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

by

D. P. GORDON

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

by

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ABSTRACT

Ascophorine bryozoans from the western South Island continental shelf and slope, from the intertidal to abyssal depths, have been studied and 180 species recorded of which 58 are new. The new species are distributed among the genera *Cribralaria, Orthoscuticella, Alleresch*a, *Exochella, Celleporaria, Didymosella, Hippoporina, Hippothyris, Buffonellodes, Chiastosella, Cribellopora, Nimba, Phonicosia, Schizomavella, Schizoporella, Dittomesia, Julianca, Prenantia, Schizosmittina, Smittina, Riscodopa, Fenestrulina, Buffonellaria, Celleporina, Galeopsis, Osthimosia, Chevron, Reteporella, Reteporellina, Rhynchozoon, Jugescharellina, Batopora, Coneschar*ellina, *Cruceschar*ellina, and *Trochosodon*. There are eight new genera: *Mobunula* (Umbonulidae), *Allerescha* (Exochellidae), *Dittomesia* and *Julianca* (Smittinidae), *Riscodopa* (Petraliellidae), *Chronocerastes* (Microporellidae), *Chevron* (Phidoloporidae), and *Jugescharellina* (Lekythoporidae).

The suborder Ascophorina is maintained as a formal taxon, with four component infraorders reflecting predominant modes of frontal-shield formation in each, i.e., Cribriomorpha, Hippothoomorpha, Umbonulomorpha, and Lepraliomorpha, each containing one or more superfamilies. The Adeonoidea (Umbonulomorpha) is established as a new superfamily.

The families Escharellidae (included here among the Exochellidae) and Celleporariidae have been found to be umbonuloid, based on the type species of the type genera. Phidoloporidae is shown to be the correct family name for "sertellid" or "reteporid" bryozoans. A long-overlooked genus, *Odontoporella* Héjjas, 1894, is stabilised by type fixation, thereby becoming an objective senior synonym of *Hippopodinella* Barroso, 1924.

Keywords: Bryozoa, Gymnolaemata, Cheilostomida, Ascophorina, classification, distribution, new species, marine fauna, New Zealand.

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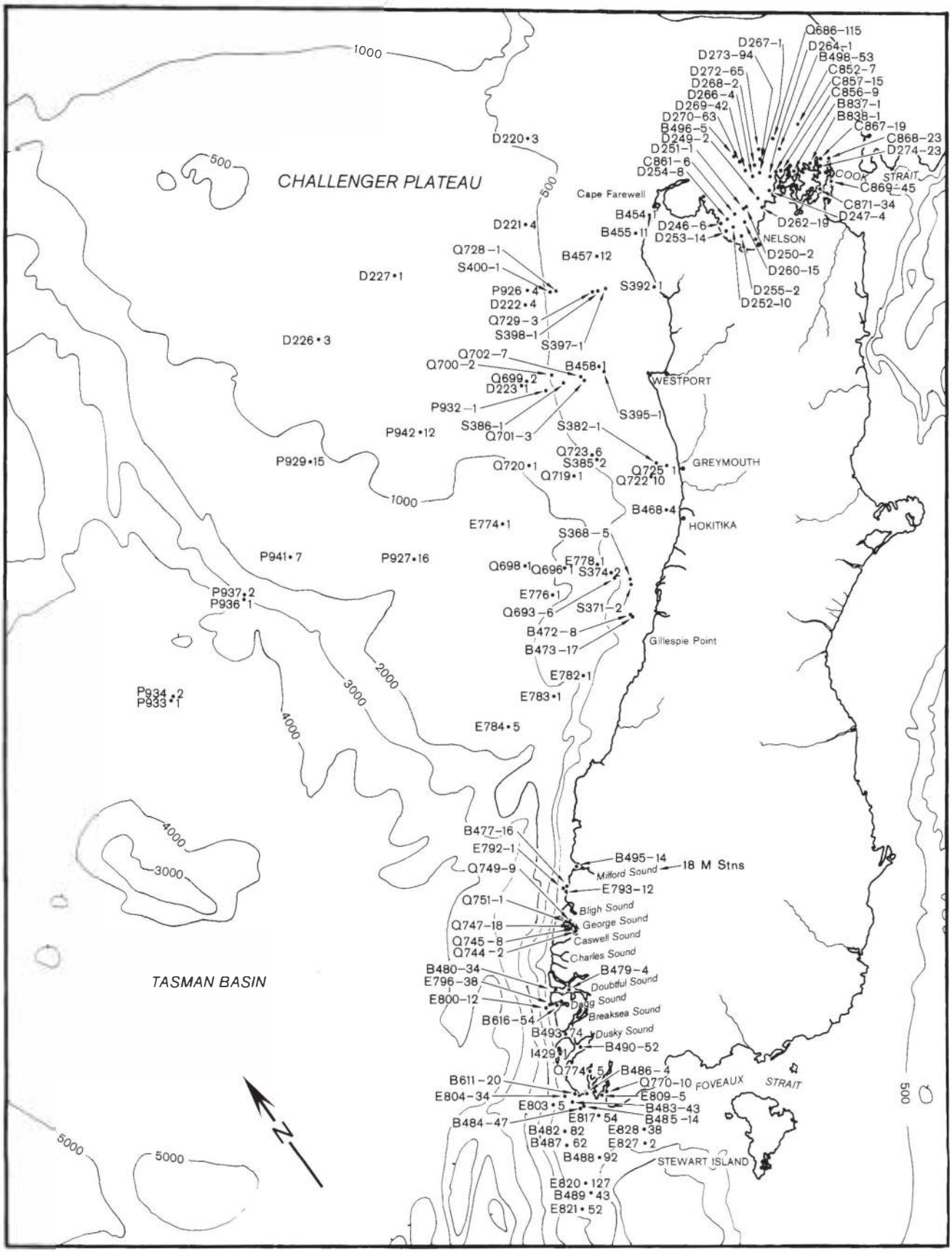

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INTRODUCTION

This memoir deals with the balance of gymnolaemate species not covered by my previous memoir (Gordon 1986) on the western South Island bryozoan fauna. This earlier work describes the environmental setting of the 141 New Zealand Oceanographic Institute stations (Fig. 1). The sampling methods and station data are reproduced here.

The previous memoir (Gordon 1986) dealt with 13 species of Ctenostomida and 132 species of "anascan" Cheilostomida. The present memoir deals with 181 species of ascophorine cheilostomes (including one found only in the Bounty Trough), making a total of 325 gymnolaemate bryozoan species from the western South Island continental shelf and slope. This compares with 227 gymnolaemates from a much smaller area of seafloor sampled along the Kermadec Ridge (Gordon 1984, 1985).

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-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

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.

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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°43.0'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 spp.

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.

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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 (16-17October 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 spp. (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 rockface 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

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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, I70°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.

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LIST OF SPECIES DESCRIBED

Class GYMNOLAEMATA
Order CHEILOSTOMIDA
Suborder ASCOPHORINA
Infraorder CRIBRIOMORPHA
Superfamily CRIBRILINOIDEA
Family CRIBRILINIDAE

Cribralaria austrinsulensis n.sp.
Figularia carinata (Waters)
Figularia mernae Uttley & Bullivant

Family EUTHYROIDIDAE

Euthyroides episcopalis (Busk)
Euthyroides jellyae Levinsen

Superfamily CATENICELLOIDEA
Family EURYSTOMELLIDAE

Eurystomella foraminigera (Hincks)

Family CATENICELLIDAE

Catenicella elegans Busk
Claviporella aurita (Busk)
Claviporella pulchra MacGillivray
Cornuticella taurina (Busk)
Cornuticella trapezoidea Powell
Costaticella hastata (Busk)
Costaticella solida Levinsen
Cribricellina (Paracribricellina) cribraria (Busk)
Orthoscuticella fissurata (Levinsen)
Orthoscuticella innominata n.sp.
Orthoscuticella margaritacea (Busk)
Orthoscuticella ventricosa (Busk)
Pterocella scutella (Hutton)
Scalicella crystallina (W. Thomson)
Talivittaticella problematica (d'Hondt)

Infraorder HIPPOTHOOMORPHA
Superfamily HIPPOTHOOIDEA
Family HIPPOTHOIDAE

Celleporella (Antarctothoa) bathamae (Ryland & Gordon)
Celleporella (Antarctothoa) delta (Ryland & Gordon)
Celleporella (Antarctothoa) tongima (Ryland & Gordon)
Hippothoa divaricata pacifica Gordon
Hippothoa flagellum Manzoni
Plesiothoa australis Moyano & Gordon

Family CHORIZOPORIDAE

Chorizopora brongniartii (Audouin)

Infraorder UMBONULOMORPHA
Superfamily ARACHNOPUSIOIDEA
Family ARACHNOPUSIIDAE

Arachnopusia perforata (Mapleston e)
Arachnopusia quadralabia Uttley & Bullivant
Arachnopusia unicornis (Hutton)

Superfamily UMBONULOIDEA
Family UMBONULIDAE

Mobunula bicuspis (Hincks) n.gen

Family EXOCHELLIDAE

Allerescha dubia n.gen., n.sp
Escharella spinosissima (Hincks)
Escharoides angela (Hutton)
Escharoides excavata (MacGillivray)
Exochella armata (Hincks)
Exochella conjuncta Brown
Exochella jullieni n.sp.
Exochella levinseni n.sp.

Family SCLERODOMIDAE

Sclerodomus gracilis Gordon

Family CELLEPORARIIDAE

Celleporaria agglutinans (Hutton)
Celleporaria emancipata n.sp.

Superfamily ADEONOIDEA
Family ADEONIDAE

Adeonellopsis yarraensis (Waters)

Infraorder LEPRALIOMORPHA
Superfamily DIDYMOSELLOIDEA
Family DIDYMOSELLIDAE

Didymosella conchicola n.sp

Superfamily SCHIZOPORELLOIDEA
Family HIPPOPODINIDAE

Cosciniopsis vallata (Uttley & Bullivant)

Family HIPPOPORINIDAE

Calyptotheca immersa (Powell)
Calyptotheca janua (Livingstone)
Emballotheca waipukurensis (Waters)

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Hippoporina ozalea n.sp.
Hippoporina powelli n.sp.
Hippoporina retepora n.sp.
Hippoporina rostrata (MacGillivray)
Hippothyris ordinaria n.sp.
Metroperiella mucronifera (Powell)

Family CRYPTOSULIDAE

Cryptosula pallasiana (Moll)

Family WATERSIPORIDAE

Watersipora arcuata Banta
Watersipora subtorquata (d'Orbigny)

Family SCHIZOPORELLIDAE

Buffonellodes improvisa (Uttley & Bullivant)
Buffonellodes madrecilla n.sp.
Buffonellodes ridleyi (MacGillivray)
Buffonellodes rimosa (Jullien)
Chiastosella dissidens n.sp.
Chiastosella duplicata n.sp.
Chiastosella enigma Brown
Chiastosella exuberans n.sp.
Chiastosella umbonata n.sp.
Chiastosella watersi Stach
Cribellopora napi n.sp.
Cribellopora siri n.sp
Escharina waiparaensis Brown
Hippomenella vellicata (Hutton)
Nimba terraenovae (Powell)
Nimba verrucosa n.sp.
Phonicosia circinata (MacGillivray)
Phonicosia oviseparata (Brown)
Phonicosia styphelia n.sp.
Rogicka biserialis (Hincks)
Schizomavella aurita n.sp.
Schizomavella incurvata (Uttley & Bullivant)
Schizomavella pansa n.sp.
Schizomavella punctigera (MacGillivray)
Schizomavella trachoma n.sp.
Schizomavella virago n.sp.
Schizoporella aotearoa n.sp.

Family SMITTINIDAE

Aimulosia marsupium (MacGillivray)
Dittomesia crispa n.gen., n.sp.
Hemismittoidea hexaspinosa (Uttley & Bullivant)
Hippomonavella flexuosa (Hutton)
Julianca retia n.gen., n.sp.
Parasmittina aotea (Brown)
Parasmittina delicatula (Busk)
Prenantia dichotoma n.sp.
Prenantia firmata (Waters)
Rhamphosmittina rogickae (Brown)
Schizosmittina bicornis n.sp.
Schizosmittina cinctipora (Hincks)
Schizosmittina conjuncta (Uttley & Bullivant)
Schizosmittina melanobater n.sp.
Smittina palisada n.sp.
Smittina personata (Hincks)
Smittina purpurea (Hincks)
Smittina rosacea Powell
Smittina torques Powell
Smittoidea discoveriae Powell
Smittoidea hyalina Gordon
Smittoidea magna Gordon
Smittoidea maunganuiensis (Waters)
Smittoidea zelandiae (Brown)

Family PETRALIELLIDAE

Mucropetraliella ligulata Stach
Riscodopa parva n.gen., n.sp

Family CREPIDACANTHIDAE

Crepidacantha crinispina Levinsen
Crepidacantha kirkpatricki Brown

Family MICROPORELLIDAE

Calloporina angustipora (Hincks)
Chronocerastes otakauensis (Brown) n.gen.
Fenestrulina disjuncta (Hincks)
Fenestrulina gelasinoides Gordon
Fenestrulina incompta Gordon
Fenestrulina multicava n.sp.
Fenestrulina personata (MacGillivray)
Fenestrulina reticulata Powell
Fenestrulina specca n.sp.
Fenestrulina thyreophora (Busk)
Microporella agonistes Gordon
Microporella diademata (Lamouroux)
Microporella discors Uttley & Bullivant
Microporella intermedia Livingstone
Microporella orientalis Harmer
Microporella speculum Brown

Family CALWELLIIDAE

Calwellia gracilis Maplestone
Malakosaria sinclairii (Busk)
Onchoporoides moseleyi (Busk)

Family MARGARETTIDAE

Margaretta barbata, (Lamarck)

Superfamily CELLEPOROIDEA
Family HIPPOPORIDRIDAE

Odontoporella adpressa (Busk)

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Description of species

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

Order CHEILOSTOMIDA Busk, 1852

Suborder ASCOPHORINA Levinsen, 1909

Infraorder CRIBRIOMORPHA Harmer 1926

Ascophorines with the frontal membrane typically arched over by spinose ribs (costae), which range from many to few depending on the development of an associated gymnocyst, or which may be lacking altogether and replaced wholly by a gymnocyst and/or cryptocystal elements; or the spines and/or the membrane overlain by additional spines or shield layers.

REMARKS: This infraorder, using the name established by Lang (1916, 1921, 1922) [with the ending formalised by Harmer (1926)] is erected here to include three fundamentally spinocystal superfamilies — Cribrilinoidea, Catenicelloidea, and Bifaxarioidea.

Superfamily CRIBRILINOIDEA Hincks, 1879

Family CRIBRILINIDAE Hincks, 1879

Cribralaria Silén, 1941

Colony encrusting. Frontal wall composed entirely of a costal shield; no gymnocyst. Costal spines branched, with intercostal lacunae in rows or scattered; lumen pores present or absent. Oral tubercles present or absent. Avicularia interzooidal, distal to zooids. Ovicell immersed in avicularian chamber. Basal pore-chambers lacking.

TYPE SPECIES: *Cribralaria curvirostris* Silén, 1941.

Cribralaria austrinsulensis n.sp. (Plate 2, A)

MATERIAL EXAMINED: NZOI Stns B487, B488, B493, D270, E817, E821, E828, Q686; also holotype of *Cribralaria curvirostris* Silén, type no. 387, Bryozoa, Zoological Museum, University of Uppsala, Sweden.

DISTRIBUTION: Western Cook Strait, Fiordland, western approaches to Foveaux Strait, 62-549 m.

DESCRIPTION: Colony encrusting. Zooids 0.47-0.64 x 0.41-0.53 mm, with 3-4 pairs of flattened, generally branching costal spines; these with 1-2 pairs of intercostal lacunae; along the mid-line the tips of the costae fuse incompletely, exposing the costal lumina. Orifice rounded distally, somewhat squared or irregular proximally, with a pair of low oral tubercles. An avicularium distal to most zooids, with distal condyles, the acute rostrum directed obliquely distally. Ovicells not identified.

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

PARATYPE: NZ01, type number P-703, from the same locality as the holotype .

TYPE LOCALITY: NZOI Stn B493, 45°34.4'S, 166°39.1'E, Breaksea Sound, Fiordland, 76-80 m.

REMARKS: Silén's (1941:123) illustrations of the type species of *Cribralaria* are misleading. As depicted by him, the intercostal lacunae appear to be intracostal, which they are not. Nor is there a proximal "round pelma" in each costa. A micrograph of this little-known species is included here (Pl. 2,B) for comparison with the New Zealand species.

Apart from *C. austrinsulensis*, the only other described species of *Cribralaria* in New Zealand waters is *C. fragilis* Powell from the Three Kings Islands. It is distinguished by more numerous costal lacunae, a pair of forked oral tubercles, and avicularia lacking condyles.

The specific name is a compound derived from the Latin words *australis*, southern, and *insula*, an island, referring to New Zealand's South Island.

Figularia Jullien 1886.

TYPE SPECIES: *Lepralia figularis* Johnston, 1847

Figularia mernae Uttley & Bullivant, 1972 (Plate 2, C, D)

Figularia mernae Uttley & Bullivant, 1972: 16.

MATERIAL EXAMINED: NZOI Stns B482, B483, B484, B487, B488, B489, B490, B493, B498, B616, D270, D273, E796, E804, E817, E820, E821, E828, Q686.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Chatham Rise, Fiordland, western approaches to Foveaux Strait; 62-549 m.

DESCRIPTION: Colony encrusting. Zooids 0.43-0.66 x 0.23-0.53 mm, with a convex costal shield generally of eight opposing pairs of spines; these each with a lumen pore adjacent to the mid-line, which may be slightly carinate. Shield bordered by a well-developed gymnocyst. Orifice 0.10-0.15 mm wide, with a distinct anter and poster marked by condyles. No oral spines. Avicularium vicarious, with elongate rostrum and complete pivot bar; combined length of mandibular and postmandibular areas 0.28-0.43 mm. Ovicell prominent, with a median suture and well-developed ectooecial fenestrae; the orifice generally a little wider than autozooidal orifices.

REMARKS: A single colony from Stn E821 (Pl. 2,D), evidently of this species, is most unusual, and is reminiscent of *Euthyroides episcopalis* (Busk). It comprises an en-

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Inovicellina and Scrupariina — surely the stems to which one adds the suffixes are Inovicell– and Scrupari–. Since Silén (1941) introduced Scrupariina with the informal rank of Division [following Levinsen (1902, 1909)], it was already a suprafamilial taxon. It seems unnecessary to further translate Scrupariina to Scrupariinina for, by that reasoning, Division Cribrimorpha (*see* Harmer 1926) would have to be rendered Cribrimorphomorpha if made an infraorder! Also Cryptocystidomorpha is more correctly rendered Cryptocystomorpha. Silén (1942) used Cryptocyst- as the stem and -idea as the suffix.

In recognising the cribrimorphs as an infraordinal taxon I follow Levinsen (1902) (who introduced the term Acanthostega — Acanthostegomorpha could be used but the Code has no rulings on the priority of taxa higher than family rank and Acanthostega has fallen into disuse), Lang (1916), Harmer (1926), Silén (1941, 1942) and others who used the term Cribrimorphs or Cribrimorpha. Nevertheless, the group is almost certainly heterogeneous in terms of frontal-shield construction [Moyano (1984) has described the frontal shield of *Bellulopora* as umbonuloid, for example] and the concept of this group, especially of the core family Cribrilinidae, is bound to change. Presently, I would include in the infraorder Cribriomorpha the superfamilies Cribrilinoidea, Catenicelloidea, and Bifaxarioidea. The latter two superfamilies are conceptually linked with the Cribrilinoidea through *Costaticella* (Silén 1942; Banta and Wass 1979; Gordon 1984) and *Bifaxaria* (Gordon 1988), respectively.

The infraorder Umbonulomorpha [cf. Gymnocystidea (Silén 1942); Ascophora Imperfecta (Harmer 1957)] is here taken to include the superfamilies Arachnopusioidea, Umbonuloidea, and Adeonoidea nov.

The infraorder Hippothoomorpha is established for bryozoans with a gymnocystal type of ascophoran frontal shield. It includes a single superfamily, Hippothooidea. [Another type of gymnocystal frontal shield, not incorporating a balloon-like ascus but analogous to the umbonuloid overarching of a true frontal membrane (but lacking a hypostegal coelom), is suspected in the enigmatic family Pseudolepraliidae (Silén 1942). As Sandberg (1977) has pointed out, the frontal shield of *Pseudolepralia* may represent a novel arrangement that coincides with Silén's (1942) structural concept of Gymnocystidea (the only genus, perhaps, to do so). *Pseudolepralia* may therefore be the basis of a new infraordinal taxon, when sufficiently studied, among the Neocheilostomina.]

The infraorder Lepraliomorpha includes the balance of ascophoran superfamilies, with a cryptocystidean (lepralioid — *see* Harmer 1902) type of frontal-shield development (not to be confused with the "anascan" infraorder Cryptocystidomorpha!).

Table 1. Higher-level classification of the bryozoan order Cheilostomida

According to d'Hondt (1985)	Scheme tentatively adopted here *
Subclass Cheilostomona	Order Cheilostomida
Order Protocheilostomida	Suborder Protocheilostomina
Order Eucheilostomida	
Suborder Inovicellatina	Suborder Inovicellina
Suborder Scrupariinina	Suborder Scrupariina
Suborder Malacostegina	Suborder Malacostegina
Suborder Neocheilostomina	Suborder Neocheilostomina
Infraorder Pseudomalacostegomorpha	Infraorder Pseudomalacostegomorpha
Infraorder Cellulariomorpha	Infraorder Cellulariomorpha
Infraorder Cryptocystidomorpha	Infraorder Cryptocystomorpha
Infraorder Ascophoromorpha	Suborder Ascophorina
	Infraorder Cribriomorpha
	Infraorder Hippothoomorpha
	Infraorder Umbonulomorpha
	Infraorder Lepraliomorpha

* Voigt (in press) has pointed out the lack of clear boundaries between some of the neocheilostome taxa.

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Cribralaria Silén, 1941

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Cribralaria austrinsulensis n.sp. (Plate 2, A)

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DISTRIBUTION: Western Cook Strait, Fiordland, western approaches to Foveaux Strait, 62-549 m.

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Figularia mernae Uttley & Bullivant, 1972 (Plate 2, C, D)

Figularia mernae Uttley & Bullivant, 1972: 16.

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DESCRIPTION: Colony encrusting. Zooids 0.43-0.66 x 0.23-0.53 mm, with a convex costal shield generally of eight opposing pairs of spines; these each with a lumen pore adjacent to the mid-line, which may be slightly carinate. Shield bordered by a well-developed gymnocyst. Orifice 0.10-0.15 mm wide, with a distinct anter and poster marked by condyles. No oral spines. Avicularium vicarious, with elongate rostrum and complete pivot bar; combined length of mandibular and postmandibular areas 0.28-0.43 mm. Ovicell prominent, with a median suture and well-developed ectooecial fenestrae; the orifice generally a little wider than autozooidal orifices.

REMARKS: A single colony from Stn E821 (Pl. 2,D), evidently of this species, is most unusual, and is reminiscent of *Euthyroides episcopalis* (Busk). It comprises an en-

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crusting portion of autozooids and avicularia and an erect bilamellar lobe. The lobe arises from 1-2 encrusting zooids whose frontal walls evidently grow outwards. The basal zooids of the lobe are elongated and comprise two back-to-back adjacent pairs. Most of the zooids in this colony have their thin frontal shields damaged, especially in the area of the costae. The overall dimensions of both the autozooids and avicularia are the same as in typical colonies of *F. mernae* but the costal shield is much reduced, with only 3-5 pairs of costae with lumen pores; the orifice is also wider, on average 0.15-0.16 mm. There are no ovicells. The resemblance to *Euthyroides* is seen not only in the erect growth and the extensive gymnocyst but also in the extent of the compensation space. In *Figularia mernae* the frontal membrane extends not only under the costal shield but under the gymnocyst as well (Pl. 1,D) [cf. *Figularia fissa* (Hincks) (Harmer 1926: 472)]: in *Euthyroides episcopalis* there is a reduced costal shield in female zooids, typically comprising five spines, 1-3 of which have lumen pores; in autozooids the shield is further reduced, to just a pair of spines defining the proximal rim of the orifice or sometimes with additional vestigial spines. In both kinds of zooids the compensation sac extends widely under the costal area and gymnocyst. By comparison with *Euthyroides* and with the catenicellids *Costaticella hastata* (Busk) and *C. solida* (Levinsen) (*see* Banta and Wass 1979), the post-costal compensation space in *Figularia mernae* appears to be a lepralioid ascus.

Figularia carinata (Waters)

Figularia carinata Waters, 1923: 569.
Figularia carinata: Brown 1952: 185; Gordon 1984: 61 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns C867, D272, D273, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Cook Strait, Foveaux Strait; 35-443 m

Family EUTHYROIDIDAE Levinsen, 1909

Colony encrusting or erect. Zooids with a gymnocystal frontal wall and a costal shield of spines generally with lumen pores; or the shield vestigial, comprising only the proximal rim of the orifice. No oral spines. Avicularium vicarious. Ovicell bifenestrate.

REMARKS: In my Kermadec Ridge memoir (Gordon 1984: 65) I hinted at the inclusion of the Euthyroididae in the Catenicelloidea. The nature of the frontal wall, the well-developed to vestigial costal shield, and the lack of articulated oral spines are features shared by the other families which I included in this superfamily, viz., the Eurystomellidae, Catenicellidae, and Ditaxiporinidae. On the other hand, there are even closer similarities to *Figularia* in the Cribrilinidae as mentioned above. For this reason I include the Euthyroididae in the Cribrilinoidea. Harmer (1902: 283; 1926: 472) and Levinsen also remarked on the morphological agreement between *Figularia* and *Euthyroides*.

Euthyroides Harmer, 1902

Colony erect, unilamellar. Zooids with gymnocystal frontal wall and a vestigial costal shield comprising just the proximal rim of the orifice or, sometimes in female zooids, up to six costae, some with lumen pores. Avicularium vicarious. Ovicell bifenestrate.

TYPE SPECIES: *Carbasea episcopalis* Busk, 1852

Euthyroides episcopalis (Busk) (Plates 1, A; 3, A,B)

Carbasea episcopalis Busk, 1852a: 52; MacGillivray 1869: 145; Hutton 1873: 94; Hutton 1880: 187; MacGillivray 1880: 28.
Euthyris episcopalis: Hincks 1882: 164; MacGillivray 1887a: 204 .
Flustra episcopalis: Hutton 1891: 104; Hamilton 1898: 194; Jelly 1889: 99; Hutton 1904: 295.
Euthyroides episcopalis: Harmer 1902: 280: Levinsen 1909: 265; Canu & Bassler 1929: 246; Livingstone 1929: 73 Macken 1958; 104; Uttley & Bullivant 1972: 31.

MATERIAL EXAMINED: NZOI Stns B482, B493, B616; also Stn S237, 45°56.5'S, 166°39.0'E, New Resolution Fiord, Edwardson Sound, 30 m depth; and the Cook Strait power cable off Oteranga Bay (coll. K.R. Grange, 28 April 1982, 40 m depth).

DISTRIBUTION: Napier, Wanganui, Cook Strait, Chatham Rise, Fiordland, Puysegur Bank, Stewart Island; 30-134 m. Also Victoria, Bass Strait.

DESCRIPTION: Colony erect, to 10 cm high, anchored by rhizoids; unilamellar, branching dichotomously, the branches from about 1.2 mm wide proximally to 2.4 mm at bifurcations. Zooids 0.64-1.00 x 0.19-0.32 mm, smooth, with a vestigial shield of 2-4 costae, mostly fused, with tiny foramina or sutures between. Orifice with broad shallow sinus, the centre of which is sometimes marked by a notch at the suture between the first pair of vestigial costae. Female zooids with 2-6 costae, some of which have a lumen pore. Ovicell large, prominent, with a median suture line and a conspicuous pair of ectooecial fenestrae. No avicularia. Down the margins of each branch run tubular kenozooids.

REMARKS: The frontal wall in marginal zooids, with just a few spines converging towards the centre of the reduced shield, is very similar to that of *Parafigularia magellanica* (Calvet) (Moyano 1984).

Euthyroides episcopalis is generally found growing in clumps with members of the Catenicellidae. Colonies from the Cook Strait cable were also found growing with *E. jellyae*, which is distinguished by its dark non-branching fan-like fronds.

Euthyroides jellyae Levinsen (Plates 1, B; 3, C, D)

Euthyroides jellyae Levinsen, 1909: 264; Canu & Bassler, 1929: 246: Powell 1967: 247; Uttley & Bullivant 1972: 30.

MATERIAL EXAMINED: Colonies from the Chetwode Islands, Pelorus Sound (coll. J. McCallum, March 1984);

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also Cook Strait power cable off Oteranga Bay (coll. K.R. Grange, 28 April 1982, 40 m depth). NMNZ: Specimen Pz.155 and unnumbered specimen from the Poor Knights Island.

DISTRIBUTION: Three Kings Islands, Poor Knights Islands, Cook Strait, Chatham Rise; 40-73 m. Also (?) northern Australia.

DESCRIPTION: Colony erect, to 56 mm high, anchored by rhizoids; unilamellar, forming broad flabellate fronds. Zooids 0.66-1.00 x 0.19-0.25 mm, smooth, with a pair of raised costae forming the proximal rim of the orifice, each with a terminal lumen pore. Avicularia vicarious, occurring at the proximal ends of new zooidal rows though new rows may begin without an avicularium being present. Female zooids with slightly wider orifice; the costae much elevated, the terminal lumen pores presented frontally; a pair of large ectooecial fenestrae.

REMARKS: Powell (1967) questioned Levinsen's (1909) attribution of his material to northern Australia.

Superfamily CATENICELLOIDEA Busk, 1852

Family EURYSTOMELLIDAE Levinsen, 1909

Eurystomella Levinsen, 1909

TYPE SPECIES: *Lepralia foraminigera* Hincks

Eurystomella foraminigera (Hincks) (Plate 4, A-C)

Lepralia foraminigera Hincks, 1883: 200.
Eurystomella foraminigera: Levinsen 1909: 89; Cook & Chimonides 1981: 113; Gordon 1984: 65 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B483, B484, B493, B616, B867, D253, D270, D272, D273, M776, M779, M780, M783B, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Auckland and Manukau Harbours, Mount Maunganui, Napier, Cook Strait, Marlborough Sounds, Chatham Rise, Otago Peninsula, Fiordland, western approaches to Foveaux Strait; 0-35 m.

REMARKS: The frontal wall (Pl. 4, A) can be compared to that of some of the Catenicellidae. Using the terminology of Banta and Wass (1979), for example, we have, immediately proximal to the orifice, a reduced costal field of two stout 'spines' forming the proximal orificial rim. These have a suture where they meet. In some zooids is a vestigial third 'spine' proximal to the suture, with minute lacunae between the spines. Beyond the costal 'field' is an infracostal area with 2-6 infracostal windows. Within the windows is a rim of cryptocyst.

This arrangement is reminiscent of that seen in some catenicellid species but the inner side of the gymnocyst in *E. foraminigera* is topologically exterior, with planar spherulitic ultrastructure. The infracostal windows include an umbonuloid component, however, with a rim of cryptocyst and a hypostegal coelom [cf. *Scuticella plagiostoma* (Banta & Wass 1979)].

Family CATENICELLIDAE Busk, 1852

Costaticella Maplestone, 1899

Sterile internodes unizooidal or bizooidal, bizooidal at bifurcations; either type of internode producing single, terminal, fertile segments. Zooidal frontal wall with a costal field of numerous spines, each with lumen pores and lacunae between, and a series of infracostal windows at the periphery of the field. Aviculiferous distolateral processes present. Narrow pore-chamber openings at locations around the periphery of the frontal area.

