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The Marine Fauna of New Zealand: Bryozoa: Gymnolaemata (Ctenostomata and Cheilostomata Anasca) from the Western South Island Continental Shelf and Slope

by

D.P. GORDON

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by

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ABSTRACT

Bryozoans from the western South Island continental shelf and slope, from the intertidal to abyssal depths, have been studied. Thirteen species of Ctenostomata are described, of which four are new; 132 species of Cheilostomata Anasca are described, of which 28 are new. The new species are distributed among the genera *Triticella, Arachnoidella, Alcyonidium, Bockiella, Kenella, Concertina* n.gen., *Amphiblestrum, Antropora, Aplousina, Crassimarginatella, Chaperia, Chaperiopsis, Cornucopina, Himantozoum, Beania, Amastigia, Caberea, Menipea, Semibugula, Mollia, Cellaria, Euginoma*, and *Melicerita*. There are two new genera: *Concertina* (Flustridae) and *Penemia* (Cabereidae). An examination of the type-species of the British Eocene genus *Akatopora* Davis has led to the recognition of this genus in Recent seas and *Aplousina*(?) *circumsaepta* Uttley and related species are herein ascribed to it. *Figularia spinea* Brown and related figulariae with oral spines and lacking lumen pores in the spines are considered to belong to *Crassimarginatella* subgenus *Valdemunitella*. *Bugula prismatica* (Gray, 1843) is redescribed.

Keywords: Bryozoa, Gymnolaemata, Ctenostomata, Cheilostomata, classification, distribution, new species, marine fauna, New Zealand.

INTRODUCTION

The bryozoan fauna of western New Zealand was, until very recently, little known. This owes, in part, to the smaller number of centres of population on the western coasts of North and South Islands, and the concomitant lack of access to many sections of coastline, especially in the South Island.

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The earliest collection of bryozoans from western New Zealand was from *Challenger* station 167 northwest of Cape Farewell in 1874. Four species were recorded, three of them new (Busk 1884; Hamilton 1896). Livingstone (1929) recorded seven species from New Plymouth and a further 16 species from off Cape Maria van Diemen. Powell (1967) recorded a further 12 species from off Cape Maria van Diemen and 11 more from the Manawatu coast. Moyano and Gordon (1980) described a new species from Cape Foulwind common to New Zealand and Chile, Hayward (1981) recorded four deep-water species taken by the *Galathea* west of South Island, and Cook and Chimonides (1984) described free-living discoidal species from shelf "sand-fauna" environments from Cape Reinga to the western approaches of Foveaux Strait. Collectively, these taxonomic works account for 59 species. All other published records of western New Zealand Bryozoa are to be found in recent ecological works (Morton and Miller 1968; Foster 1982; Miller 1982; Bradstock and Gordon 1983). The most comprehensive list is of bryozoans associated with bryozoan coral west of D'Urville Island (Bradstock and Gordon 1983), where 94 species occurred at one station. These records combined add a further 84 species, making 143 in all.

It was originally intended that this memoir should deal with the complete gymnolaemate fauna of western New Zealand. As the study proceeded it soon became apparent that the species diversity would be too great to permit treatment in one work. Gordon and McKnight (1983) have already pointed out the high number of bryozoan species anticipated for the New Zealand region. In the event, it has become necessary to restrict the coverage to the western South Island only and to exclude the Ascophora. This memoir deals with 145 species and subspecies of Ctenostomata and Cheilostomata Anasca, of which 32 are new. It is anticipated that ~170 species of Ascophora from this area will be dealt with in a future memoir.

ENVIRONMENT

The bryozoans described here were collected from 141 New Zealand Oceanographic Institute stations ranging from the intertidal zone to abyssal depths (4441 m), with more than half the stations at depths less than 200 metres. Bryozoans from three intertidal locations (Nelson, Totaranui, and Cape Foulwind) sampled by me are also included.

Over the length of the western South Island, the width of the continental shelf decreases from north to south. It is widest in the western approaches to Cook Strait, shelving gently north-westwards to the extensive Challenger Plateau which lies mostly between 500 and 1000 metres depth. This plateau is bordered by the New Caledonia Trough to the north and the Tasman Basin to the south. The narrowest part of the shelf lies adjacent to Fiordland. Here it is mostly only 1–3 km wide, sloping abruptly to the 4000 m contour which is only 24 km offshore at its closest point.

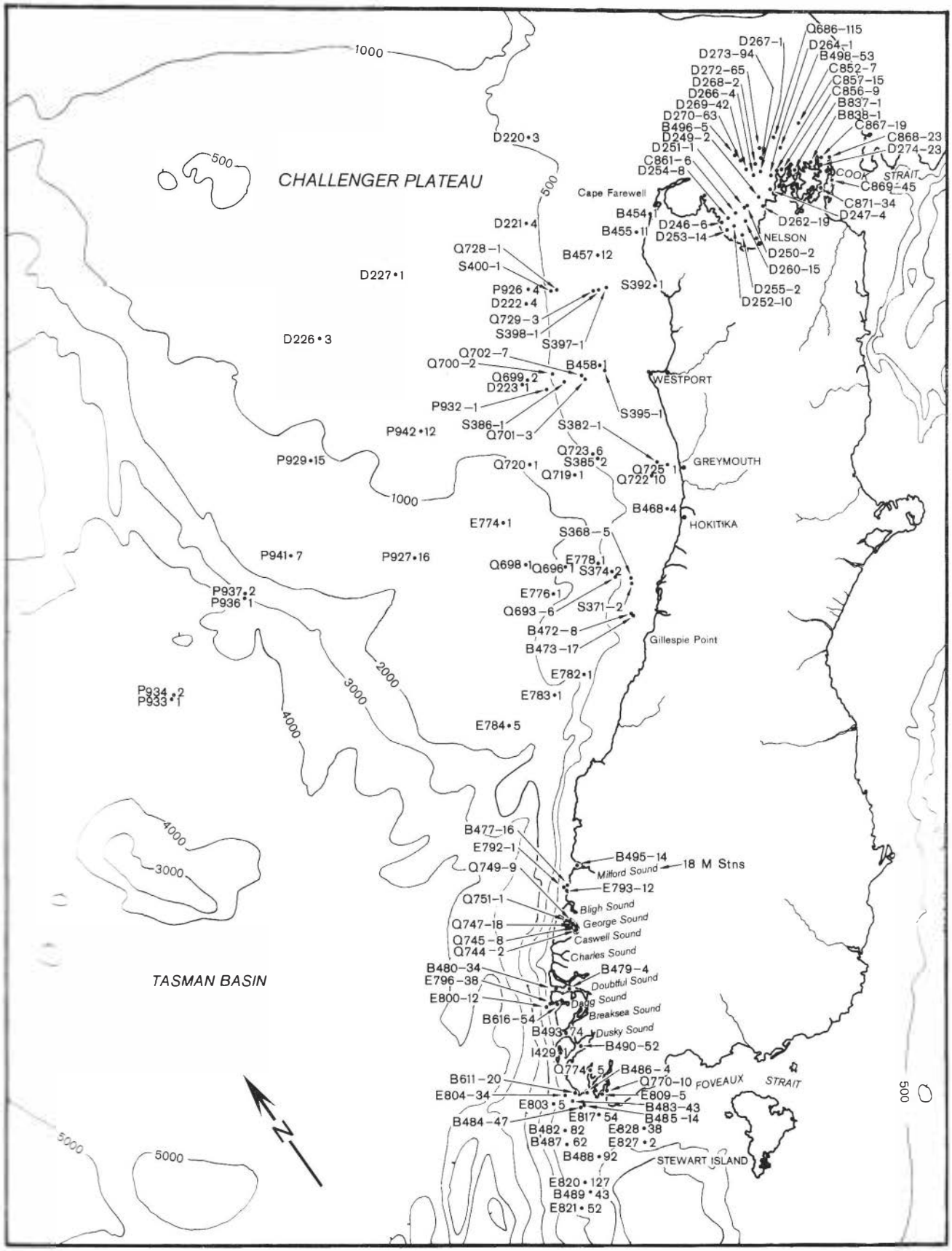
Surface sediments on the shelf and upper slope consist almost entirely of modern sands and muds (Probert and Swanson 1985). Inshore, in waters less than 50 m deep, the sediment is mostly fine sand to coarse silt. At depths of 90–140 m there is a mid-shelf increase in mud, with sediments then becoming coarser on the outer shelf. Much of the western shelf of the South Island experiences a high input of river-borne sediment, which is deposited at an average rate of around 1–2 mm per year. This rate is apparently lower in the north and higher in the south.

Bryozoan diversity reflects the type of substratum available for settlement. Clean shell debris and stable rocky ground are favoured habitats. Mud and mobile sediments, while supporting some species, do not yield high numbers of species. An exception is found in the bryozoan coral grounds of Tasman Bay, at scattered localities from Separation Point to D'Urville Island. *Hippomenella vellicata* (Hutton) and *Celleporaria agglutinans* (Hutton) are able to settle on small hard particles protruding from a mud bottom, growing into coral-like mounds which support a substantial bryozoan (and other) epifauna (Bradstock and Gordon 1983).

At 33 stations there was only a single bryozoan species per station; 84 stations had 1–10 species; 14 stations had more than 50 species, and two had more than 100. The latter were a station in Stephens Hole near D'Urville Island (Q686) with 115 species and a station on Puysegur Bank (E820) with 127 species (Fig. 1). At both of these stations the substratum was predominantly molluscan shell gravel and bryozoans dominated the sessile fauna.

In general, the stations with the greatest diversity of species were in the vicinity of these two areas. Between Cape Farewell and Milford Sound the shelf

FIG. 1. (*opposite*). South Island, New Zealand, showing the NZOI stations from which bryozoans were obtained. The spot marks the station location, the numbers to the right and left of the spot are the number of bryozoan species at that station and the station number respectively. Depth in metres.



bryozoan fauna seems limited by the terrigenous sediment and the highest number of species recorded at any one station was only 17 (Stn B473, just north of Gillespie Point).

Between 500 m and 1000 m depth on the Challenger Plateau the bottom grades from mud with a planktonic carbonate fraction of somewhat more than 20% to a true foraminiferan ooze (McDougall 1975). Here the bryozoan fauna is specialised and, although widespread, of limited diversity, with from 1–16 species per station and dominated by rooted bugulids, conscharellinids, and cellariids.

LIST OF STATIONS

New Zealand Oceanographic Institute data are given below in abbreviated form from field notes logged in the Station Registers. Bryozoan substrata are listed but occurrences of some types of animals noted in the field but not relevant to this report are omitted. The following abbreviations for equipment are used: CB – box corer; DC – cone dredge with canvas bag, diameter 300 mm, length 900 mm; DCMB – cone dredge with cylindrical steel wire mesh bag (12.5 mm mesh), diameter 300 mm, length 900–1200 mm, with canvas as inner lining; DD – Devonport dredge, rectangular with steel wire mesh bag (12.5 mm mesh), width 750 mm, height 150 mm, length 900 mm; DLB – letterbox dredge; DM – mussel dredge; DP – pipe dredge; DR – rock dredge, modified to include a flexible chain-linked mid-section, with steel wire mesh bag, for cobbles, pebbles, rock fragments (*see* McDougall 1973); GD – Dietz grab; GHO – medium orange peel grab; GLO– large orange peel grab; SEB – epibenthic sled; TAM – Agassiz trawl with 1200 mm netting bag, mesh 50 mm; TAM + tangles – Agassiz trawl with 1200 mm netting bag, mesh 50 mm, trailing frayed rope; TM – modified Menzies trawl; TMA – Manihiki trawl. For each of the stations listed below, the number of bryozoan species per station is cited following the depth in metres.

New Zealand Oceanographic Institute (NZOI)

B454 (1 June 1961) 40°37.8′S, 172°25.5′E. DC.
Sandy mud, worms and dead shell. Depth 19 m. 1 sp.

B455 (1 June 1961) 40°40.0′S, 172°13.0′E. DC.
Yellow-brown sand, dead shell, quartz fragments, pebbles. Depth 58 m. 11 spp.

B457 (1 June 1961) 40°38.0′S, 171°43.0′E. DC.
Soft grey mud with pebbles, worms and dead shell. Depth 211 m. 12 spp.

B458 (2 June 1961) 41°23.5′S, 171°03.0′E. DC.
Soft grey mud, worms and dead shell. Depth 201 m. 1 sp.

B468 (3 June 1961) 42°39.0′S, 170°47.0′E. DC.
Grey-brown muddy sand, small stones, live and dead shells. Depth 156 m. 4 spp.

B472 (3 June 1961) 43°20′S, 169°47′E. DC.
Very shelly grey muddy sand. Depth 215 m. 8 spp.

B473 (3–4 June 1961) 43°20.0′S, 169°47.0′E. DC.
Grey mud with rock fragments, coral, brachiopods, and dead shell. Depth 215 m. 17 spp.

B477 (4 June 1961) 44°40.2′S, 167°35.0′E. DC.
Coarse grey sand with bivalve shells. Depth 82 m. 16 spp.

B479 (5 June 1961) 45°19.5′S, 167°00.0′E. DC.
Coarse sand with large pebbles, coral, worm tubes, brachiopods, bivalve shells. Depth 154 m. 4 spp.

B480 (5 June 1961) 45°16.8′S, 166°51.3′E. Doubtful Sound. DC.
Coarse grey shelly sand. Depth 116 m. 34 spp.

B482 (5–6 June 1961) 46°08.8′S, 166°06.0′E. DD.
Rocky substrate with encrusting corals, brachiopods, etc. Depth 88 m. 82 spp.

B483 (6 June 1961) 46°01.5′S, 166°21.0′E. DC.
Coarse shell sand with bivalve shells and fragments. Depth 187 m. 43 spp.

B484 (6 June 1961) 46°05.0′S, 166°22.0′E. DC.
Fine shell sand with rounded pebbles and small bivalves. Depth 124 m. 47 spp.

B485 (6 June 1961) 46°04.1′S, 166°24.5′E. DC.
Some coral. Depth 62 m. 14 spp.

B486 (6 June 1961) 46°01.2′S, 166°30.1′E. Chalky Inlet. DD.
Small pebbles, shells, brown seaweed with holdfast. Depth 34 m. 4 spp.

B487 (6 June 1961) 46°16.0′S, 166°03.0′E. Puysegur Bank. DD.
Angular encrusted rocks, with hydroids, coral, bivalves. Depth 196 m. 62 spp.

B488 (7 June 1961) 46°28.7′S, 166°14.3′E. DD.
Small encrusted rocks, *Pecten* shells, *Neothyris*. Depth 164 m. 92 spp.

B489 (7 June 1961) 46°39.0′S, 165°57.0′E. DD.
Little rock, many brachiopods, *Pecten*, gastropods, hydroids. Depth 198 m. 43 spp.

B490 (8 June 1961) 45°44.3′S, 166°44.8′E. Dusky Sound. DD.

Rocks, shell, coral, worm tubes. Depth 148 m. 52 spp.

B493 (8 June 1961) 45°34.4′S, 166°39.1′E. Breaksea Sound. DD.
Large round pebbles, *Glycymeris*. Depth 84 m. 74 spp.

B495 (9 June 1961) 44°33.6′S, 167°47.6′E. DD.
Worm tubes, bivalves. Depth 124 m. 14 spp.

B496 (11 June 1961) 40°36.5′S, 173°33.0′E. Tasman Bay. DD.
Fine grey mud, bivalve shells. Depth 58 m. 5 spp.

B498 (11 June 1961) 40°46.3′S, 174°02.8′E. Jag Rocks. DD.
Live *Pecten* shells with hydroids. Depth 44 m. 53 spp.

B611 (18 October 1962) 45°59.8′S, 166°25.8′E. DCMB.
Coarse broken shell, rocks, coral. Depth 68 m. 20 spp.

B616 (18 October 1962) 45°20.0′S, 166°47.0′E. Dagg Sound. DCMB.
Boulders, pebbles, medium-coarse sand, shell, hydroids. Depth 134 m. 54 spp.

B837 (21 March 1963) 40°59.0′S, 174°03.0′E. Forsyth Bay. GHO.
Soft grey mud, worm tubes. Depth 40 m. 1 sp.

B838 (21 March 1963) 40°59.0′S, 174°07.0′E. Guards Bay. GHO.
Fine dark grey sandy mud, a few shells. Depth 17 m. 1 sp.

C852 (2 March 1962) 40°41.3′S, 164°20.3′E. GHO.
Coarse grey muddy shelly sand. Depth 132 m. 7 spp.

C856 (2 March 1962) 40°55.2′S, 173°50.7′E. N.E. of French Pass. GHO.
Coarse shelly pebbly sand, barnacle plates, bivalves. Depth 22 m. 9 spp.

C857 (2 March 1962) 40°56.1′S, 173°48.4′E. Current Basin. GHO.
Shelly sandy mud, bivalves, gastropods. Depth 31 m. 15 spp.

C861 (3 March 1962) 41°00.0′S, 173°15.5′E. Tasman Bay. GHO.
Shelly sandy mud, coarse shell, shell fragments. Depth 38 m. 6 spp.

C867 (5 March 1962) 41°02.2′S, 174°21.1′E. Queen Charlotte Sound. GHO.
Golden medium shelly sand over fine dark grey sandy mud. Depth 88 m. 19 spp.

C868 (5 March 1962) 41°03.45′S, 174°23.6′E. Off Cape Koamaru. GHO.
Gravel. Depth 198 m. 23 spp.

C869 (5 March 1962) 41°13.0′S, 174°17.1′E. Tory Channel. GHO.
Sandy shelly gravel with cobbles, algae, bivalves, brachiopods, barnacle plates. Depth 35 m. 45 spp.

C871 (5 March 1962) 41°14.4′S, 174°09.1′E. Tory Channel. GHO.
Mud with coarse shell, bivalves. Depth 66 m. 34 spp.

D220 (26 September 1964) 39°32.0′S, 171°48.0′E. Challenger Plateau. TMA.
Light-grey muddy foraminiferal sand, worm tubes, molluscs. Depth 337 m. 3 spp.

D221 (26 September 1964) 40°06.0′S, 171°16.0′E. TMA.
Light grey-brown foraminiferal ooze. Depth 688 m. 4 spp.

D222 (27 September 1964) 40°38.0′S, 170°46.0′E. TMA.
Firm light-grey ooze. Depth 651 m. 4 spp.

D223 (27 September 1964) 41°10.0′S, 170°14.0′E. TMA.
Fine light-grey ooze. Depth 770 m. 1 sp.

D226 (27–28 September 1964) 39°54.0′S. 168°40.0′E. TMA.
Ooze, corals. Depth 823 m. 3 spp.

D227 (28 September 1964) 39°50.0′S, 169°43.0′E. TMA.
Light-grey ooze, corals, gastropods. Depth 752 m. 1 sp.

D246 (4 October 1964) 41°00.0′S, 173°09.4′E. GHO.
Grey shelly sandy mud, dead shells. Depth 29 m. 6 spp.

D247 (5 October 1964) 41°00.0′S, 173°41.4′E. GHO.
Grey sandy mud, broken shell, worm tubes. Depth 42 m. 4 spp.

D249 (5 October 1964) 41°00.0′S, 173°30.5′E. GHO.
Blue-grey mud, broken shell. Depth 48 m. 2 spp.

D250 (5 October 1964) 41°00.0′S, 173°23.0′E. GHO.
Blue-grey sandy mud, shells. Depth 46 m. 2 spp.

D251 (5 October 1964) 41°00.0′S, 173°16.3′E. GHO.
Soft blue-grey mud, broken shell. Depth 42 m. 1 sp.

D252 (5 October 1964) 41°00.0′S, 173°04.0′E. GHO.
Soft blue-grey mud. Depth 20 m. 10 spp.

D253 (5 October 1964) 41°05.0′S, 173°04′E. GHO.
Shelly sandy pebbly mud. Depth 15 m. 14 spp.

D254 (5 October 1964) 41°05.0′S, 173°09.2′E. GHO.
Soft blue-grey mud. Depth 26 m. 8 spp.

D255 (5 October 1964) 41°10.0′S, 173°09.5′E. GHO.
Soft blue-grey mud. Depth 17 m. 2 spp.

D260 (5 October 1964) 41°05.0′S, 173°16.5′E. GHO.
Soft blue-grey mud. Depth 35 m. 15 spp.

D262 (5 October 1964) 41°05.0′S, 173°30.5′E. GHO.
Soft blue-grey mud. Depth 33 m. 19 spp.

D264 (6 October 1964) 40°55.0′S, 173°43.0′E. GHO.
Soft blue-grey mud. Depth 48 m. 1 sp.

D266 (6 October 1964) 40°50.0′S, 173°36.6′E. GHO.
Blue-grey sandy mud. Depth 64 m. 4 spp.

D267 (6 October 1964) 40°50.0′S, 173°43.0′E. TAM
Fine muddy sand. Depth 60 m. 1 sp.

D268 (6 October 1964) 40°45.0′S, 173°43.0′E. GHO.
Blue-grey sandy mud. Depth 70 m. 2 spp.

D269 (6 October 1964) 40°44.5′S, 173°36.0′E. GHO.
Grey sandy shelly mud. Depth 57 m. 42 spp.

D270 (6 October 1964) 40°40.0′S, 173°36.6′E. GHO.
Grey sandy shelly mud. Depth 62 m. 63 spp.

D272 (6 October 1964) 40°40.0′S, 173°49.4′E. DM.
Dead shell. Depth 59 m. 65 spp.

D273 (6 October 1964) 40°45.0′S, 173°49.5′E. DM.
Dead shell. Depth 75 m. 94 spp.

D274 (7 October 1964) 41°04.0′S, 174°19.0′E. GHO.
Blue-grey sandy mud. Depth 27 m. 23 spp.

E774 (15 October 1967) 42°00.0′S, 169°15.0′E. TAM.
Grey ooze, gastropods, pteropods. Depth 1168 m. 1 sp.

E776 (15 October 1967) 42°43.0′S, 169°15.5′E. TAM.
Grey ooze, wood, gastropods. Depth 978–1067 m. 1 sp.

E778 (16 October 1967) 42°43.0′S, 169°52.0′E. TAM.
Grey ooze, gastropods, hydroids. Depth 469–463 m. 1 sp.

E782 (16 October 1967) 43°23.0′S, 169°03.5′E. TAM.
Soft grey mud, wood, gastropods. Depth 823 m. 1 sp.

E783 (16–17 October 1967) 43°23.0′S, 168°36.5′E. TAM.
Grey ooze, wood, gastropods. Depth 966 m. 1 sp.

E784 (17 October 1967) 43°23.0′S, 168°05.0′E. TAM.
Brownish mud, corals, gastropods. Depth 1221–1213 m. 5 spp.

E792 (19 October 1967) 44°40.0′S, 167°33.5′E. TAM.
Fine muddy sand and gravel, rocks, gastropods, bivalves, brachiopods, corals. Depth 213–123 m. 1 sp.

E793 (19 October 1967) 44°40.5′S, 167°32.0′E. TAM.
Soft grey mud, angular pebbles, hydroids, worm tubes. Depth 243–253 m. 12 spp.

E796 (20 October 1967) 45°20.0′S, 166°45.5′E. TAM.
Muddy sandy gravel, pebbles, small boulders, wood, gastropods, dead bivalves. Depth 251–226 m. 38 spp.

E800 (20 October 1967) 45°20.5′S, 166°41.5′E. TAM.
Corals. Depth 1003–993 m. 12 spp.

E803 (21 October 1967) 45°57.0′S, 166°09.0′E. TAM.
Bivalves, corals, brachiopods, hydroids. Depth 534–514 m. 5 spp.

E804 (21 October 1967) 45°58.5′S, 166°18.5′E. TAM.
Encrusted rocks, brachiopods, hydroids. Depth 183 m. 34 spp.

E809 (22 October 1967) 46°06.7′S, 166°40.6′E. Preservation Inlet. Shore collection.
Bivalves, gastropods, algae, from the intertidal zone. 5 spp.

E817 (23 October 1967) 46°13.5′S, 166°29.0′E. TAM.
Encrusted pebbles, gastropods. Depth 235–218 m. 54 spp.

E820 (23 October 1967) 46°35.0′S, 165°58.0′E. TAM.
Encrusted boulders, live and dead bivalves, gastropods, hydroids, worm tubes. Depth 220 m. 127 spp.

E821 (23 October 1967) 46°43.5′S, 165°46.5′E. TAM.
Encrusted rocks, gastropods. Depth 549 m. 52 spp.

E827 (24 October 1967) 46°35.5′S, 166°44.5′E. TAM.
Small pebbles, gastropods. Depth 530–526 m. 3 spp.

E828 (24 October 1967) 46°30.0′S, 166°49.0′E. TAM.
Dead bivalves, worm tubes. Depth 220 m. 38 spp.

I429 (8 December 1977) 45°41.5′S, 166°32.3′E. Dusky Sound. GD.
Coarse grey sand. Depth 26 m. 1 sp.

M763 (29 March 1981) 44°36.2′S, 167°49.7′E. Milford Sound. SCUBA.
Vertical rock face. Depth 27 m. 11 spp.

M773 (30 March 1981) 44°37.1′S, 167°51.5′E. Milford Sound. SCUBA.
Vertical rock face with overhangs, ledges. Depth 25 m. 18 pp. (Sample combined with M777).

M774 (30 March 1981) 44°40.0′S, 167°54.6′E. Milford Sound. SCUBA.
Rock face of irregular relief. Depth 30 m. 22 spp.

M775 (30 March 1981) 44°38.9′S, 167°55.2′E. Milford Sound. SCUBA.
Vertical rock face with cracks, ledges. Depth 20 m. 13 spp.

M776 (30 March 1981) 44°39.5′S, 167°54.2′E. Milford Sound. SCUBA.
Vertical rock face with cracks, ledges, debris. Depth 15 m. 21 spp.

M777 (31 March 1981) 44°37.1′S, 167°51.5′E. Milford Sound. SCUBA.
Vertical rock face with overhangs, ledges. Depth 25 m. 18 spp. (Sample combined with M773).

M778 (31 March 1981) 44°29.0′S, 167°30.8′E. Milford Sound. SCUBA.
Rock face of irregular relief. Depth 20 m. 26 spp.

M779 (31 March 1981) 44°36.0′S, 167°49.4′E. Milford Sound. SCUBA.
Rock face. Depth 30 m. 46 spp.

M780 (1 April 1981) 44°36.6′S, 167°52.1′E. Milford Sound. SCUBA.
Steep rocky slope with some shelves. Depth 40 m. 33 spp.

M782 (1 April 1981) 44°40.1′S, 167°55.1′E. Milford Sound. SCUBA.
Vertical rock face. Depth 22 m. 12 spp.

M783B (1 April 1981) 44°37.1′S, 167°51.5′E. Milford Sound. DP.
Depth 100–60 m. 10 spp.

M784B (1 April 1981) 44°36.8′S, 167°50.7′E. Milford Sound. DP.
Depth 60–30 m. 2 spp.

M789 (4 April 1981) 44°33.0′S, 167°50.0′E. Milford Sound. SCUBA.
Rocky knoll of irregular relief. Depth 30 m. 14 spp.

M791 (6 April 1981) 44°37.1′S, 167°51.5′E. Milford Sound. SCUBA.
Vertical rock face with overhangs, ledges. Depth 30 m. 25 spp.

M793 (7 April 1981) 44°36.0′S, 167°49.4′E. Milford Sound. SCUBA.
Rock face. Depth 30 m. 20 spp.

M794 (7 April 1981) 44°39.0′S, 167°53.9′E. Milford Sound. SCUBA.
Rock face. Depth 45 m. 10 spp.

M795 (8 April 1981) 44°37.1′S, 167°51.5′E. Milford Sound. SCUBA.
Rock face. Depth 8 m. 10 spp.

M797 (9 April 1981) 44°37.1′S, 167°51.5′E. Milford Sound. SCUBA.
Rock face. Depth 30 m. 24 spp.

M799 (9 April 1981) 44°36.8′S, 167°52.6′E. Milford Sound. SCUBA.
Vertical rock face with overhangs. Depth 42 m. 10 spp.

P926 (17 April 1980) 40°33.1′S, 170°57.3′E. Challenger Plateau. SEB.
Foraminiferal ooze, gastropods, bivalves. Depth 570–572 m. 4 spp.

P927 (18 April 1980) 40°50.1′S, 168°14.8′E. SEB.
Foraminiferal ooze, hydroids, brachiopods. Depth 1009–1005 m. 16 spp.

P929 (18 April 1980) 40°42.8′S, 167°56.0′E. SEB.
Fine foraminiferal ooze, corals, brachiopods. Depth 1029 m. 15 spp.

P932 (19 April 1980) 41°18.4′S, 166°15.8′E. TM.
Compact ooze. Depth 4059–4032 m. 1 sp.

P933 (20 April 1980) 41°39.7′S, 165°13.1′E. TM.
Foraminiferal ooze, molluscs, cirripedes. Depth 4421–4419 m. 1 sp.

P934 (20 April 1980) 41°39.1′S, 165°13.6′E. SEB.
Mud, cirripede. Depth 4405–4441 m. 2 spp.

P936 (21 April 1980) 41°19.8′S, 166°29.3′E. TM.
Foraminiferal ooze, cirripede. Depth 2988–3023 m. 1 sp.

P937 (21 April 1980) 41°19.2′S, 166°27.9′E. SEB.
Foraminiferal ooze, bivalve, gastropods. Depth 3253–3347 m. 2 spp.

P941 (23 April 1980) 41°15.2′S, 167°07.2′E. SEB.
Foraminiferal ooze, gastropods, brachiopods, pumice, whalebone. Depth 1463–1457 m. 7 spp.

P942 (24 April 1980) 41°00.6′S, 169°06.0′E. SEB.
Foraminiferal ooze, gastropods, corals. Depth 914 m. 12 spp.

Q686 (2 December 1981) 40°41.3′S, 174°03.8′E. Stephens Hole. DR.
Broken shell, bivalves, gastropods, brachiopods. Depth 205 m. 115 spp.

Q693 (19 February 1982) 42°50.4′S, 169°58.7′E. DLB.
Echinoid spines. Depth 297 m. 6 spp.

Q696 (21 February 1982) 42°34.8′S, 169°30.8′E. DLB.
Depth 960 m. 1 sp.

Q698 (22 February 1982) 42°23.7′S, 169°11.8′E. DLB.
Depth 1120 m. 1 sp.

Q699 (23 February 1982) 41°08.9′S, 170°20.6′E, DLB.
Depth 698 m. 2 spp.

Q700 (23 February 1982) 41°15.1′S, 170°37.5′E. DLB.
Depth 560 m. 2 spp.

Q701 (24 February 1982) 41°24.4′S, 170°53.6′E. DLB.
Small rock fragments. Depth 248 m. 3 spp.

Q702 (24 February 1982) 41°23.1′S, 170°51.8′E. TM.
Small rock fragments, gastropods. Depth 296–255 m. 7 spp.

Q719 (2 March 1982) 42°01.6′S, 170°12.7′E. DLB.
Depth 793 m. 1 sp.

Q720 (2 March 1982) 41°44.0′S, 169°50.1′E. DLB.
Depth 960 m. 1 sp.

Q722 (4 March 1982) 42°23.4′S, 170°53.6′E. DLB.
Pebbles. Depth 167 m. 10 spp.

Q723 (4 March 1982) 41°58.3′S, 170°28.1′E. DLB.
Pteropod shells. Depth 507 m. 6 spp.

Q725 (5 March 1982) 42°23.9′S, 171°06.8′E. DLB.
Worm tubes. Depth 33 m. 1 sp.

Q728 (5 March 1982) 40°42.0′S, 171°08.6′E. DLB.
Depth 477 m. 1 sp.

Q729 (6 March 1982) 40°51.8′S, 171°28.0′E. DLB.
Depth 195 m. 3 spp.

Q744 (14 July 1982) 44°58.75′S, 167°26.8′E. George Sound. SCUBA.
Antipatharians. Depth 35 m. 2 spp.

Q745 (15 July 1982) 44°54.05′S, 167°25.17′E. George Sound. SCUBA.
Brachiopods. Depth 40 m. 8 spp.

Q747 (15 July 1982) 44°51.2′S, 167°23.1′E. George Sound. SCUBA.
Bivalves, worm tubes, rocks. Depth 30 m. 18 spp.

Q749 (16 July 1982) 44°54.0′S, 167°26.2′E. George Sound. SCUBA.
Brachiopods. Depth 40 m. 9 spp.

Q751 (16 July 1982) 44°51.1′S, 167°30.65′E. Bligh Sound. SCUBA.
Brachiopods. Depth 40 m. 1 sp.

Q770 (23 July 1982) 46°04.5′S, 166°45.2′E. Long Sound. SCUBA.
Brachiopods. Depth 35 m. 10 spp.

Q774 (25 July 1982) 45°54.5′S, 166°40.9′E. Chalky Inlet. SCUBA.
Brachiopods. Depth 35 m. 5 spp.

S368 (28 January 1983) 42°57.4′S, 170°06.8′E. TAM
Spatangus multispinus. Depth 151–153 m. 5 spp.

S371 (28 January 1983) 42°57.7′S, 170°02.5′E. TAM.
Spatangus multispinus. Depth 180–171 m. 2 spp.

S374 (29 January 1983) 42°49.8′S, 169°55.9′E. TAM.
Spatangus multispinus. Depth 438 m. 2 spp.

S382 (2 February 1983) 42°19.6′S, 171°01.1′E. TAM. *Spatangus multispinus*. Depth 124 m. 1 sp.

S385 (3 February 1983) 41°59.0′S, 170°29.6′E. CB. Calcareous muddy sand. Depth 496 m. 2 spp.

S386 (4 February 1983) 41°20.9′S, 170°40.8′E. CB. Calcareous muddy sand. Depth 511 m. 1 sp.

S392 (7 February 1983) 41°07.5′S, 172°04.3′E. CB. Sand. Depth 29–32 m. 1 sp.

S395 (8 February 1983) 41°27.8′S, 171°06.8′E. CB. Mud. Depth 178 m. 1 sp.

S397 (10 February 1983) 40°55.5′S, 171°37.1′E. CB. Sandy mud with pebbles. Depth 155 m. 1 sp.

S398 (10 February 1983) 40°53.4′S, 171°31.8′E. CB. Muddy sand. Depth 177 m. 1 sp.

S400 (11 February 1983) 40°41.3′S, 171°06.0′E. CB. Light-grey foraminiferal ooze. Depth 505 m. 1 sp.

LIST OF SPECIES DESCRIBED

Class GYMNOLAEMATA
Order CTENOSTOMATA
Suborder STOLONIFERA
Superfamily WALKERIOIDEA
Family TRITICELLIDAE

Triticella nodosa n.sp.

Superfamily VESICULARIOIDEA
Family VESICULARIIDAE

Amathia wilsoni Kirkpatrick
Bowerbankia gracilis Leidy
Bowerbankia imbricata (Adams)

Superfamily PENETRANTIOIDEA
Family PENETRANTIIDAE

Penetrantia irregularis Silén
Penetrantia parva Silén

Suborder CARNOSA
Superfamily ARACHNIDIOIDEA
Family ARACHNIDIIDAE

Anguinella palmata van Beneden
Arachnoidella echinophilia n.sp.
Nolella annectens Harmer
Nolella ?stipata Gosse

Superfamily ALCYONIDIOIDEA
Family ALCYONIDIIDAE

Alcyonidium multigemmatum n.sp.
Alcyonidium cf. *mytili* auctt.
Bockiella abyssicola n.sp.

Order CHEILOSTOMATA
Suborder ANASCA
Superfamily MEMBRANIPOROIDEA
Family MEMBRANIPORIDAE

Conopeum seurati (Canu)

Family ELECTRIDAE

Electra pilosa (Linnaeus)

Family FARCIMINARIIDAE

Columnella magna (Busk)

Family FLUSTRIDAE

Carbasea indivisa (Busk)
Concertina cultrata n.gen., n.sp.
Gregarinidra inarmata (Hincks)
Gregarinidra serrata (MacGillivray)
Kenella aliena n.sp.
Watersia militaris (Waters)

Family CALLOPORIDAE

Akatopora circumsaepta (Uttley)
Amphiblestrum alcimum Gordon
Amphiblestrum blandum n.sp.
Amphiblestrum contentum n.sp.
Antropora pacifera n.sp.
Aplousina anxiosa n.sp.
Crassimarginatella (Corbulella) bifurca (Powell)
Crassimarginatella (Corbulella) corbula (Hincks)
Crassimarginatella (Corbulella) gibba n.sp.
Crassimarginatella (Crassimarginatella) cucullata (Waters)
Crassimarginatella (Crassimarginatella) fossa Uttley
Crassimarginatella (Valdemunitella) hara n.sp.
Crassimarginatella (Valdemunitella) fraudatrix n.sp.
Crassimarginatella (Valdemunitella) pyrula (Hincks)
Crassimarginatella (Valdemunitella) spinea (Brown)
Crassimarginatella (Valdemunitella) valdemunita (Hincks)
Ellisina sericea (MacGillivray)
Foveolaria (Foveolaria) elliptica (Busk)
Foveolaria (Odontionella) cyclops (Busk)
Retevirgula acuta (Hincks)
Retevirgula aggregata Gordon
Retevirgula sejuncta (MacGillivray)

Family CHAPERIIDAE

Chaperia acanthina (Lamouroux)
Chaperia granulosa n.sp.
Bryopastor challengeri Gordon
Chaperiopsis (Chaperiopsis) boninensis (Silén)
Chaperiopsis (Chaperiopsis) cervicornis (Busk)
Chaperiopsis (Chaperiopsis) cf. *cristata* (Busk)
Chaperiopsis (Chaperiopsis) incognita n.sp.
Chaperiopsis (Chaperiopsis) serrata (Uttley & Bullivant)
Chaperiopsis (Chaperiopsis) serrata biporosa (Uttley & Bullivant)
Chaperiopsis (Chaperiopsis) spiculata Uttley
Chaperiopsis (Chaperiopsis) splendida n.sp.
Chaperiopsis (Clipeochaperia) chathamensis (Uttley & Bullivant)
Chaperiopsis (Clipeochaperia) funda Uttley & Bullivant
Icelozoon sp.
Patsyella acanthodes Gordon

Family HIANTOPORIDAE

Hiantopora jucunda Gordon

Superfamily AETEOIDEA
Family AETEIDAE

Aetea ?australis Jullien
Aetea ligulata Busk
Aetea truncata (Landsborough)

Superfamily SCRUPARIOIDEA
Family SCRUPARIIDAE

Leiosalpinx australis (Busk)
Scruparia ambigua (d'Orbigny)

Superfamily BUGULOIDEA
Family BUGULIDAE

Bugula flabellata (Thompson in Gray)
Bugula neritina (Linnaeus)
Bugula prismatica (Gray)
Bugula stolonifera Ryland
Bugulella gracilis (Nichols)
Dimetopia cornuta Busk
Dimetopia spicata Busk
Camptoplites cf. *abyssicolus* (Kluge)
Camptoplites asymmetricus Hastings
Camptoplites bicornis elatior (Kluge)
Camptoplites reticulatus unicornis (Busk)
Cornucopina pectogemma (Goldstein)
Cornucopina salutans n.sp.
Himantozoum exile n.sp.
Kinetoskias elongata Harmer

Family BEANIIDAE

Beania bilaminata (Hincks)
Beania cribrimorpha Gordon
Beania decumbens MacGillivray
Beania discodermiae (Ortmann)
Beania inermis cryptophragma n.ssp.
Beania intermedia (Hincks)
Beania magellanica (Busk)
Beania plurispinosa Uttley & Bullivant
Beania proboscidea n.sp.
Beania quadricornuta (Hincks)
Beania stonycha n.sp.
Beania trampida n.sp.

Family PETALOSTEGIDAE

Petalostegus bicornis (Busk)

Family CABEREIDAE

Amastigia fiordica n.sp.
Amastigia funiculata (MacGillivray)
Amastigia magna n.sp.
Amastigia puysegurensis n.sp.
Caberea angusta Hastings
Caberea boryi (Audouin)
Caberea darwinii Busk
Caberea darwinii guntheri Hastings
Caberea helicina Hastings
Caberea rostrata Busk
Caberea solida n.sp.
Caberea zelandica (Gray)
Canda arachnoides Lamouroux
Emma cervicornis MacGillivray
Emma rotunda Hastings
Emma triangula Hastings
Emma tricellata (Busk)
Menipea vectifera Harmer
Menipea vera n.sp.
Notoplites obliquidens Harmer
Penemia ignota (Hayward)
Scrupocellaria ornithorhyncus Thomson
Semibugula enigmatica n.sp.
Tricellaria aculeata d'Orbigny
Tricellaria monotrypa (Busk)
Tricellaria occidentalis (Trask)

Superfamily MICROPOROIDEA
Family MICROPORIDAE

Manzonella lepida (Hincks)
Manzonella monopia (Brown)
Micropora elegans Maplestone
Micropora gracilis (Uttley)
Micropora inarmata Soule
Micropora mortenseni Livingstone
Micropora variperforata Waters
Mollia amoena n.sp.

Family SELENARIIDAE

Otionella affinis Cook & Chimonides
Otionella proberti Cook & Chimonides
Otionella squamosa (Tenison-Woods)
Otionella symmetrica Cook & Chimonides
Otionella zelandica Cook & Chimonides

Family STEGINOPORELLIDAE

Steginoporella magnifica Harmer

Family MACROPORIDAE

Macropora grandis (Hutton)

Family ASPIDOSTOMATIDAE

cf. *Aspidostoma* sp.

Superfamily CELLARIOIDEA
Family CELLARIIDAE

Cellaria hirsuta (MacGillivray)
Cellaria humilis Moyano
Cellaria immersa (Tenison-Woods)
Cellaria magnimandibulata n.sp.
Cellaria tenuirostris (Busk)
Cryptostomaria cf. *crassatina* Canu & Bassler
Euginoma conica n.sp.
Melicerita angustiloba Tenison-Woods
Melicerita chathamensis Uttley & Bullivant
Melicerita ejuncida n.sp.

CLASSIFICATION

Diagnoses of suborders, superfamilies, families, genera, and species which are given in my memoir on Kermadec Ridge Bryozoa (Gordon 1984) are not repeated below.

Order CTENOSTOMATA Busk, 1852
Suborder STOLONIFERA Ehlers, 1876
Superfamily WALKERIOIDEA Hincks, 1877
Family TRITICELLIDAE Sars, 1873

Colony of creeping stolons from which arise erect branched or unbranched stolons bearing autozooids. Autozooids mostly bilaterally symmetrical, deciduous, with a convex dorsal face and a flatter partly membranous ventral face. Orifice bilabiate. Polypide lacking a gizzard.

Triticella Dalyell, 1848

Zooids borne on pedicel-like stolons. Embryos briefly attached to outside of parent before liberation.

TYPE-SPECIES: *Triticella flava* Dalyell, 1848

Triticella nodosa n.sp. (Fig. 2)

MATERIAL EXAMINED: NZOI Stns Q693, S368, S382.

DISTRIBUTION: Off the coast of South Island between Greymouth and Hokitika, 151–297 m.

DESCRIPTION: Colony of long creeping stolons about 0.03 mm diameter, widening slightly at nodal areas from which arise clusters of erect pedicel-like stolons 0.11–1.30 mm long bearing bilaterally compressed zooids 0.41–0.58 mm long × 0.13–0.17 mm wide. The pedicels are faintly ringed. Tentacles ?14; lophophore around 0.51 mm long. Transverse chitinous rib (frenaculum) absent.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-395.

PARATYPE: NZOI, type number P-628, from NZOI Stn S382, 42°19.6′S, 171°01.1′E, 124 m, on spines of *Spatangus multispinus*.

TYPE-LOCALITY: NZOI Stn Q693, off the coast of South Island near Hokitika, 42°50.4′S, 169°58.7′E, 297 m.

REMARKS: *Triticella nodosa* is the eleventh known species of *Triticella* (*see* d'Hondt 1983). The only previous record of the genus from the New Zealand region is that of Marcus (1921b) who described *T. periphanta* from the north arm of Carnley Harbour, Auckland Island, at 64 m depth. From Marcus's description and illustration, *T. periphanta* differs as follows: substratum of mussel shells and stones; larger zooids (around 0.7 × 0.2 mm); and different insertion of pedicels on creeping stolon.

Triticella nodosa occurred exclusively on the aboral spines of the frontal notch of the echinoid *Spatangus multispinus* Mortensen, with other bryozoans (*Arachnoidella echinophilia, Celleporella* sp. *Crisia* sp., *Galeopsis* sp., and *Nolella ?stipata*).

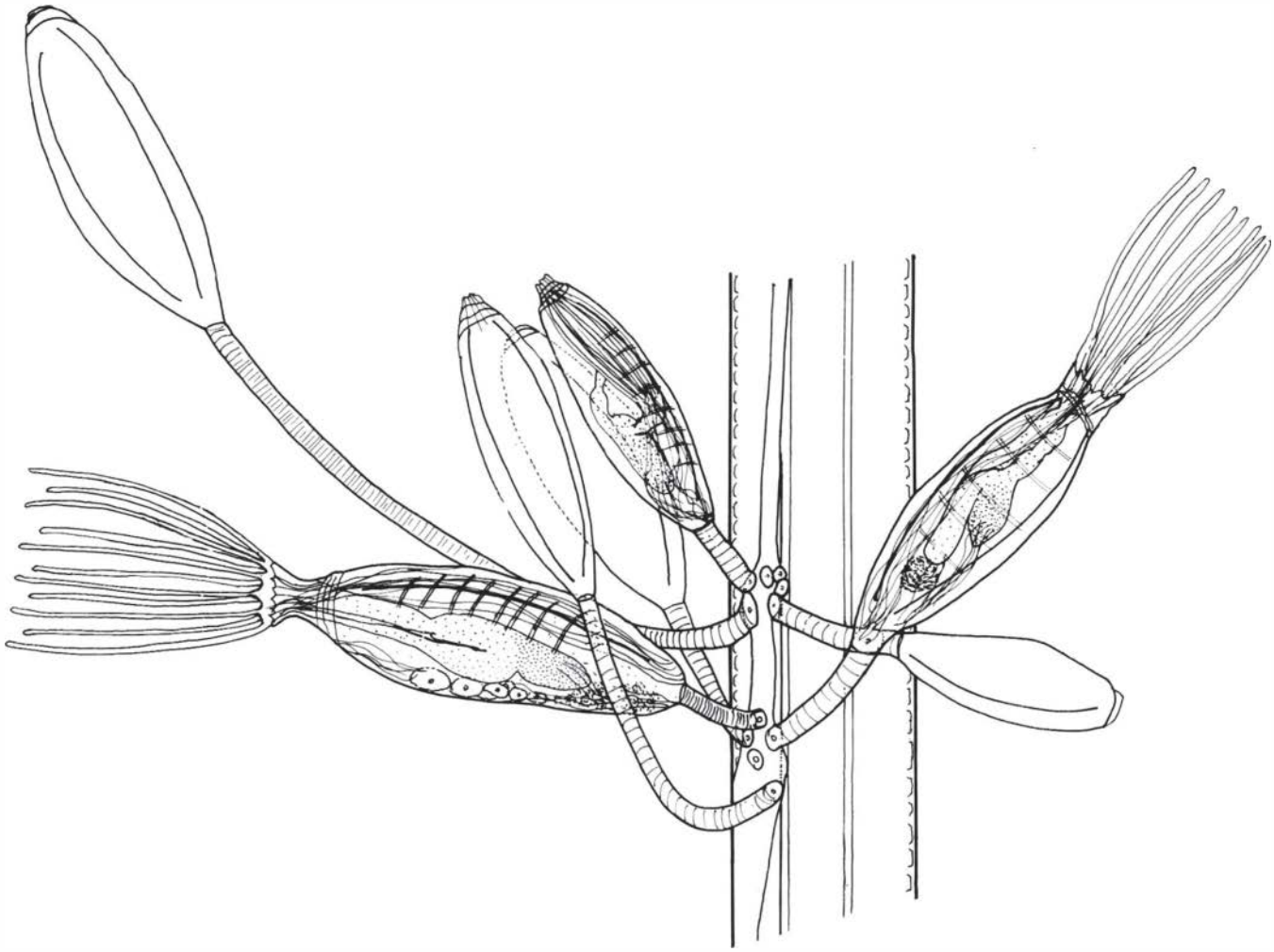


FIG. 2. *Triticella nodosa* n.sp. Part of a colony on a spine of *Spatangus multispinus* Mortensen (Stn Q693).

Superfamily VESICULARIOIDEA Johnston, 1847

Zooids non-pedicellate, arising directly from stolons or rarely from other zooids. Many zooids bud from each stolon segment, sometimes in contiguous clusters. Stolon segments lack muscle strands and zooids cannot rock on their bases. Polypides with a gizzard. Brooding of embryos internal.

REMARKS: The budding of autozooids directly from the stolonal axis has been regarded as an invariable characteristic of vesicularioids, but Jebram (1973), working with *Bowerbankia* species, has shown that, at least in culture, autozooids may arise from other autozooids.

Family VESICULARIIDAE Johnston, 1847

Colony creeping on the substratum or pendent and bushy, with many zooids occurring singly or in clusters on long stolonal axes; budding rarely from other autozooids. Autozooids generally vase-shaped and slightly constricted proximally where they are attached to the stolon.

Bowerbankia Farre, 1837

Colony adnate, rampant or pendent; autozooids more or less elongated, often grouped on or around the stolon in clusters, but never strictly contiguous laterally. Tentacles 8 or 10.

TYPE-SPECIES: *Sertularia imbricata* Adams, 1800

Bowerbankia imbricata (Adams)

Sertularia imbricata Adams, 1800: 11.
Bowerbankia imbricata: Prenant & Bobin 1956: 293 (*cum syn.*); Ryland 1965: 79; Ryland 1975: 388; Occhipinti Ambrogi 1981: 69; Hayward 1985: 139.

MATERIAL EXAMINED: DPG: Colonies from Goat Island Bay, Leigh, Whangateau Harbour, Auckland Harbour, Port Nelson.

DISTRIBUTION: Hauraki Gulf, Auckland Harbour, Nelson; also Britain, Europe, Pacific and Atlantic coasts of North America, Alaska, Indonesia, Argentina.

DESCRIPTION: Colony adnate, comprising series of long branching stolons from which clusters of zooids of different ages and sizes arise at irregular intervals. Stolons approximately the diameter of extended zooids. Zooids elongate, 0.46–0.81 mm long, c. 0.23 mm diameter when contracted, slightly constricted proximally, tapering distally; more or less transparent, with polypide visible; gizzard present; orificial collar seen upon emergence of polypide; orifice squared when retracted; tentacles 10. Embryos relatively large, occurring in body cavity; yellow.

REMARKS: *Bowerbankia imbricata* and its congener *B. gracilis* are among the most widely distributed ctenostomes, being virtually cosmopolitan. Ryland (1965) included these two species in a catalogue of marine fouling bryozoans, and their distribution in New Zealand mostly in shipping harbours is consistent with their being of exotic origin. When one compares dimensions of zooids of colonies recorded in different parts of the world, size differences would appear to be indicated, but authors have not always stated whether measurements were taken from extended or retracted zooids.

These two species may occur together on some substrata, with the zooids and stolons inter-mixed. Each may be distinguished on the basis of tentacle number and embryo colour. Reports of numbers of tentacles of these species from different localities are always consistent, although Rogick and Croasdale (1949) noted that young colonies of *B. imbricata* may have some zooids with only nine tentacles. Reports of embryo colour, however, are sometimes inconsistent.

According to Ryland (1965) *B. imbricata* has golden-yellow embryos and *B. gracilis* has pink ones. This is in contrast to Prenant and Bobin (1956) who reported that embryos of *B. imbricata* were salmon pink or pale brick-red. (They did not mention the colour of embryos of *B. gracilis*.) Jebram (1975), who cultured both species, commented that, in natural habitats, *B. gracilis* has pink embryos and lasting buds and *B. imbricata* has yellow ones throughout the whole breeding season. He ascribed this to differential selection of food items from the plankton. He also noted, however, that *B. gracilis* fed with *Dunaliella*-raised *Oxyrrhis* (a dinoflagellate) produced ova, larvae, and hibernacula which were pale yellow to white, but this was never seen in the natural environment. In Jebram's cultures, tentacle numbers were consistently ten and eight for the two species and there was no difference between them in the form or size of their zooids.

Bowerbankia imbricata in New Zealand occurs on a variety of living and non-living substrata. In the upper reaches of Whangateau Harbour it may occur in tidal creeks where salinity is at times substantially reduced, and in turbid waters the zooidal walls may become somewhat opaque. This latter condition led me (Gordon 1967) to identify what was probably *B. imbricata* as a species of *Nolella*.

Bowerbankia gracilis Leidy (Fig. 3)

Bowerbankia gracilis Leidy, 1855: 142; Prenant & Bobin 1956: 303 (*cum syn.*); Ryland 1965: 78; Morton & Miller 1968: 413; Ryland 1975: 388; Occhipinti Ambrogi 1981: 66; Hayward 1985: 144.

MATERIAL EXAMINED: DPG: Colonies from Goat Island Bay, Leigh, Waitemata Harbour, Port of Napier, Oaonui, Tataraimaka (North Taranaki), Totaranui, Oban.

DISTRIBUTION: Hauraki Gulf, Auckland Harbour, Hawkes Bay, Taranaki, Tasman Bay, Stewart Island; also Britain, Europe, eastern United States, Greenland, Brazil, Washington State to Mexico, South Africa, India.

DESCRIPTION: Colony as in *B. imbricata*. Zooids 0.47–0.62 mm long when contracted, 0.73–1.04 mm long when extended (including collar), generally wider than the stolons from which they arise; polypide with gizzard easily seen through transparent body wall; orifice squared when retracted; tentacles 8. Embryos relatively large, appearing in body cavity; pink.

REMARKS: Ryland (1965) noted that zooidal width in *B. gracilis* is greater than stolon diameter, whereas in *B. imbricata* zooidal and stolonal diameters are comparable. In *B. imbricata* from New Zealand zooidal diameter is generally greater than that of stolons, with some overlap.

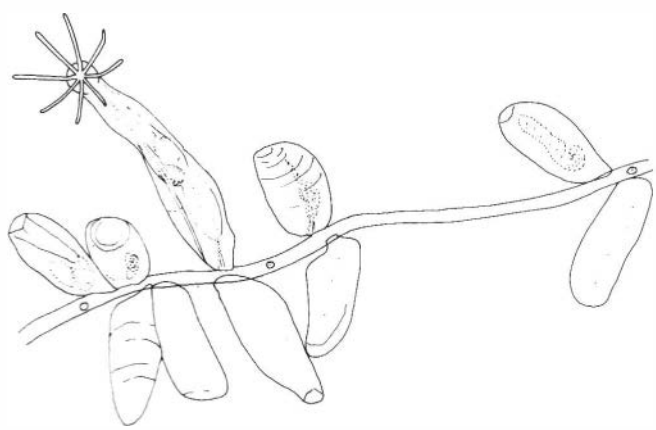


FIG. 3. *Bowerbankia gracilis* Leidy. Zooids on a creeping stolon (Goat Island Bay, Leigh).

