, rounded distally, provided with a wide, V-shaped, proximal sinus. Apertural collar reduced, thin, and low. Avicularia variable. Small suboral avicularia, with sharp triangular mandible, usually placed at apex of an umbonate process. Less common are large interzooecial avicularia, each with bluntly pointed, triangular mandible. Ovicells large, globose, each with coarsely perforate, frontal area.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 096, off Espíritu Santo Island, 10–24 fathoms. Station 104, off Isla Partida, 13 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms.

DISTRIBUTION: This species was originally described from the Galapagos Islands (Canu and Bassler, 1930). The range was extended by Osburn (1950–1953, no. 2) northward to the San Benito Islands, off the west coast of Baja California, Mexico. The present record is the first of the occurrence of this species in the Gulf of California.

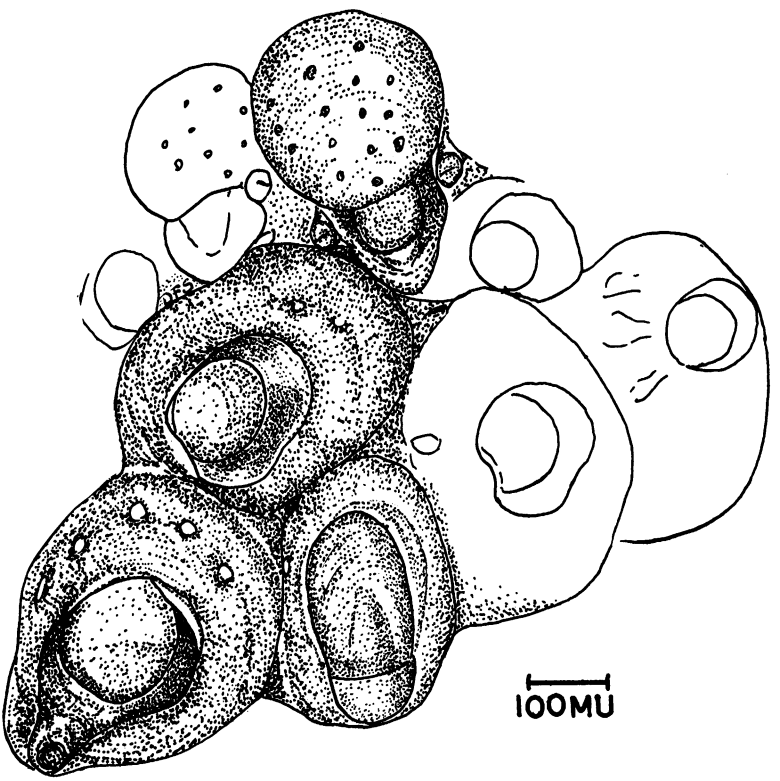

FIG. 3. *Schismopora globosa,* new species.

Schismopora globosa, new species

Figure 3

DIAGNOSIS: Zoaria small, globular, encrusting, multilaminar. Rhomboid zooecia distinct or deeply immersed, irregularly arranged. Frontal (olocyst) inflated, with 12 to 14 peripheral pores. Primary aperture ovoid, with shallow proximal sinus. Apertural collar thin, low. One or two minute, suboral avicularia flanking most apertures. Few giant interzooecial avicularia. Ovicells globular, coarsely perforate.

DESCRIPTION: Zoaria roughened, multilaminar, small to moderate in size, forming irregular globular encrustations on shells of mollusks. Rhomboid zooecia variable in size, measuring from 415 to 460 microns in length and 320 to 380 microns in width. Zooecia are irregularly arranged and possessing indistinct boundaries. Frontal (olocyst) swollen, covered by thin, glassy, chitinous cuticle. Each zooecium possessing 12 to 14 large, peripheral pores (areolae). Aperture ovoid, wider than long, measuring 92 to 126 microns in length and 115 to 150 microns in width. Many apertures immersed. Proximal apertural border provided with a wide, shallow sinus. Operculum thick, well chitinized. Apertural collar low, thin. Fused to sides of apertural collar may be one or two minute suboral avicularia, each with a distally directed, bluntly rounded mandible. Some zooecia devoid of suboral avicularia. Giant interzooecial avicularia, with elongate, broadly rounded mandibles, few in number and scattered irregularly over the zoaria. Ovicells globose, coarsely perforate.