TYPE SPECIES: *Catenicella lineata* MacGillivray, 1895

Costaticella hastata (Busk) (Plate 4, D-F)

[?] *Catenicella bicuspis* Gray, 1843: 293 [fide Busk 1852b: 355].
Catenicella hastata Busk, 1852b: 355; Busk 1852a: 7; MacGillivray 1869: 143; Hutton 1873: 88; MacGillivray 1879a: 19; Hutton 1880: 180; Busk 1884: 10; MacGillivray 1887a: 197; Hutton 1891: 103; Jelly 1889: 37; Harmer 1902: 309; Hutton 1904: 294.
Costicella hastata: Levinsen 1909: 236.
Costaticella hastata: Canu & Bassler 1929: 445; Livingstone 1929: 97; Powell 1967: 243 (*cum syn.*); Uttley & Bullivant 1972: 52; Wass & Yoo 1975: 810; Wass & Yoo 1976: 288; Banta & Wass 1979: 9.

MATERIAL EXAMINED: NZOI Stns B480, B482, B485, B493, B498, B616, E820, M778, M779, M789.

DISTRIBUTION: Three Kings Islands, Colville Channel, Napier, Cook Strait, Marlborough Sounds, Chatham Rise, Otago Peninsula, Fiordland, western approaches to Foveaux Strait, Stewart Island; 20-220 m. Also New South Wales, Victoria, Bass Strait, Tasmania.

DESCRIPTION: Colony erect, branching, with jointed segments of 1-2 zooids. Unizooidal segments 0.49-0.64 x 0.36-0.53 mm (not including joints), shield-shaped, with one or both distolateral corners somewhat produced or not at all. Frontal wall with a well-developed costal field of 9-10 spines, each with a lumen pore distally and a larger infracostal window proximally. Orifice D-shaped. A pair of avicularia adjacent to the orifice laterally. Fertile segment unizooidal, large, more or less egg-shaped, with a wider orifice than in autozooids; with 4-5 infracostal windows bordering a diminutive shield of five costae. A median carina with a narrow fissure, and a pair of transversely orientated ectooecial fenestrae revealing a pitted and granular/papillate endooecial surface. Distally is a bluntly forked prolongation of the ovicell.

REMARKS: The distribution of coelomic chambers and the formation of the frontal wall have been described and illustrated by Harmer (1902) and Banta and Wass (1979) respectively. The number of costal spines may

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very considerably within a colony. Banta and Wass (1979, figs 38, 39) illustrated zooids with 7-13 costae.

Costaticella gisleni Silén, 1954 bears a number of similarities to *C. hastata*, especially in the fertile segment. The autozooids of *C. gisleni*, however, have fewer (invariably five) intracostal windows and the distolateral corners are not produced. It is a little-known species.

Costaticella solida (Levinsen) (Plate 4, G-J)

Costicella solida Levinsen, 1909: 234.
Costaticella solida: Livingstone 1929: 97; Stach 1934a: 16; Banta & Wass 1979: 4; Wass & Banta 1981: 379.
Costaticella hastata: Bock 1982: 387.

MATERIAL EXAMINED: NZOI: Stn B616. DPG: Wainuiomata River mouth, drift.

DISTRIBUTION: Cook Strait, Fiordland, Stewart Island; 134 m. Also Victoria, Bass Strait, southern Australia.

DESCRIPTION: Colony erect, branching, with jointed segments of 1-2 zooids. Unizooidal segments 0.55-0.63 x 0.34-0.45 mm (not including joints), shield-shaped, with one or both distolateral corners produced or not at all. Frontal wall with a costal field of 6-7 spines, the distal pair largest, with lumen pores, the field bounded by 4-5 infracostal windows. Orifice a little longer than wide. A pair of avicularia adjacent to the orifice laterally. Pairs of pore-chamber openings, visible frontally, occur distal and lateral to the orifice and proximally. Fertile segment unizooidal, large, rather squat compared to that in *C. hastata*, with three infracostal windows bordering a reduced shield of 3-4 costae, the distal pair being quite stout. Orifice almost three times as wide as long. A pair of transversely orientated ectooecial fenestrae revealing a pitted and papillate endooecial surface; a median fissure lacking. Distally is a median prolongation of the ovicell.

REMARKS: The present material resembles Levinsen's (1909) illustrations more than does the material of Banta and Wass (1979) and Wass and Banta (1981), which had more infracostal windows in the sterile zooids and a median fissure in the ovicell.

Orthoscuticella Wass & Yoo, 1976

Sterile internodes unizooidal, bizooidal at bifurcations. Fertile segments unizooidal, terminal. Zooidal frontal wall typically with a number of conspicuous infracostal windows; costal field absent, or a vestigial pair of costae present, contributing to the proximal rim of the orifice, with or lacking a median suboral 'ascopore' or a sinus. Avicularian processes usually well developed. Paired distal, mid-lateral, and proximolateral pore-chambers typically present, the proximal pair occasionally greatly expanded at the expense of the mid-lateral pair.

TYPE SPECIES: *Catenicella lorica* Busk 1852

Orthoscuticella margaritacea (Busk) (Plates 5, A-G; 6, A)

Catenicella margaritacea Busk, 1852b: 356; Busk 1852a: 9; MacGillivray 1869: 143; MacGillivray 1879a: 15; MacGillivray 1887a: 197; Jelly 1889: 37.
Scuticella margaritacea: Levinsen 1909: 229; Stach 1937a: 383.

MATERIAL EXAMINED: NZOI Stn B488; also NMNZ specimen Pz.127, from Chatham Island (no other information); a colony from Southwest Island, Three Kings group, coll. R.V. Grace, 3 Jan. 1976, 24 m depth.

DISTRIBUTION: Three Kings Islands, Chatham Island, western approaches to Foveaux Strait; 24-164 m. Also Victoria.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids 0.64-0.79 x 0.48-0.53 mm (Stn B488) or 0.51-0.64 x 0.49-0.60 mm (Three Kings), shield-shaped, generally tapering proximally, with one or both of the distolateral aviculiferous corners expanded, sometimes markedly. Frontal wall with a V-shaped arrangement of five windows, of equal size or the distal ones larger. Zooids of bizooidal segments with 3-5 windows. Orifice high arched, with a straight or gently concave proximal rim which has a minute nick in the centre. Proximolateral and lateral pore-chambers facing mainly laterally. The groove between the zooids of a bizooidal segment lacking a pore-chamber. Dorsal surface of zooid with fine longitudinal ribbing. Ovicelled zooidal complex 1.04-1.07 x 0.62 mm (Stn B488), 0.81-0.83 x 0.57-0.66 mm (Three Kings), or 1.05 x 0.68 mm (Chatham Island), orifice wider than long, with a broad sinus in the gently concave proximal rim; 3-7 windows on the frontal wall (some merge to create fewer larger windows), the outermost ones tending to be drop-shaped, tapering to the orificial rim; an oval pore-chamber on each side proximolaterally; ovicell with a pair of large ectooecial fenestrae or the ectooecium not quite separating the fenestrae and these confluent; endooecium with a pitted/papillate surface within the fenestrae; a small apical prominence with 1-2 pore-chambers present.

REMARKS: The finely ribbed dorsal zooidal surface and the lack of a pore-chamber in the groove between the zooids of a bizooidal segment are, in the absence of ovicells, key features to look for in this species, which has been confused with *O. fissurata*.

Busk (1852a) illustrated this species with a distinct sinus. I have not encountered this but, according to Levinsen (1909), it may vary from well defined to quite rudimentary.

Orthoscuticella fissurata (Levinsen) (Plates 5,H-J; 6,B)

[?] *Catenicella margaritacea*: Hutton 1873: 89; Hutton 1880: 180; Hutton 1891: 102.
Scuticella margaritacea var. *fissurata* Levinsen 1909: 231.
[?] *Scuticella margaritacea*: Macken 1958: 106.
Scuticella margaritacea: Uttley & Bullivant 1972: 53.
[?] *Scuticella fusiformis* Powell, 1967: 240.

MATERIAL EXAMINED: NZOI Stns B493, B498, E820; also

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NMNZ specimens Pz.19 and Pz.34, both ? Hutton material from Lyall Bay (no other information), Pz.163 from the Patea breakwater, coll. W.R.B. Oliver, 28 Feb. 1909; drift material from near the Wainuiomata River mouth, coll. DPG April 1979; colony from Lyall Bay, coll. R.C. Willan, Jan. 1980.

DISTRIBUTION: Three Kings Islands, Patea, Cook Strait, Fiordland, western approaches to Foveaux Strait; 0-22 m. Also Victoria.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids 0.53-0.64 x 0.38-0.46 mm, shield-shaped, with the distolateral aviculiferous corners approximately equally developed. Frontal wall with a V-shaped arrangement of five windows, the distal ones smallest. Zooids of bizooidal segments with 4-5 windows. Orifice with a distinct U-shaped sinus or the entrance to the sinus constricted by denticles. Proximolateral and lateral pore-chambers facing mainly frontally. The groove between the zooids of a bizooidal segment with a narrow pore-chamber. Dorsal surface of zooid smooth. Ovicelled zooidal complex 0.87-0.92 x 0.53-0.58 mm; orifice wider than long, with a sinus not quite as broad as in *O. margaritacea*, five windows on the frontal wall, with a lumen pore in each of the incipient costae comprising the proximal or orificial rim on either side of the sinus; a pair of oval pore-chambers on each side laterally and proximolaterally; ovicell with an ectooecial fenestral band, proximally indented in the middle exposing a tubercular endooecium; ovicell with an apical bicuspid prominence with a pair of openings to kenozooidal chambers.

REMARKS: This species was well illustrated by Levinsen (1909: pl. 20, figs 3b, c) but has nevertheless been confused, at least in the New Zealand region, with *O. margaritacea* which also has five frontal windows in the autozooid.

In addition to the differences already noted between the two species (above), the calcified roof of the ascus is smaller in *O. margaritacea*, extending to the level of the distal frontal windows only, but often to the median proximal window in *O. fissurata*.

I have examined Uttley and Bullivant's (1972) material from Pitt Island in the Chatham Group — it is *O. fissurata*.

Scuticella fusiformis Powell, 1967a, whose ovicells were not found, may be this species also, although Powell described and illustrated an ascopore instead of a sinus and the dimensions are not quite in accord.

Orthoscuticella ventricosa (Busk) (Plate 6, C-F)

Catenicella ventricosa Busk, 1852b, 357; Busk 1852a: 7 (*partim*); MacGillivray 1879a: 18 (*partim*); Jelly 1889: 39 (*partim*).
Catenicella ventricosa var. *maculata* Busk, 1852a: Pl. 3, figs 4, 5.
[?] *Scuticella ventricosa*: Livingstone 1929: 97, Stach 1934a: 16.
Scuticella ventricosa: Canu & Bassler 1929: 447 (*partim*); Powell 1967: 239; Wass & Yoo 1975: 810.

MATERIAL EXAMINED: NMNZ specimen Pz. 415, from Bligh Sound, Fiordland, coll. W.H. Dawbin, 10 May 1950, 46 m depth.

DISTRIBUTION: Three Kings Islands, Fiordland; 46-549 m. Also Victoria, Bass Strait; Pleistocene of Tasmania.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids 0.70-0.81 x 0.40-0.53 mm, shield-shaped, with generally subequal acute distolateral corners. Frontal wall with a V-shaped field of mostly seven windows, occasionally 5 or 6 in both uni- and bizooidal segments. Orifice high arched with a gently concave proximal rim; a distinct ascopore present. Proximolateral and lateral pore-chambers facing lateralfrontally; a narrow pore-chamber present in the groove between the zooids of a bizooidal segment. Dorsal surface of zooid smooth. Ovicelled zooidal complex large, 1.26-1.36 x 0.81-0.88 mm; orifice wider than long, with a distinct sinus; seven windows on the frontal wall, with an elongate-oval pore-chamber on either side; ectooecium with seven fenestrae, a proximofrontal pair, a distofrontal pair with a smaller slit-like fenestra between and a large proximolateral pair; a pair of cat's-ear-like prominences with pore-chambers above and below.

REMARKS: Wass and Banta (1981) referred to *Orthoscuticella ventricosa* as a species complex, since there are several similar forms with seven frontal windows. I am aware of four, three of which were illustrated by Busk (1852a) who, unfortunately, depicted the ovicell of only one of them. Levinsen (1909) illustrated the ovicell of two others but, ironically, the ovicell of *O. ventricosa sensu stricto* has not previously been described. The four species are as follows:

First, autozooids of *O. ventricosa s.s.* were figured by Busk (1852b, fig. 1; 1852a, pl. 3, figs 4, 5, as var. *maculata*) clearly showing a suboral ascopore.

Second, Busk (1852a, pl. 2, figs 1, 2) illustrated autozooids of another form, labelled '*C. ventricosa*', without an ascopore. Unfortunately, Levinsen (1909) referred to this as *Scuticella maculata*, not realising that Busk's 'variety' was *O. ventricosa s.s.* Levinsen (1909, pl. 11, figs 7a-c) illustrated the ovicell of this form. Wass and Banta (1981: 384, figs 91-93) refer to it as "*O. maculata sensu* Levinsen" and illustrate the ovicell with excellent SEM photos.

Third, Busk (1852a, pl. 3, figs 1-3) illustrated autozooids and ovicell of a form with a distinct orificial sinus. Although mostly with seven frontal windows, doublet zooids may have only five. The ovicell differs from the two previous forms, and one other illustrated by Levinsen (1909: 227, pl. 11, figs 5a, b; pl. 20, figs 5a, 6a,b).

This fourth species, interpreted by Levinsen to be *O. ventricosa s.s.* was not seen by Busk. It is fairly common in New Zealand waters.

Three species then, require to be named. Since one of them occurs in New Zealand a new name is introduced here for it.

Orthoscuticella innominata n.sp. (Plate 7, A-D)

[?] *Catenicella ventricosa*: Hutton 1873: 88; Hutton 1880: 180; Hutton

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1891: 102; Hamilton 1898: 194; Hutton 1904: 294.
Scuticella ventricosa: Levinsen 1909: 227; Canu & Bassler 1929: 447 (*partim*).
[?] *Scuticella ventricosa*: Macken 1958: 106; Uttley & Bullivant 1972: 53.
Orthoscuticella ventricosa: Bock 1982: 388; Gordon 1984: 68.

MATERIAL EXAMINED: NZOI: Stns B480, B493, B495; also C759, 34°11.7'S, 172°9.9'E, Three Kings Islands, 99 m depth. NMNZ: Pz.278, Chatham Islands, coll. H.H. Travers; Pz.615, off Taiaroa Head, Otago, coll. M.V. *Alert*, 23 Jan. 1951, 137 m depth. Oteranga Bay, Cook Strait, coll. K.R. Grange, 28 April 1982, 40 m depth.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Cook Strait, Chatham Islands, Otago, Fiordland; 40-124 m. Also Bass Strait, southern Australia.

DESCRIPTION: Colony erect, branching, to 150 mm high, comprising jointed segments of 1-2 zooids. Single zooids, including distolateral projections, 0.64-0.94 x 0.40-0.64 mm, shield-shaped, the distolateral corners scarcely or considerably projecting on one or both sides Frontal wall with a V-shaped field of seven windows, of which the most proximal one is smallest. Zooids of bizooidal segments with 5-7 windows. Orifice a little wider than long, the proximal rim gently concave, with a slight suture and notch submedially, indicating fusion of a pair of costae. Proximolateral chambers long, the lateral pair short, more or less adjacent to the orifice, facing mostly laterally; a narrow pore-chamber in the groove between the zooids of a bizooidal segment. Dorsal surface of zooid smooth. Ovicelled zooidal complex large, 1.04-1.13 x 0.83-0.90 mm, the frontal area about two-thirds the total length; orifice more than twice as wide as long, the proximal rim sinuous, with a median sinus and suture and even a hint of an ascopore; frontal windows seven, the most proximal one smallest; lateral pore chambers running the length of the frontal wall and often medially constricted; ovicell with a transversely oval pair of fenestrae, and a pair of narrow pore chambers laterally rising to an apical pair of aviculiferous prominences.

HOLOTYPE: Large fertile colony in the collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-473.

PARATYPE: NZOI, type number P-704, from the same locality as the holotype.

TYPE LOCALITY: Off Oteranga Bay, Cook Strait, 40 m depth.

REMARKS: This species is notable for the female zooid, which has a larger-than-usual frontal wall, with concomitant reduction of the ovicell.

The specific name is derived from the Latin *innominatus*, meaning unnamed.

Claviporella MacGillivray, 1887

Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments unizooidal to trizooidal. Zooidal frontal wall convex suborally, with an ascopore that may be denticulate; this area bordered by 0-5 small windows. Orifice with a sinus and typically flanked by stout tubercles distally and laterally. Distolateral avicularium sometimes greatly expanded on one side. Openings to pore-chambers relatively small. Ovicell with several small scattered foramina.

TYPE SPECIES: *Catenicella geminata* W. Thomson, 1858

Claviporella aurita (Busk) (Plate 8, A-C)

Catenicella aurita Busk, 1852a: 8; Hutton 1873: 88; MacGillivray 1879a: 26 (*partim*); Hutton 1880: 180.
Claviporella aurita: MacGillivray 1887b: 65; Jelly 1889: 63; MacGillivray 1890a: [410]; Hutton 1891: 103; 1904: 104; Levinsen 1909: 243; Livingstone 1929: 98; Stach 1934a: 16; 1935a: 347; Macken 1958: 106; Wass & Yoo 1975: 810; 1976: 287; Wass 1977: 104; Banta & Wass 1979: 18; Wass & Banta 1981: 372 (*partim*); Bock 1982: 387; Wass 1983: 46.

MATERIAL EXAMINED: NZOI Stn B493. DPG: Mount Maunganui, Lyall Bay, Kaikoura, Stewart Island. Also BM(NH) slides 1899.7.1.242, 1899.7.1.365b (Busk collection), attributed to *C. aurita*, provenance in New Zealand unknown (=*C. pulchra*); and BM(NH) slides 1899.7.1.4868 (lectotype, here designated) and 1899.7.1.4869 (Busk collection), both of *C. aurita* (Busk) from Campbell Island, New Zealand.

DISTRIBUTION: Cape Maria van Diemen, Mount Maunganui, Cook Strait, Kaikoura, Fiordland, Stewart Island; 0-84 m. Also SE Australia (Victoria and Tasmania) Late Miocene to Recent, southern Australia.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids, including avicularian processes, 0.43-0.49 x 0.32-0.53 mm, shield-shaped. Frontal wall smooth, rising to a suboral inflated area in which is a slightly toothed slit-like to suboral ascopore; around the periphery of the inflated area is a semicircle of 3-5 small windows. Orifice with median sinus in inflated part of frontal wall and distinct condyles. Two pairs of tubercles typically present, a stout elongated distal pair and a shorter lateral pair; the distal rims of the distolateral avicularia sometimes also tubercular and projecting. The distolateral avicularia short or one greatly expanded along the length of one side, making the zooid wider than long. A pair of tiny pore-chambers proximolaterally; another pair proximal to the avicularia. Dorsal surface of zooid smooth. Bizooidal segment about 0.40-0.49 mm long, the daughter zooid nearly equally twinned with its parent, with a mid-distal avicularium facing laterally. Fertile segment unizooidal, with a tubercle either side of the orifice, the subglobular ovicell terminal, with scattered perforations.

REMARKS: Thanks to the courtesy of Patricia L. Cook, then of the British Museum (Natural History), I was able to examine what is very likely the material of *C. aurita* on which Busk (1852a) based his description and illustrations. Unfortunately, owing to a curatorial oversight dating from last century, Busk's slides of *C. aurita* were mixed up. What had been recorded as

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'type' in the Museum register was from a locality not mentioned by Busk (1852a). An examination of Busk's slides has turned up what is almost certainly the figured material. It is on slide 1899.7.1.4868 from Campbell Island. Busk (1852a, pl.4, fig.1) showed a particular branch sequence that is not common, which can be identified on the slide. The depiction of individual zooids accords well with the actual specimen except for two details — Busk failed to show two avicularia — one at the inner distolateral corner of the proximal singlet in the right-hand branch, and the other between the two orifices of the doublet. Two ovicells on this slide are as shown in figure 3 of the same plate. I accordingly select this colony as the lectotype of *Catenicella aurita* Busk.

The ovicell illustrated by MacGillivray (1879a, pl. 24, fig. 16) belongs not to *C. aurita* as stated but rather to *C. imperforata* MacGillivray 1887b. [The reference of Jelly (1889) to *C. bicorne* Goldstein as a possible senior synonym of *C. imperforata* is a *nomen nudum* (Bretnall 1922). Goldstein never published his description of this species.] Wass (1983) has described the ancestrula of *C. aurita*. It has a large oval opesia bordered by nine stubby non-calcified spine-like protuberances; is proximally tapered, and is attached by a non-calcified disc to the substratum.

Claviporella pulchra MacGillivray (Plate 8, D-H)

Claviporella pulchra MacGillivray, 1887b: 65; 1887c: 176.
Claviporella cacatua: Jelly 1889: 63 (*nom. nud.*); Bretnall 1922: 192.
Claviporella aurita: Wass & Banta 1981: 372 (fig. 16)

MATERIAL EXAMINED: NZOI Stns B480, B493; also Museum of Victoria, H880, holotype slide of *Claviporella pulchra*, Port Phillip Heads, and an unnumbered slide of *C. pulchra* from Point Danger.

DISTRIBUTION: Fiordland; 84-116 m. Also Victoria.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids, including avicularian processes, 0.33-0.43 x 0.29-0.30 mm, narrowly shield-shaped. Frontal wall smooth, rising to a suboral inflated area in which is a narrow, slightly toothed slit-like ascopore; around the periphery of the inflated area is a semicircle of three tiny windows. Orifice with median sinus in inflated part of frontal wall and distinct condyles. Two pairs of tubercles typically present, a stout elongated distal pair and a shorter lateral pair. The distolateral avicularia short or moderate, never greatly expanded along one side. A pair of tiny pore-chambers proximolaterally; another pair proximal to the avicularia. Dorsal surface of zooid smooth. Bizooidal segment about 0.51-0.56 mm long, the daughter zooid projecting at an angle somewhat from its parent, with no median avicularium between them. Fertile segment bizooidal, about 0.68 mm long, the ovicell pertaining to the inferior zooid; with numerous scattered pores; a pair of orificial tubercles present, or one replaced by a frontally facing avicularium; distal zooid lacking ascopore (this region occupied by ovicell), with a pair of small orificial tubercles and distolateral avicularia and a median prominently projecting tubercle. The distal zooid may be replaced by a kenozooid.

REMARKS: The holotype specimen of *C. pulchra* is practically unrecognisable. It is badly effloresced, but immersion of a separated zooid in a drop of water on a slide dissolved the efflorescence and revealed the same features seen in the Victoria Museum specimen from Point Danger.

In *C. pulchra* there is a discernible axis from which side branches arise. The axial zooids are alternately doublets and singlets. From one side of many of the singlets, just below the avicularium, arises either another singlet, beginning a side branch, or a terminal fertile segment. Doublet zooids in this species appear always to produce singlets. In *C. aurita*, branching is more regularly sympodial and the tendency for doublets to alternate with singlets is less rigid — doublets may produce either two singlets or, much more commonly, a doublet and a singlet. There is no branching from the sides of *C. aurita* zooids.

Whereas the fertile segment of *C. aurita* comprises the one zooid with an ovicell, that of *C. pulchra* is bizooidal. Wass and Banta (1981, fig. 16) drew attention to this type of ovicell in specimens labelled *C. aurita*.

MacGillivray (1887b,c) mentioned a "papillose" surface to the zooid in *C. pulchra*. In all specimens I have seen, including the holotype, papillae are not present. However, from certain angles, in transmitted light, spots are visible in the calcification that could be mistaken for papillae.

Cribricellina Canu & Bassler, 1927

Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments unizooidal, terminal. zooidal frontal wall with numerous scattered pores (windows) of which the peripheral ones are generally larger. Orifice with a sinus or an ascopore. Pore-chambers lateral to dorsolateral. Female zooid with numerous scattered pores in frontal wall, ovicell with scattered foramina or a large ectooecial fenestral band and papillate endooecium.

TYPE SPECIES: *Catenicella rufa* MacGillivray, 1869

REMARKS: Wass and Yoo (1976) proposed a segregate genus, *Paracribricellina*, on the grounds that an ascopore instead of an orificial sinus, and differences in the morphology of pore-chambers and avicularia, were sufficient for generic distinction. The ovicells differ also; but this move would require a comparable splitting of the species of *Orthoscuticella*, for example, which also may have an ascopore or sinus and whose frontal walls and ovicells differ even more markedly. Such a split may be appropriate at subgeneric level. I regard *Paracribricellina* as a subgenus only.

Subgenus **Paracribricellina** Wass & Yoo, 1976

Cribricellina with an ascopore; lacking distinct dorsal

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pore-chambers; the ovicell with a broad-banded ectooecial fenestra.

TYPE SPECIES: *Catenicella cribraria* Busk, 1852

Cribricellina (Paracribricellina) cribraria (Busk) (Plates 1, D; 9, A-C)

Catenicella cribraria Busk, 1852b: 359; Busk 1852a: 9; MacGillivray 1869: 126; Hutton 1873: 88; MacGillivray 1879a: 20; Hutton 1880: 180; Busk 1884: 11; MacGillivray 1887a; 197; Hutton 1891: 102; Hamilton 1989: 194; Jelly 1889: 36; Hutton 1904: 294.
Cribricella cribraria: Levinsen 1909: 294.
Cribricellina cribraria: Canu & Bassler 1929: 450; Livingstone 1929: 97; Stach 1934b: 42; Stach 1937a: 383; Macken 1958: 106; Powell 1967: 245.
Cribricellina cribralia [*sic*]: Wass & Yoo 1975: 810.
Paracribricellina cribraria: Wass & Yoo 1976: 290; Wass 1977: 113; Banta & Wass 1979: 18; Bock 1982: 388.

MATERIAL EXAMINED: NZOI: Stns B480, B482, B488, B490, B493, E796, E820. DPG: Wellington Harbour, Kaikoura.

DISTRIBUTION: Three Kings Islands, Colville Channel, Napier, Wellington, Cook Strait, Kaikoura, Otago, Fiordland, western approaches to Foveaux Strait; 40-251 m. Also Queensland, New South Wales, Victoria, Tasmania, South Australia.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids 0.53-0.64 x 0.38-0.45 mm, shield-shaped. Frontal wall with 8-15 peripheral windows, generally larger laterally, and 17-34 windows centrally. Orifice with a somewhat concave proximal rim, no condyles, and no definitive sinus; a faint median suture connects the proximal rim with a small transverse slit-like ascopore. Distolateral avicularia with cross-bars, the corners more or less equally developed and not particularly protruding. Extremely narrow pore-chambers occur just behind the lateral margins of the zooid. Ovicell unizooidal, terminal, the triangular frontal wall with about 15 windows peripherally, the lateral ones larger, and about 40 centrally; the orifice more or less D-shaped though somewhat sinuous proximally. A deep wide ectooecial fenestra exposes a finely porous and papillate endooecium. Apex of ovicell smooth; no avicularia or pore-chambers.

REMARKS: Different workers have commented on the brownish colouration of this species.

Pterocella Levinsen, 1909

Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments trizooidal, rarely bizooidal, bent forwards. Zooidal frontal wall with a small costal shield, with tiny lacunae and peripheral infracostal windows. Orifice with condyles, the concave proximal rim formed largely by the first pair of costae. Distolateral processes with tiny avicularia. Pore-chambers well developed. Ovicell fenestrate, endooecium pitted and papillate. Anchoring rootlets arise dorsally from many bizooidal segments.

TYPE SPECIES: *Cellaria vesiculosa* Lamark, 1816

REMARKS: I include in this genus *Carinatocella* Stach, 1935b. The included species (Stach 1935c) are so similar to *Pterocella vesiculosa* it seems incredible that Stach erected a new genus for them. Indeed, in a brief diagnosis of *Carinatocella* on the first page of the work in which he introduced it (Stach 1935b: 389), he wrote "Characters as for *Pterocella*, but the suprascapular compartments are not calcified". This seems a trivial distinction. The amount of calcification of these chambers is only a matter of degree.

The generic diagnosis given above is modified from the one given by me earlier (Gordon 1984: 67). In that work (p. 66) I stated that the fertile segments of *Pterocella alata* (i.e., *P. vesiculosa*) may be uni-, bi-, or trizooidal. This was based on a drawing of Wass (1977, fig. 19) which Wass and Banta (1981: 368) later stated to be in error. The fertile segments are mostly strictly trizooidal, although I have found one subterminal bizooidal fertile segment in *Pterocella scutella* (q.v.).

D'Hondt (1979a) has shown that *Cellaria vesiculosa* Lamarck, 1816, is a senior synonym of *Catenicella alata* W. Thomson, 1858.

Pterocella scutella (Hutton) (Plate 9, D-I)

Catenicella carinata Busk, 1852b: 363; Busk 1852a: 12; MacGillivray 1869: 143; Hutton 1877: 359; MacGillivray 1879a: 25; Hutton 1880: 182; MacGillivray 1890b: 1; Hutton 1891: 103; Hamilton 1898: 194; Jelly 1899: 35; Hutton 1904: 294.
Catenicella alata Hutton, 1873: 89.
Catenicella scutella Hutton, 1891: 103; Hamilton 1891: 194; Jelly 1889: 39; Hutton 1904: 294.
Pterocella carinata: Levinsen 1909: 248; Livingstone 1929: 98; Wass & Yoo 1975: 810; Wass & Yoo 1976: 242.
Carinatocella harmeri Stach 1935b: 393; Macken 1958: 106; Wass 1977: 115; Banta & Wass 1979: 19; Wass & Banta 1981: 368.

MATERIAL EXAMINED: NZOI Stns B480, B482, B486, B493, B495, E820; also a colony from Southwest Island, Three Kings group, coll. R.V. Grace, 3 Jan. 1976, 24 m depth.

DISTRIBUTION: Three Kings Islands, Napier, Wanganui, Cook Strait, Fiordland, Stewart Island; 24-220 m. Also Victoria, Bass Strait.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-3 zooids. Single zooids, including projections, somewhat triangular, 0.51-0.64 x 0.49-0.77 mm, generally a little wider than long, deep-bodied, the dorsal side around 0.40 mm deep, thorn-shaped in profile. Frontal wall with a small shield of three costae with three peripheral infracostal windows. Orifice with distinct condyles and a concave proximal margin. Distolateral corners of zooid projecting, more or less horizontal or angled obliquely upwards, with a tiny avicularium at each corner. Frontal gymnocyst reduced by the presence of pore-chambers; these widely open proximally, laterally, and distally. Bizooidal segments broadly triangular, with a small pore-chamber and avicularium on the boundary between the component zooids. Fertile segments trizoidal, rarely bizooidal, the frontal wall of the female zooid with a small

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shield of three modified costae with three infracostal windows; a fourth window occurs adjacent to the shield of the lateral zooid of the complex; ovicell with two large ectooecial fenestrae, revealing a pitted endooecium; distal zooid of the complex with only two narrow costae comprising the shield. Dorsal surface of zooids smooth, with fine parallel striations on the distolateral corners. Joints between zooids tend to curve somewhat frontally, causing the branches of the colony to bend inwardly. From the dorsal side of many of the bizooidal segments arise corrugated anchoring rootlets.

REMARKS: Stach (1935b) introduced a new name for *Catenicella carinata* Busk, 1852b, a primary homonym of *Catenicella carinata* d'Orbigny, 1851. According to Article 52(b) of the International Code of Zoological Nomenclature (Ride et al. 1985) such a homonym at the species level must be permanently rejected. In the event, Stach's replacement name *harmeri* is a junior synonym of *scutella* Hutton.