Amathia Lamouroux, 1812

Colony rampant or aborescent, comprising septate branching stolons bearing groups of connate zooids disposed in two parallel series along each internode.

TYPE-SPECIES: *Sertularia lendigera* Linnaeus, 1767

Amathia wilsoni Kirkpatrick (Fig. 4)

Amathia wilsoni Kirkpatrick, 1888: 18; Macken 1956: 22.

MATERIAL EXAMINED: NZOI: Stn B493. DPG: Colonies from Te Werahi Beach, Cape Reinga (drift material), Three Kings Islands, Bay of Islands and Poor Knights Islands (Dr R.V. Grace, coll.), Island Bay, Wellington (drift material).

DISTRIBUTION: Northern and north-eastern North Island, Cook Strait, Fiordland; also Port Phillip Bay, Victoria.

DESCRIPTION: Colony dendroid, to 17.5 cm long, the stem comprising numerous descending stolons and anchored by rhizoids; the aborescent part of numerous transparent septate stolonal branches. Branching trichotomous at each node, each internode with 5–8 pairs of connate autozooids on the adaxial side. Distal-most internodes lacking autozooids, terminating as pointed branchlets. All branches and branchlets curving inwards toward centre of colony. Zooidal dimensions are given in Table 1.

REMARKS: *Amathia wilsoni* is the commonest and most widespread of the known *Amathia* species in New Zealand. Large quantities are often washed ashore on Wellington south coast beaches after southerly storms. In Port Nicholson *A. wilsoni* is a host substratum for at least 18 other species of bryozoans (mostly buguloideans, catenicellids and small cyclostomes) and small red algae. It was first recorded in New Zealand by Macken (1956). Note that her figure for the mean width of zooids should be 0.098 mm, not 0.98 mm as cited.

TABLE 1. Zooidal dimensions of *Amathia wilsoni* (mm)

Locality	Zooidal length (retracted)	Zooidal width (retracted)	Internodal diameter
Three Kings Is	0.37–0.63	0.12–0.19	0.21–0.32
Wellington	0.47–0.60	0.12–0.23	0.24–0.32
Wellington (Macken 1956)	0.32–0.54	0.09–0.13	0.27–0.36

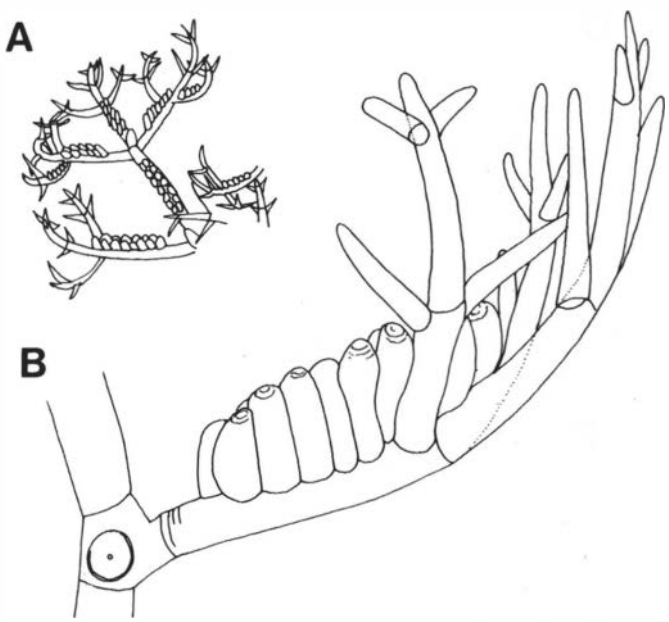


FIG. 4. *Amathia wilsoni* Kirkpatrick. A, disposition of branches; B, autozooids and branch segments (Wellington).

Superfamily PENETRANTIOIDEA Silén, 1946
Family PENETRANTIIDAE Silén, 1946

Penetrantia Silén, 1946

TYPE-SPECIES: *Penetrantia densa* Silén, 1946

Penetrantia irregularis Silén (Fig. 5, A–G)

Penetrantia irregularis Silén, 1956: 93; Morton & Miller 1968: 290.

MATERIAL EXAMINED: NZOI: Stns B493, M775, M780, M789. DPG: Colonies from Whangarei Heads, Manukau Harbour, Port Nicholson.

DISTRIBUTION: East and west coasts of northern North Island, Wellington, Fiordland, Otago.

DESCRIPTION: Colony boring in mollusc shells, a densely ramifying network of branching stolons bearing autozooids at intervals; primary stolons (from which autozooids arise) and secondary branches crisscross irregularly, fusing where they meet. Autozooids 0.44–0.54 mm long, 0.12 mm diameter, elongate to ovoid, generally rounded proximally; each with two

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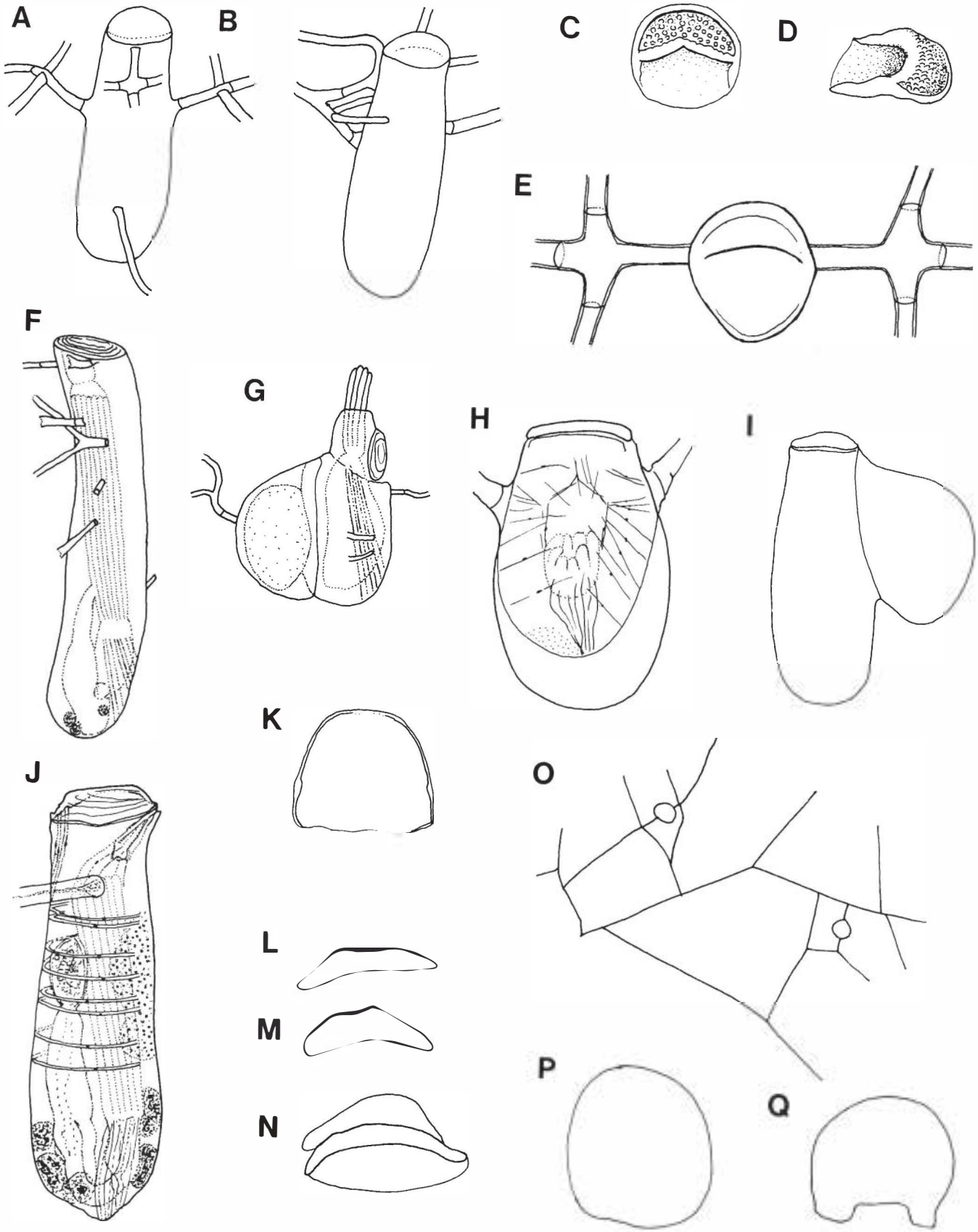


main distal stolonal connections and cruciform branching; a brownish operculum distally, with inner crescentic central thickening and rugose surface for muscle attachment. Gonozooid shorter than autozooid, with subspherical to ovoid embryo chamber; operculum like that of autozooid.

REMARKS: The colonies I have seen appear to match Silén's (1956) description of the type material from Otago Peninsula but there is evidently some variation in zooidal dimensions and tentacle number. Colonies I have examined have shorter autozooids (0.44–0.54 mm compared to Silén's 0.65 mm) and fewer tentacles (11–13 compared to Silén's 14). Silén also described reduced gonozooidal polypides with 8–10 tentacles.

The operculum may be a useful taxonomic feature in distinguishing living penetrantiid species. It differs markedly in the two New Zealand species: whereas the inner opercular surface is sculptured in *P. irregularis*, it is smooth in *P. parva*.

The shape of the bore-holes is not regarded as a reliable taxonomic character in *Penetrantia* (Pohowsky 1978), but in *P. irregularis* the holes are always roughly circular whereas those of *P. parva* often have a median proximal cusp, and this can be a helpful distinction in initial sorting of New Zealand material.

Penetrantia parva Silén (Fig. 5, H–Q)

Penetrantia parva Silén, 1946: 4; Gordon 1984: 20 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B489, D273.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Tasman Bay, Fiordland; also Oahu, Hawaii.

Suborder CARNOSA Gray, 1841
Superfamily ARACHNIDIOIDEA Hincks, 1880
Family ARACHNIDIIDAE Hincks, 1880

Anguinella van Beneden, 1845

Colony arborescent, semi-erect to pendent, comprising long tubular zooids; the zooids opaque, earthy, externally continuous with the branches which bear them.

TYPE-SPECIES: *Anguinella palmata* van Beneden, 1845

Anguinella palmata van Beneden (Fig. 6)

Anguinella palmata van Beneden, 1845: 58; Prenant & Bobin 1956: 238 (*cum syn.*); Gordon 1967: 47; Morton & Miller 1968: 412.

MATERIAL EXAMINED: DPG: Colonies from Orana Beach and Ladies Bay, Waitemata Harbour; Port of Nelson.

DISTRIBUTION: Auckland, Nelson; also Britain, Europe, Atlantic coast of America from Massachusetts to Florida and Brazil, Newcastle (New South Wales).

DESCRIPTION: Colony dendroid, with several main axes giving rise to shorter branches from which long tubular zooids arise. Zooids attaining 1.0–1.5 mm in length at their curved free ends, merging without external differentiation proximally into the branch axes; muddy coloured; tentacles 10.

REMARKS: According to Prenant and Bobin (1956) colonies of *A. palmata* may attain 20 cm in length. The largest colonies I have seen in New Zealand were 4.5 cm long. The New Zealand distribution in two shipping harbours points to an exotic origin. Allen (1953) commented on the occurrence, in Australia, of *A. palmata* in 1953. It was first recorded in Auckland Harbour by R.J. Harger (unpublished notes, University of Auckland, ?1960).

Arachnoidella d'Hondt, 1983

Colony encrusting, branching often cruciform. Zooids uniserial to more or less contiguous, with an adnate dilatation and a tubular peristome; sometimes filiform proximally and often with marginal processes.

TYPE-SPECIES: *Arachnoidea annosciae* d'Hondt & Geraci, 1976

REMARKS: The genus *Arachnoidea* Moore, 1903 contains eight nominal species. The type-species, *A. raylankesteri*, is a freshwater species whose zooids are interconnected by anastomosing filaments. The remaining species lack these filaments in the strict sense and are all marine. For these reasons d'Hondt (1983) established the subgenus *Arachnoidella* to accommodate the marine species but it seems appropriate to treat it as a full genus.

Arachnoidella echinophilia n.sp. (Fig. 7)

MATERIAL EXAMINED: NZOI Stn Q693.

FIG. 5. (*opposite*). *Penetrantia irregularis* Silén. A, B, variations in stolonal attachments to autozooids; C, underside and D, partial profile views of operculum; E, top view of operculum and primary stolons (Whangarei Heads); F, autozooid and G, gonozooid (from Otago Peninsula) (after Silén 1956). *Penetrantia parva* Silén: H, ventral and I, lateral views of gonozooid; J, lateral view of autozooid; K, underside and L, M, lateral views of operculum; N, lateral view of double (?regenerated) operculum; O, pattern of branching of part of colony in shell of live *Maoricolpus roseus* (Quoy & Gaimard) (Turritellidae); P, Q, shape of bore-holes (Goat Island Bay, Leigh).

Sig 2*

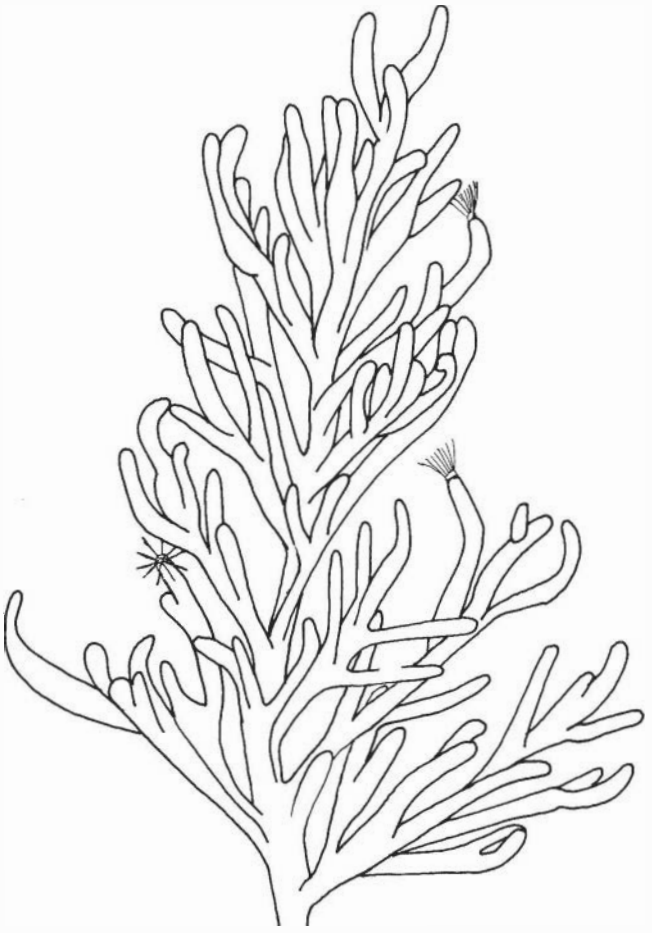


FIG. 6. *Anguinella palmata* van Beneden. Part of colony (Achilles Point, Auckland Harbour).

DISTRIBUTION: Off the coast of South Island near Hokitika.

DESCRIPTION: Colony of uniserial zooids or zooids becoming crowded. Zooids, when not crowded, with a slender filiform proximal part up to 0.6 mm long and 0.05 mm diameter, broadening into an adnate dilatation from which arises a more or less tubular peristome which is opaque and muddy-coloured with granules and fine concentric striations; dilatation + peristome 0.51–0.73 × 0.17 mm; peristome length 0.21–0.43 mm; lophophore 0.18 mm long, with 14 tentacles and a short pleated collar; no marginal processes from the zooidal dilatation.

HOLOTYPE: Two colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-396.

PARATYPE: BM(NH), reg. no. 1985.1.22.9, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn Q693, off the coast of South Island near Hokitika, 42°50.4′S, 169°58.7′E, 297 m.

REMARKS: This is the first record of the genus *Arachnoidella* from the South Pacific Ocean. Only two colonies were found, both on the spines of *Spatangus multispinus* Mortensen.

Nolella Gosse, 1855

TYPE-SPECIES: *Nolella stipata* Gosse, 1855

Nolella ?stipata Gosse

cf. *Nolella stipata* Gosse, 1855: 35; Gordon 1984: 22 (*cum syn.*)

MATERIAL EXAMINED: NZOI Stns Q693, S368.

DISTRIBUTION: Off the coast of South Island near Hokitika.

DESCRIPTION: Colony encrusting. Zooids dense, tall, comprising opaque, muddy-coloured peristomes 0.71–1.09 × 0.20–0.28 mm, from an adherent base about 0.43 mm across; each zooid arises almost directly from the distal wall of the adnate part of its parent zooid, with one or two additional filiform connectives between adjacent zooids; lophophore 0.75 mm long; tentacles 17; a pleated collar present.

REMARKS: One colony was found on a horny worm tube, and two others on spines of *Spatangus multispinus*. In zooidal dimensions and tentacle number it is closest to *N. stipata*, a nominally wide-spread species which I have recorded from the Kermadec Ridge (Gordon 1984). More and fertile material is desirable, however, before a positive identification can be made.

Nolella annectens Harmer (Fig. 8)

Nolella annectens Harmer, 1915: 57.

MATERIAL EXAMINED: NZOI Stn S368.

DISTRIBUTION: Indonesia, Sunda Islands.

DESCRIPTION: Colony encrusting, comprising an irregular network of zooids linked by filiform processes. Zooids comprising a basal dilatation with erect peristome 0.17 mm diameter and up to 2.56 mm tall; in mature zooids the ovary occurs in the dilatation, the polypide is contained in the peristome; pleated closing apparatus relatively long.

REMARKS: This species occurred on an arenaceous zoanthidean. In the proportions of the peristome and dilatation it is entirely comparable with *N. annectens* from the Sunda Islands. Harmer's (1915) material was found growing in a sponge, with the peristomes protruding. As in the west coast South Island material, the zooids of Harmer's colonies begin with the peristome initially quite short in proportion to the dilatation which contains the polypide. The pleated collar is well developed and the zooidal walls semi-transparent, allowing details of the polypide to be seen.

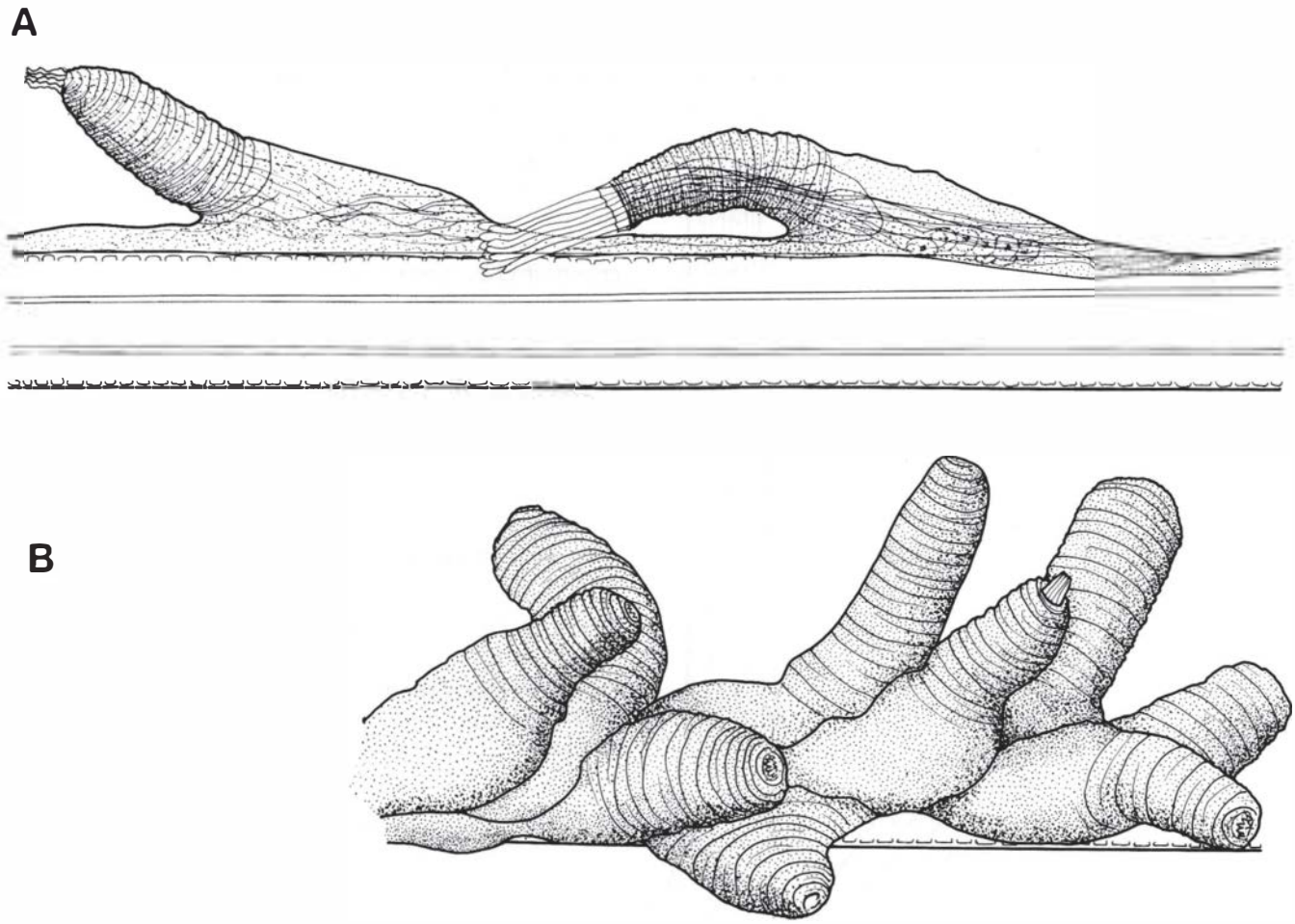


FIG. 7. *Arachnoidella echinophilia* n.sp. A, two zooids near the distal end of a colony; B, a group of older zooids (on spines of *Spatangus multispinus* Mortensen) (Stn Q693).

Harmer's illustrations and description do not make it clear, however, if, in mature zooids, the polypide is wholly accommodated in the peristome, as in the present material.

Superfamily ALCYONIDIOIDEA Johnston, 1838
Family ALCYONIDIIDAE Johnston, 1838

Alcyonidium Lamouroux, 1813

TYPE-SPECIES: *Ulva diaphana* Hudson, 1778

Alcyonidium cf. **mytili** auctt.

MATERIAL EXAMINED: NZOI: Stns B487, B489, B493, E828, M775. DPG: Colony from Hobson Bay, Auckland.

DESCRIPTION: Colony encrusting molluscs and stones, semi-transparent; colony surface smooth throughout, the orifice not protruding when zooids retracted. Zooids 0.68–1.20 × 0.42–0.78 mm, more or less regularly shaped and contiguous throughout, not tending to polygonal and suberect in older parts of colonies; lophophores 0.61–0.68 mm long. Embryos 0.12–0.17 mm diameter, > 12 in large embryo sac occupying much of the zooidal interior.

REMARKS: The genus *Alcyonidium* presents considerable taxonomic difficulties. The range of useful morphological features that may be used in discriminating species is less than in calcareous bryozoans and colonial and zooidal variation blurs specific boundaries. Recent techniques involving biochemical genetics (Thorpe and Ryland 1979) have shown that for several nominate species, including *A. mytili* Dalyell (Thorpe *et al.* 1978), additional genetically distinguishable cryptic species exist. These, and the nominate species, are still being characterised morphologically.

The colonies examined resemble *A. mytili* of authors, not necessarily of Dalyell (1848), which

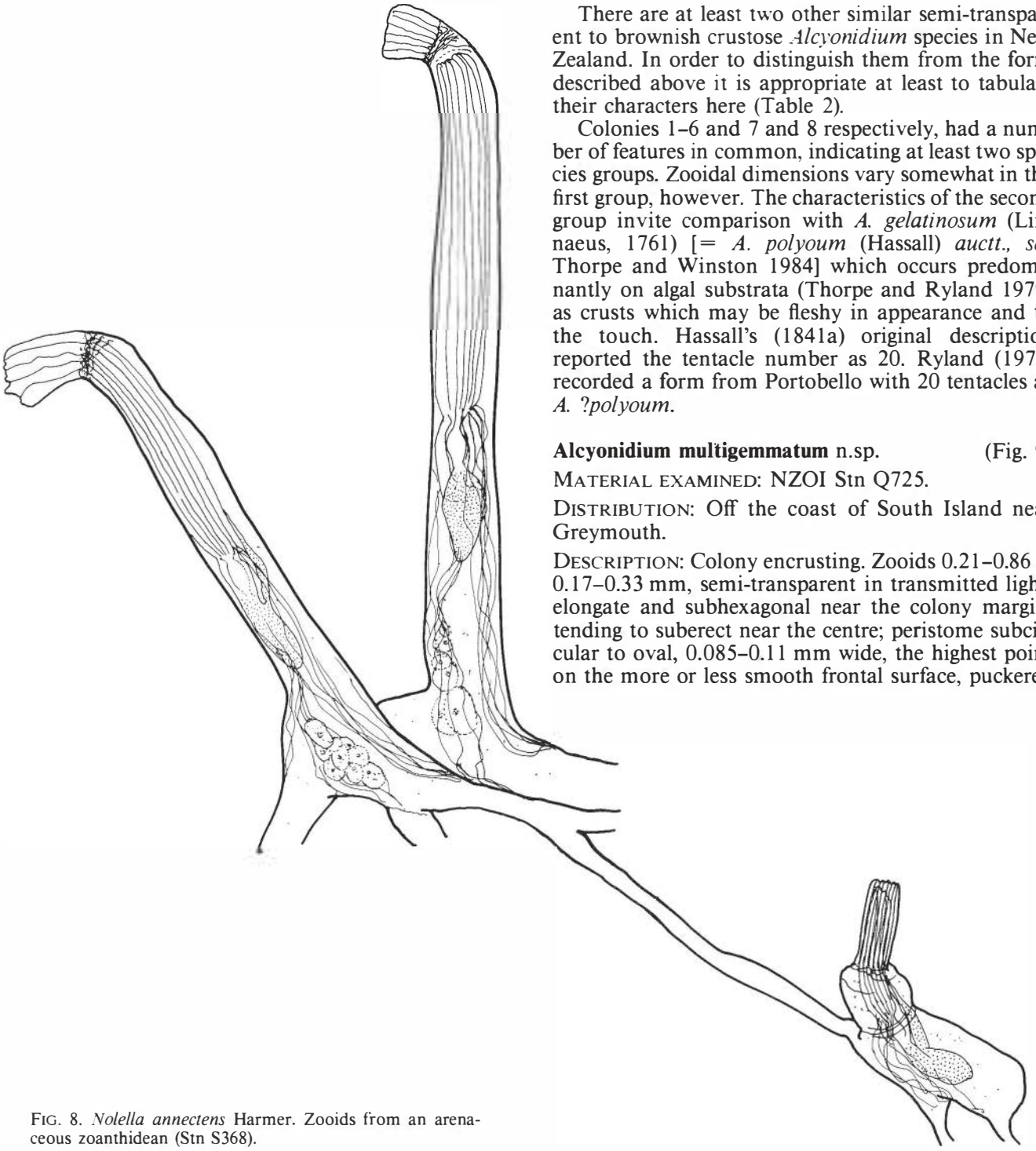


FIG. 8. *Nolella annectens* Harmer. Zooids from an arenaceous zoanthidean (Stn S368).

Thorpe *et al.* (1978) suggest may be conspecific with a species they found which is characterised by strikingly white zooidal walls. *Alcyonidium mytili auctt.* has moderately large zooids, is generally thinly encrusting and occurs predominantly on molluscan shells or stones. It has 17–18 tentacles. The tentacle number was not determined for the New Zealand colonies examined.

There are at least two other similar semi-transparent to brownish crustose *Alcyonidium* species in New Zealand. In order to distinguish them from the form described above it is appropriate at least to tabulate their characters here (Table 2).

Colonies 1–6 and 7 and 8 respectively, had a number of features in common, indicating at least two species groups. Zooidal dimensions vary somewhat in the first group, however. The characteristics of the second group invite comparison with *A. gelatinosum* (Linnaeus, 1761) [= *A. polyoum* (Hassall) *auctt., see* Thorpe and Winston 1984] which occurs predominantly on algal substrata (Thorpe and Ryland 1979) as crusts which may be fleshy in appearance and to the touch. Hassall's (1841a) original description reported the tentacle number as 20. Ryland (1975) recorded a form from Portobello with 20 tentacles as *A. ?polyoum.*

Alcyonidium multigemmatum n.sp. (Fig. 9)

MATERIAL EXAMINED: NZOI Stn Q725.

DISTRIBUTION: Off the coast of South Island near Greymouth.

DESCRIPTION: Colony encrusting. Zooids 0.21–0.86 × 0.17–0.33 mm, semi-transparent in transmitted light; elongate and subhexagonal near the colony margin, tending to suberect near the centre; peristome subcircular to oval, 0.085–0.11 mm wide, the highest point on the more or less smooth frontal surface, puckered when closed, pleated collar present; lophophore 0.36 mm long with 16 tentacles. At the angles between adjacent zooids, beginning with the third zooidal row from the growing margin, are small inflated chambers; these commoner at the colony centre. Ancestrula c. 0.34 mm long and 0.21 mm wide, sac-like, the orifice almost terminal, producing daughter zooids to left and right before distal ones are produced.

TABLE 2. Characteristics of some other New Zealand *Alcyonidium* colonies

Locality	Substratum	Zooidal length (mm)	Zooidal width (mm)	Lophophore length (mm)	Tentacle number	Description
1. Otago Heads	*Maurea* sp.	0.35–0.56	0.20–0.30	—	16	Zooids tending to polygonal and semi-erect in colony centre. Non-fleshy, orifice protruding somewhat or not at all. Substratum calcified. Tentacles 16–18. Brownish to semi-transparent.
2. Papanui Beach, Otago	*Perna canaliculus*	0.30–0.46	0.15–0.23	0.29	—	
3. Whangarei Heads	*Maurea* sp.; bryozoan	0.35–0.58	0.30–0.45	0.29	17	
4. Manukau Harbour	*Perna canaliculus*	0.24–0.40	0.16–0.30	0.28	—	
5. Whangarei Heads	*Trochus viridus*	0.41–0.66	0.24–0.61	—	18	
6. Portobello aquarium	*Leptomithrax* sp.	0.43–0.66	0.26–0.43	—	17	
7. Owhiro Bay, Wellington	brown algal holdfast	0.45–0.70	0.30–0.42	0.49	18–19	Zooids tending to polygonal and semi-erect in colony centre. Fleshy, orifice slightly protruding. Substratum non-calcified. Tentacles 18–20. Pale brownish to semi-transparent.
8. Bluff	ascidian test	0.45–0.60	0.26–0.43	0.49	20	

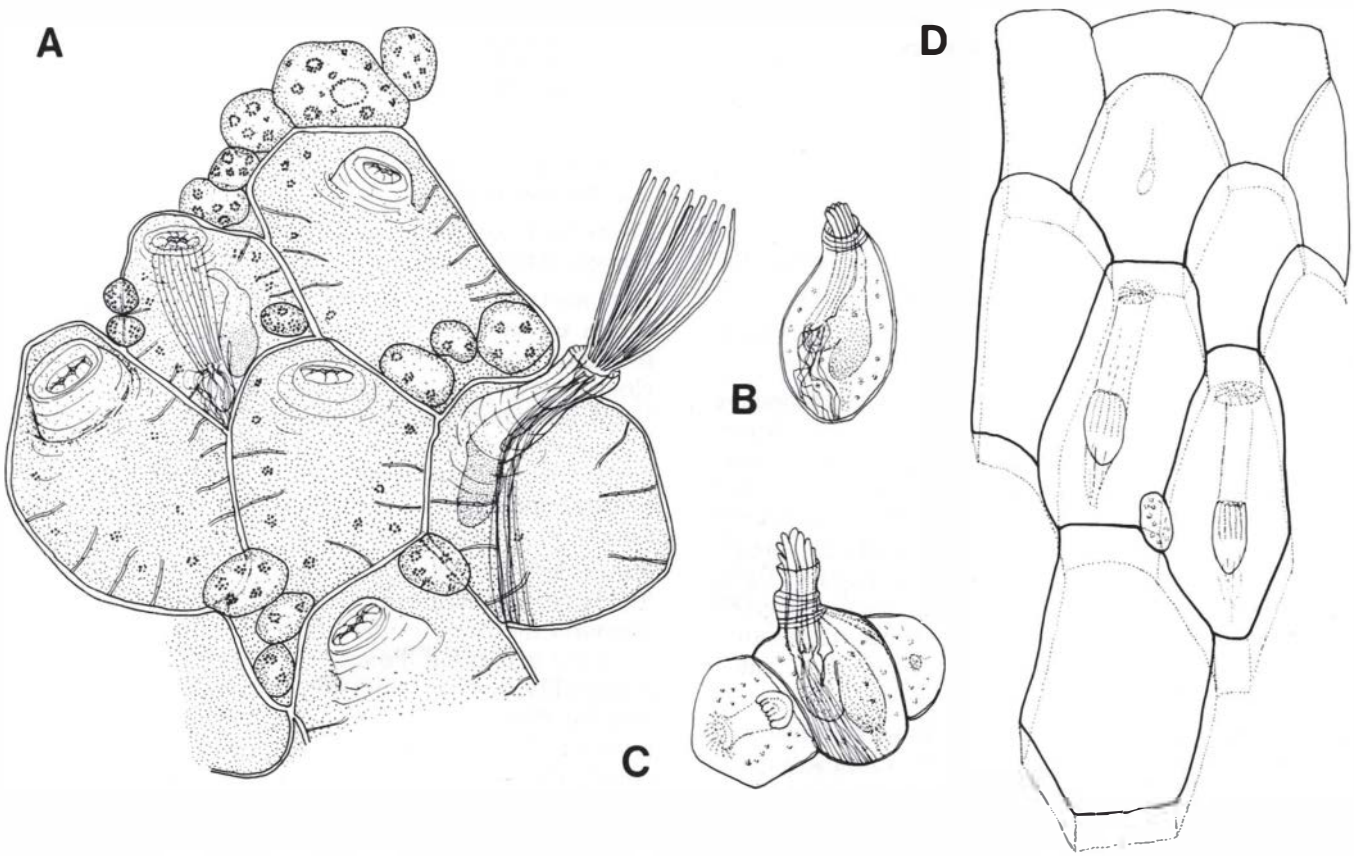


FIG. 9. *Alcyonidium multigemmatum* n.sp. A, older part of colony with numerous adventitious kenozooidal chambers; B, ancestrula; C, ancestrula and buds of first two daughter zooids; D, part of growing margin showing a kenozooid at about the third zooidal row from the growing edge (Stn Q725).

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-397.

PARATYPE: NZOI, type number P-629, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn Q725, off the coast of South Island near Greymouth, 42°23.9′S, 171°06.8′E, 33 m.

REMARKS: This species occurred on chaetopterid worm tubes. Its most characteristic feature is the numerous adventitious chambers of various sizes. Large numbers of spherular cells (cf. Lutaud 1961; or morular cells (Lutaud 1983)) occur in these chambers as well as in autozooids. The chambers invite comparison with *A. hirsutum* (Fleming, 1828) (Hayward 1985) which has similar chambers that impart a characteristic surface texture. *Alcyonidium hirsutum*, however, has a longer lophophore and differs ecologically. It is strictly intertidal, occurring on algae, and is probably confined to the north-east Atlantic where it is known to comprise at least five genetic species with identical morphologies.

Bockiella Silén, 1942

Colony erect, with somewhat cylindrical and anastomosing branches; bases of branches comprise both autozooids and kenozooids; axial kenozooids not present. Orifice papilliform and rounded. Kenozooids not spinose and, when budding, the buds are smaller than those of autozooids.

TYPE-SPECIES: *Bockiella angusta* Silén, 1942

Bockiella abyssicola n.sp. (Fig. 10)

MATERIAL EXAMINED: NZOI Stns P933, P934.

DISTRIBUTION: Eastern margin of Tasman Basin near the Bellona Trough in depths exceeding 4000 m.

DESCRIPTION: Colony erect, to 15 mm high, branches c.0.73 mm diameter, wider at bifurcations. Autozooids disposed in branches in an irregular spiral about an imaginary axis, 0.73–0.90 × 0.24–0.37 mm, the orifice slightly subterminal, papilliform; polypide with 17 tentacles. Erect parts of colony constricted proximally where attached to substratum, originating from networks of stoloniform processes from adherent autozooids; these ramifying, arranged uniserially, longer and narrower (1.46 × 0.27 mm) than autozooids in erect branches.

HOLOTYPE: Colonies attached to *Arcoscalpellum* sp. (Cirripedia), in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-398.

TYPE-LOCALITY: NZOI Stn P934, 41°39.1′S, 165°13.6′E, 4405–4441 m.

REMARKS: The New Zealand material agrees with the characters of *Bockiella* even though kenozooids are lacking between the autozooids in the erect parts of the colonies. Significantly, the adherent creeping part is very similar to that illustrated by Hayward (1978) for *B. angusta* from the west European continental slope.

Order CHEILOSTOMATA Busk, 1852
Suborder ANASCA Levinsen, 1909
Superfamily MEMBRANIPOROIDEA Busk, 1854
Family MEMBRANIPORIDAE Busk, 1854

Conopeum Gray, 1848

Colony encrusting. Zooids oval to subrectangular, the opesia occupying most of the frontal area, bounded by a narrow granular cryptocyst, with a small area of gymnocyst proximally. Free edge of operculum somewhat thickened and broadened, but without a distinct sclerite. Spines and kenozooids present or absent. No ovicells or avicularia. Ancestrula not twinned.

TYPE-SPECIES: *Millepora reticulum* Linnaeus, 1767

Conopeum seurati (Canu) (Plate 1, A–D)

Nitscheina seurati Canu, 1928: 262.
Conopeum seurati: Bobin & Prenant 1962: 381; Prenant & Bobin 1966: 127 (*cum syn.*); Ryland & Hayward 1977: 62; Poluzzi 1980: 106; Occhipinti Ambrogi 1981: 80; ? Winston 1982: 117.

MATERIAL EXAMINED: DPG: Colonies from boat marina, Nelson Harbour.

DISTRIBUTION: Estuarine habitats in Britain, northern Europe, Mediterranean, ?Florida.

DESCRIPTION: Colony encrusting, forming extensive sheets up to 8 cm across, with some overgrowth in the colony centre. Zooids 0.38–0.66 × 0.17–0.45 mm, elongate-oval to subrectangular; opesia occupying virtually the whole frontal area, completely bordered by a granular/subdenticulate cryptocystal rim, with a vestige of proximal gymnocyst in some zooids. A pair of stout spines distally, or these lacking. Kenozooids rare.

REMARKS: Comparison of the Nelson material with SEMs of northern Italian specimens (Poluzzi 1980) supports the present identification, although the distribution is unusual. Poluzzi's specimens had the same reasonably thick calcification although, as the literature on this species shows, this can vary. Winston's (1982) SEM of zooids from a winter-growing Floridan colony shows thinner walls. The free edge of the operculum of the present material is brownish but not banded as shown by Prenant and Bobin (1966).

Two other species of *Conopeum* have been recorded for New Zealand. Waters (1898: 679) reported *C. reticulum* (as *Membranipora lacroixii*) from an

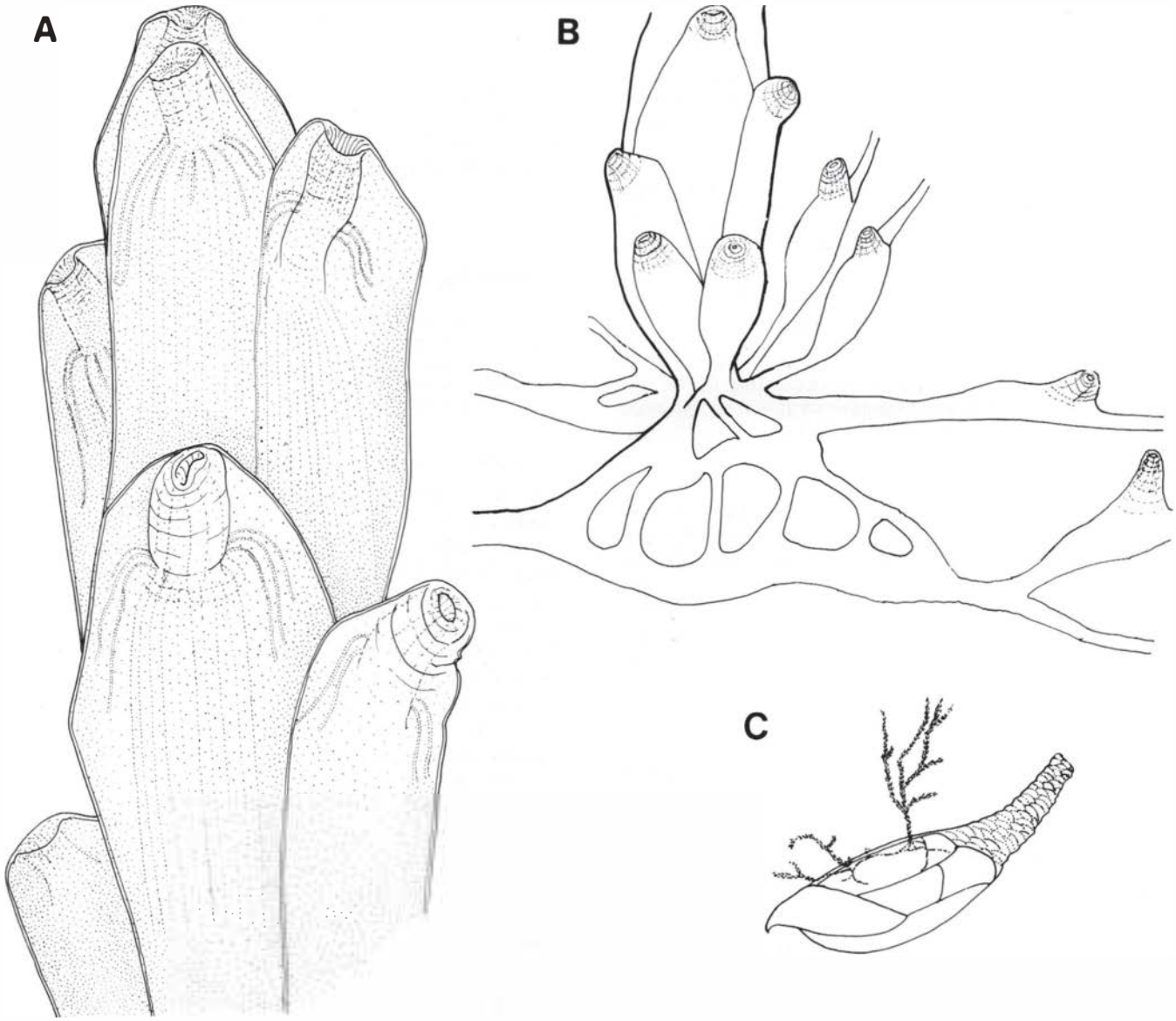


FIG. 10. *Bockiella abyssicola* n.sp. A, growing tip of erect branch; B, base of branch with adherent zooids; C, whole colony on *Arcoscalpellum* sp. (Cirripedia) (Stn P934).

unspecified locality but his description is inconclusive. Livingstone (1929) recorded the same species (as *Conopeum lacroixii*) from 65 fathoms depth at an unspecified North Island locality. His photograph appears to be of *Akatopora circumsaepta* (Uttley).

The other species is *Conopeum oretiensis* Uttley, 1951, from Napier and Foveaux Strait. It is characterised by numerous kenozooids and marginal spines.

Family ELECTRIDAE Stach, 1937

Colony encrusting in most cases, although erect forms occur in certain environmental conditions. Zooids with generally well-developed gymnocyst, porous or imperforate, cryptocyst narrow, much reduced. Spines present or absent. Ovicells and avicularia absent. Larvae of the cyphonautes type.

Electra Lamouroux, 1816

Colony as above. Zooids with generally large opesia sometimes bordered by chitinous spines; the gymnocyst with one, occasionally two, spines bordering the proximal rim of the opesia, these either short or greatly elongated.

TYPE-SPECIES: *Flustra pilosa* Linnaeus, 1767 (*see* Ryland and Hayward 1977)

Electra pilosa (Linnaeus) (Plates 1, E, F; 2, A, B)

Flustra pilosa Linnaeus, 1767: 1301.
Electra pilosa: Busk 1884: 78; Uttley 1951: 18; Macken 1958: 104; Prenant & Bobin 1966: 140 (*cum syn.*); Gordon 1967: 51; Uttley & Bullivant 1972: 15; Ryland 1975: 384; Ryland & Hayward 1977: 64.

MATERIAL EXAMINED: DPG: Colonies from Leigh, Piha, Auckland Harbour, Napier, Oaonui, Wellington, Totaranui, Kaikoura, Birdling's Beach, Bluff, Oban.

DISTRIBUTION: Both coasts of North and South Islands and Stewart Island; also cosmopolitan.

DESCRIPTION: Colony whitish, encrusting, forming circular, linear, or lobate patches according to the type of substratum. Zooids elongate-oval or rectangular, with an extensive frontal membrane covering the opesia which occupies 50–95% of the frontal area; opesia bordered by a smooth, narrow cryptocystal rim and usually with one or two short chitinous spines on each lateral margin. Gymnocyst corresponding to the area of the opesia, usually prominent, with several conspicuous perforations and bearing a short, or very long and curving, chitinous spine arising from a median gymnocystal prominence, or the gymnocyst greatly reduced and virtually absent in some zooids, the median spine correspondingly reduced or absent also.

REMARKS: As Ryland and Hayward (1977) have remarked, *E. pilosa* exhibits remarkable morphological plasticity, at both the level of the colony and the individual zooid. Norman (1894) described several variants from north-western Europe and noted how, in some, "the basal portion [gymnocyst] becomes nearly or quite obsolete". None of his variants, however, corresponds exactly to a form which occurs fairly commonly in the greater Cook Strait area and north-western South Island (Plate 1, E, F). It occurs on, *inter alia, Carpophyllum* spp., and the zooids are rectangular with a severe reduction or near total supression of the gymnocyst and spines. At first glance it resembles a *Membranipora*, but several of the zooids in any colony have a small area of porous gymnocyst and proximal tubercle typical of *E. pilosa*. Both Uttley (1951) and Uttley and Bullivant (1972) commented on this form in the central New Zealand region.

Family FARCIMINARIIDAE Busk, 1852

Colony erect, branching, with few bifurcations, the branches cellariiform, or flattened and unilamellar or bilamellar. Zooids rectangular, elongated, weakly calcified, the opesia occupying all or virtually all of the frontal area. Marginal spines and avicularia present or absent. Ovicells large or reduced, endozooidal, or absent.

Columnella Levinsen, 1914

Colony erect, branching, the branches four-sided in cross-section. No gymnocyst or cryptocyst, the long rectangular zooids completely covered by the frontal membrane. Spines absent. Avicularia adventitious or absent. Ovicells large.

TYPE-SPECIES: *Columnaria borealis* Levinsen, 1909

Columnella magna (Busk) (Plate 2, C, D)

Farciminaria magna Busk, 1884: 49; Kluge 1914: 650.
Levinsenella magna: Harmer 1926: 402; Hastings 1943: 393 (*cum syn.*); Silén 1951: 63.
Columnella magna: D'Hondt 1975: 563; Hayward & Cook 1979: 67; Hayward 1981: 29.

MATERIAL EXAMINED: NZOI Stn P934.

DISTRIBUTION: Kermadec Trench, eastern margin of Tasman Basin near the Bellona Trough; also middle North Atlantic, Bay of Biscay, off the coast of Uruguay, South Indian Ocean, eastern Africa.

DESCRIPTION: Colony 72 mm tall, slender, infrequently bifurcating. Zooids elongate, rectangular, 1.56–1.76 × 0.42–0.46 mm, narrower towards the proximal end of the colony where ribbed calcareous thickening occurs, first laterally, then across the whole front of each zooid under the frontal membrane; the axillary zooids lacking an operculum; zooids between bifurcations in four longitudinal rows, back-to-back pairs of zooids alternating with the other pairs. Ovicells and avicularia not seen.

REMARKS: According to Hayward and Cook (1979) avicularia are small, adventitious, occurring at the proximal ends of zooids, with the semi-circular mandible perpendicular to the frontal plane. Hastings (1943) has described the ovicells, which have a membranous ectooecium.

This species was recently reported from the New Zealand region for the first time (Hayward 1981), occurring at 2640 m depth in the Kermadec Trench.

Family FLUSTRIDAE Lamouroux, 1821

Carbasea Gray, 1848

Colony erect, frondose, unilaminar. Zooids simple, rectangular, lightly calcified. No avicularia. Spines reduced or absent. Embryos brooded in internal ovisacs or endozooidal ovicells closed by the zooidal operculum.

TYPE-SPECIES: *Flustra carbasea* Ellis & Solander, 1786

Carbasea indivisa Busk (Plate 2, E, F)

Carbasea indivisa Busk, 1852: 53.
Carbasea cyathiformis MacGillivray, 1860: 164.
Carbasea indivisa var. *cyathiformis*: MacGillivray 1880: 29.
Euthyroides indivisa var. *cyathiformis*: Macken 1958: 104.

MATERIAL EXAMINED: NZOI: Stns B493, M778. DPG: Colonies from Kaikoura.

DISTRIBUTION: Cook Strait, Kaikoura, Fiordland; also south-eastern Australia.

DESCRIPTION: Colony erect, unilaminar, flexible; the frond with the margins united from early astogeny as to form a bowl-shaped colony up to 12 mm diameter and 16 mm high; the zooids opening on the inner, concave face. Zooids elongate-rectangular or subhexagonal, 0.66–0.98 × 0.29–0.44 mm, lightly calcified, the frontal surface entirely membranous. No spines, avicularia or ovicells. Embryos not seen.

REMARKS: MacGillivray (1880) had colonies which were flat and frondose, but which had involute lateral margins united proximally, tending to the truly bowl-shaped form which he also encountered and which occurs in New Zealand. Both colony forms were observed, by Busk (1852) and MacGillivray (1880) respectively, to have zooids which were "minutely granular behind". The granular appearance is imparted to the zooids by transmitted light and derives from the nature of the calcification of the basal wall. The actual external surface is smooth.

Carbasea indivisa is generally found attached to catenicellid bryozoans, e.g., *Costaticella hastata* (Busk).

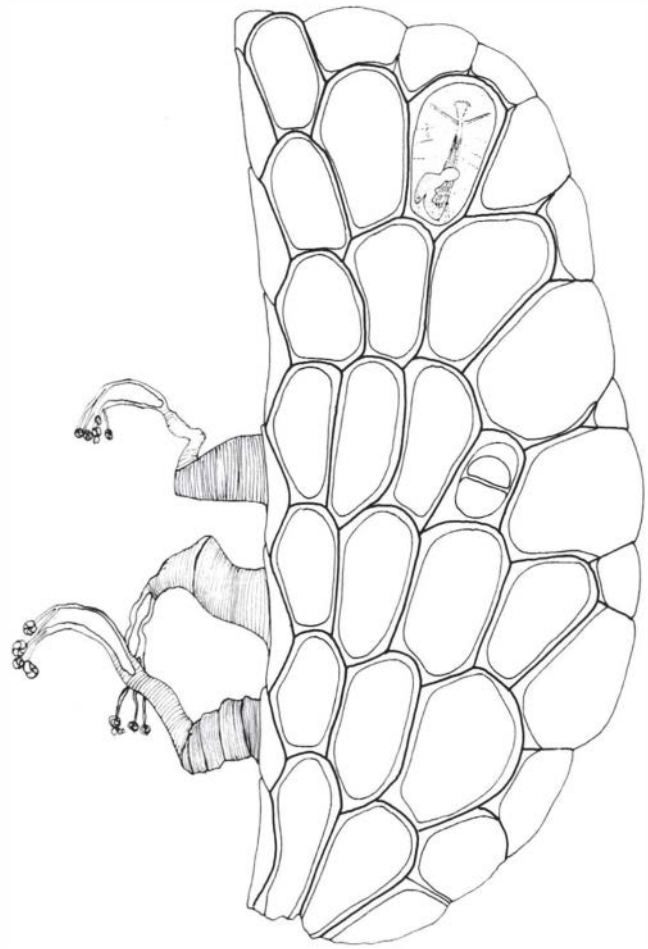


FIG. 11. *Concertina cultrata* n.gen., n.sp. Whole colony (Stn P927).

Concertina n.gen.

Colony erect, bilamellar, of simple form. Zooids relatively large. Avicularia vicarious, occurring at bifurcations of zooidal rows. Some marginal zooids modified as kenozooids, with concertina-like rhizoids. No spines. Ovicell prominent, vicarious, not closed by the zooidal operculum.

TYPE-SPECIES: *Concertina cultrata* n.sp.

Concertina cultrata n.sp. (Fig. 11; Plate 2, G, H)

MATERIAL EXAMINED: NZOI Stns P927, P929, P942; also S153, south of Mernoo Saddle, 45°21.1′S, 173°35.8′E, 1386 m.

DISTRIBUTION: Challenger Plateau, 914–1029 m, and head of Bounty Trough, 1386 m.

DESCRIPTION: Colony erect, bilamellar, fairly rigid, up to 7 mm high and 2.5 mm wide, blade-shaped, with one straight edge of kenozooids and one curved growing edge of autozooids. Autozooids 0.63–1.05 × 0.34–0.73 mm, larger towards the growing edge, with a narrow gymnocystal rim which is slightly raised distally. Kenozooids in one longitudinal row, uniting the two zooidal layers, the frontal membranes expanded into long, tubular anchoring rhizoids, often concertina-like proximally and usually fimbriated terminally. Avicularia occasional, 0.44–0.63 × 0.22–0.29 mm, the rostral rim prominent, raised at an angle to the plane of the colony; mandible simple, without sclerites; crossbar complete; the avicularian cystid without a cryptocyst. Ovicells prominent, mitriform with a median suture, vicarious, not closed by the zooidal operculum.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-400.

PARATYPE: NZOI, type number P-631, from NZOI Stn S153, 45°21.1′S, 173°35.8′E, 1386 m.

TYPE-LOCALITY: NZOI Stn P927, 40°50.1′S, 168°14.8′E, 1005–1009 m.

REMARKS: The form of the colony and the kenozooids, and the prominent ovicells, which are about as long as autozooids and replace them in a zooidal series, justify the erection of a new, monotypic genus.

The fimbriated rhizoidal ends of the kenozooids attach to individual foraminiferans and in life the colony gives the appearance of lying on edge on the substratum, with the kenozooids facing into the sediment.

Gregarinidra Barroso, 1949

TYPE-SPECIES: *Membranipora gregaria* Heller, 1867

Gregarinidra serrata MacGillivray (Plate 3, A)

Membranipora serrata MacGillivray, 1869: 131.
Gregarinidra serrata: Gordon 1984: 25 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns D273, M779, M794, M795, M797.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Tasman Bay, Fiordland, Foveaux Strait; also south-east Australia and Japan.