Schismopora globosa differs from *Schismopora anatina* (Canu and Bassler), 1930, in having hemispherical zoaria instead of erect branching zoaria, smaller zooecia, and in lacking the large projecting avicularian umbo.

I am indebted to Dr. Richard S. Boardman of the United States National Museum for the opportunity to examine cotypes of *S. anatina*.

HOLOTYPE: Allan Hancock Foundation number 143, Allan Hancock Foundation, University of Southern California, Los Angeles, California.

PARATYPE: In the American Museum of Natural History.

TYPE LOCALITY: Puritan-American Museum of Natural History Expedition, station 89, Los Frailes Bay, Baja California, latitude 23° 21′ N., longitude 109° 25′ W., 20–40 fathoms, fine sand, Puritan dredge, April 19, 1957.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms.

GENUS *HOLOPORELLA* WATERS, 1909

Holoporella brunnea (Hincks), 1884

Cellepora brunnea HINCKS, 1884, Ann. Mag. Nat. Hist., ser. 5, vol. 13, p. 56.

Smittia californiensis ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, pp. 303, 304, pl. 22, fig. 71 (in part).

Cellepora brunnea, C. H. AND E. O'DONOGHUE, 1926, Contrib. Canadian Biol. Fish., new ser., vol. 3, no. 3, p. 121.

Holoporella brunnea, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, pp. 731, 732, pl. 16, figs. 108–110.

Holoporella brunnea, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 496, 497, pl. 62, figs. 10–12.

Holoporella brunnea, SOULE AND DUFF, 1957, Proc. California Acad. Sci., ser. 4, vol. 29, no. 4, pp. 127, 128.

Zoaria (colonies) brown to gray in color, encrusting rock and mollusk shells, or erect, cylindrical, branching antler-like. Zooecia of moderate size, indistinct except at young peripheral areas of zoaria. Frontal (olocyst) smooth to roughened, bounded by a series of 14 to 16 small, peripheral pores. Aperture rounded distally, with a straight proximal border marked by a distinct notch. Apertural collar thin, low, on distal aspect bearing a pair of tall, stout, hollow spines. Interzooecial avicularia very large, each with an elongated, blunt, brown-colored mandible possessing a spade-shaped columella. Immediately below the aperture may be found a small avicularium raised on a tall, conical umbo. Ovicells smooth, non-perforate, hood-shaped.

OCCURRENCE: Station 084, Los Frailes Bay, Baja California, intertidal. Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 093, San Lorenzo Reef, San Lorenzo Channel, 2 fathoms. Station 095, off Espíritu Santo Island, 5–9 fathoms. Station 097, off Espíritu Santo Island, 24–26 fathoms. Station 098, San Gabriel Bay, Espíritu Santo Island, 1–1.5 fathoms. Station 103, off Isla Partida, 12–13 fathoms. Station 104, off Isla Partida, 13 fathoms. Station 108, off Isla Partida, 0.5–3.25 fathoms. Station 109, San Francisco Island, intertidal. Station 111, off San Francisco Island, 0.5–4 fathoms. Station 112, Amortajada Bay, San José Island, 0.5–2.25 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 123, Aqua Verde Bay, Baja California, 1–3.25 fathoms. Station 124, off San Marcial Rock, 1–3 fathoms. Station 131, off Carmen Island, 41–45 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 133, off Carmen Island, 20 fathoms. Station 134, Salinas Bay, Carmen Island, 5–8 fathoms. Station 138, off Puerto Escondido, Baja California, 18–20 fathoms. Station 139, off Puerto Escondido, Baja California, 40–46 fathoms. Station 140, Marquer Bay, Carmen Island, intertidal. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 143, Coronados Island, intertidal. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 147, off Pulpito Point, 0.5–2 fathoms. Station 149, San Marcos Island, intertidal. Station 150, off San Marcos Island, 5–7 fath-

oms. Station 151, off San Marcos Island, 10–11 fathoms. Station 154, San Carlos Bay, Sonora, Mexico, intertidal. Station 155, San Carlos Bay, Sonora, Mexico, 1–2.5 fathoms. Station 158, off Tiburón Island, 1–3 fathoms. Station 159, off Tiburón Island, 10 fathoms. Station 160, off Tiburón Island, 20–22 fathoms. Station 161, off Tiburón Island, 30–32 fathoms. Station 162, off Tiburón Island, 40 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This is an extremely abundant species, ranging from British Columbia, Canada, to Ecuador (Osburn, 1950–1953, no. 2). *Holoporella brunnea* is the most abundantly represented species taken by the expedition in the Gulf of California.