The identity of *Catenicella scutella* Hutton (nom. nov. for *C. alata* Hutton), from Lyall Bay, Wellington, has been a mystery. Material of this species does not occur in either the British Museum (P.L. Cook, *in litt.* 1 August 1983) or the National Museum of New Zealand. Hutton (1873) included this species in Busk's (1852a) section 'Simplices' in which Busk's only included species was *Catenicella carinata*. This strongly indicated that Hutton had a species of *Pterocella*, of which two are presently known in New Zealand, both occurring in Cook Strait, viz., *P. vesiculosa* and *P. harmeri*. His description, unillustrated, mentions "lateral processes projecting horizontally and forwards from the whole length of the [zooid]" and "a single median pore (fenestra?), and occasionally another on each side of it". Of all of the species of Catenicellidae in the Cook Strait region, this description most closely corresponds to *Pterocella harmeri* (i.e., *carinata* Busk). What is puzzling is that Hutton (1880) later listed both *C. scutella* Hutton and *C. carinata* Busk, in the "Simplices", in the New Zealand fauna. He later included both species in a checklist of New Zealand marine Bryozoa (Hutton 1891), as did Hamilton (1898) who also added *C. alata* W. Thompson. Hutton (1904) included all three species names in his *Index Faunae Novae Zealandiae*.

Last year, however, I had the opportunity to examine a long-overlooked collection of bryozoans at the Otago Museum, Dunedin, collected by Hutton and curated by him when he was director of the museum. His *Catenicella scutella* is in this collection. It corresponds to *P. harmeri*. The sole specimen (registered number A. 88.86) becomes the lectotype of *C. scutella*.

Talivittaticella Gordon & d'Hondt, 1985

Colony erect, branching. Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments bizooidal. Zooidal frontal wall mostly smooth, with a small costal shield and usually infracostal windows. Proximolateral and other pore-chambers widely open, shallow.

TYPE SPECIES: *Orthoscuticella*(?) *problematicum* d'Hondt, 1981

Talivittaticella problematica (d'Hondt) (Plate 10, A)

Orthoscuticella(?) *problematicum* d'Hondt, 1981: 42; d'Hondt 1983: 76; d'Hondt & Schopf 1984: 939.

MATERIAL EXAMINED: NZOI Stn E800; also Muséum national d'Histoire naturelle, Paris, specimens from Atlantis II Stn 167, 7°54'S, 34°17'W, 1000 m depth off Recife, Brazil.

DISTRIBUTION: Deep water off southwestern South Island; 993-1003 m. Also Brazil to Uruguay.

DESCRIPTION: Colony erect, branching, to 46 mm high, comprising slender jointed segments of 1-2 zooids. Single zooids 0.67-0.94 x 0.25-0.32 mm, with a small V- or U-shaped field of or 4-6 tiny costae; the pair of costae forming the proximal rim of the orifice largest, roundly quadrate, with a conspicuous lumen pore in each; the other costae converging to a point proximal to the suture between the larger costae; each small costa has an associated infracostal window; 1-4 such windows define the border of the shield. Orifice high arched, generally a little longer than wide. Proximolateral pore-chambers elongate, extending to the level of the most proximal part of the shield, with a line of small pores. Pore-chambers adjacent to the orifice continuous with the distal chamber via a constriction unless avicularia are present, in which case they are separate. Avicularia small, with a crossbar. Fertile segment bizooidal, subterminal, 1.04-1.24 x 0.43-0.46 mm, frontal wall similar to that of autozooid but with only the two suborifical costae in the distal zooid of the segment, which also has paired distolateral avicularia or these lacking.

REMARKS: Three species pertaining to this genus were described and illustrated in some detail by Gordon and d'Hondt (1985).

Catenicella de Blainville, 1830

Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments trizooidal at bifurcations, bizooidal between them, the ovicell pertaining to the proximal zooid, or the fertile segment may be tri- to quadrizooidal between bifurcations, with up to three succeeding ovicelled zooids atop one another. Zooidal wall smooth, with a pair of narrow longitudinal pore-chambers, often with serial punctuations, frontolaterally. Orifice with condyles. Distolateral corners of zooids aviculiferous. Ovicell with ectooecial fenestra and scattered pores.

TYPE SPECIES: *Eucratea contei* Audouin, 1826

REMARKS: Several species have trizooidal fertile segments, including the type-species [which has been figured by Norman (1903, pl. 42, figs 1-3) and Marcus

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(1938, pl. 7, fig. 17)], *Catenicella buskii* Thomson, and *C. gibbosa* Busk (Wass and Banta 1981), although the arrangement of the zooids within the triplet may be different. In *C. contei*, the maternal zooid produces an ovicell and distal zooid distal to the orifice and a branch-zooid proximolateral to the orifice. In *C. buskii* and *C. gibbosa* the bifurcation is distal to the orifice.

Catenicella uberrima (Harmer) is noteworthy for the linear series of ovicelled zooids (up to three) which may succeed one another in a segment, in addition to the type of triplet described above (Waters 1913, pl. 65, fig. 3; Harmer 1957, pl. 50, fig. 4). *C. contei* can also have two successive ovicelled zooids in a bifurcating segment, which then comprises a total of four zooids with orifices (Marcus 1938, pl. 7, fig. 17).

The spots that appear in the frontal wall of *Catenicella* (and *Cornuticella*) species in transmitted light are not minute pores but apparently represent punctuations on the inside of the wall, corresponding to the loci of superior parietal muscle insertions (Banta and Wass 1979).

Catenicella elegans Busk

Catenicella elegans Busk, 1852b: 361; Gordon 1984: 67 (*cum syn.*).
Vittaticella elegans: Wass & Banta 1981: 376; Bock 1982: 391.

MATERIAL EXAMINED: NZOI Stns B480, B482, B486, B498, B616, C867, E820, M789, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Chatham Rise, Kaikoura, Banks Peninsula, Fiordland, Foveaux Strait, Stewart Island; 0-220 m. Also southern Australia, Chile, southern California, Japan, Brazil, Bermuda.

REMARKS: The structure and development of the fertile segment have been described by Wass and Banta (1981).

Scalicella Harmer, 1957

Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments bizooidal or trizooidal. Zooidal frontal wall smooth, with a narrow pair of frontally facing vittae with serial punctuations. Orifice with condyles. Dorsal surface inflated. Distolateral corners of zooid aviculiferous, somewhat expanded. Ovicell with ectooecial fenestra.

TYPE SPECIES: *Catenicella umbonata* Busk, 1852

Scalicella crystallina (W. Thomson) (Plate 10, B, C)

Catenicella crystallina W. Thomson, 1858: 139; MacGillivray 1879a: 25; MacGillivray 1887a: 198; Hutton 1891: 103; Hamilton 1898: 194; Jelly 1889: 36; Hutton 1904: 294.
Scalicella crystallina: Harmer 1957: 768; Wass & Yoo 1975: 810; Wass & Yoo 1976: 293; Banta & Wass 1979: 21.

MATERIAL EXAMINED: NZOI Stns B482, B488, B616, E820.

DISTRIBUTION: Napier, Fiordland, western approaches to Foveaux Strait; 40-220 m. Also Victoria, Bass Strait.

DESCRIPTION: Colony erect, branching, with jointed segments of 1-3 zooids. Single zooids 0.47-0.53 x 0.36-0.43 mm, very deep bodied, with a distinct keel. Frontal wall smooth, somewhat flattened, with a pair of diverging vittae on either side. Orifice with condyles and a concave proximal rim. Adjacent and distal to the orifice are pairs of chamber openings. Distolateral corners aviculiferous Ovicell with an inverse Y-shaped ectooecial fenestra.

REMARKS: Wass and Yoo (1975, pl. 4, fig. 10; 1976, pl. 3, fig. 4) have illustrated by SEM triplet fertile segments in this species. They were not seen in the NZOI material.

Cornuticella Canu & Bassler, 1927

Sterile segments unizooidal, bizooidal at bifurcations. Fertile segments bizooidal, rarely trizooidal, the ovicelled zooid terminal. Zooidal frontal wall smooth; vittae occur laterally; a pair of small rounded chambers adjacent to the orifice. Orifice with condyles; the proximal rim concave. Distolateral corners variable, with small or large avicularia, or these absent and the corners long, spine-like. Dorsal surface smooth; distal pore-chambers occur dorsally, varying in size according to size of distolateral corners.

TYPE SPECIES: *Catenicella cornuta* Busk, 1852

Cornuticella trapezoidea Powell (Plates 10, D-H; 11, A,B)

Cornuticella trapezoidea Powell, 1967: 241.

MATERIAL EXAMINED: NZOI: Stns B498, D270. DPG: Maui gas pipeline off Oaonui, Taranaki, coll. B.A. Foster, 1974; Poor Knights Islands, coll. R.V. Grace, winter 1967.

DISTRIBUTION: Three Kings Islands, Poor Knights Islands, Oaonui, Cook Strait; 40-73 m.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2 zooids. Single zooids, including distolateral processes, 0.41-0.77 x 0.36-0.53 mm, those on main branches longer than those on secondary branches. Frontal wall smooth. Lateral vittae very narrow, a little recessed behind the margins of the zooid, not visible frontally; an awl-shaped or drop-shaped boundary chamber occurs adjacent to the orifice of the inferior zooid of a bizooidal segment. Orifice with condyles, the proximal rim concave. Distolateral corners variable, both may be aviculiferous, the avicularia both large or small or one of each, or one or both corners elongate and spine-like, curving backwards, replacing the avicularia; the outer corners of both zooids of a bizooidal segment are mostly spine-like. Either side of the orifice is a small round opening of an infrascapular chamber; suprascapular chambers are visible mostly dorsally, where they are short if behind spine-like processes, or long curving slits if behind large avicularian processes. Ovicell with a small round or slit-like frontal fenestra, otherwise smooth, with a

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pair of vittae dorsally.

REMARKS: *Cornuticella trapezoidea* may be distinguished from *C. cornuta*, which has been recorded in New Zealand waters by Powell (1967) and others, by its more frontally appearing suprascapular chambers and the lack of a distal projection on the ovicell.

Cornuticella taurina (Busk) (Plates 10, I-O; 11, C-D)

Catenicella taurina Busk, 1852a: 12; Jelly 1889: 39.
Catenaria cornuta: Levinsen 1909: 256.
Cornuticella cornuta: Wass & Yoo 1975: 810.
Cornuticella taurina: Harmer 1957: 783; Banta & Wass 1979: 20; Wass & Banta 1981: 378.

MATERIAL EXAMINED: NZOI: Stns B477, B480, B482, B493, B495, B498, E796, M779. DPG: Colonies from Makara, coll. 3 April 1983; Oteranga Bay, coll. K.R. Grange, 28 April 1982, 40 m depth.

DISTRIBUTION: Makara, Cook Strait, Fiordland; 30-251 m. Also Victoria, South Africa.

DESCRIPTION: Colony erect, branching, comprising jointed segments of 1-2, rarely three, zooids. Single zooids, including distolateral corners, 0.43-0.62 x 0.32-0.49 mm. Frontal wall smooth. Vittae narrow, occurring just behind the margins of the zooid; a small oval or circular boundary chamber occurs in bizooidal segments. Orifice with condyles, the proximal rim concave. Distolateral corners variable, both may be aviculiferous or one or both corners expanded widely or scarcely at all to a point, replacing the avicularia; the outer corners of both sides of a bizooidal segment are mostly pointed. Either side of the orifice is a small round opening of an infrascapular chamber. Suprascapular chambers tiny, occurring distally or absent altogether. Ovicell smooth, lacking a fenestra, with a pair of vittae dorsally.

REMARKS: Colonies of this species exhibit some geographical variation — whereas a specimen from Stn B495 in Milford Sound had zooids with relatively small distolateral points and avicularia, both of these structures were more prominent in a colony from off Oteranga Bay in Cook Strait where current flow is known to be strong.

This species is readily distinguished from both *C. trapezoidea* and *C. cornuta* by the minimal development of suprascapular chambers in autozooids and by the non-fenestrate ovicell.

Wass & Banta (1981, fig. 19) illustrated an unusual trizooidal fertile segment of *C. taurina*.

Infraorder HIPPOTHOOMORPHA nov.

Ascophorina with a gymnocystal frontal shield, typically smooth, hyaline, sometimes with small punctae and/or tubercles. Lepralioid ascus. Articulated oral spines absent. Areolae absent. Frontal budding, if present, from pore-chambers.

REMARKS: Bryozoa with a gymnocystal frontal shield and lepralioid ascus (i.e., one that develops as an inward-growing fold of membranous wall beneath the calcareous shield) are grouped here at the infraordinal level but placed near the Cribriomorpha in the recognition that these two taxa share some fundamental features of shield structure and ascus development (in contrast to Gordon 1984). A conceptually important genus possibly linking the two infraorders is *Tremoschizodina* (Tremoschizodinidae). The little-known family-group taxon Tremoschizodininae Vigneaux, 1949 probably ought to be considered a family of Catenicelloidea. Like *Cribricellina* (*Paracribricellina*) (Catenicellidae) it has a porous gymnocyst with a weakly developed pair of costae forming the proximal rim of the orifice. On the other hand, *Tremoschizodina* greatly resembles *Trypostega* and *Stictostega* (Hippothoidae) which have the same type of porous gymnocyst but lack suborificial costae.

It is this kind of conceptual linkage, from Cribrilinoidea through Catenicelloidea to Hippothooidea that militates against abandoning the umbrella taxon Ascophorina.

Superfamily HIPPOTHOOIDEA Fischer, 1866

Family HIPPOTHOIDAE Fischer, 1866

Hippothoa Lamouroux, 1821

TYPE SPECIES: *Hippothoa divaricata* Lamouroux, 1821

Hippothoa divaricata pacifica Gordon

Hippothoa divaricata pacifica Gordon, 1984: 111.

MATERIAL EXAMINED: NZOI Stns B457, B488, B489, D220, D272, E796, E820, E821.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, western approaches to Cook Strait, Fiordland, western approaches to Foveaux Strait; 18-549 m.

REMARKS: Moyano (1986) described Chilean *H. divaricata* with a schizoporelloid ancestrula and different astogeny and pointed out that, if these characters hold true for European *H. divaricata*, the New Zealand subspecies should be raised to species rank.

Hippothoa flagellum Manzoni (Plate 11, E-G)

Hippothoa flagellum Manzoni, 1870a: 328; Ryland & Gordon 1977: 22 (*cum syn.*); Morris, 1980: 30; Gordon 1984: 111; Moyano 1986: 102.
Hippothoa watersi Morris, 1980: 31.

MATERIAL EXAMINED: NZOI Stns B484, B487, B488, B489, B493, B498, C856, C871, D246, D260, D262, D266, D269, D270, D272, D273, D274, E796, E804, E817, E820, E828, M774, M776, M779, M780, M782, M791, Q686. Also *Hippothoa flagellum*, BM(NH) 97.5.1.793, from Falmouth,

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England; and slide no. 2639, holotype of *H. watersi*, Manchester Museum H.1251, from New Zealand.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Cook Strait, Marlborough Sounds, Tasman Bay, Fiordland, westernapproachesto Foveaux Strait; 15-635 m. Nearly cosmopolitan.

REMARKS: *Hippothoa watersi* Morris is synonymous with *H. flagellum*. The distribution of interzooidal communications is the same, and any perceived differences are subtle. For example, the autozooidal orifice in New Zealand colonies (equivalent to *H. watersi*) tend to be a little higher and more in the plane of the substratum. They also tend to be more triangular, but the range of variation in the orifices of both northern and New Zealand populations overlaps and the supposed distinctions are not consistent throughout the geographic range of the species.

Zooeciules of New Zealand *H. flagellum* are not abundant, and tend to be slender with a tiny oval orifice. Occasionally they are larger — in a colony from Stn B488, southwest of Puysegur Point, two well-developed zooeciules are present. They are clavate in shape, with a medially constricted orifice, and are practically identical to equally uncommon zooeciules occurring in British *H. flagellum* (cf. Ryland and Gordon 1977, fig. 3C, E; Hastings 1979, fig. 2, A-C).

Plesiothoa Gordon & Hastings, 1979

Colony encrusting, uniserial to pluriserial. Zooids with smooth frontal wall and a series of marginal perforations, with a caudal portion that is never stolon-like. Orifice with sinus and condyles. Female zooids resembling autozooids. Male zooids not externally identifiable but zooeciules with reversed orifices, resembling avicularia, may occur. Polypide with gizzard. Pore-chambers rounded to tubular. Ancestrula schizoporelloid, often with dentate margin.

TYPE SPECIES: *Hippothoa gigerium* Ryland & Gordon, 1977

REMARKS: *Hippothoa gigerium* was a replacement name for *Hippothoa divaricata* var. α (*conferta*) Hincks, 1880, a secondary homonym of *Lepralia hyalina* var. ε *conferta* Busk, 1876.

As Moyano (1986) has pointed out, the genus *Atacama* Morris, 1980 is a synonym of *Plesiothoa*. The type and only species, *A. foramina* Morris, from the Pliocene of Chile has the same uniserial to loosely pluriserial habit of colony growth, rows of pores along the lateral zooidal margins, and, more importantly, female zooids and orifices like those of autozooids, and similar zooeciules.

Plesiothoa is unique in the order Cheilostomata, as the only genus whose species are known to have a stomach gizzard (Gordon 1975a; Gordon & Hastings 1979), but there are skeletal characters which nevertheless also typify the genus, such as the female orifice having the same size and shape as the autozooidal orifice, and zooeciules (where present) with reversed orifices.

Plesiothoa australis Moyano & Gordon

Plesiothoa australis Moyano & Gordon, 1980: 76; Lopez-Gappa 1985: 54; Moyano 1986: 103.

MATERIAL EXAMINED: DPG: Specimens from Cape Foulwind, South Island, coll. by D.P. Gordon, 21 October 1977.

DISTRIBUTION: Cape Foulwind; intertidal. Also central Chile at about 38°S, and Ria Deseado, Argentina.

DESCRIPTION: Colony encrusting, uniserial to triserial and very rarely quadri- to pentaserial; caudal parts of zooids of moderate length, shorter where the colony is 2-5 zooids wide. Autozooids 0.29-0.41 x 0.2 mm, elongate to pyriform, widest in the region behind the disto-lateral pore-chambers; budding primarily from these chambers, with secondary connections made from any of the three to four lateral pairs of conical pore-chambers; these marked externally by one, occasionally two, holes per chamber. Zooids overlapping where space is limited. Frontal wall rising to a prominent suboral umbo. Orifice subcircular, steeply inclined, the sinus bluntly V-shaped, condyles single, prominent; the orifice flanked laterally by a pair of lappets, which, if extended forward and outward slightly, give the appearance of a "scoop" distally; this apparatus not well developed in young zooids. Polypides with gizzard. Female zooids with ovicells approximating autozooids in size and shape: orifice with same general shape also but proportionally wider. Frontal walls with prominent umbo. Ovicell globose, imperforate frontally with concentric striations and about four marginal holes, marking pore-chambers. Zooeciules and/or male zooids unknown. Ancestrula ovoid, the orifice as in autozooids, with lateral lappets; frontal umbo slightly developed, the basal margin commonly entire, occasionally undulate: with terminal distolateral pore-chambers from which the first zooid is produced in the midline.

REMARKS: At the only known New Zealand locality for *P. australis* (Cape Foulwind), colonies occurred on *Corallina officinalis* in mid-tidal rock pools.

Celleporella Gray, 1848

TYPE SPECIES: *Cellepora hyalina* Linnaeus, 1767

REMARKS: Moyano (1986), in an important recent work, has distinguished four subgenera of *Celleporella*. *Celleporella sensu stricto* has pluriserial unilaminar or bilaminar colonies arising from a schizoporelloid ancestrula with a distolateral first zooid, having spiral early astogeny. *Antarctothoa* (type species *Escharina bougainvillei* d'Orbigny) has pluriserial unilaminar colonies arising from a schizoporelloid ancestrula with two daughter zooids, having radial astogeny. *Neothoa* (type-species *Hippothoa patagonica* Busk) has unilaminar uniserial colonies arising from a tatiform ancestrula. Moyano further distinguishes *Austrothoa* (type and sole

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species *Celleporella yagana* Moyano and Gordon) with unilaminar pluriserial colonies, also arising from a tatiform ancestrula, partly on the basis of "female zooids not very different from autozooids" compared to "female zooids reduced" in *Neothoa*, but this distinction is not especially convincing. *Neothoa* and *Austrothoa* both also lack presumed-male zooids or zooeciules whereas these occur in *Celleporella* and *Antarctothoa*, so a case could be made for making *Neothoa* a full genus with *Neothoa sensu stricto* and *Austrothoa* as subgenera.

Subgenus **Antarctothoa** Moyano, 1986

Celleporella with pluriserial unilaminar colonies arising from a schizporelloid ancestrula with two daughter zooids and having radial astogeny.

TYPE SPECIES: *Escharina bougainvillei* d'Orbigny, 1842, 1847

Celleporella (Antarctothoa) bathamae (Ryland & Gordon) (Plate 11, H)

Hippothoa bathamae Ryland & Gordon, 1977: 44 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B455, B493, C868, E809, E820, M774, M775.

DISTRIBUTION: Marlborough Sounds, Kahurangi Point, Fiordland, Otago Peninsula; 0-220 m.

DESCRIPTION: Colony encrusting, zooids contiguous. Autozooids 0.36-0.56 x 0.16-0.26 mm, the frontal wall strongly convex, sometimes transversely striated, often with a suboral umbo. Orifice subcircular, with a well-formed rounded sinus, and generally with scarcely developed condyles. Pore-chambers subtubular, closely appressed, with slit-like lacunae between. Polypide with 12-13 tentacles. Male zooids scattered, often the same size as autozooids; orifice small, the same shape as in autozooids. Female zooids generally shorter than autozooids, the orifice broad, the proximal margin not straight but variably concave, merging into a reasonably or weakly defined V-shaded sinus. Ovicell globose, with 0-4 frontal pores and 6-8 pores peripherally. Ancestrula oval, proportionately shorter and wider than other zooids, with a similar orifice; budding initially distolateral and symmetrical, with the first pair of daughter zooids adjoining distal to the ancestrula, leaving a small space between, and budding a third zooid medially.

REMARKS: At the type locality (Aquarium Point, Portobello Peninsula, Otago Harbour), *C. (A). bathamae* occurs on *Macrocystis pyrifera*. In NZOI collections, colonies occurred on mussels (e.g., *Aulacomya ater*) as well as on brown algae.

Celleporella (Antarctothoa) delta (Ryland & Gordon) (Plate 11, I)

Hippothoa delta Ryland & Gordon, 1977: 32.
Celleporella delta: Gordon 1984: 112 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B493, B498, M795, S368. DPG: Colonies from Lyall Bay, Wainuiomata River mouth (drift on algae), Nelson.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Castlepoint, Wellington, Marlborough Sounds, Nelson, Kaikoura, Fiordland, Otago Harbour, Bluff, Stewart Island, Auckland Island; 0-153 m.

REMARKS: This is a variable species, and a detailed study of colonies from a wide range of ecological habitats is warranted. In particular, early astogeny has not been seen in many of the colonies in the collections, and this character would be of assistance in confirming the conspecificity of some dubious material. In general, it may be said that zooids mostly have frontal umbones and/or transverse striations, deep and narrow autozooidal and male orificial sinuses with bicuspid condyles, and a straight or convex proximal rim either side of the nick-like sinus in female orifices. All of these characters are variable, however, even in single colonies. Also, the pairs of tubercles distolateral to zooidal orifices in some colonies may be marked or lacking. Finally, the degree of lateral continuity between zooids seems to be related to the stability of the substratum. Colonies on algal fronds may have marked interzooidal lacunae compared to colonies on holdfasts.

Celleporella (Antarctothoa) tongima (Ryland & Gordon)

Hippothoa tongima Ryland & Gordon 1977: 37 (*cum syn.*).
Celleporella tongima: Gordon & Hastings 1979: 577.

MATERIAL EXAMINED: NZOI Stns B498, C856, C868, C869, D252, D253, D269, D272, Q686.

DISTRIBUTION: Spirits Bay, Hen and Chicken Islands, Leigh, Waikanae coast, Marlborough Sounds, Cook Strait; 0-205 m. Also Pleistocene of North Island (near Wanganui and Waipukurau).

DESCRIPTION: Colony encrusting, zooids contiguous. Autozooids 0.36-0.51 x 0.12-0.20 mm, the frontal wall smooth with sometimes slight transverse striations, rarely umbonate or tubercular. Orifice subcircular with U-shaped sinus and moderately developed bicuspid condyles; these sometimes inconspicuous. Pore-chambers subtubular, closely appressed with no lacunae, 5-7 along each zooidal margin, with a conspicuous opaque white spot in each one frontally. Polypide with 10 tentacles. Male zooids slightly smaller than autozooids, the orifice tiny, typically with unicuspid condyles; the polypide with four tentacles. Female zooids and ovicells together about as long as autozooids, the orifice with a straight or weakly concave proximal rim and short notch-like sinus; ovicell with a cluster of pores near the apex and a peripheral row of about nine larger ones. Ancestrula smooth; early astogeny as in *C. (A). bathamae* but with no interzooidal lacunae.

REMARKS: The development of zooids during colony ontogeny has been illustrated by Gordon and Hastings (1979: 572).

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Family CHORIZOPORIDAE Vigneaux, 1949

Chorizopora Hincks, 1879

TYPE SPECIES: *Flustra brongniartii* Audouin, 1826

Chorizopora brongniartii (Audouin)

Flustra brongniartii Audouin, 1826: 240.
Chorizopora brongniartii: Hincks 1880: 224; d'Hondt & Redier 1977: 217; Lopez Gappa 1981a: 43; Gordon 1984: 113 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B483, B487, B488, B490, B493, B498, C869, D270, D272, D273, E804, E817, E820, E828, M780, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Marlborough Sounds, Tasman Bay, Fiordland, western approaches to Foveaux Strait, Dunedin; 35-443 m. Also Victoria, New Guinea, Philippines, China, Burma, Sri Lanka, Red Sea, Mediterranean Sea, Britain, South Africa, Kerguelen, Patagonia, Argentina.

Infraorder UMBONULOMORPHA nov.

Neocheilostomes with the frontal membrane covered over by a later-developing calcareous shield and outer hypostegal coelom; this shield perforate or imperforate centrally, with associated lateral areolar pores, the underside with a distinct boundary marking an area of parallel fibrous ultrastructure. Ovicells, avicularia, spines present or absent.

REMARKS: This new infraorder is established to accommodate three related superfamilies — Arachnopusioidea, Umbonuloidea, and Adeonoidea. Chlidoniopsoidea [*sic*] (d'Hondt 1985) probably also should be included.

Superfamily ARACHNOPUSIOIDEA Jullien, 1888

Family ARACHNOPUSIIDAE Jullien, 1888

Arachnopusia Jullien, 1888

TYPE SPECIES: *Lepralia monoceros* Busk, 1854

Arachnopusia unicornis (Hutton) (Plate 12, A-C)

Eschara unicornis Hutton, 1873; 99.
Arachnopusia unicornis: Foster 1982: 140; Bock 1982: 360; Gordon 1984: 69 (*cum syn.*); Hayward & Thorpe 1988a: 794.

MATERIAL EXAMINED: NZOI: Stns B455, B480, B482, B483, B485, B487, B488, B490, B493, B498, B616, C856, C857, C861, C867, C868, C869, C871, D252, D253, D264, D266, D269, D270, D272, D273, D274, E796, E800, E820, E821, M780, M789, M797, Q686. DPG: Totaranui, Abel Tasman National Park.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Auckland Harbour, Mount Maunganui, Maui-A oil platform, Taranaki, Cook Strait, Marlborough Sounds, Tasman Bay, Totaranui, Kahurangi Point, Fiordland, western approaches to Foveaux Strait; 0-549 m. Also southern Australia.

REMARKS: As Uttley and Bullivant (1972) remarked, this species is subject to "bewildering variation" particularly in regard to the appearance of the frontal shield. Consistent features, however, are the grooved distal rim of the orifice, a small median avicularium in the proximal rim, and a lateral-oral avicularium (of varying size) on the side opposite the long projecting spine. The principal variable features are the number of perforations in the frontal shield, the number of distal orificial spines in developing zooids, and both number and size of adventitious avicularia. In life, this species has 15-16 tentacles in the lophophore. The colony colour is light orange, but the embryo colour is strong red (Munsell designation) (Gordon 1970).

Arachnopusia perforata (Maplestone) (Plate 12, D)

Hiantopora perforata Maplestone 1909: 271.
Arachnopusia perforata: Uttley & Bullivant 1972: 24; Gordon 1984: 69; Hayward & Thorpe 1988a: 790.

MATERIAL EXAMINED: NZOI Stns E796, E800, E820, E821, Q686.

DISTRIBUTION: Kermadec Ridge, Marlborough Sounds, Dagg Sound (Fiordland), western approaches to Foveaux Strait, Chatham Rise; 150-1003 m. Also western Tasman Sea.

REMARKS: One distinctive feature of this species is the presence of grooves in the frontal shields of many (but not all) of the zooids, causing the frontal wall to appear divided into sectors of perforations (Plate 12, D).

Arachnopusia quadralabia Uttley & Bullivant (Plates 12, E; 13, A-B)

Arachnopusia quadralabia Uttley & Bullivant 1972: 23.

MATERIAL EXAMINED: NZOI Stn B482; also paratypes of this species, P-158 and P-159, held at NZOI.

DISTRIBUTION: Chatham Islands, Puysegur Bank; 69-88 m.

DESCRIPTION: Colony encrusting. Zooids 0.42-0.53 x 0.25-0.41 mm, the frontal shield irregular, perforated by 8-12 pores, the surface between uneven, with a conspicuous broad rounded eminence between the orifice and the porous area; this eminence with an avicularium or a pore at its summit, and a ledge, generally with squared-off corners, on its distal face. Orifice framed by the ledge proximally, frontal shield components distally, and a stout spine base and avicularium laterally; operculum set into the membrane and sunken from frontal view; the distal rim strongly grooved. Avicularia adventitious; apart from the lateral-oral and suboral ones there may be two more on the frontal shield

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proximally, the rostrum acute, pivot bar lacking, the suboral one directed distally, the others proximally or obliquely so; occasional larger avicularia present interzooidally, with complete pivot bar, the rostrum triangular, directed proximally or distally at an angle frontally.

REMARKS: Comparison of material from Stn B482 with a paratype specimen shows conspecificity. This little-known species has previously been recorded only from the type locality near the Chatham Islands. In some ways it could be taken to be a more calcified form of *A. unicornis*, but the large suboral prominence and squared-off ledge seem distinctive enough. *A. quadralabia* will be better characterised when material with freshly growing colony margins is discovered.

Superfamily UMBONULOIDEA Canu, 1904

Family UMBONULIDAE Canu, 1904

Colony encrusting, to erect, bilamellar. Zooidal frontal shield with marginal areolae, imperforate centrally, convex, often umbonate. Secondary orifice sometimes with supraopercular denticles; oral spines present or absent. One or more avicularia typically adjacent to orifice. Ovicell, when present, perforate. Mural septula present.

Mobunula n. gen.

Colony encrusting. Frontal shield very convex, with aviculiferous umbo and marginal areolae. Other adventititious avicularia present. Oral spines and supraopercular denticles present. Ovicell hyperstomial, finely porous. Mural septula present.

TYPE SPECIES: *Mucronella bicuspis* Hincks, 1883

Mobunula bicuspis (Hincks) (Plate 13,C)

Mucronella bicuspis Hincks, 1883: 201.
Mucronella biincisa var. *bicuspis*: Jelly 1889: 190; Hutton 1891: 105, 1904: 297; Hamilton 1898: 195.
Umbonula bicuspis: Brown 1952: 305 (*cum syn.*); Powell 1967: 230; Gordon 1967: 57; Uttley & Bullivant 1972: 31.