REMARKS: The Kermadec Ridge colonies examined by me (Gordon 1984) did not have ovicells and so these structures could not be illustrated. For this reason a photograph of *G. serrata* is included here.

Gregarinidra inarmata (Hincks) (Plate 3, B)

Membranipora inarmata Hincks, 1881b: 4; MacGillivray 1886b: 104.

MATERIAL EXAMINED: NZOI: Stns B498, Q686. Museum of Victoria: Specimens 63602, *Membranipora inarmata*; 63603, *Membranipora pectinata.*

DISTRIBUTION: Near D'Urville Island, Cook Strait; also Victoria, Bass Strait.

DESCRIPTION: Colony small, encrusting. Zooids 0.37–0.55 × 0.20–0.27 mm, elongate, the opesia bordered by a narrow gymnocystal rim bearing 5–8 spines along each margin, these overarching the opesia except for the most distal pair; gymnocyst lacking proximally except when ovicells are present; the ovicells immersed in the proximal ends of succeeding zooids. Avicularia lacking. Ancestrula resembling other zooids though smaller, and more ovoid in outline.

REMARKS: Only three colonies were encountered; the largest, of 40 zooids and lacking the ancestrula and a few periancestrular zooids, had 16 fertile zooids; another, also lacking the ancestrula, had 7 fertile zooids; and an ancestrulate colony, with 29 zooids, had 3 fertile zooids. These appeared to be mature colonies, even though of small size, and the absence of avicularia would appear to be a real feature.

Membranipora pectinata MacGillivray, 1886 is very close to this species and may be conspecific. It differs only in the greater length of the spines, which interdigitate above the zooidal midline.

Although avicularia are otherwise very characteristic of species of *Gregarinidra, G. inarmata* nonetheless conforms in other characteristics (encrusting habit, marginal spines. immersed ovicells). MacGillivray (1886: 104), for example, drew a comparison with *G. serrata*.

Watersia Levinsen, 1909

Colony erect, bilamellar, or encrusting and unilamellar. Zooids elongate, subrectangular, with or without a pair of oral spines. Avicularia mostly vicarious, generally occurring at the bifurcations of zooidal rows. Ovicells hyperstomial, with a bifenestrate ectooecium.

TYPE-SPECIES: *Flustra militaris* Waters, 1887

REMARKS: Gordon (1985) has commented on the familial relationship of *Watersia*, allying it among the flustrid genera.

Watersia militaris (Waters) (Plate 3, C, D)

Flustra militaris Waters, 1887b: 93; 1896: 279.
Watersia militaris: Levinsen 1909: 94, 99; Livingstone 1929: 53.

MATERIAL EXAMINED: NZOI Stns B498, M791.

DISTRIBUTION: Three Kings Islands, D'Urville Island, Milford Sound; also Port Jackson (New South Wales).

DESCRIPTION: Colony encrusting, giving rise to erect, bilamellar fronds (not seen in New Zealand material). Zooids 0.61–0.90 × 0.24–0.34 mm, elongate, subrectangular, with a very small and narrow rim of gymnocyst and subjacent cryptocyst proximally. A pair of oral spines on most zooids, including ovicelled zooids, where they are longer. Avicularia occasional, vicarious, occurring at the bifurcations of zooidal rows; tapering proximally; the rostrum raised; the mandible triangular; no cross-bar. Ovicell hyperstomial, bifenestrate. Many older zooids towards colony centre with porous calcified frontal walls.

REMARKS: Although the New Zealand material is encrusting it is undoubtedly Waters's species. As a comparison, *Gregarinidra serrata* (q.v.) may similarly grow into extensive encrusting sheets containing fertile zooids prior to erect frondose portions arising.

The form of the ovicell and the presence of vicarious avicularia are reminiscent of those of *Crassimarginatella* subgenus *Valdemunitella* in the Calloporidae.

Kenella Levinsen, 1909

Colony erect, unilamellar or bilamellar, dichotomously branching, supported by rhizoids which descend the branch margins. No spines or avicularia. Ovicell endozooidal.

TYPE-SPECIES: *Flustra biseriata* Busk, 1884

Kenella aliena n.sp. (Fig.12; Plate 3, E)

MATERIAL EXAMINED: NZOI Stn E793.

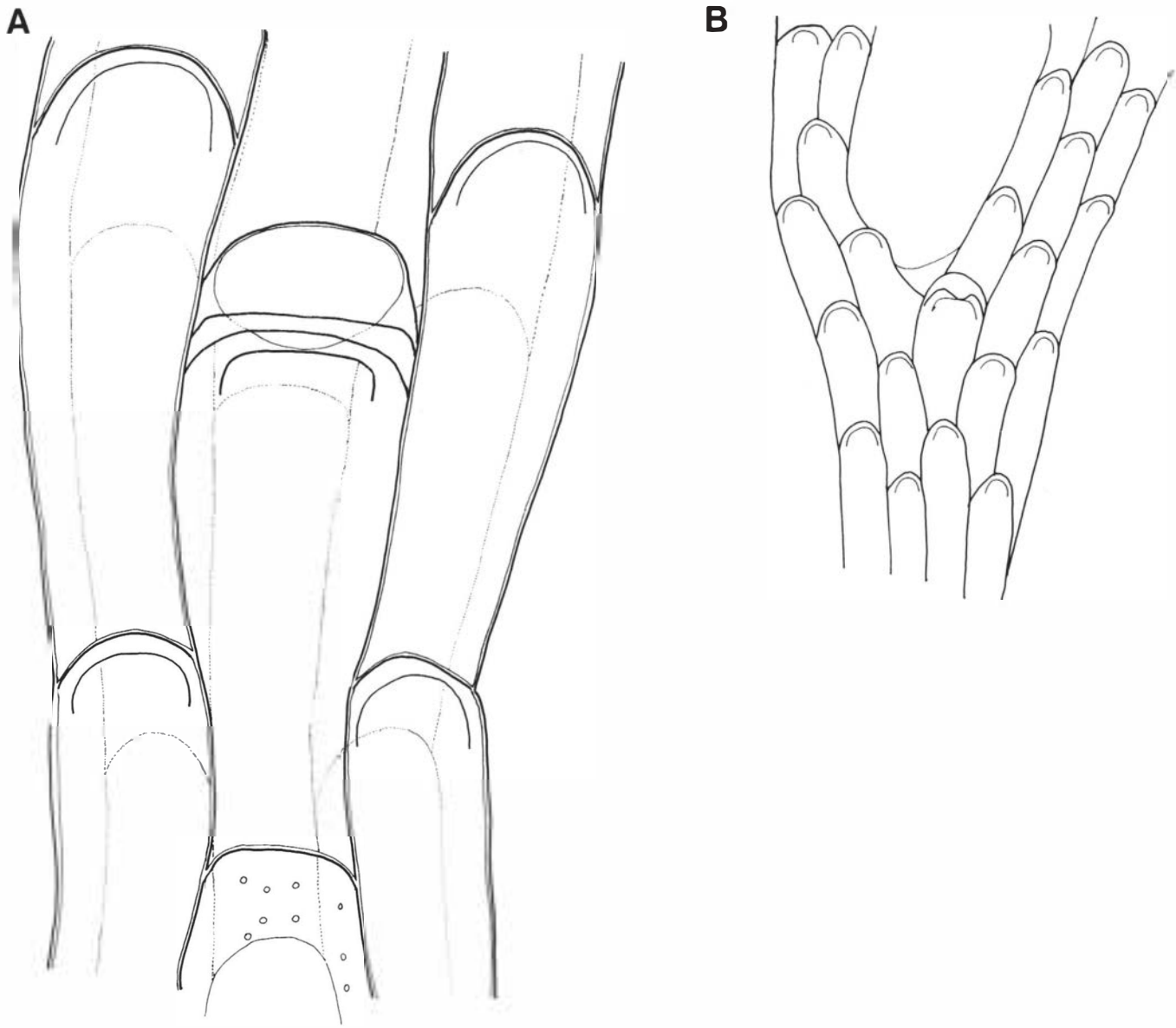


FIG. 12. *Kenella aliena* n.sp. A, fertile zooid surrounded by non-ovicelled zooids; B, bifurcation (marginal rhizoids not shown) (Stn E793).

DISTRIBUTION: Northern Fiordland.

DESCRIPTION: Colony erect, unilamellar, to 33 mm high, dichotomously branching, the greatest branch width (at a proximal bifurcation) 2.3 mm. Zooids bi- to pentaserial, 0.49–0.68 × 0.20–0.24 mm, the frontal surface entirely membranous. No spines or avicularia. Ovicell moderately large, endozooidal, completely accommodating the embryo; the maternal and next distal zooids widest where the ovicell occurs. The lateral margins of the branches comprising rhizoids which communicate throughout their length by uniporous septula with adjacent autozooids.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-399.

PARATYPE: NZOI, type number P-630, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn E793, off the entrance to Poison Bay, northern Fiordland, 44°40.5′S, 167°32.0′E, 243–253 m.

REMARKS: This species looks superficially like a *Himantozoum* (Bugulidae), but differs from the majority of species of that genus in the marginal rhi-

zoids, the lack of spinose processes and avicularia, the total lack of even a small proximal gymnocyst, and in the endozooidal ovicells which bulge into the cavity of the distal zooids and which fully accommodate the embryo.

There is no existing genus to which it unequivocally belongs, but it possesses some of the characteristics of *Kenella* Levinsen, viz., the endozooidal ovicell, the lack of spines and avicularia, and the marginal rhizoids. It differs from the type-species, *K. biseriata* (Busk), however, which is bilamellar and, according to Levinsen (1909) [presumably based on the description of Waters (1896)], its ovicell is associated with a kenozooid.

Hastings (1943) placed *Kenella* in the Farciminariidae but I think the characters are those of the Flustridae in which Levinsen included it. She also indicated (1943: 423) that *Bugula versicolor* Busk might be allied with *K. biseriata*, but d'Hondt and Schopf (1984) have made *B. versicolor* the type species of a new monotypic genus, *Semidendrobeania*.

Family CALLOPORIDAE Norman, 1903

Retevirgula Brown, 1948

TYPE-SPECIES: *Membranipora acuta* Hincks, 1885

Retevirgula acuta (Hincks) (Plate 4, A)

Membranipora acuta Hincks, 1885: 249.
Retevirgula acuta: Brown 1948: 109; 1952: 74; Gordon 1967: 51; Ryland 1975: 384.

MATERIAL EXAMINED: NZOI: Stns B455, D272, M774, M776, M782, M794. DPG: Colonies from Bay of Islands, Goat Island Bay, Leigh, Auckland Harbour, Whatipu, New Plymouth, Kaikoura.

DISTRIBUTION: East coast of New Zealand from Bay of Islands to Kaikoura, west coast from Manukau Heads to Milford Sound.

DESCRIPTION: Colony thinly encrusting, hyaline. Autozooids discrete, separated by lacunae of various sizes and connected by up to 14 tubular processes to neighbouring zooids; 0.41–0.54 × 0.22–0.24 mm, pyriform, tapering proximally. Gymnocyst extensive. Cryptocyst a very narrow rim bordering the oval opesia, the margin beaded at the boundary with the gymnocyst. Spines 0–2, on the lateral cryptocystal rim, short, projecting over the opesia, which is slightly constricted near the spine bases. An interzooidal avicularium distal to each autozooid; with complete crossbar; the rostrum raised, directed distally, slightly hooked at the tip. Ovicell hyperstomial, tapering distally to the avicularium which surmounts it. Occasional kenozooids between the autozooids.

REMARKS: This species is generally associated with algae, occurring on holdfasts of stout brown algae or on crustose coralline or erect, frondose red algae.

Retevirgula aggregata Gordon

Retevirgula aggregata Gordon, 1984: 27.

MATERIAL EXAMINED: NZOI Stn B455.

DISTRIBUTION: Off Kahurangi Point, north-west South Island, and Kermadec Ridge.

Retevirgula sejuncta (MacGillivray) (Plate 4, B)

Membranipora lineata L. var. Waters 1889a: 3.
Membranipora sejuncta MacGillivray, 1891: 78; Waters 1898: 678.
Pyrulella sejuncta: Hastings 1930: 710.
Retevirgula sejuncta: Brown 1948: 109; Uttley & Bullivant 1972: 15.

MATERIAL EXAMINED: NZOI Stn Q686.

DISTRIBUTION: D'Urville Island, Chatham Islands; also Victoria, southern New South Wales.

DESCRIPTION: Colony encrusting. Autozooids oval in shape, wider proximally. Opesia occupying most of the frontal area. Gymnocyst not developed proximally. Cryptocyst restricted as a very narrow rim just below the bases of the 12 or 13 gymnocystal spines; these stout, converging near the zooidal mid-line, the most distal ones more erect. Zooids separated by a system of interzooidal connecting tubes and lacunae among which are interspersed kenozooids with a small oval opesia, and small avicularia with a raised curved rostral rim and lacking a cross-bar. Ovicell prominent, smooth, not surmounted by an avicularium but often with a distal pore.

REMARKS: This appears to be MacGillivray's (1891) species. Hastings (1930) pointed to features in MacGillivray's illustration which caused her to doubt conspecificity with Water's (1889a) specimens. These were the shape of the avicularian rostrum and the form of the ovicell. Both MacGillivray and Waters referred to and illustrated triangular mandibles but Hastings's re-examination of Waters's material showed that they may be quite rounded.

MacGillivray's illustration shows what appears to be an ovicell with what Hastings referred to as a "triangular frontal area". In the present material the most distal pair of oral spines can alter the form of the ovicell, which, although generally smooth, may have a faint ridging, giving the semblance of a frontal area. MacGillivray also referred to the avicularia as occurring distal to the autozooids but he did not mention kenozooids. None of these features is especially significant in itself but together they indicate that two very similar species may be involved. Waters (1898), however, later regarded his variety as the same as MacGillivray's species and I have followed his synonymy.

Ellisina Norman, 1903

TYPE-SPECIES: *Membranipora levata* Hincks, 1882

Ellisina sericea (MacGillivray)

Biflustra sericea MacGillivray, 1890a: 107.
Ellisina sericea: Gordon 1984: 28 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B483, B484, B488, B490, C867, C869, D270, D273, E796, E817, E820, E821, E828, M778, M779.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Cook Strait, Tasman Bay, Fiordland, Foveaux Strait; also Victoria.

REMARKS: In the present specimens, the avicularia distal to the autozooids may sometimes be replaced by kenozooids with small circular or oval opesiae.

Crassimarginatella Canu, 1900

TYPE-SPECIES: *Membranipora crassimarginata* Hincks, 1880

Crassimarginatella (Crassimarginatella) cucullata (Waters) (Plate 4, C)

Membranipora sculpta var. *cucullata* Waters, 1898: 685.
Crassimarginatella cucullata: Uttley 1951: 29; Uttley & Bullivant 1972: 15 (*cum syn.*).
Crassimarginatella siléni Brown, 1952: 58.

MATERIAL EXAMINED: NZOI: Stns B473, B477, B482, B490, B498, B616, C869, D270, D272, D274, E796, Q686. N.Z. Geological Survey: 2 slides labelled "*Crassimarginatella sileni* Brown" from Weka Pass (Middle Miocene); 1 slide labelled "*Crassimarginatella cucullata* (Waters)" from "Weka Pass". Canterbury Museum: zb26 *Crassimarginatella cucullata*, Recent from Tahuna, Nelson. British Museum (Natural History): D36540, holotype of *Crassimarginatella sileni* Brown, Weka Pass, Middle Miocene.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Fiordland.

DESCRIPTION: Colony encrusting. Zooids 0.41–0.66 × 0.22–0.37 mm, elongate-oval. Opesia large, comprising around 80% of the zooidal length; gymnocyst variable, sometimes comprising 30% of the zooidal length, generally much less; smooth-surfaced, partially obscured when ovicells present. Cryptocyst bordering the opesia, negligible distally, wider proximally; descending; conspicuously granular, the granulations appearing denticulate where they border the opesia. A pair of small oral spines with minute bases present on some zooids. Avicularia frequent, shorter than autozooids but attaining their width, with a subcircular to ovoid rim; the rostrum broadly rounded, smooth, much raised; crossbar complete; the rostral area somewhat larger than the avicularian opesia which is reduced by the presence of a granular cryptocyst. Ovicell prominent, subglobular, smooth peripherally with a large, granular endooecial exposure.

REMARKS: *Crassimarginatella cucullata* is here considered to include *C. sileni* Brown. I have examined Brown's holotype from the British Museum (Natural History) and slides of G.H. Uttley in N.Z. Geological Survey and Canterbury Museum. *C. sileni* specimens are all of fossil material and none of the avicularia have cross-bars, but these are presumed to have been lost through wear or abrasion of the fossil material. *C. sileni* agrees with *C. cucullata* in the raised rostral rim of the avicularium, the granular endooecial area of the ovicell, in the comparable area of gymnocyst, and in the overall dimensions of the zooids. Brown (1952) has remarked on the two unusual spatulate avicularia in the holotype of *C. sileni*. All of the others in the holotype are of the ovoid form.

Crassimarginatella (Crassimarginatella) fossa Uttley (Plate 4, D, E)

Crassimarginatella fossa Uttley, 1951: 30.

MATERIAL EXAMINED: NZOI: Stns B482, B485, B498, C750, C867, C868, D246, D269, D270, D272, D273, M763, M778, M782, M791. Canterbury Museum, zb27, holotype of *C. fossa*.

DISTRIBUTION: West coast of Northland, Colville Channel, Tasman Bay, New Brighton, Timaru, Fiordland.

DESCRIPTION: Colony encrusting. Zooids 0.37–0.63 × 0.24–0.34 mm, elongate-oval, generally narrowing proximally, with raised rims and separated from each other by furrows. Opesia large, comprising 80–90% of the zooidal length. Gymnocyst restricted proximally, scarcely evident or moderately developed and bearing a tubercle (Uttley). Cryptocyst bordering the opesia, negligible distally, widest proximally, descending, granular. Spines moderately developed as a distolateral pair or two or three along each margin, or absent. Avicularia vicarious, infrequent, attaining the dimensions of autozooids; with a slightly raised distal rim, the rostral area delimited from the opesia by a pair of stout pivots approximately mid-way along the rim; avicularian cryptocyst and gymnocyst like that of autozooids but lacking spines. Ovicell recumbent, with a broad, shallow, crescentic furrow; the ectooecial rim sometimes produced into an umbo.

REMARKS: Uttley (1951) noted that in some colonies the zooidal gymnocyst may be umbonate. In the absence of ovicells, such colonies would resemble those of *C. papulifera* (MacGillivray) (Plate 4, F) which also has more or less identical vicarious avicularia. The two species may be distinguished by the lack of marginal spine bases and the smaller ovicell with deeper cleft in *C. papulifera*.

Subgenus **Corbulella** Gordon, 1984

TYPE-SPECIES: *Membranipora corbula* Hincks, 1880

Crassimarginatella (Corbulella) corbula Hincks
(Plate 5, A)

Membranipora corbula Hincks, 1880c: 378.
Crassimarginatella (Corbulella) corbula: Gordon 1984: 29 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B487, B488, B493, D270, D273, E817, E820, M763, M779, M780, M791, M793, M797, Q686.

DISTRIBUTION: Kermadec Ridge, Tasman Bay, Fiordland, western Foveaux Strait; also Australia, Japan.

REMARKS: Colonies of this species were observed on *Dimetopia spicata* from Stn B493. Spines on zooids of such colonies appear proportionately stouter than those of encrusting colonies and ovicells lack a peak or umbo at the proximal rim of the ectooecium. Vicarious avicularia were not seen in these epizoitic colonies.

Crassimarginatella (Corbulella) bifurca (Powell)
(Plate 5, B)

Membraniporella bifurca Powell, 1967a: 219; Gordon 1984: 60.

MATERIAL EXAMINED: NZOI Stns B473, B482, B483, B484, B490, D270, E796, E817, E820.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Tasman Bay, Westland, Fiordland, Puysegur Bank.

REMARKS: A colony from Stn B490 had a vicarious avicularium typical of *Crassimarginatella (Corbulella)*, i.e., with a dentate rostral rim and opesial spines. Although the degree of fusion of the spines of both the autozooids and avicularia is extreme for this subgenus, the affinities of this species are clearly with *Corbulella* and not *Membraniporella*, which has small adventitious avicularia.

The number of oral spines (four) in the South Island colonies and the presence of kenozooids is as Powell (1967a) described in Three Kings Islands colonies. Kermadec Ridge colonies had, by contrast, five or six more slender spines and no kenozooids.

Crassimarginatella (Corbulella) gibba n.sp.
(Plate 5, C, D)

MATERIAL EXAMINED: NZOI Stn B455.

DISTRIBUTION: Near Kahurangi Point, north-west Nelson province.

DESCRIPTION: Colony encrusting. Zooids 0.36–0.66 × 0.24–0.45 mm, broadly ovoid. Opesia large, protected by a cage of 16–21 spines which are not laterally contiguous and do not strictly fuse in the mid-line at their simple or forked apices, although the distalmost ones may be in intimate contact. Oral spines four, semi-erect, the proximal pair stouter. Gymnocyst bearing an angular prominence. Cryptocyst narrow, granular, concealed by the opesial spines. Avicularia not seen. Kenozooids tend to be common in older parts of a colony, occupying the interiors of former autozooids, or they may occur separately; the surface smooth, with a relatively large central opesial foramen. Ovicell with a prominent rounded or subangular ectooecial ridge delimiting an area of endooecium.

HOLOTYPE: Colonies, in collection of the New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-405.

PARATYPE: NZOI, type number P-638, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn B455, north of Kahurangi Point, 40°40.0′S, 172°13.0′E, 58 m.

REMARKS: Although avicularia are lacking and the choice of a genus is subjective, this species seems better accommodated in *Crassimarginatella (Corbulella)* than in *Membraniporella*, chiefly by comparison with the similar species *C. (Corbulella) spinosissima* Gordon from the Kermadec Ridge.

Subgenus **Valdemunitella** Canu, 1900

Crassimarginatella with bifenestrate ovicells. Spines typically bordering the opesiae of autozooids or absent. Gymnocyst moderately developed. Avicularia lacking crossbar, with or without spines and a serrated rostral rim.

TYPE-SPECIES: *Membranipora valdemunita* Hincks, 1885

REMARKS: The exact status of *Valdemunitella* has been questioned. Hastings (1945), in a review of the species of *Crassimarginatella*, noted how the suite of characteristics of that genus were more or less shared by those of *Valdemunitella* and *Pyrulella* Harmer. Hastings suggested that *Valdemunitella* might be retained as a separate taxon on the basis of the bifenestrate ovicell and Brown (1952) recognised it as a full genus on the same basis. Harmelin (1973) studied the development of the ovicell and interzooidal communication organs in three species with characters corresponding to *Crassimarginatella sensu stricto, Pyrulella*, and, in part, to *Valdemunitella*, and concluded that the latter two taxa may be included in the synonymy of *Crassimarginatella*. I have already discussed *Pyrulella* in a previous work (Gordon 1984) in which I concurred with Hastings that it must fall into synonymy with *Valdemunitella* on the basis of the type species, but I pointed out that a suite of species remained, sharing characters distinguishable from *Crassimarginatella sensu stricto*, for which I introduced *Corbulella* at the subgeneric level. Similarly, a

small suite of species exists with the characters of the type species of *Valdemunitella*, justifying the retention of this taxon, but likewise within *Crassimarginatella*. These species are: *Crassimarginatella exilimargo* Canu & Bassler, 1928, *Crassimarginatella (Valdemunitella) fraudatrix* n.sp., *Crassimarginatella (Valdemunitella) hara* n.sp., *Figularia spinea* Brown, 1952, *Membranipora pyrula* Hincks, 1881, *Membranipora valdemunita* Hincks, 1885, and possibly *Cribrilina spatulata* Calvet, 1909. *Valdemunitella bermudae* d'Hondt & Schopf, 1984 belongs, instead, in *Corbulella*.

Crassimarginatella (Valdemunitella) valdemunita Hincks (Plate 6, A–C)

Membranipora valdemunita Hincks, 1885: 248.
Valdemunitella valdemunita: Uttley 1951: 34 (*cum syn.*).; Brown 1952: 63 (*cum syn.*); Uttley & Bullivant, 1972: 16; Wass & Vail 1978: 43; Vail & Wass 1981: 646.

MATERIAL EXAMINED: NZOI: Stns B482, B488, B490, B498, C856, C867, C869, D246, D254, D262, D273, D274, E820, Q686. DPG: Colony from Manukau Harbour.

DISTRIBUTION: Manukau Harbour, Napier, Wellington, Marlborough Sounds, Tasman Bay, Chatham Rise, Timaru, Fiordland, Foveaux Strait; also Sydney Harbour, New South Wales.

DESCRIPTION: Colony encrusting. Zooids 0.54–0.76 × 0.22–0.49 mm, elongate-oval to pyriform, narrowing proximally. Opesia large, averaging 60–70% of the zooidal length. Gymnocyst moderately developed, around 25–30% of the zooidal length, smooth, bearing generally one, occasionally two pointed tubercles, or these lacking. Cryptocyst narrow, granular, bordering the opesia laterally and proximally. Spines variable, often a distal oral pair and up to three on each lateral margin curving part-way over the opesia, though not as far as the mid-line, or spines lacking altogether; these variations may exist in single colonies. Avicularia vicarious, elongate, smaller overall than autozooids; the rostral rim rounded, raised, entire or slightly denticulate; condyles prominent, acicular, nearly meeting at the mid-line. Ovicell prominent, with a pair of ectooecial fenestrae separated by a thin median suture.

REMARKS: This species is distinguished from the other species of this subgenus in the New Zealand region in having fewer and shorter spines.

Harmelin (1973) remarked how the avicularia of *Crassimarginatella solidula* (Hincks) resemble those of *C. valdemunita* and, if *Valdemunitella* were acceptable as a taxon, it might accommodate that species. The ovicell, however, which is a more characteristic feature in *Valdemunitella*, develops differently in *C. solidula*. In this species the endooecium grows as a single fold whereas in *C. (Valdemunitella) pyrula*, for example, both it and the ectooecium develop as two folds which fuse leaving a median suture.

In life the growing edges, polypides and embryo are deep lemon yellow in colour.

Crassimarginatella (Valdemunitella) fraudatrix n.sp. (Plate 6, D, E)

MATERIAL EXAMINED: NZOI Stns M791, Q745; on mollusc shells.

DISTRIBUTION: Milford and George Sounds, Fiordland.

DESCRIPTION: Colony encrusting. Zooids 0.51–0.68 × 0.22–0.37 mm, elongate-oval. Opesia large, occupying around 80% of the zooidal length. Gymnocyst moderately to little developed, smooth, bearing no tubercles. Cryptocyst narrow, granular, bordering the opesia laterally and proximally. Spines encircling the opesia, two distally, two orally and 12 or 13 around the remainder of the opesia including proximally; long, slightly interdigitating above the mid-line. Avicularia as long as or longer than autozooids; the rostrum broadly rounded, raised, minutely denticulate; the mandibular pivots stout, relatively short; the avicularian opesia bordered by a narrow cryptocyst and about ten long slender spines. Ovicell raised, with two narrow fenestrae.

HOLOTYPE: Colonies, in collection of the New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-407.

PARATYPES: NZOI, type number P-639, from the same locality as the holotype; BM(NH), reg. no. 1985.1.22.4, Stn Q745, George Sound, 44°54.05′S, 167°25.17′E, 40 m.

TYPE-LOCALITY: NZOI Stn M791, Milford Sound, 44°37.1′S, 167°51.5′E, 30 m.

REMARKS: *Crassimarginatella (Valdemunitella) fraudatrix* resembles *C. (V.) pyrula* but the spines of the latter are stouter with larger bases, the gymnocyst often bears a tubercle, and the avicularia lack spines. In this last character, *C. (V) fraudatrix* resembles species of subgenus *Corbulella* in which the avicularia have a denticulate rostral rim and a spine-protected opesia, which again points to the ovicell as being the sole distinguishing feature in *Valdemunitella*.

Crassimarginatella (Valdemunitella) pyrula (Hincks) (Plate 6, F)

Membranipora pyrula Hincks, 1881b: 3.
Valdemunitella pyrula: Uttley 1951: 34 (*cum syn.*); Brown 1952: 65 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B477, B482, B483, B487, B489, B493, B616, C867, C868, D272, D273, E817, E820, E828. DPG: Colony from Portobello. Museum of Victoria: Slides 62943, 63610.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Fiordland, Otago Harbour, western Foveaux Strait; also Victoria, Bass Strait, South Australia.

DESCRIPTION: Colony encrusting. Zooids 0.49–0.68 × 0.24–0.44 mm, elongate-oval. Opesia large, comprising around 80% of the zooidal length. Gymnocyst moderately developed to negligible, smooth, bearing a stout, broad-based spine-like tubercle, or two similar smaller tubercles, or none. Cryptocyst narrow, granular, bordering the opesia laterally and proximally. Spines well-developed, a distal pair, an oral pair and five or six pairs laterally, converging above the zooidal mid-line. Avicularia vicarious, variable, generally half the length, or attaining the length, of autozooids; the rim subcircular overall, the acicular condyles dividing the rostral and opesial areas often equally; the rostrum broadly rounded, raised, minutely denticulate; the avicularian gymnocyst without spines but often bearing a pointed tubercle; cryptocyst granular. Ovicell bifenestrate.

REMARKS: Slides of this species from the Museum of Victoria agree with Hinck's (1881b) description and illustration. The New Zealand specimens typically have shorter avicularia and often a stout gymnocystal tubercle. One avicularium in MV 63610 is like those in the New Zealand colonies, however, and the overall range of variation in the species would seem to be able to accommodate the New Zealand form.

Crassimarginatella (Valdemunitella) hara n.sp. (Plate 6, G)

MATERIAL EXAMINED: NZOI Stn B482; on a mollusc shell.

DISTRIBUTION: Puysegur Bank.

DESCRIPTION: Colony encrusting. Zooids 0.32–0.47 × 0.22–0.36 mm, ovoid. Opesia large, completely covered by a cage of 25–27 laterally contiguous spines not or barely interdigitating along the zooidal midline and loosely fusing; the distal-most pair more strongly fused, simulating an orificial bar. Oral spines four, long and stout, the proximal pair particularly so. Gymnocyst small, bordering the spinose area. Cryptocyst not evident except as a smooth, exceedingly slender rim bordering the opesia and seen only when the spines are removed. Avicularia not seen. Ovicells with bifenestrate ectooecium, the fenestrae not surrounded by calcification but open proximally; a median suture present.

HOLOTYPE: Colonies, in collection of the New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-406.

TYPE-LOCALITY: NZOI Stn B482, 46°08.8′S, 166°06.0′E, 88 m.

REMARKS: This species differs from *Crassimarginatella (V.) spinea* in its more numerous frontal spines and fewer oral spines.

Crassimarginatella (Valdemunitella) spinea (Brown)

Figularia spinea Brown, 1952: 181; Gordon 1984: 62 (*cum syn.*).
Figularia cf. *huttoni*: Wass & Yoo 1983: 329.

MATERIAL EXAMINED: NZOI Stns B480, B482, B483, B485, B487, B488, B489, B490, B611, B616, C857, C861, D269, D270, D273, D274, E796, E804, E817, E820, E821, E828, M773, M774, M778, M779, M780, M789, M791, M793, M794, M797, Q686.

DISTRIBUTION: Common subtidally throughout the New Zealand region from the Kermadec Ridge to Stewart Island.

REMARKS: This species seems to be better accommodated in *Crassimarginatella (Valdemunitella)* than in *Figularia*. Both it and *Cribrilina spatulata* Calvet, 1909 differ from the type-species of *Figularia* (*F. figularis* (Johnston)) in having oral spines and in lacking costal lumen pores and an avicularian cross-bar. For those in which avicularia are known, other species of undisputed *Figularia* also share the characters of the type-species. *F. spinea*, Calvet's species, and the preceding similar new species are here segregated from *Figularia* and allied with *Crassimarginatella (Valdemunitella)*. Perhaps it is significant that live *C. (V.) spinea* and *C. (V.) valdemunita* are also similarly pigmented (a lemon yellow colour).

Aplousina Canu & Bassler, 1927

Colony encrusting. Zooids generally of large size. Gymnocyst and cryptocyst generally narrow. Spines rare. Avicularia absent. Ovicell immersed, well-developed to vestigial.

TYPE-SPECIES: *Aplousina gigantea* Canu & Bassler, 1927

Aplousina anxiosa n.sp. (Plate 7, A)

MATERIAL EXAMINED: NZOI Stns B482, B490.

DISTRIBUTION: Southern Fiordland.

DESCRIPTION: Colony small, encrusting. Zooids 0.46–0.83 × 0.37–0.61 mm, elongate-oval to subcircular. Opesia huge, bordered by a very narrow granular cryptocyst all round except distally. Gymnocyst variable, occurring only proximally, laterally, or distally, or all round or negligible; with smooth scattered nodules. No spines or avicularia. Ovicell fairly prominent, the smooth but broadly nodular surface merging with the gymnocyst of the distal zooid; not sealed by the closed zooidal operculum. Basal pore-chambers large, one distally, one on each side laterally.

HOLOTYPE: Colonies, in collection of New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-404.

PARATYPES: NZOI, type number P-637, and BM(NH), reg. no. 1985.1.22.5, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn B490, 45°44.3′S, 166°44.8′E, 148 m; found on the concave surfaces of dead bivalves near the umbones.

REMARKS: This is the first record of true *Aplousina* from the New Zealand region. It is distinguishable from other species in the genus by the gymnocystal nodules and the overall smaller size of zooids.

Akatopora Davis, 1934

Colony encrusting, often multilamellar and associated with gastropod shells. Zooids with relatively large opesia. Small kenozooids and small avicularia interzooidally. No spines. Ovicells immersed.

TYPE-SPECIES: *Akatopora clausentina* Davis, 1934

REMARKS: Davis's genus appears to include some Recent species previously ascribed to other genera. These include *Aplousina*(?) *circumsaepta* Uttley, 1951, *Crassimarginatella leucocypha* Marcus, 1937, and *Crassimarginatella tincta* Hastings, 1930. Each has been noted as occurring often on mollusc shells (Uttley 1951; Mawatari 1952; Cook 1968a). Cook (1968a) specifically mentioned that colonies of *A. tincta* were multilamellar and often associated with gastropod shells inhabited by hermit crabs. These features also characterise *A. circumsaepta*.

Through the courtesy of the Department of Palaeontology, British Museum (Natural History), I have been able to examine the holotype of *Akatopora clausentina*. It resembles *A. circumsaepta* very closely (cf. Plate 7, D and E) in the disposition of the interzooidal kenozooids and the form of the ovicell. *Akatopora* appears very similar to *Craspedopora* Canu & Bassler, 1929, which appears, however, to lack ovicells. The type species, *C. typica* Canu & Bassler, is kept in the Institut Royal des Sciences Naturelles, Brussels, and type specimens may not be borrowed from that institution unless hand-carried. I have, however, examined the holotypes of *C. canaliculata* Davis, 1934 and *C. gregoryi* Davis, 1934 (British Museum (Natural History)). These lack ovicells but otherwise resemble *A. circumsaepta* and *A. clausentina*, especially *C. canaliculata*, which is multilamellar and partially encrusts a gastropod shell. Davis (1934) himself compared these two *Craspedopora* species with *Conopeum* Gray, 1848, which also has similar kenozooids in the angles between zooids and lacks ovicells, and this is a valid comparison. Species of *Conopeum* are often associated with mollusc shells, although Recent species have a cyphonautes larva and are clearly distinguished on this basis. It seems that the consistent absence of ovicells from the fossil material may have to continue to serve in distinguishing species of *Craspedopora* from those of *Akatopora* but, if the type species of *Craspedopora* should ever be discovered with ovicells, *Akatopora* would probably have to be regarded as a subjective junior synonym.

Akatopora circumsaepta (Uttley) (Plate 7, B–D)

Aplousina(?) *circumsaepta* Uttley, 1951: 28.

MATERIAL EXAMINED: NZOI: Stns B489, B496, C869, D252, D267, D269, D273, Q686. DPG: Colony from Jellicoe Channel, Hauraki Gulf.

DISTRIBUTION: Hauraki Gulf, Marlborough Sounds, Tasman Bay, Fiordland, western Foveaux Strait.

DESCRIPTION: Colony encrusting gastropod shells, multilamellar. Zooids 0.27–0.61 × 0.20–0.37 mm. Opesia large, occupying about 90% of the zooidal length, bordered by a narrow granular cryptocyst. Gymnocyst negligible proximally, more usually absent. No spines, Kenozooids regularly or irregularly placed interzooidally or adventitiously at the distal ends of zooids, generally paired and triangular in shape but ranging from 1–4 and variable, sometimes occurring laterally; with a small subcircular to tear-drop-shaped opesia and granular cryptocyst; ocassionally replaced by, or adjacent to, a small avicularium which is smooth-rimmed distally, with a granular cryptocyst. Ovicell somewhat immersed, closed by the zooidal operculum, but not inconspicuous; generally with a pair of kenozooids distally, these rather broadened in some colonies, covering the ovicell and giving the appearance of ovicellular fenestrae. Numerous mural and basal septula in zooids in multilamellar colonies.

REMARKS: Live colonies are highly coloured. A colony from NZOI Stn Q686 was deep purple in life. Other colonies, seen dried or preserved, were blue or red. Hastings (1930) commented on the bright pink or mauve colouration of dried or preserved old colonies of *A. tincta*.

There is some variation in the zooids of *A. circumsaepta*. They are smaller in a colony from Stn Q686, in which the ovicellular surface is more exposed, whereas in colonies from Stn D267 the zooids are somewhat larger with the kenozooids covering the ovicellular surface. In colonies from Stn D273 the ovicellular surface is exposed and bears a prominent nodule. The kenozooidal rims are also somewhat produced.

Foveolaria Busk, 1884

Colony encrusting; or erect and vincularian, bilamellar, frondose or retiform from an encrusting base. Cryptocyst surrounding the opesia, granular, steeply descending. Gymnocyst well developed proximally, becoming thicker with secondary calcification. Avi-

Sig 3*

cularia adventitious on the gymnocyst. Ovicells hyperstomial, becoming immersed in secondary calcification.

REMARKS: Brown (1952) discussed this genus and concluded that *Odontionella* Canu & Bassler might be used at the subgeneric level for *Foveolaria* species which have a prominent denticulate projection of the proximal cryptocystal rim. I follow his treatment here.

Subgenus **Foveolaria** Busk, 1884

Colony erect and vincularian, bilamellar, frondose or retiform from an encrusting base. Zooidal characters as for the genus.

TYPE-SPECIES: *Foveolaria elliptica* Busk, 1884

Foveolaria (Foveolaria) elliptica Busk (Plate 8, A)

Foveolaria elliptica Busk, 1884: 68; Canu 1900: 381; Levinsen 1909: 152; Brown 1952: 76; Moyano 1974: 7.

MATERIAL EXAMINED: NZOI Stns B488, B489, D221, D222, D223, D226, E820, E821. British Museum (Natural History): Specimen 1887.12.9.343 pt.

DISTRIBUTION: Challenger Plateau, Fiordland, western Foveaux Strait; also Bass Strait, Australia, and southern Chile.

DESCRIPTION: Colony erect, bifurcating, with lengths of branches between bifurcations up to 18 mm. Zooids arranged in 7–11 alternating longitudinal rows, 0.81–1.00 × 0.37–0.61 mm, the opesia occupying half or less of the zooidal length. Cryptocyst completely encircling the opesia, steeply descending, with a distinct rim in young zooids; faintly granular. Gymnocyst extensive, convex, with surface texturing and generally four frontal pores. No oral spines. Avicularia single, borne distally on the gymnocyst, orientated transversely or obliquely proximally; with a hastate mandible and condyles; no pivot bar. Ovicell hyperstomial, convex, but somewhat obscured in thickly calcified older colonies.

REMARKS: In some colonies the distal cryptocystal rim may bear small denticles.

Subgenus **Odontionella** Canu & Bassler, 1917

Encrusting or erect *Foveolaria* with the zooidal cryptocyst denticular proximally and projecting into the opesia.

TYPE-SPECIES: *Membranipora hians* Hincks, 1885, a junior subjective synonym of *Membranipora cyclops* Busk, 1854.

Foveolaria (Odontionella) cyclops (Busk) (Plate 8, B–F)

Membranipora cyclops Busk, 1854: 61.
Membranipora tessellata Hutton, 1873: 96.
Odontionella cyclops: Uttley 1949: 181 (*cum syn.*); Brown 1952: 81 (*cum syn.*); Gordon 1967: 53; Uttley & Bullivant 1972: 16; Ryland 1975: 384.
Odontionella cyclops var. *tessellata*: Brown 1952: 83 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B480, B482, B483, B484, B485, B487, B488, B489, B490, B493, B495, B611, B616, C851, C852, C869, C871, D269, D273, E817, E820, M763, M778, M780, M789, M791, Q686. DPG: Colonies from Whangarei Heads, Leigh, Manukau Harbour, Bay of Plenty, Te Araroa, New Plymouth, Wellington Harbour, Totaranui, Kaikoura, Otago shelf.

DISTRIBUTION: Throughout New Zealand from Whangarei to Foveaux Strait; also magellanic South America and ?Victoria.

DESCRIPTION: Colony encrusting, unilamellar, to erect and bilamellar, frondose, fenestrate, or subcylindrical and vincularian. Zooids 0.41–0.78 × 0.34–0.61 mm, with a subquadrate opesia occupying about half the zooidal length. Cryptocyst completely encircling the opesia, very steeply descending, granular, with the proximal cryptocystal margin projecting forwards and downwards and bearing numerous fine denticles. Gymnocyst generally supporting one or two avicularia, these developing early in zooidal ontogeny, acute, lacking a pivot bar, directed distally or obliquely so or transversely. Zooidal gymnocyst becoming secondarily calcified, with the calcification of neighbouring gymnocysts forming a continuous raised surface considerably above the frontal membrane in older zooids. One to four delicate ephemeral oral spines may be present in zooids at the colony margin. Ovicell hyperstomial, with a small triangular endooecial exposure proximally, the ovicell becoming progressively obscured by secondary calcification.

REMARKS: This species is very variable, both in colonial and zooidal morphology. The amount of gymnocystal calcification contributes to the latter's variability. Two to four pores generally occur in the gymnocyst, sometimes at the extreme corners; the degree to which they remain detectable also depends on the amount of calcification. In some colonies, evidently corresponding to *O. cyclops* var. *tessellata* Hutton (*see* Brown 1952), the distal gymnocystal rim has irregular processes projecting partially over the frontal membrane. This arrangement occurs, in the present material, in encrusting and erect colonies from western Foveaux Strait (Stns E820, E821), though not in all zooids. It is distinctive enough but seems to be the only such feature which could justify the retention of the "variety". Overall, these colonies seem to be part of the general range of variation exhibited in this species.

The "trifoliate markings" on the ovicell in both the species and the "variety" are not especially evident in the material before me and seem, from Brown's (1952) description and illustration (fig. 35), to result from a particular configuration of secondary calcification.

Brown (1952: 82–83) pointed to evidence that this species may occur in southeastern Australia. Jullien (1888) reported it from Cape Horn.

Antropora Norman, 1903

Colony encrusting. Zooidal cryptocyst moderately developed, gymnocyst negligible or absent. Spines absent. Avicularia small, interzooidal, or absent. Ovicells endozooidal. Basal pore-chambers present.

TYPE-SPECIES: *Membranipora granulifera* Hincks, 1880

REMARKS: The type-species and the few other species positively attributed to *Antropora* (*see* Cook 1968a) are characterised, *inter alia*, by small interzooidal avicularia. These are lacking in the following new species, which necessitates an amendment to the generic diagnosis.

Antropora pacifera n.sp. (Plate 9, A)

MATERIAL EXAMINED: NZOI Stns B477, B483, B484, B487, B488, B489, B611, B616, C844, C867, C869, D269, D270, D272, D273, E796, E804, E817, E820, E828, M779, Q686; on molluscan shell fragments.

DISTRIBUTION: Cook Strait, Marlborough Sounds, Tasman Bay, Fiordland, western Foveaux Strait.

DESCRIPTION: Colony encrusting. Zooids 0.41–0.73 × 0.29–0.71 mm, with relatively large opesia bordered by a moderate-sized granular cryptocyst. Gymnocyst not evident except at the extreme proximal corners. No avicularia. Ovicell endozooidal, visible frontally as a narrow, faintly granular, bulge distally on some zooids, projecting considerably under the cryptocyst of each zooid distal to it. Generally three basal pore-chambers in the distal half of each zooid.

HOLOTYPE: Colonies, in collection of the New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-403.

PARATYPES: NZOI, type number P-636, and BM(NH), reg. no. 1985.1.22.2, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn B488, 46°28.7′S, 166°14.3′E, 164 m.

REMARKS: This is the southernmost record for a species of *Antropora*.

Amphiblestrum Gray, 1848

TYPE-SPECIES: *Membranipora flemingii* Busk, 1854

Amphiblestrum alcimum Gordon

Amphiblestrum alcimum Gordon, 1984: 33.

MATERIAL EXAMINED: NZOI Stns B483, B488, D262, D270, E821.

DISTRIBUTION: Kermadec Ridge, Tasman Bay, Fiordland, western Foveaux Strait.

REMARKS: The present specimens extend the range of *A. alcimum*, which was first described from the Kermadec Ridge. In overall zooidal dimensions the more southern colonies are slightly smaller than the Kermadec ones.

Amphiblestrum blandum n.sp. (Plate 9, B, C)

MATERIAL EXAMINED: NZOI: Stns D262, M776. DPG: Colonies from Portobello.

DISTRIBUTION: Tasman Bay, Milford Sound, Portobello.

DESCRIPTION: Colony encrusting. Zooids 0.39–0.90 × 0.29–0.59 mm, averaging 0.51 × 0.39 mm, the opesia occupying about half the zooidal length, with the proximal edge straight or generally round. Each zooid with a narrow raised rim, sometimes developed distally. Cryptocyst more or less flat, extensive, granular. Gymnocyst absent. Oral spines typically absent or a pair of rare, fragile, caducous spines may be present on some zooids. Avicularia rare, small, found at the extreme proximal ends of the zooids which bear them; orientated transversely; the rostrum acute, elevated. Ovicell prominent, with a large exposure of endooecium which is granular like the cryptocyst.

HOLOTYPE: Colony, in the collection of the New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-401.

PARATYPES: NZOI, type number P-632, from the same locality as the holotype, and P-633 from NZOI Stn D262, 41°05.0′S, 173°30.5′E, 33 m.

TYPE-LOCALITY: Aquarium Point, Portobello, 1 m; type-specimen collected by the author 18 October 1977.

REMARKS: No colony in the present material has both avicularia and ovicells. The Portobello specimens have ovicells but lack avicularia. The NZOI material is non-fertile but has rare avicularia. Notwithstanding, the specimens appear to belong to the same species.

Amphiblestrum contentum n.sp. (Plate 9, D)

MATERIAL EXAMINED: NZOI: Stns B468, B472, B473. DPG: Colonies from Hauraki Gulf.

DISTRIBUTION: Hauraki Gulf, Westland.

DESCRIPTION: Colony encrusting. Zooids 0.49–0.73 × 0.39–0.51 mm, the opesia with a gently curving or straight proximal edge, bordered by a smooth, narrow cryptocystal rim. Cryptocyst concave, smooth or faintly granular, bordered by a finely denticulate to granular raised mural rim. The distal oral rim and the articular condyles finely denticulate, projecting into the zooidal interior. A pair of stout cryptocystal spines arching over the opesia, their ends palmate, like the fingers of a hand. Gymnocyst occupying about 30% of the zooidal length, bearing one or two adventitious avicularia; the rostra acute, inclined, orientated transversely or obliquely so, towards or away from each other. Ovicell prominent, with a fairly extensive, smooth, triangular endooecial exposure.

HOLOTYPE: Colonies, in collection of the New Zealand Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-402.

PARATYPES: NZOI, type number P-634, and BM(NH), reg. no. 1985.1.22.3, both from the same locality as the holotype; NZOI type number P-635, from NZOI Stn B468, 42°39.0′S, 170°47.0′E, 156 m.

TYPE-LOCALITY: NZOI Stn B472, off Gillespie Point, Westland, 43°20.0′S, 169°47.0′E, 215 m.

REMARKS: The distinctive spines of this species are particularly characteristic. In colonies where these become lost the relatively smooth cryptocyst and finely denticulate condyles would be key features to look for.

Family CHAPERIIDAE

REMARKS: The characteristics and genera of this family have recently been evaluated by Gordon (1982). Overlooked in this paper, however, was the work of Balavoine (1959), who introduced a new family (Chaperinidae) and genus (*Chaperina*) based on *Chaperia tropica* Waters, 1909. Balavoine's only comment and justification was that "Cette famille est à classer entre les Chaperidae (par sa frontale et son apertura semilunaire) et les Hiantoporidae (par la radication à la base de la zoécie)."

Thanks to the courtesy of The Manchester Museum, I have been able to examine a specimen (evidently the holotype, since it is the only one in the Waters Collection) of *C. tropica*. It is a typical species of *Chaperiopsis*, a genus introduced by Uttley (1949). Possibly Balavoine (1959) simply overlooked Uttley's genus and sought, like Uttley, to establish a genus for the group of species with avicularia and ovicells, but he mentioned no other species than *Chaperia tropica*. He also carelessly included Harmer's (1957) reference to *Smittina tropica* (Waters) in the synonymy of *Chaperia tropica*.

Thus, *Chaperina* is a junior subjective synonym of *Chaperiopsis* and Chaperinidae is unnecessary.

Chaperia Jullien, 1881

TYPE-SPECIES: *Chaperia australis* Jullien, 1881, a junior subjective synonym of *Flustra acanthina* Lamouroux, 1825 (Brown 1952; Hayward & Cook 1983).

Chaperia acanthina (Lamouroux) (Plate 9, E, F)

Flustra acanthina Lamouroux, 1825: 605.
Chaperia acanthina: Brown 1952: 95 (*cum syn.*); Gordon 1967: 51; Uttley & Bullivant 1972: 17; Ryland 1975: 384 [as *Chaperica acanthina* (sic)]; Gordon 1982: 2; Hayward & Cook 1983: 19.

MATERIAL EXAMINED: NZOI: Stn C871. British Museum (Natural History): Specimens 35.3.6.316 and 35.3.6.54 from Cape Orford, West Falkland Island, Vallentin Collection.

DISTRIBUTION: Cook Strait; also Falkland Islands, Antarctica, Australia, South Africa, and, reportedly, Japan.

DESCRIPTION: Colony encrusting. Zooids 0.32–0.51 × 0.37–0.51 mm, more or less hexagonal in outline, with a large oval opesia occupying an average of 50% of the zooidal length, bordered by a smooth, narrow, cryptocystal rim. Cryptocyst granular. Gymnocyst absent. A row of five or six spines around the distal border, each articulated at the base, smaller distally. Occlusor laminae well-developed, each occurring as an oblique sloping shelf on either side within the opesia, curving but not fully converging distally. Opesia 0.15–0.27 × 0.22–0.32 mm, often slightly wider than long, as with the zooid. No ovicells or avicularia. Small multiporous septula in end walls.

REMARKS: *Chaperia acanthina* has been accorded a wide southern hemisphere distribution and has even been reported from Japan (Silén 1941). In New Zealand I have found what I have taken to be *C. acanthina* from Whangarei Heads to Otago Peninsula but, on the basis of NZOI material, it appears that there may be two shallow-water forms in New Zealand waters, not previously distinguished.

I have examined specimens from the type locality (courtesy of the British Museum (Natural History)) in order to evaluate the relationships of the New Zealand forms. One form has somewhat smaller and proportionally deeper zooids than the other and occurs on algae. The ancestrula of this form resembles that illustrated by Jullien (1888, pl. 5 fig. 3), in which the opesia and cryptocyst are more or less encircled by spines, with the distal ones more widely spaced. Jullien shows five proximal spine bases with a hint of an additional spine at the left distolateral corner of the opesia. The New Zealand form has seven somewhat stouter spines, six being in approximately the positions indicated by Jullien plus another at the right distolateral corner. On the basis of all these features, this form is regarded as *C. acanthina* although the zooids in the NZOI

material do not attain the maximum length of the Falkland Islands specimens.

The other shallow-water New Zealand form has conspicuous zooids with a relatively larger cryptocyst, and encrusts hard substrata like rocks and shells. The ancestrula is not completely encircled by spines. It is thus regarded as a separate species, and is now described below.

Chaperia granulosa n.sp. (Fig. 13; Plate 9, G, H)

Chaperia acanthina. Gordon 1967: 51; 1982: 2; Ryland 1975: 384; Gordon 1982: 3, fig. 1A.

MATERIAL EXAMINED: NZOI: Stns B484, B488, B493, C804, C816, C844, C856, C867, C869, C871, D246, D269, D270, E804, E809, E820, Q686, Q723, S385. DPG: Colonies from Leigh, Auckland Harbour.

DISTRIBUTION: Hauraki Gulf, Marlborough Sounds to Fiordland and western Foveaux Strait.

DESCRIPTION: Colony encrusting. Zooids 0.51–1.18 × 0.47–0.85 mm, with an oval opesia occupying 30–44% of the zooidal length. Cryptocyst extensive, granular. Gymnocyst absent. A row of 6–9 articulated spines around the border of the opesia sometimes to the level of the proximal ends of the occlusor laminae; a mid-distal pair smallest, often at a lower level and at an angle to the others; the longest spines attaining 0.66 mm in length. Occlusor laminae well-developed, not fully converging distally. Opesia 0.26–0.37 × 0.27–0.41 mm, sometimes with a distinct smooth narrow rim. A prominent bulbous structure protrudes from the distal rim of the orifice. No avicularia or ovicells. Multiporous septula present. Ancestrula 0.42 × 0.39 mm, the opesia occupying about half the frontal area, with eight spines bordering the opesia (except proximally) and a single short spine at the proximal end of the cryptocyst, just to one side of the mid-line.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-408.

PARATYPES: NZOI, type number P-640 from Stn C871, and P-641 from Stn B493.

TYPE-LOCALITY: Stephen's Hole, off D'Urville Island, Marlborough Sounds, 40°40′S, 174°03.3′E, 205 m.

REMARKS: The larger size of the zooids and the hard substratum on which it occurs distinguish this species from *C. acanthina*, although it is not yet established that it never settles on algae. Another character, though possibly influenced by the type of substratum, is the ratio of zooidal length to depth — in both Falkland and New Zealand *C. acanthina* it is approximately 1:1 whereas in *C. granulosa* it is from 2:1 to 5:1. The ancestrula further separates these two species — in *C. granulosa* there is only a single tiny spine proximal to the opesia. An unusual feature of *C. granulosa* is the bulbous extrovert-like structure that protrudes from the distal rim of the orifice. Its function is not known. In dried material it shrinks and flattens against the bases of the spines, resembling the "common basis" or web that joins the spines as illustrated by MacGillivray (1886b: pl. 127 fig. 8) for *Membranipora spinosa*, which may be conspecific.