Holoporella quadrispinosa Canu and Bassler, 1930

Holoporella quadrispinosa CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 37, 38, pl. 6, figs. 4–6.

Holoporella quadrispinosa, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 502, pl. 55, fig. 12.

Zoaria encrusting mollusk shells and marine algae. Zooecia small, distinct only on margins of zoaria. Frontal (olocyst) coarsely granular, raised, bounded by a row of 12 to 14 peripheral pores. Aperture rounded distally, with a wide notch in middle of straight, proximal border. Apertural collar thin, low, bearing four elongated, slender, hollow spines about the distal rim. Small suboral avicularium raised on a low umbo immediately below aperture. Interzooecial avicularia small, with bluntly rounded mandibles. Ovicells globose, imperforate, hood-shaped.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 090, off Ceralvo Island, 2–3.5 fathoms. Station 098, San Gabriel Bay, Espíritu Santo Island, 1–1.5 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 125, Monserrate Island, intertidal. Station 129, off Monserrate Island, 3 fathoms. Station 136, lagoon, Puerto Escondido, Baja California, intertidal. Station 158, off Tiburón Island, 1–3 fathoms. Station 164, San Esteban Island, intertidal.

DISTRIBUTION: This species was originally described from the Galapagos Islands by Canu and Bassler (1930). Its range has since been extended to San José del Cabo at the southern end of Baja California by Osburn (1950–1953, no. 2). The material collected by the Puritan-American Museum Expedition marks a further extension of the range into the Gulf of California.

Holoporella minuta, new species

Figure 4

DIAGNOSIS: Zoaria encrusting, multilaminar, irregular. Zooecia small, irregularly arranged, with indistinct zooecial outlines. Frontal (olocyst) inflated, granular, with nine to 12 areolae. Aperture orbicular, with smooth, arcuate, proximal border. Apertural collar well developed, supporting a suboral avicularium raised on a slight umbonate process. No oral spines. No frontal or interzooecial avicularia.

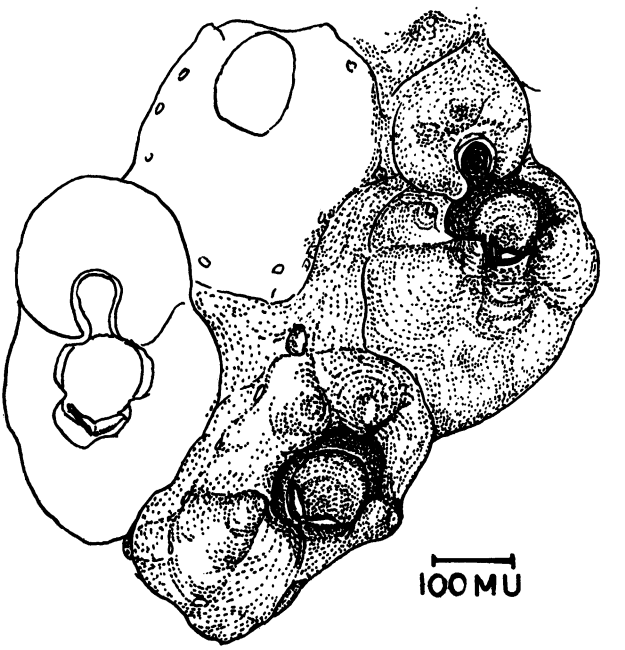

FIG. 4. *Holoporella minuta,* new species.