MATERIAL EXAMINED: NZOI: Stns B477, B488, B493, B498, B616, C871, D269, D272, D273, E820, Q686. DPG: Goat Island Bay, Castlepoint; also BM(NH) 1950. 11.6.12 (part), *Umbonula ovicellata* (type species of *Umbonula*), from Lough Ine, southern Ireland.

DISTRIBUTION: Three Kings Islands, Goat Island Bay, Waitemata Harbour, Napier, Castlepoint, Marlborough Sounds, western approaches to Cook Strait, Kaikoura, Chatham Rise, Otago shelf, Fiordland, western approaches to Foveaux Strait, Stewart Island; 0-220 m.

DESCRIPTION: Colony encrusting. Zooids relatively deep-bodied (to 0.57 mm), 0.53-1.03 x 0.42-0.64 mm, the frontal shield covering about half the underlying membrane, very convex, rising to a stout suboral column, or umbo which usually bears a round-mandibled avicularium on its distal face and 0-2 smaller avicularia apically; marginal areolae occur, with ridges between. Peristome with a pair of blunt lateral denticles simulating condyles, and a pair of prominent denticles proximally; 3-4 oral spines usually present. Up to 3 additional adventitious avicularia frontally and marginally; all avicularia with crossbars and usually round, denticulate rostral rims. Ovicell prominent, much wider than long, finely and evenly perforate. No pore-chambers; mural septula present. Polypide with 17 tentacles.

REMARKS: As Brown (1952) remarked, "this species is puzzling in its affinities". The frontal shield is umbonuloid, with parallel fibrous ultrastructure beneath, but the orificial denticles and ovicell are reminiscent of the cryptocystidean family Petraliellidae. Nevertheless there are resemblances to the type species of *Umbonula* in the overall form of the zooid.

On balance, I consider the present species distinctive enough to represent a new, presently monotypic, genus — it differs from the three British and European species of *Umbonula* for example, in having a non-cormidial orifice (cf. Sandberg 1977, plate 4, fig. 2) with oral spines, well-developed supraopercular denticles, and especially the finely porous ovicell. In life, *M. bicuspis* is an intense dark orange colour.

The generic name is an anagram of *Umbonula*.

Family EXOCHELLIDAE Bassler, 1935

Exochella Jullien, 1888

TYPE SPECIES: *Mucronella tricuspis* Hincks, 1881

Exochella armata (Hincks) (Plate 13, D-F)

Mucronella diaphana var. armata Hincks, 1882: 167; Jelly 1889: 192; Hutton 1891: 105; 1904: 322.
Exochella zelanica Levinsen, 1909: 322; Gordon 1967: 58.

MATERIAL EXAMINED: NZOI Stns D273, E809. DPG: Lyall Bay.

DISTRIBUTION: Auckland, Wellington, Tasman Bay, Banks Peninsula, southern Fiordland; 0-75 m.

DESCRIPTION: Colony encrusting. Zooids almost as wide as long, 0.23-0.45 x 0.25-0.43 mm, relatively smooth walled. Frontal shield convex, rising to a prominent suboral umbo, with 7-8 areolae along each margin. Orifice with a prominent, somewhat squared, process in the middle of the proximal rim, flanked by a rounded pseudosinus on each side; this arrangement with a similar appearance from beneath. Oral spines typically 3, on the distal rim. Avicularia 0-2, mostly one, borne on the lateral margin where the zooid is widest, adjacent to the umbo or more proximally, with complete pivot bar and acute rostrum, directed laterally; occasional small proximal avicularia directed proximally. Ovicell as

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prominent as the suboral umbo and as convex, with its own umbo, bordered distobasally by areolae.

REMARKS: Not a common species, it occurs on algae, shells, or rocks.

Exochella conjuncta Brown (Plate 14, A)

Smittia napierii Waters, 1883: 438 (*pars*); 1889: 17; Hutton 1891: 105; 1904: 297; Hamilton 1898: 195.
Exochella conjuncta Brown, 1952: 294; Macken 1958: 105; Uttley & Bullivant 1972: 45; Bradstock & Gordon 1983: 163.

MATERIAL EXAMINED: NZOI Stns B616, C861, C868, C871, D250, D253, D260, D262, D269, D270, D272, D273, M775, M776, M783, Q686.

DISTRIBUTION: Marlborough Sounds, Cook Strait, Tasman Bay, Chatham Rise, Fiordland; 15-205 m. Also Pleistocene of North Island; New South Wales.

DESCRIPTION: Colony encrusting. Zooids 0.32-0.68 x 0.23-0.45 mm; frontal shield flat or a little convex, smoothly granular, with 5-7 areolae along each margin. Orifice with a narrow, raised peristomial rim which is curved into a conspicuous U-shaped pseudosinus proximally; this sinus constricted at a deeper level by two stout processes which fuse medially, forming a spiramen. Oral spines 3, present only at the margin in young zooids, becoming obliterated by the developing peristome. Avicularia 1-2, about mid-way along the zooid where it is widest, with complete pivot bar, the rostrum narrow, very acute, directed laterally. Ovicell immersed, not conspicuous, with slit-like areolae marking its distal limit and a couple of rounded areolae laterofrontally.

REMARKS: This very distinctive *Exochella* is immediately recognisable by the conspicuous peristomial pseudosinus.

Exochella jullieni n.sp. (Plate 14, B-D)

MATERIAL EXAMINED: NZOI Stns B482, B487, B488, B490, B616, C871, D273, E804, E817, E820, M779, Q686.

DISTRIBUTION: Marlborough Sounds, Cook Strait, Tasman Bay, Fiordland, western approaches to Foveaux Strait; 30-235 m.

DESCRIPTION: Colony encrusting. Zooids small, 0.38-0.51 x 0.27-0.36 mm, relatively flat-walled. Frontal wall smooth, the marginal areolae round, oval, or slit-like, not conspicuous, in rows or irregularly disposed, even opening in the centre of the frontal wall. Orifice like that of *E. tricuspis*, with two peristomial indentations leading to a pair of spiramina; the primary orifice with a broad, low, lyrulate structure; oral spines 0-3, only on some marginal zooids. Avicularia 1-2, about midway along each zooid or just proximal to this, narrow, with complete pivot bar, the rostrum very acute, directed laterally. Ovicell inconspicuous, visible as a low bulge, recumbent on the distal zooid and concealed by secondary calcification.

HOLOTYPE: Part of a colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-475.

PARATYPE: NZOI, type number P-705, from Stn B490, Dusky Sound, Fiordland, 45°44.3'S, 166°44.8'E, 148 m.

TYPE LOCALITY: NZOI Stn B487, 46°16.0'S, 166°03.0'E, Puysegur Bank, 196 m.

REMARKS: This species closely resembles, and is likely to be confused with, *E. tricuspis* because of the similar orifice. *E. jullieni*, however, has a flatter frontal wall, narrower avicularia, a sub-spiraminal lyrula in the primary orifice and often perforations in the central part of the zooidal wall as well as laterally.

The species is named for Jules Jullien who established the genus a century ago.

Exochella levinseni n.sp (Plate 14, E-G)

MATERIAL EXAMINED: NZOI Stns B477, B482, B484, B493, B616, C867, C871, D273.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Fiordland; 66-134 m.

DESCRIPTION: Colony encrusting. Zooids small, 0.34-0.56 x 0.26-0.38 mm; frontal shield only moderately convex but elevated abruptly into a high peristome which is thickest proximally; 6-7 conspicuous areolae along each zooidal margin. Orifice with a pair of peristomial pseudosinuses separated by a median ridge, squared basally, beneath which is a broad, low, alate lyrulate structure. Avicularia borne typically singly at the widest part of the frontal shield, with complete pivot bar, the rostrum acute, directed laterally. Ovicell visible as a bulge, recumbent on the distal zooid and covered by secondary calcification.

HOLOTYPE: Part of a colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-476.

TYPE LOCALITY: NZOI Stn B616, Dagg Sound, Fiordland, 45°20.0'S, 166°47.0'E, 134 m.

REMARKS: The form of the orifice easily distinguishes *E. levinseni* from *E. tricuspis* and *E. jullieni* which each have a pair of peristomial spiramina associated with the otherwise similar pseudosinuses.

The species is named for Georg Marius Reinold Levinsen who clarified understanding of the genus in his description of several new species (Levinsen 1909).

Escharella Gray, 1848

TYPE SPECIES: *Berenicea immersa* Fleming, 1828

REMARKS: The genus *Escharella* is here included in the Exochellidae. It was discovered that all of the New Zealand species have umbonuloid frontal shields. This unexpected finding was made when the ultrastructure of the inner side of the frontal shield was examined in the distinctly lyrulate species *E. spinosissima* (Hincks). Its appearance is the same as that of *Exochella* species. This negates the validity of *Elleschara* Gordon (1984). I

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established this genus for *Escharella bensoni* (Brown) which has a descending ridge simulating a lyrula, which caused me to suspect an umbonuloid affinity. Although the lyrulate structures of *E. spinosissima* and *E. bensoni* differ in form, they are nevertheless comparable to the range of peristomial processes in *Exochella* for example.

Importantly, the type-species, *E. immersa* (Fleming) (Plate 15,D) is also umbonuloid. Thanks to the courtesy of Mr P. J. Chimonides (British museum, Natural History), I have been able to examine this species — it has the same shield ultrastructure as the New Zealand species. It would be interesting to know the shield ultrastructure of the only other "escharellid" genus, *Hemicyclopora* Norman, 1894.

Escharella spinosissima (Hincks) (Plate 15, A-C)

Mucronella spinosissima Hincks, 1881: 124; 1892:327; Uttley & Bullivant 1972: 31.
Escharella spinosissima: Levinsen 1909: 84; Brown 1952: 337 (*cum syn.*); Powell 1967: 313.

MATERIAL EXAMINED: NZOI Stns B455, B473, B479, B482, B483, B484, B487, B488, B489, B490, B495, C869, D270, D273, D274, E796, E804, E817, E820, E821, E828, M779, M797, Q686; also Stn E297, Three Kings Islands, 34°16.0'S, 172°9.4'E, 315m.

DISTRIBUTION: Three Kings Islands, Cook Strait, Marlborough Sounds, Tasman Bay, Kahurangi Point, Chatham Rise, Otago shelf, Westland, Milford Sound, Doubtful Sound, Dusky Sound, Fiordland coast, Puysegur Bank, Foveaux Strait; 20-549 m. Also Pliocene of Hawkes Bay; Bass Strait.

DESCRIPTION: Colony encrusting, small. Zooids 0.29-0.64 x 0.18-0.53 mm, the frontal shield inflated, rising to the peristomial region, imperforate centrally, with marginal areolae. No avicularia. Peristome with eight articulated spines, even in ovicelled zooids, with a median process on the proximal rim. Orifice with a toothed distal rim and a broad, low, lyrula. Ovicell globular, smooth and imperforate, becoming subimmersed with secondary calcification.

REMARKS: This is a very variable species. Whereas a colony from Stn B490 has a tubercular frontal shield with numerous small marginal areolae (Plate 15 A), another from Stn B488 has fewer areolae with marked ribbing between (Plate 15 B). Another colony from Stn E297 (Three Kings Islands) is somewhat intermediate in appearance. Inasmuch as all three forms have similar zooids at the growing margin, in the same size range, with a toothed distal orificial rim and similar lyrula, they are evidently all conspecific.

The ancestrula was described by Powell (1967) as tatiform with twelve peripheral spines.

Alleresche n.gen.

Colony encrusting. Zooids umbonuloid, with marginal pores only. Orifice with median denticle and suboral avicularium. Oral spines ephemeral. Ovicell imperforate. Basal pore-chambers present.

TYPE SPECIES: *Allerescha dubia* n.sp.

REMARKS: The type species is comparable to species of *Escharella* and *Exochella* in general appearance and even has an umbonuloid frontal shield, but bears a median suboral avicularium, derived from lateral areolae, as well as a median denticle.

The generic name is an anagram of *Escharella*.

Allerescha dubia n.sp. (Plate 15, E, F)

MATERIAL EXAMINED: NZOI Stn B482.

DISTRIBUTION: Puysegur Bank; 88 m.

DESCRIPTION: Colony encrusting. Zooids 0.36-0.49 x 0.23-0.36 mm, the frontal shield inflated, rising to a suboral avicularian chamber, coarsely featured, with moderately large areolar pores with ridges between and the avicularian eminence rugose. 'Primary' orifice with a broad, concave proximal rim in which is set a descending tooth; 'secondary' orifice formed by a peristomial rim which tends to encroach on each side medially giving a constricted appearance. Oral spines four, only on marginal zooids, evanescent. Avicularian chamber formed from an areolar pore on either side, appearing externally small, facing distally, subcircular, with a complete pivot bar, set immediately above the median tooth. Ovicell recumbent, imperforate, unevenly surfaced. Basal pore-chambers present, one mid-distally, two distolaterally.

HOLOTYPE: Colony fragments in collection of the N.Z.Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-474.

TYPE LOCALITY: NZOI Stn B482, Puysegur Bank, 46°08.8'S, 166°06.0'E, 88 m.

REMARKS: The species name is a Latin adjective meaning doubtful, alluding to an initially tentative generic attribution.

Escharoides Milne-Edwards, 1836

TYPE SPECIES: *Cellepora coccinea* Abildgaard, 1806

Escharoides angela (Hutton)

Lepralia angela Hutton, 1873: 96.
Escharoides angela: Brown 1952: 298 (*cum syn.*); Gordon 1984: 71 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B493.

DISTRIBUTION: Kermadec Ridge, Auckland, Hauraki Gulf, Napier, Nelson, Kaikoura, Fiordland, western approaches to Foveaux Strait; 0-88 m.

Escharoides excavata (MacGillivray)

Lepralia excavata MacGillivray, 1860: 166.

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Escharoides excavata: Gordon 1984: 72 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B457, B473, B477, B482, B484, B487, B488, B493, B616, C871, E820, M797, Q686.

DISTRIBUTION: New Zealand region from the Kermadec Ridge and Three Kings Islands, along North and South Islands to Foveaux Strait; 0-220 m. Also Queensland to Victoria, Japan, Gulf of California, Galapagos Islands.

Family SCLERODOMIDAE Levinsen, 1909

Colony erect, multiserial, rooted. Zooidal boundaries not externally visible. Umbonuloid frontal shield appearing regularly perforated, but only the marginal and proximal pores (areolae) opening internally. Secondary orifice lacking oral spines; one or more adventitious avicularia associated with the peristome, often deeply so. Ovicell concealed by secondary calcification, opening into peristome.

Sclerodomus Levinsen, 1909

Colony erect, rooted, subcircular in cross section, not bilamellar. Zooids in 2-many longitudinal series, facing all around the branch or mainly on one aspect; zooidal boundaries obscured by continuous secondary calcification. Frontal shield regularly pitted, the pits in longitudinal sulci where the shield is thicker. Secondary orifice subtriangular to circular, with one or more peristomial avicularia, generally concealed. Ovicell visible as a bulge in younger zooids, later concealed, opening into the peristome. Uniporous mural septula present.

TYPE SPECIES: *Bifaxaria denticulata* Busk, 1884

REMARKS: The concept of *Sclerodomus* and the composition of the Sclerodomidae were clarified by Gordon (1988).

Sclerodomus gracilis Gordon

Sclerodomus gracilis Gordon, 1988: 254.

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Near Dagg Sound, Fiordland; 993-1003 m.

DESCRIPTION: Colony erect, branching, about 0.26-0.36 mm diameter between bifurcations, 0.66 mm at bifurcations, anchored by rhizoids. Zooids four-serial, alternating, facing mainly on one aspect such that, frontally, three series of zooids are seen and, dorsally, two series are seen; zooidal boundaries indistinct, dimensions ca. 0.57-0.83 x 0.25-0.28 mm, the frontal shield with small scattered pores in short longitudinally elongate furrows. Primary orifice and operculum indistinct beneath the peristome. An avicularium in the middle or in one side of the rim of the peristome proximally; another larger, avicularium occasionally on the frontal shield. No oral spines. Fertile zooids with the peristomial rim projecting from the branch more than in regular zooids, with the avicularium more deeply set behind the rim in a pseudosinus; ovicell immersed, opening into the peristome. Ancestrula like regular zooids, supported by a rhizoid, the orifice later becoming occluded.

REMARKS: This is presently the only known species of this mostly subantarctic and Antarctic family in New Zealand waters.

Family CELLEPORARIIDAE Harmer, 1957

Colony encrusting to erect, often massive; or small, conical, rooted; or discoidal and free-living. Zooids umbonuloid, closely packed, usually recumbent or semi-erect with irregular orientation through mostly frontal budding. Adventitious avicularia typically associated with the orifice; sinus lacking; pseudosinus may be present. Spatulate avicularia present. Ovicell hyperstomial, hood-like, widely open.

REMARKS: The family Celleporariidae was established by Harmer (1957), as a segregate of the long-established family Celleporidae, because of the frontal-shield arrangement, which Harmer interpreted to be umbonuloid. The balance of the Celleporidae, regarded as true ascophorans, comprised the family Celleporinidae. Hayward (1979) showed that, contrary to Harmer's (1957) and other opinions, the genus *Cellepora* and the family Celleporidae are valid taxa. *Cellepora* is firmly established on the basis of its well-known type-species *C. pumicosa* (Pallas, 1766). Subsequent to Harmer's (1957) interpretation there has been some doubt that the frontal shields of all *Celleporaria* species are truly umbonuloid (e.g., Cook 1973:260). Nevertheless, the Celleporariidae have been retained as a separate family by a number of workers (e.g., Pouyet 1973; Cook and Chimonides 1981). Cook and Chimonides (1981) restricted the Celleporariidae to *Celleporaria* Lamouroux, 1821 and *Sphaeropora* Haswell, 1881, commenting that the "family is generally characterised by a colony growth form which tends to consist principally of frontal buds after a zone of primary astogenetic change which may be extremely small." But, according to the diagnosis of Hayward and Ryland (1979) for example, *Cellepora* also corresponds to this family description, and *Cellepora* and *Celleporaria* have a number of features in common, including an asymmetric umbonate suboral avicularium and broad proximal rim to the orifice. Indeed, Ryland (1979) used the combination *Celleporaria pumicosa*. Superficially, at least, *Celleporaria* would appear to come under the scope of the Celleporidae (e.g., Gordon 1984). In the event, the Celleporariidae are umbonuloid and must be separated from the Celleporidae *sensu stricto*. I have examined the type species of *Celleporaria*, *C. cristata* (Lamouroux, 1821) (= *Cellepora lirata* MacGillivray, 1888) (Plate 16, D-F). The inner surface of the frontal shield has an area of parallel fibrous ultrastructure with a clear boundary line where

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the frontal membrane attaches to the wall in life. Thanks to the courtesy of Mr P. J. Chimonides (British Museum, Natural History), I have also been able to examine *Cellepora pumicosa* and *Omalosecosa ramulosa*. *Cellepora pumicos*a is unquestionably lepralioid; *O. ramulosa*, though erect, is very like *Celleporaria* in the shape and arrangement of orifice, ovicell, and suboral avicularium. I could detect no trace of parallel ultrastructure however, and there is no membrane-boundary mark in the wall. *Omalosecosa* may be included in the Celleporidae, therefore, along with *Celleporina*, *Osthimosia*, *Turbicellepora* (which are certainly confamilial with *Cellepora*) and other genera. In passing, it should be noted too, that Osthimosiidae Jullien, 1888 has priority over Celleporinidae Harmer, 1957.

Celleporaria Lamouroux, 1821

TYPE SPECIES: *Cellepora cristata* Lamarck, 1816

Celleporaria agglutinans (Hutton) (Plate 16, A-C)

Cellepora agglutinans Hutton, 1873: 99; 1880: 194; Jelly 1889:45; Hutton 1891: 106; Hamilton 1898: 196; Hutton 1904: 298.
[?] *Holoporella hastigera*: Brown 1952: 367.
Harmerella hastigera: Uttley & Bullivant 1972: 52.
Celleporaria agglutinans: Bradstock & Gordon 1983: 160.

MATERIAL EXAMINED: NZOI: Stns B455, B482, B490, B498, C857, C861, C871, D269, D270, D272, D273, D274, E820, Q686. DPG: Colonies from Poor Knights Islands, Cape Rodney to Okakari Point Marine Reserve.

DISTRIBUTION: Poor Knights Islands, Hauraki Gulf, Cook Strait, Marlborough Sounds, Tasman Bay, Kahurangi Shoals, Chatham Rise, Dusky Sound, Puysegur Bank, Stewart Island; 20-220 m.

DESCRIPTION: Colony encrusting to erect, massive, foliose, the surface mammillate. Zooids large, 0.38 (periancestrular) - 1.09 x 0.27-0.71 mm, smooth or slightly textured, with slightly raised margins and tiny marginal areolae. Primary orifice roundly D-shaped to transversely suborbicular with tiny, scarcely evident lateral condyles or these not recognisable, the proximal margin of the orifice gently concave; oral spines 5-7, slender, occurring around the distal half of the orifice in periancestrular zooids only. A suboral spine-like umbo present in periancestrular zooids; in most other zooids in a colony this incorporates a tiny round avicularium at its base, facing to one side; if a low peristomial rim develops around the orifice, a pseudosinus may occur adjacent to the avicularium. One or a pair of tiny, laterally compressed, avicularia occur adjacent to the orifice in most zooids, on a raised base. 'Spatulate' avicularia may be large, columnar, the rostrum sloping obliquely upward, triangular, slightly denticulate and beaked distally, the cross-bar with an incipient ligula; a smaller type of 'spatulate' avicularium is non-columnar with a lingulate, rounded rostrum and a palatal shelf occupying almost half the palatal area; there is no ligula on the thin cross-bar. Ovicell sac-like, the big subcircular opening generally confluent with the peristomial rim. Ancestrula sac-like, the orifice as in later zooids but encircled by nine slender spines, budding three zooids, one mid-distally, the other two distolaterally.

REMARKS: This species name was determined by Whitten (1979), who sent a specimen to P.L. Cook (British Museum, Natural History) for comparison with Museum material. Although common in the New Zealand region, this species has been confused nomenclaturally with *Celleporaria hastigera* (*Holoporella hastigera* of previous workers) from Bass Strait which (without my seeing specimens) may not be a junior synonym — Brown (1952), who selected a lectotype, and Busk (1884), in his plate, indicate apically aviculiferous suboral mucrones. Busk (1881) also showed laterally sinuate opercula. This is not the case in the present material.

Celleporaria agglutinans can occur as worn, drift colonies on New Zealand beaches. The references to "*Holoporella* cf. *tuberculata* (Busk)" and "*Holoporella* sp." in Gordon (1967) possibly referred to this species in its eroded state.

Ecologically, this is one of the most important bryozoan species in New Zealand waters, forming extensive beds of coralline clumps attaining up to 50% cover and 0.55 m in height in limited areas, forming nursery grounds in which juveniles of commercial fish feed and shelter (Bradstock and Gordon 1983).

Celleporaria emancipata n.sp. (Plate 16, G, H)

Holoporella tridenticulata: Uttley & Bullivant 1972: 52.

MATERIAL EXAMINED: NZOI Stns B483, B487, B488, B489, E820, E821.

DISTRIBUTION: Mernoo Bank, Chatham Rise, Puysegur Bank, Campbell Plateau; 75-549 m.

DESCRIPTION: Colony domed, free-living, to 32.5 mm diameter and 15 mm high, slightly concave basally. Zooids recumbent or erect, 0.51-0.64 x 0.42-0.64 mm, smooth, with small marginal areolae. Primary orifice more or less D-shaped, a little wider than long, with three uni- or bicuspid denticles in the proximal rim, oral spines not present (at least in the 'adult' colonies seen). A relatively large avicularium chamber suborally, occupying about half the length of the frontal shield, the 'opening' of the avicularium subapical where the chamber forms a suboral eminence, the mandible perfectly D-shaped. 'Spatulate' avicularia not abundant, not particularly elevated, though the rostrum may slant obliquely upward, the cross-bar very proximal, the mandible of variable length, but parallel-sided with a broad round tip, a palatal shelf scarcely developed. Ovicell sac-like, confluent with the peristome and concealing the primary orifice. Ancestrula not seen.

HOLOTYPE: Colony, in the collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-477.

PARATYPE: NZOI, type number P-706, from the same

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locality as the holotype.

TYPE LOCALITY: NZOI Stn B488, Puysegur Bank, 46°01.5'S, 166°21.0'E, 187 m.

REMARKS: The orifice invites immediate comparison with *C. tridenticulata* (Busk), but I believe *C. emancipata* is worthy of specific distinction because of the larger, multiple-layered, free-living colonies, with orifices which have a mean larger size (around 0.23 mm wide compared to 0.17 mm wide in, say, Kermadec Ridge colonies of *C. tridenticulata*, absence of oral spines, strictly tongue-shaped (not spoon-shaped as in Kermadec colonies) large avicularium, and proportionally larger suboral avicularium chamber.

That the colonies are free-living in life is apparent from the existence of opercula and/or mandibles in both the colonies themselves and in encrusting fauna on the concave underside (*Annectocyma* sp., *Disporella* sp., *Eurystrotos ridleyi, Crassimarginatella spinea, Escharoides excavata, Exochella jullieni, Foveolaria cyclops, Galeopsis adherens, Hippothoa flagellum, Micropora gracilis, Microporella discors, Aimulosia marsupium, Rhabdopleura annulata*, and tiny tubicolous polychaetes).

The species name derives from the Latin, set free, and alludes to the free-living state of live colonies.

Superfamily ADEONOIDEA Busk, 1884, *nom. transl.*

Colony encrusting to erect, bilamellar, foliaceous. Zooids umbonuloid; frontal shield granular with spiramina and areolae, no other pores; spiramina evanescent or permanent, single or multiporous. Avicularia usually present, adventitious and vicarious, lacking crossbars. No ovicells; enlarged sexual polymorphs sometimes present, brooding internal.

REMARKS: The Adeonidae is here considered as sufficiently distinct among the umbonuloid families to justify a superfamily to accommodate it. Cheetham (1968, p.110) suggested that a new superfamily would, in time, be appropriate for the Adeonidae. This was, however, with the misunderstanding that the Adeonidae were lepralioid-cryptocystidean in frontal-shield construction [as indeed some, i.e., the Adeonellidae, have turned out to be (Cook 1973)]. The Adeonidae are, indeed, umbonuloid and this raises the question of a relationship with *Metrarabdotos*, also umbonuloid. There *are* many similarities, especially in the mutual possession of gonozooids and in the absence of articulated oral spines. However, the gonozooids of *Metrarabdotos* have a distal 'cover' and locus of embryo development which is separated from the main body cavity of the maternal zooid by a membrane — thus more akin to an ovicellular arrangement (cf. also *Polirhabdotos* Hayward and Thorpe, 1987, fig.1C) than the situation in, say, *Adeona*, in which the embryo occupies most of the maternal-zooidal body cavity (Waters 1913, pl. 73, fig. 4, and p. 529). Also, the secondary orifice of *Metrarabdotos* often has peristomial denticles like those of umbonuloidean genera (e.g., *Mobunula*, *Exochella*), and the avicularia have cross-bars, lacking in all adeonids. The question remains open but, on balance, I would leave the Metrarabdotosidae in the Umbonuloidea.

Family ADEONIDAE Busk, 1884

REMARKS: Busk (1884) is the author of this family (as Adeonae) (*see* Ride *et al* 1985, Article 11f).

Adeonellopsis MacGillivray, 1886

TYPE SPECIES: *Adeonellopsis foliacea* MacGillivray, 1886

Adeonellopsis yarraensis (Waters) (Plate 1, F; 12, F)

Microporella yarraensis Waters, 1881: 331.
Adeonellopsis yarraensis; Gordon 1984: 73 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B455, B483, B484, B487, B488, B493, B495, B611, B616, C852, C871, D269, E817, E820, Q686.

DISTRIBUTION: Continental shelf of New Zealand region from Kermadec Ridge to Foveaux Strait, including fiords; 30-235 m. Also Queensland, New South Wales, Philippines, Japan.

REMARKS: Brooding zooids, not seen in the Kermadec material (Gordon 1984), occur in the axils of branch bifurcations and are relatively large (0.68 x 0.14 mm) compared to regular autozooids but have much the same form.

Infraorder LEPRALIOMORPHA nov.

Ascophorina with a cryptocystidean frontal shield with outer hypostegal coelom; centrally perforate or imperforate; lateral areolae present; frontal budding, when it occurs, from interzooidal pore-chambers and/or the hypostegal coelom and areolae.

Superfamily DIDYMOSELLOIDEA Brown, 1952

Colony encrusting, or erect, uni- or bilamellar to cylindrical. Zooids interior-walled, with sunken primary orifice and raised peristomes; frontal shield with septula and numerous pores. No spines. One or a pair of spiramina present. Basal septula and basal coelom often present. Avicularia adventitious. Ovicells present, opening into the peristome.

REMARKS: D'Hondt (1985) proposed this superfamily for two distinctive genera of interior-walled bryozoans, *Didymosella* and *Tubiporella*. Although possibly premature, the proposal has merit. He also proposed the superfamily Euthyriselloidea (similarly interior-walled). Perhaps the two superfamilies could be combined, in which case Euthyriselloidea, introduced first, would be the preferred name. Both the Euthyrisellidae and Didymosellidae have been thoroughly discussed by Cook and Chimonides (1981).

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Family DIDYMOSELLIDAE Brown, 1952

With the characters of the superfamily.

Didymosella Canu & Bassler, 1917

Characters as for family, but spiramina paired, and ancestrulae have "cribrimorph" frontal walls.

TYPE SPECIES: *Lepralia larvalis* MacGillivray, 1869

Didymosella conchicola n.sp. (Plate 17, A-C)

MATERIAL EXAMINED: NZOI Stns B482, B490, D270.

DISTRIBUTION: Tasman Bay, Dusky Sound, Puysegur Bank; 62-148 m.

DESCRIPTION: Colony small, encrusting, basal coelom lacking. Zooids (including peristome) 0.72-1.43 x 0.37-0.79 mm, the frontal shield regularly perforated by numerous pores, stellate below, and scattered septula along the margins; the perforated wall is distinctly delimited from a smooth erect or suberect tubular peristome, which has a pair of large proximal spiramina opening above the operculum, and 2-4 small pores laterally at its summit. Operculum continuous with floor of compensation sac but delimited from it by a thin line. Avicularia triangular, typically paired, at the proximal edge of the peristome, with complete pivot bar, the mandible curved, elongate (0.36 mm), and expanded mid-length. Ovicell recognisable as a bulge low on the distal wall of the peristome near the substratum, opening into the peristome above the operculum. Ancestrula 'cribrimorph', ca. 0.37 x 0.28 mm, with four subpeltate costae fused together above the frontal membrane and with the proximal lobes of a pair of processes simulating a peristome.

HOLOTYPE: Two colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-478.

PARATYPE: NZOI, type number P-707, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn B490, Dusky Sound, Fiordland, 45°44.3'S, 166°44.8'E, 148 m.

REMARKS: The species name *conchicola* (Latin, 'shell-dweller') alludes to the fact that this species has so far been found only on the concave surfaces of dead valves of *Cardita aoteana* Finlay, a bivalve mollusc. Colonies are small and ovicells appear when only eight zooids are present.

D. conchicola is one of only four Recent species known. Like the type-species, it lacks a basal zooidal coelom, but differs from that species in the smaller, more numerous frontal pores and more tubular peristome.

Superfamily SCHIZOPORELLOIDEA Jullien, 1883

Family HIPPOPODINIDAE Levinsen, 1909

Colony encrusting, the zooids often large, robust. Zooidal frontal shield cryptocystidean, generally regularly perforated. Orifice generally broadly arched, with lateral condyles, the proximal rim shallowly concave. No oral spines (sometimes in ancestrula). Avicularia, when present, adventitious, typically paired, lateral-oral. Ovicell endozooidal, perforated, closed by the zooidal operculum. Ancestrula resembling later zooids.