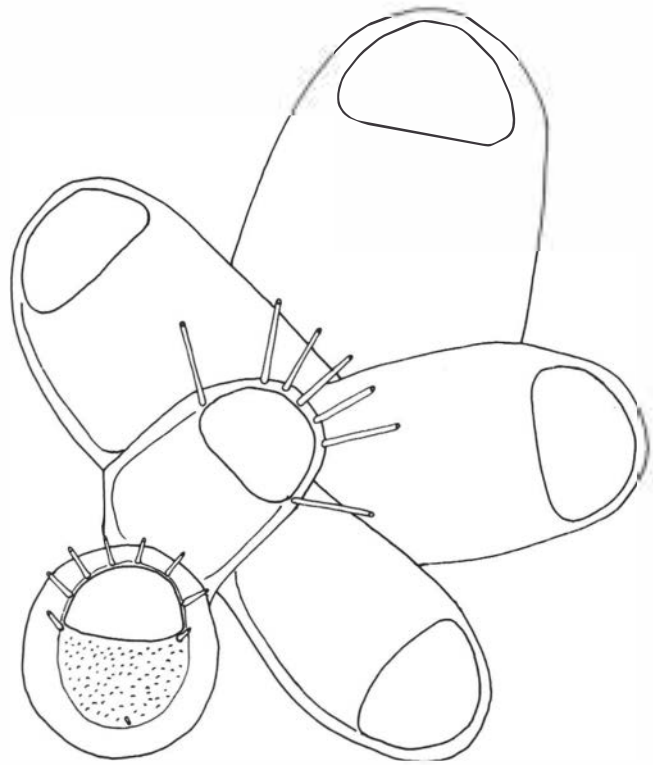


FIG. 13. *Chaperia granulosa* n.sp. Young ancestrulate colony (Stn Q723).

Icelozoon Gordon, 1982

Colony encrusting. Cryptocyst extensive, granular, delimited clearly from the smooth bordering gymnocyst. Occlusor laminae conspicuous, well-developed. Oral spines present. No avicularia. Ovicell hood-like, with a narrow proximofrontal fenestra. Multiporous mural septula present.

TYPE-SPECIES: *Chaperia dichotoma* Kluge, 1914

Icelozoon sp. (Plate 10, A)

MATERIAL EXAMINED: NZOI Stn Q722.

DISTRIBUTION: Off the coast of South Island near Greymouth.

DESCRIPTION: Colony encrusting, uniserial, dichotomously branching. Zooids 0.88–1.06 × 0.52–0.66 mm, more or less pyriform, with a transversely oval opesia bordered by a smooth narrow rim proximally. Cryp-

tocyst granular, bordered by a narrow, faintly textured gymnocyst which is also the lateral wall; no gymnocyst proximally. Spines six, not occurring as far as the proximal rim of the opesia. Occlusor laminae well-developed, spanning the opesial length from the distal rim to the proximal rim, not converging distally. No avicularia. Ovicells not seen.

REMARKS: Only a few non-ovicelled zooids of this species were found. It concurs with the two known species of *Icelozoon* in the uniserial mode of growth and the extensive cryptocyst bordered by a narrow gymnocystal band.

Bryopastor Gordon, 1982

Colony erect, vincularian, supported by basal rhizoids. Cryptocyst extensive, granular; gymnocyst absent. Occlusor ridges defined by conspicuous muscle lacunae. No spines or avicularia. Ovicells endozooidal. Multiporous mural septula present.

TYPE-SPECIES: *Heterocella pentagona* Canu & Bassler, 1929

Bryopastor challengeri Gordon (Plate 10, B, C)

Bryopastor challengeri Gordon, 1982: 20.

MATERIAL EXAMINED: NZOI Stns P927, P929, P942.

DISTRIBUTION: Challenger Plateau.

DESCRIPTION: Colony erect, vincularian, four-serial; zooids arranged back-to-back in alternating pairs, with joints occurring as breaks in calcification across the middle of every third, fourth, or fifth zooecial pair in a longitudinal series, allowing flexion of colony; jointed zooids generally with a proximal cryptocyst and polypide. Autozooids 0.78–0.95 × 0.40–0.58 mm, with an extensive, granular cryptocyst continuing laterally and distally around the opesia. Opesia about 30% of zooidal length, rounded or straight proximally, generally more elongate in jointed zooids. Gymnocyst absent. Conspicuous occlusor muscle scars in distolateral corners of autozooids. No spines or avicularia. Female zooids with opesia wider and longer than in autozooids, the cryptocyst correspondingly reduced. Endozooidal ovicells not strictly present, the distal end of the female zooid appearing as a shallow concavity which causes a slight bulging of proximal end of next distal zooid. Occlusor muscle scars widely separated in female zooids, occurring laterally. Ancestrula not seen, but anchoring rootlets emanating from half-autozooids proximally.

REMARKS: Colonies of *B. challengeri* occur at depths of 914–1029 m on a foraminiferan ooze.

Patsyella Brown, 1948

TYPE-SPECIES: *Monoporella capensis* var. *dentata* Waters, 1887

Patsyella acanthodes Gordon (Plate 10, D, E)

Patsyella acanthodes Gordon, 1982: 10.

MATERIAL EXAMINED: NZOI Stns B487, B488, B489, C871, E804, E820, E821, E828.

DISTRIBUTION: Marlborough Sounds, Cook Strait, southern Fiordland, western Foveaux Strait.

DESCRIPTION: Colony encrusting. Zooids 0.58–0.78 × 0.45–0.68 mm, arranged more or less quincuncially, with an extensive depressed granular cryptocyst occupying over half the zooidal length. Opesia roundly quadrate, a little wider than long, smooth-rimmed, bordered by 2–5 stout spines; spines simple or shallowly forked, with relatively small points of articulation at the base; often an occasional additional spine somewhere on the proximal zooidal rim. Occlusor laminae conspicuous, well-developed, curving from the distal wall to the lateral margins of the opesia, each enclosing a deep pocket for muscle insertions. Avicularia adventitious, sessile, columnar, occurring at proximal corners of many zooids, with irregular orientation. Ovicell endozooidal, immersed under cryptocyst of next distal zooid, which bulges conspicuously; smooth-rimmed proximally, with a granular crescentic area above the ovicellular opening; ovicelled zooids larger than others, with wider opesiae and occlusor laminae more widely separated.

REMARKS: Very young zooids, which lack avicularia and ovicells, resemble species of *Membraniporella* (e.g., *M. marcusi* Cook) in which the arrangement of the spines over the opesia is very open.

Chaperiopsis Uttley, 1949

TYPE-SPECIES: *Membranipora galeata* Busk, 1854

Chaperiopsis (Chaperiopsis) incognita n.sp. (Plate 11, A)

[?]*Chaperia arcifera* Levinsen, 1909: 39.

MATERIAL EXAMINED: NZOI Stn B483.

DISTRIBUTION: Southern Fiordland.

DESCRIPTION: Colony encrusting. Zooids 0.46–0.73 × 0.41–0.51 mm, opesia about as wide as long, occupying 30–50% of the zooidal length. Cryptocyst wider proximally, granular. Gymnocyst variable in size, smooth, not bearing avicularia. Distal rim of zooid raised, somewhat thickened, bearing six long spines,

the proximal pair cervicorn. An avicularium mid-distally below the zooidal rim, the rostrum directed distally; no other avicularia. Ovicells not seen.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-451.

PARATYPE: NZOI, type number P-683, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn B483, west of the entrance to Chalky Inlet, southern Fiordland, 46°01.5′S, 166°21.0′E, 187 m.

REMARKS: Levinsen's name for this species was informally proposed and accompanied by a very brief description of two morphological features; the spines, and the position of the opercular sclerite in the frontal membrane. Since Levinsen's species is the only strictly six-spined *Chaperiopsis* species presently known from the New Zealand region, the present material may correspond to it. A new name is necessary however. According to the curator of Bryozoa at the Zoologisk Museum, Copenhagen, their catalogues and Levinsen collection have no specimens by that name. Levinsen's material, if any, of this species, is thus unidentifiable.

Chaperiopsis (Chaperiopsis) boninensis (Silén)

Chaperia transversalis var. *boninensis* Silén, 1941: 48.
Chaperiopsis (Chaperiopsis) boninensis: Gordon 1984: 35.

MATERIAL EXAMINED: NZOI Stn B488.

DISTRIBUTION: Kermadec Ridge, western Foveaux Strait; also Bonin Islands, Japan.

REMARKS: The specimens from Stn B488 considerably extend the range of this species in the New Zealand region. Further remarks may be added here to my (1984) description of Kermadec colonies. In ovicelled zooids the distal pair of spines is more widely separated than in non-ovicelled zooids and the transverse groove is caused by the close apposition of the spines to the developing ovicell. A small fenestral pore may occur in each side of the ovicell frontally. The specimens from western Foveaux Strait had four oral spines compared to five in the Kermadec colonies.

Chaperiopsis (Chaperiopsis) cervicornis (Busk)
(Plate 11, B–E)

Membranipora cervicornis Busk, 1854: 60.
Chaperia cervicornis: Brown 1952: 112 (*cym syn.*); Gordon 1967: 52; Ryland 1975: 384.

MATERIAL EXAMINED: NZOI: Stns B482, B483, B484, C869, D252, D253, D273, E804, E817, E820, M776, M795, M796, Q686. DPG: Colonies from Three Kings Islands, Whangarei Heads, Leigh, Auckland Harbour, Manukau Heads, Mount Maunganui, Te Araroa, Napier, Castlepoint, Wellington, Nelson, Totaranui, Kaikoura, Dunedin wharves, Portobello. British Museum (Natural History): Specimen 1944.1.8.176 on *Bugularia dissimilis* from Bass Strait.

DISTRIBUTION: Throughout New Zealand from Three Kings Islands to Foveaux Strait; also Bass Strait.

DESCRIPTION: Colony encrusting. Zooids 0.39–0.51 × 0.24–0.37 mm, with raised lateral margins. Opesia relatively large, subcircular, occupying 30–50% of the zooidal length, and bordered by a distinct rim on the edge of the cryptocyst. Cryptocyst smooth, fairly extensive. Gymnocyst not evident. Oral spines 6–8, cervicorn, the proximal pairs stouter than the distal pairs and the bases of the distal spines set at a lower level in the zooidal rim. Mid-distal avicularium usually present, sessile, of variable size, sometimes fairly large; the rostrum directed laterally. Occlusor laminae widely separated proximally, converging mid-distally. Ovicell hood-like, with a transverse exposure of endooecium along the proximal ovicellular rim and a kenozooidal opening behind.

REMARKS: New Zealand colonies of this species in some ways differ from Busk's (1854) description and illustration. For example, Busk showed the spines as broadly alcicorn, with some of the opposing tines fusing, whereas in New Zealand colonies the spines are more slender, with fewer tines, and do not fuse. Busk also noted that the colour of dead colonies is purplish, whereas New Zealand ones are always beige.

I have examined a colony of *C. cervicornis* from very near the type locality of Tasmania, and I conclude that the New Zealand form is this species. The spines (4–6) in the Bass Strait material are as Busk illustrated them in most zooids but in some zooids they are as in New Zealand colonies, although there are never as many as eight. In both forms the proximal spines are stout and much branched and the most distal spines slender and little branched, or simple.

In both forms the cryptocyst is quite smooth and the avicularium is transversely placed. The ovicell in the Bass Strait colony may be capped by the avicularium or a kenozooecium whereas the latter is the case in the New Zealand colonies I have seen.

The Bass Strait colony is beige in the dried state which indicates very strongly that the purplish colonies Busk mentioned were of *C. colensoi* (Brown, 1952), which also has cervicorn spines and occurs in Bass Strait. Indeed a slide of *C. colensoi* in the Hincks Collection at the British Museum (Natural History) (99.5.1.542) is labelled "*Membranipora cervicornis* Busk". In this species (Plate 11, F) the cryptocyst, though also smooth, is considerably reduced, the spines (four) are proportionately stouter, and the avicularium is distally directed.

The bases of the slender distal spines of *C. cervicornis* were not remarked upon by Brown (1952) who had access to both Recent and fossil material. Certainly it is possible to overlook them.

Harmer's (1926) description and illustration of the ovicell in Torres Strait colonies suggests he may have had a different species.

Chaperiopsis (Chaperiopsis) cf. **cristata** (Busk) (Plate 12, B–D)

cf. *Amphiblestrum cristatum* Busk, 1884: 65 (part).
Chaperiopsis cristata: Uttley & Bullivant, 1972: 17.

MATERIAL EXAMINED: NZOI: Stns B457, B488, E793, M779, M780, M797, Q722, Q723, S385; also C759, near Three Kings Islands, 34°11.7′S, 172°09.9′E, 99 m. DPG: Colony from Otago Shelf. British Museum (Natural History): Specimen 99.7.1.1070 from Kerguelen Island.

DISTRIBUTION: Three Kings Islands, Milford Sound, Otago shelf.

DESCRIPTION: Colony encrusting. Zooids 0.49–0.54 × 0.41–0.61 mm. Opesia conspicuous, subcircular, occupying 33–65% of the zooidal length, and bordered all round by a granular cryptocyst which is widest proximally. Gymnocyst smooth, very small or moderately developed, bearing one or two avicularia on conical bases. Oral spines four, long and stout, unbranched, with conspicuous bases, the proximal pair larger. Mid-distal avicularium of moderate size, lacking only in ovicelled zooids, distally directed; gymnocystal avicularia tall and spine-like or considerably larger with long rostra directed proximally or obliquely so; both types surmounting the ovicell distally. Ovicell prominent, smooth, with a circular to transversely oval ectooecial fenestra; all four oral spines present in ovicelled zooids.

REMARKS: The New Zealand species resembles *C. cristata* (Busk, 1884) from the South Indian Ocean. Both forms have four simple spines, a granular cryptocyst, and a smooth, generally well-developed, gymnocyst bearing one or two articulated tall columnar avicularia, or a large non-articulated avicularium directed proximally or obliquely so.

C. cristata from Kerguelen Island (Plate 12, A) differs in having narrow spines, with smaller bases, and a wide transverse exposure of ectooecium in the ovicell, which is generally surmounted by the large avicularium in contrast to the New Zealand colonies, which typically bear the columnar avicularia.

Chaperiopsis (Chaperiopsis) spiculata Uttley

Chaperiopsis spiculata Uttley, 1949: 188; Uttley & Bullivant 1972: 18; Gordon 1984: 37.

MATERIAL EXAMINED: NZOI Stns B477, B482, B488, B616, D270, D273, D274, E796, E804, E820, E828, Q686.

DISTRIBUTION: Kermadec Ridge, Napier, D'Urville Island, Tasman Bay, Fiordland, Foveaux Strait.

Chaperiopsis (Chaperiopsis) serrata Uttley & Bullivant

Scutochaperia serrata Uttley & Bullivant, 1972: 18; Gordon 1982:6.

MATERIAL EXAMINED: NZOI Stns B493, D272, Q686. Also paratype slide P-153, held at NZOI.

DISTRIBUTION: D'Urville Island, Tasman Bay, Mernoo Bank, Fiordland.

DESCRIPTION: Colony encrusting. Zooids 0.50–0.75 × 0.30–0.45 mm, with a large oval opesia occupying 50–65% of the zooidal length. Cryptocyst narrow, granular, extending around sides of opesia. Gymnocyst up to 50% of length of zooid, smooth, often obscured by ovicell of proximal zooid. A single slender unbranched spine at each distolateral corner of opesia, articulated at base. Occlusor laminae a continuous, narrow shelf curving around distal half of each zooid. Avicularia prominent, broad-based, situated on distal edge of gymnocyst, rising to tip of rostrum, which is angled upward, acute, proximally directed; at level of avicularian opesia a broad, fimbriate calcareous process extends over proximal half of zooidal opesia. The mid-distal avicularium lacking. Ovicell fairly prominent, smooth, with a well-developed crescentic fenestra proximally; oral spines retained in ovicelled zooids. Large mural chambers with multiporous septula occur in end walls.

REMARKS: Gordon (1982) has shown that *Scutochaperia* must be regarded as inclusive in *Chaperiopsis (Chaperiopsis)*.

Chaperiopsis (Chaperiopsis) serrata biporosa Uttley & Bullivant (Plate 12, E)

Scutochaperia serrata biporosa Uttley & Bullivant, 1972: 19; Gordon 1982: 6.

MATERIAL EXAMINED: NZOI Stns B482, B488, B490, D270. Also paratype slide P-154, held at NZOI.

DISTRIBUTION: Tasman Bay, eastern Chatham Rise, Fiordland, western Foveaux Strait.

DESCRIPTION: Colony encrusting. Zooids 0.49–0.73 × 0.29–0.41 mm; opesia occupying 42–67% of the zooidal length. Cryptocyst narrow, granular, extending around sides of opesia. Gymnocyst up to 51% of length of zooid, smooth, often largely obscured by ovicell of proximal zooid. Spines 2–4, often a slender distal pair and a stouter, club-ended or slightly bifid proximal pair or either of these pairs of spines missing. Occlusor laminae a continuous narrow shelf curving around distal half of each zooid. Gymnocystal avicularia prominent, broad-based; the rostrum acute, proximally directed; fimbriate shield arising from avicularian column extensive, generally with a "straight" denticulate distal rim, though this very variable, and proximally curving to delimit a pair of small holes in the shield, below and adjacent to the mandibular

pivots. A small avicularium on the mid-distal rim present in some zooids. Ovicell fairly prominent, smooth, with a well-developed triangular or crescentic ectooecial fenestra proximally.

REMARKS: Inasmuch as some zooids in every colony of this variable form have the shield little more developed than in *C. (C.) serrata sensu stricto*, it seems inappropriate to accord to *biporosa* specific status (*see* Gordon 1982).

Chaperiopsis (Chaperiopsis) splendida n.sp.
(Plate 13, A–E)

MATERIAL EXAMINED: NZOI Stns E793, E821.

DISTRIBUTION: Fiordland, western Foveaux Strait.

DESCRIPTION: Colony relatively large, with semi-erect dichotomous branches arising from an encrusting supportive base primarily of kenozooids. Autozooids 0.54–0.71 × 0.24–0.39 mm. Opesia occupying about 45% of the zooidal length, bordered by a granular cryptocyst laterally and proximally. Gymnocyst comprising 33–54% of the zooidal length, smooth, merging into the prominent avicularian column which it supports. Oral spines four, an erect distal pair and a stout proximal pair which curve toward each other, overlapping and fusing above the opesia with the distal end of the avicularian column; this column producing on each side three or four spine-like processes projecting laterally; the avicularium relatively small, the rostrum directed proximally upwards, or the avicularium much larger, with an elongated rostrum directed laterally, the avicularian column in this instance not fusing with the proximal oral spines; an avicularium present on the mid-distal rim of each zooid. Kenozooids relatively large, smooth-surfaced, with an oval opesia surrounded by a narrow cryptocyst; each semi-erect branch of a colony square or triangular in cross-section, with kenozooids in three or four layers beneath the autozooidal layer. Ovicell with a pair of lateral fenestrae proximally and a pair of avicularia distally, the rostra proximally directed.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-409.

PARATYPES: NZOI, type number P-642 from Stn E793, and P-643 from Stn E821, 46°43.5′S, 165°46.5′E, 549 m.

TYPE-LOCALITY: NZOI Stn E793, north of the entrance to Bligh Sound, 44°50.5′S, 167°32.0′E, 243–253 m.

REMARKS: This species is reminiscent of *C. (Chaperiopsis) intermediata* Gordon, 1984 in which the avicularian column is fused to a stout pair of oral spines. It also resembles *C. (Clipeochaperia) chathamensis* in which the shield is more extensive. Indeed, it is almost arbitrary as to whether *C. spendida* may be included in either of the subgenera *Chaperiopsis* and *Clipeochaperia* as presently recognised (*see* Gordon 1982). Insofar as the distal oral rim is not consistently ribbed, the avicularian column may not always fuse with the proximal spines, and the colony is pigmented, I prefer to include it in the former.

It may be noted that in the dried alcohol-preserved material before me the polypides, but not other soft parts, are dark red in colour.

Subgenus **Clipeochaperia** Uttley & Bullivant, 1972

TYPE-SPECIES: *Clipeochaperia funda* Uttley & Bullivant, 1972

Chaperiopsis (Clipeochaperia) chathamensis (Uttley & Bullivant)

Parmachaperia chathamensis Uttley & Bullivant, 1972: 20; Gordon 1982: 8.

MATERIAL EXAMINED: NZOI Stns E803, E804, E821. Also paratype slide P-157 of *Parmachaperia chathamensis*, held at NZOI.

DISTRIBUTION: Chatham Rise, southern Fiordland, western Foveaux Strait.

DESCRIPTION: Colony encrusting, with erect bilamellar lobes. Zooids 0.45–0.55 × 0.27–0.35 mm, with opesia completely hidden by a frontal shield formed from one or two large avicularian columns (modified spines) arising from broad bases on gymnocyst and fusing with a stout proximal pair of oral spines. Cryptocyst smooth, narrow. Gymnocyst completely obscured, except in developing zooids, by avicularian columns. A small, distal pair of spines also present, with a mid-distal avicularium, the rostrum distally directed. Occlusor ridges weakly developed, delimiting a concavity on each distolateral wall. Distal oral rim of opesia strongly beaded. Ovicell partly subimmersed in calcification of surrounding zooids; smooth, with a narrow, crescentic fenestra. Vicarious avicularia occasional at edge of colony. Well-developed mural septula occur.

REMARKS: Gordon (1982) has shown that *Parmachaperia* may be regarded as a junior synonym of *Clipeochaperia.*

Chaperiopsis (Clipeochaperia) funda Uttley & Bullivant

Clipeochaperia funda Uttley & Bullivant, 1972: 19; Gordon 1982: 8.
Chaperiopsis (Clipeochaperia) funda: Gordon 1984: 37.

MATERIAL EXAMINED: NZOI Stns B483, B487, B489, B498, C869, D262, D270, D273, E804, E817, E820, E828, Q686.

DISTRIBUTION: Kermadec Ridge, D'Urville Island, Tasman Bay, Marlborough Sounds, Fiordland, Foveaux Strait, Otago shelf.

Family HIANTOPORIDAE Gregory, 1893

Hiantopora MacGillivray, 1887

TYPE-SPECIES: *Lepralia ferox* MacGillivray, 1869

Hiantopora jucunda Gordon

Hiantopora jucunda Gordon, 1984: 38.

MATERIAL EXAMINED: NZOI Stns B482, B484, B488, B490, D270, E820.

DISTRIBUTION: Kermadec Ridge, Fiordland, western Foveaux Strait.

REMARKS: The present specimens considerably extend the range of this species in the New Zealand region. The southern colonies have a few more avicularian processes which lack the surface denticles of the Kermadec colonies, but they are otherwise the same.

Superfamily AETEOIDEA Smitt, 1867
Family AETEIDAE Smitt, 1867

Aetea Smitt, 1867

TYPE-SPECIES: *Sertularia anguina* Linnaeus, 1758

Aetea ?australis Jullien

cf. *Aetea australis* Jullien, 1888: 26.
Aetea ?australis: Gordon 1984: 39.

MATERIAL EXAMINED: NZOI Stns B473, B482, B487, B493, C869, D260, D262, D269, D273, E820, M773, M778, Q686.

DISTRIBUTION: Throughout the New Zealand region from the Kermadec Ridge to Foveaux Strait.

REMARKS: A colony from Stn B473, occurring in a boring in mudstone, had zooids with the erect portions up to 3.5 mm long (dilatation 0.49 × 0.13 mm).

Aetea ligulata Busk

Aetea ligulata Busk, 1852: 30; Prenant & Bobin 1966: 89 (*cum syn.*); Gordon 1984: 39.

MATERIAL EXAMINED: NZOI Stns D272, Q686.

DISTRIBUTION: Throughout the New Zealand region from the Kermadec Ridge to Foveaux Strait.

Aetea truncata (Landsborough) (Plate 13, F–I)

Anguinaria truncata Landsborough, 1852: 288.
Aetea truncata: Prenant & Bobin 1966: 86 (*cum syn.*); Ryland & Hayward 1977: 48.

MATERIAL EXAMINED: NZOI: Stns B498, D247, D272, D273, M773, M791, M793, Q686. DPG: Colonies from Goat Island Bay, Leigh.

DISTRIBUTION: Leigh, Tasman Bay, D'Urville Island, Milford Sound; also cosmopolitan except for polar seas.

DESCRIPTION: Colony encrusting. Zooids in branching uniserial series, each zooid comprising an adnate basal portion 0.09–0.13 mm wide, tapering and stoloniform proximally, and an erect tubular portion 0.78–2.12 mm long; the tubular portion with a distal membranous area 0.37–0.44 × 0.09–0.12 mm, truncated distally, with a distal operculum. Erect and adnate portions finely punctate throughout, sometimes with a tendency for the punctae to be aligned in horizontal rows in places.

REMARKS: This form is very similar to the New Zealand colonies of apparent *A. ligulata*, which appear to differ only in having broad, smoothly rounded corrugations in the erect tubular portions of zooids. Both *A. ligulata* and *A. truncata* tend to occur on non-algal substrata in New Zealand waters, whereas *A. ?australis* mostly occurs on algae.

Superfamily SCRUPARIOIDEA Busk, 1852

Colony delicate, with erect uniserial branches from a creeping base. Zooids tubular proximally, arising from the frontal surface of zooids as well as distally and laterally. Everted tentacle sheath with a denticulate cuticular ring. No oral spines or avicularia. Ovicells present, with median suture, or lacking, and embryos attached to the frontal membrane.

Family SCRUPARIIDAE Busk, 1852

With the characters of the superfamily.

Scruparia Oken, 1815

With the characters of the family.

TYPE-SPECIES: *Sertularia chelata* Linnaeus, 1758

Scruparia ambigua (d'Orbigny) (Plates 13, J, K; 14, A, B)

Eucratea ambigua d'Orbigny, 1841: pl. 3, figs 13–17; 1843: 11.
Scruparia ambigua: Prenant & Bobin 1966: 99 (*cum syn.*); Gordon 1967: 49; Ryland 1975: 384; Ryland & Hayward 1977: 50.

MATERIAL EXAMINED: NZOI: Stns B493, M793. DPG: Colonies from Leigh, Piha, Waitemata Harbour, Manukau Harbour, Mount Maunganui, Castlepoint, Wellington, Nelson, Separation Point, Kaikoura, Portobello, Oban.

DISTRIBUTION: In New Zealand from Leigh to Stewart Island; also cosmopolitan except in polar waters.

DESCRIPTION: Colony delicate, with erect uniserial

chains of zooids from encrusting uniserial zooids. Zooids elongate, claviform, tubular proximally; with a distal dilatation coinciding with the frontal membrane, 0.30–0.50 mm long, arising just proximal to the frontal membrane or distally or laterally, in the latter case via pore-chambers. Ovicell elongate, somewhat egg-shaped, with a median longitudinal suture. Ancestrula tub-shaped, giving rise, by a short tube, to a daughter zooid at each end.

REMARKS: The ovicell is relatively longer than in the British colonies of this species.

S. ambigua differs from the type species, which has also been recorded from New Zealand (Hastings 1941), in that the creeping part of the colony is a chain of autozooids instead of a stolon, and in having the frontal membrane rather more parallel to the zooidal axis.

Leiosalpinx Hayward & Cook, 1979

Colony erect, diffuse, branching dichotomously. Zooids uniserial, elongate and tubular. No spines, avicularia, or ovicells. Embryos attach to frontal membrane.

TYPE-SPECIES: *Alysidium inornata* Goldstein, 1882

REMARKS: *Leiosalpinx* was established as monotypic. It also includes the following species, *L. australis* (Busk), whose early astogeny indicates scruparid affinities.

Leiosalpinx australis (Busk) (Plate 14, C–G)

Brettia australis Busk, 1884: 7.

MATERIAL EXAMINED: NZOI Stns E800, E827.

DISTRIBUTION: Doubtful Sound, western approaches to Foveaux Strait; also Mollucca Islands.

DESCRIPTION: Colony erect, diffuse, dichotomously branching. Zooids elongate, 0.56–1.03 × 0.10–0.16 mm, tubular, with a distal oval opesia; the zooid often curved overall, the frontal surface gently concave, the dorsal surface convex, generally with a median line of tubercles giving a serrated profile. Lophophore 0.24 mm long. No spines or avicularia. Ovicells lacking; 1–2 membrane-bounded embryos attach to the frontal membrane adjacent to the slit in the membrane where the lophophore emerges. Ancestrula erect, like a *Scruparia* zooid, the opesial region longer than the proximal calcified part, supported basally by a rhizoid. A single daughter zooid issues frontally just proximal to the opesia; it is even more *Scruparia*-like, and is supported basally by two stolons. It, in turn, buds a zooid frontally, this time more elongate, resembling later zooids. All further budding distal or distolateral.

REMARKS: Although Busk did not mention the dorsal tubercles, they are shown on one zooid in his plate XXXIV, fig. 3. Inasmuch as a number of zooids in some New Zealand colonies are quite straight and lack tubercles, *L. australis* may be conspecific with *L. inornata*. Busk's colony came from 1509 m off the Mollucca Islands in Indonesia. The New Zealand specimens came from 528–1003 m.

Superfamily BUGULOIDEA Gray, 1848
Family BUGULIDAE Gray, 1848

Bugula Oken, 1815

TYPE-SPECIES: *Sertularia neritina* Linnaeus, 1758

Bugula neritina (Linnaeus) (Plate 15, A)

Sertularia neritina Linnaeus, 1758: 815.
Bugula neritina: Oken 1815: 89; Busk 1852: 44; Hutton 1873: 92; 1880: 186; Hincks 1880: 75; Hutton 1891: 103; Hamilton 1898: 194; Hutton 1904: 295; Ralph & Hurley 1952: 11; Macken 1958: 105; Skerman 1959: 61; 1960: 624; Ryland 1960: 74; 1965: 45; Prenant & Bobin 1966: 492 (*cum syn.*); Gordon 1967: 54; Morton & Miller 1968: 120; Ryland & Hayward 1977: 162.

MATERIAL EXAMINED: DPG: Colonies from Whangarei Harbour, Waitemata Harbour, Nelson Harbour.

DISTRIBUTION: Ports of Whangarei, Auckland, Napier, Wellington, Lyttelton; also nearly cosmopolitan except in boreal and antiboreal regions.

DESCRIPTION: Colony erect, to 9.8 cm high, biserial, reddish- to purplish-brown in life, dichotomously branching, bifurcation types 4 or 5 of Harmer. Zooids 0.81–1.07 × 0.28 mm (Whangarei), 0.66–0.90 × 0.34 mm (Nelson), alternating, the outer distal corner acute, projecting slightly, no other spines. A short exposure of gymnocyst proximally. No avicularia. Ovicell, large, white, globular, attached at the inner distal corner of the zooid. Ancestrula without spines or rhizoids.

REMARKS: This important marine-fouling species has apparently been known in New Zealand since Hutton's (1873) record from Lyall Bay, Wellington, although it should be noted that this is the type-locality for *B. prismatica* (Gray), which has similarly coloured colonies with conspicuous white ovicells.

Bugula flabellata (Thompson in Gray) (Plate 15, B)

Avicularia flabellata Thompson in Gray, 1848: 106.
Bugula flabellata: Busk 1852: 44; Hincks 1880: 80; Macken 1958: 105; Skerman 1959: 68; 1960: 624; Ryland 1960: 82; 1965: 42; Prenant & Bobin 1966: 503 (*cum syn.*); Gordon 1967: 53; Morton & Miller 1968: 120; Ryland & Hayward 1977: 158; Foster 1982: 144.

MATERIAL EXAMINED: DPG: Colonies from Auckland, Napier, Wellington, Nelson, Otago Harbour, Bluff.

DISTRIBUTION: Ports of Auckland, Napier, Wellington, Nelson, Lyttelton, Dunedin, and Bluff, and Maui-A oil platform, Taranaki; also widely dispersed in warm and temperate waters of both Hemispheres.

DESCRIPTION: Colony erect, 2–3 cm high, buff coloured when alive, greyish-white when dry. Zooids 0.64–0.86 × 0.21 mm, multiserial, with zooids in 3–6 longitudinal series, the distal corners each with a pair of spines; the marginal zooids with three spines at the outer corner, one sometimes quite long. Frontal membrane extends to proximal end of zooid, with no exposure of gymnocyst except in outermost zooids. Avicularia pedunculate, bird's-head-like, graded in size from large marginal ones to small avicularia on the middle zooids, each attached approximately mid-laterally. Ovicell more or less globular with a straight proximal rim.

REMARKS: This marine-fouling species was first recorded in New Zealand by Macken (1958) in Wellington Harbour, but it is very probable that "*Bugula* sp." of Ralph and Hurley (1952) was also this species. It and *B. neritina* are the only two *Bugula* species recorded from the Wellington wharves. Endemic *B. prismatica* is not known from this habitat.

Bugula stolonifera Ryland (Plate 15, C)

Bugula stolonifera Ryland, 1960: 78; 1965: 50; Prenant & Bobin 1966: 541; Gordon 1967: 54; Morton & Miller 1968: 120; Ryland & Hayward 1977: 170; Winston 1982: 129 (*cum syn.*).

MATERIAL EXAMINED: DPG: Colonies from Nelson Harbour.

DISTRIBUTION: Auckland and Nelson Harbours; also Mediterranean, Adriatic, southern Britain, Ireland, Massachusetts to Florida, Gulf of Mexico, Brazil.

DESCRIPTION: Colony erect, c. 2 cm high, greyish. Zooids 0.47–0.77 × 0.19 mm, biserial, alternating; branching dichotomous, bifurcation mostly type 4 of Harmer; outer distal corners with a pair of short spines, the inner corner with a single spine. Frontal membrane extends to proximal end of zooid. A pedunculate bird's-head avicularium generally on the outer margin of each zooid, variable, generally the width of a zooid in length, not exceeding 0.24 mm. Ovicell subhemispherical, the proximal rim straight with a sinuous narrow ectooecial band.

REMARKS: This marine-fouling species was first recorded in New Zealand from Auckland Harbour (Gordon 1967). The colonies from Nelson constitute only the second record in these waters but this no doubt reflects the limited observations of fouling organisms in New Zealand ports since Skerman's work in the late fifties.

Bugula prismatica (Gray) (Plate 15, D)

Acamarchis prismatica Gray, 1843: 292.
Bugula prismatica: Hutton 1873: 93; (1880: 186?); 1904: 295.

MATERIAL EXAMINED: NZOI: Stns B482, B498. British Museum (Natural History): Specimen 1842.12.9.299, part of holotype, from Lyall Bay, New Zealand.

DISTRIBUTION: Lyall Bay, outer Marlborough Sounds, south-western Fiordland.

DESCRIPTION: Colony erect, to 51 mm in height, biserial, bifurcating repeatedly at intervals of 3.5–5.0 mm; bifurcation type 3 of Harmer. Zooids 0.61–0.73 × 0.22–0.32 mm, alternating, the outer distal corner acute, projecting slightly, no other spines; the outer lateral margin of each zooid descending more or less parallel to the inner lateral margin for most of its length, turning inward at the proximal end and leaving a short exposure of gymnocyst. From this arises a short subtubular projection which supports an avicularium. Avicularia 0.17–0.24 mm in longest dimension, the length of the beak 40–57% of the total length, the tip of the beak downcurved. Ovicell globular in frontal view, pyriform and slightly laterally compressed from other angles, tapering to the point of attachment at the inner distal corner of maternal zooids; thus the ovicells lie along the middle of a branch axis. Dorsal surface of branches shows a characteristic pigmented zigzag line with a gently sinuous median longitudinal groove superimposed on this pattern, cutting across the angles of the zigs and zags and delimiting a series of small triangles. Ancestrula 1.43 mm long, lacking spines and rhizoids.

REMARKS: The dried colonies in the NZOI collection are pale reddish brown with conspicuous white ovicells. In these respects, at least, they match the brief description of Gray (1843). Examination of the holotype of *Acamarchis prismatica* Gray confirms the identity of the NZOI specimens. This species is very close to *B. robusta* MacGillivray (*see* description of Harmer (1926) and Hastings (1939)), which has, however, a type 5 bifurcation.

Himantozoum Harmer, 1923

Colony erect, unilamellar, dichotomously branching, anchored by basal rhizoids. Branches flat or convex frontally, biserial to pluriserial. Frontal surface of zooids largely membranous, with an inconspicuous gymnocyst; distal spines and/or lateral processes variously developed; marginal zooids typically asymmetrical. Avicularia briefly pedunculate, attached medially at the proximal end of the frontal surface of zooids, or absent. Ovicell reduced or absent.

TYPE-SPECIES: *Bugula mirabilis* Busk, 1884

Himantozoum exile n.sp. (Fig. 14; Plate 16, A, B)

MATERIAL EXAMINED: NZOI Stn E774.

DISTRIBUTION: Southern Challenger Plateau.

DESCRIPTION: Colony erect, to 55 mm high, dichotomously branching, slender, not exceeding 0.7 mm in width at a bifurcation (the widest point); biserial throughout except in fertile regions of a branch which are triserial with the interpolation of female zooids medially. Autozooids 0.80–1.15 × 0.20–0.24 mm, lacking spines; female zooids as long as but wider than (0.32 mm) autozooids, with the distal corners produced into short spine-like projections. Ovicells vestigial. Avicularia on marginal zooids only, inserted at the extreme proximal end of the zooid.

HOLOTYPE: Colony, in a vial in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-410.

PARATYPE: NZOI, type number P-644, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn E774, southern slope of Challenger Plateau, 42°00.0′S, 169°15.0′E, 1168 m.

REMARKS: In the sum of its characters *H. exile* differs from the 15 other described species of *Himantozoum*. It seems closest to *H. margaritiferum* (Busk, 1884) and *H. emaciatum* Harmer, 1926, but may be distinguished from both in the arrangement of zooids at a bifurcation.

Kinetoskias Daniellsen, 1868

Colony erect, comprising biserial branches of zooids arising from the distal end of a stout rhizoid which serves as a peduncle, in turn anchored by smaller rhizoids proximally. Only one zooid prior to a bifurcation producing a pair of distal buds. Zooids alternating, not forked proximally, the frontal membrane occupying the entire frontal surface; each zooid moveable by the contraction of a special muscle in the body cavity. Spines vestigial or absent. Avicularia borne laterally, not on long pedicels. Ovicell hyperstomial, oblique.

TYPE-SPECIES: *Kinetoskias smitti* Daniellsen, 1868

Kinetoskias elongata Harmer, 1926 (Fig. 15; Plate 16, C)

Kinetoskias elongata Harmer, 1926: 469.

MATERIAL EXAMINED: NZOI Stn P941; also S153, 45°21.1′S, 173°35.8′E, 1386 m.

DISTRIBUTION: Eastern South Island continental slope, Challenger Plateau; also Indonesia.

DESCRIPTION: Colony erect, comprising a few biserial branches arising from a tubular peduncle 0.4 mm in diameter. Branches dichotomous with bifurcations characteristic of the genus. Zooids 0.88–0.98 × 0.24 mm, weakly calcified, a short spine-like process at the outer distal corner. Avicularium borne laterally, the proximal end tapering to a point. Ovicells not seen.

REMARKS: Harmer's specimens came from 798–3112 m in Indonesian waters. The New Zealand colonies occurred at 1386 and 1463 m, and are the first record of *Kinetoskias* from the New Zealand region.

Harmer described the ovicell of this species as "very oblique, the entooecium marked by radiating lines".

Camptoplites Harmer, 1923

Colony erect, dendroid, dichotomously branching, the branches frequently joined by rhizoidal cross-connections. Branches biserial or pluriserial, the zooids lacking forked proximal ends in dorsal view. Avicularia borne on flexible pedicels longer than the avicularia themselves. Ovicells well-developed or vestigial.

TYPE-SPECIES: *Bugula bicornis* Busk, 1884

Camptoplites bicornis elatior (Kluge) (Fig. 16)

Camptoplites bicornis var. *elatior* Kluge, 1914: 622; Hastings 1943: 447.
(?)*Camptoplites bicornis* var. 2: Hayward 1981: 34.

MATERIAL EXAMINED: NZOI Stns E784, P927, P929.

DISTRIBUTION: Challenger Plateau; also Antarctica (Weddell Quadrant).

DESCRIPTION: Colony erect, dichotomously branching. Zooids 1.22–1.51 × 0.29–0.34 mm, alternating, arranged biserially; only one zooid prior to a bifurcation producing a pair of distal buds; proximal end of zooid oblique with respect to the opesial area and tubular, the distal end with a very short spine-like process at each corner. Avicularia of three types: a large long-headed type 0.59 mm in length, a small long-headed type, and a small round-headed type; each arises singly on the gymnocyst just proximal to the opesia. Ovicell inconspicuous, visible as a slight distal and dorsal bulge, with a V-shaped marking delimiting it dorsally.

REMARKS: The fertile NZOI specimens agree very closely with Hastings (1943) and Kluge's (1914) descriptions, especially in the form of the avicularia and ovicell. Neither author illustrated a bifurcation as seen in dorsal view, however, which would confirm the present identification.

Hayward's (1981) "var. 2" from 2470 m in the Kermadec Trench appears very similar – the zooids are

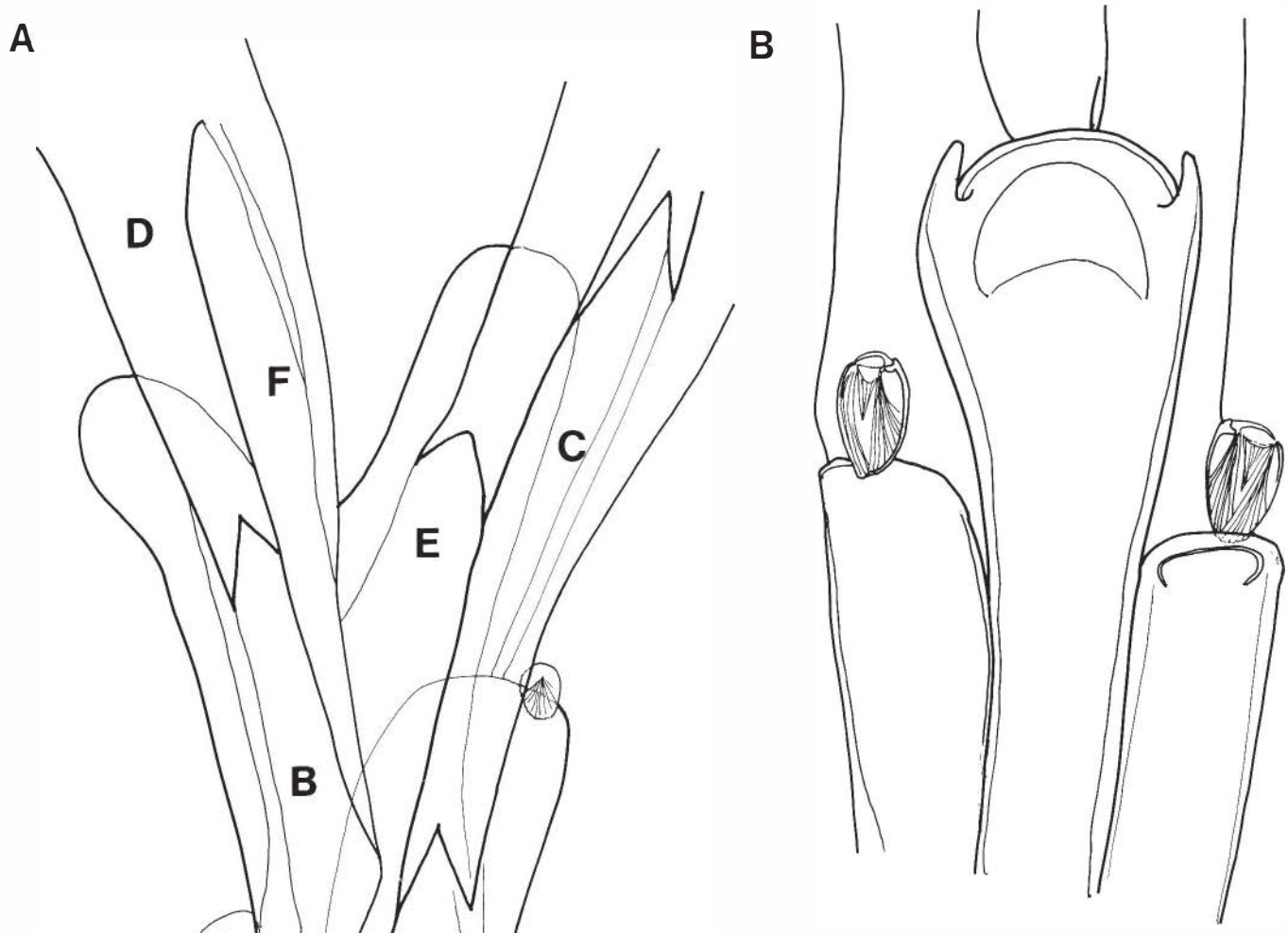


FIG. 14. *Himantozoum exile* n.sp. A, bifurcation in dorsal view; B, fertile zooid in a triserial section of a branch (Stn E774).

in the same size range as Kluge's (1914) material and the NZOI specimens and the same three types of avicularia are present; however, Hayward observed a palatal peg-like process in both the large and small long-headed avicularia. His material lacked ovicells and he did not illustrate a bifurcation in dorsal view.

Some of the NZOI colony fragments are characterised by numerous rhizoids originating dorsally just above the level of the proximal opesial margin. Some also had the round-headed avicularia, which were lacking from the fertile colony fragments. They otherwise concur in all other features including the bifurcation and are here regarded as part of the same subspecies.

Two other infertile colonies from Stn P927 had the distal corners of the zooids considerably produced as moderately long and stout spine-like processes, some of which were partly forked. The bifurcations and other features indicated that these also belong to *C. bicornis elatior.*

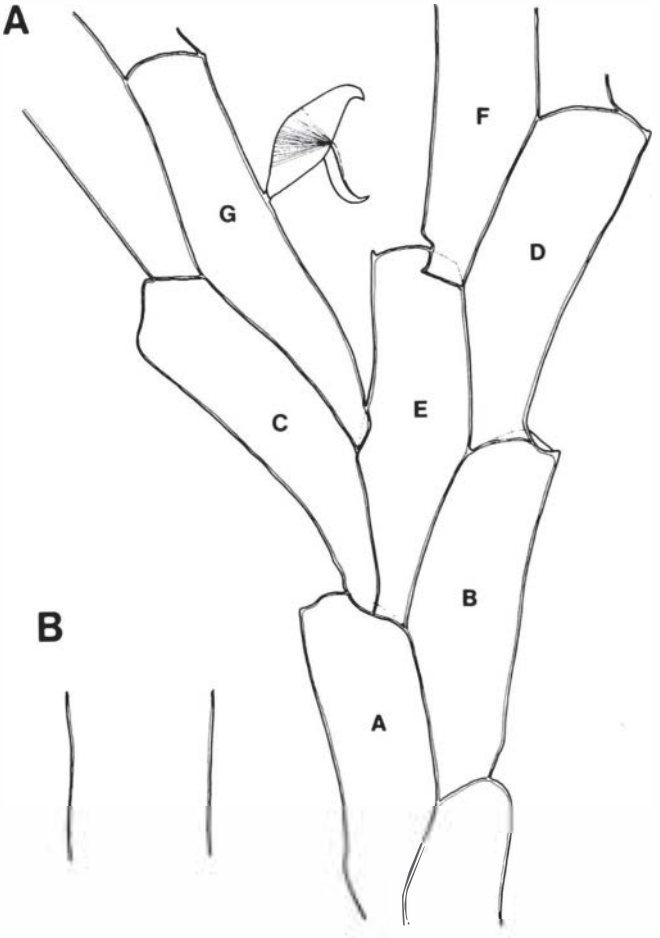


FIG. 15. *Kinetoskias elongata* Harmer. A, bifurcation, dorsal view; B, part of peduncle at same scale (Stn P941).

Camptoplites reticulatus unicornis (Busk) (Fig. 17)

Bugula reticulata var. α *unicornis* Busk, 1884: 40; Hastings 1943: 463.

MATERIAL EXAMINED: NZOI Stns P927, P929.

DISTRIBUTION: Challenger Plateau; also central and equatorial North Atlantic Ocean.

DESCRIPTION: Colony erect, dichotomously branching, the branches biserial, of somewhat zigzag form. Zooids 0.98–1.39 × 0.27 mm, the proximal end tubular, diverging at an angle from the proximal end of the opesia; only one zooid prior to a bifurcation producing a pair of distal buds; a very long slender spine produced distolaterally from each zooid, including ovicelled zooids in which only the spine base may remain. A single small round-headed avicularium borne just below the proximal opesial margin in most zooids. Ovicell prominent, longer than wide, the endooecium evenly and faintly textured.

REMARKS: The NZOI colonies conform to Busk's (1884, pl. 9, fig. 2) illustrations of this form, even though the distribution is remarkably disjunct. The only difference, which is not significant, is that the zigzag outline of the branches is rather more pronounced in the New Zealand specimens.

According to Hastings (1943) the axillary rootlets "issue frontally" which implies that they issue directly outwards frontally from the axils. In the present specimens, however, they first loop around the back of the branch, issuing frontally from around the side of zooid B in a bifurcation.

Camptoplites asymmetricus Hastings (Fig. 18; Plate 16, D)

Camptoplites asymmetricus Hastings, 1943: 466.

MATERIAL EXAMINED: NZOI Stns E793, E821.

DISTRIBUTION: Northern Fiordland, south-western Foveaux Strait; also Patagonian shelf, southern Chile, South Georgia, Weddell Sea.

DESCRIPTION: Colony erect, to 23 mm in height, dichotomously branching at intervals of 3–5 mm. Zooids biserial, 0.90–1.02 mm × 0.22–0.24 mm, with an elongate-oval opesia, a smooth gymnocyst slightly shorter than the opesia, and a smooth narrow cryptocystal rim at the proximal end of the opesia. Spines three; a rather long spine at the inner dorsal corner of each zooid directed outward and slightly upward, and a pair of shorter spines at the outer distal corners, the proximal one of the pair arching obliquely down towards the centre of the opesia, the distal one of the same length projecting laterofrontally. Avicularia three on each zooid, borne on long flexible pedicels arising from a vertical row of three conspicuous pores at the distal end of the gymnocyst; either all small round-headed avicularia or, occasionally, the most proximal one larger and long-headed. Cross-connecting rhizoids arise laterally at the proximal end of the gymnocyst and join with adjacent branches by two or three half-encircling connectives. Thicker anchoring rhizoids arise from one side of the axils of some of the bifurcations. The proximal ends of the zooids at a bifurcation are more chitinous and appear as joints. Ovicells not seen.

REMARKS: The three gymnocystal avicularia and their attachment scars are particularly characteristic of this species.

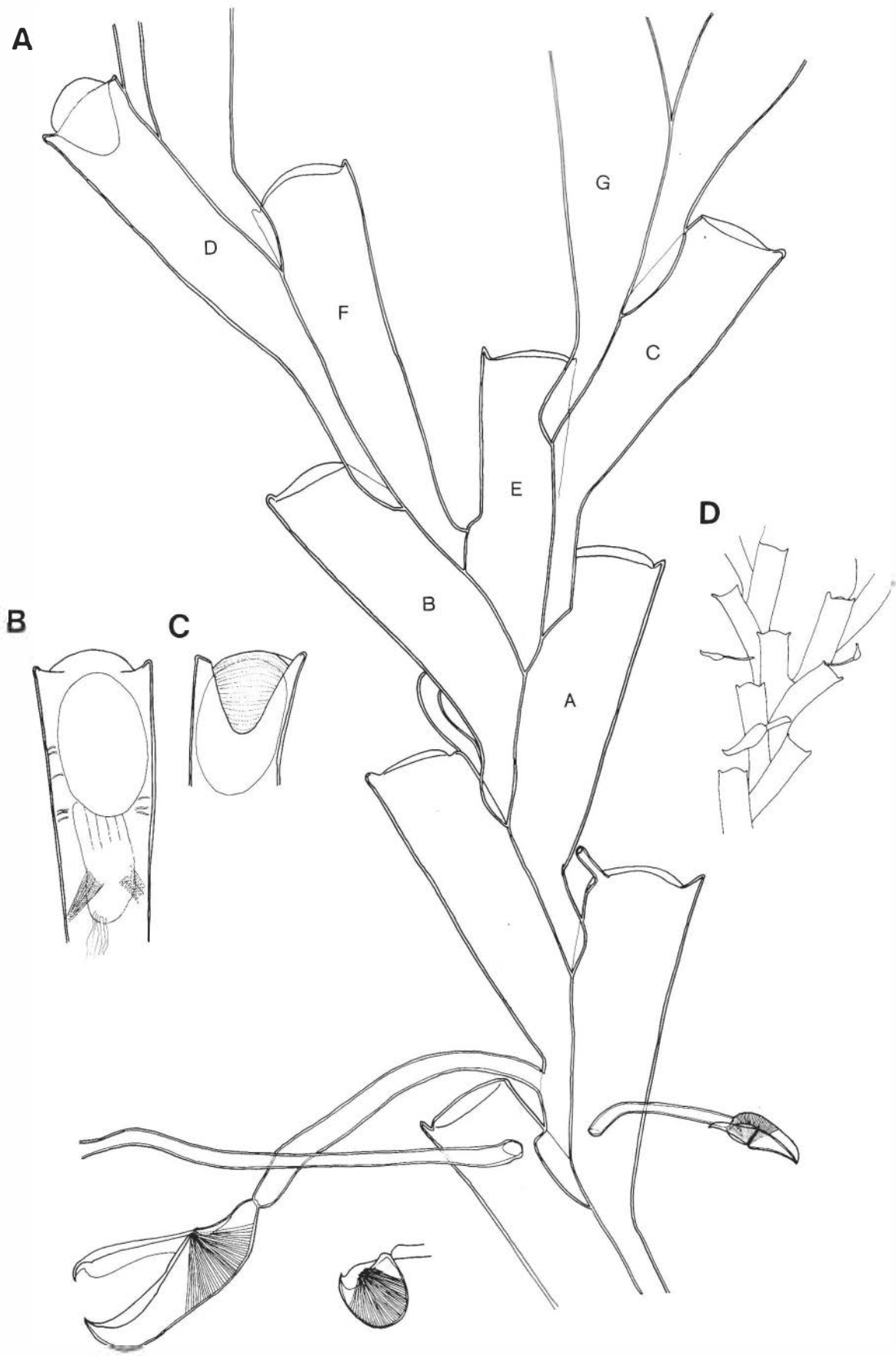
Camptoplites cf. **abyssicolus** (Kluge) (Fig. 19)

cf. *Bugula abyssicola* Kluge, 1914: 632.

MATERIAL EXAMINED: NZOI Stn P942.

DISTRIBUTION: Challenger Plateau.

DESCRIPTION: Colony delicate, bifurcating, the branches biserial although appearing superficially



uniserial by the alternation of opesiae and the inconspicuous long tubular proximal portions of zooids. Zooids, including proximal portion, 1.34–1.46 × 0.32 mm, arranged such that in frontal view the branch outline appears somewhat zigzag with the dilated portions of the zooids protruding obliquely frontally; in lateral view the dorsal outline of the branch is almost straight. Bifurcation conforming to type 3 of Harmer (1923). The outer distal corner of each zooid produced as a spine, with a spine arising dorsally beneath the ovicell. Ovicell reclining distally behind the orifice, more or less globular. Avicularia not seen.