DESCRIPTION: Zoaria multilaminar, forming small to moderate-sized, irregular encrustations on the shells of mollusks. Zooecia small, those of a young zoarium regularly arranged, distinct, ovoid. These zooecia measuring from 345 to 390 microns in length and from 320 to 340 microns in width. However, most zoaria are multilaminar, with their zooecia irregularly arranged, many deeply immersed, zooecial outlines obliterated. Frontal (olocyst) inflated, finely granular, covered by a glistening chitinous cuticle, imperforate except for a series of small peripheral pores (areolae) varying in number from nine to 12. Orbicular

aperture, with its smooth arcuate proximal border and a well-chitinized operculum, usually immersed. Aperture measuring 95 to 97 microns in width and from 90 to 92 microns in length. Bilaterally, two small cardelles. Apertural collar well developed, frequently incorporating a small, suboral avicularium proximally that is raised on a low umbonate process. Avicularian mandible small, bluntly rounded. On young zooecia the apertural collar may bear four small, conical projections. No oral spines. No interzooecial or frontal avicularia present on any of the 27 zoaria in the collection. Ovicells are prominent, imperforate, hyperstomial, globose, with an open, hood-like, frontal area.

Holoporella minuta is readily distinguishable from other species of this genus by virtue of its small zooecial size and the lack of interzooecial or frontal avicularia.

HOLOTYPE: Allan Hancock Foundation number 144, Allan Hancock Foundation, University of Southern California, Los Angeles, California.

PARATYPE: In the American Museum of Natural History.

TYPE LOCALITY: Puritan-American Museum of Natural History Expedition, station 87, Pulmo Reef, Baja California, latitude 23° 26′ N., longitude 109° 25′ W., 2–4 fathoms, rocks, water temperature at 4 fathoms 21.5° C., April 18, 1957.

OCCURRENCE: Station 87, Pulmo Reef, Baja California, 2–4 fathoms. Station 89, Los Frailes Bay, Baja California, 20–40 fathoms. Station 115, off San José Island, 13.5–17.5 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 144, off Coronados Island, 13–16.5 fathoms.

GENUS *TREMATOOECIA* OSBURN, 1940

Trematooecia hexagonalis (Canu and Bassler), 1930

Holoporella hexagonalis CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 38, 39, pl. 7, fig. 1.

Trematooecia hexagonalis, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 503, 504, pl. 60, fig. 7.

Zoaria (colonies) forming irregular, tan-colored encrustations on coralline algae and shells of mollusks. Zooecia distinct, tall, varying from ovoid to hexagonal in outline. Frontal (olocyst) smooth, glassy, on young zooecia pierced by two rows of moderately large peripheral pores. Aperture centrally placed, large, rounded distally, with a semicircular proximal rim below a pair of lateral cardelles. Apertural collar low, bearing four stout, tapering, spine-like processes. None of these processes showing evidence of possessing avicularia, and cannot be called "avi-

cularian tuberosities" (Canu and Bassler, 1930). Occasionally a medium-sized, frontal avicularium with a short blunt mandible is found. Ovicells globose, prominent, with a coarse, perforate, frontal area.

OCCURRENCE: Station 087, Pulmo Reef, Baja California, 2–4 fathoms. Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 119, off San Diego Island, 10–15 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 122, inlet between San Carlos Bay and Point San Telmo, Baja California, intertidal. Station 123, Aqua Verde Bay, Baja California, 1–3.25 fathoms. Station 128, off Monserrate Island, 5–6 fathoms. Station 130, off Santa Catalina Island, 1–2.5 fathoms. Station 131, off Carmen Island, 41–45 fathoms. Station 132, off Carmen Island, 14–30 fathoms. Station 141, Marquer Bay, Carmen Island, 0.5–2 fathoms. Station 144, off Coronados Island, 13–16.5 fathoms. Station 145, off Coronados Island, 40–45 fathoms. Station 167, off Angel de la Guarda Island, 15–17 fathoms. Station 168, off Angel de la Guarda Island, 16–17 fathoms. Station 172, Puerto Refugio, Angel de la Guarda Island, 16–18 fathoms. Station 173, Puerto Refugio, Angel de la Guarda Island, 17–19 fathoms.

DISTRIBUTION: This species was originally described from the Galapagos Islands by Canu and Bassler (1930). Its geographical range was extended northward as far as Rosario Bay on the Pacific coast of Baja California by Osburn (1950–1953, no. 2). Osburn reported one locality in the Gulf of California, Puerto Refugio, Angel de la Guarda Island, 15–30 fathoms. This is primarily a tropical species.

FAMILY CELLEPORINIDAE HARMER, 1957

GENUS *CELLEPORINA* GRAY, 1848

Celleporina costazi (Audouin), 1826

Cellepora costazii AUDOUIN, 1826, *in* Savigny, Description de l'Egypte, histoire naturelle, vol. 1, pt. 4, p. 237, pl. 7, fig. 4.