REMARKS: Excluded from this family is *Hippoporina* and related genera (*see* REMARKS under Hippoporinidae).

Cosciniopsis Canu & Bassler, 1927

Colony encrusting. Zooids relatively robust, generally pigmented, the frontal shield evenly perforated and tubercular. No oral spines. Lateral-oral avicularia present or absent. Ovicell subimmersed in distal zooid, visible as a bulge of its frontal shield, closed by the zooidal operculum.

TYPE SPECIES: *Cosciniopsis coelatus* Canu & Bassler, 1927

Cosciniopsis vallata (Uttley & Bullivant)(Plate 17, D)

Dakaria feejeensis vallata Uttley & Bullivant, 1972: 37.
Calyptotheca sp. Ryland, 1975: 387.

MATERIAL EXAMINED: NZOI: Stns B457, B484, B616, C857, C867, C869, C871, D269, D272, D274, E809, M780, Q686. DPG: Kaikoura, intertidal.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Kahurangi Shoals, Fiordland, Kaikoura, western approaches to Foveaux Strait; 0-205 m.

DESCRIPTION: Colony encrusting. Zooids robust, 0.76-1.24 x 0.47-1.18 mm, often as wide as long, the frontal shield evenly perforated by small pores and tubercular. Proximal rim of orifice broadly concave, with a pair of small blunt condyles; no oral spines or peristome but the distal rim sometimes raised into a small ridge. A small avicularium occurs on either side of the orifice, with complete crossbar, the acute rostrum directed slightly obliquely proximally. Ovicell large, prominent, subimmersed in and covered by the frontal wall of the distal zooid; closed by the zooidal operculum, the orifice not larger than in non-ovicelled zooids. Ancestrula resembling later zooids, heavily calcified, with no spines.

REMARKS: Uttley and Bullivant's (1972) attribution of this species to "*Dakaria feejeensis*" is curious. The type-species of *Dakaria*, *D. chevreuxi* Jullien, 1903, lacks ovicells and avicularia both of which the present species has. Further, *Lepralia feejeensis* Busk, 1884 is the type-species of *Hippopodina* Levinsen, 1909 and it is hard to conceive how they could have overlooked this genus as a possibility. Though very similar to *Cosciniopsis*, *Hippopodina* species collectively appear to differ in small, but variable, details such as the often quadrate zooidal outline, the shape of the proximal orificial rim, and shape and orientation of the avicularia. In addi-

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tion, the larva of the type-species metamorphoses into either a singlet, or, more typically, a distinctive triplet or tetrad ancestrula (Powell 1968a; Eitan 1972).

Calyptotheca, another genus suggested for this species (Ryland 1975), has species with generally more distinct orificial sinuses, which are often dimorphic, smaller oral avicularia, and, in the New Zealand species (*see* later) a well-calcified hyperstomial ovicell — compared to *C. vallata* in which the subimmersed ovicell has a very thinly calcified ectooecium and membranous endooecium.

Family HIPPOPORINIDAE Brown, 1952

Colony encrusting, or erect from an encrusting base. Frontal shield generally regularly perforated. Orifice generally with a broad shallow sinus delimited by condyles, occasionally schizoporelloid; no oral spines. Ovicell generally prominent, perforated, sometimes with a larger (dimorphic) orifice. Avicularia adventitious. Ancestrula typically tatiform or semi-tatiform.

REMARKS: In the sum of their characters, genera like *Hippopodina* and *Cosciniopsis* differ sufficiently from *Hippoporina* and its allies to possibly warrant maintaining the two families, Hippopodinidae Levinsen and Hippoporinidae Brown (cf. Gordon 1984). That is not to say that all included genera are placed in these families with confidence. There is presently uncertainty as to the exact limits of schizoporelloidean families and genera and much work remains to be done on frontal-shield and ovicell ontogeny to clarify relationships. It may be appropriate to regard such families as Hippopodinidae, Hippoporinidae, Gigantoporidae, and Stomachetosellidae as subfamilies of Schizoporellidae.

Emballotheca Levinsen, 1909

TYPE SPECIES: *Eschara quadrata* MacGillivray, 1880

REMARKS: When Levinsen (1909) first proposed *Emballotheca*, he included it in his new family Escharellidae, a heterogeneous group which included, *interalia*, *Inversiula*, *Exochella*, and *Schizoporella*. Bassler (1953) included both *Emballotheca* and the Escharellidae in the Schizoporellidae. Rogick (1955) recognised that, as then constituted, *Emballotheca* comprised two groups of species, the one with a 'schizoporellid' orifice, the other with a 'mucronellid' orifice. The latter group included the type-species of *Emballotheca* so this group was included by her in the Smittinidae (Mucronellidae of earlier authors). The former group of species became part of *Calyptotheca* Harmer, 1957.

On the basis of a New Zealand species, *Monoporella waipukurensis* Waters, 1887a, Powell (1967) also included *Emballotheca* in the Smittinidae. Brown (1952), however, had difficulty choosing a genus for *M. waipukurensis*, assigning it to "*Hippoporina*?" As Powell (1967) pointed out, the huge ovicells and dimorphic orifices (not to mention the convex proximal rim of the orifice) ally this species with the type-species of *Emballotheca*. Nevertheless, Brown was right, I believe, in associating *E. waipukurensis* with *Hippoporina* and related genera. The ovicell is not typical of the Smittinidae whereas it is typical of the Hippoporinidae. Further, there are no oral spines in either the type-species of *Emballotheca* or *E. waipukurensis* — typical of the Hippoporinidae but not the Smittinidae. The dimorphic orifices would also be unusual in the Smittinidae. Wass and Yoo (1983) included the type-species, *E. quadrata*, in the Hippoporinidae.

Emballotheca waipukurensis (Waters) (Plate 17, E, F)

Monoporella waipukurensis Waters, 1887a: 50
Hippoporina? waipukurensis: Brown 1952: 272 (*cum syn.*).
Emballotheca waipukurensis: Powell 1967: 336; Fleming 1971: 28.

MATERIAL EXAMINED: NZOI Stns D273, Q686.

DISTRIBUTION: Three Kings Islands, Cook Strait; 75-205 m. Also Pliocene of Hawkes Bay (Waipukurau Gorge).

DESCRIPTION: Colony encrusting. Zooids quadrate to rectangular, generally with squared corners, 0.49-0.79 x 0.21-0.60 mm, the frontal shield regularly and evenly perforated and with small tubercles; no obvious areolae except for a small distolateral pair and possibly an even smaller proximolateral pair. Orifice wider (0.12-0.18 mm) than long (0.10-0.15 mm), the proximal rim gently convex, with a median lyrula that is directed either vertically downwards or is angled slightly distally; condyles tiny, situated just proximal to the midlateral position; a smooth narrow, scarcely raised peristomial rim around the orifice; no oral spines. Ovicell large, occupying all the frontal shield proximal to an orifice, globular, porous and tubercular like the frontal shield, the proximal rim smooth, slightly upturned; female orifice large, about as wide (0.19-0.28 mm) as long (0.19-0.23 mm); a smooth, stout suboral umbo present only on ovicelled zooids. Avicularia uncommon, usually on or adjacent to ovicelled zooids, rarely paired, adjacent to the orifice, with short pivots, no crossbar, the rostrum subspatulate, rounded at the tip.

REMARKS: Until Powell's (1967) discovery of Recent material, this species was previously known only from the New Zealand Pliocene.

Calyptotheca Harmer, 1957

Colony encrusting, erect, or discoidal. Zooids generally with more-or-less evenly perforated frontal shield and dimorphic orifices. No oral spines. Avicularia small, adventitious, adjacent to orifice and/or marginal, rarely large and vicarious or absent. Ovicell immersed, or hyperstomial and conspicuous, closed by the zooidal operculum.

TYPE SPECIES: *Schizoporella nivea* var. *wasinensis* Waters, 1913

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Calyptotheca janua (Livingstone) (Plate 18, A)

Hippopodina janua Livingstone, 1929: 92.
Calyptotheca janua: Powell 1967: 285 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B457, C871, S398; also Stn C753, off Ahipara, Northland, 35°20.1'S, 172°52.0'E, 187 m.

DISTRIBUTION: Cape Maria van Diemen, Ahipara, Marlborough Sounds, Kahurangi Shoals; 59-211 m.

DESCRIPTION: Colony encrusting or discoidal and (evidently) free-living. Zooids quadrate or irregular and quincuncially arranged, 0.47-0.92 x 0.34-0.88 mm, the frontal shield regularly perforated (sometimes irregularly so), except for an area just proximal to the orifice; a row of small, irregularly shaped and distributed areolae along each margin; the frontal shield sometimes high-arched in the middle, giving the orifice a somewhat sunken appearance. Orifice wider than long, the proximal rim gently concave with small condyles at the corners. Avicularia tiny, borne distolaterally, oval in shape, the cross-bar complete. Ovicell conspicuous, subglobular, with scattered pores a little smaller than those of the frontal shield, the female orifice not larger than regular orifices.

REMARKS: A single colony from Stn S398 near the Kahurangi Shoals is lunulitiform. It is 8 mm in diameter, 1.2 mm high at the apex, and concave beneath. No particle or grain is visible as an initial substratum and the colony must have been free-living for most, if not all, of its existence.

Calyptotheca immersa (Powell) (Plate 18, B)

Schizomavella immersa Powell, 1967: 271; Gordon 1972a: 505; Ryland 1975: 387; Gordon & Ballantine 1977: 126.

MATERIAL EXAMINED: NZOI: Stn C856. DPG: Goat Island Bay, Leigh.

DISTRIBUTION: Three Kings Islands, Spirits Bay, Goat Island Bay, D'Urville Island; 0-98 m.

DESCRIPTION: Colony encrusting, orange in life. Zooids elongate-rectangular, 0.34-0.81 x 0.23-0.43 mm, evenly perforated by numerous frontal pores, the marginal areolae only a little larger, with small tubercles between the pores. Orifice roundly triangular, the outline broken by a pair of very stout condyles, angled proximally, the sinus broadly V-shaped. No oral spines. Lophophore with 13-14 tentacles. A median suboral avicularium, relatively small, subcircular, the cross-bar complete, generally on a small eminence which is the highest part of the frontal shield. Ovicell fully recumbent, the chamber somewhat flattened frontally, the smooth ectooecium completely covered by secondary layers of calcification from about three neighbouring zooids; the external appearance is that of a wide, low bulge, perforated and tubercular like the frontal shield, but with a Y-shaped outline of converging zooidal boundaries on its surface; orifice wider than that of autozooids; larva a dark reddish-orange. Ancestrula with a smooth frontal shield and a small area of uncalcified membrane proximal to the anascan-like operculum; no spines present.

REMARKS: This species is difficult to place generically. It clearly differs from *Schizomavella* in the evenly perforated frontal shield, immersed ovicell, and dimorphic orifices; however, the sole median suboral avicularium is unusual in *Calyptotheca*, which also has a wider sinus to the orifice. Nevertheless, the dimorphic orifices and cormidial secondary calcification on the ovicell are characteristic of this genus.

At Echinoderm Reef, Goat Island Bay (Cape Rodney to Okakari Point Marine Reserve), this species commonly occurs on small stones and pebbles under larger boulders. Since it breeds year round in this habitat, it appears to be an opportunistic species. However, apart from also settling under large boulders, it was not found on any other kind of substratum.

Hippothyris Osburn, 1952

TYPE SPECIES: *Hippothyris emplastra* Osburn, 1952

Hippothyris ordinaria n.sp. (Plate 18, C, D)

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Near entrance to Dagg Sound, Fiordland; 993-1003 m.

DESCRIPTION: Colony encrusting. Zooids relatively large, 1.06-1.20 x 0.87-1.11 mm, the frontal shield evenly perforated except for an area proximal to the orifice and faintly textured but not tubercular; zooidal boundaries distinct. Orifice a little wider than long, raised somewhat in a peristomial rim which is widest proximally where there may be a short umbo or ridge; proximal rim of orifice very broad and shallow with tiny condyles at the corners. No oral spines. Avicularia not seen. Ovicell prominent though small relative to the zooid, perforated with numerous pores.

HOLOTYPE: Portion of colony in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-482.

TYPE LOCALITY: NZOI Stn E800, 45°20.5'S, 166°41.5'E, near the entrance to Dagg Sound, 993-1003 m.

REMARKS: This species differs from *H. aganactete* Gordon from the Kermadec Ridge in its more numerous frontal pores and apparent lack of avicularia. A possible avicularium was seen on one zooid — as a chamber subjacent to the orifice with an irregular opening. Another chamber occurred interzooidally. In both instances the opening was irregular and not obviously avicularian.

The name is derived from the Latin adjective *ordinarius*, meaning regular, ordinary.

Hippoporina Neviani, 1895

TYPE SPECIES: *Cellepora pertusa* Esper, 1796

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Hippoporina powelli n.sp. (Plate 18, E, F)

MATERIAL EXAMINED: NZOI Stn D226.

DISTRIBUTION: Challenger Plateau; 823 m.

DESCRIPTION: Colony erect, dichotomously branching, 1.19-1.67 mm diameter, widening to 2.25 mm at bifurcations, the zooids in six alternating longitudinal series. Zooids large, 1.21-1.67 x 0.68-0.94 mm, with distinct boundaries; frontal shield evenly perforated, not markedly convex, and proximally depressed below the level of the zooidal margin in young zooids; about six small round or slit-like areolar pores — a pair proximolateral to the orifice, a midlateral pair, and a proximolateral pair, the latter the most obvious but any of the pores may be lacking. Orifice subovoid, about as wide (0.25-0.28 mm) as long, encircled by a low, granular peristome, the condyles exceedingly tiny. No avicularia. Ovicells not seen.

HOLOTYPE: Parts of a colony, in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-480.

PARATYPE: NZOI, type number P-708, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn D226, 39°54.0'S, 168°40.0'E, Challenger Plateau, 823 m.

REMARKS: This species differs from *Hippoporina burlingtoniensis* (Waters) (*see* Wass and Yoo 1983) in its larger size, smaller condyles, and more porous frontal shield. Both species are erect and hexaserial and have a comparable arrangement of areolar pores. The generic attribution is tentative. Ovicells have never been seen, avicularia are lacking, and the condyles are not as well developed as is typical for species of *Hippoporina*. The nature of the colony base, whether encrusting or rhizoidal, is also unknown. The largest branch fragment is 24 mm long.

The species is named for Neil Andrew Powell, who made a major study of New Zealand Bryozoa (Powell 1967a).

Hippoporina ozalea n.sp. (Plate 19, A, B)

MATERIAL EXAMINED: NZOI Stn E793.

DISTRIBUTION: Northern Fiordland; 243-253 m.

DESCRIPTION: Colony erect from an encrusting base, dichotomously branching, three to five-serial, the zooids all facing on one aspect so that there are distinct frontal and abfrontal surfaces; branch diameter 0.91-1.07 mm, widening to about 1.70 mm at bifurcations. Marginal zooids thickly calcified dorsally and on one side laterally. Encrusting and centre-row zooids 0.61-0.90 x 0.42-0.53 mm, more or less evenly perforated by scattered pores, the remaining surface granular, the zooidal boundaries somewhat irregular. Orifice slightly longer (0.15 mm) than wide, somewhat sunken, with a pair of small, acute, proximally angled condyles. A median suboral avicularium is present, with complete crossbar, the rostrum acute, directed frontally; typically another such avicularium adjacent to it in ovicelled zooids. Ovicell prominent, generally wider than the fertile zooid, perforated like the frontal shield.

HOLOTYPE: Colony in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-479.

TYPE LOCALITY: NZOI Stn E793, 44°40.5'S, 167°32.0'E, on the coast south of the entrance to Milford Sound, Fiordland, 243-253 m.

REMARKS: The species name is derived from the Greek adjective *ozaleos*, branching.

Hippoporina retepora n.sp. (Plates 1, L; 19, C, D)

MATERIAL EXAMINED: NZOI Stn E821; also Stn F146, eastern end of Campbell Plateau, 53°00'S, 172°45'E, 435 m.

DISTRIBUTION: Puysegur Bank, south-western South Island, Campbell Plateau; 435-549 m.

DESCRIPTION: Colony erect, fenestrate, the branches 0.64-2.74 mm wide, the fenestrae subcircular to elongate-oval, 0.87-4.30 mm across their longest dimension; the zooids two to five-serial, all facing on one side, the broad frontal surface flat to gently convex, the dorsal surface correspondingly concave, the rims of the fenestrae curving dorsally. Zooids 0.55-0.88 x 0.42-0.45 mm, the boundaries irregular and difficult to discern in older parts of the colony; frontal shield with irregularly distributed pores, with marginal areolae the same size or larger. Orifice a little wider (0.13-0.16 mm) than long, the proximal rim very shallow, a pair of acute condyles almost in the proximal corners of the orifice, this sometimes enlarged in marginal zooids, with complete crossbar and acute rostrum directed obliquely laterally. Ovicell prominent, with scattered pores mostly in its distal half, like a hood proximally, the margins continuous with a high peristome enclosing both the orifice and 1-2 small avicularia including sometimes the adventitious one that is normally adjacent to the orifice.

HOLOTYPE: Colony fragments in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-481.

PARATYPE: NZOI, type numbers P-709, from NZOI Stn E821, 46°43.5'S, 165°46.5'E, Puysegur Bank, 549 m.

TYPE LOCALITY: NZOI Stn F146, Campbell Rise, 53°00'S, 172°45'E, 435 m.

REMARKS: This remarkable species is slate gray to bluish grey in alcohol. It evidently forms large colonies — the broadest fragment is 7.5 cm high. The fenestrate colony form is reflected in the specific epithet, named for an pre-Linnean genus of Phidoloporidae.

Hippoporina rostrata (MacGillivray)

Schizoporella rostrata MacGillivray, 1887d: 179.
Hippoporina rostrata: Gordon 1984: 76 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B484, B487, B488, B498,

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D247, D254, D262, D269, D270, D272, D273, D274, E820, M791, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Manukau Heads, Cook Strait, Chatham Rise, Fiordland, western approaches to Foveaux Strait; 0-220 m. Also Victoria (Australia), South Africa.

Metroperiella Canu & Bassler, 1917

TYPE SPECIES: *Schizoporella lepralioides* Calvet *in* Jullien & Calvet, 1903

REMARKS: I have discused this genus in an earlier publication (Gordon 1984) in which I pointed out that the identity of the type-species is in doubt — it may be a junior synonym of *Codonellina montferrandii* — and it also lacks one of the otherwise characteristic features of other species assigned to the genus, namely, the dimorphic orifices.

Metroperiella mucronifera (Powell) (Plate 19, E)

Schizomavella mucronifera Powell, 1967: 272.

MATERIAL EXAMINED: NZOI Stns B498, M779, M780, M791, M793, M795, M797, M799, Q686.

DISTRIBUTION: Three Kings Islands, Cook Strait, Milford Sound; 8-205 m.

DESCRIPTION: Colony encrusting, to erect, bilamellar. Zooids 0.42-0.88 x 0.27-0.45 mm, frontal shield relatively convex, more or less regularly, but not densely, perforated; marginal areolae insignificant, slit-like where present. Orifice variable, inasmuch as the sinus ranges from narrowly V-shaped and nearly closed off by the converging points of the condyles, or broadly V- or U-shaped, almost hippoporine, the condyles widely separated; no oral spines. Avicularium median, suboral, the chamber expanded into a tall, projecting umbo that is finely tubercular towards its apex; the umbo often bifurcated, especially on fertile zooids where it may even be trifurcated, in which case there are usually two additional avicularia. Ovicell prominent, perforated, somewhat personate, with the development of peristomial lappets.

REMARKS: This is an interesting species, especially in its variable orifice. Powell (1967) included it in *Schizomavella*, but the centrally perforate frontal shield and lack of oral spines are more typical of *Metroperiella*. The sometimes hippoporine orifice and the unusual suboral avicularian complex which, with the ovicellular lapets, guards the fertile orifice, invite comparison with *Hippoporina*.

Family CRYPTOSULIDAE Vigneaux, 1949

Colony encrusting. Zooids with uniformly but coarsely perforated frontal shield. Orifice large, bell-shaped. No oral spines. Suboral avicularium may be present. Ovicells absent, embryos brooded internally. Multiporous septula present.

Cryptosula Canu & Bassler, 1925

With the characters of the family.

TYPE SPECIES: *Eschara pallasiana* Moll, 1803

Cryptosula pallasiana (Moll) (Plate 20, A)

Eschara pallasiana Moll, 1803: 64.
Lepralia pallasiana: Hincks, 1880: 297; Jelly 1889: 130 (*cum syn.*); Hamilton 1898: 195; Hutton 1904: 297.
Smittina pallasiana: Levinsen 1909: 340.
Cryptosula pallasiana: Canu & Bassler 1925: 33; Marcus 1940: 253; 1942: 58 (*cum syn.*); Osburn 1952: 470 (*cum syn.*); Brown 1952: 274; Ralph & Hurley 1952: 11; Macken 1958: 105; Skerman 1958: 229; 1960a: 624; Gordon 1967: 60; Morton & Miller 1968: 411; Ryland 1965: 72; 1969: 224; 1974a: 80; Hayward & Ryland 1979: 90; Occhipinti Ambrogi 1980: 388; 1981: 118; Bock 1982: 383.

MATERIAL EXAMINED: DPG: Specimens from Whangateau Harbour, Auckland Harbour, Napier, Aotea Lagoon (Porirua Harbour), Wellington, ports of Nelson and Dunedin, Otago Harbour, Bluff.

DISTRIBUTION: Whangateau Harbour, Waitemata Harbour, Napier, Porirua and Wellington Harbours, ports of Nelson and Dunedin, Bluff; intertidal. Also cosmopolitan, particularly in ports, harbours, and estuarine situations.

DESCRIPTION: Colony encrusting. Zooids 0.53-0.79 x 0.29-0.56 mm, the frontal shield coarsely perforated by up to 30 relatively large pores in the area proximal to the orifice in young zooids, with as few as 13 larger pores (with secondary calcification) in older zooids; ridges and tubercles between the pores, with those near the orifice generally converging into a small suboral umbo. Orifice large, bell-shaped, widest proximally with a pair of small descending condyles in the proximal third where it begins to widen. Avicularia lacking in present material. No oral spines. No ovicells.

REMARKS: This widespread marine fouling species is, anatomically, the most studied ascophoran bryozoan (Calvet 1900; Gordon 1973, 1974, 1975b, 1977). In New Zealand habitats, the colour of colonies ranges from orange in seawater of near-oceanic salinity, through pinkish orange, to white in the upper reaches of estuaries and brackish lagoons. It has been known in New Zealand waters from at least the 1890s when Hamilton (1898) recorded it from the ports of Wanganui, Napier, and Dunedin.

Family WATERSIPORIDAE Vigneaux, 1949

Colony encrusting, to erect, bilamellar. Zooidal frontal shield regularly and evenly perforated, with small areolae. Orifice with or without sinus, condyles present. No oral spines or avicularia. Ovicells absent,

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embryos brooded internally. Multiporous mural septula present. Ancestrula resembling later zooids.

Watersipora Neviani, 1895

Characters of the family.

TYPE SPECIES: *Lepralia cucullata* Busk, 1854

REMARKS: The genus *Watersipora* and its species constitute a taxonomic 'can of worms'. In the first place, the genus was based on a misidentified type species (Harmer 1957). Second, species boundaries are blurred because of morphological variation in the relatively few taxonomic characters that exist. Third, the earliest established species assumed to belong to the genus and which may be a senior synonym of a number of the other species is inadequately characterised, and a type specimen is lacking.

These problems have been discussed in varying degrees by a number of authors (e.g., Harmer 1957; Ryland 1974b; Soule and Soule 1976, 1985; d'Hondt 1984a) and it is pointless adding further words here, except to summarise what, it seems to me, needs to be done.

1. The generally accepted type-species of *Watersipora* (Bassler 1953), referred to by Neviani (1895b) as "*Smittia (Watersipora) cucullata* Busk", needs to be formally established. According to Article 70b of the International Code of Zoological Nomenclature (Ride *et al.* 1985), if "a type species is considered to have been misidentified, the case is to be referred to the Commission".

2. The oldest-available name for any species of *Watersipora* has been taken to be *Cellepora subovoidea* d'Orbigny, 1852, a nomen novum for *Cellepora ovoidea* Audouin, 1826 [based on an illustration of Savigny 1817 (*see* Bouchet and Danrigal 1982)], *nec Cellepora ovoidea* Lamouroux, 1816. *If* subsequent species (e.g., *Cellepora subtorquata* d'Orbigny, 1852, *Lepralia cucullata* Busk, 1854, *Schizoporella aterrima* Ortmann, 1890, *Dakaria chevreuxi* Jullien 1903, and *Dakaria typica* Okada and Mawatari, 1937) are all mutually synonymous (cf. Harmer 1957) (which is not proven), then whatever constitutes *Cellepora subovoidea* must be finally settled for the present situation is very unsatisfactory. As Soule and Soule (1985) remarked, "a neotype will have to be designated since Audouin's type materials do not exist. Savigny's illustrations cannot be recognized, and the type locality of *W. subovoidea* is unknown". Recommendation 75E of the Code (Ride *et al.* 1985) states, "Neotypes should be designated to clarify the application of names when their continued existence as nomina dubia threatens the stability of their names". This move is long overdue, considering the economic and ecological importance of the species involved. Alternatively, since *C. subovoidea* is unrecognisable, the name perhaps should be dropped altogether.

3. Following on from the very helpful morphological study of type specimens and geographic variants by Soule and Soule (1976), techniques of biochemical genetics such as enzyme electrophoresis may be needed to determine species boundaries.

Watersipora subtorquata (d'Orbigny) (Plate 20, B-H)

Escharina torquata d'Orbigny, 1842: pl. 4, fig. 3; 1847: 11.
Cellepora subtorquata d'Orbigny, 1852: 399; Waters 1905: 6.
Watersipora cucullata: Marcus 1937: 118; 1938: 46.
Watersipora subtorquata: Ryland 1974: 345; Soule & Soule 1976: 299; 1985: 295.

MATERIAL EXAMINED: DPG: Colonies from the ports of Auckland, Napier, Wellington, and Nelson. B.J. Wilson: Colonies from Otago Harbour. J. McCallum: Colonies from Westhaven boat marina, Auckland.

DISTRIBUTION: Auckland, Napier, Wellington, Dunedin; intertidal. Also Brazil, Bermuda, West Indies, Cape Verde Islands, Japan, Torres Strait, Great Barrier Reef.

DESCRIPTION: Colony encrusting, to erect and bilamellar, forming large, irregular brittle fist-sized colonies; dark grey-black centrally to dull orange beyond, with broad deep-orange margins. Zooids more or less elongate-rectangular, 0.74-1.50 x 0.29-0.68 mm, the frontal shield evenly perforated by numerous pseudopores, with a pair of areolae distally, one either side of the sinus or condyles, each with a small multiporous septulum. Orifice occupying the distal end of the zooid with no or rare intervening pores, about as wide as long, the proximal margin with a moderately broad, rounded or widely V-shaped sinus; the orificial rim thin, raised, variable, often with proximally curling edges (lappets) in older zooids, which may even be spout-like and form a secondary sinus, the distal rim often with a narrow crest also; condyles weakly developed, generally closely applied to the proximal "shoulders" near the sinus; operculum 0.20-0.26 mm wide and long, dark overall, with a darker mushroom-shaped area centrally and distally. No spines, avicularia, or ovicells. Polypides with orange lophophores 0.74-0.85 mm long, 24 tentacles. Ancestrula ca. 0.64 x 0.38 mm, without spines, resembling later zooids.

REMARKS: The synonymy is deliberately conservative, referring to those species definitely corresponding to d'Orbigny's species from Rio de Janeiro which probably also includes *Schizoporella atrofusca* form *labiosa* Hincks, 1886 (Arabian Sea), *Schizoporella aterrima* Ortmann, 1890 (Japan), *Dakaria chevreuxi* Jullien, 1903 (Azores), *Schizoporella cucullata* var. *labiosa* Calvet, 1903 (Azores), *Dakaria typica* Okada and Mawatari, 1937 (Japan), *Watersipora cucullata* var. *watersi* Mawatari 1952 (Japan), and *Watersipora aterrima* Ortmann (d'Hondt 1984a) from France.

Ryland (1974b) encountered colonies of *Watersipora* from eastern Australia with two different types of sinusoid orifice and operculum. The ones from Arrawarra coincided with Hastings's (1930) illustrations of the type specimen of *W. cucullata* Busk from the Aegean Sea, and the others from the Low Isles to *W. subtorquata*

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d'Orbigny. Since Ryland (1974b), following Harmer (1957), assumed *W. cucullata* to be a junior synonym of *W. subovoidea sensu* Harmer, he called his Arawarra specimens *W. subovoidea*. Whatever constitutes *Cellepora subovoidea* Audouin, *W. cucullata* certainly appears distinct from *W. subtorquata* (Soule and Soule 1976). Like Ryland's Low Isles material, the New Zealand specimens correspond to d'Orbigny's species so his is the name chosen here. It is obvious from Kubota and Mawatari's (1985) SEM photos that their northern Japanese material (referred to as *Dakaria subovoidea*) is identical to the New Zealand specimens.

Watersipora arcuata Banta (Plate 20, I,J)

Watersipora cucullata: Hastings 1930: 729 (*partim*); Wisely 1958: 363; Skerman 1960a: 615; 1960b: 631; Gordon 1967: 61; Morton & Miller 1968: 388, 413; Miller & Batt 1973: 88, 92; Luckens 1975: 1; 1976: 12; Morton & Walsby 1983: 63; Dromgoole & Foster 1983: 93.

Dakaria subovoidea: Harmer 1957: 1022; Gordon 1967: 76; Miller & Batt 1973: 88, 92; Grace 1983: 105.

Watersipora arcuata Banta 1969a: 96 (*cum syn.*) 1969b: 248; Ryland 1975: 388; Gordon & Ballantine 1977: 126; Dinamani & Lenz 1977: 23; McKoy 1981: 406; Bock 1982: 383; Dromgoole & Foster 1983: 85; Brock 1985: 45, 47.

MATERIAL EXAMINED: NZOI: Stn J649, lee breakwater, Port Taranaki. DPG: Colonies from Taurikura Bay (Whangarei Heads), Leigh Cove, Waitemata Harbour, Ports of Napier and Nelson.

DISTRIBUTION: Bay of Islands, Whangarei Heads, Leigh, Mahurangi Estuary, Waitemata Harbour, New Plymouth, Napier, Nelson; intertidal. Also Gulf of California, Baja California, Southern California, Galapagos Islands, New South Wales, South Australia.

DESCRIPTION: Colony encrusting, forming unilamellar to multilamellar erect crusts, black with vermilion margins. Zooids more or less elongate-rectangular, 0.68-1.11 x 0.29-0.60 mm, the frontal shield evenly perforated by numerous pseudopores, with a pair of areolae distally, one either side of the orifice, each with a small multiporous septulum. Orifice slightly wider than long, 0.18-0.24 x 0.16-0.27 mm, the operculum dark, with a pair of sublateral clear spots (lucidae) and longitudinal sclerites; the proximal margin of the orifice broad, gently convex or almost straight, the rim thin, raised; a pair of inconspicuous condyles at one third the length of the orifice from the proximal corners. No spines, avicularia, or ovicells.

REMARKS: This important marine-fouling species evidently reached New Zealand between the summers of 1955-56 and 1958-59. On the basis of past absences and past and present occurrences, Banta (1969b) concluded that the species spread from western Mexico to Australia and New Zealand and was subsequently introduced to southern California. Within New Zealand, *W. arcuata* has a reasonably wide distribution though strictly confined to shipping ports.

Family SCHIZOPORELLIDAE Jullien, 1883

Schizomavella Canu & Bassler, 1917

TYPE SPECIES: *Lepralia auriculata* Hassall, 1842

Schizomavella punctigera (MacGillivray)

Schizoporella punctigera MacGillivray, 1883a: 133.