REMARKS: Only one short colony fragment, with a single bifurcation, was found. It most resembles *C. abyssicolus* (Kluge), from 2450 m in the South Indian Ocean near Antarctica, which, however, has two pairs of small oral spines, no dorsal spines, avicularia, and smaller ovicells. More specimens of the two forms would be needed to decide if the range of variation in *C. abyssicolus* may include the New Zealand form.

Cornucopina Levinsen, 1909

TYPE-SPECIES: *Bicellaria grandis* Busk, 1852

Cornucopina pectogemma (Goldstein) (Plate 16, E–J)

Bicellaria pectogemma Goldstein, 1882: 42.
Cornucopina pectogemma: Hastings 1943: 397 (*cum syn.*); d'Hondt 1975b: 570.

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Doubtful Sound, Fiordland; also South Indian Ocean, South Atlantic Ocean, Ross Sea, South Shetland Islands.

DESCRIPTION: Colony erect, plumose, to 100 mm high, anchored by a dense cluster of rhizoids from an axial trunk of descending stolons. Branching dichotomous. Zooids alternating, biserial, comprising a narrow tubular proximal portion 0.49–0.61 mm long and a dilatation around 0.50 mm long projecting obliquely from the branch axis. Spines 1–4 distobasally and one at the proximal corner of the opesia, to 2.8 mm long. Avicularia of two kinds – claviform, attached near the opesial rim on one side, around 0.21 mm long; tubiform, stout, 2.39–3.42 mm long, (the rostrum 0.12–0.49 mm long), borne distolaterally in the same series as the spines, with a small bulbous swelling where it attaches. Ovicell globose, prominent, with a frontal area showing faint striations diverging from a common point on the proximal rim of the ovicell.

REMARKS: This is the first record of this species from the New Zealand region.

Cornucopina salutans n.sp. (Plate 17, A, B)

MATERIAL EXAMINED: NZOI Stn E827.

DISTRIBUTION: Western approaches to Foveaux Strait.

DESCRIPTION: Colony erect, plumose, to 60 mm high, anchored to foraminiferal tests by a dense cluster of rhizoids from an axial trunk of descending stolons. Branching dichotomous. Zooids alternating, biserial, comprising a long narrow tubular portion, longer proximally (0.55–0.64 mm), from which extends a dilatation around 0.42–0.66 mm long, projecting obliquely from the branch axis. From the outer distal corner of each dilatation arises a spine-bearing process ≃ 0.43 mm long bearing 2–4 long curving spines attaining 1.22 mm. An additional spine distolaterally in the mid-line and another arising proximally and basolaterally from the corner of the dilatation completely opposite the spine-bearing process. No avicularia. Ovicell globose, prominent, with very faint longitudinal striations converging somewhat proximally, the endooecial chamber continuous with a tube arising near the proximal end of the opesia.

HOLOTYPE: Colony, in a vial in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-411.

PARATYPES: NZOI, type number P-645, and BM(NH), reg. no. 1985.1.22.10, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn E827, western approaches to Foveaux Strait, 46°35.5′S, 166°44.5′E, 526–530 m.

REMARKS: There are a number of species of *Cornucopina* with spine-bearing processes. *C. salutans* differs from these in the sum of its characters and especially in the complete lack of avicularia.

Dimetopia Busk, 1852

Colony erect, dichotomous. Branches with zooids opposite and decussate, arranged back-to-back in pairs. Opesia at an angle to the branch axis. No avicularia. Spines and ovicells present.

TYPE-SPECIES: *Dimetopia cornuta* Busk, 1852

Dimetopia cornuta Busk (Plate 17, C, D)

Dimetopia cornuta Busk, 1852a: 384; 1852b: 35; 1884: 47; MacGillivray 1860: 163; 1880: 34; 1887a: 196; Hutton 1873: 95; 1880: 189; 1891: 104; 1904: 295; Hamilton 1898: 194; Livingstone 1929: 55; Macken 1958: 105.

MATERIAL EXAMINED: NZOI Stns B480, B482, B488, B490, B493, B495, E820, Q686.

FIG. 16. (*opposite*). *Camptoplites bicornis elatior* (Kluge). A, bifurcation, dorsal view, also showing the three types of avicularia (small round-headed type detached); B, frontal and C, dorsal views of ovicell; D, bifurcation in frontal view (Stn P927).

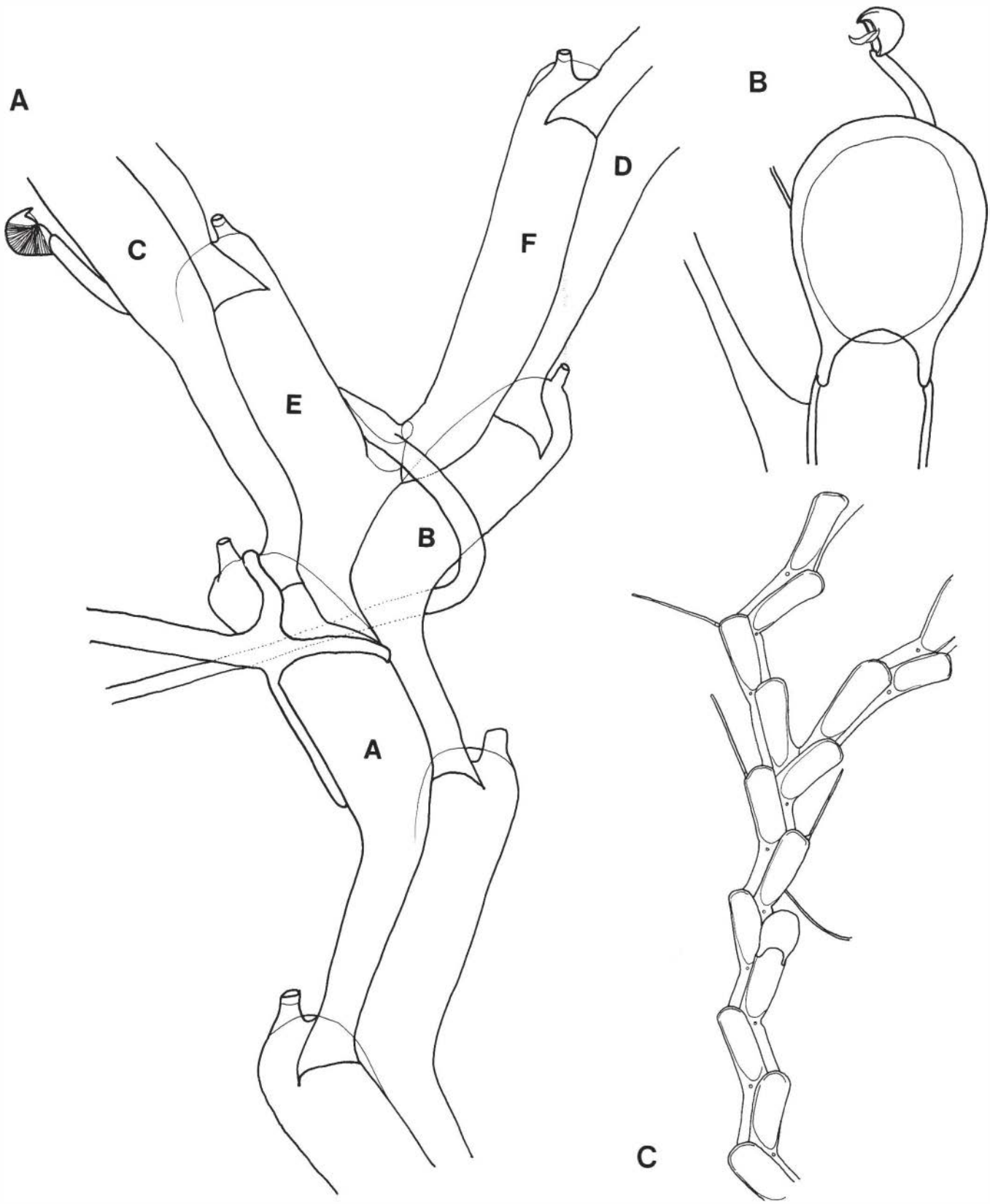


FIG. 17. *Camptoplites reticulatus unicornis* (**Busk**). A, bifurcation, dorsal view, with rootlets; B, ovicell; C, bifurcation, frontal view.

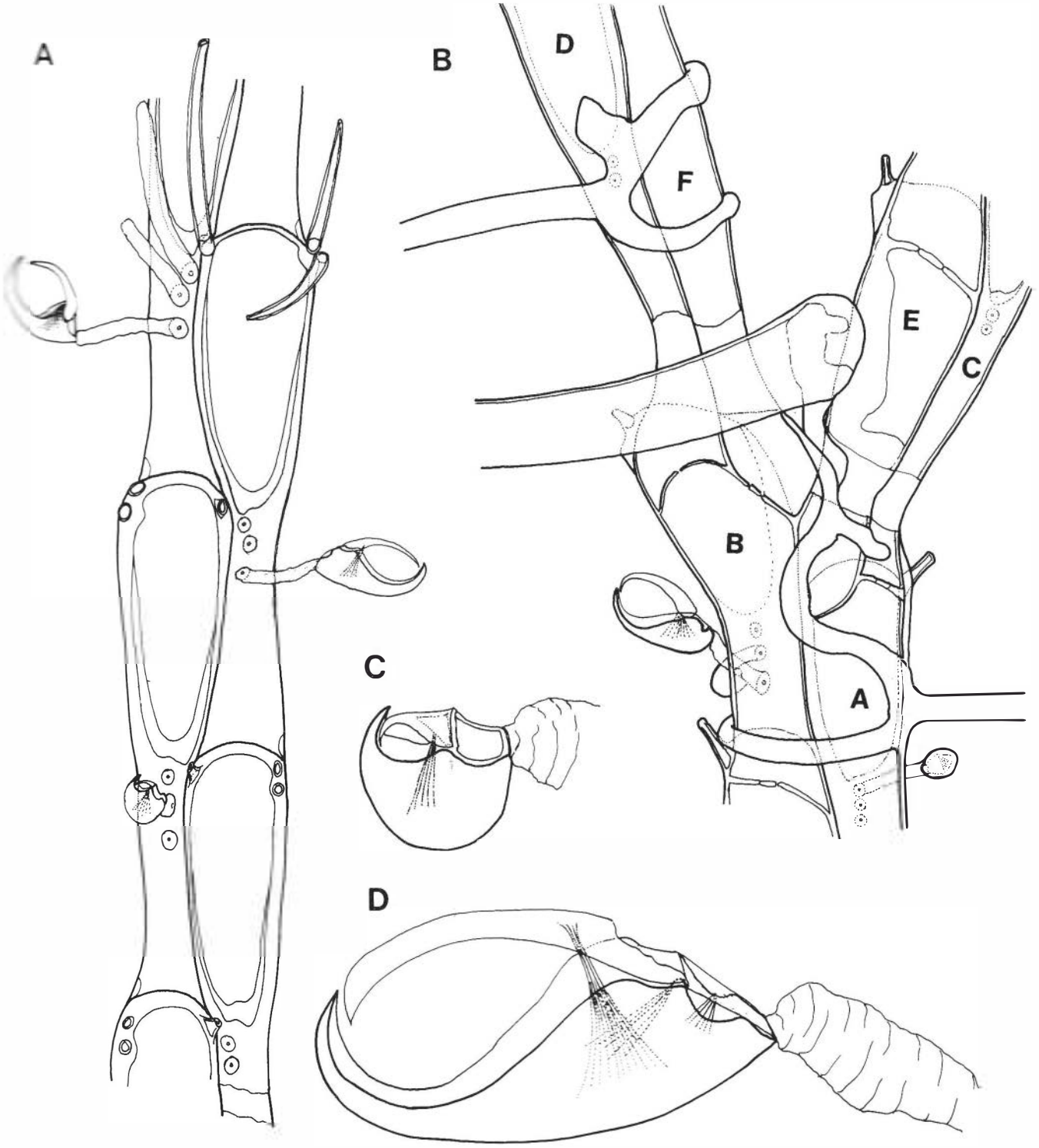


FIG. 18. *Camptoplites asymmetricus* Hastings. A, portion of branch, showing disposition of spines and avicularia; B, bifurcation, dorsal view, with rootlets; C, small round-headed avicularium and D, large long-headed avicularium at same scale.

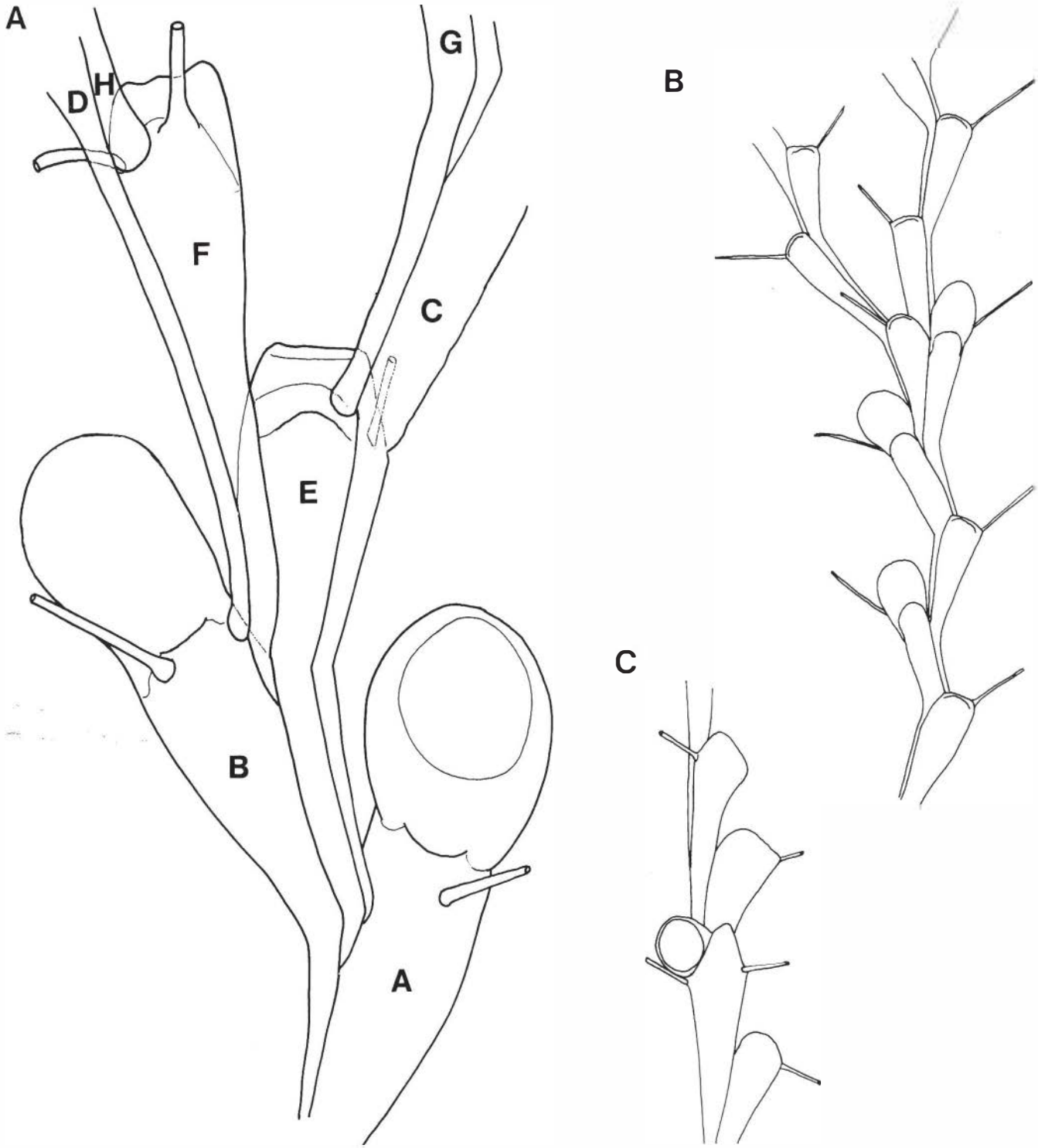


FIG. 19. *Camptoplites* cf. *abyssicolus* (Kluge). A, bifurcation, dorsal view, with two ovicelled zooids; B, bifurcation, frontal view; C, ovicelled zooid and part of branch in profile.

DISTRIBUTION: Fiordland, Marlborough Sounds, Cook Strait; also south-eastern Australia.

DESCRIPTION: Colony erect, bushy, to 20 mm high, anchored by rhizoids. Branching dichotomous. Zooids 0.49–0.59 × 0.20 mm, cornute, the opesia occupying about half the length of the zooid, sloping at about 30° to the branch axis. Spines three or four, acicular, one at each distolateral corner, with one in the mid-line just proximal to the opesia or two either side of the mid-line. Ovicell prominent, smooth, as wide as the opesia, slightly compressed dorso-ventrally.

REMARKS: This species is distinguished from *D. spicata* by its fewer spines and the shallower angle of the opesia.

Dimetopia spicata Busk (Plate 17, E)

Dimetopia spicata Busk, 1852a: 384; 1852b: 35; MacGillivray 1860: 163; 1880: 33; 1887a: 196; 1890b: 1; Hutton 1873: 95; 1880: 189; 1891: 104; 1904: 295; Hamilton 1898: 194; Macken 1958: 105.

MATERIAL EXAMINED: NZOI Stns B482, B493, B495, B616, E820.

DISTRIBUTION: Fiordland, Puysegur Bank, Cook Strait; also south-eastern Australia, South Australia.

DESCRIPTION: Colony erect, bushy, anchored by rhizoids. Branching dichotomous. Zooids 0.46–0.54 × 0.24–0.27 mm, broadly funnel-shaped, the opesia almost at right angles to the branch axis, its length approaching that of the zooid itself. Spines 7–9, more or less acicular, of variable length, situated around the periphery of the opesia above a band of thicker calcification which is best seen by transmitted light. Ovicell prominent, smooth, or with grooves where adjacent spines lie closely appressed to it.

REMARKS: The greater number of spines and angle of the opesia to the branch axis distinguish *D. spicata* from *D. cornuta*.

Bugulella Verrill, 1879

Colony erect, uniserial, dichotomous, the branching generally interpolating a tubular segment. Zooids elongate, tubular, broadening distally. Opesia with marginal spines. Avicularium typically present. Ovicell not closed by the zooidal operculum.

TYPE-SPECIES: *Bugulella fragilis* Verrill, 1879

REMARKS: *Bugulella*, as presently recognised, includes some species formerly attributed to *Brettia* Dyster, 1858. The precise status of the genus *Brettia* has never been altogether clear. This is primarily because the type species has never been knowingly rediscovered, either from the type-locality at Tenby, Wales, or anywhere else in Britain. The type specimen exists in the British Museum (Natural History) (Ryland & Hayward 1977, Hayward & Cook 1979) but has been described as "unrecognizable". The species, according to these authors, was based on a single dead fragment.

Nevertheless, *B. pellucida* was introduced with a description, and accompanying figures drawn by George Busk. These show parts of four zooidal series in frontal and profile views. The zooids are elongate, tubular, budding one or two zooids distally, with the opesial margin bearing six short spines and one zooid showing a distolateral pore-chamber. The distal zooidal margin is rounded, not angular. Avicularia and ovicells were not present but their absence from a single dead fragment does not negate their possible presence in the species.

Few of the species attributed to *Brettia* in the past share all of these characteristics although some, attributed to *Bugulella*, do. In terms of autozooidal morphology alone, *Bugulella* could probably be regarded as synonymous with *Brettia*, even in the absence of information proving whether or not *Brettia pellucida* lacks ovicells and avicularia. The unusual type of bifurcation, however, in more than one species of *Bugulella*, would support the retention of this genus.

A comparative study of *Brettia*-like species from around the world is most desirable. In the meantime, it appears they may be distributed as follows:

Brettia Dyster
- *Brettia pellucida* Dyster, 1858: 260
- *Brettia cornigera* Busk, 1884: 7 (*mihi*)

Bugulella Verrill
- *Bugulella fragilis* Verrill, 1879: 472
- *Brettia pellucida* var. *gracilis* Nichols, 1911: 7 [syn. *Erymophora gracilis*: Hastings 1943: 470. *Erymophora* sp. Hastings, 1943: 469. *Bugulella australis* Hayward & Cook, 1979: 64 (*mihi*)]
- *Brettia* sp. Kluge 1914: 642 [syn. *Brettia longa* (part) Waters, 1904: 26. *Erymophora klugei* Hastings, 1943: 470]
- *Bugulella sinica* Liu, 1984: 248
- *Erymophora gracilis mawatarii* d'Hondt, 1977: 63

Labiostomella Silén
- ?*Brettia gisleni* Silén, 1941: 14

Leiosalpinx Hayward & Cook
- *Alysidium inornata* Goldstein, 1882: 42 [syn. *Catenaria attenuata* Busk, 1884: 14 (*fide* Hastings 1943: 476)]
- *Brettia australis* Busk, 1884: 7 (*mihi*)

Falsibugulella Liu
- *Falsibugulella sinica* Liu, 1984: 270

Cuneiforma d'Hondt & Schopf
- *Cuneiforma asymetrica* d'Hondt & Schopf, 1984: 930

Corynoporella Hincks
- *Corynoporella tenuis* Hincks, 1888: 215 [syn. *Brettia minima* Waters, 1900: 52. *Corynoporella spinosa* Robertson, 1905: 284 (*fide* Kluge 1962: 360; 1975: 433)]

Dendrobeania Levinsen

Brettia frigida Waters, 1900: 51 [syn. *Dendrobeania fruticosa* var. *frigida*: Kluge 1962: 334; 1975: 401. *Corynoporella japonica* Mawatari, 1957: 82 (*mihi*)]

Notoplites Harmer

?*Brettia longa* Waters, 1904: 26 (part) [syn. ?*Notoplites tenuis* var. *uniserialis* Hastings, 1943: 351 (*fide* Hastings 1943: 352)]

Brettiella Gordon

Brettiella ovicellata Gordon, 1984: 43

Halysisis Norman

Brettia ijimai Okada, 1921: 25

Incertae sedis

Brettia tropica Waters, 1913: 465
Brettia mollis Harmer, 1926: 198
Brettia triplex Hastings, 1943: 476
Bugulella clavata Hincks, 1887: 122
Bugulella elegans Hayward, 1978: 213 [syn. *Bugulella* sp. Harmelin 1977: 1067]
Maplestonia simplex MacGillivray, 1885: 107 [syn. *Brettia simplex* Levinsen, 1909: 113]

Bugulella gracilis (Nichols) (Plate 17, F–I)

Brettia pellucida var. *gracilis* Nichols, 1911: 7.
Erymophora gracilis: Hastings 1943: 470; Prenant & Bobin 1966: 563.
Erymophora sp. Hastings, 1943: 469.
Bugulella australis Hayward & Cook, 1979: 64; Hayward 1981: 37.

MATERIAL EXAMINED: NZOI Stns D222, E776, E783, E803, P929.

DISTRIBUTION: Challenger Plateau; also south-west Ireland, eastern South Africa.

DESCRIPTION: Colony erect, tangled. Zooids in uniserial chains, branching dichotomously in the following manner: an autozooid produces two parallel tubes distally, one developing into another autozooid, the other, thinner-walled, fusing with the proximal end of an autozooidal tube that develops from the lateral pore-chamber of the parallel autozooid; three zooids are thus involved at any bifurcation. Zooids elongate, 0.83–1.24 × 0.05–0.20 mm, tubular proximally, widening at the opesia. Opesia oval, bordered by nine or ten marginal spines, these tending to be longer proximally and curving somewhat over the frontal membrane. Avicularia on some zooids, pedicellate, borne singly mid-distally. Ovicell prominent, its opening as wide as the distal arch of the opesia, minutely punctate in transmitted light, not closed by the zooidal operculum.

REMARKS: Nichols (1911), Hastings (1943), Maturo and Schopf (1968), d'Hondt (1977), and Hayward and Cook (1979) have all commented on the unusual mode of branching in *Bugulella* species. Maturo and Schopf (1968) had synonymised Nichols's variety with *B. fragilis* Verrill, but the details of branching differ in a way which seems significant, viz., in *B. gracilis* an autozooid which begins a new branch arises from a lateral pore-chamber adjacent to the opesia and a fairly long tubular segment whereas in *B. fragilis* it arises from the proximal end of the parent zooid and the associated tubular segment is extremely short.

The mode of branching of Nichols's form is identical to that of *Bugulella australis* Hayward and Cook and it would seem that they are conspecific.

Hayward's (1978) *Bugulella elegans* lacks the tubular segment in its branching and its avicularia are sessile not pedicellate. For this reason I have included *B. elegans* among those species listed as incertae sedis.

In the place of autozooids, a zooid of *B. gracilis* may bud distally long, stolon-like kenozooids, each with a small distal opesia. The kenozooids in turn produce two distal kenozooids without the interpolation of tubular segments as in the budding of autozooidal branches. Long chains of kenozooidal branches may be produced where a large tangled colony is adjacent to a substratum. Here the kenozooids and even occasional autozooids may adhere to the substratum.

The minute ovicellular punctae seen in transmitted light are not visible in SEMs. They may be loci of differential calcification.

Family BEANIIDAE Canu & Bassler, 1927

Beania Johnston, 1840

TYPE-SPECIES: *Beania mirabilis* Johnston, 1840

Beania bilaminata (Hincks)

Diachoris bilaminata Hincks, 1881a: 157.
Beania bilaminata: Gordon 1984: 44 (*cum syn.*)

MATERIAL EXAMINED: NZOI Stns B482, E821.

DISTRIBUTION: Kermadec Ridge and throughout New Zealand.

Beania cribrimorpha Gordon (Plate 18, A, B)

Beania cribrimorpha Gordon, 1984: 44.

MATERIAL EXAMINED: NZOI Stn Q686; also NZOI Stn H69, Foveaux Strait, 46°37.5′S, 167°53.9′E, 54 m. NZOI H-325, holotype of *B. cribrimorpha*.

DISTRIBUTION: Kermadec Ridge, D'Urville Island, Foveaux Strait.

REMARKS: In the holotype colony the frontal spines interdigitate and some are forked at their tips. In the colony from Stn H69 the spines are as stout as those in the holotype and tend to interdigitate at their tips in many zooids. In the colony from Stn Q686 the spines are less stout and do not interdigitate at all. All of these colonies, however, are completely adherent to the substratum in life, with the zooids so closely

contiguous that their tubular connections are inapparent. Avicularia are lacking and the arrangement of distal spines is more or less the same, and they are believed to be conspecific.

Beania decumbens MacGillivray (Plate 18, C)

Beania decumbens MacGillivray, 1882: 115; 1886a: 67.

MATERIAL EXAMINED: NZOI Stns D273, Q686.

DISTRIBUTION: Tasman Bay, D'Urville Island; also Port Phillip Heads, Victoria.

DESCRIPTION: Colony encrusting. Zooids in branching uniserial rows, elongate, 0.54–0.60 × 0.20–0.24 mm, with three short, erect distal spines, two distolateral, and 14–15 pairs of marginal spines overarching the frontal membrane and meeting in the midline. Avicularia paired, one either side of orifice adjacent to a distolateral spine; small; the rostrum acute. Each zooid has four interzooidal connections.

REMARKS: This is the first positive record of this species in the New Zealand region. The record of Gordon (1970: 323) was of *Beania intermedia* Hincks.

Beania discodermiae (Ortmann)

Diachoseris discodermiae Ortmann, 1890: 26.
Beania discodermiae: Gordon 1984: 45 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B489, B498, D273, E820, M773, M778, M779, M780, M782, M789, M791, M797, M799, Q686; also NZOI Stn H69, Foveaux Strait, 46°37.5′S, 167°53.9′E, 54 m. DPG: Manukau Harbour.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, D'Urville Island, Milford Sound, Fiordland, Foveaux Strait and its western approaches; also Malaysia, Japan.

Beania quadricornuta (Hincks) (Plate 18, D)

Diachoris quadricornuta Hincks, 1885: 245.
Beania quadricornuta: Waters 1889: 4,; Jelly 1889: 17.

MATERIAL EXAMINED: NZOI Stns M773, M776, M779, M780, M793, M795.

DISTRIBUTION: Milford Sound; also Victoria, New South Wales.

DESCRIPTION: Colony loosely encrusting. Zooids 0.68–0.73 × 0.28–0.31 mm, each slightly overlapping distally, the connecting tubes not visible frontally. A stout pair of spines distally, with the next two pairs more or less erect and less angled across the opesia than the succeeding 5–7 pairs of interdigitating marginal spines. Avicularia paired or, more usually, single, projecting at an angle frontally from between the first and second marginal spines; elongate; distinctly pedicellate; with recurved rostral tip and elongate triangular mandible. Ovicells not known.

REMARKS: This species is distinguished from *B. spinigera* (MacGillivray), which appears to have similar avicularia, in the less open arrangement of zooids in which connecting tubes are frontally obscured. The marginal spines of *B. spinigera*, as depicted by MacGillivray (1860, 1880), scarcely interdigitate. *Beania elongata* (Hincks) also has a more open arrangement of zooids than *B. quadricornuta*, non-overlapping distally, and shortly pedicellate more parallel-sided avicularia which are somewhat truncate distally. Waters (1889a) synonymised *Diachoris maxilla* Jullien with *B. quadricornuta* but the former has much more discrete zooids and stellate processes on the operculum.

Beania inermis cryptophragma n.ssp. (Plate 18, E–I)

MATERIAL EXAMINED: NZOI Stn M778.

DISTRIBUTION: Milford Sound, Fiordland.

DESCRIPTION: Colony loosely encrusting, anchored by short rhizoids with fimbriate attachment discs. Zooids 0.51–0.75 × 0.24–0.39 mm, not widely separated, the six connecting tubes associated with each zooid not much evident from frontal view; each zooid scarcely overlapping its distal neighbour. Spines stout, mostly straight, but set at a high angle above the opesia, converging with some interdigitation above the zooidal mid-line; two pairs of oral spines somewhat more erect but otherwise not clearly set off from the remaining 6–9 pairs of lateral spines. Avicularia occasional, rarely seen frontally; arising from the side of a zooid subjacent to the operculum, directed basally between the zooids; the palatal surface flat, facing the substratum; with complete pivot bar and short obtuse rostrum. Ovicells not seen.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type nuber H-412.

PARATYPE: NZOI, type number P-646, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn M778, Milford Sound, 44°29.0′S, 167°30.8′E, 20 m.

REMARKS: *Beania inermis* (Busk) has a similar complement of spines to the form from Milford Sound, although much shorter. Of more significance is the avicularium of this species. According to Hastings (1943), it is located just distal to a distolateral connecting tube and projects basally. Hastings mentioned a short pedicel, however, which is not really distinguishable in the present form. Following Hastings (1943), who described a new "variety" of *B. inermis* but retained the specific name on the basis of the characteristic avicularia, I do the same here, rather than establish a full species. Her "variety" *unicornis*

differs from subspecies *cryptophragma* in having longer connecting tubes, with spines, and a small proximally directed spine from the free edge of the operculum.

Beania intermedia (Hincks)

Diachoris intermedia Hincks, 1881b: 133.
Beania intermedia: Waters 1909: 137; Hastings 1943: 419 (*cum syn.*).
Beania decumbens: Gordon 1970: 323.

MATERIAL EXAMINED: NZOI: Stn B498; also Stn C844, off Cape Palliser, 41°38.3′S, 175°11.2′E, 88 m. DPG: Goat Island Bay, Leigh.

DISTRIBUTION: Leigh, Marlborough Sounds, Chatham Islands; also Victoria, Tasmania, Indian Ocean, Red Sea, Suez Canal, Cape Verde Islands, Tortugas, St Helena, Gorgona (Colombia).

Beania magellanica (Busk)

Diachoris magellanica Busk, 1852a: 54.
Beania magellanica: Gordon 1984: 46 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B484, B488, B493, B498, C759, D273, E820, M779, Q686.

DISTRIBUTION: Throughout New Zealand from the Kermadec Ridge and Three Kings Islands to the western approaches to Foveaux Strait; also magellanic South America, Victoria, New South Wales, Kerguelen, Mauritius, South Africa, Torres Strait, Japan, Mediterranean, Cape Verde Islands.

Beania plurispinosa Uttley & Bullivant (Plate 18, J)

Beania plurispinosa Uttley & Bullivant, 1972: 28; Gordon 1984: 46 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B488, C759, E820, M774, M775, M776, M779, M780, M791, M797. DPG: Abel Tasman National Park, Nelson.

DISTRIBUTION: Throughout the New Zealand region from the Kermadec Ridge to the western approaches to Foveaux Strait; also Victoria, Australia.

REMARKS: Whitten (1979) has shown that rare basally directed large avicularia may occur in this species. I have encountered these only in colonies from Nelson.

Beania proboscidea n.sp. (Plate 19, A–C)

MATERIAL EXAMINED: NZOI Stns P927, P929, P941.

DISTRIBUTION: Challenger Plateau.

DESCRIPTION: Colony evidently comprising a cluster of semitransparent suberect zooids; these large, 0.98–1.51 × 0.54–0.85 mm, thin-walled, having a somewhat inflated appearance and rather deep-bodied proximally. The distal end generally narrower, though truncate, from which extends an opaque proboscis-like extrovert up to 0.88 mm long, this puckered apically, able to retract somewhat into itself but evidently not into the zooidal cavity; connected to the tentacle sheath. Each zooidal margin with a series of six or seven spine groups, occurring in triplets distally, doublets laterally, and singles proximally; the doublets and triplets arising from a common locus on the margin and set in the same plane but at different angles to the frontal membrane, with the innermost spine arched somewhat over the opesia, the outermost spine projecting outward laterally, and the centre spine projecting upward frontally; the spine series continuous around the dorsal side of the base of the extrovert; these distal spines as long as the extrovert. Dorsal spines 5–8, filamentous, flexible. Septula five, a mid-dorsal pair, a lateral pair, and one proximofrontally, immediately adjacent to the opesia. Avicularia absent. Ovicells evidently absent.

HOLOTYPE: Zooids in a vial, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-413.

PARATYPES: NZOI, type number P-647, and BM(NH), reg. no. 1985.1.22.8, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn P941, 41°15.2′S, 167°07.2′E, 1457–1463 m.

REMARKS: Probably as a consequence of collecting and sorting, most of the zooids of this species are solitary. Only a few clusters occur, numbering no more than four zooids in each. These are attached at any of the five septula mentioned above, almost always without connecting tubes involved. Notwithstanding the fact that zooids exist in clusters, they give every appearance of being able to exist alone.

In many respects, zooids of this species have a number of the features that characterise some deep-sea ctenostomes from fine-sediment environments, viz., the large size, the prolongation of the distal end of the zooid, and the occurrence of filamentous kenozooids (in this instance the dorsal spines).

Beania stonycha n.sp. (Plate 19, D–F)

MATERIAL EXAMINED: NZOI Stns E820, M779, M791, M799.

DISTRIBUTION: Milford Sound, western approaches to Foveaux Strait.

DESCRIPTION: Colony encrusting, the surface visibly bristly; able to be lifted from the substratum with a blade. Zooids more or less erect, 0.73–0.81 × 0.34–0.39 mm, bearing six spines around the oral rim; these spines long, stout, more or less erect. Three pairs of thinner marginal spines immediately subjacent on the distal third of the lateral margins, these curving across the frontal membrane. Avicularia of two kinds, a relatively slender avicularium arising on one side of the zooidal margin between the bases of the second and third spines, erect, visible frontally; plus a stout, inflated avicularium originating between two of the

six connecting tubes and projecting into the space between the basal surface of the colony and the substratum. Each zooid producing a short rhizoid with broad attachment disc. No basal spines. Ovicells not seen.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-414.

PARATYPE: NZOI, type number P-648, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn M791, Milford Sound, 44°37.1′S, 167°51.5′E, 30 m.

REMARKS: Superficially, this species resembles *B. plurispinosa* Uttley & Bullivant, but has stouter spines, more erect zooids, two kinds of avicularia, and no basal spines.

Beania trampida n.sp. (Plate 19, G)

MATERIAL EXAMINED: NZOI Stn E793.

DISTRIBUTION: Northern Fiordland.

DESCRIPTION: Colony evidently of widely separated zooids, each with four tubular connections and a basal anchoring rhizoid. Zooids large, wholly erect, boat-shaped, wider and deeper proximally, 1.27–1.54 × 0.34–0.39 mm; devoid of spines, but six pointed tubercles on the distal oral rim. Avicularia relatively small, longest dimension 0.2 mm, borne singly at a proximal corner of the orifice. Ovicells not seen.

HOLOTYPE: Zooids in a vial, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-415.

PARATYPE: NZOI, type number P-649, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn E793, off the entrance to Poison Bay, Fiordland, 44°40.5′S, 167°32.0′E, 243–253 m.

REMARKS: *Beania trampida* closely resembles *B. erecta* Waters which, however, has six tubular connections. It also resembles *B. scotti* Hastings which has four connections but proportionately larger avicularia as well as distal spines, and a tapering proximal end. *B. challengeri*, another erect species, has six connections and larger, paired avicularia.

Family PETALOSTEGIDAE Gordon, 1984

Petalostegus Levinsen, 1909

TYPE-SPECIES: *Catenaria bicornis* Busk, 1884

Petalostegus bicornis (Busk)

Catenaria bicornis Busk, 1884: 14.
Petalostegus bicornis: Levinsen 1909: 114; Gordon 1984: 46 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns E778, E800.

DISTRIBUTION: Kermadec Ridge, Fiordland; also Molluccas, Society Islands.

Family CABEREIDAE Busk, 1852

Semibugula Kluge, 1929

Colony erect, dichotomously branching, biserial. Zooids lightly calcified, with the frontal membrane occupying much of the zooidal length. Cryptocyst absent, gymnocyst reduced. Jointed spines present or absent. Avicularia sessile, marginal. Lateral rootlet pores present. Ovicell hyperstomial.

TYPE-SPECIES: *Semibugula birulai* Kluge, 1929

REMARKS: *Bugulicellaria* Mawatari, 1957, is a junior synonym. Both Kluge (1929) and Mawatari (1957) noted that their species appeared intermediate between the Bugulidae (or Bicellariellidae) and Cabereidae (or Scrupocellariidae). Kluge included his *Semibugula birulai* in the former family and Mawatari included his *Bugulicellaria yezoensis* in the latter. Mawatari noted that the mode of bifurcation resembled that of *Tricellaria* and, in spite of the unusual extent of the frontal membrane, allied his new species with *Tricellaria*. I agree with Mawatari that the affinities appear to be more with the Cabereidae (Scrupocellariidae).

Semibugula enigmatica n.sp. (Fig. 20)

MATERIAL EXAMINED: NZOI Stn P929.

DISTRIBUTION: Challenger Plateau.

DESCRIPTION: Colony erect, biserial, scarcely calcified, hyaline. Zooids 1.18–1.24 × 0.19 mm, alternating, the frontal membrane occupying much of the frontal surface, the proximal part of the zooid tapering and somewhat tubular; a single long spine, jointed near the base, arises from the inner distal corner of each zooid. Avicularia generally single, at the outer distal corner, or paired; the mandible broadly triangular, hooked. A rootlet issues laterally from the proximal end of each zooid. Ovicells and bifurcations not seen. A thin chitinous line extends around the walls of each pair of zooids.

HOLOTYPE: Unique colony fragment, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-416.

TYPE-LOCALITY: NZOI Stn P929, Challenger Plateau, 40 °42.8′S, 167°56.0′E, 1029 m.

REMARKS: This curious species appears to belong to *Semibugula*. It resembles *S. yezoensis* (Mawatari) in the delicate nature of the zooids, the details of the avicularium, and the origin and disposition of the rootlets. It differs in having jointed spines and tapering proximal ends to the zooids.

This is the first record of this genus from the Southern Hemisphere.

Tricellaria Fleming, 1828

Colony erect, dichotomously branching, anchored by rhizoids. Branches typically biserial, zooids alternating, or a branch beginning with a single zooid; each branch jointed at its base and comprising three or more zooids. Zooids tapering proximally. Spines usually present distally and sometimes a scutum over the frontal membrane. Lateral avicularia, if present, as sessile triangular prominences borne distally on the zooid; frontal avicularia may be present on the proximal gymnocyst. No basal avicularia or vibracula but occasional rhizoids issuing from small chambers. Ovicell hyperstomial, or immersed, typically with an ectooecial pore(s) or fenestra.

TYPE-SPECIES: *Cellaria ternata* Ellis & Solander, 1786

Tricellaria aculeata (d'Orbigny) (Plate 20, A, B)

Bicellaria aculeata d'Orbigny, 1847: 8.
Tricellaria aculeata: Hastings 1943: 356 (*cum syn.*); Macken 1958: 104.

MATERIAL EXAMINED: NZOI: Stns B480, B488, B490, B493, C869, M778, M779. DPG; Kaikoura.

DISTRIBUTION: Marlborough Sounds, Cook Strait, Fiordland, Auckland Islands, Campbell Island; also Chile, magellanic South America, South Georgia, Bouvet Island, Kerguelen.

DESCRIPTION: Colony erect, tufted, branching frequently, the branch joints uniserial, and the ends of the branches tending to curve inwards. Each infertile branch (internode) short, comprising three zooids, with new branches arising distally from either or both of the two distal zooids in a triplet, or lateroproximally from the gymnocyst of either, but not both, of the same two zooids – thus there are three potential sites for the origin of new branches but, in life, it seems as though only dichotomies, not trichotomies, occur. Zooids 0.45–0.53 × 0.15–0.19 mm, with an oval opesia and relatively long, smooth gymnocyst. Distal spines 3–5, long, relatively stout, with often one or two shorter, more slender spines just distal to the scutal spine. Scutum arising mid-laterally on the inner opesial margin of each zooid, slender, forked, generally with three or four tines. Avicularia small, sessile; a frontal avicularium present just proximal to the smooth, narrow cryptocyst; a distolateral avicularium often visible projecting from the middle zooid and sometimes also occurring on the other zooids but set behind the distal spine bases and visible only dorsally. Ovicells prominent, smooth, with a tiny mid-proximal fenestra. Fertile branches with 4–6 zooids.

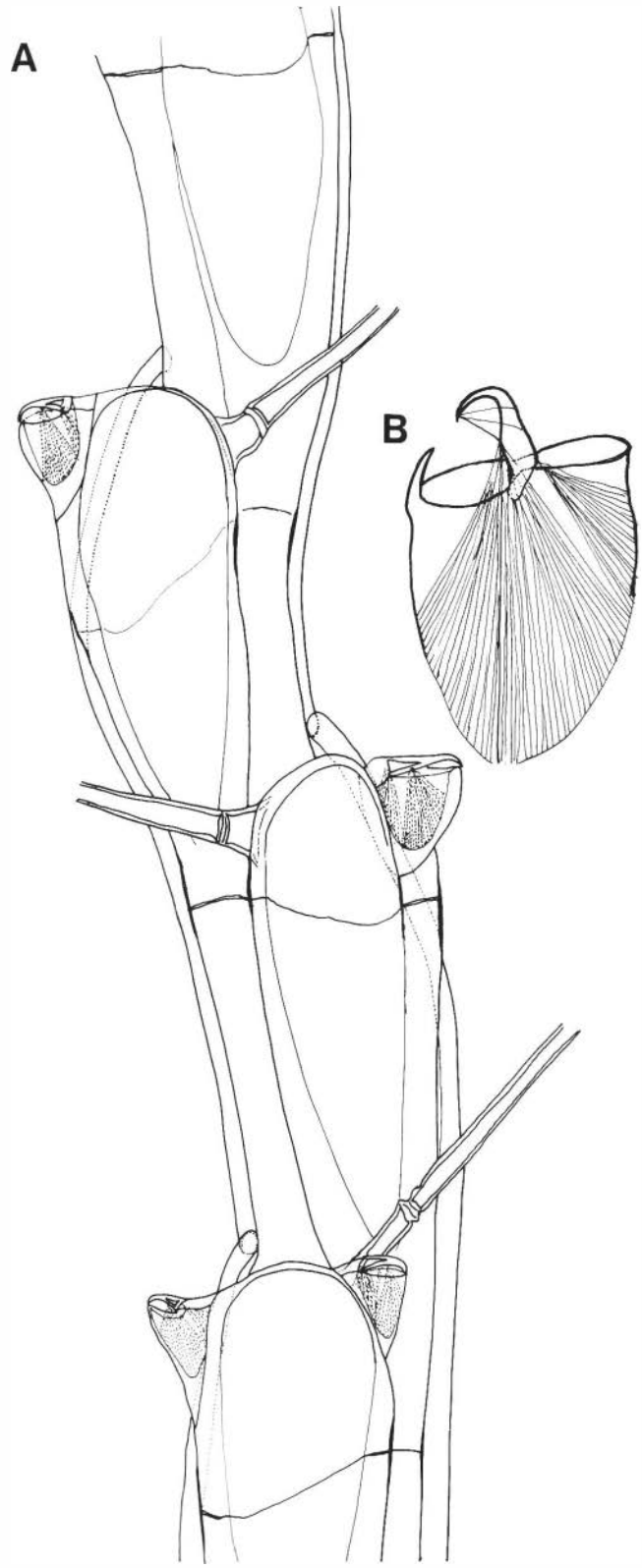


FIG. 20. *Semibugula enigmatica* n.sp. A, part of branch; B, sessile avicularium.

REMARKS: Hastings (1943) discussed this species, noting that variations may occur in the numbers of spines, presence or absence of the scutum and avicularia, and number of zooids in fertile internodes. Nevertheless, the uniserial joints are very characteristic.

Tricellaria monotrypa (Busk) (Plate 20, C, D)

Cellularia monotrypa Busk, 1852a: 368.
Tricellaria monotrypa: Hastings 1943: 356 (*cum syn.*); Macken 1958: 104.

MATERIAL EXAMINED: NZOI Stns B482, B488, B493, E796, E820, M778.

DISTRIBUTION: Cook Strait, Fiordland, western approaches to Foveaux Strait; also Bass Strait.

DESCRIPTION: Colony erect, the branches somewhat flattened, tending to curve inwards, biserial, except at internodes, which are three zooids wide; at bifurcations joints pass through the zooids to left and right of the median axial zooid, thus internodes comprise whole zooids and half zooids. Zooids 0.43–0.60 × 0.21–0.34 mm, mostly tapering proximally though some more or less parallel-sided; opesia oval, surrounded by a smooth cryptocyst which is widest proximally. Gymnocyst smooth. The outer, and sometimes the inner, distal corner of each marginal zooid, and the mid-distal rim of the axial zooid, are produced into a short spine-like tubercle. No scutum or jointed spines. Avicularia absent. Ovicell immersed, reduced, visible frontally as a narrow cap-like structure with a crescentic proximal rim.

REMARKS: Hastings (1943) remarked on the presence of a small spike-like tubercle at the inner distal corner of the fertile zooid. In the present material this spine is present on some autozooids as well.

Tricellaria occidentalis (Trask) (Plate 20, E)

Menipea occidentalis Trask, 1857: 113.
Tricellaria occidentalis: Harmer 1923: 354; Osburn 1950: 122; Mawatari 1951: 9 (*cum syn.*); Gordon 1967: 56.

MATERIAL EXAMINED: DPG: Colonies from Nelson Harbour.

DISTRIBUTION: Auckland and Nelson Harbours; also British Columbia to California, Japan, China.

DESCRIPTION: Colony erect, to 5 cm high, buff coloured. Zooids 0.43–0.71 × 0.19 mm, arranged biserially in articulated segments of 3, 5, 7, or 9 zooids. Opesia elongate-oval, generally about two-thirds the zooidal length, with a proximal gymnocyst. From the inner margin of the proximal half of the opesia is a scutal spine, variously awl-like, bifid, trifid, or, in ovicelled zooids, a large lobate structure; typically three outer distolateral spines (the most proximal one often forked), a median distal spine, and a pair of inner distolateral spines. Frontal avicularia absent. Lateral avicularia present or absent, generally conspicuously projecting, with an upturned rostral tip. Ovicell subglobular, recumbent, smooth, with about a dozen scattered pores.

REMARKS: This pan-Pacific marine-fouling species was first recorded in New Zealand from Auckland (Gordon 1967). The Nelson colonies constitute only the second record in these waters but this no doubt reflects the limited observations of fouling organisms in New Zealand ports since Skerman's (1958, 1959, 1960) work.

The Nelson colonies absolutely correspond to the material excellently illustrated by Mawatari (1951) from Japan. At least two "varieties" have been named, but these seem part of the intrinsic variation possible in this species, which shows a considerable variety of form in single colonies.

Emma Gray, 1843

TYPE-SPECIES: *Emma crystallina* Gray, 1843

Emma cervicornis MacGillivray (Plate 20, F, G)

Emma cervicornis MacGillivray, 1869: 127; Hastings 1939: 325.

MATERIAL EXAMINED: NZOI Stns B480, B493, C750.

DISTRIBUTION: Fiordland; also southern Victoria, Australia.

DESCRIPTION: Colony erect, tufted, curling. Branches of bizooidal internodes except at bifurcations where they are trizooidal. Zooids 0.41–0.43 × 0.19–0.21 mm. with rounded opesia encircled by a granular cryptocyst. Gymnocyst smooth, tapering. Distal rim of zooid angled away from the branch axis, bearing four or five spines, the two outermost ones longer and stouter. Scutum present on all zooids, simple or, more usually, forked, arching over the proximal cryptocyst. Avicularia typically paired, i.e., one per zooid, the palatal surface facing more or less outward. Rhizoids originating from most internodes, from one zooid just proximal to a joint, each having a coiled appearance near its origin. Frontal branching also occurring from some internodes. Ovicelled zooids not seen.

REMARKS: According to Hastings (1939), in fertile internodes the first of the three zooids is fertile with its ovicell immersed in the third, whose frontal avicularium surmounts the ovicell. The scutum of the fertile zooid tends to be much branched.

This is the first record of this species from New Zealand.

Emma rotunda Hastings (Plate 19, H–J)

Emma rotunda Hastings, 1939: 324 (*cum syn.*); Gordon & Ballantine 1977: 125.

MATERIAL EXAMINED: NZOI: Stns B493, M778; also Stn C750, near Ahipara, Northland, 35°20.0′S, 173°10.5′E, 20 m. DPG: Leigh and Kaikoura.

DISTRIBUTION: Northland, Poor Knights Islands, Hauraki Gulf, Kaikoura, Fiordland, Campbell Island; also New South Wales, Victoria, Tasmania.

DESCRIPTION: Colony erect to repent, curled and tangled. Branches of bizooidal internodes except at bifurcations where they are trizooidal. Zooids 0.43–0.56 × 0.21–0.24 mm, with somewhat semicircular opesia encircled by a granular cryptocyst. Gymnocyst smooth, tapering. Distal rim of zooid angled away from the branch axis, bearing two or three spines, the innermost one smallest. Scuta not present, except on fertile zooids. Lateral avicularia present on some zooids, the palatal surface facing more or less outwards. Ovicells in trizooidal internodes in frontally budded branches, on a lateral zooid and immersed in the median zooid, not surmounted by an avicularium but bearing a small spine-like scutum near one corner of the ovicell. Rhizoids originating dorsally on some zooids.

REMARKS: Non-fertile internodes of this species are distinguished from those of *Emma triangula* (below) by the rather more angled, less triangular, opesiae.

Emma triangula Hastings (Plate 21, A–C)

Emma triangula Hastings, 1939: 323 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B480, B485, B486, B498, B616, E820, M789.

DISTRIBUTION: Near Three Kings Islands, Cook Strait, Marlborough Sounds, Fiordland; also Port Phillip Heads, Victoria.

DESCRIPTION: Colony erect to repent, curled and tangled. Branches of bizooidal internodes except at bifurcations where they are trizooidal. Zooids 0.56–0.71 × c. 0.32 mm, the opesia roundly triangular, with the spine-bearing area of the distal margin rather narrower than in other species. Cryptocyst encircling opesia, smooth and narrow distally, broad and granular proximally. Gymnocyst smooth, tapering. Spines two or three, one or two of which are very long, the other(s) very short to acicular. Lateral avicularia paired, single, or absent, the palatal surface facing more or less outwards. Ovicells on one or both zooids in bizooidal fertile internodes occurring in frontally budded branches, with a large central ovicellular fenestra and a simple scutal spine placed near the inner corner of the ovicell. Rhizoids originating from the distolateral shoulder of many zooids.

REMARKS: Hastings (1939) described an internal spine for muscle attachment. This structure occurs in the present material.

Emma tricellata Busk

Emma tricellata Busk, 1852a: 373; Hastings 1939: 326 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stn B480.

DISTRIBUTION: Central Fiordland; also Bass Strait, Tasmania, Victoria, and southern New South Wales.

DESCRIPTION: Colony erect to repent, curled and tangled. Branches of trizooidal internodes throughout. Zooids with semicircular opesia and surrounding granular cryptocyst which is wider proximally. Gymnocyst smooth, tapering. Distal spines 2–4, the median zooid at bifurcations with one or two spines. Lateral avicularia present, generally one per segment, the palate facing distolaterally. A simple scutal spine on autozooids, a forked scutum on fertile zooids.

REMARKS: This species is at once distinguished from other species of *Emma* in the New Zealand region by its trizooidal segments.

Menipea Lamouroux, 1812

Colony erect, the branches biserial to pluriserial and flattened, bilamellar or unilamellar and typically jointed. Cryptocyst present. No scutum. Avicularia present; basal heterozooids in some species. Ovicell present. Rootlets typically in lateral bundles.

TYPE-SPECIES: *Cellularia crispa* Pallas, 1766

Menipea vectifera Harmer (Plate 21, D–G)

Menipea vectifera Harmer, 1923: 346; Hastings 1943: 339.

MATERIAL EXAMINED: NZOI Stns B488, M747, M776, M778, M779, M780, M797; also Stn C844, off Cape Palliser, 41°38.3′S, 175°11.2′E, 88 m.

DISTRIBUTION: Three Kings Islands, Cook Strait, Fiordland.

DESCRIPTION: Colony erect, frondose, unjointed, the branches all or mostly in the same plane; to 4.5 cm high, the branches c. 2 mm wide, unilamellar, with rhizoids along the lateral margins, and an anchoring tuft at the base of the colony. Zooids 0.43–0.53 × 0.24–0.28 mm, in 3–10 alternating longitudinal series. Opesia elongate. Cryptocyst granular, narrow laterally, moderately wide proximally. Gymnocyst absent or, at most negligible: one or two pairs of tiny spine bases distally. Frontal avicularia borne singly on non-ovicelled zooids, occupying the full width of the proximal

end of the zooid; the rostrum acute, directed transversely or obliquely so; not present on marginal zooids which have a small, laterally directed, distal avicularium. Ovicell prominent though somewhat flattened frontally, with a large ectooecial fenestra and a pair of avicularia distally, these mostly directed obliquely distally. Dorsally are relatively large avicularia, the smaller of these occurring in most branch axils, with occasional transversely oriented avicularia lying across 3–5 rows of zooids.