Non Cellepora costazi, ROBERTSON, 1908, Univ. California Publ. Zool., vol. 4, no. 5, p. 313, pl. 24, fig. 89.

Costazia costazi, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, p. 506, pl. 62, figs. 3, 4.

Costazia costazi, SOULE AND DUFF, 1957, Proc. California Acad. Sci., vol. 29, no. 4, pp. 128, 129.

Colonies forming hyaline to ivory-white encrustations on rock. Zooecia of average size, distinct. Frontal (olocyst) smooth, with a row of eight to 10 peripheral pores. Aperture elongate, rounded distally, with a distinct, wide, U-shaped, proximal sinus. Apertural collar thin, high, bearing a pair of small pedicellate avicularia, their mandibles directed forward. No

vicarious avicularia present. Ovicells numerous, globose, each with a semicircular frontal area possessing a row of radially disposed pores.

OCCURRENCE: Station 109, San Francisco Island, intertidal.

DISTRIBUTION: This species is known from tropical to temperate waters. In the eastern Pacific valid records of its occurrence are rare. It was reported by Osburn (1950–1953, no. 2) from San Nicolas Island, California, San Pedro, California breakwater, and San Francisco, California. This is the first record of this species in the Gulf of California.

FAMILY MAMILLOPORIDAE CANU AND BASSLER, 1927

GENUS *MAMILLOPORA* SMITT, 1873

Mamillopora cupula Smitt, 1873

Mamillopora cupula SMITT, 1873, K. Svenska Vetensk. Akad. Handl., new ser., vol. 11, no. 4, p. 33, pl. 7, figs. 146, 147.

Mamillopora cupula, CANU AND BASSLER, 1930, Proc. U. S. Natl. Mus., vol. 76, art. 13, pp. 45, 46.

Mamillopora cupula, HASTINGS, 1930, Proc. Zool. Soc. London, for 1929, p. 733, pl. 16, figs. 113–117, pl. 17, fig. 122.

Mamillopora cupula, OSBURN, 1952, *in* Allan Hancock Foundation publications of the University of Southern California, vol. 14, no. 2, pp. 517, 518, pl. 64, figs. 10, 11.

Zoaria rounded, cup-shaped or dome-like, vaulted, non-encrusting. Zooecia erect, the frontal area reduced to the aperture and a wide roughened apertural collar that possesses a row of low tubercles. Aperture elongated, rounded distally, with a widened, curved, proximal border below a pair of prominent lateral cardelles. Interzooecial avicularia numerous, each with a broad, blunt mandible directed distally. Ovicells immersed, appearing as low convex protuberances that incineration reveals to be finely perforate.

OCCURRENCE: Station 089, Los Frailes Bay, Baja California, 20–40 fathoms. Station 114, Amortajada Bay, San José Island, 22–25 fathoms. Station 120, off San Diego Island, 25–40 fathoms. Station 131, off Carmen Island, 41-45 fathoms. Station 138, off Puerto Escondido, Baja California, 18–20 fathoms. Station 139, off Puerto Escondido, Baja California, 40–46 fathoms.

DISTRIBUTION: Originally described from the tropical waters of the Gulf of Mexico by Smitt (1873), this species has since been reported from the tropical eastern Pacific by Canu and Bassler (1930), Hastings (1930), and Osburn (1950–1953, no. 2). Osburn recorded it from the Gulf of California but indicated no specific localities. Two locality records from the Gulf of California were found in the Hancock collection: bottom sample 275, off Raza Island, 40 fathoms, and off Isla Partida, 55 fathoms.

SUMMARY

In the Puritan collection of 75 species of ascophoran Bryozoa, four are described as new species. Twenty-six species are reported here for the first time from the Gulf of California, among which are three species that are also additions to the Panamic fauna.

Of the 71 previously described species, 9 per cent are cosmopolitan, 46 per cent have been recovered in both temperate and tropical waters, 4 per cent were confined to warm temperate waters, and 41 per cent are presently known from only tropical waters.

The bryozoan material in the Puritan collection was collected from the littoral zone, at depths ranging from intertidal to a maximum of 50 fathoms.

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