Schizomavella punctigera: Powell 1967: 269; Gordon 1984: 82 (*cum syn.*).

Schizomavella punctigerum: Winston 1986: 27.

MATERIAL EXAMINED: NZOI Stns B455, B482, B483, B487, B488, B489, B490, B493, B611, C868, C869, C871, D270, D273, E817, E820, E828, M775, M776, M780, M793, M794, M795, M799.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Tasman Bay, Chatham Rise, Milford Sound, Puysegur Bank, Foveaux Strait, Stewart Island; 8-370 m. Also SE Australia, Indonesia, Jamaica, Venezuela.

REMARKS: The suboral avicularium may vary within a single colony, occurring as a short, rounded, raised structure, or, as Powell (1967) depicted, more than twice as long and flatter. The number of ovicellular pores also varies, depending on the extent of encroaching secondary calcification.

This species may also have spatulate frontal avicularia, as shown in Winston (1986, fig. 63). Her Jamaican material had 6-7 oral spines compared to 5-6 in New Zealand material, but accords in other features.

Schizomavella incurvata (Uttley & Bullivant) (Plate 21, B)

Lacerna incurvata Uttley & Bullivant, 1972: 39.

MATERIAL EXAMINED: NZOI Stns E821, M779, M797; also NZOI P-167, paratype colony of *Lacerna incurvata.*

DISTRIBUTION: Chatham Rise, Milford Sound, Puysegur Bank; 30-549 m.

DESCRIPTION: Colony initially encrusting, tending to concave, almost dish-shaped, with the free edges raised above the substratum. Zooids 0.32 (periancestrular) - 1.07 x 0.23-0.62 mm, elongate-rectangular to subquadrate, the frontal shield nearly smooth to subrugose, with 6-14 conspicuous areolae along each margin. Orifice somewhat pyriform, with a pair of deep-set, proximally angled, condyles delimiting the rounded shallow sinus. Oral spines 4-5. A median suboral avicularium or this offset from the mid-line, subcircular, with a complete cross-bar; sometimes additional, identical, avicularia along the margins. Ovicell fairly prominent, smooth with up to >40 pores, these often partly obliterated distally by encroaching secondary calcification. A pair of additional lateral-oral avicularia in ovicelled zooids.

REMARKS: This species is a typical *Schizomavella.* The

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genus *Lacerna* has been discussed by Gordon (1984). *Inter alia*, it has imperforate ovicells and lacks avicularia.

Schizomavella aurita n.sp. (Pate 21, C, D)

MATERIAL EXAMINED: NZOI Stn S371

DISTRIBUTION: Off the Westland coast; 171-180 m.

DESCRIPTION: Colony tiny, encrusting. Zooids 0.32-0.45 x 0.20-0.32 mm, the frontal shield slightly convex, smooth, imperforate except for 2-3 pairs of areolae, the zooidal margins appearing as thin lines which rise up to produce a pair of erect ear-like projections either side of the orifice around the distal areolae. Orifice with U-shaped sinus and stout ridge-like condyles; operculum 0.073-0.105 mm wide; a pair of evanescent oral spines. Avicularia rare, suboral, nearly circular, lacking a cross-bar but with a pair of condyles distally. Ovicell with a smooth calcareous margin peripherally and a broad frontal area with numerous pores; merging with the "ears" to form a kind of peristome.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-492.

TYPE LOCALITY: NZOI Stn S371, off the Westland coast between Hokitika and Gillespie Point, 42°57.7'S, 170°02.5'E, 171-180 m.

REMARKS: This species seems most closely allied to *Schizomavella*, although the rare avicularia lacking a complete pivot bar are unusual. It has been found only on the aboral spines of the frontal notch of the echinoid *Spatangus multispinus* Mortensen, with other bryozoans (*Arachnoidella echinophilia*, *Celleporella delta*, *Crisia* sp., *Galeopsis mimicus*, *Nolella ?stipata*, and *Triticella nodosa*) (*see* Gordon 1986).

The species name is derived from the Latin adjective *auritus*, eared.

Schizomavella pansa n.sp. (Plate 21, E, F)

MATERIAL EXAMINED: NZOI Stn E793.

DISTRIBUTION: Fiordland coast; 243-253 m.

DESCRIPTION: Colony erect, branching, the branches circular in cross section with zooids opening around two-thirds of the circumference. Zooids about 0.64 x 0.28 mm, the shield smooth or somewhat textured, imperforate except for 2-4 conspicuous areolae along each margin. Orifice with relatively broad shallow sinus accentuated by stout, protruding condyles. No oral spines. Avicularium subcircular, with complete cross-bar. Ovicell not seen.

HOLOTYPE: Unique colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-493.

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

REMARKS: The unique holotype specimen is 10 mm high, with a 1.5-mm-diameter stem arising from a 3-mm-diameter, flattened base. The first 4 mm are largely kenozooidal to the level where feeding orifices occur. The first branching, at 6 mm from the base, is trichotomous. Two subsequent branchings are dichotomous. Though facing mainly on one aspect, the zooids seem to be arranged in 5-8 longitudinal series. The abfrontal surface is marked by a faintly granular texture, shortly furrowed pores, and thin lines of vibices.

No other *Schizomavella* species in the New Zealand region has an erect branching habit. The species name is derived from the Latin, meaning spread, and alludes to the spread-open, wide-armed appearance of the holotype colony.

Schizomavella virago n.sp. (Plate 22, A)

MATERIAL EXAMINED: NZOI Stns B490, B493, B837, D270, D272, D273, E796, E817, E820, E821, E828.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Fiordland, Puysegur Bank; 40-549 m.

DESCRIPTION: Colony encrusting. Zooids subquadrate, often wider than long, 0.40-0.85 x 0.36-0.81 mm; the frontal shield convex, porcellanous though faintly textured, with 5-6 small areolae along each margin. Orifice with a deep round sinus, the condyles descending; oral spines 5-7, with 2 present in ovicelled zooids. Avicularia numerous, at least three on each zooid, one median and suboral, a lateral-oral pair, and sometimes additional ones from any point on the distal and lateral margins where there are areolae; the rostrum small, though much raised above the frontal surface, the cross-bar complete. Ovicell prominent, sometimes raised considerably above the frontal shield, with >40 pores, each with a raised rim, giving a rugose appearance to the ovicellular surface, the number of pores becoming reduced by encroaching secondary calcification; at the boundary of this calcification are 1-4 additional avicularia projecting above the ovicell.

HOLOTYPE: Colony fragments, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-495.

PARATYPE: NZOI, type number P-717, from NZOI Stn E821, 46°43.5'S, 165°46.5'E, Puysegur Bank, 549 m; and Stn B490, 45°44.3'S, 166°44.8'E, Dusky Sound, 148 m.

TYPE LOCALITY: NZOI Stn B837, 40°59.0'S, 174°03.0'E, Forsyth Bay, Marlborough Sounds, 40 m.

REMARKS: *Virago* is a Latin female noun meaning female warrior, and alludes to the large number of avicularia associated with female zooids in this species.

Schizomavella trachoma n.sp (Plate 22, B)

MATERIAL EXAMINED: NZOI Stns B487, B490, E820, E828, Q686.

DISTRIBUTION: D'Urville Island, Dusky Sound, Puysegur Bank, western approaches to Foveaux Strait; 148-220 m.

DESCRIPTION: Colony encrusting, soon becoming mul-

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tilamellar by frontal budding. Zooids irregularly disposed, with irregular boundaries, 0.34-0.90 x 0.34-0.58 mm, the frontal shield rugose, with 6-9 areolae along each margin. Orifice somewhat pyriform, with conspicuous condyles clearly delimiting and constricting the entrance to the rounded sinus; a smooth low peristomial rim surrounding the orifice. Oral spines 2-3, non-articulated, short and stumpy. Avicularium single, on one side of the orifice, or absent; the rostrum round, a little elongated, cross-bar smooth. Ovicell fairly prominent, with a U-shaped endooecium conspicuously perforated by about 20-32 pores.

HOLOTYPE: A large colony about 30 mm across and 15 mm high, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-494.

PARATYPE: NZOI, type number P-716, from NZOI Stn B487, 46°16.0'S, 166°03.0'E, Puysegur Bank, 196 mm.

TYPE LOCALITY: NZOI Stn B490, 45°44.3'S, 166°44.8'E, Dusky Sound, 148 m.

REMARKS: *Trachoma* is a Greek neuter noun meaning roughness, and alludes to the irregular texture of the frontal shield and colony surface of this species.

Escharina Milne-Edwards, 1836

TYPE SPECIES: *Eschara vulgaris* Moll, 1803

Escharina waiparaensis Brown

Escharina waiparaensis Brown, 1952: 229; Hayward & Cook 1983:71; Gordon 1984: 84 (*cum syn.*); 1985: 177.

MATERIAL EXAMINED: NZOI Stns B480, B481, B483, B484, B487, B493, B498, B616.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Chatham Rise, Fiordland, Puysegur Bank; 44-350 m. Also Miocene of Southland, Miocene of Hawkes Bay; also South Africa.

Schizoporella Hincks, 1877

Colony encrusting to erect, bilamellar, branching, or cylindrical. Zooids with regularly perforated frontal shield. Orifice with definite sinus. Spines absent or on marginal zooids only. Avicularia adventitious, paired or single, lateral to the orifice, occasionally additional ones elsewhere, not small. Ovicell prominent, not closed by zooidal operculum, with scattered pores and/or ridges and umbones.

TYPE SPECIES: *Lepralia unicornis* Johnston in Wood, 1844

REMARKS: Buge (1975) discovered, upon examination of the holotype specimen, that *Multiporina ostracites* d'Orbigny, 1852 (Oligocene) is a junior synonym of *Lepralia unicornis* Johnston, making *Multiporina* a senior synonym of *Schizoporella*. As Buge (1975) pointed out, *Schizoporella* is so well known a genus (*S. unicornis* is a common marine-fouling species) that invoking the Principle of Priority would only cause confusion. A case to suppress *Multiporina* in favour of *Schizoporella* needs to be made to the International Commission on Zoological Nomenclature, however (Ride *et al.* 1985, Articles 23b, 79c).

Schizoporella aotearoa n.sp. (Plate 22, C)

MATERIAL EXAMINED: NZOI Stn M780.

DISTRIBUTION: Milford Sound, Fiordland; 40 m.

DESCRIPTION: Colony encrusting. Zooids 0.49-0.64 x 0.29-0.43 mm, sometimes as long as wide, with distinct zooidal boundaries and regularly perforated by relatively large pores. Orifice with a short U-shaped sinus, the condyles set in the "corners" of the orifice. Oral spines absent. Avicularium relatively large, single, adjacent to the orifice, the rostrum triangular, directed upward frontally, the cross-bar complete. Ovicell large, prominent, wider than the maternal zooid, with a flattened sloping surface perforated by >40 pores, bordered by a distal rim of secondary calcification.

HOLOTYPE: Colony fragment in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-496.

TYPE LOCALITY: NZOI Stn M780, 44°36.6'S, 167°52.1'E, Milford Sound, 40 m.

REMARKS: This species may be the first record of a genuine, non-introduced, *Schizoporella* species from New Zealand except that the ovicell is not altogether typical of other species of this genus in the extensive porous area; also the ovicell in the unique holotype looks as if it could be closed by the zooidal operculum in life.

The species name, *aotearoa*, is the Maori name for New Zealand.

Hippomenella Canu & Bassler, 1917

TYPE SPECIES: *Lepralia mucronelliformis* Waters, 1899

Hippomenella vellicata (Hutton) (Plate 21, A)

Lepralia vellicata Hutton, 1873: 98.
Hippomenella vellicata: Brown 1952: 278; Gordon 1984: 77 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B473, B482, B487, B490, B493, B498, B616, C852, C861, C869, C871, D269, D270, D272, D273, E820, M773, M791, M797, Q686. DPG: Separation Point, Abel Tasman National Park.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Tasman Bay, Separation Point, Chatham Rise, Fiordland, western approaches to Foveaux Strait; 25-350 m.

Chiastosella Canu & Bassler *in* Bassler, 1934

TYPE SPECIES: *Schizoporella daedala* MacGillivray, 1887

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Chiastosella umbonata n.sp. (Plate 22, D)

Chiastosella daedala: Uttley & Bullivant 1972: 43.

MATERIAL EXAMINED: NZOI Stns C867, C869, D273, M784B.

DISTRIBUTION: Marlborough Sounds, Tasman Bay, Chatham Rise, Milford Sound; 30-88 m.

DESCRIPTION: Colony encrusting. Zooids small, 0.42-0.47 x 0.27-0.53 mm, about as wide as long, sometimes wider. Frontal shield produced into a tall umbo; largely smooth and imperforate, with marginal areolae. Orifice with a comparatively small U-shaped sinus flanked by a pair of grooved condyles; spines mostly 6, occasionally only 5. Avicularia mostly paired, acute, directed laterally, with raised rostral tip and complete cross-bar. Ovicell with a central umbo, not as high as that of the frontal shield, and an imperforate crescentic "gutter" distally with pores between it and the umbo. A pair of oral spines on ovicelled zooids. Basal pore-chambers present.

HOLOTYPE: A colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-487.

TYPE LOCALITY: NZOI Stn C869, Tory Channel, 41°13.0'S, 174°17.1'E, 35 m.

REMARKS: The extreme umbonate frontal shield instantly distinguishes this from all other species, including *C. daedala* MacGillivray to which Uttley and Bullivant (1972) attributed their material. Wass and Yoo (1983) have illustrated *C. daedala* by SEM —there are more frontal pores than in *C. umbonata* and the ovicell is proportionately larger with a more discrete porous crescentic area.

Chiastosella watersi Stach (Plate 22, E)

Chiastosella watersi Stach, 1937b: 336; Brown 1952: 225 (*cum syn.*); Powell 1967: 280.
Chiastosella gabrieli: Uttley & Bullivant, 1972: 43.

MATERIAL EXAMINED: NZOI: Stns B498, C869, D270, D272, D273, D274, E817, Q686. DPG: Bluff.

DISTRIBUTION: Three Kings Islands, Cook Strait, Chatham Rise, Otago Heads, Bluff, Puysegur Bank; 0-235 m. Also Pliocene of Hawkes Bay.

DESCRIPTION: Colony encrusting. Zooids 0.53-0.85 x 0.23-0.56 mm; frontal shield with conspicuous marginal areolae, the holes encroaching towards the centre of the shield which is internally imperforate. Orifice with a rounded V-shaped sinus and grooved condyles, the tips of which sometimes project into the entrance to the sinus. Oral spines 4-5, reduced to 2 in ovicelled zooids. Avicularia sporadic, borne singly, the cross-bar complete, the rostrum rounded or acute and generally elevated. Ovicell appearing prominent though merging into secondary calcification of distal zooid; frontal surface imperforate, with a crescent of pores and an arc of calcification marking the distal boundary of the ovicell. Basal pore-chambers present.

REMARKS: Colonies from NZOI Stn Q686 (Stephens Hole, Cook Strait) have a granular frontal shield and ovicellular surface. The ovicell is also flatter and less prominent. Although appearing initially very distinct, this form accords, in zooidal dimensions and other features, with the non-granular morphotype.

According to Powell (1967), colonies from northern New Zealand may have from 3-5 oral spines on non-ovicelled zooids, and occasionally paired avicularia. Whereas avicularia are sporadic in the present material, Powell found them to be rarely absent in Three Kings colonies.

Dightonia Brown, 1948, a monotypic genus from the Oligocene of New Zealand, has many features in common with *Chiastosella watersi*, especially in the form of the ovicell with its distal crescent of areolae. The orifices of *Dightonia* are dimorphic, however, and the frontal shield is centrally perforate.

Chiastosella enigma Brown (Plate 22, F)

Chiastosella enigma Brown, 1954a: 557; Macken, 1958: 105; Uttley & Bullivant 1972: 43.

MATERIAL EXAMINED: NZOI: Stns B482, B487, B488, B489, B490, B611, D270, D273, D274, E817, E820. DPG: Otago Shelf.

DISTRIBUTION: Cook Strait, Tasman Bay, Chatham Rise, Otago Shelf, Puysegur Bank; 27-235 m.

DESCRIPTION: Colony encrusting. Zooids 0.50-0.92 x 0.50-0.88 mm, often as wide as long or wider. Frontal shield with smooth-surfaced irregularities — ridges, grooves, and pores; areolae occur marginally, and frontally along the proximal boundaries of the avicularian chambers; with secondary calcification the whole frontal shield can appear porous but the inner surface is centrally imperforate. Orifice with a parallel-sided, very narrow, sinus and non-grooved, non-projecting condyles; 4-5 oral spines, 2 in ovicelled zooids. Avicularia generally paired, adjacent to the orifice distolaterally, long, acute, with complete cross-bar, the rostrum directed obliquely laterally or, in space-limited fertile parts of colonies between adjacent ovicells, occurring proximal to the oral spines and directed proximally. Ovicell fairly prominent, centrally imperforate but bordered by a porous crescentic gutter and adjacent row of pores distally and, especially in older parts of colonies, several larger areolar pores proximally. Basal pore-chambers present.

REMARKS: As Brown (1954a) pointed out, some of the species of *Chiastosella* (Schizoporellidae) resemble those of *Calloporina* (Microporellidae) which differs only in the possession of an ascopore. Both genera are generally highly pigmented and have basal pore-chambers. No doubt there is a close relationship here, obscured by the conventional taxonomy. Perhaps only biochemical techniques will settle the matter.

Fresh colonies of *C. enigma* are brownish orange fading to yellowish green.

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Chiastosella duplicata n.sp. (Plate 23, A-C)

MATERIAL EXAMINED: NZOI Stns B488, B489, E796, E820, E821.

DISTRIBUTION: Entrance to Dagg Sound, Puysegur Bank; 164-549 m.

DESCRIPTION: Colony encrusting. Zooids large, robust, deep-bodied, 0.70-1.07 x 0.61-1.07 mm. Frontal shield imperforate and relatively smooth centrally in young zooids, tending to irregular and furrowed in older zooids, with marginal areolae separated by ridges. Orifice with a U-shaped sinus and smooth shelf-like condyles; oral spines 3. Avicularia paired, rarely single, very long and acute, with complete cross-bar, occurring mid-laterally, directed mostly laterally, with opposing tips of adjacent avicularia from two zooids occurring just distal to the orifice of a subjacent, proximal, zooid. Ovicell reasonably large but not much raised above the colony surface and somewhat immersed in secondary calcification; the frontal surface textured, with a crescent of small pores and a smooth, imperforate "gutter" distally, the latter variably developed, sometimes masked by secondary calcification. Basal pore-chambers present with multiporous septula; the basal wall of the zooid distally produced into a spine-like projection, not separated from the zooidal body cavity by a septulum, in parts of colonies raised above the substratum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-485.

PARATYPE: NZOI, type numbers P-710, from the same locality as the holotype, and from NZOI Stn B489, Puysegur Bank, 46°39.0'S, 165°57.0'E, 198 m.

TYPE LOCALITY: NZOI Stn E821, Puysegur Bank, 46°43.5'S, 165°46.5'E, 549 m.

REMARKS: Three species of *Chiastocella* in the New Zealand region occur to depths exceeding 500 m, i.e., *C. duplicata, C. longaevitas* Powell, and *C. exuberans* n.sp. Each is robust and superficially resembles the other two. *C. longaevitas* is distinguished, *inter alia*, by a completely porous frontal shield and 6-7 oral spines; *C. duplicata* has 3 oral spines and marginal areolae; *C. exuberans* has 4-5 oral spines, marginal areolae, and distinctive distally directed avicularia.

The name *duplicata* refers to the paired avicularia.

Chiastosella exuberans n.sp. (Plate 23, D,E)

MATERIAL EXAMINED: NZOI Stns B488, E803, E804.

DISTRIBUTION: Puysegur Bank, 164-534 m.

DESCRIPTION: Colony encrusting. Zooids robust, deep bodied, 0.59-1.28 x 0.53-1.50 mm, the frontal shield imperforate, except for inconspicuous areolae, and tubercular, with some tubercles spine-like. Orifice proportionately large, occupying one-half to one-third the zooidal length, with a short U-shaped sinus the corners of which may project rather more than the condyles; oral spines 4-5. Avicularia mostly paired, with complete cross-bar, the rostrum somewhat elongate, acute, directed distally or obliquely so. Ovicell recumbent, irregular-surfaced, the distal crescentic area present but not that discrete. Multiporous mural septula occur along the bottoms of lateral walls in recesses not quite discrete enough to be called pore-chambers.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-486.

PARATYPE: NZOI, type number P-711, from NZOI Stn E804, Puysegur Bank, 45°58.5'S, 166°18.5'E, 183 m.

TYPE LOCALITY: NZOI Stn E803, Puysegur Bank, 45°57.0'S, 166°09.0'E, 534-514 m.

REMARKS: The species name alludes to the robust, wide-orificed appearance of the zooids.

Chiastosella dissidens n.sp. (Plate 23, F)

MATERIAL EXAMINED: NZOI Stns B477, B483, B487, B616, E796, E804, E817, E820, E828.

DISTRIBUTION: Fiordland, Puysegur Bank, western approaches to Foveaux Strait; 82-226 m.

DESCRIPTION: Colony encrusting. Zooids 0.49-0.88 x 0.29-0.70 mm, more or less smooth-shielded though faintly textured, with numerous marginal areolae. Orifice with a U-shaped sinus; bordered distally by 2-3 spines and, on the other three sides, by a prominent peristomial ridge which has an additional pair of oral spines set in its free ends; scattered pores occur proximolaterally to the peristome. Avicularia absent. Ovicell fairly prominent, with an extensive smooth frontal area bordered distally by a semicircle of small pores and a double ridge of calcification.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-484.

TYPE LOCALITY: NZOI Stn B616, entrance to Dagg Sound, 45°20.0'S, 166°47.0'E, 134 m.

REMARKS: *Chiastosella dissidens* differs considerably (hence the specific name) from all other species of the genus in its lack of avicularia, its mostly smooth frontal shield, and a peristome incorporating oral spines. Nevertheless, the ovicell certainly can be accommodated within the concept of *Chiastosella.*

Cribellopora Gautier, 1957

TYPE SPECIES: *Cribellopora simplex* Gautier, 1957

Cribellopora napi n.sp. (Plate 24, A)

Cribellopora divisopora: Powell 1967: 260.

MATERIAL EXAMINED: NZOI Stns B487, D269, D272, E796, Q686. Also slides of *Schizoporella divisopora*, 2865, 2866, 3101, and 3102, Waters Collection, Manchester Mu-

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seum, all from Port Jackson, New South Wales; and slides of *Schizoporella trichotoma*, 2890, 2895, 2897, Waters Collection, Manchester Museum, all from Cape Verde Islands.

DISTRIBUTION: Three Kings Islands, Marlborough Sounds, Tasman Bay, Fiordland, Puysegur Bank, 57-226 m.

DESCRIPTION: Colony encrusting. Zooids 0.32-0.60 x 0.19-0.58 mm, the frontal shield with 40-50 relatively large compound pores in autozooids, 25-35 in ovicelled zooids, either evenly distributed in the shield or with an imperforate area centrally and a small subcentral umbo; the pores initially simple, becoming divided by 3-6 radii into compound pores, with an even finer calcareous meshwork between the radii. Orifice with a narrow, almost slit-like, sinus, thick grooved condyles, and a smooth narrow rim all around; articulated spines absent, but a pair of short lateral-oral evanescent spines in some marginal zooids; these spines leaving no basal trace. No avicularia. Ovicell prominent, smooth, tending to umbonate or subcarinate in older zooids, with a row of small simple pores around the periphery; closed by the zooidal operculum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-488.

PARATYPE: NZOI, type number P-712 from NZOI Stn D272, Tasman Bay, 40°40.0'S, 173°49.5'E, 59 m.

TYPE LOCALITY: NZOI Stn Q686, Stephens Hole, 40°41.3'S, 174°03.8'E, 205 m.

REMARKS: The genus *Cribellopora* includes only three other previously named species. *Cribellopora trichotoma*, from the Cape Verde Islands, has a distinct U-shaped sinus, 4-5 spines on autozooids, two spines on ovicelled zooids, an ovicell with numerous stellate pores, and an operculum with a pair of diagonal sclerites. This species was subsequently recorded by Hastings (1930) and Osburn (1952) from the Galapagos Islands and the Gulf of California. Their descriptions and illustrations more or less coincide with that of Waters (1918) and Hastings was able to examine Waters's specimens. Her figures do not show spines, however, although Osburn mentions four "minute and evanescent" spines. This is surprising, for an examination of Waters's specimens shows obvious spines or spine bases both in marginal zooids and older zooids.

Gautier (1957) described a new genus and species, *Cribellopora simplex*, from the Balearic Islands, later synonymising it with *C. trichotoma* (Gautier 1962). His illustrations show fewer pores centrally, a different configuration of the opercular sclerites, and no spines on any zooid but he was confident the two species are conspecific. I have not examined his specimens.

The other species, *Cribellopora divisopora* (Waters, 1887b) has fewer, proportionally larger, somewhat sunken frontal pores, a pair of spots instead of diagonal sclerites on the operculum, and stellate pores confined to the periphery of the ovicell. Powell (1967), on the basis of Three Kings specimens which he attributed to *C. divisopora*, assumed that *C. divisopora* has a smooth ovicell with non-stellate marginal pores. Because of this I assigned Kermadec Ridge specimens with stellate ovicellular pores to *C. trichotoma* (Gordon 1984) instead of to *C. divisopora* to which it clearly belongs. Wass and Yoo (1983) illustrated by SEM southern Australian material which also has stellate ovicellular pores, attributing it to *C. divisopora*, and although appearing different from the Kermadec specimens — the stellate pores are fewer, with thicker radii, and they do not occur as close to the zooidal margins — their attribution is probably correct.

The specific epithet, *napi*, is taken from the initials of Neil Andrew Powell, for whom this species is named.

Cribellopora siri n.sp. (Plate 24, B)

MATERIAL EXAMINED: NZOI Stns B483, B484, E804, E821.

DISTRIBUTION: Puysegur Bank; 124-549 m.

DESCRIPTION: Colony encrusting. Zooids 0.53-0.81 x 0.40-0.92 mm, often as wide as, or wider than, long; frontal shield convex, with deep "valleys" between the zooids, the surface finely granular, with small compound pores around the periphery and especially adjacent to the orifice; these with 1-5 radii which are not further divided. Orifice with a very small U-shaped sinus and average-sized non-ribbed condyles, bordered proximally by a smooth narrow rim. No oral spines or avicularia. Ovicell prominent, granular, with a row of tiny pores around the distal rim; closed by the zooidal operculum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-489.

PARATYPE: NZOI, type number P-713, from NZOI Stn E821, Puysegur Bank, 46°43.5'S, 165°46.5'E, 549 m.

TYPE LOCALITY: NZOI Stn B483, Puysegur Bank, 46°01.5'S, 166°21.0'E, 187 m.

REMARKS: Although the compound pores are not well developed, this species otherwise accords well with the concept of *Cribellopora*.

The species is named for the government department (Scientific and Industrial Research) to which the N.Z. Oceanographic Institute belongs.

Phonicosia Jullien, 1888

TYPE SPECIES: *Phonicosia jousseaumei* Jullien, 1888

Phonicosia circinata (MacGillivray)

Lepralia circinata MacGillivray, 1869: 134.
Arthropoma circinatum: Hayward & Cook 1983: 69.
Phonicosia circinata: Gordon 1984: 87 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B457, B487, B488, B489, B490, B493, B616, C869, D269, D270, D272, D273, E804, E817, E820, E821, E828, M779, Q686.

DISTRIBUTION: Kermadec Ridge, and throughout New

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Zealand from Three Kings Islands to Foveaux Strait; 10-635 m. Also Australia, Indonesia, Funafuti, Sri Lanka, Japan, Tristan da Cunha.

Phonicosia oviseparata (Brown) (Plate 24, C,D)

"Schizoporella" oviseparata Brown, 1952: 242.
Schizoporella globosa Powell, 1967: 265.

MATERIAL EXAMINED: NZOI Stns B493, E796, E804, E820, E828. BM(NH) Palaeontology: Holotype of *"Schizoporella" oviseparata*, D.3679.

DISTRIBUTION: Three Kings Islands, Fiordland, Puysegur Bank; 84-226 m. Lower Oligocene to Recent.

DESCRIPTION: Colony encrusting. Zooids 0.34-0.60 x 0.23-0.41 mm, with smooth convex frontal shields and deep furrows between and up to seven areolae along each margin. Orifice with a shallow sinus and rather stout condyles; oral spines six, with four in ovicelled zooids. A stout crescentic ridge occurs proximal to the orifice, tapering to the sides of the zooid where it separates the marginal areolae from a larger distal pair — all areolae, especially the distal pair, are constricted by calcareous processes. No avicularia. Ovicell globular, smooth, with a row of small marginal areolae. Three large pore-chambers occur in the distal half of each zooid.

REMARKS: Thanks to the courtesy of Dr P.D. Taylor, I have been able to examine Brown's holotype specimen. It appears identical to Recent material although details of the spine bases and distal areolar pores are not clearly seen in the former. Powell's (1967) illustration of the orifice of this species (as *Schizoporella globosa*) is misleadingly narrow. The distal areolar pores are reminiscent of the 'stellate' pores of *Cribellopora* species.

Phonicosia styphelia n.sp. (Plate 24, E)

MATERIAL EXAMINED: NZOI Stn B493.

DISTRIBUTION: Fiordland; 84 m.

DESCRIPTION: Colony encrusting. Zooids 0.44-0.75 x 0.32-0.66 mm, convex, separated by deep furrows, the frontal shield somewhat rough textured, centrally imperforate with 2-3 rows of marginal areolae merging to one row proximally. Orifice with a rounded V-shaped simus and narrow inconspicuous condyles; oral spines four, with two in ovicelled zooids. A transverse umbo or ridge occurs proximal to the orifice. No avicularia. Ovicell prominent, frontally imperforate and rugose, with a row of small areolae distally. In the distal half of the zooid are 3-4 pore-chambers.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-491.

PARATYPE: NZOI, type number P-715, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn B493, entrance to Breaksea Sound, Fiordland, 45°34.4'S, 166°39.1'E, 84 m.

REMARKS: This species is similar to *Schizoporella vandiemenensis* Powell, 1967 (= *Phonicosia vandiemenensis* n. comb.) which, however, has a single row of areolar pores and a peristome "surrounding the orifice".

The species name is derived from the Greek *styphelos*, hard or rough, alluding to the frontal shield.

Rogicka Uttley & Bullivant, 1972

TYPE SPECIES: *Schizoporella biserialis* Hincks, 1885

Rogicka biserialis (Hincks)

Schizoporella biserialis Hincks, 1885: 250.
Rogicka biserialis: Uttley & Bullivant 1972: 38; Gordon 1984: 86 (*cum syn*); Hayward 1988: 313.

MATERIAL EXAMINED: NZOI: Stns B473, B482, B488, C868, E817, E820, E828, Q686. DPG: Port of Napier.

DISTRIBUTION: Three Kings Islands, Napier, Cook Strait, Tasman Bay, off Westland, Puysegur Bank; 0-318 m. Also New South Wales, and Mauritius.

Nimba Jullien *in* Jullien & Calvet, 1903

TYPE SPECIES: *Nimba praetexta* Jullien *in* Jullien & Calvet 1903

Nimba terraenovae (Powell)

Schizoporella terraenovae Powell, 1967: 268.
Nimba terraenovae: Gordon 1984: 84.

MATERIAL EXAMINED: NZOI Stn B457.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Kahurangi Point; 104-490 m.

Nimba verrucosa n.sp. (Plates 24 F; 25, A)

MATERIAL EXAMINED: NZOI Stns B457, E820.

DISTRIBUTION: Kahurangi Point, Puysegur Bank; 211-220 m.