REMARKS: Harmer noted the presence of internal calcareous bars extending into the body cavity as well as internal avicularia. Both structures occur in the present material, although the latter are not especially avicularium-like. Their internal structure and function are not known.

Menipea vera n.sp. (Plate 22, A, B)

MATERIAL EXAMINED: NZOI Stns B488, E793.

DISTRIBUTION: Fiordland and western approaches to Foveaux Strait.

DESCRIPTION: Colony erect, bushy, to 6.0 cm high, the branches flattened, unilamellar, c. 1 mm wide, with rhizoids along the lateral margins, and anchoring tufts at the base of the colony. Zooids 0.43–0.56 × 0.24–0.26 mm, in 2–5 alternating longitudinal series. Opesia elongate. Cryptocyst granular, narrow laterally, wider proximally. Gymnocyst small; a pair of small spine bases distally. Frontal avicularia paired, single, or absent, only sometimes present on marginal zooids; small; the rostrum acute, raised, directed obliquely proximally; one of a pair of avicularia is often incompletely developed, appearing as a bulge. Small lateral avicularia present on some marginal zooids; basal avicularia absent. Ovicell prominent though flattened, with a large ectooecial fenestra and one or two avicularia distally, these directed obliquely distally.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-417.

PARATYPES: NZOI, type number P-650, and BM(NH), reg. no. 1985.1.22.12, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn B488, 46°28.7′S, 166°14.3′E, 164 m.

REMARKS: Individual zooids are very like those of *M. rectifera* but may be distinguished by the type of frontal avicularium. Joints occur naturally at some bifurcations in *M. vera*. Many branches are unjointed.

Penemia n.gen.

Colony erect, biserial, unjointed. Cryptocyst present. No scutum. Spines or tubercles present. No avicularia. Axial kenozooid present dorsally or lacking. Ovicell present. A proximal rootlet pore in most zooids dorsally.

TYPE-SPECIES: *Menipea ignota* Hayward, 1981

Penemia ignota (Hayward) (Plate 22, C–E)

Menipea ignota Hayward, 1981: 27.

MATERIAL EXAMINED: NZOI Stn B487; also Stn P971, Hikurangi Trough, 41°11.9′S, 177°19.6′E, 2200–2328 m.

DISTRIBUTION: Kermadec Trench, Hikurangi Trough, Puysegur Bank.

DESCRIPTION: Colony erect, to 5 mm high, with dichotomous branches 0.24–0.34 mm wide. Zooids 0.45–0.62 × 0.17–0.25 mm wide, alternating in biserial rows, each row facing away from the other. Frontal area elongate-oval, the widest part of the zooid, and more than half its length; overlapping adjacent opesiae. Opesia bordered by a smooth, proximally wide cryptocyst with distinct rim; flanking the oral area are a pair of stout non-articulated horn-like projections. Gymnocyst smooth, wholly or partially obscured when ovicells present. No avicularia. Ovicell quite recumbent, titled backwards, with an apical foramen. Dorsally, each marginal zooid has a proximal rootlet pore and a subdistal spur adjacent to the rootlet pore of the succeeding zooid in the same row. A moderately large kenozooid with ovoid membranous area occurs dorsally in each branch axil. Ancestrula similar to other zooids, but smaller overall, and more tapered proximally.

REMARKS: Although, as Hayward (1981) suggested, this species bears similarities to *Menipea*, the sum of its characters would place it on the fringe of that genus. More recently d'Hondt and Schopf (1984) have described a clearly related species, *Menipea pacifica* (from 6079 m in the North Pacific, the deepest-known occurrence of any bryozoan), which supports the establishment of a new genus. Both *Penemia pacifica* and *P. ignota* share the characters of the genus as diagnosed above and have the same type of bifurcation which, though conceptually derivable from that of *Menipea*, is not strictly identical.

The present specimens of *P. ignota* lack the granulations on the cryptocyst that Hayward described. They also differ in the possession of an ovicellular fenestra.

Canda Lamouroux, 1816

TYPE-SPECIES: *Canda arachnoides* Lamouroux, 1816

Canda arachnoides Lamouroux (Plates 22, F; 23, A)

Canda arachnoides Lamouroux, 1816: 131; Hastings 1943: 364 (*cum syn.*); Uttley & Bullivant 1972: 30.

MATERIAL EXAMINED: NZOI Stns B482, B493, M763, M791, also Stn C759, near Three Kings Islands, 34°11.7′S, 172°09.9′E, 99 m.

DISTRIBUTION: Three Kings Islands, Chatham Rise, Fiordland; also Australia, Timor.

DESCRIPTION: Colony erect, bushy, to 22 mm high, with adjacent branches joined at intervals by fine, thread-like cross-connections, and the whole anchored by a mass of basal rhizoids which have a series of recurved barbs in places. Branches biserial, with a third zooid interpolated at bifurcations. Zooids 0.41–0.45 × 0.24–0.26 mm, somewhat rectangular in outline frontally, the frontal membrane occupying the entire length of the zooid. Cryptocyst granular, narrow laterally, wide proximally, not present distally. A single small spine base at each distal corner. Frontal avicularia occur in vertical groups along the frontal keels of some branches, with acicular pivots and the palate more or less facing the branch apex. One vibraculum per zooid, occurring dorsally with the aperture visible adjacent to the cryptocyst frontally. Ovicells occurring often in vertical groups along the frontal keel like the avicularia or even with the avicularia, prominent, occupying half the branch width, with a large frontal fenestra, and a similar fenestra distally which may remain thus or develop into a crowning avicularium.

REMARKS: According to Maplestone (1882), this species is bright orange in life, and the polypides have 16 tentacles.

Notoplites Harmer, 1923

TYPE-SPECIES: *Notoplites rostratus* Harmer, 1923

Notoplites obliquidens Harmer (Fig. 21)

Notoplites obliquidens Harmer, 1926: 355.

MATERIAL EXAMINED: NZOI Stn P927.

DISTRIBUTION: Challenger Plateau; also south of Sulawesi, Indonesia.

DESCRIPTION: Colony erect, dichotomously branching. Zooids 1.02–1.12 × 0.27 mm, alternating, the opesial mid-line at an oblique angle to the branch axis; opesial outline elongate-oval, bordered by a smooth, very narrow, cryptocystal margin laterally and proximally. A single erect avicularium in the gymnocystal mid-line, just proximal to the cryptocyst; the rostrum acute; the palatal surface normal to the plane of the opesia; no marginal or dorsal avicularia. Spines four or five, on the distolateral margin, the most proximal one curving outward and partially over the opesia, the others erect and straight of which one or two originate

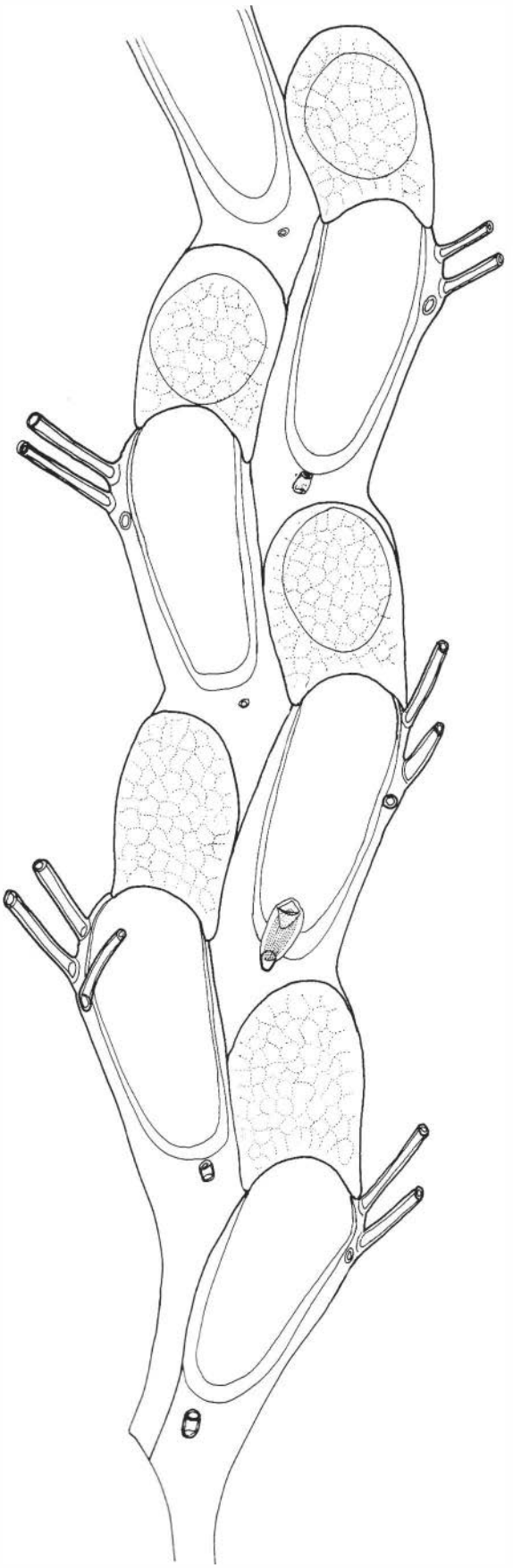


FIG. 21. *Notoplites obliquidens* Harmer. Ovicelled zooids.

behind the ovicell when it is present; no scutum. Ovicell elongate, prominent, no fenestra but a hint of a textured surface.

REMARKS: Although Harmer's (1926) single colony lacked ovicells, the other morphological features described and illustrated by him concur with those of the isolated colony segments and the single bifurcated fragment in the NZOI material.

Scrupocellaria van Beneden, 1845

TYPE-SPECIES: *Sertularia scruposa* Linnaeus, 1758

Scrupocellaria ornithorhyncus Thomson (Plate 23, B)

Scrupocellaria ornithorhyncus Thomson, 1858: 144; Hastings 1943: 360 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stn M779, also Stn C756, off Ninety Mile Beach, 34°40.0′S, 172°32.4′E, 75 m. DPG: Separation Point.

DISTRIBUTION: Northland, Abel Tasman National Park, Fiordland; also Victoria, Tasmania, Hawaii, Trinidad Island off Brazil, Tristan da Cunha, Gough Island.

DESCRIPTION: Colony erect or somewhat reptant, dichotomously branched, the zooids alternating. Zooids 0.32–0.36 × 0.13–0.17 mm, with a somewhat pyriform opesia. Cryptocyst bordering the proximal half of the opesia only, wider proximally, smooth or with scattered granules. Gymnocyst comprising about half the zooidal length, smooth. Spines three or four at outer distal corner of opesia, two at inner distal corner plus the base of a moderately broad scutum. Lateral avicularia prominent, giving a branch a serrated outline; small vibracular chambers occur laterally between the avicularia, the dorsal branch surface being mostly smooth. A pair of vibracula in the axil of each dichotomy. Ovicell prominent, smooth, with a tiny central fenestra, and an avicularium distolaterally over the branch mid-line; the distal oral arch ribbed in fertile zooids.

REMARKS: The present specimens agree precisely with Hastings's (1943) description and illustration. Hastings particularly noted the ribbing or "tuberculation" of the distal oral rim in ovicelled zooids.

Amastigia Busk, 1852

TYPE-SPECIES: *Amastigia nuda* Busk, 1852

Amastigia fiordica n.sp. (Plate 23, C, D)

MATERIAL EXAMINED: NZOI Stn E793.

DISTRIBUTION: Fiordland.

DESCRIPTION: Colony erect, branching, the branches mostly four-serial throughout, convex frontally, with the marginal series of zooids facing nearly laterally on each side. Zooids 0.38–0.49 × c. 0.18 mm, with elongate-oval opesia and granular, steeply descending cryptocyst which is not noticeably wider proximally. Gymnocyst shorter than the opesia, bearing a pair of avicularia in the central rows of zooids, a single avicularium in the marginal rows, the rostra acute, directed obliquely proximally and somewhat frontally. Spine bases small, 2 + 2 on the marginal zooids, 3 + 2 on the central zooids, plus the base of a scutal spine. A small lateral avicularium at the outer distal corner of each marginal zooid. Ovicells on the marginal zooidal rows only, prominent, flattened, with the endooecium mostly exposed, and surmounted by a single avicularium. Vibracula present dorsally, their setal grooves converging along the mid-line of the branch.

HOLOTYPE: Two branch fragments, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-418.

TYPE-LOCALITY: NZOI Stn E793, off the entrance to Poison Bay, Fiordland, 44°40.5′S, 167°32.0′E, 243–253 m.

REMARKS: Diagnostic features include the disposition of the vibracula and the ovicells confined to the marginal zooids.

Amastigia magna n.sp. (Plate 23, E, F)

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Off Dagg Sound, Fiordland.

DESCRIPTION: Colony erect, branching, the branches bi- or tri-serial. Zooids 0.62–0.64 × 0.17–0.26 mm, with elongate-oval opesia and granular cryptocyst that is wider proximally than laterally. Gymnocyst about as long as the opesia, bearing one, occasionally two avicularia, the rostrum subacute, directed obliquely proximally and somewhat frontally. Spine bases small, one evidently pertaining to a scutum. A small lateral avicularium at the outer distal corner of each marginal zooid. Ovicell prominent, flattened, with the endooecium mostly exposed, and surmounted by a single avicularium; in triserial parts of branches the ovicells are not found on the central zooids. Vibracular chambers elongate, alternating along the zooidal mid-line.

HOLOTYPE: Branch fragments, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-419.

TYPE-LOCALITY: NZOI Stn E800, near the entrance to Dagg Sound, Fiordland, 45°20.5′S, 166°41.5′E, 993–1003 m.

REMARKS: The zooids are larger than those of *A. fiordica* and ovicells are lacking on the central zooids.

Amastigia puysegurensis n.sp. (Plate 24, A, B)

MATERIAL EXAMINED: NZOI Stns B490, E793, E800, E821.

DISTRIBUTION: Fiordland, western approaches to Foveaux Strait.

DESCRIPTION: Colony erect, branching, the branches bi- to quadri- (mostly tri-) serial, to 25 mm high. Zooids 0.38–0.56 × c. 0.16 mm, with elongate-oval opesia and granular cryptocyst which does not widen proximally. Gymnocyst shorter than opesia, bearing a pair of avicularia in the central rows of zooids, a single avicularium in the marginal rows, the rostra acute, directed obliquely proximally and somewhat frontally. Spine bases small, 2–4 + 1 or 2 on marginal zooids, 2–3 + 1 on central zooids, the larger numbers of spines occurring on non-ovicelled zooids. A large, flattened scutum with a diagonal ridge covers much of the opesia. A small lateral avicularium occurs at the outer distal corner in marginal zooids. Ovicells on both central and marginal zooids, prominent, flattened, with the endooecium mostly exposed, and surmounted by a single avicularium. Vibracula present dorsally in pairs, the setal grooves of each pair tapering alongside one another in the mid-line, alternating only in some biserial branches. Rootlets emerge adjacent to the setal hinge.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-420.

PARATYPES: NZOI, type number P-651, and BM(NH), reg. no. 1985.1.22.11, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn E821, Puysegur Bank, south-west of South Island, 46°43.5′S, 165°46.5′E, 549 m.

REMARKS: Diagnostic features include the pairing of vibracula in triserial branches and the occurrence of ovicells in all the zooidal rows.

Amastigia funiculata (MacGillivray) (Plate 24, C, D)

Menipea funiculata MacGillivray, 1886c: 128; 1889a: 285.
Amastigia funiculata: Harmer 1923: 335.

MATERIAL EXAMINED: NZOI Stn E796.

DISTRIBUTION: Off Doubtful Sound, Fiordland.

DESCRIPTION: Colony erect, branching, to 12 mm high, the branches biserial, to triserial in fertile parts. Zooids 0.43–0.71 × 0.18–0.22 mm, elongate, the opesia occupying half or more of the zooidal length. Opesia oval, bordered by a narrow granular cryptocyst which is not wider proximally. Gymnocyst up to half the zooidal length, smooth. Spines 1–3 at outer distal corner and one at inner distal corner depending on position of zooid in branch and whether or not it is ovicelled. A broad scutum covers most of the opesia. A single frontal avicularium on the gymnocyst in many zooids, the rostrum acute, directed outward frontally. A lateral avicularium present on many lateral zooids, and a basal avicularium present dorsally at bifurcations, this becoming obscured by descending rhizoidal stolons in older parts of colony. Ovicell prominent, flattened, with a large exposure of endooecium and sometimes surmounted by an avicularium.

REMARKS: Unlike many *Amastigia* species, the frontal surfaces of the branches are mostly flat, and all the zooids meet the basal wall normally. The disposition of zooids at a bifurcation corresponds to pattern 15 of Harmer except that the proximal parts of zooids F and G are shorter than is customary.

Caberea Lamouroux, 1816

TYPE-SPECIES: *Caberea dichotoma* Lamouroux, 1816

Caberea angusta Hastings (Plate 24, E, F)

Caberea angusta Hastings, 1943: 389.

MATERIAL EXAMINED: NZOI Stn B490.

DISTRIBUTION: Three Kings Islands, and Preservation Inlet, Fiordland.

DESCRIPTION: Colony erect, biserial, branching, the branch width 0.24–0.49 mm. Zooids 0.31–0.39 × 0.17–0.24 mm, with wide, faintly textured cryptocyst which is somewhat squared proximally. Gymnocyst negligible to absent. Scutum with stout peduncle merging with cryptocyst; with a short rounded or truncate distal lobe and well-developed proximal lobe covering the opesia; a small point on the proximal lobe directed towards peduncle. Orificial bar absent but a pair of processes from each side of the orifice projecting towards each other, the distal lobe of the scutum applied to these and covering the gap between them. Spines 2 + 2, the outer ones stouter. Frontal avicularia variable but attaining a moderate size, situated along the branch mid-line, the rostra acute, directed alternatively to left and right, giving a zigzag appearance to the series. Lateral avicularia very small, adjacent to the outermost spine base. Ovicells not seen. Vibracula large, oblique, in contact with one another.

REMARKS: According to Hastings (1943) the branches are strongly keeled dorsally and rather flat and broad frontally. The present specimen is not markedly so, being only somewhat more convex dorsally than frontally. There are two additional spines. In all other features the specimen from Stn B490 accords with Hastings's description. According to her, the ovicells arise from little more than half the distal border of the orifice.

Caberea boryi (Audouin) (Plate 25, A–C)

Crisia boryi Audouin, 1826: 242.
Caberea boryi: Hastings 1943: 367 (*cum syn.*); Prenant & Bobin 1966: 449 (*cum syn.*); Ryland & Hayward 1977: 129.

MATERIAL EXAMINED: NZOI Stn M793.

DISTRIBUTION: Three Kings Islands, Cook Strait, Milford Sound; also Australia, Japan, Indian Ocean, Red Sea, South Africa, Morocco, Mediterranean, Britain.

DESCRIPTION: Colony erect, to 41 mm high, biserial, the branch width 0.34–0.56 mm. Zooids 0.39–0.44 × c. 0.17 mm, with smooth, proximally wide cryptocyst (reduced when ovicells present). Gymnocyst barely longer than the cryptocyst. Scutum with stout peduncle, lacking a distal lobe *per se* or with a slight lobe, overlying or barely exposing a pair of processes which converge, leaving a suture, forming an incomplete orificial bar, to which the scutum is fused; proximal lobe well-developed, covering much of the opesia, leaving a narrow fish-hook-shaped opening; a small point on the proximal lobe directed towards the peduncle. No spines. Frontal avicularium small, on the gymnocyst adjacent to the cryptocyst, displaced when ovicells present; lateral avicularium small, between orifice and vibraculum. Frontal avicularium greatly enlarged before a bifurcation, with broadly triangular mandible and hooked rostral tip. Ovicell with a small, shallow ectooecial fenestra. Vibracula relatively small, completely separated from each other, alternating.

REMARKS: Ryland and Hayward (1977) recorded the presence of spines in British colonies. Harmer noted their occurrence in young zooids but that they were difficult to distinguish in others.

Hastings (1943) included *C. boryi*, in her key to *Caberea* species, among those which have a complete orificial bar to which the scutum is fused. In the present material the bar is not complete but is divided by a narrow suture. Apparently this may be closed by fusion in some parts of the range of the species (*see* Hastings 1943, fig. 19B).

Caberea darwinii Busk

Caberea darwinii Busk, 1884: 29 (*pars*); Hastings 1943: 374 (*cum syn.*); Macken 1958: 104; Gordon 1984: 50.

MATERIAL EXAMINED: NZOI Stn M776.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Milford Sound, Kaikoura, Stewart Island, Auckland Islands; also Ross Sea, southern South America, South Georgia, Tristan da Cunha, Marion and Prince Edward Islands, Kerguelen.

Caberea darwinii guntheri Hastings (Plate 25, D, E)

Caberea darwinii var. *guntheri* Hastings, 1943: 386.

MATERIAL EXAMINED: NZOI Stn B498.

DISTRIBUTION: Off D'Urville Island, Cook Strait; also off the Patagonian Shelf, South America.

DESCRIPTION: Colony erect, biserial, branching, the branch width 0.37–0.51 mm. Zooids 0.34–0.41 × c. 0.19 mm, with a relatively wide, granular cryptocyst proximally. Gymnocyst very short, smooth. Scutum variable, either with a moderately developed proximal lobe or this much reduced, at least partly obscuring a pair of orificial processes or condyles behind it. Spines 2 + 2, or 1 + 1 in ovicelled zooids. Frontal avicularia variable, generally of moderate size, the rostra directed proximally, or distally when adjacent to ovicells. Lateral avicularia small, adjacent to distolateral spine base. Large avicularia present proximal to bifurcations, rather rounded, with a broad, roundly triangular mandible, the avicularian base lobed and encroaching onto an adjacent scutal peduncle and other structures. Ovicell with a broad endooecial exposure. Vibracula large, the grooves overlapping.

REMARKS: Although the zooids and scuta are a little smaller, on average, than in Hastings's (1943) material, the colony from Milford Sound otherwise conforms to her description.

Caberea helicina Hastings (Plate 25, F)

Caberea helicina Hastings, 1943: 368 (*cum syn.*); Gordon 1984: 51.

MATERIAL EXAMINED: NZOI Stns B493, C869, E793, E820, M773, M780, M797.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Marlborough Sounds, Fiordland, western approaches to Foveaux Strait; also Victoria, Tasmania, New South Wales.

REMARKS: The ovicells of this species, not seen in the limited Kermadec material (Gordon 1984), have a broad, shallow endooecial exposure.

The autozooids of this species may vary in shape – in colonies from Stns E820 and M773 they are relatively longer and narrower than is usual, with a correspondingly elongate scutum.

Caberea rostrata Busk (Plate 26, A–C)

Caberea rostrata Busk, 1884: 28; Hastings 1943: 389; Macken 1958: 104; Gordon 1984: 52 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns D273, M779.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, off Mahia Peninsula, New Plymouth, Tasman Bay, Milford Sound; also Tristan da Cunha.

REMARKS: The scuta in the present specimens are mostly much smaller than those in Kermadec Ridge material, with the distal lobe generally undeveloped.

Sig 5*

Caberea solida n.sp. (Plate 25, C, D)

MATERIAL EXAMINED: NZOI Stns B482, B488, B490, B616, E804, E820, M780, M797.

DISTRIBUTION: Fiordland, western approaches to Foveaux Strait.

DESCRIPTION: Colony erect, biserial, branching, to 35 mm high, the branch width 0.38–0.85 mm. Zooids 0.30–0.36 × c. 0.28 mm, with smooth, wide cryptocyst. Gymnocyst negligible. Scutum with broad, stout peduncle, truncated distally, a broad shallow distal lobe covering much of the relatively small opesia; beneath the scutum a pair of condyle-like processes. Spines 2 + 2; in ovicelled zooids 2 + 1 or 1 + 1. Frontal avicularium variable, generally relatively small, encroaching on the scutal peduncle, and situated exactly on the branch mid-line. Lateral avicularia small. Ovicell flattened, with broad, very shallow ectooecial fenestra. Vibracula large, converging and overlapping.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-421.

PARATYPES: NZOI, type number P-652, from Stn E820, Puysegur Bank, 46°35.0′S, 165°58.0′E, 220 m, and BM(NH), reg. no. 1985.1.22.7, from Stn B490, Dusky Sound, Fiordland, 45°44.3′S, 166°44.8′E, 148 m.

TYPE-LOCALITY: NZOI Stn M797, Milford Sound, Fiordland, 44°37.1′S, 167°51.5′E, 30 m.

REMARKS: In its zooidal morphology, *Caberea solida* may be allied with the *darwinii* group of species (*see* Hastings 1943: 365), which is characterised by the lack of an orificial bar. Instead, the outer distal border of the scutum meets a projection from the opposite corner of the orifice, so that the operculum is framed, and there is another small condyle-like process adjacent to the peduncle. *C. solida* is, however, a much more robust species than *C. darwinii*, which has a branch width less than half that of *C. solida*; the proximal lobe of the scutum is also more developed in *C. darwinii*.

Caberea zelandica Gray (Plate 26, E, F)

Selbia zelandica Gray, 1843: 292.
Caberea zelandica: Hastings 1943: 371 (*cum syn.*); Macken 1958: 104; Gordon 1967: 56; Uttley & Bullivant 1972: 30; Foster 1982: 144.

MATERIAL EXAMINED: NZOI: Stns B498, C869, E793. DPG: Colonies from Waitemata Harbour, Kaikoura.

DISTRIBUTION: Three Kings Islands, Cape Maria van Diemen, Waitemata Harbour, Maui-A oil platform (Taranaki), Marlborough Sounds, Palliser Bay, Chatham Rise, Fiordland.

DESCRIPTION: Colony erect, biserial, branching, the branch width 0.38–0.75 mm. Zooids 0.30–0.36 × c. 0.24 mm, with wide, smooth to granular cryptocyst. Gymnocyst small to negligible. Scutum often somewhat oblique, with a short, pointed distal lobe and rounded or angled proximal lobe which only partially covers the opesia; a complete orificial bar present to which the distal lobe of the scutum is applied. Spines 2 + 2 (1 + 1 in ovicelled zooids). Frontal avicularia variable, sometimes of moderate size, adjacent to the peduncular spine in non-ovicelled zooids. Lateral avicularia small, or sometimes relatively enlarged. Ovicell wider than long, one corner encroaching on to the peduncle base, with a broad, very shallow endooecial exposure. Vibracula large, overlapping, and converging.

REMARKS: *Caberea zelandica* is most closely related to *C. helicina* in its zooidal morphology but the branches of the former are much stouter, the opesial margin is not beaded, and the ovicells are proportionately wider.

Superfamily MICROPOROIDEA Gray, 1848
Family MICROPORIDAE Gray, 1848

Micropora Gray, 1848

TYPE-SPECIES: *Flustra coriacea* Johnston, 1847

Micropora ?coriacea inarmata Soule

Micropora coriacea inarmata Soule, 1959: 30; Gordon 1984: 52.

MATERIAL EXAMINED: NZOI Stns B472, B482, B490, C869, D272, E820.

DISTRIBUTION: Kermadec Ridge, Cook Strait, Fiordland, western approaches to Foveaux Strait; also Gulf of California.

Micropora elegans Maplestone

Micropora elegans Maplestone, 1901: 205; Gordon 1984: 53 (*cum syn.*).
Micropora cf. *normani*: Wass & Yoo 1983: 315 (part).

MATERIAL EXAMINED: NZOI Stns B482, B483, B484, B487, B488, B489, B490, D272, E796, E803, E817, E820, E821, M774, M782, M797; also Stns E908, Aotea Seamount, 38°38.0′S, 172°41.0′E, 256–336 m; H69, Foveaux Strait, 46°37.5′S, 167°53.9′E, 54 m; and H727, Foxton coast, 40°20.35′S, 175°11.6′E, 31 m.

DISTRIBUTION: Kermadec Ridge, Aotea Seamount, Foxton coast, Tasman Bay, Fiordland, Foveaux Strait; also southern Australia.

Micropora gracilis (Uttley) (Plate 27, A)

Opaeophora gracilis Uttley, 1949: 174; Uttley & Bullivant 1972: 24.
Micropora cf. *normani*: Wass & Yoo 1983: 315 (part).

MATERIAL EXAMINED: NZOI Stns B457, B468, B477, B483, B488, B493, B616, C869, D270, D272, E820, E828, Q686.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Chatham Rise, Fiordland, Foveaux Strait; also South Australia.

DESCRIPTION: Colony encrusting. Zooids 0.32–0.66 × 0.26–0.56 mm, the cryptocyst finely granular, imperforate centrally, with a row of 8–16 small opesiules (some occluded) around the periphery. Gymnocyst negligible or absent. Orifice-opesia wider than long, with an identation at each proximal corner. No spines. Avicularia interzooidal, rarely adventitious on the frontal wall; lacking a complete cross-bar; the rostrum acute, directed obliquely upward. Ovicell smooth with a central umbo.

REMARKS: This species was included in *Opaeophora* (or *Manzonella* as here regarded) by Uttley (1949), presumably because of the large number of opesiules in the frontal wall. Inasmuch as the avicularia in typical *Manzonella* are elongate and dagger- or scimitar-shaped, this species would be better placed in *Micropora* although, it should be noted, the avicularia in *Micropora* species have a complete cross-bar, which is lacking in *M. gracilis*. More significant, perhaps, is the resemblance of the frontal wall of *M. gracilis* to that of *Micropora variperforata* Waters (q.v.), which has a similar array of small opesiules or, at least, opesiular depressions. *M. gracilis* was illustrated by Wass and Yoo (1983: fig. 43) (as *M.* cf. *normani*).

Micropora mortenseni Livingstone

Micropora mortenseni Livingstone, 1929: 61; Gordon 1984: 53 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B488, B490, B498, B611, C856, C869, D262, D270, D272, D273, E820, M775, M776, M779, M782.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Marlborough Sounds, Fiordland, western approaches to Foveaux Strait.

REMARKS: At a number of stations off the south-western South Island (e.g., B488, B490) zooids of this species are characterised by gymnocystal tubercles which are not present in other parts of the range of the species. At these stations, *M. mortenseni* occurs on the concave surface of dead valves of *Cardita aoteana* Finlay, a bivalve mollusc. Other bryozoan species, belonging to genera such as *Macropora, Calyptotheca, Escharoides, Microporella, Didymosella*, and *Aplousina* are also more heavily calcified than is usual and it appears that the habitat or microenvironment has, in some way, induced the extra deposition of skeletal material.

Micropora variperforata Waters (Plate 27, B)

Micropora variperforata Waters, 1887a: 51; Brown 1952: 128.

MATERIAL EXAMINED: NZOI Stn unknown.

DISTRIBUTION: Western South Island.

DESCRIPTION: Colony encrusting. Zooids 0.43–0.60 × 0.24–0.47 mm, the cryptocyst granular, with 18–37 small pores. No gymnocystal tubercles, though a small trace of proximal gymnocyst occurs in some zooids. A pair of opesiular depressions at the sides just proximal to the orifice-opesia, with a variable number of mostly occluded accessory opesiular pores around the periphery of the gymnocyst. No spines. Avicularia interzooidal; the cross-bar complete; the rostrum acute, directed obliquely upwards. Ovicell granular distally, with a smooth to faintly striated triangular band frontally above the orifice-opesia.

REMARKS: A colony which I had, on first examination, grouped with *Micropora elegans*, turned out to be what appears to be Waters's (1887a) *M. variperforata*. This species was introduced doubtfully by Waters in a paper on Tertiary species. His description seems to have been based on preserved live material, however, for he mentions the operculum as being 0.14 mm wide. He identified some fossil material from the Hawke's Bay District as being conspecific. One of the distinctive features of *M. variperforata* was the supplementary opesiules, which were variable in number. He also illustrated avicularia, and ovicells with a smooth frontal band.

The present material has all of these features and the opercular width is 0.11–0.15 mm. This latter appears not to be a distinguishing feature, however, as the operculum of the similar *M. elegans* (Kermadec colony) is 0.10–0.13 mm.

Whether or not *M. variperforata* can truly be regarded as a distinct species is difficult to say. If it is conspecific with *M. elegans* it would be a senior synonym. The species of *Micropora* in the New Zealand region seem to be somewhat variable. There appear to be at least five entities, but a more detailed study of *Micropora* on a worldwide basis seems warranted.

Manzonella Jullien, 1888

TYPE-SPECIES: *Membranipora exilis* Manzoni, 1869

Manzonella lepida (Hincks) (Plate 27, C)

Haploporella lepida Hincks, 1881b: 11.
Opaeophora lepida: Brown 1948: 114; 1952: 129 (*cum syn.*); Gordon 1984: 54 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B480, B482, B490, C869, D252, D253, D270, D272, D273, E820, M778, M779, M780, Q686; also Stn H69, Foveaux Strait, 46°37.5′S, 167°53.9′E, 54 m. DPG: Colonies from Leigh, Manukau Heads, New Plymouth, Totaranui, Kaikoura, Otago shelf, Bluff.

DISTRIBUTION: Hauraki Gulf, Manukau, Taranaki coast, Marlborough Sounds, Tasman Bay, Kaikoura, Fiordland, Foveaux Strait.

DESCRIPTION: Colony encrusting. Zooids 0.24–0.64 × 0.13–0.36 mm, the cryptocyst granular, somewhat convex centrally and proximally, with 2–5 opesiules on each side. Orifice-opesia wider than long, the proximal rim beaded. No spines. Avicularia relatively large, interzooidal, somewhat scimitar-shaped; with a raised rostral rim, acute, with pivots; no cross-bar. Ovicell prominent, granular.

REMARKS: In life, the colonies of this species are white, or slightly flushed with pink when brooding developing larvae.

Manzonella monopia (Brown)

Opaeophora lepida var. *monopia* Brown, 1952: 131; Gordon 1984: 54 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B482, B487, B488, B490, C868, D269, D270, D274, E796, E817, E820, E821, M793; also Stns C759, near Three Kings Islands, 34°11.7′S, 172°09.9′E, 99 m, and C851, west of Kapiti Island, 40°40.4′S, 174°43.6′E, 128 m. DPG: Oaonui, on the Taranaki coast.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Taranaki coast, near Kapiti Island, Marlborough Sounds, Tasman Bay, Fiordland, western approaches to Foveaux Strait.

REMARKS: A form occurred at Stns B482, C868, D270, E796, E817, and Oaonui, which differs somewhat from colonies in other parts of the range in having more-rounded orifices, straighter avicularian mandibles, and four or five spines instead of two. The zooids of the two forms are in the same size range and they appear to be otherwise conspecific.

Mollia Lamouroux, 1821

TYPE-SPECIES: *Eschara patellaria* Moll, 1803

Mollia amoena n.sp. (Plate 27, D)

MATERIAL EXAMINED: NZOI: Stns C871, E820, Q686; also Stn C842, east of Cape Palliser, 41°38.5′S, 175°20.0′E, 77 m. N.Z. Geological Survey: Paratype of *Rosseliana pulchra* Brown.

DISTRIBUTION: Marlborough Sounds, Cape Palliser, western approaches to Foveaux Strait.

DESCRIPTION: Colony encrusting. Zooids 0.30–0.68 × 0.26–0.47 mm, wholly contiguous, with a relatively large subquadrate opesia occupying about half the zooidal length. Cryptocyst granular, descending at first gently, then steeply, under the frontal membrane. Gymnocyst confined to proximal tubercles or absent. No spines or avicularia. Ovicell subimmersed, twice as wide as long, with a smooth band of ectooecium distally and a granular area proximally.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-422.

PARATYPES: NZOI, type number P-653, from Stn Q686, near D'Urville Island, 40°41.3′S, 174°03.8′E, 205 m; BM(NH), reg. no. 1985.1.22.1, from the type locality.

TYPE-LOCALITY: NZOI Stn C842, east of Cape Palliser, 41°38.5′S, 175°20.0′E, 77 m.

REMARKS: *Mollia amoena* resembles *Rosseliana pulchra* Brown, 1952 from the New Zealand Lower Oligocene. *R. pulchra* zooids, however, are slightly larger overall, with thin, raised rims, and a concave cryptocyst that does not descend steeply distally.

Family SELENARIIDAE Busk, 1854

Colony more or less discoidal or conical, free-living. Zooids with subcircular opesia or with a median process of the proximal cryptocyst delimiting a pair of opesiules cut off from or confluent with the opesia. No oral spines. Cryptocyst granular. Gymnocyst absent, or vestigial proximally. Elongate avicularia present, with an open denticulate cryptocyst or the cryptocyst porous or cribriform; the condyles simple, paired or fused, the articulation sometimes asymmetrical and/or loop-like; the mandibles elongate, often setiform. No ovicells; sexual dimorphism may occur.

Otionella Canu & Bassler, 1917

Colony discoidal or irregularly so, free-living. Zooids budded distally in radial series; with subcircular opesia, no opesiules. Cryptocyst proximally concave. Elongate frontal avicularia with an open denticulate cryptocyst or the cryptocyst porous; the condyles paired, simple or fused; the mandibles elongate. Basal avicularia present. Ancestrula with an avicularium distally and one proximally.

TYPE-SPECIES: *Otionella perforata* Canu & Bassler, 1917

Otionella symmetrica Cook & Chimonides
(Fig. 22, A, B; Plate 28, A)

Otionella symmetrica Cook & Chimonides, 1984: 244.

MATERIAL EXAMINED: NZOI Stns B616, I429, S392; also colonies from off Hokianga Harbour, Wanganui, Cook Strait, Kaikoura, Otago shelf, and Foveaux Strait.

DISTRIBUTION: New Zealand coastal waters, 37–177 m; not yet found off the east coast of North Island.

DESCRIPTION: Colony discoidal, mostly circular, sometimes irregular when colony fractured and new zooids grow from the fracture; to 6.8 mm diameter and 2.2 mm high, the basal surface generally shallowly concave, with shallow sinuous grooves radiating from the centre, and minute pits. Zooids 0.34–0.53 × 0.26–0.49 mm, with subcircular opesia 0.13–0.19 × 0.13–0.24 mm, occupying, on average, 37% of the zooidal length. Cryptocyst concave, granular, extending distally around the opesia. Gymnocyst vestigial to absent proximally. Avicularia 0.24–0.51 × 0.13–0.24 mm, more or less bilaterally symmetrical, open frontally, with a lateral cryptocyst whose granulations appear denticulate where bordering the avicularian chamber; no gymnocyst; condyles prominent, triangular, unfused; mandible mostly between 0.45 and 0.65 mm long but occasionally attaining 1.1 mm in length, parallel-sided, barely wider in the distal third which is slightly inrolled and toothed, with a small terminal claw. Basal avicularia parallel to the colony edge.

REMARKS: *Otionella zelandica* Cook & Chimonides, 1984 also has symmetrical avicularia but is distinguished by the overall smaller size of colonies and zooids, avicularia which are proportionately larger with respect to autozooids, and the lack of a zone of cryptocyst distal to the opesia.

Otionella proberti Cook & Chimonides
(Plate 28, B)

Otionella proberti Cook & Chimonides, 1984: 241.

MATERIAL EXAMINED: NZOI Stn B616; also colonies from off Wanganui, Otaki Beach, Cook Strait, Pegasus Bay, Otago shelf, and eastern Foveaux Strait.

DISTRIBUTION: New Zealand coastal waters, 37–137 m, from Ninety Mile Beach to Foveaux Strait, also entrance to Dagg Sound, central Fiordland.

DESCRIPTION: Colony discoidal, more or less circular when fully grown, small, to 3.3 mm diameter and 1.0 mm high, the basal surface flat or shallowly concave, with shallow sinuous grooves radiating from the centre. Zooids 0.24–0.38 mm × 0.15–0.32 mm, with roundly subquadrate opesia, 0.09–0.11 × 0.08–0.11 mm, occupying, on average, 30% of the zooidal length; some older opesiae become occluded by a calcified lamina. Cryptocyst concave, granular, not occurring distal to the opesia. Gymnocyst absent to thinly developed around the proximal half of the zooid. Avicularia 0.15–0.36 × 0.09–0.15 mm, asymmetrical, open frontally with lateral cryptocyst whose granulations appear denticulate where bordering the avicularian chamber; generally a small smooth area of gymnocyst proximally; condyles relatively prominent, fused; mandible not seen. Basal avicularia radial or oblique.

REMARKS: This is the smallest of the Recent *Otionella* species in New Zealand. According to Cook and Chimonides (1984), the avicularian mandible has a broadening about mid-length before tapering finely to the tip.

Otionella squamosa (Tenison-Woods)
(Fig. 22, C–E; Plate 28, C)

Selenaria squamosa Tenison-Woods, 1880: 29; Stach 1936: 63; Brown 1952: 145 (part).
Otionella squamosa: Cook & Chimonides 1984: 232 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B616, Q726; also colonies from off Ninety Mile Beach, Whangaroa Harbour entrance, Whangarei Heads, Hen and Chicken Islands, off Dargaville coast, Great Barrier Island, Bay of Plenty, off Taranaki coast, Otaki Beach, Cook Strait, Motunau, Pegasus Bay, eastern Foveaux Strait.

DISTRIBUTION: New Zealand coastal waters, 20–121 m.

DESCRIPTION: Colony variable, from dome-shaped with a regular margin, to very irregular with regenerating portions and proportionately flatter, attaining 9.0 mm diameter and 3.0 mm high, the basal surface flat to rather concave, smooth or with faint sinuous lines. Zooids 0.38–0.56 × 0.29–0.45 mm, with subovoid opesia 0.15–0.17 × 0.11–0.15 mm, occupying, on average, 31% of the zooidal length. Cryptocyst concave, granular, not occurring distal to the opesia. Gymnocyst absent or vestigial. Avicularia 0.28–0.49 × 0.09–0.15 mm, asymmetrical, with a granular cryptocystal shield with 6–10 slit-like perforations; gymnocyst absent or negligible; condyles prominent, unfused; mandible long, attaining 1.6 mm length, somewhat incurved in the distal half, with undulate margins and generally somewhat expanded centrally, tapering to a point; no teeth. Basal avicularia oblique.

REMARKS: This species forms the largest colonies of any of the five Recent *Otionella* species in New Zealand, although the colony form can vary somewhat. Colonies from the Hauraki Gulf approaches are generally around 5.0 mm in diameter, dome-shaped, and flat-bottomed. The avicularian mandibles and opercular sclerites are dark-brown. As a consequence of the regular radial symmetry and oblique arrangement of the peripheral mandibles, the colonies resem-

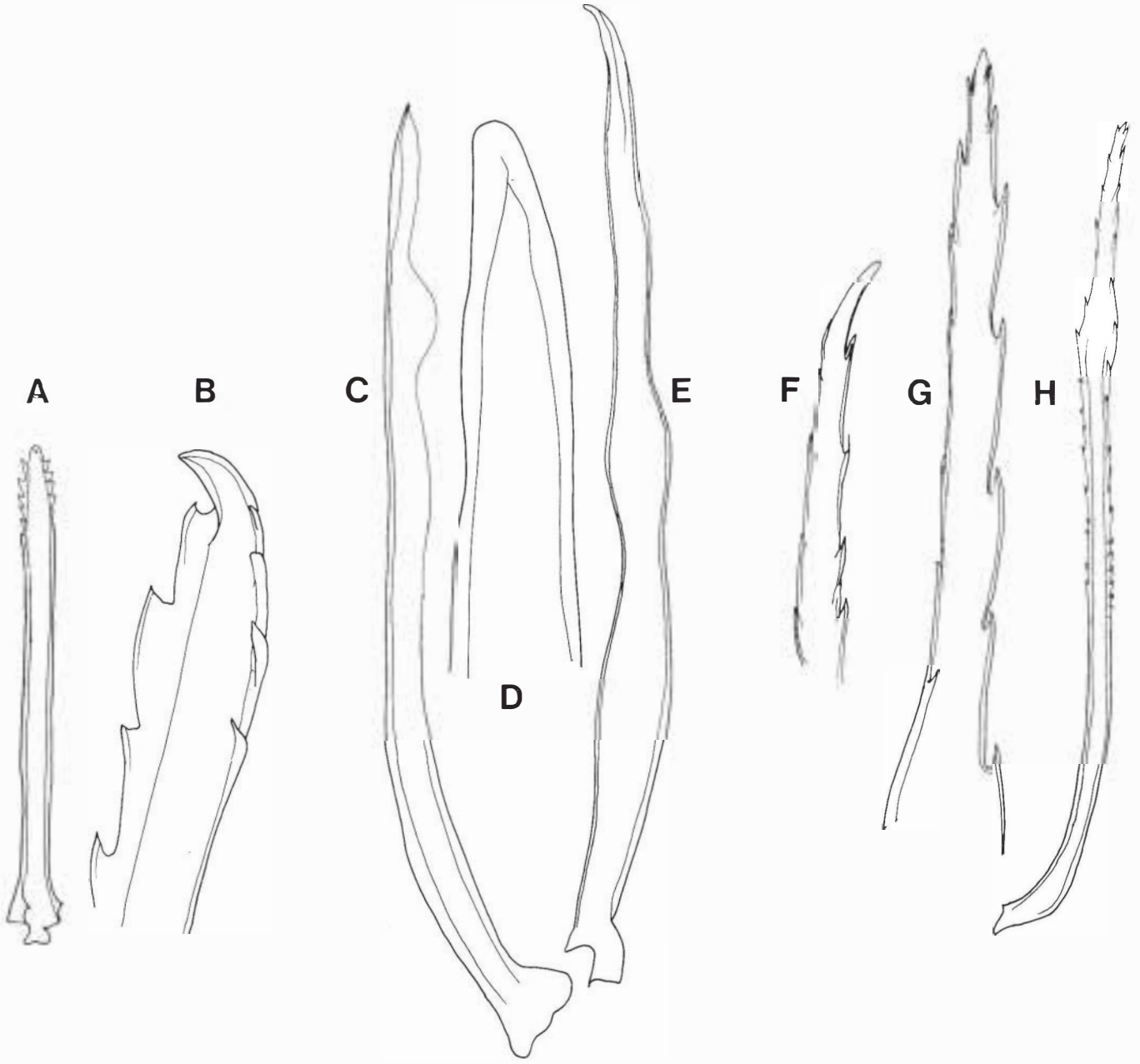


FIG. 22. Avicularian mandibles of three species of *Otionella*. A, B, *O. symmetrica* Cook & Chimonides; C–E, *O. squamosa* (Tenison-Woods); F–H, *O. affinis* Cook & Chimonides. A, C, E, and H are to the same scale; B, D, F, and G show the mandible tip magnified (same scale).

ble a cross between a circular saw and a Catherine wheel. By contrast, colonies from off the Karamea coast, South Island, are larger, though proportionately lower in height, with a concave basal surface, a more irregular outline, and yellowish mandibles and sclerites.

Cook and Chimonides (1984) have discussed the taxonomic complications concerning this species.

Otionella affinis Cook & Chimonides
(Fig. 22, F–H; Plate 28, D)

Otionella affinis Cook & Chimonides, 1984: 243.

MATERIAL EXAMINED: NZOI Stns B498, B616, Q701, Q729; also colonies from near Three Kings Islands, Ninety Mile Beach, Dargaville coast, Bay of Plenty,

Wanganui coast, Cook Strait, off Motunau, Mernoo Bank, Canterbury shelf, eastern Foveaux Strait.

DISTRIBUTION: New Zealand coastal waters, 31–296 m.

DESCRIPTION: Colony discoidal, circular, to 5.9 mm diameter and 2.2 mm high, the basal surface concave, smooth with fine grooves radiating from near the centre. Zooids 0.21–0.41 × 0.30–0.49 mm, often a little wider than long, with subovoid to roundly subquadrate opesia 0.10–0.13 × 0.11–0.15 mm, occupying, on average, 31% of the zooidal length. Cryptocyst concave, granular, not occurring distal to the opesia. Gymnocyst smooth, narrowly present proximally or absent. Avicularia 0.25–0.43 × 0.11–0.28 mm, typically as long as autozooids, asymmetrical, with a granular perforated cryptocystal shield; gymnocyst typically present laterally and proximally, smooth; condyles prominent, fused, forming a V-shaped arrangement; mandible attaining 1.6 mm length, generally somewhat shorter, slightly incurved, with fine marginal denticles along the distal two-thirds of its length and a slight lateral expansion about one-third its length from the finely tapered and toothed distal end. Basal avicularia often large, oblique.

REMARKS: *Otionella affinis* may be distinguished from *O. squamosa* primarily by its avicularia, which are larger relative to the size of the autozooids and have fused condyles. The opesiae and zooids of *O. affinis* also tend to be a little wider than long and the avicularian mandibles more slender and toothed compared to *O. squamosa*.

Otionella zelandica Cook & Chimonides
(Plate 28, E)

Otionella zelandica Cook & Chimonides, 1984: 242.

MATERIAL EXAMINED: NZOI Stns B261, 46°50.0′S, 168°38.3′E, 53 m; B263, Foveaux Strait, 46°55.0′S, 168°24.0′E, 53 m, and Z2810, Otago shelf, 46°07.3′S, 170°36.1′E.

DISTRIBUTION: Otago Peninsula to Stewart Island and Puysegur Point.

DESCRIPTION: Colony dome-shaped with a regular margin, to 4.1 mm diameter and 1.7 mm high, the basal surface flat or gently concave, smooth with inconspicuous sinuous grooves. Zooids 0.27–0.41 × 0.21–0.41 mm, with subcircular opesia. Cryptocyst concave, rising to proximal rim of opesia, granular. Gymnocyst vestigial, at corners, or absent. Avicularia 0.14–0.43 × 0.10–0.26 mm, symmetrical, open frontally with lateral cryptocyst whose granulations appear denticulate where bordering the avicularian chamber; sometimes a short gymnocyst proximally; mandibles not seen. Basal avicularia radial.

REMARKS: Cook and Chimonides (1984) described the mandibles of the frontal avicularia as very short with a spoon-shaped terminal expansion, whereas those of the basal avicularia are long and flattened with two or three expansions.

Family MACROPORIDAE Uttley, 1949

Macropora MacGillivray, 1895

TYPE-SPECIES: *Macropora centralis* MacGillivray, 1895

Macropora grandis (Hutton)

Lepralia grandis Hutton, 1873: 98.
Macropora grandis: Brown, 1952: 135 (*cum syn.*); Gordon 1984: 57 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B457, B473, B477, B482, B483, B488, B490, B493, B616, D270, D273, E817, E821, Q686.

DISTRIBUTION: Kermadec Ridge, North Island from Whangarei to Cook Strait, South Island from Marlborough Sounds to Foveaux Strait.

Family STEGINOPORELLIDAE Hincks, 1884

Steginoporella Smitt, 1873

TYPE-SPECIES: *Membranipora magnilabris* Busk, 1854

Steginoporella magnifica Harmer

Steganoporella neozelanica var. *magnifica* Harmer, 1900: 264.
Steginoporella magnifica: Gordon 1984: 56 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B480, B484, B488, B498, B611, B616, C754, C759, C857, C867, C869, D262, D269, D272, D273, M773, M774, M776, M780, M782, M791, M793, M795, M797, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands to Fiordland; also Tonga.

Family ASPIDOSTOMATIDAE Jullien, 1888

Colony encrusting, or erect from an encrusting base. Zooids with extensive cryptocyst, generally concave towards the opesia, which typically has proximolateral indentations. Avicularia interzooidal. Ovicells recumbent or immersed, the opening separate from the zooidal orifice.

Aspidostoma Hincks, 1881

Colony encrusting or erect, vincularian or bilamellar or reticulate from an encrusting base. Zooids

with extensive granular cryptocyst, with combined orifice-opesia with proximolateral indentations. Avicularia interzooidal. Ovicells recumbent. Pore-chambers present.

TYPE-SPECIES: *Eschara gigantea* Busk, 1854

cf. **Aspidostoma** sp. (Plate 28, F)

MATERIAL EXAMINED: NZOI Stn E796.

DISTRIBUTION: Central Fiordland, near Dagg Sound.

DESCRIPTION: Colony encrusting. Zooids 0.49–0.66 × 0.34–0.53 mm, with extensive granular cryptocyst; this convex, flattening near the proximal rim of the opesia. Opesia wider than long, bordered by a granular semicircular rim distally and laterally, the free edges of the rim extending a little way proximally on to the cryptocyst. Proximal rim of opesia gently concave, not raised. No spines. Avicularia and ovicells not seen. Five small basal pore-chambers present.

REMARKS: Only eight dead zooids (four undamaged) of this species were found, on a pebble. Since ovicells and avicularia are lacking, its affinities are presently obscure, although it may be an aspidostomatid. It approaches *Aspidostoma* in its overall zooidal morphology but lacks the prominent proximal rim and lateral indentations of that genus. It likewise resembles *Euritina arctica* Osburn, 1950, an arctic aspidostomatid, which may not, however, be congeneric with the otherwise Cretaceous–Eocene species of this genus.

Superfamily CELLARIOIDEA Lamouroux, 1821
Family CELLARIIDAE Lamouroux, 1821

Cellaria Ellis & Solander, 1786

TYPE-SPECIES: *Farcimia sinuosa* Hassall, 1841b

Cellaria tenuirostris (Busk) (Plate 29, A, B)

Salicornaria tenuirostris Busk, 1852a: 17 (*pars*).
Cellaria tenuirostris: Gordon 1984: 58 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B480, B483, B484, B485, B486, B487, B488, B490, B493, B495, B496, B611, C871, D270, E804, E820, E821, M763, M773, M774, M778, M779, M780, M789, M791, M793, M797, Q686; also colonies from the Kermadec Ridge and Kaikoura.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Cook Strait, Tasman Bay, Kaikoura, Chatham Islands, Otago shelf, Fiordland, western approaches to Foveaux Strait; also Bass Strait, New South Wales, Bonin Islands (south-east of Japan).

REMARKS: Fertile colonies from Fiordland were more slender than those from the Kermadec Ridge, and sometimes smoother, but accorded well in zooidal dimensions except that greater zooidal lengths obtained in some Kermadec material. *C. tenuirostris* is distinguished from *C. immersa* (Tenison-Woods) (q.v.) by the crystocystal ridges on both avicularia and autozooids, the narrower and shorter mandibular area, and more slender colony form.

Cellaria immersa (Tenison-Woods) (Plate 29, C–E)

Salicornaria immersa Tenison-Woods, 1880: 27.
Cellaria immersa: Brown 1952: 156 (*cum syn.*); Uttley & Bullivant 1972: 26.

MATERIAL EXAMINED: NZOI Stns B484, B488, B496, B498, B611, C852, C857, C861, C867, C871, D249, D253, D254, D255, D269, D270, E820, M778, Q686; also colonies from off Kaikoura and Otago Peninsulas.

DISTRIBUTION: Cook Strait, Tasman Bay, Kaikoura, Chatham Rise, Otago shelf, southern Fiordland, western approaches to Foveaux Strait; also Twofold Bay, New South Wales.