DESCRIPTION: Colony encrusting, uniserial, branching mostly at right angles. Zooids 0.57-0.75 x 0.38-0.43 mm, more or less pyriform, tapering proximally, edged by a flattened rim. Frontal shield more or less smooth, with scattered papillae or wart-like structures, centrally imperforate except for about five small areolar pores on each side. Orifice with a broad U-shaped sinus and moderately developed condyles; completely surrounded by a flared peristome, no oral spines. Ovicell recumbent, closed by the zooidal operculum, imperforate, and decorated by numerous wart-like tubercles. Budding takes place from what looks like tiny pore-chambers — one on each side and one mid-distally.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-490.

PARATYPE: NZOI, type number P-714, from NZOI Stn B457, Kahurangi Point, 40°38.0'S, 171°43.0'E, 211 m.

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TYPE LOCALITY: NZOI Stn E820, Puysegur Bank, 46°35.0'S, 165°58.0'E, 220 m.

REMARKS: *Nimba verrucosa* more closely resembles the type-species, *N. praetexta*, than does *N. terraenovae*, for it also has a flared peristome and no spines. *N. praetexta* has an overall granular shield and a series of lateral pores or areolae in the flattened marginal rim.

The species name is derived from the Latin adjective *verrucosus*, warty.

Buffonellodes Strand, 1928

TYPE SPECIES: *Buffonella rimosa* Jullien, 1888

REMARKS: *Buffonellodes* should, perhaps, be included in the Eminooeciidae (Hayward and Thorpe 1988c).

Buffonellodes ridleyi (MacGillivray)

Schizoporella Ridleyi MacGillivray, 1883b: 191; 1887c: 148; Quelch 1884: 215.
'Schizoporella' ridleyi: Wass & Yoo 1983: 346.
Buffonellodes ridleyi: Uttley & Bullivant 1972: 42; Gordon 1984: 89 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B455, B457, B477, B479, B493, B498, C871, D246, D262, D273, E820, M780, M783B, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Marlborough Sounds, Tasman Bay, Kahurangi Shoals, Chatham Rise, Fiordland, Puysegur Bank; 29-280 m. Also South Australia, Victoria.

REMARKS: This is one of a group of similar-looking species. Hincks (1891) compared *B. ridleyi* to *Schizoporella tumida* Hincks, 1881 from Bass Strait, which is probably also a *Buffonellodes* species.

Buffonellodes rimosa (Jullien)

Buffonella rimosa Jullien, 1888: 47.
Schizoporella imperforata Powell, 1967: 267.
Buffonellodes rimosa: Uttley & Bullivant 1972: 42; Gordon 1984: 88.

MATERIAL EXAMINED: NZOI Stn C868.

DISTRIBUTION: Three Kings Islands, Cook Strait, Chatham Rise; 69-198 m. Also magellanic South America.

DESCRIPTION: Colony encrusting. Zooids small, 0.17-0.45 x 0.12-0.32 mm, the frontal shield very smooth, convex, with a very prominent avicularian chamber and umbo proximal to the orifice; completely imperforate except for a series of very narrow areolae in the interzooidal furrows. Orifice with a rounded V-shaped sinus and stout condyles; oral spines four, with two on ovicelled zooids. Avicularium facing distally, more or less circular, with complete cross-bar and slightly denticulate rostral rim. Ovicell as round and prominent as the avicularian chamber, with an apical umbo, smooth, and completely imperforate, not closed by the zooidal operculum; in the mature colony virtually every zooid is ovicelled. Pore-chambers present.

REMARKS: This species was illustrated by Gordon (1984).

Buffonellodes madrecilla n.sp. (Plate 25, B)

MATERIAL EXAMINED: NZOI Stns B483, B484, B487, B490, D270, D272, E817, E820, E828.

DISTRIBUTION: Tasman Bay, Fiordland, Puysegur Bank; 59-220 m.

DESCRIPTION: Colony encrusting. Zooids 0.36-0.53 x 0.27-0.38 mm, the frontal shield convex, granular or comparably textured, imperforate except for a few small areolae in the interzooidal furrows. Orifice with a small, very shallow sinus flanked by relatively stout ledge-like condyles which make the sinus appear superficially bigger than it is; oral spines six. Avicularium surmounting a large avicularian cavity on the mid-frontal wall, the rostrum acute, directed more or less frontally upward, the cross-bar complete. Ovicell prominent, subglobular, completely enveloping the orifice proximally with a scalloped persona; the ovicellular surface granular and completely imperforate.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-483.

TYPE LOCALITY: NZOI Stn B488, Puysegur Bank, 46°28.7'S, 166°14.3'E, 164 m.

REMARKS: This species is closest to *Buffonellodes* although the personate ovicell and centrally located avicularium are unusual for this genus.

The specific name is from the Spanish, *madrecilla*, a diminutive form of *madre*, mother, but expressing endearment and affection, alluding to the all-embracing ovicell of this species.

Buffonellodes improvisa (Uttley & Bullivant) (Plate 25, C)

Lacerna improvisa Uttley & Bullivant, 1972: 39.

MATERIAL EXAMINED: NZOI Stn B455. Also holotype of *L. improvisa*, Canterbury Museum zb 193; and NZOI paratype P-165 (= *Schizomavella punctigera*).

DISTRIBUTION: Kahurangi Point, Mernoo Bank; 58-75 m.

DESCRIPTION: Colony encrusting. Zooids 0.30-0.45 x 0.19-0.32 mm, the frontal shield with a smoothly granular surface, imperforate except for 3-5 round to irregular-shaped areolae along each margin, rising to a smooth suboral avicularian eminence. Orifice with shallow rounded sinus appearing deeper because of the stout protruding condyles. Oral spines four, on marginal zooids only, the spine bases obliterated in older zooids. Avicularium circular with complete cross-bar. Ovicell smooth, completely imperforate. Pore-chambers present, one mid-distally and two distolaterally.

REMARKS: The distinctive areolae set this species apart from *B. ridleyi* and *B. rimosa* in which they are narrow and slit-like. *Buffonellodes rimosa* further differs in retaining spines in ovicelled zooids and *B. ridleyi* has a deeper orificial sinus. *Buffonellodes marsupifera*, also

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from the New Zealand region (Gordon 1984), has no areolae at all.

It should be noted that the sole paratype slide of this species, held at the New Zealand Oceanographic Institute, contains two small colony fragments of *Schizomavella punctigera* (MacGillivray) only.

Family SMITTINIDAE Levinsen, 1909

Schizosmittina Vigneaux, 1949

TYPE SPECIES: *Schizosmittina planovicellata* Vigneaux, 1949

Schizosmittina cinctipora (Hincks) (Plate 26, A)

Schizoporella cinctipora Hincks, 1883: 200.
Schizomavella cinctipora: Brown 1952: 236; Uttley & Bullivant 1972: 41.
Smittina maplestonei: Powell 1967: 319.
Schizosmittina maplestonei: Gordon 1984: 92.

MATERIAL EXAMINED: NZOI: Stns B482, D273, E793, Q686; also H69, 46°37.5'S, 167°53.9'E, 50 m. DPG: Goat Island Bay, Leigh; specimens of *Schizosmittina maplestonei* coll. by DPG from Queenscliff, Victoria, October 1980. Slide 3066, *Schizoporella cinctipora*, Recent, Napier, New Zealand, Jelly Collection, Manchester Museum. Museum of Victoria: *Lepralia vitrea*, type H720, Williamstown; *Schizoporella botryoides*, type (? lectoparatype) H695, Williamstown; *Schizoporella nodulifera*, syntype H707, Western Port/Port Phillip Heads; *Schizoporella speciosa*, syntype H822, Port Phillip Heads; *Schizoporella maplestonei*, lectotype (chosen by N.A. Powell) H38, Williamstown.

DISTRIBUTION: Kermadec Ridge, Spirits Bay, Hauraki Gulf, Napier (Pliocene to Recent), Wanganui, Manawatu Coast, Cook Strait, Tasman Bay, Kaikoura, Mernoo Bank, Chatham Islands, Fiordland, Portobello, Puysegur Bank, Southland (Middle Miocene to Recent), Foveaux Strait, Stewart Island, Auckland and Campbell Islands; 0-253 m.

DESCRIPTION: See Gordon (1984: 92, as *S. maplestonei*).

REMARKS: Having now seen specimens of *Schizosmittina maplestonei* MacGillivray, 1879, from Victoria, it is apparent that Powell (1967) was in error in synonymising *S. cinctipora* with this species; *S. maplestonei* (Plate 26, B, C) has a pair of frontal tubercles proximal to the orifice, and, in ovicelled zooids, tubercular peristomial projections can form a small spiramen above the sinus. *Schizoporella lucida* Hincks, 1885 is unquestionably a junior synonym of *S. maplestonei*, as Powell (1967) also determined. However, several species of MacGillivray, some of which were included by Powell, are not synonyms. *Lepralia botryoides* MacGillivray, 1879b, *Schizoporella nodulifera* MacGillivray, 1890b, and *S. speciosa* MacGillivray, 1890b, are all junior synonyms of *Lepralia vitrea* MacGillivray, 1879b, which should be known as *Schizosmittina vitrea*.

Schizosmittina vitrea is indeed very similar to *S. maplestonei*, but is immediately distinguished by the much broader, widely rounded sinus and the tendency to become much more nodular ("botryoidal") than *S. maplestonei*. Powell (1967) noted the distinction between sinuses too but felt this was not sufficient to maintain the two species.

The slope of the orifice varies in *S. cinctipora* — it tends to be in the plane of the frontal shield *or* it may slope inward in neanic (youthful) zooids, whereas it slopes inward in most ovicelled zooids such that the sinus can appear almost perpendicular to the plane of the frontal shield.

Schizosmittina conjuncta (Uttley & Bullivant) (Plate 26, D, E)

Schizomavella conjuncta Uttley & Bullivant, 1972: 41.

MATERIAL EXAMINED: NZOI Stns B488, B498, E820, M775.

DISTRIBUTION: Cook Strait, Chatham Islands, Milford Sound, Puysegur Bank; 20-220 m.

DESCRIPTION: Colony encrusting. Zooids 0.49-0.75 x 0.23-0.62 mm, the frontal shield evenly perforated by about 30-62 pores and 3-4 larger areolae along each margin. Orifice sloping inward, with a moderately wide U-shaped sinus and thick condyles; oral spines 4, evanescent, on marginal zooids only. Peristome and secondary orifice cormidial, i.e., partly contributed by adjacent distal zooids, the peristome extending around the orifice and generally producing a pair of lappets proximally which may fuse above the avicularium, forming a spiramen. Avicularium median and suboral, of variable length, derived from an areola on each side, cross-bar complete; the palate well developed and the palatal foramen somewhat transverse, the rostrum rounded, directed proximally. Ovicell recumbent to immersed, somewhat flattened frontally, with several scattered pores.

REMARKS: This species differs from *S. cinctipora* in its wider orificial sinus and proximally directed, median suboral avicularium.

Schizosmittina bicornis n.sp. (Plate 26, F)

MATERIAL EXAMINED: NZOI Stns Q702, Q722; also Stn C851, off the Kapiti Coast, 40°40.4'S, 174°43.6'E, 128 m.

DISTRIBUTION: Off the Kapiti Coast, off Westport and Greymouth; 128-296 m.

DESCRIPTION: Colony encrusting, small. Zooids 0.41-0.79 x 0.23-0.36 mm, the frontal shield evenly perforated with around 30-65 pores (average 47), somewhat convex, with furrows between the zooids. Orifice sloping downward obliquely distally, with a relatively small U-shaped sinus and somewhat flattened non-projecting condyles; operculum around 0.106 mm wide; bordered proximally by a crescentic ridge, the ends of which are produced into a pair of projections, flanking the orifice; no oral spines, but sometimes the distal rim is also raised, in which case the peristome more or less encircles the orifice. Avicularia small, inserted in the

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peristomial ridge mid-proximally or to one side, subcircular, with a complete cross-bar, or lacking altogether. Ovicell prominent, fusing with the peristome, with a smooth band of calcification peripherally and a broad frontal area with numerous perforations; not closed by the zooidal operculum. Mural septula only, no porechambers.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-500.

PARATYPE: NZOI, type number P-720, from NZOI Stn Q722, off Greymouth, 42°23.4'S, 170°53.6'E, 167 m.

TYPE LOCALITY: NZOI Stn C851, Kapiti Coast, 40°40.4'S, 174°43.6'E, 128 m.

REMARKS: This species forms small colonies that produce ovicells when there are as few as 15-20 zooids.

The species name refers to the pair of prominences either side of the orifice.

Schizosmittina melanobater n.sp. (Plate 27, A)

MATERIAL EXAMINED: NZOI Stns B482, B484.

DISTRIBUTION: Puysegur Bank; 88-124 m.

DESCRIPTION: Colony encrusting, often forming multilaminate crusts. Zooids 0.61-0.90 x -0.34-0.66 mm, flat or slightly convex, the frontal shield evenly perforated with around 85-110 small pores. Orifice with a rather broad sinus and stout condyles with acute, barely projecting points; no oral spines; operculum dark, 0.106-0.135 mm wide; no autozooidal peristome, through the rim of the orifice is smooth and may be a little raised. No avicularia. Ovicells somewhat recumbent, fairly prominent, with a smooth bank of calcification peripherally and a broad frontal area with numerous perforations; merging proximally into a smooth peristome that encloses the orifice on both sides; not closed by the zooidal operculum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-501.

PARATYPE: NZOI, type number P-721, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn B482, Puysegur Bank, 46°08.8'S, 166°06.0'E, 88 m.

REMARKS: Ovicells occur only in large colonies, and even then, do not occur that densely. A striking feature of this species is the very dark operculum, which is reflected in the species name, derived from the Greek *melanos*, black, and *bater* (m.), threshold.

Dittomesia n.gen.

Colony encrusting to erect, unilamellar. Zooids with perforated frontal shield and marginal areolae. Operculum D-shaped, more or less continuous with the frontal membrane, deeply set. Oral spines and lyrula absent. Suboral spiramen and avicularium present. Ovicell immersed, closed by the zooidal operculum. Mural septula present.

TYPE SPECIES: *Dittomesia crispa* n.sp.

REMARKS: A new genus seems appropriate for a *Smittina/Smittoidea*-like species from southwestern South Island. Its most distinctive attribute is the alyrulate primary orifice and D-shaped operculum which seals the ovicell and is more or less continuous with the frontal membrane.

Dittomesia is an anagram of *Smittoidea*.

Dittomesia crispa n.sp. (Plate 27, B-D)

MATERIAL EXAMINED: NZOI Stns B488, E821.

DISTRIBUTION: Puysegur Bank; 164-549 m.

DESCRIPTION: Colony encrusting to suberect, unilamellar. Zooids 0.79-1.41 x 0.40-0.92 mm, the frontal shield flat, bordered by a low rim interzooidally, evenly perforated except for a triangular area suborally, with 4-9 areolae along each margin. Secondary orifice surrounded on three sides by the distal zooid in which it is inset, oval to D-shaped, lacking spines; the proximal rim of the secondary orifice is more or less straight and shallowly grooved with a median suture. Primary orifice deeply set, with a pair of small condyles, the operculum narrowly D-shaped with a sclerite around the distal rim, more or less continuous with the frontal membrane proximally though able to be separated from it. Avicularium suboral, small, oval with a complete crossbar, directed proximally; associated with a spiramen distally which opens beneath the proximal rim of the secondary orifice. Ovicell immersed, flush with the zooidal surface, delimited by the pattern of pores externally, the secondary orifice transversely narrow, the opening to the larval chamber closed by the zooidal operculum. Mural septula present.

HOLOTYPE: Colony fragment, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-497.

PARATYPE: NZOI, type number P-718, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn E821, Puysegur Bank, 46°43.5'S, 165°46.5'E, 549 m.

REMARKS: The secondary orifice is puzzling, particularly the proximal rim which is very discrete structurally and could be taken for the rim of a primary orifice. It cannot be interpreted as a modified lyrulate structure or even as fused gigantic condyles (with a suture line between). There is a pair of condyles at a deeper level, and the spiramen opens *beneath* the unusual rim. In the externally similar species *Smittina purpurea* (Hincks) (q.v.), the spiramen opens *above* the lyrula.

The species name is a Latin adjective meaning curly, alluding to the way the colony curls around irregular substrata.

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Smittina Norman, 1903

TYPE SPECIES: *Lepralia landsborovii* Johnston, 1847

Smittina torques Powell

Smittina torques Powell, 1967: 325; Gordon 1984: 91 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B490, C867, C869, D250, D252, D253, D260, D262, D269, D270, D272, D273, Q686. DPG: Manukau Harbour, Abel Tasman National Park (Totaranui).

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Manukau Harbour, Cook Strait, Tasman Bay, Dusky sound, Foveaux Strait; 0-205 m.

Smittina purpurea (Hincks) (Plate 27, E, F)

Smittia landsborovii var. *purpurea* Hincks, 1881: 123.

MATERIAL EXAMINED: NZOI Stns D260, D262.

DISTRIBUTION: Tasman Bay; 33-35 m. Also Bass Strait.

DESCRIPTION: Colony encrusting. Zooids 0.36-1.09 x 0.17-0.60 mm, the frontal shield evenly perforated with about 40 pores in young zooids; coarsely perforated, with trabeculae, in secondarily thickened older zooids. Orifice with medium-sized slightly alate lyrula and blunt condyles; a pair of evanescent spines at the distal corners in marginal zooids. A low peristome develops, the proximal lobes of which arch towards each other and fuse to form a spiramen. At the entrance to the spiramen is an avicularium; this is small to moderate sized, suboval to tear-drop shaped, with a tiny opesial area, a complete crossbar, and a larger palatal lumen and moderate palatal shelf; usually it is just above the frontal surface and directed proximally; occasionally it is a little larger, more raised, and directed obliquely laterally; the chamber communicates with one lateral-oral areola. Ovicell prominent, subglobular in young zooids, becoming subimmersed in secondary calcification, with a pair of conspicuous frontal pores and sometimes a smaller pore between; fused with the peristome which describes an arc on the proximal face of the ovicell, the peristome becoming more raised and subtubular, with a circular or oval rim, in older zooids.

REMARKS: This identification is tentative. Hincks (1881), without illustrating it, commented on the peristomial spiramen and purple colouration of this species ("variety", in Hincks's terminology), which was taken from Bass Strait. In 1884, he also described a "form *personata*" from Port Phillip Heads. He illustrated a peristomial spiramen in this form and remarked on large spathulate avicularia. This form was, by implication, not purple coloured. Unfortunately, he did not describe the ovicells but, presumably, they resembled those of *Smittina landsborovii* (Johnston) from Britain.

The present material lacks large spathulate avicularia, but the ovicells are certainly not like those of *S. landsborovii*. The colour in life is not known. Also, according to Brown (1952), who selected a neotype from Hincks's specimens, the zooids are "small", whereas those of the present material can attain more than a millimetre in length. Unfortunately, it is not clear whether the zooidal dimensions Brown gave refer to the neotype or to his fossil material. At least the smallest zooids in the present material overlap in range with the dimensions given by Brown. But, complicating matters, is that there are three entities in the present collections with peristomial spiramina and personate ovicells.

Smittina spiraminifera Gordon, 1984, from the Kermadec Ridge is yet another spiraminate species. It is distinguished by its smooth, high peristome completely enclosing the avicularium.

Smittina personata (Hincks) (Plate 27, G, H)

Smittia landsborovii forma *personata* Hincks, 1884: 283.

MATERIAL EXAMINED: NZOI Stns B487, B488, E821.

DISTRIBUTION; Puysegur Bank; 164-549 m. Also Port Phillip Heads.

DESCRIPTION: Colony encrusting to suberect, unlamellar. Zooids 0.44-1.60 x 0.29-0.64 mm, the frontal shield evenly perforated by 27-62 pores (average 49) except for an imperforate area proximal to the orifice; some marginal, areolar, pores may be larger than the rest; in older parts of colonies thin lines may traverse zooidal walls giving irregular zooidal outlines but there is no development of a secondarily thickened frontal wall with trabeculae and large pores. Orifice a little wider than long, with a broad, alate lyrula and very blunt condyles; no oral spines. A peristomial spiramen develops as in *S. purpurea*; the generally broad persona is intimately associated with the suboral avicularium, of which the spiramen often appears to be a part. Avicularium small, oval, within the entrance to the spiramen, developing from a pair of lateral-oral areolae, with a thin crossbar and no palatal shelf or very large, lingulate, with a tiny opesia, larger palatal foramen and extensive palatal shelf sunken below the level of the frontal shield, directed proximally, occasionally obliquely so, the round rostral rim scarcely, if at all, raised. Ovicell initially fairly prominent though recumbent, becoming subimmersed and flush with the zooidal surface, with several scattered pores frontally; not closed by the zooidal operculum; the combined peristome more or less transversely oval, not as raised or subtubular as in *S. purpurea*.

REMARKS: While this species has the kind of avicularium described by Hincks (1884), although more lingulate than spathulate, there are nevertheless some differences. Hincks's illustration shows small tubercles on the frontal shield and ovicell and no imperforate area suborally.

Although Brown (1952) and Powell (1967) synonymised *S. personata* with *S. purpurea*, it remains to be established if they are truly conspecific. Jelly (1899) listed them as separate but synonymised *S. jacobensis*

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(Busk, 1884) from Cape Verde and Marion Islands with *S. personata*. Thanks to the courtesy of Mr P. J. Chimonides (British Museum, Natural History), I have been able to examine a specimen of *Smittina jacobensis*. It is similar to the above species but readily distinguished by the lyrula which is a tiny acute-to-subacute denticle.

Marcus's (1921) illustration of *Smittina landsborovii* f. *personata* from Juan Fernandez is very similar to material here referred to *S. purpureaa*, especially in the ovicellular pores, although marginal zooids have four oral spines. *Smittina monacha* (Jullien, 1888) from Magellanic South America appears to be conspecific with the Juan Fernandez population, as well as bearing similarities to the following, new, species.

Smittina palisada n.sp. (Plate 28,A,B)

MATERIAL EXAMINED: NZOI Stns D273, E793, Q686.

DISTRIBUTION: Cook Strait, Tasman Bay, Fiordland coast; 75-253 m.

DESCRIPTION: Colony encrusting. Zooids small, 0.27-0.64 x 0.12-0.28 mm, the frontal shield regularly perforated by around 15-20 pores in young zooids, 20-28 pores (average 23) in older zooids except suborally, otherwise smooth, but the pores becoming wider and deeper in older zooids and zooidal boundaries becoming irregular with secondary calcification. Orifice 0.10-0.11 mm wide, with a relatively broad, alate lyrula and tiny condyles; four evanescent oral spines in marginal zooids; the peristome is unusual — it begins as a pair of proximolateral processes which contribute to the peristomial bridge and spiramen, but, additionally, as many as five further palisade-like processes develop around the orifice, either fusing to form a continuous peristomial rim or with sutures between, retaining the palisaded effect. Suboral avicularium communicating with a single lateral-oral areola, often raised and almost spout-like, with tiny opesia, complete crossbar, the palatal lumen and shelf of about equal area, the rounded rostrum directed proximally, occasionally obliquely so; often an additional, larger avicularium of the same form mid-frontally, arising from a marginal areola, directed proximally or distally, or, when space-limited by neighbouring ovicells, obliquely laterally. Ovicell prominent, subglobular in most zooids, becoming recumbent and less prominent in older zooids where frontal-wall thickness is increased, smooth, with several frontal pores and encroachment of secondary calcification and part of the irregular peristomial rim proximally.

HOLOTYPE: Colony, in collection of the New Zealand Oceanographic Institute, DSIR, Wellington, type number H-502.

PARATYPE: NZOI, P-722, from Stn E793, Fiordland coast, 44°40.5'S, 167°32.0'E, 243-253 m.

TYPE LOCALITY: NZOI Stn Q686, Stephens Hole, Cook Strait, 40°41.3'S, 174°03.8'S, 205 m.

REMARKS: The palisade-like peristomial processes (from which the species is named) are similar to those of *Smittina kukuiula* Soule and Soule, 1973, from Hawaii, though more developed.

In their 1973 work, Soule and Soule commented on the origin of the avicularian chamber in smittinids. In some species it develops from a pair of areolae in addition to a median peristomial pore; in others, only a single areola is involved. They established a new genus, *Hemismittoidea*, based primarily on this distinction. It is a helpful character at the species level — of the three personate/spiraminate species in the present collection, two (*S. purpurea*, *S. palisada*) communicate with a single marginal areola and one (*S. personata*) communicates with a pair of such areolae. Apart from this distinction, all three species seem mutually allied in the genus *Smittina*. The number of such communications in the type-species of *Smittina* is not known, nor is it known for a majority of smittinids, so the effective use of this character as a consistent generic criterion remains to be demonstrated.

Smittina rosacea Powell

Smittina rosacea Powell, 1967: 323; Gordon 1984: 90.

MATERIAL EXAMINED: NZOI Stns B482, B489, D262, D269, D270, D273, E804, E817, E820, E828, M780, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Tasman Bay, Fiordland, Puysegur Bank; 33-235 m.

Prenantia Gautier, 1962

Colony encrusting or erect, branching. Zooids with perforated frontal shields. Orifice with lyrula and condyles; no oral spines. Suboral avicularium present or absent. Ovicell recumbent to immersed, perforate or imperforate, closed by the zooidal operculum. Basolateral septula present.

TYPE SPECIES: *Lepralia cheilostomata* Manzoni, 1870a

REMARKS: The name of the type species was spelt *cheilostomata* by Manzoni (1870a). It has been consistently misspelled since Hincks's (1880) work (cf. Gautier 1962; Hayward and Ryland 1979).

Prenantia firmata (Waters)

Mucronella firmata Waters, 1887a: 58; Hamilton 1898; 195.
Petraliella firmata: Brown 1952: 308; Macken 1958: 105; Uttley & Bullivant 1972: 31.
Smittina punctata Powell, 1967: 324; Gordon 1984: 90.

MATERIAL EXAMINED: NZOI Stns B484, B488, B493, B611, C871, D272, E820, Q686. National Museum of N.Z.: specimen labelled *Petraliella firmata*.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Wanganui, Napier, Cook Strait, Marlborough Sounds, Otago Harbour, Puysegur Bank; 59-220 m: also Middle Miocene of Southland, Pliocene of Hawkes Bay.

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REMARKS: Because of the lack of a median suboral avicularium, earlier workers (e.g., Waters 1887a; Brown 1952) interpreted this species to be a petraliellid even though it has obvious smittinid features. Indeed, Brown (1952) remarked that "the ovicell very strongly resembles that of the Smittinidae". It wasn't until I examined a specimen at the National Museum of New Zealand, Wellington, labelled as *Petraliella firmata*, that I realised that Powell's (1967) species, *Smittina punctata*, is a junior synonym. In the event, because an avicularium is lacking and the ovicell is closed by the zooidal operculum, I would place this species in the genus *Prenantia*.

Prenantia dichotoma n.sp. (Plate 28, C-E)

MATERIAL EXAMINED: NZOI Stn B488.

DISTRIBUTION: Puysegur Bank; 164 m.

DESCRIPTION: Colony erect, dichotomously branching, the branches 0.47-0.94 mm wide, increasing to 1.71 mm at bifurcations, 2-4-serial, with zooids all facing to one side. Zooids 0.42-0.66 x 0.25-0.43 mm, the frontal shield regularly perforated centrally, bordered on all sides by an imperforate zone. Secondary orifice in the plane of the thickened frontal shield, with a pseudosinus leading to the relatively broadly alate lyrula; condyles not discernible. No oral spines. No avicularia. Ovicell scarcely discernible externally — marked by an area of fewer pores; deeply immersed, closed by the zooidal operculum. Basolateral septula present. The rounded abfrontal side of the colony is uniformly faintly textured and is made up of the basal walls of the zooids composing the branch though their separate outlines are not apparent.

HOLOTYPE: Two erect branches, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-499.

TYPE LOCALITY: NZOI Stn B488, Puysegur Bank, 46°28.7'S, 166°14.3'E, 164 m.

REMARKS: Although erect and branching, *Prenantia dichotoma* shares with the type-species the following characters — no avicularium or oral spines and an ovicell closed by the zooidal operculum. It differs in the complete immersion of the ovicell and the erect habit. *Smittina exclusa* Harmer, 1957, is a similar species, with a completely immersed ovicell and no suboral avicularium. It has, however, oral spines on newly formed zooids and small, scattered frontal avicularia.

Prenantia dichotoma is named for the dichotomous branching habit.

Parasmittina Osburn, 1952

TYPE SPECIES: *Lepralia jeffreysi* Norman, 1876

Parasmittina delicatula (Busk) (Plate 28, F)

Mucronella delicatula Busk, 1884: 156.
Parasmittina delicatula: Soule & Soule 1973: 401; Gordon 1984: 95 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B488, B498, C857, C868, D269, D273, Q686. DPG: Abel Tasman National Park.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Whangarei, Hauraki Gulf, Wanganui (Upper Pliocene to Recent), Cook Strait, Tasman Bay, Puysegur Bank; 0-205 m. Also Victoria, New South Wales, Hawaii, Japan.

Parasmittina aotea (Brown) (Plate 28, G)

Mucronella nitida forma *inaequalis*: Waters 1887a: 55.
Smittina trispinosa var. *aotea* Brown, 1952: 331; Macken 1958: 105.
Parasmittina trispinosa var. *aotea*: Powell 1967: 331; Uttley & Bullivant 1972: 31.

MATERIAL EXAMINED: NZOI Stns B482, B483, B484, B487, B488, B489, B490, B498, C869, D260, D262, D269, D270, D273, E804, E817, E820, Q686.

DISTRIBUTION: Three Kings Islands (Pliocene to Recent), Cook Strait, Tasman Bay, Otago Heads, Fiordland, Puysegur Bank; 33-235 m.

DESCRIPTION: Colony encrusting. Zooids 0.34-0.75 x 0.23-0.47 mm, the frontal shield imperforate centrally with small tubercles, and 1-2 rows of numerous marginal areolae; zooidal boundaries indistinct in all but marginal zooids. Orifice elevated, with a rimmed peristome, sometimes spout-like proximally or sinusoid, with narrow, tapering, non-alate lyrula and pointed condyles; 2-3 oral spines in young zooids. Avicularia typically paired, either both small, narrow, with tiny opesia, complete cross-bar, tiny palatal lumen and larger shelf, orientated obliquely proximally on the sides of the orificial eminence proximal to the pseudosinus; or one avicularium larger, triangular, with an elongate rostrum, complete cross-bar and proportionally larger palatal lumen, directed obliquely proximally; rarely a third, small avicularium elsewhere on the frontal shield. Ovicell subimmersed, with secondary calcification encroaching on the perforated frontal area. Basolateral septula present.

REMARKS: This so-called variety is worth of specific status although there are definite affinities with *Parasmittina trispinosa* from Europe. The principal difference is in the orientation of the avicularia, which are directed obliquely distally in *P. trispinosa*, proximally so in *P. aotea*.

Hemismittoidea Soule & Soule, 1973

TYPE SPECIES: *Hemismittoidea corallinea* Soule & Soule, 1973

Hemismittoidea hexaspinosa (Uttley & Bullivant)

Parasmittina hexaspinosa Uttley & Bullivant, 1972: 32.
Hemismittoidea hexaspinosa: Gordon 1984: 97; López-Gappa 1986: 71.

MATERIAL EXAMINED: NZOI: Stns B489, B493, C868, D262, D270, D273, E817, E820, E821, Q686. DPG: Oaonui, Taranaki.

DISTRIBUTION: Kermadec Ridge, Taranaki, Cook Strait,

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Chatham Rise, Fiordland, Puysegur Bank; 10-635 m. Also southwest Atlantic Ocean.

REMARKS: Hitherto known only from New Zealand, this species has since been discovered in the Beagle Channel and on the Burdwood Bank between Tierra del Fuego and the Falkland Islands (López-Gappa 1986).