DESCRIPTION: Colonies erect, branching, flexible, to 52 mm high, the branch segments relatively stout. Zooids 0.34–0.43 × 0.25–0.32 mm, alternating, arranged in up to 22 longitudinal series in the branch segments; more or less hexagonal in outline or two sides shorter than the others giving a subquadrangular outline. Cryptocyst markedly concave, granular, lacking ridges within the zooidal outline. Combined orifice and opesia with raised rim which tends to be beaded distally, smooth proximally; the proximal rim convex, either side of which is a smooth, knob-like upturned condyle. Avicularia vicarious, the rostrum hastate in outline and biconcave; the pivot bars stoutly developed, sometimes meeting in the mid-line; the post-mandibular area granular, the granulations giving the foramen a denticulate proximal margin. Ovicelled zooids of the same form as autozooids, the opesia/orifice sometimes a little wider proportionally than the autozooidal orifice, the ovicellular opening transversely oval.

REMARKS: Where this species and *C. tenuirostris* occur together, isolated segments can be difficult to separate as to species although cleaning in hypochlorite solution usually renders diagnostic features clearer. These features are compared in Table 3.

Whether or not these two species are capable of hybridising is not known. A colony of *C. immersa* from NZOI Stn U228 (42°27.2′S, 173°42.6′E) off Kaikoura Peninsula had a slight development of cryptocystal ridges on both autozooids and avicularia (Plate 28, E). Both species occurred at this station.

Brown (1952) cited zooidal dimensions for *C. immersa* as 0.25–0.29 × 0.22–0.24 mm, but I have not encountered zooids this small. Brown also noted that young branch segments at bifurcations are firmly fixed to the parent branch. This is the case in the present material. Since completed branches in older parts of colonies are proximally jointed, it appears that the

TABLE 3. Comparison of the diagnostic features of *Cellaria immersa* and *C. tenuirostris*

	C. immersa	*C. tenuirostris*
Maximum branch length (mm)	15	14
Branch diameter (mm)	0.57–1.32	0.25–0.53
Zooidal length (mm)	0.34–0.43	0.29–0.41
Zooidal width (mm)	0.25–0.32	0.21–0.30
No. zooidal series	*8–22	*5–8
Cryptocyst	without ridges	with ridges
Avicularium	without cryptocystal ridges; wide-based	without cryptocystal ridges; narrow-based
Mandibular length (mm)	0.21–0.24	0.14–0.18

*the number at the base of some branches at bifurcations

flexible articulations develop secondarily once the new branch develops sufficiently to be subject to flow stresses which may break the rigid connection.

Cellaria hirsuta (MacGillivray) (Plate 30, A)

Salicornaria hirsuta MacGillivray, 1869: 128.
Salicornaria pilosa Kirchenpauer, 1869: 26.
Salicornaria (?) *hirsuta* Hutton, 1873: 91.
Onchopora hirsuta: Hutton 1880: 184.
Cellaria setigera: Hamilton 1898: 194; Hutton 1904: 296; Macken 1958: 104.

MATERIAL EXAMINED: NZOI: Stns B480, B493, Q686. DPG: Colonies stranded on the beach near the mouth of the Wainuiomata River.

DISTRIBUTION: D'Urville Island, Cook Strait, southern Fiordland.

DESCRIPTION: Colony erect, jointed, 10–20 mm high, the branches to 0.6 mm diameter. Zooids 0.34–0.49 × 0.24–0.28 mm, bordered by a smooth narrow rim which is continuous with that of adjacent zooids. Cryptocyst granular, deeply concave. Opesia semilunate, somewhat raised, emplaced centrally within the cryptocyst or slightly distal to this, with a pair of proximal and distal denticles. Vicarious avicularia larger than autozooids (0.38 × 0.53 mm), with huge D-shaped mandibles; the distal rim of the avicularian orifice cowl-like, projecting; the proximal rim with a pair of tiny opesiules. Ovicelled zooid wider than autozooids, with a wider opesia and a transverse slit-like ovicellular opening. A long (to 1.5 mm) chitinous bristle arises from a pore in the proximal cryptocyst of numerous zooids, as do occasional rootlets; the bristles and rootlets give the colony a "hairy" appearance.

REMARKS: Hamilton (1898), Hutton (1904), and Macken (1958) referred to this species as *Cellaria setigera*. This was one of a number of names coined by Pergens (1887) for several undated and unpublished illustrations of A.G. Desmarest and C.A Lesueur. The names were not accompanied by descriptions or locality data and are regarded as *nomina nuda* (Harmer 1957, d'Hondt 1979).

In life, colonies of *C. hirsuta* are pink.

Cellaria magnimandibulata n.sp. (Plate 30, B)

MATERIAL EXAMINED: NZOI Stns P926, P927, P929, P942.

DISTRIBUTION: Challenger Plateau, New Zealand, 570–1029 m.

DESCRIPTION: Colony erect, stick-like, unbranched, to 13.0 mm high and 1.3 mm diameter, from a tapered ancestrular region from which arise several rootlets up to 8.5 mm long which dichotomise two or three times into smaller branches attached to foraminiferan tests. Zooids large, 0.71–1.28 × 0.34–0.68 mm, the boundaries slightly raised, the cryptocyst bordered by ridges which merge distally and proximally with the zooidal boundaries; the cryptocyst granular except for a smooth area proximal to the opesia. Opesia D-shaped, emplaced somewhat distally, with a slightly raised rim and a pair of proximal denticles. Avicularia vicarious, with a huge flap-like mandible; the palate extensive, flat, granular, with lateral lappets and a subcircular central foramen. Ovicelled zooids with opesia wider than long, the ovicellular opening transversely elongate, bordered by a cowl-like rim distally and the opesial margin proximally.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-423.

PARATYPES: NZOI, type number P-654, and BM(NH) reg. no. 1985.1.22.6, both from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn P927, Challenger Plateau, 40°50.1′S. 168°14.8′E, 1005–1009 m.

REMARKS: The huge avicularian mandible and broad rostral palate with subcircular foramen are especially characteristic of this species.

Cellaria humilis Moyano

Cellaria humilis Moyano, 1983: 7; Gordon 1984: 58.

MATERIAL EXAMINED: NZOI Stns B616, E804, E821.

DISTRIBUTION: Kermadec Ridge, Fiordland, Puysegur Bank.

REMARKS: The colonies from south-western South Island greatly extend the range of this species in the New Zealand region. No specimens have yet been encountered, however, with ovicelled zooids.

Cryptostomaria Canu & Bassler, 1927

Colony erect, unjointed, dichotomously branching, roundly four-angled to more or less cylindrical. Orifice deeply set, with or without proximolateral indentations or minute condyles. No avicularia. Ovicell apparent as frontal bulge, the distal rim of the opening may be cowl-like.

TYPE-SPECIES: *Cryptostomaria crassatina* Canu & Bassler, 1927

Cryptostomaria cf. **crassatina** Canu & Bassler (Plate 30, C, D)

cf. *Cryptostomaria crassatina* Canu & Bassler, 1927: 4; 1929: 173.

MATERIAL EXAMINED: NZOI Stn E821.

DISTRIBUTION: Puysegur Bank, south-western South Island.

DESCRIPTION: Colony erect, branching (the single fragment 5.0 mm high, 0.71 mm diameter), four-serial, the zooids alternating back-to-back in pairs. Zooids 0.56–0.88 × 0.49–0.60 mm, appearing thick-walled, separated by delicate ridges in furrows, granular. Cryptocystal ridges broad, rounded, occupying most of the frontal surface, converging somewhat proximally. Opesia deeply sunken between the ridges, the lowest part of the zooid, slightly wider than long (0.12 × 0.13–0.15 mm), with smooth, non-condylate proximal rim. Ovicells not seen.

REMARKS: The single fragment in the NZOI collection is only four-serial compared to the multiserial specimen photographed by Canu and Bassler (1929: pl. 20, fig. 3). The zooids are in the same size range as their southern Philippines material, however, and the opesial dimensions are comparable. More and fertile material from New Zealand is required before a positive determination can be made.

Euginoma Jullien, 1883

Colony conical to stick-like, occasionally with articulated branches. Zooids typically lozenge-shaped, with cryptocystal ridges, granular, facing regularly round the axis, or to one side only and leaving a basal colony surface behind. Opesia lacking tooth-like denticles. Avicularia absent. Ovicell with separate opening above the opesia.

TYPE-SPECIES: *Euginoma vermiformis* Jullien, 1883

Euginoma conica n.sp. (Plate 30, E)

MATERIAL EXAMINED: NZOI Stns P937, P941; also Stn P971, Hikurangi Trough east of Cook Strait, 41°11.9′S, 177°19.6′E, 2200–2328 m.

DISTRIBUTION: Challenger Plateau and Hikurangi Trough, 1457–3347 m.

DESCRIPTION: Colony a 2 mm-high cone with a maximum diameter of 1.02 mm, tapering to a pointed ancestrula; from this and its first daughter zooid arise anchoring rootlets slightly longer than the cone. Zooids 0.28–0.43 × 0.21–0.43 mm, alternating, with a subcircular cryptocystal ridge merging into the zooidal boundary distally, granular. Opesia D-shaped, projecting denticles absent. Avicularia absent. Ovicelled zooids terminal, with a larger opesia and a prominent semicircular opening separated by a narrow cryptocystal rim from the opesia.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-424.

PARATYPE: NZOI, type number P-937, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn P937, Challenger Plateau, 41°19.2′S, 166°27.9′E, 3253–3347 m.

REMARKS: These unusual colonies appear to be a diminutive type of *Euginoma* in the form of the zooid and opesia, and in lacking avicularia.

Melicerita Milne-Edwards, 1836

Colony erect, bilamellar, typically with acute margins. Zooids typically hexagonal, arranged in transverse rows, adjacent cryptocysts separated by distinct ridges. Opesia with proximolateral indentations and median convexity, wider than long. Avicularia vicarious to interzooidal, usually found at colony margins. Ovicells visible as bulges, the opening associated with subjacent finely beaded and/or porous area(s).

TYPE-SPECIES: *Melicerita charlesworthii* Morris, 1843

Melicerita angustiloba Tenison-Woods

(Plate 31, A)

Melicerita angustiloba Tenison-Woods, 1862: 73; Brown 1952: 165 (*cum syn.*); Wass & Yoo 1983: 307.

MATERIAL EXAMINED: NZOI Stns D221, D222, P926.

DISTRIBUTION: Challenger Plateau, west of Cape Farewell; also Tertiary of New Zealand, Victoria, and South Australia.

DESCRIPTION: Colony erect, flattened, curved, scimitar-shaped overall, to c. 30 mm high and 3.2 mm wide. Zooids 0.66–0.86 × 0.41–0.53 mm, more or less hexagonal, except at margins where one side is often somewhat expanded. Cryptocyst granular, concave. Opesia with the proximal rim convex and slightly curled outward; a pair of condyles partly concealed by the rim, with a slender pair of denticles opposite, at a level below the distal oral rim; the denticles less developed or wanting in marginal zooids. Avicularia relatively large, though not fully vicarious, at intervals along the margins, set almost at right angles to the central zooids; the rostrum as wide as autozooidal opesiae, with two stout condyles delimiting the rostral foramen from a smaller proximal foramen. Ovicelled zooid larger, with larger opesia than in autozooids, the opesia proportionately higher above the cryptocyst; the ovicellular opening sinuate, transversely set; between it and the opesia a thin, finely beaded wall stretching across the width of the zooid, the beads in radial rows laterally.

REMARKS: The present specimens accord with Brown's (1952) and Waters's (1882) descriptions of the opesia with two pairs of denticles. The avicularia are also identical to that illustrated by Waters (1882: pl. 9, fig. 29). The zooidal dimensions given by both Brown and Waters, however, are considerably smaller. Brown also indicated that the colonies he dealt with, though evidently fertile, were very small. Thus there is some doubt as to whether the Recent specimens are truly conspecific with the fossil form.

Powell (1969) reported the occurrence of *M. angustiloba*, previously known only as fossil, in Recent seas, based on colonies from Cook Strait and the Otago shelf. Powell probably had two species. His figs 5 and 7 appear to be of *M. chathamensis* Uttley & Bullivant, 1972, which has deeper zooidal cryptocysts bordered by high ridges, and the opesia has a cowl-like distal rim. He also described the avicularia as having a complete pivot bar which is true of *M. chathamensis*. He mentioned the opesia as having both proximal and distal denticles however, which *M. chathamensis* lacks. His colonies and zooids had the same dimensions as the present NZOI material.

Melicerita knoxi Uttley & Bullivant, 1972, is a slightly larger species again, also with prominent ridges separating the zooids. The avicularian rostral foramen is proportionately longer than in *M. chathamensis* in which it is slit-like. The pivot bar is also complete and there are no distal opesial denticles.

Melicerita chathamensis Uttley & Bullivant

(Plate 31, B, C)

Melicerita chathamensis Uttley & Bullivant, 1972: 27.

MATERIAL EXAMINED: NZOI Stn Q723; also Stn C753, off Ahipara, Northland, 35°20.1′S, 172°52.0′E, 190 m, and paratype slide P-161 of *M. chathamensis* held at NZOI.

DISTRIBUTION: Off Ahipara, Cape Foulwind, and Chatham Islands.

DESCRIPTION: Colony erect, scimitar-shaped, to 26 mm long and 4 mm wide. Zooids more or less hexagonal, 0.45–0.58 × 0.34–0.38 mm, except at margins where one side is often somewhat expanded. Cryptocyst granular, markedly concave, separated from adjacent cryptocysts by prominent ridges. Opesia with a broad prominent proximal process, slightly curved outward, condyles and distal denticles lacking. Avicularia relatively large, though not fully vicarious, at intervals along the margins; the opening slit-like, not as wide as the autozooidal orifice, with complete pivot bar. Ovicell large, relatively prominent; the zooidal orifice wider than in non-ovicelled zooids; the ovicellular opening more or less triangular, flanked lateroproximally on either side by a finely pitted, finely beaded thin-walled area.

REMARKS: This species is unusual in that the operculum is completely separated from the opesia, which is deeply set beneath it. This is in contrast to *M. latilaminata* Rogick, for example, where the operculum fits the opesia-orifice "snugly" (Rogick 1956b). The operculum of the ovicelled zooid of *M. chathamensis* is quite unlike the orifice in shape, being more or less D-shaped and not much wider than the autozooidal operculum.

Melicerita ejuncida n.sp. (Plate 31, D, E)

MATERIAL EXAMINED: NZOI Stns B616, P927, P929, P942, Q696, Q720.

DISTRIBUTION: Challenger Plateau and off central Fiordland, 132–1029 m.

DESCRIPTION: Colony slender, erect, to 10 mm high and 0.75 mm wide, with zooids arranged in short transverse series, on each side of the colony, of two zooids alternating with a single zooid flanked on each side by an avicularium, or two zooids ± an avicularium alternating with another, slightly offset, such grouping. Zooids 0.68–1.15 × 0.24–0.51 mm, hexagonal, the proximal and distal ends pointed. Cryptocyst shallow, granular. Opesia with marked lateral indentations, the median proximal process straight, only

slightly upturned, tooth-like condyles and distal denticles not evident. Avicularia marginal, occurring in every transverse zooidal series, the opening small, transversely oval, with a pair of small condyles sometimes evident. Ovicelled zooid larger, with larger opesia than in autozooids; the ovicellular opening transversely elongate; between it and the opesia a thin, finely beaded wall stretching across the width of the zooid, the beads in radial rows laterally.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-425.

PARATYPE: NZOI, type number P-656, from the same locality as the holotype.

TYPE-LOCALITY: NZOI Stn P927, Challenger Plateau, 40°50.1′S, 168°14.8′E, 1005–1009 m.

REMARKS: This species is distinguished from all other *Melicerita* species by its small, slender colonies. In mature colonies, the ancestrular zooid and those just distal to it have a longitudinal buttress partially sealing the opesia.

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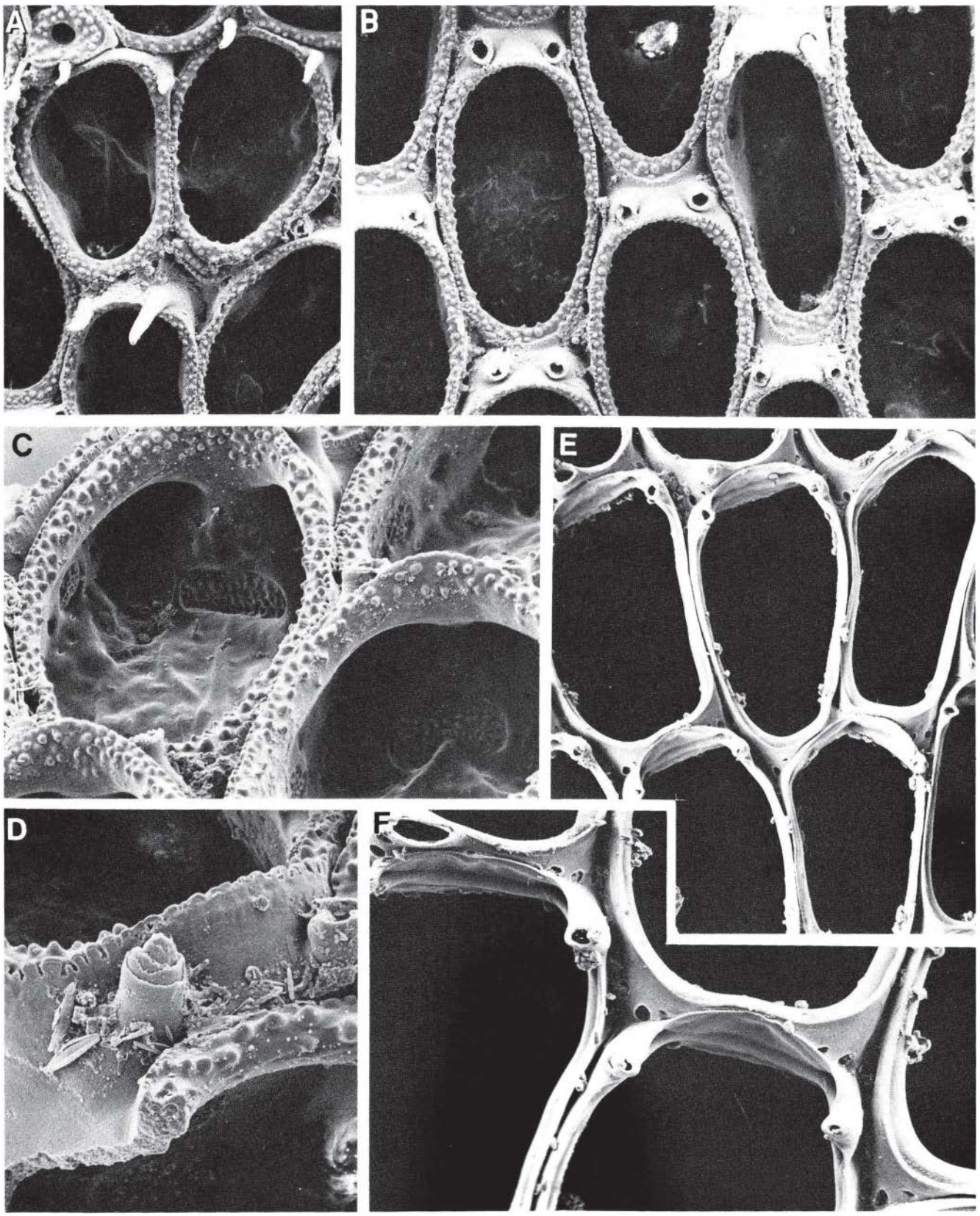
PLATES



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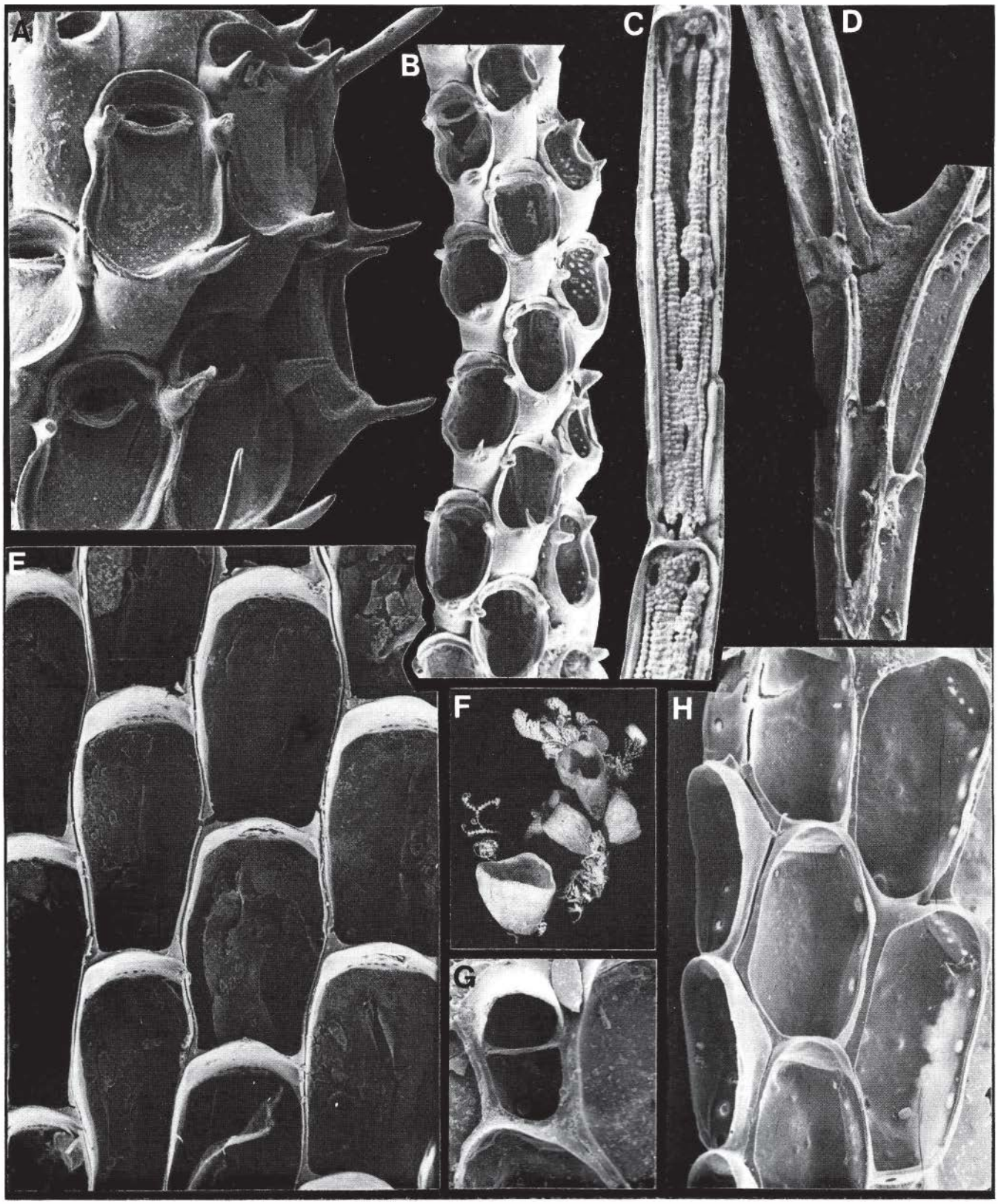

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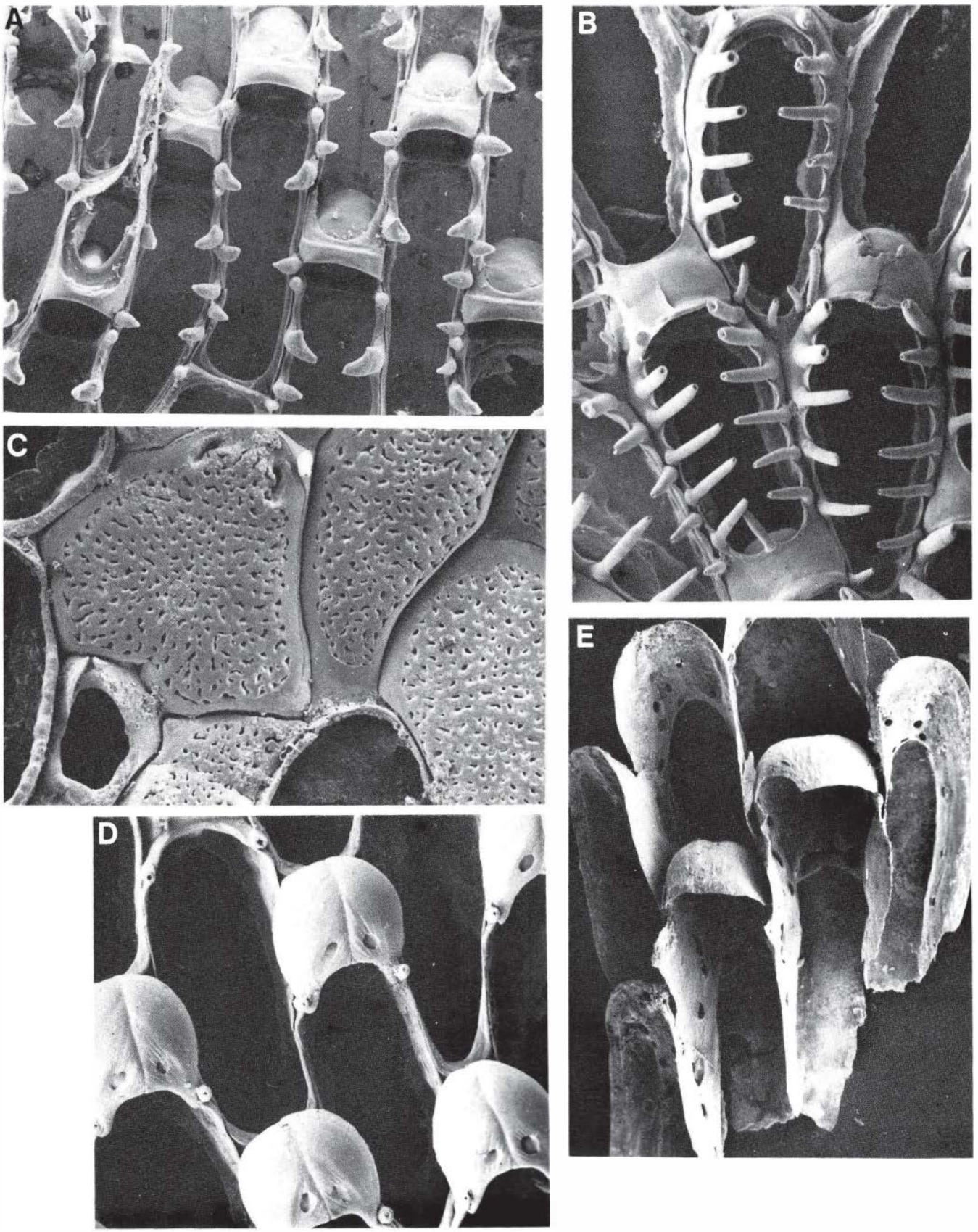

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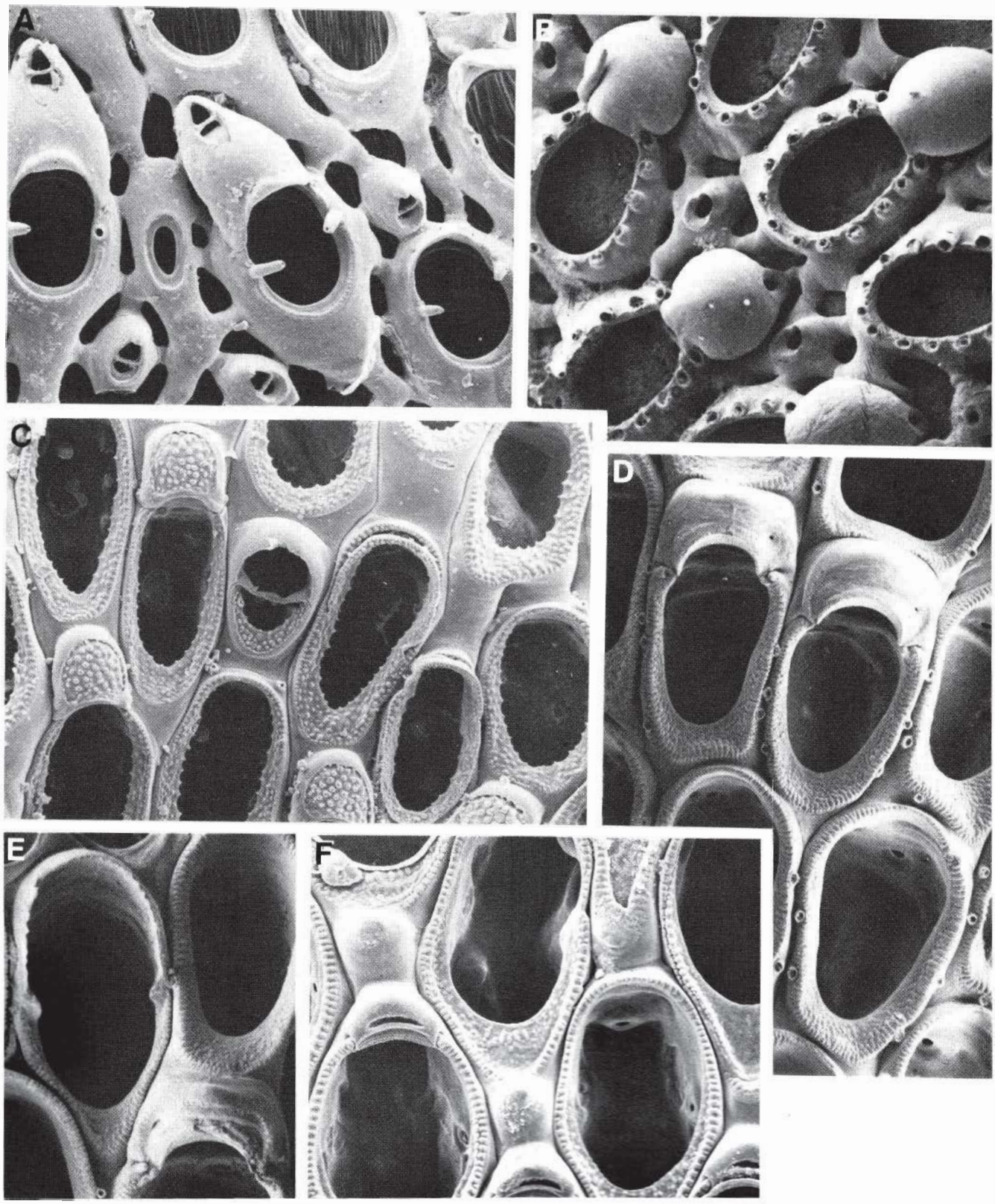

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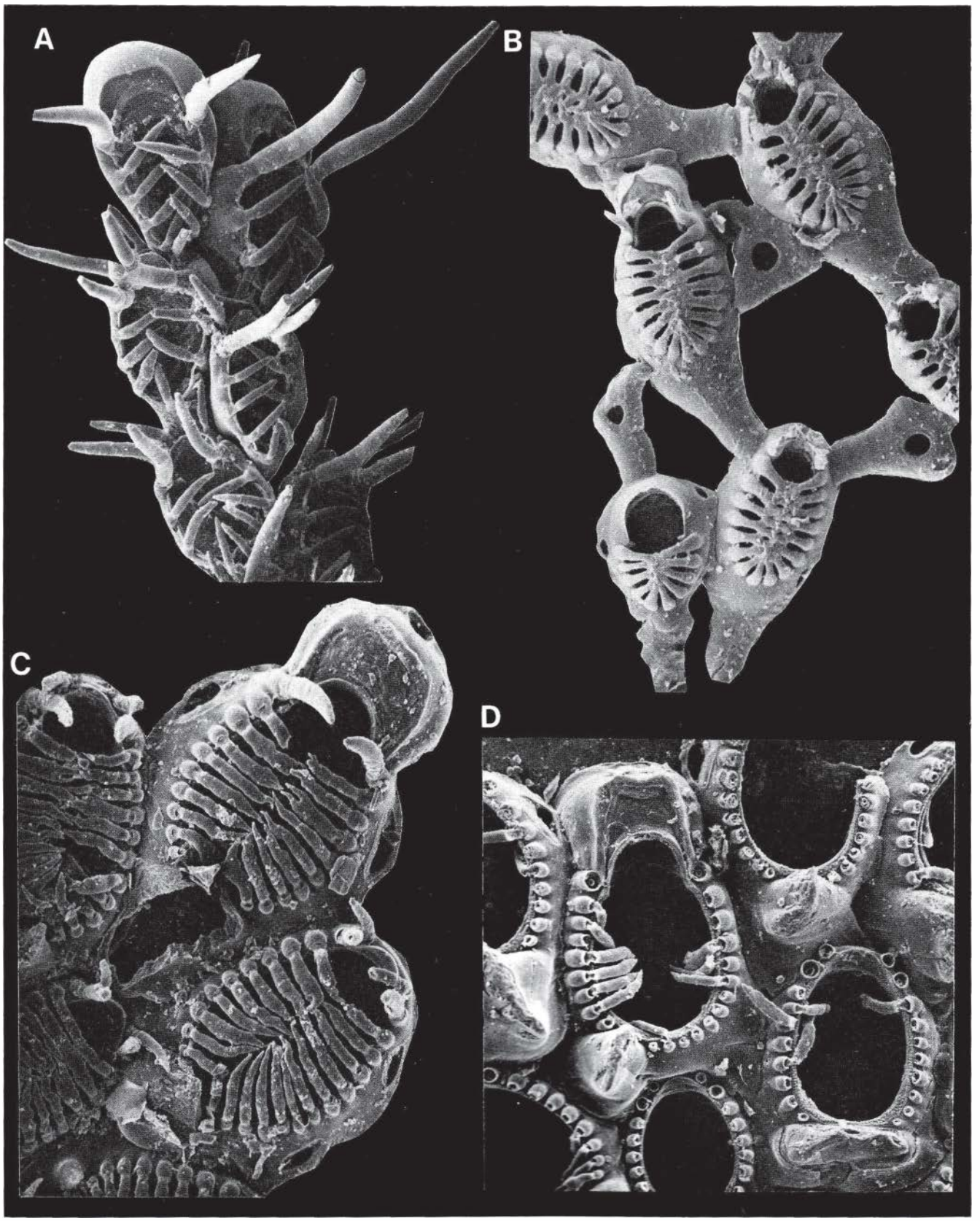

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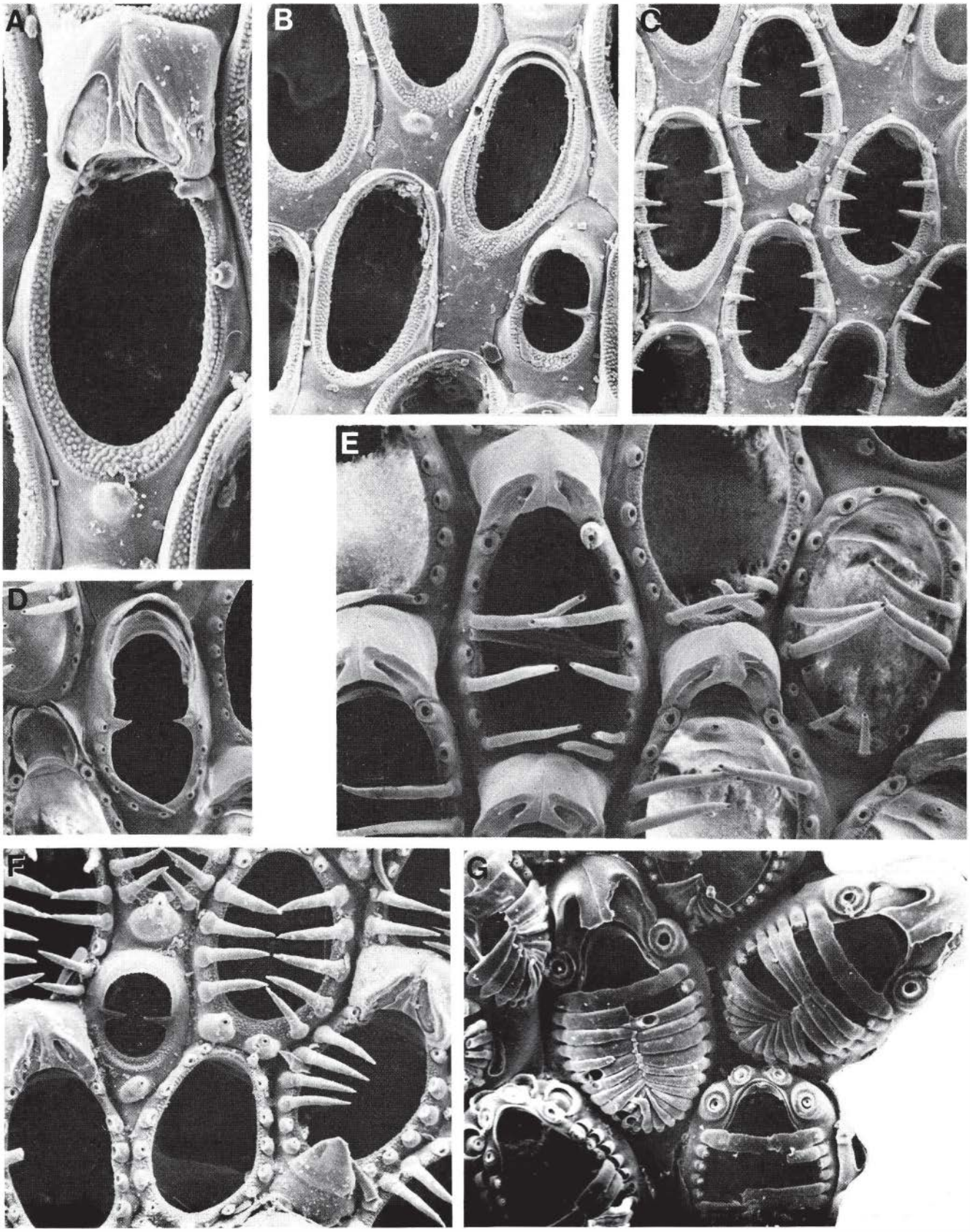

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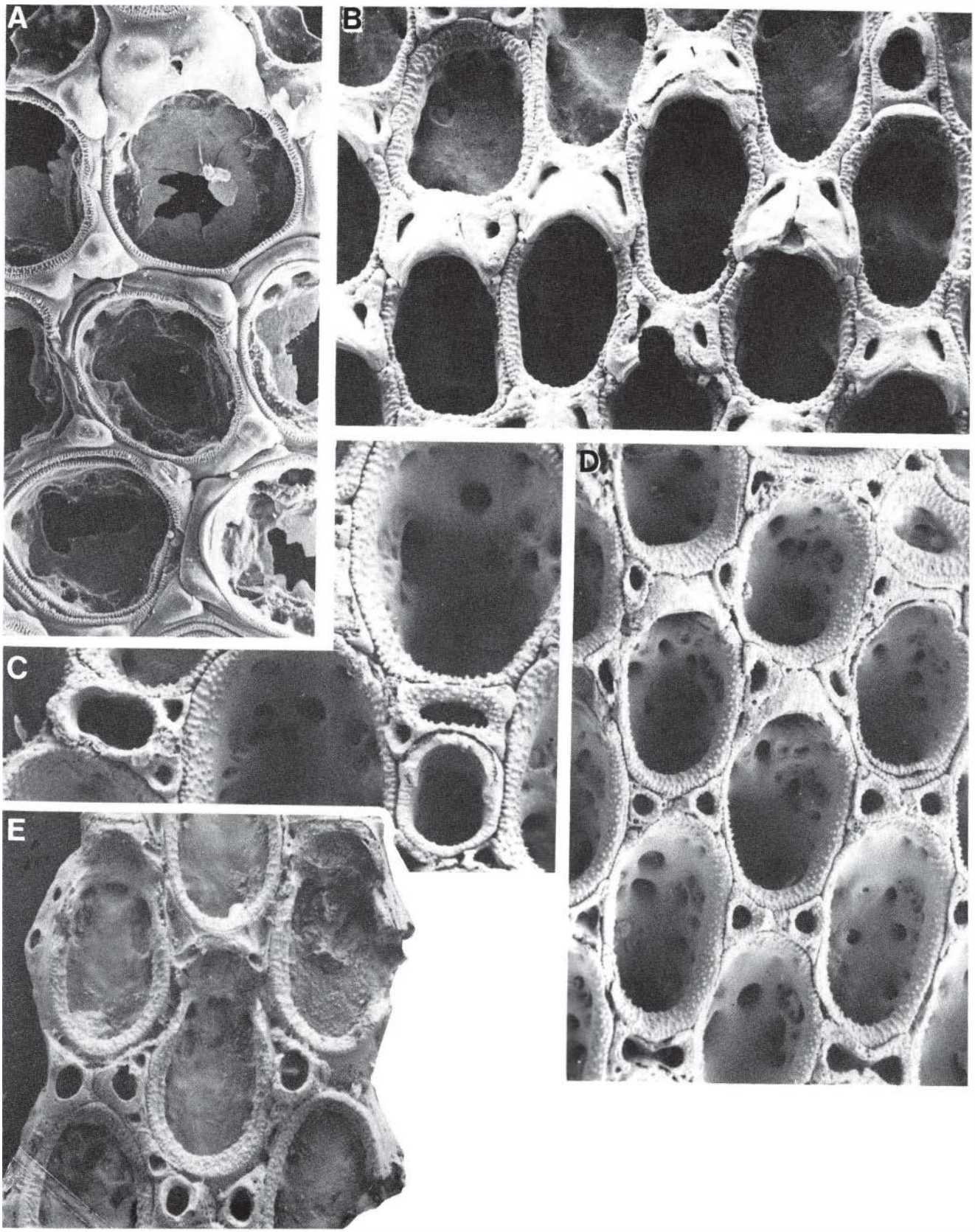

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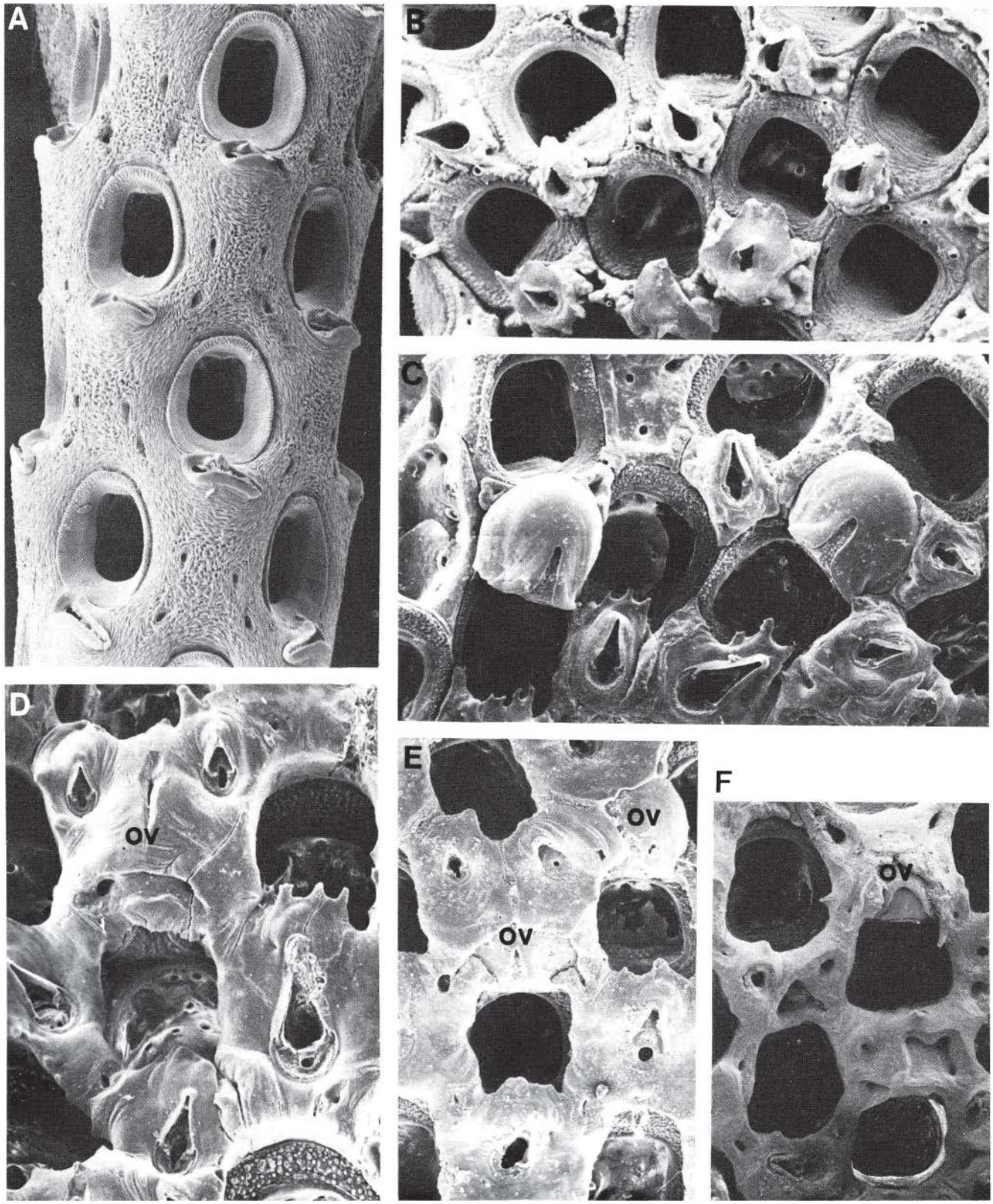

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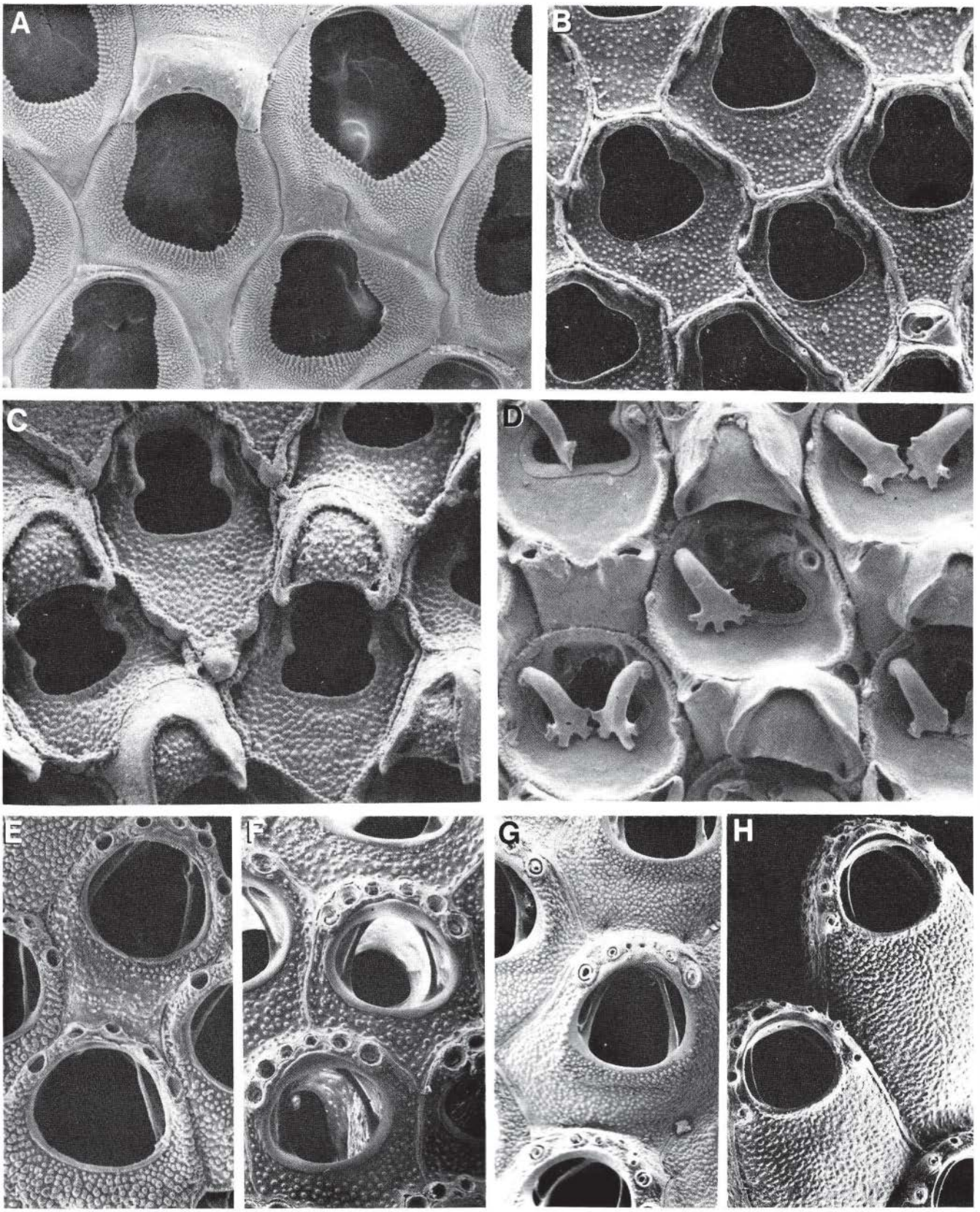

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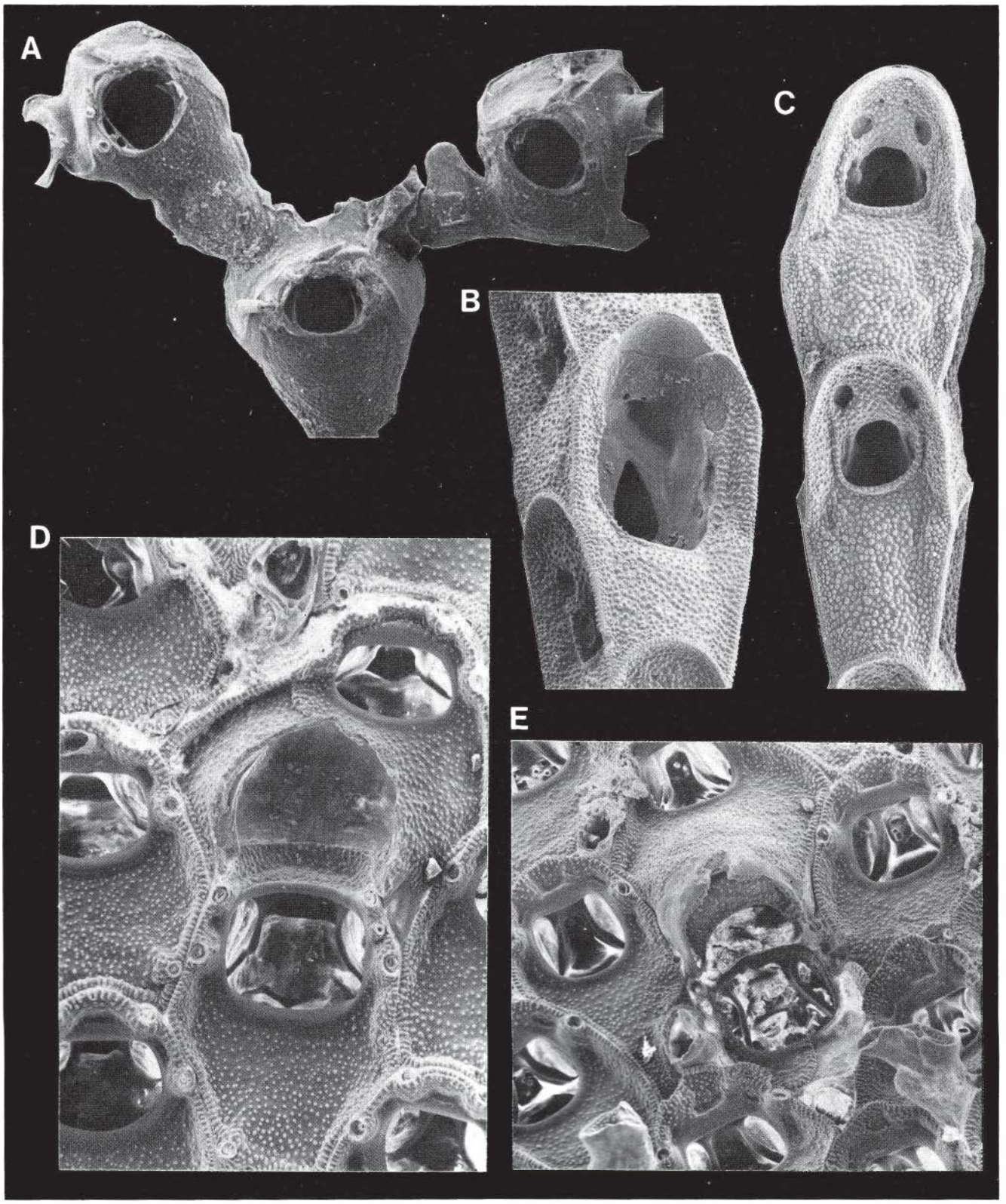

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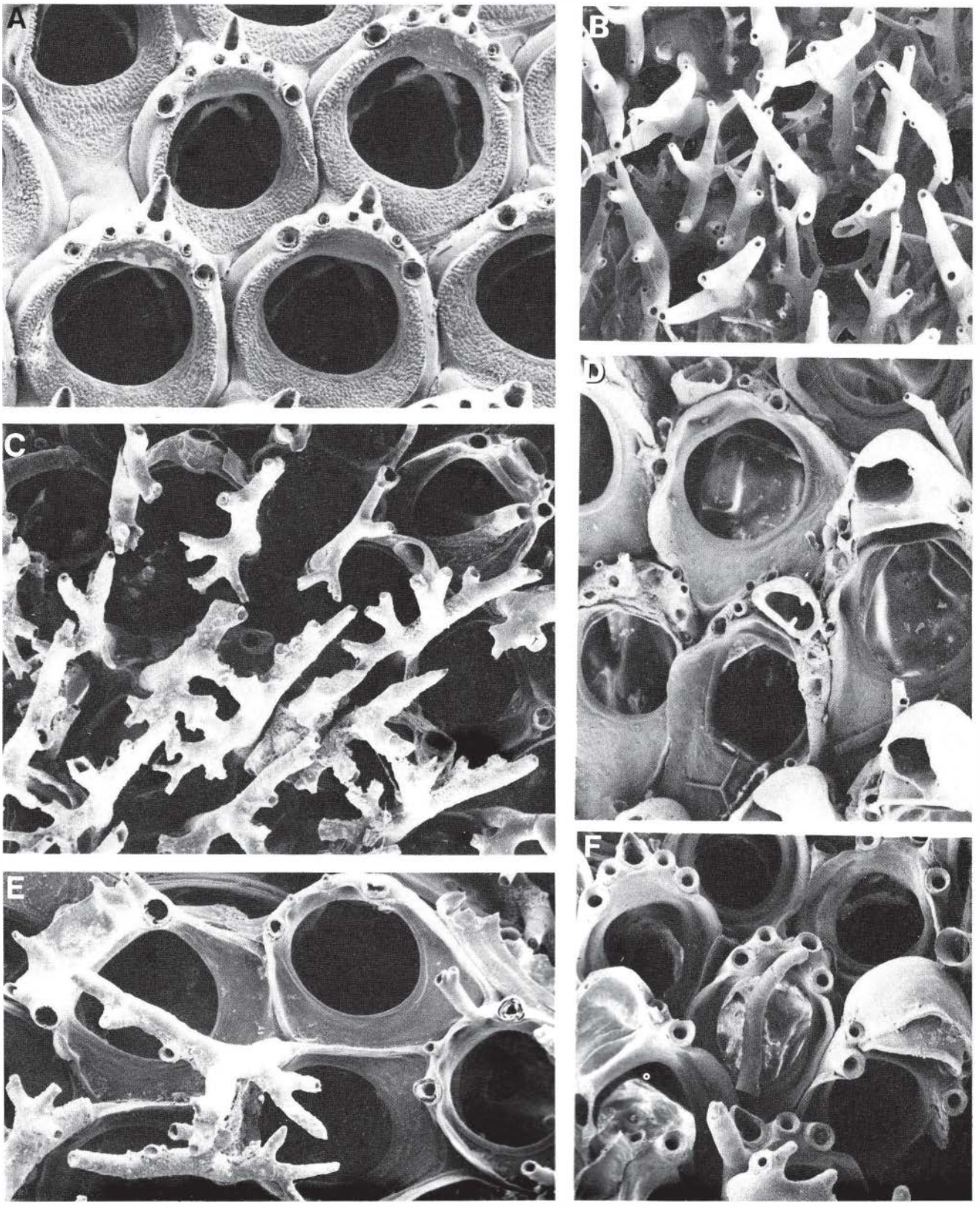

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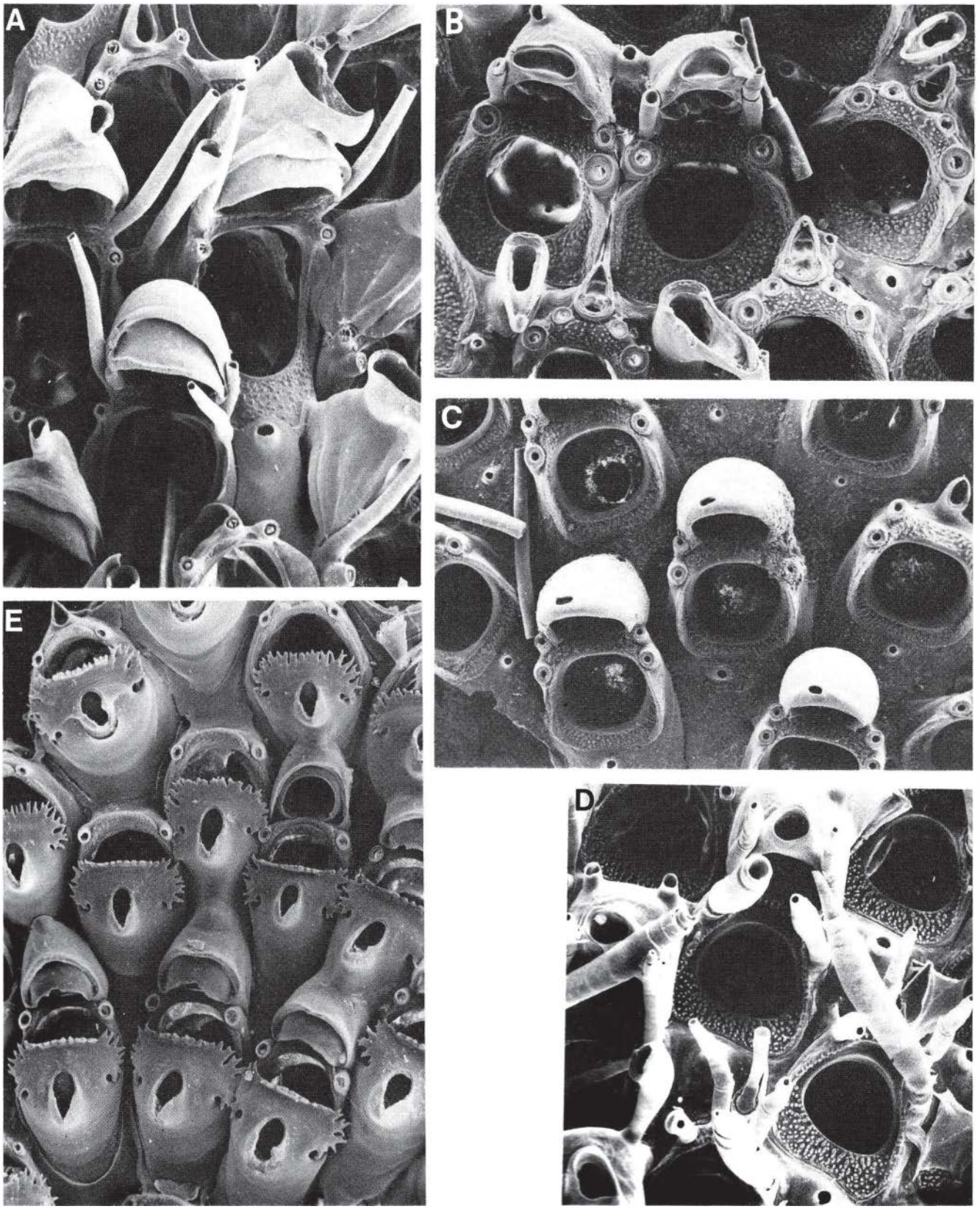

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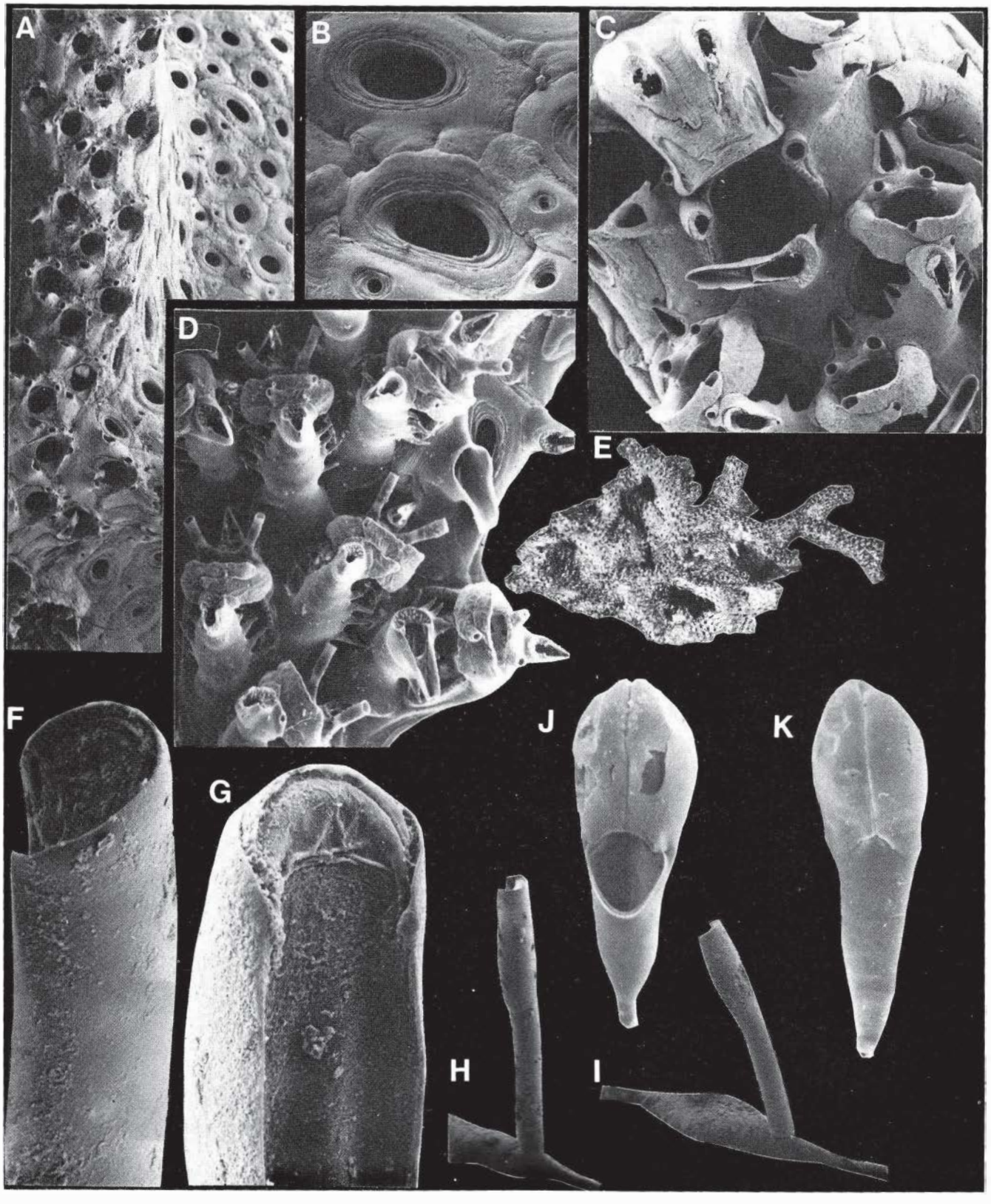

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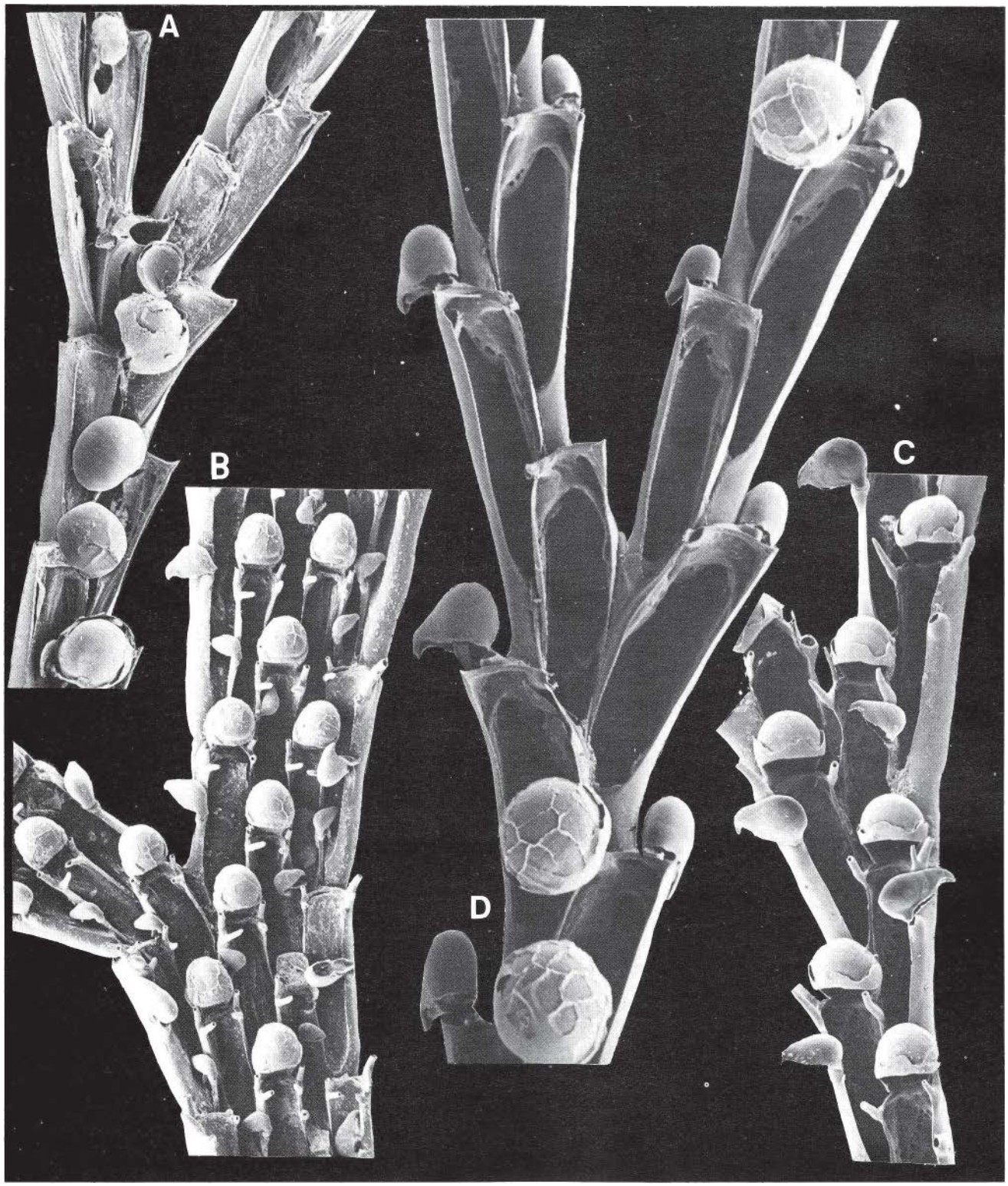

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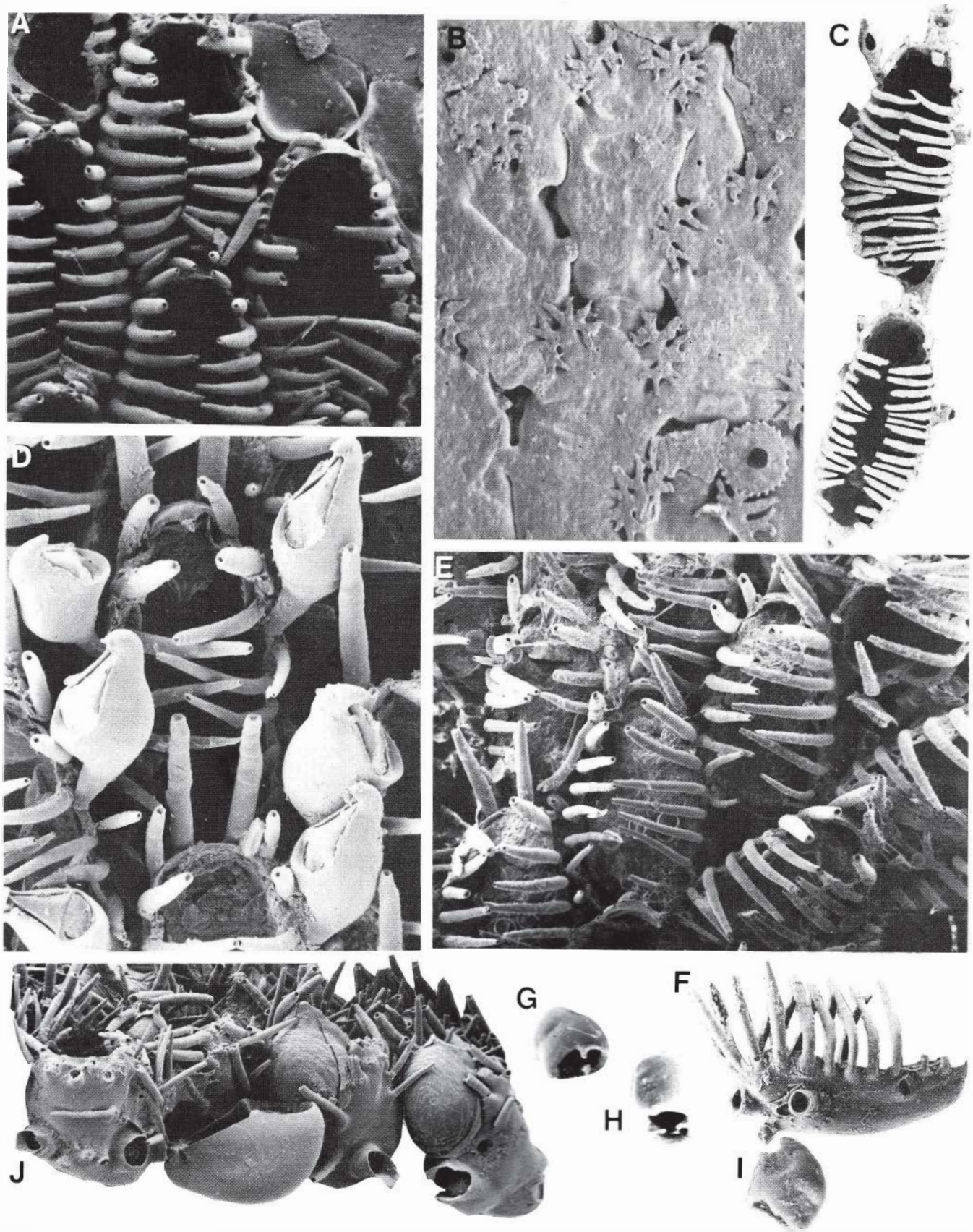

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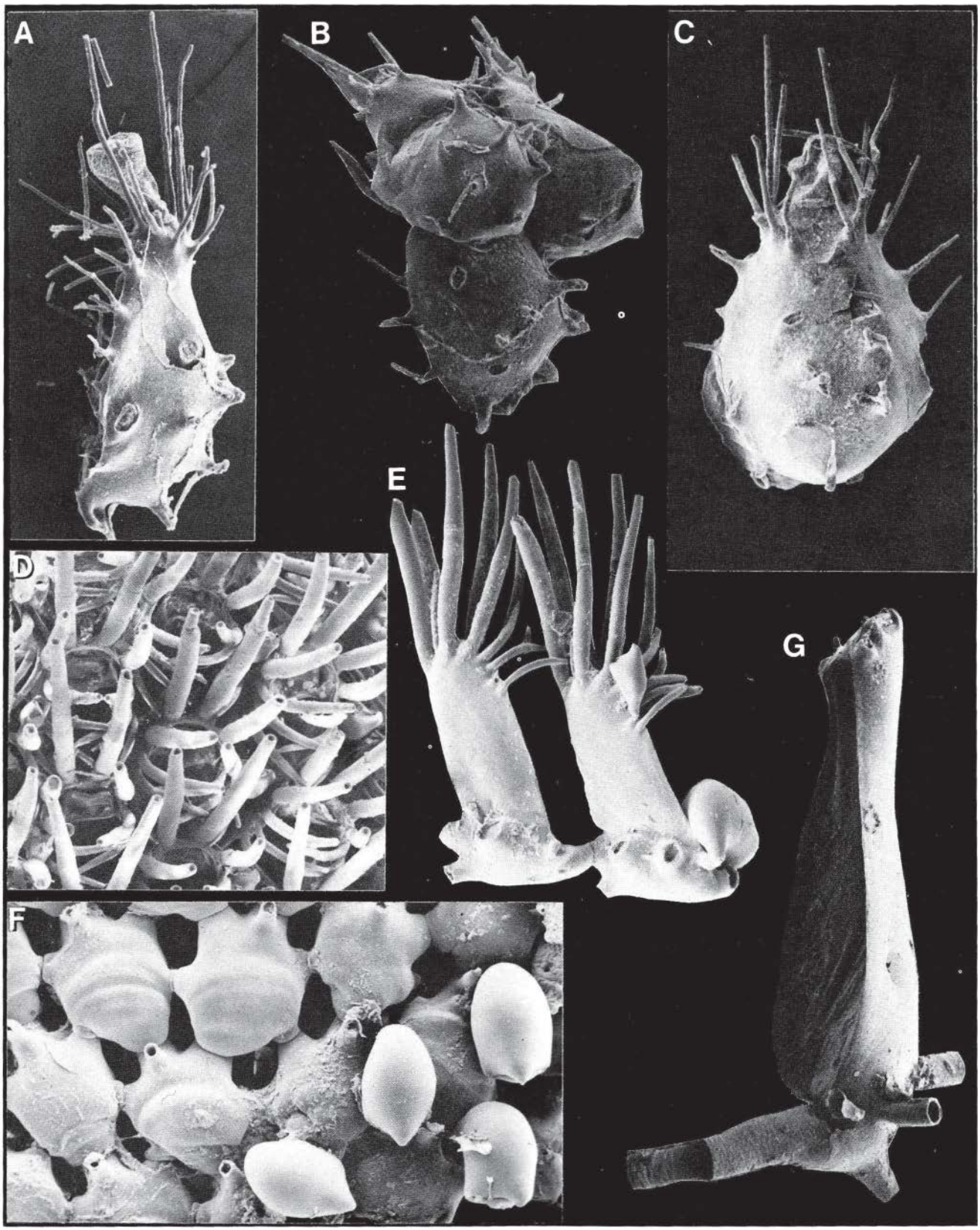

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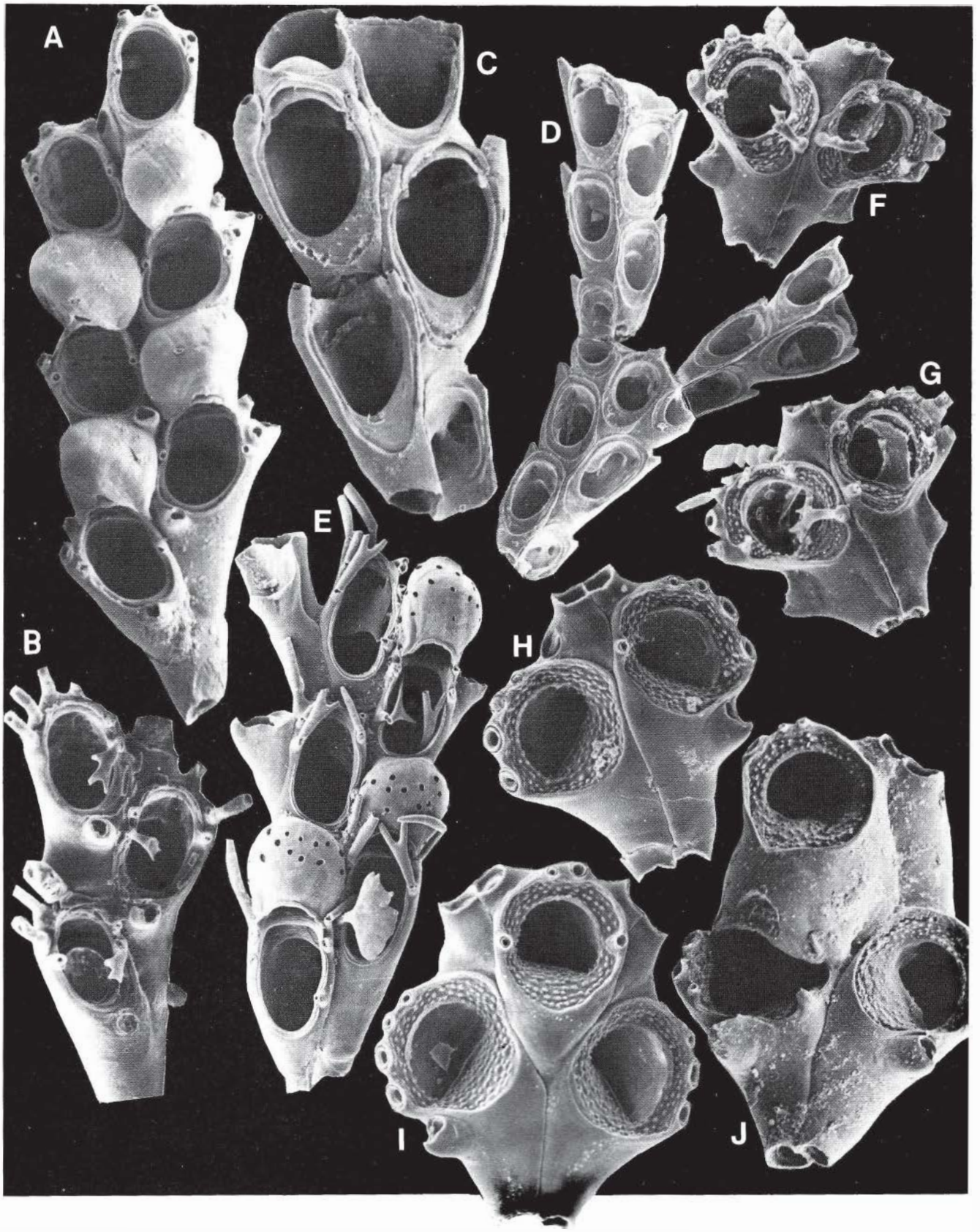

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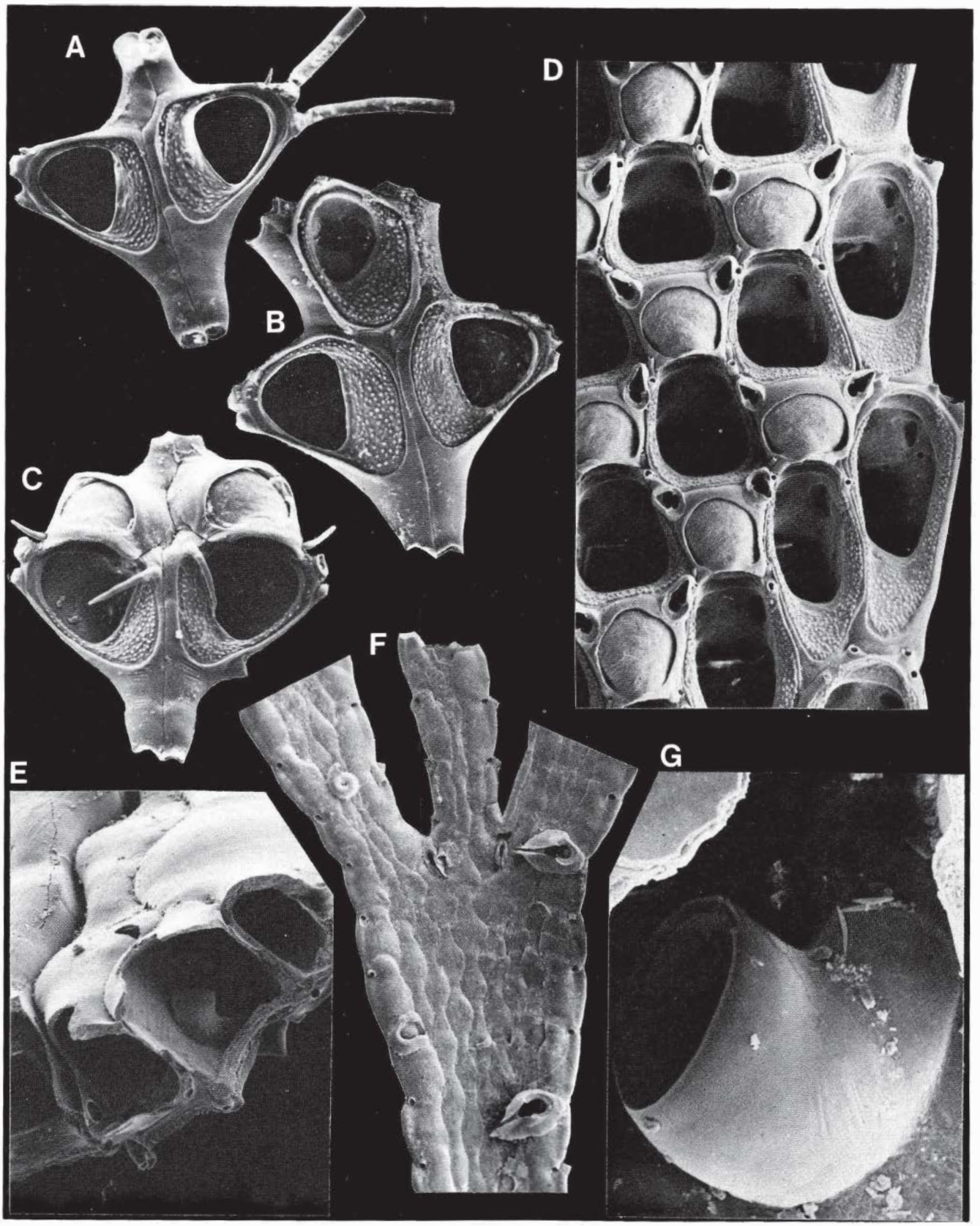

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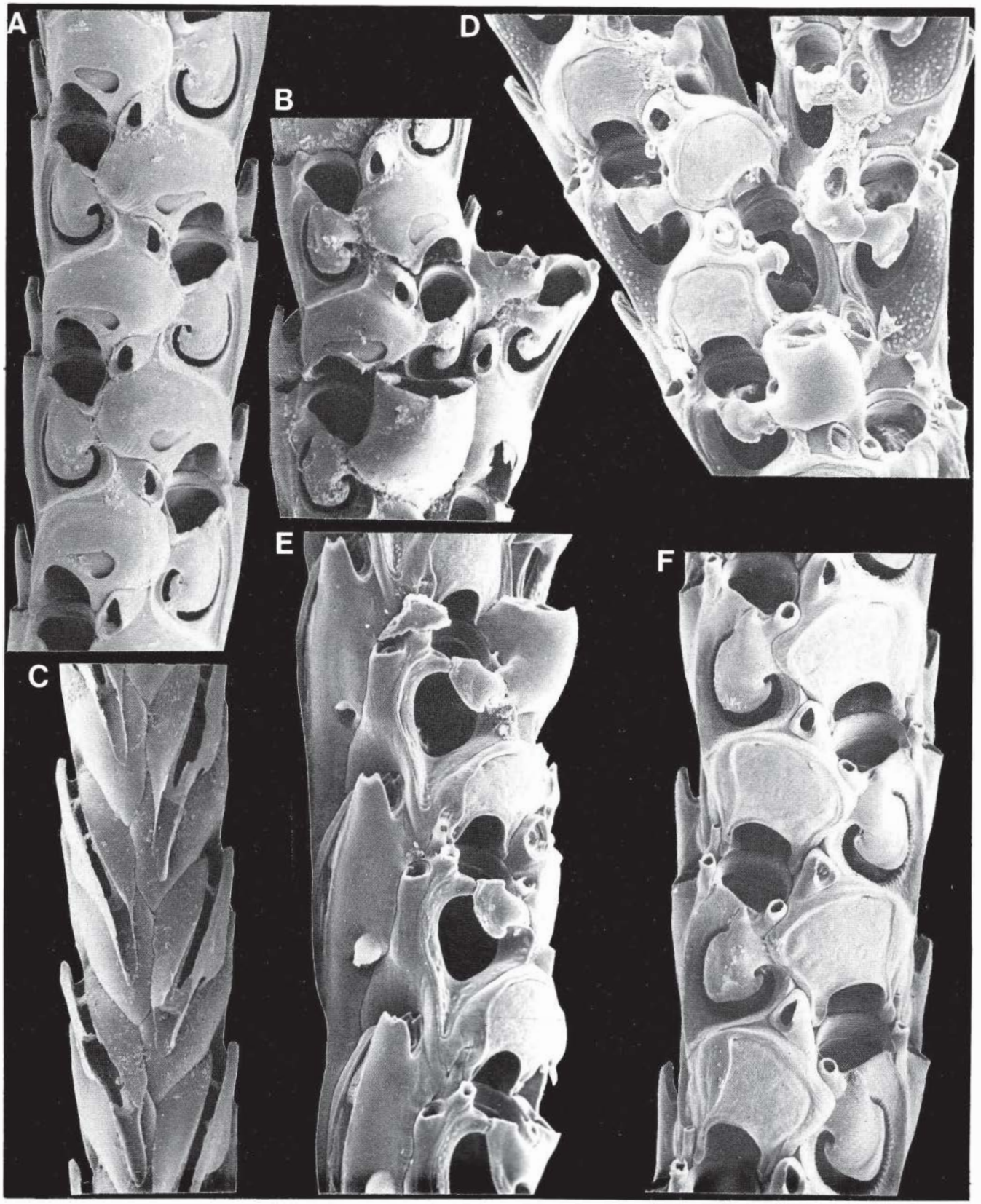

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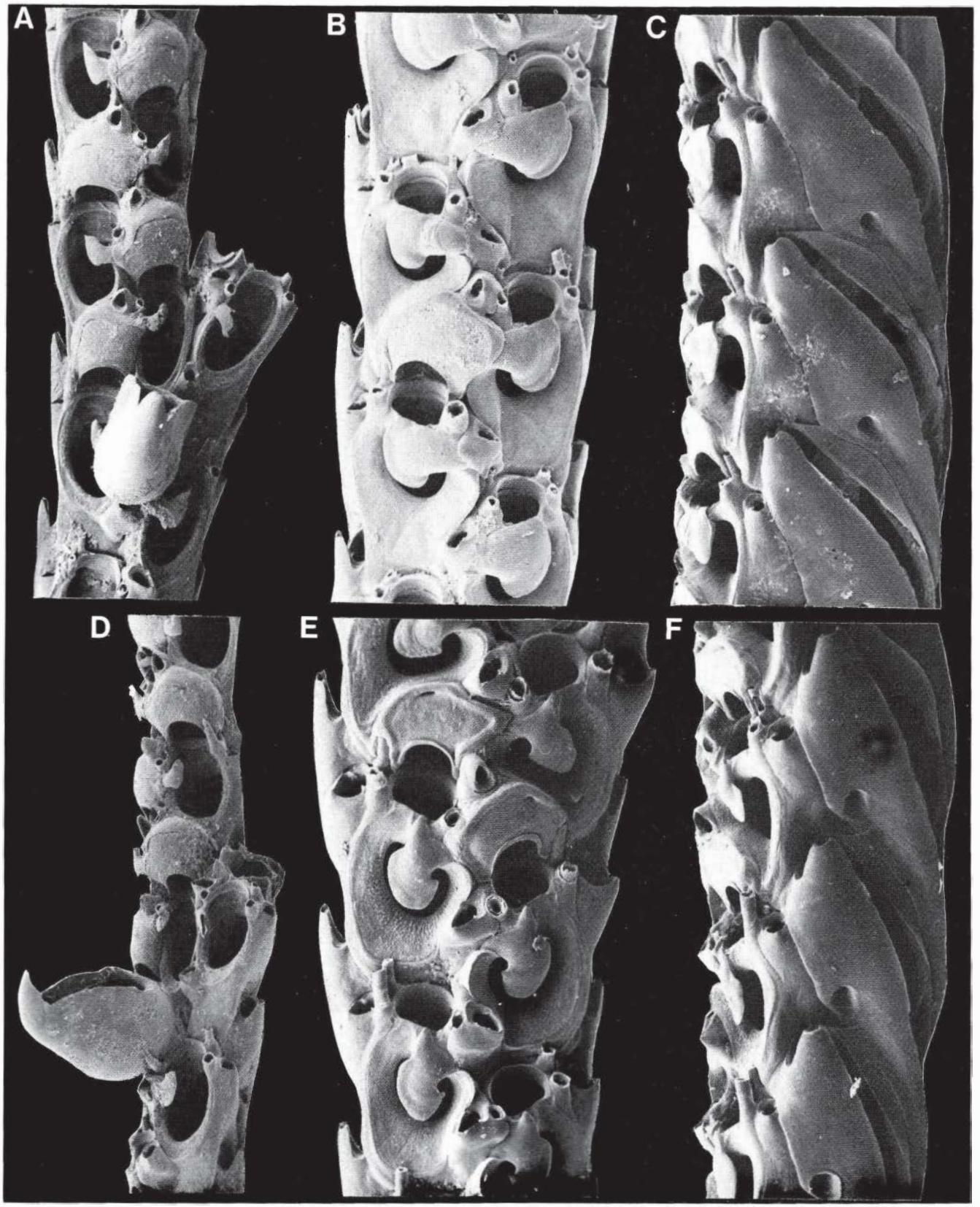

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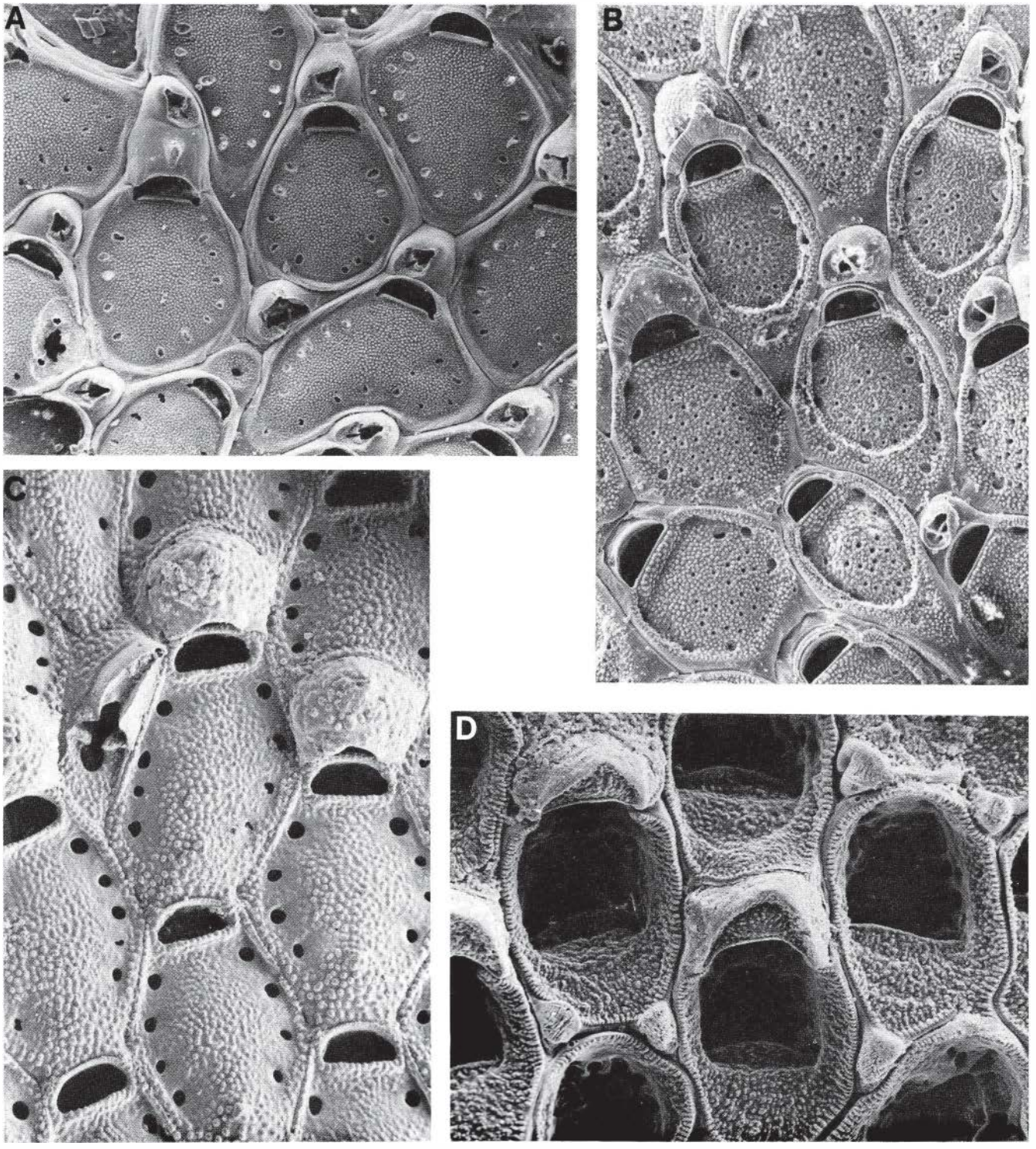

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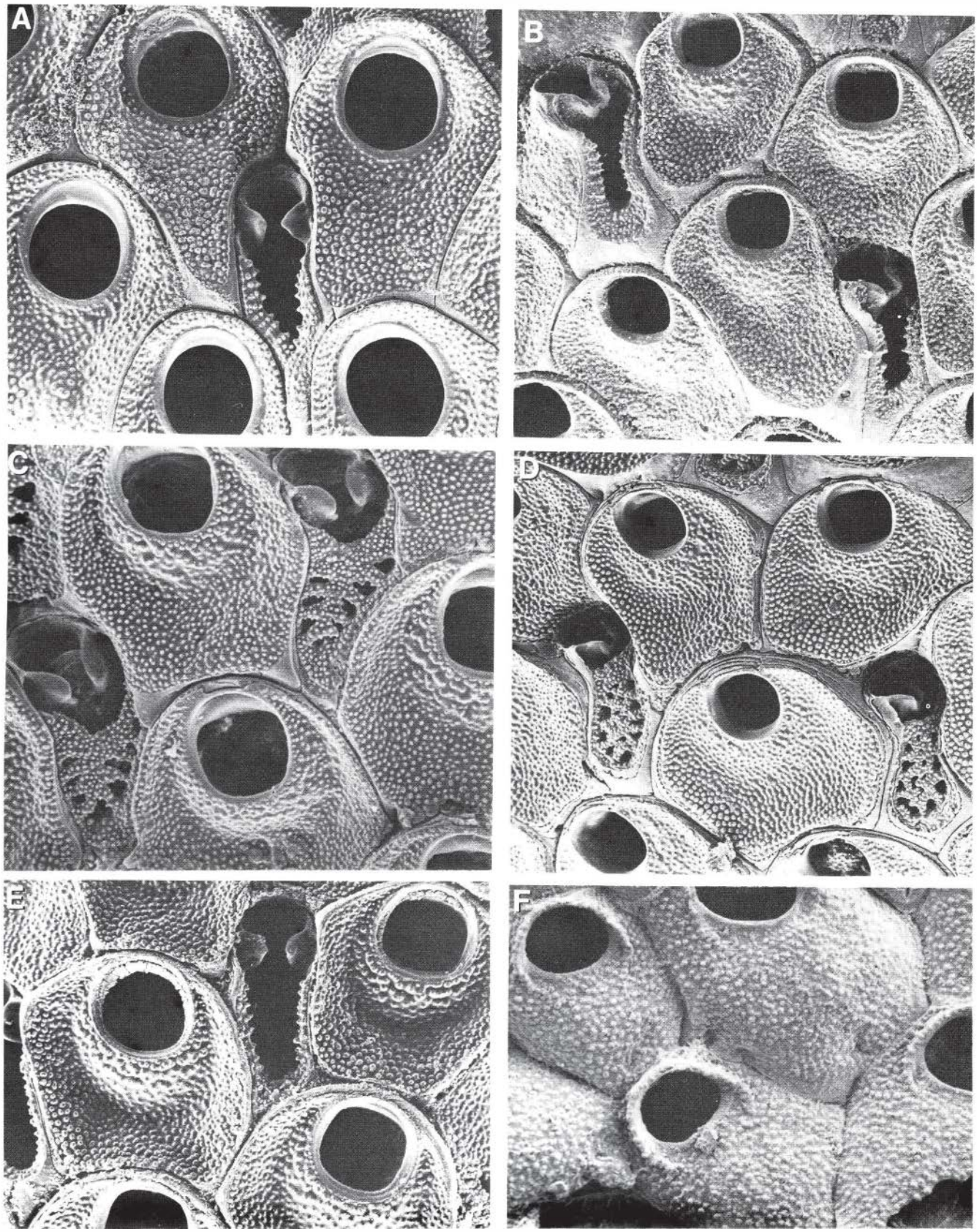

PLATE 28. A, *Otionella symmetrica* Cook & Chimonides (Stn S392). B. *Otionella proberti* Cook & Chimonides (Stn B616). C, *Otionella squamosa* (Tenison-Woods) (Stn D338, 41°22.5′S, 174°50.5′E, 31 m). D. *Otionella affinis* Cook & Chimonides (Stn Q702). E, *Otionella zelandica* Cook & Chimonides (Stn B261). F, cf. *Aspidostoma* sp. (Stn E796).

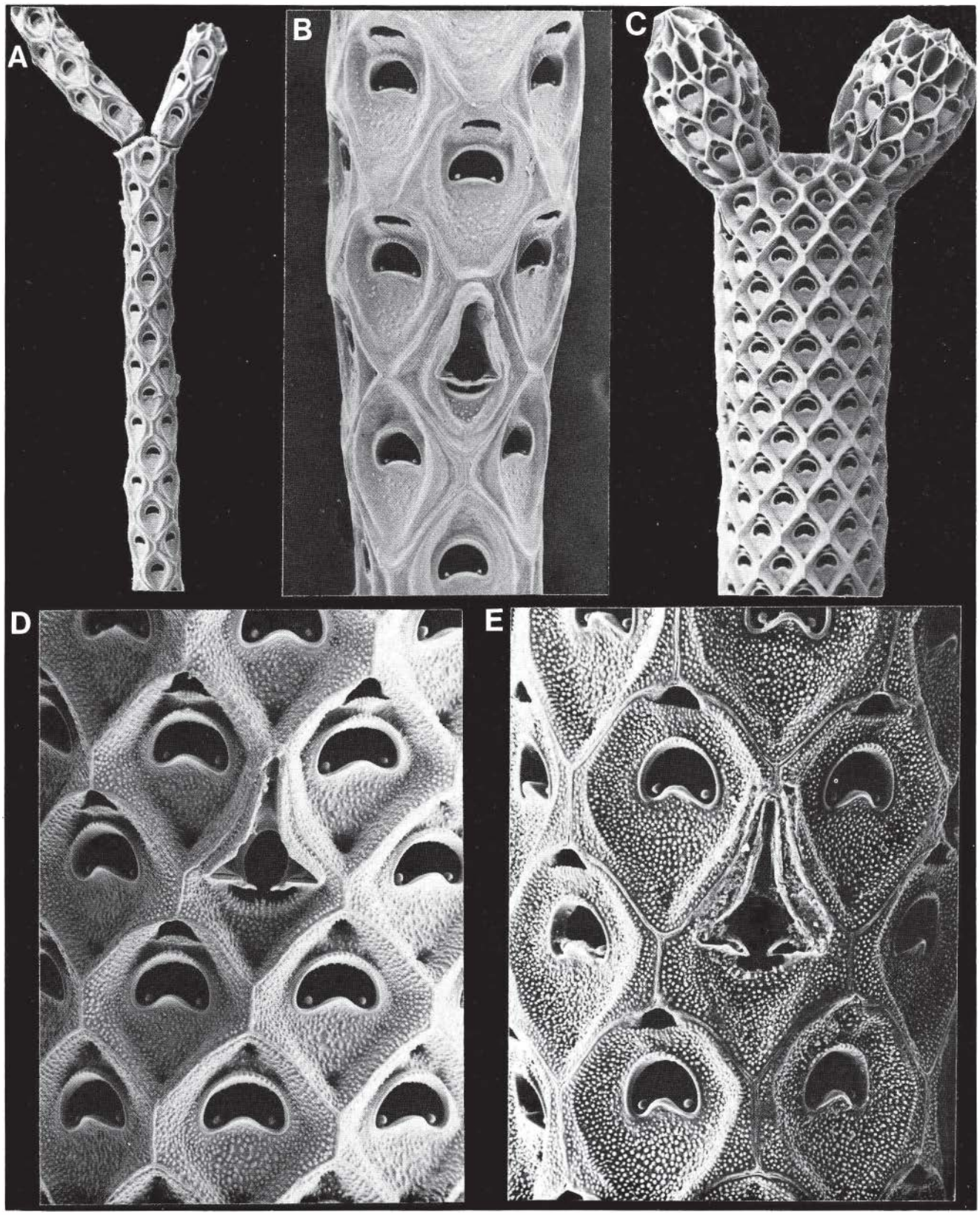

PLATE 29. A, B, *Cellaria tenuirostris* (Busk) (Stn M778). C–E, *Cellaria immersa* (Tenison-Woods) (C, D, Stn M778; E, Stn U228, 42°27.2′S, 173°42.6′E). (A and C, and B and D are at the same scales respectively.)

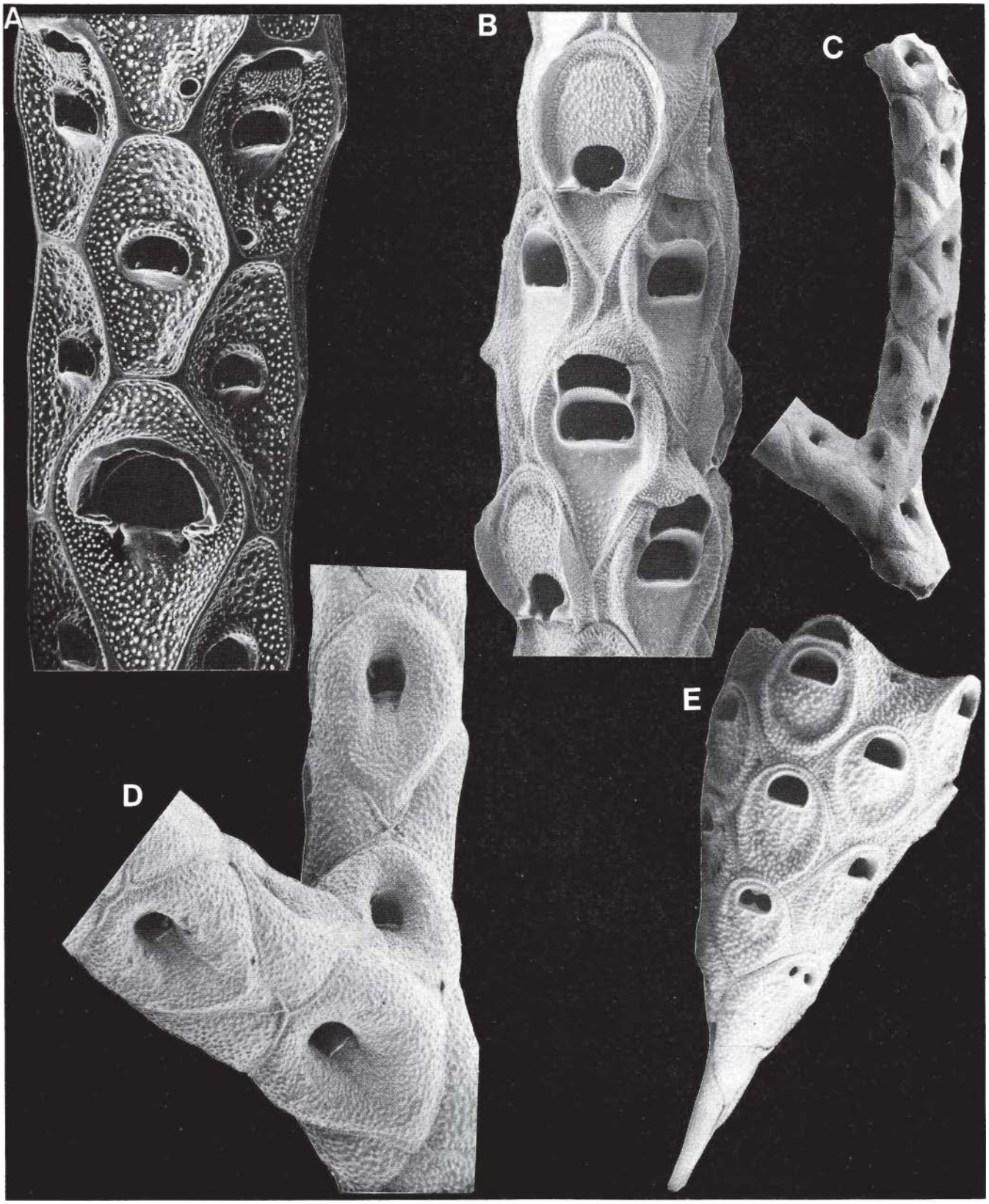

PLATE 30. A, *Cellaria hirsuta* (MacGillivray) (drift, Wainuiomata River mouth). B. *Cellaria magnimandibulata* n.sp. (Stn P927). C, D, *Cryptostomaria* cf. *crassatina* Canu & Bassler (Stn E821). E. *Euginoma conica* n.sp. (Stn P937).

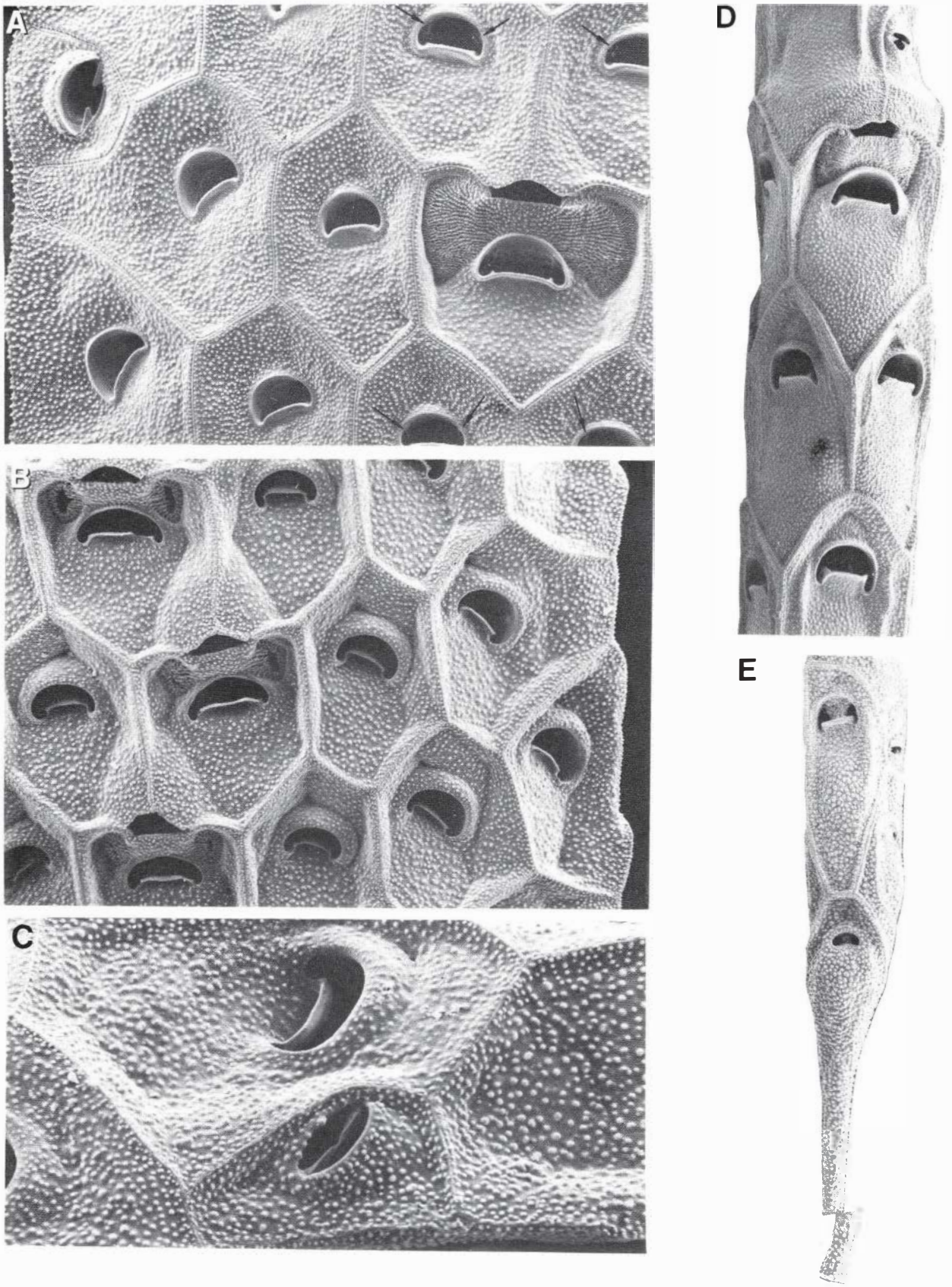

PLATE 31. A, *Melicerita angustiloba* Tenison-Woods (Stn D222). B, C, *Melicerita chathamensis* Uttley & Bullivant (Stn C753). D, E, *Melicerita ejuncida* n.sp. (Stn P927).