Rhamphosmittina Hayward & Thorpe, 1988

Colony encrusting to erect, unilamellar. Frontal shield imperforate, with marginal areolae. Orifice with lyrula and condyles. Transverse suboral avicularium; other avicularia may be present. Ovicell hyperstomial, smooth with a few small pores.

TYPE SPECIES: *Rhamphostomella bassleri* Rogick, 1956.

REMARKS: According to Hayward and Thorpe (1988b), *Rhamphostomella* von Lorenz, 1886 is a northern hemishpere genus with a circumpolar distribution, "all species of which display umbonuloid frontal wall ontogeny". The sole New Zealand species attributed to *Rhamphostomella* accords with the new genus of Hayward and Thorpe (1988b), *Rhamphosmittina*, monospecific for the Antarctic species *R. bassleri*.

Rhamphosmittina rogickae (Brown)

Smittina rogickae Brown, 1958: 73.
Rhamphostomella biperforata Powell, 1967: 332.
Rhamphostomella rogickae: Gordon 1984: 98.

MATERIAL EXAMINED: NZOI Stn B482.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, outer Hauraki Gulf, Puysegur Bank; 0-635 m.

Aimulosia Jullien, 1888

Colony encrusting. Zooids with a smooth to granular frontal shield that is imperforate except for small marginal areolae. Orifice with a median denticle or lyrula; operculum with the proximal margin nearly straight. A prominent suboral umbo supports a small avicularium with a complete pivot bar. Ovicells prominent, imperforate. Basal pore-chambers present.

TYPE SPECIES: *Aimulosia australis* Jullien, 1888

REMARKS: The genus *Aimulosia* is little known. The type species *A. australis* was well-enough described but has not been well understood because precise details of the orifice have been misinterpreted. Canu and Bassler (1920), in their work on North American early Tertiary Bryozoa, ascribed a fossil species, *Aimulosia clavula*, to this genus, setting the stage for a redefinition. They described the orifice of both the type-species and *A. clavula* as "semilunar" and, in later works, species with a distinctly bell-shaped orifice, including some assigned to *Hippoporella* (=*Lepraliella*, *see* Gordon 1984), became regarded as 'typical' of *Aimulusia* (*see* Canu and Bassler 1923; Osburn 1947, 1952; Cook 1964; Soule and Soule 1964; Winston 1986; Winston and Håkansson 1986).

The orifice appears somewhat sinusoid — Brown (1952: 311-312), on the basis of a specimen labelled, by Jullien himself, "*Aimulosia australis* J. Jullien, Terre de feu, Canal du Beagle", in the E.C. Jelly Collection at the Manchester Museum, described it as rather "deep, squared ... covered in maturity by a secondary lip forming the "dent arrondie" of Jullien". The "dent arondie" in fact is the feature that set the genus apart in Jullien's mind. It is a minor median convexity in the proximal rim of the orifice that Jullien (1888) said corresponds to the lyrula of smittinids. Indeed, Jullien included *Aimulosia* in the Smittinidae (as Smittidae Jullien).

I have examined the Manchester Museum specimen seen by Brown (1952). It indeed fully corresponds to Jullien's (1888) description and illustrations and is unquestionably *A. australis*. The "dent arrondie" is variable (Plate 25, D-G). Where it is nearly lacking, the well-developed condyles seem to flank a sinus, but this is broad and the operculum lacks a flap. Otherwise *A. australis* bears a striking resemblance to some species of *Buffonellodes*. I here follow Hayward and Thorpe (in press) in including *Aimulosia* in the Smittinidae. Whatever genus or genera the North American species correspond to it is not, in probably most instances, *Aimulosia*, as based on the type species.

Aimulosia marsupium (MacGillivray)

Lepralia marsupium MacGillivray, 1869: 136; 1879: 22.
Porella marsupium: Hamilton 1898: 195; Bock 1982: 377; Gordon 1984: 98 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B455, B482, B483, B484, B488, B489, B493, B498, C868, D246, D252, D253, D260, D262, D266, D268, D269, D272, D273, D274, E796, E817, E820, E821, E828, Q686; DPG: Manukau Harbour.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Manukau Harbour, Castlepoint, Cook Strait, Marlborough Sounds, Tasman Bay, Kahurangi Point, Chatham Rise, Otago Harbour, Fiordland, Puysegur Bank; 0-549 m. Also Miocene of Southland, Pliocene of Hawkes Bay and Wanganui, Miocene to Recent of Victoria.

Julianca n.gen.

Colony erect, branching, with frontal and abfrontal surfaces, lacking dorsal kenozooids. Frontal shield smooth with small marginal areolae. Orifice with lyrula and condyles. Oral spines present in young zooids. Avicularia small, suboral, or larger, lateral-oral. Ovicell prominent, imperforate, not closed by the zooidal operculum. Uniporous mural septula present.

TYPE SPECIES: *Julianca retia* n.sp.

Julianca retia n.sp. (Plate 28, H, I; 29, A)

MATERIAL EXAMINED: NZOI Stn E793, E821.

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DISTRIBUTION: Fiordland, Puysegur Bank; 243-549 m.

DESCRIPTION: Colony erect, biserial, reticulate, the branching irregular or with discernible main branches parallel and cross-connected; branch width 0.23-0.79 mm, increasing to 2.0 mm at bifurcations; the zooids all facing to one side, the abfrontal side composed of dorso-lateral zooidal walls, with vibices but no kenozooids. Zooids 0.55-0.79 x 0.26-0.49 mm, smooth, with a few small marginal areolae. Orifice with an alate lyrula and a pair of projecting condyles; peristome little developed externally, occurring usually as a pair of short triangular lappets, one either side of the orifice; oral spines 4, present only in younger zooids. Avicularia of two kinds, the one smaller, median suboral, circular in outline, with a complete crossbar and no palatal shelf, the other occasional, replacing the smaller, elongate, with parallel-sided rostrum of which half the length is palatal shelf, with complete cross-bar and a small proximal cryptocyst; occurring along one side of the orifice of both ordinary or ovicelled zooids and often slightly curved by the zooidal operculum. Small uniporous mural septula present.

HOLOTYPE: Colony fragments, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-498.

PARATYPE: NZOI, type number P-719 from NZOI Stn E793, off the entrance to Poison Bay, northern Fiordland, 44°40.5'S, 167°32.0'E, 243-253 m.

TYPE LOCALITY: NZOI Stn E821, Puysegur Bank, 46°43.5'S, 165°46.5'E, 549 m.

REMARKS: A new genus is established for a reticulate smittinid from southern New Zealand. It is an interesting species, sharing features with a number of genera. For example, the reticulate colony form and general appearance are reminiscent of that of *Jaculina* Jullien (*in* Jullien and Calvet, 1903. *Jaculina* is alyrulate, however. *Bryocryptella* Cossman, 1906, another erect, branching, smittinid-like genus, also has an alyrulate type-species. *Smittina landsborovii wiebachi* d'Hondt, 1977, a lyrulate species, was placed in *Bryocryptella* by Hayward and Ryland (1979) but the lyrula may preclude this attribution. On the other hand, *Bryocryptella wiebachi* differs from *Julianca retia* in having perforate ovicells and basal pore-chambers.

Porelloides may be related to *Julianca* but the type-species, *P. laevis*, is non-fenestrate, has dorsal kenozooids, multiporous mural septula, and only suboral avicularia (Hayward 1979).

Julianca is an anagram of *Jaculina*.

Smittoidea Osburn, 1952

TYPE SPECIES: *Smittoidea prolifica* osburn, 1952

Smittinella zelandiae Brown.

Smittinella zelandiae Brown, 1952: 335.
Smittoidea zelandiae: Gordon 1984: 95.

MATERIAL EXAMINED: NZOI Stn E821.

DISTRIBUTION: Kermadec Islands, Puysegur Bank; 10-590 m. Also Middle Oligocene of Nelson Province, and Pliocene of Wanganui and Hawkes Bay.

REMARKS: The present specimen differs from Kermadec material in the complete lack of oral spines.

Smittoidea discoveriae Powell (Plate 29, B)

Smittoidea discoveriae Powell, 1967: 329.

MATERIAL EXAMINED: NZOI Stns B487, B490, D273, E820.

DISTRIBUTION: Three Kings Islands, Tasman Bay, Puysegur Bank; 75-220 m.

DESCRIPTION: Colony encrusting, tending to multiple zooidal layers. Zooids subquadrate or elongate-rectangular to irregularly shaped and disposed, 0.36-1.18 x 0.23-0.68 mm, the frontal shield granular to lightly tubercular, with irregularly sized areolae along each margin, sometimes quite conspicuous. Orifice generally longer than wide, sometimes with moderately raised, thin peristomial rim, with a very broad lyrula, the alae of which, with the adjacent condyles, almost enclose the lateral sinus. A pair of evanescent oral spines may be present in marginal zooids. Avicularium tiny, immediately suboral as in *Smittina* species, more or less parallel-sided, with complete cross-bar and rounded rostrum. Ovicell subimmersed, textured as the frontal wall, with a few pores.

REMARKS: Because of the tiny suboral avicularium, this species may at first be mistaken as a *Smittina*.

Smittoidea hyalina Gordon

Smittoidea hyalina Gordon, 1984: 94.

MATERIAL EXAMINED: NZOI Stn E821.

DISTRIBUTION: Kermadec Ridge, Puysegur Bank; 104-549 m.

Smittoidea maunganuiensis (Waters) (Plates 1, C; 29, C, D)

Smittia maunganuiensis Waters, 1906: 19.
Smittina acaroensis Levinsen, 1909: 342; Brown 1952: 329 (*cum syn.*); Macken 1958: 105; Gordon 1967: 59; Morton & Miller 1968: 122.
Smittina akaroensis Levinsen, 1909: pl, 18, fig. 12; Uttley & Bullivant 1972: 33.
Smittoidea acaroensis: Powell 1967: 326 (*cum syn.*); Bock 1982: 377.

MATERIAL EXAMINED: NZOI: Stns B485, B488, D254, E820, M778, M779, Q686. DPG: Waitemata Harbour. Also slide no. 4362, *Smittia maunganuiensis*, Waters Collection, Manchester Museum.

DISTRIBUTION: Hauraki Gulf, Waitemata Harbour, Cook Strait, Tasman Bay, Chatham Rise, Akaroa Harbour, Milford Sound, Puysegur Bank; 0-220. Also Victoria.

DESCRIPTION: Colony encrusting, to erect, foliose, bilamellar. Zooids 0.51-0.88 x 0.21-0.62 mm, the frontal shield initially centrally smooth, becoming lightly tubercular with age, bordered by numerous areolae, these becoming very conspicuous with age and more or less trans-

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versely elongate. Orifice with a medium-sized alate lyrula and acute condyles. Oral spines in marginal zooids. Avicularium median, suboral, circular, with a complete cross-bar. Ovicell initially prominent, becoming partially immersed in secondary calcification, the frontal surface with numerous pores.

REMARKS: Examination of Waters's (1906) material of *Smittia maunganuiensis* from Chatham Island shows it to be a senior synonym of *Smittina acaroensis*. This species has been compared to *Smittoidea evelinae* (Marcus, 1937) (Rogick 1956; Powell 1967). If Rogick's (1956) Antarctic specimens are indeed *S. evelinae* (described originally from Brazil) then *S. evelinae* differs from *S. maunganuiensis* in being ivory coloured (instead of orange) and unilamellar. Zooidal dimensions for Rogick's specimens differ also, being 0.85-1.33 x 0.51-0.74 mm, larger than the New Zealand species.

Levinsen (1909) and Powell (1967) also mentioned a ligula on the avicularian cross-bar of *S. acaroensis* as being important, but this may frequently be reduced or lacking (as in the present specimens). Though not depicted by Waters (1906), it is present in his specimens.

Uttley and Bullivant (1972) amended Levinsen's (1909) species name to *akaroensis*. While it is true the type locality is Akaroa Harbour, Banks Peninsula, and that Levinsen (1909) used *akaroensis* in the plate caption, nevertheless, in the formal description the name is *acaroensis*, which would surely be the latinised form of the name intended by Levinsen. In all probability the use of *akaroensis* in the plate caption is the *lapsus calami*, not *acaroensis*. Subsequent authors such as Hastings (1932) (equivalent to first reviser who cited both names and chose one), Marcus (1937), and Brown (1952) used *acaroensis*. All this is academic, however, given conspecificity with *S. maunganuiensis*.

Smittoidea magna Gordon

Smittoidea magna Gordon, 1984: 94.

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Kermadec Ridge, Fiordland; 993-1003 m. Also Upper Pliocene (Castlecliffian), Wanganui.

REMARKS: Only a single colony occurred at station E800 — it is more punctuated or pitted frontally than the Kermadec type specimen.

Hippomonavella Canu & Bassler *in* Bassler, 1934

TYPE SPECIES: *Lepralia praeclara* MacGillivray, 1895

REMARKS: The genus *Hippomonavella* is very close to *Pseudoflustra* Bidenkap, 1897, a North Atlantic/Arctic genus of erect bilamellar species. These are rooted, however, the rootlets being derived by frontal budding of the zooidal hypostegal coelom (*see* Kluge 1962, 1975). The ancestrula of the type-species, *P. solida*, has not been described, but apparently there is no encrusting colonial phase. On zooidal morphology alone, *Hippomonavella flexuosa* (below) could be a *Pseudoflustra* (cf. Powell 1968b, pl. 12c).

Hippomonavella flexuosa (Hutton) (Plage 29, E)

Eschara flexuosa Hutton, 1873: 99; 1880: 194.
Hemeschara fairchildi Hutton, 1873: 100 (*pars*).
Lepralia flexuosa: Hamilton 1898: 195; Hutton 1904: 297.
Smittina flexuosa: Brown 1952: 325; Macken 1958: 105.

MATERIAL EXAMINED: NZOI Stns B493, D269, D273.

DISTRIBUTION: Cook Strait, Tasman Bay Fiordland, Foveaux Strait; 44-253 m.

DESCRIPTION: Colony encrusting, to erect, foliaceous, bilamellar. Zooids 0.30-1.30 x 0.17-0.60 mm, subrectangular, the frontal shield nearly smooth or with a regular uneven texturing, with 5-15 conspicuous areolae along each margin depending on the length of the zooid. Orifice roundly subquadrate, the proximal rim nearly straight with generally a slight median convexity; no peristome or lyrula, but a pair of proximally angled condyles. A pair of oral spine bases present in marginal zooids. Avicularium median, proximal to the orifice, sub-lingulate, with a complete cross-bar, small opesia, and fairly long palatal shelf, the rostrum rounded, directed proximally. Ovicell prominent though recumbent, with 28-39 frontal pores.

REMARKS: Wass and Yoo (1983) published scanning electron micrographs of the type-species, *Hippomonavella praeclara*, hitherto known only as a Tertiary fossil, but occurring alive off South Australia. It has a more concave proximal orificial rim and an acute avicularium but is otherwise very similar to *H. flexuosa*. The only other species of *Hippomonavella* known in the New Zealand region is *H. gymnae* from the Kermadec Ridge (Gordon 1984).

Family PETRALIELLIDAE Harmer, 1957

Mucropetraliella Stach, 1936

Colony encrusting, to erect, unilamellate. Frontal shield evenly perforated. Orifice with a median lyrula and condylate structures; a suboral aviculiferous mucro present. Other small or larger avicularia often present. Oral spines present or absent. Ovicell recumbent, densely and evenly pitted. Supportive rhizoids from basal pore-chambers, and multiporous septula present.

TYPE SPECIES: *Lepralia ellerii* MacGillivray, 1869

REMARKS: Hastings (1940) pointed out that *Discopora* Lamarck, 1816 is a senior synonym of *Mucropetraliella*. Several authors since then have followed Hastings in this (Bassler 1953; Brown 1954b; Powell 1967; Gordon 1984) but it appears that *Discopora* Lamarck is itself a junior homonym of *Discopora* Rafinesque-Schmaltz, 1814 (Neave 1939). This means that *Mucropetraliella* is, indeed, available.

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Mucropetraliella ligulata Stach

(Plates 29, F; 30, A, B)

Mucropetraliella ligulata Stach, 1936: 377.

MATERIAL EXAMINED: NZOI: Stns B482, M779, M791, M793, M797. South Australian Museum: Specimen of *M. ligulata* from Kangaroo Island, S.A., north of Western River, 42 m; coll. S.A. Shepherd 16 Jan. 1965; syntype of *Mucropetraliella ligulata*, reg. no. SAM LI, Beachport, 200 m.

DISTRIBUTION: Milford Sound, Puysegur Bank; 30-88 m. Also South Australia.

DESCRIPTION: Colony forming an elevated crust above the substratum, supported by branching rhizoids; unilamellar, lobate, somewhat concave, with a visibly hispid appearance. Zooids large, 0.85-1.92 x 0.32-0.81 mm, the frontal shield convex, more or less evenly perforated up to the base of the avicularian complex. Orifice with an alate lyrula of variable width and a pair of acute condyles, the operculum not clearly delimited from the frontal membrane at its proximal edge. No oral spines. Obscuring the orifice proximally is an avicularian complex that comprises a large swollen chamber basally that may include a moderately large round avicularium opening on its proximal face or, more commonly, a smaller avicularium facing more to one side; both kinds with a minutely serrated rostral rim; the avicularian eminence produced into an extraordinary, longitudinally furrowed projection about 1.00 mm long which protrudes frontally outwards or curves somewhat to one side, with 1-2 pores and 0-5 points apically; from near the base of the projection 1-3 additional, similar, short projections usually arise, each with a small non-denticulate avicularium apically; an occasional large avicularium arises from the side of the chamber of the complex — it is lingulate to subspathulate and about 0.45 mm long, lying across more than half the width of an adjacent zooid; all avicularia have complete pivot bars. Ovicell prominent, recumbent, the ectooecium reduced to a narrow peripheral rim, the endooecium densely and minutely pitted. No lateral pore-chambers; multiporous mural septula present. Basally, each zooid has a distal, somewhat triangular, rootlet chamber and often 1-3 subjacent multiporous septula.

REMARKS: Although the operculum is widely connected to the frontal membrane, giving a superficially umbonuloid appearance, examination of the growing edge of preserved colonies clearly reveals typical cryptocystidean frontal shield development.

Mucropetraliella neozelanica (Livingstone, 1929), from the Three Kings Islands to the Kapiti Coast, lacks a comparable avicularian complex and has oral spines. Victorian *M. biaviculata* (Waters, 1887b) has a diminutive avicularian complex and a very similar form but six oral spines.

Riscodopa n.gen.

Colony discoidal, rooted. Zooids with granular, perforated frontal shields. Orifice with median lyrula flanked by sinus, no suboral aviculiferous mucro. Oral spines present or absent. Avicularia oval, Paired. Ovicell prominent, finely pitted or perforated. Mural septula present, and basal septula from which rootlets issue.

TYPE SPECIES: *Mucropetraliella cotyla* Cook & Chimonides, 1981.

REMARKS: *Riscodopa* is established for two species of rooted discoidal, petraliellids from New Zealand. One of these was described as *Mucropetraliella cotyla* by Cook and Chimonides (1981). The finding of a second species with similar colony form and orificial morphology justifies the establishment of a new genus.

Riscodopa is an anagram of *Discopora.*

Riscodopa parva n.sp. (Plate 30, C-E)

MATERIAL EXAMINED: NZOI Stns E784, P927, P929, P932, P941, P942, Q698, Q728; also Stns E881, off Ahipara, Northland, 35°20'S, 172°15.0'E, 1286-1313 m; G4, north of Norfolk Island, 28°25.0'S, 167°15.0'E, 831 m; P939, Challenger Plateau, 41°20.4'S, 166°54.8'E, 1760-1799 m; S153, Bounty Trough, 45°21.1'S, 173°35.8'E, 1386 m.

DISTRIBUTION: Norfolk Ridge, north-west slope of North Island, Challenger Plateau, Bounty Trough; 477-4059 m.

DESCRIPTION: Colony discoidal, rooted; small, attaining 4.12 mm diameter and 1.28 mm height. Zooids generally as wide as, or wider than, long, 0.32-0.53 x 0.40-0.66 mm, the frontal shield variably perforated, with as few as 11 relatively large pores to more than 40 relatively small pores, the surface granular, and pitted near the orifice. Orifice with a well-developed lyrula flanked by a pair of sinuses, either deep and nearly parallel, or shallower and diverging; 4-5 oral spines or spine bases on all post-ancestrular zooids. Avicularia paired, flanking the orifice and opposing each other, with complete cross-bar and semi-circular rostrum, the mandible opening towards the distal rim of the orifice; alternatively, one or both of these avicularia is replaced by a larger, lingulate to subspathulate avicularium, with an extensive palatal shelf, that is directed proximally; an additional subcircular avicularium may occur on the mid-frontal wall of periancestrular zooids. Ovicell very prominent, even projecting, variable in shape, either wider than long or longer than wide, densely and evenly perforated. Ancestrula tatiform, bordered by about 10 spines and surrounded by six zooids. Mural and basal septula present, with delicate rootlets issuing from the latter.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, type number H-504.

PARATYPE: NZOI, type number P-724, from NZOI Stn P939, Challenger Plateau, 41°20.4'S, 166°54.8'E, 1386 m.

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TYPE LOCALITY: NZOI Stn S153, at head of Bounty Trough, east of South Island, 45°21.1'S, 173°35.8'S, 1386 m.

REMARKS: *Riscodopa cotyla* (Cook and Chimonides, 1981 differs in its larger size (average diameter 10 mm), fewer oral spines (three, in periancestrular zooids only), larger zooids, fewer ancestrular spines (seven), and distally directed avicularia which are never lingulate-spathulate. The development of the ovicell of this species was described by Cook and Chimonides (1981) in some detail.

Family CREPIDACANTHIDAE Levinsen, 1909

Crepidacantha Levinsen, 1909

TYPE SPECIES: *Crepidacantha crinispina* Levinsen, 1909

Crepidacantha crinispina Levinsen

Crepidacantha poissoni [sic] var. *crinispina* Levinsen, 1909: 266.
Crepidacantha crinispina: Canu & Bassler 1929: 409; Brown, 1952: 359; 1954c: 248 (*cum syn.*); Powell 1967: 342 (*cum syn*); Uttley & Bullivant 1972: 48; Gordon 1984: 100.

MATERIAL EXAMINED: NZOI Stns B472, B482, B483, B487, B488, B489, B493, B498, B616, C869, C871, D260, D270, D272, D273, E804, E817, E820, E821, M763, M773, M774, M775, M776, M779, M780, M782, M783B, M791, M793, M794, M795, M797, M799, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Leigh, Auckland, Cook Strait, Marlborough Sounds, Tasman Bay, Nelson, Totaranui, Chatham Islands, off Westland, Fiordland, Puysegur Bank; 0-549 m. Also Victoria, New Caledonia, Indonesia, Thailand, Philippines.

REMARKS: Live zooids have twelve tentacles. Intertidal colonies at Goat Island Bay in the Hauraki Gulf breed nearly year round, with a cessation of larval production between May and August. Embryos are a pale orange-yellow (7.5 YR 9/4 on the Munsell Color Chart) (Gordon 1970). The ancestrula is membraniporine and bordered by numerous marginal spines.

Crepidacantha kirkpatricki Brown (Plate 30, F)

Crepidacantha kirkpatricki Brown, 1954c: 256; Powell 1967: 344.

MATERIAL EXAMINED: NZOI Stns B484, B496, B498, B616, C867, C868, C869, D270, D272, D273, M779, Q686.

DISTRIBUTION: Off the Manawatu Coast, Cook Strait, Marlborough Sounds, Tasman Bay, Fiordland, Puysegur Bank; 30-205 m. Also South Australia to Queensland.

DESCRIPTION: Colony encrusting. Zooids 0.40-0.60 x 0.32-0.47 mm, the frontal shield granular except for a transverse area suborally, imperforate except for numerous small areolae. About eight very slender short spines arise from the distal margin of each zooid. Orifice trifoliate, the proximal margin fairly broad, the lateral sinuses diverging. No oral spines; the distal rim of the orifice somewhat raised. A short median suboral umbo present. Avicularia paired, transversely orientated or nearly so, connected by a smooth grooved area along which the mandibles are directed; no cross-bar; either side of each avicularium is a short transverse ridge. Ovicell not raised, subimmersed, the frontal surface more or less flattened, mostly occupied by a porous tubercular area.

REMARKS: The broad porous area of the ovicell and the transversely orientated avicularia are the key features of this species, distinguishing it from the three other species of *Crepidacantha* known from the New Zealand region, viz. *C. bracebridgei* and *C. crinispina* (Brown 1954c; Powell 1967; Gordon 1984), and *C. zelanica* (Brown 1952, 1954c).

Family MICROPORELLIDAE Hincks, 1879

Microporella Hincks, 1877

TYPE SPECIES: *Eschara ciliata* Pallas, 1766

Microporella agonistes Gordon (Plate 31, A)

Microporella agonistes Gordon, 1984: 101
Microporella ciliata: Powell 1967: 288 (*pars*).

MATERIAL EXAMINED: NZ01 Stns B472, B473, B480, B482, B483, B484, B485, B487, B488, B489, B498, C868, D254, D260, D266, D269, D270, D272, D273, D274, E796, E804, E817, E820, E821, E828, M779, M870, M791, M794, Q686; also Stn C843, off Cape Palliser, 41°17.2'E, 175°17.2'E, 53 m.

DISTRIBUTION: Kermadec Ridge, Cook Strait, Marlborough Sounds, Tasman Bay, off Westland, Fiordland, Puysegur Bank, western approaches to Foveaux Strait; 26-549 m.

REMARKS: As I noted earlier (Gordon 1984), this species is distinguished by its small average size. Periancestrular zooids are as small as 0.25 mm long; the longest zooids seen in any colony so far are 0.53 mm.

Microporella diademata (Lamouroux) (Plate 31,B)

Flustra diademata Lamouroux, 1825: 609.
Escharina diademata: Milne Edwards 1836: 233.
Lepralia personata Busk, 1854: 74.
Microporella personata: Busk, 1884: 137.
Microporella ciliata var. *personata*: MacGillivray 1889: 275.
Microporella ciliata var. *diademata*: Brown 1952: 252 (*cum syn.*).
Microporella ciliata: Powell 1967: 288 (*pars*).

MATERIAL EXAMINED: NZOI Stns B473, E821.

DISTRIBUTION: Off Westland, and Puysegur Bank; 215-549 m. Also Falkland Islands.

DESCRIPTION: Colony encrusting. Zooids 0.42-1.00 x

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0.23-0.73 mm, the frontal shield of small tubercles and numerous small perforations. Orifice with a gently concave non-corrugated proximal rim; oral spines 5-6. Ascopore lunate, non-denticulate or scarcely so, with a tiny narrow rim. Avicularium single, generally situated immediately proximal to the ascopore on one side, of average size, with complete cross-bar, the triangular rostrum directed laterally or obliquely distally. Ovicell prominent, imperforate except for a row of areolae around the periphery, with a tall spout-like peristome arching above the ascopore but not enclosing it, and a pair of oral spines at the inner corners of the peristome.

REMARKS: The present specimens accord precisely with Busk's (1854) illustrations of *Lepralia personata*, particularly in the form of the peristome which encloses a pair of spines. According to Brown (1952), Busk's species is the same as Lamouroux's (1825) from the same geographic area.

Microporella orientalis Harmer

Microporella orientalis Harmer, 1957: 962; Powell 1967: 169; Gordon 1984: 103.

MATERIAL EXAMINED: NZOI Stns B481, B482, B484, B490.

DISTRIBUTION: Kermadec Ridge, Dusky Sound, Puysegur Bank; 18-210 m. Also Victoria, Queensland, Loyalty Islands, Indonesia, Philippines, Red Sea.

REMARKS: In specimens from Stn B490 the ascoporal disc appears as a tall column surrounding the ascopore in numerous zooids.

Microporella intermedia Livingstone

Microporella (Ellipsopora) flabellaris var. *intermedia*: Livingstone, 1929: 88.
Microporella ciliata var. *intermedia*: Powell 1967: 290.
Microporella intermedia: Gordon 1984: 102.

MATERIAL EXAMINED: NZOI Stns B488, B493, C867, C869, C871, D272, D273, Q745.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Marlborough Sounds, George Sound, Dusky Sound, Puysegur Bank; 35-164 m.

Microporella discors Uttley & Bullivant

Microporella discors Uttley & Bullivant, 1972: 45; Gordon 1984: 101 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B487, B488, B489, B493, B498, C856, C871, D252, D272, E820, E821, M783B, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Marlborough Sounds, Tasman Bay, Milford Sound, Dagg Sound, Puysegur Bank; 20-549 m.

Microporella speculum Brown (Plate 31, C)

Microporella speculum Brown, 1952: 256; Powell 1967: 294.

MATERIAL EXAMINED: NZOI Stn M793.

DISTRIBUTION: Three Kings Islands, Milford Sound; 20-37 m. Also Pliocene of Hawkes Bay.

DESCRIPTION: Colony encrusting. Zooids 0.49-0.71 x 0.40-0.56 mm, the frontal shield evenly tuberculated and perforated, with a few scattered marginal areolae. Orifice with a non-denticulated proximal rim; oral spines 6-7. Ascopore large, reticulate, Avicularia small, paired or single, with complete cross-bar, directed obliquely distally. Ovicell subglobular, imperforate except for conspicuous marginal areolae, granular with a smooth area proximally and/or frontally; completely lacking lateral lappets or peristomial processes, with four oral spines in ovicelled zooids.

REMARKS: Powell (1967) described and illustrated the avicularian mandible — it is long and setiform and lacks basal hooks.

Chronocerastes n.gen.

Colony encrusting. Zooids imperforate except for marginal areolae. Orifice D-shaped, ascopore non-denticulate. Oral spines and peristomial processes present. Avicularia absent. Ovicell with ectooecial pores and an exposure of endooecium; not closed by zooidal operculum. No pore-chambers; mural septula present.

TYPE SPECIES: *"Lepralia" otakauensis* Brown, 1952

Chronocerastes otakauensis (Brown) (Plate 31, D-F)

"Lepralia" otakauensis Brown, 1952: 283.

MATERIAL EXAMINED: NZOI Stn E821; also a slide of *"Lepralia" otakauensis* at N.Z. Geological Survey from Everett's Quarry near Oamaru.

DISTRIBUTION: Puysegur Bank; 549 m. Also Lower Oligocene of Oamaru.

DESCRIPTION: Colony encrusting. Zooids large, 0.76-1.32 x 0.53-0.98 mm, very convex, the frontal shield imperforate, smooth to faintly textured, with about 9-13 small areolae along each lateral margin. Orifice D-shaped, the proximal rim straight, smooth or very faintly beaded; ascopore suboral, non-denticulate, separated by a smooth narrow area from the proximal orificial rim, obscured by a spine-like umbo in most zooids. Oral spines five in periancestrular zooids, three in marginal zooids, the proximal pair being incorporated into a broad-based pair of spine-like processes which, together with the suboral one, give a tricornute appearance to marginal zooids — these "spines" project distally and their bases are united by a low ridge, the whole peristomial apparatus obscuring the orifice somewhat. No avicularia. Ovicell prominent, the distal face of the ectooecium perforated by funnel-shaped pores, with a large, smooth endooecial exposure frontally which is framed by the edge of the ectooecial layer, which is produced into an apical fold; not closed by zooidal operculum. Mural septula present low on the

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lateral walls.

REMARKS: It is necessary to introduce a new genus for this species, which Brown (1952) provisionally assigned to "*Lepralia*". *Chronocerastes otakauensis* has a range extending from Lower Oligocene to Recent and the name *Chronocerastes* reflects the duration in time (Greek *chronos*, time) as well as the horn-like peristomial processes (Greek *cerastes*, horned). Because of the ascopore it is included in the Microporellidae. Indeed the ovicell might be compared with that of *Calloporina*. The lack of basal pore-chambers is not usual in the family but is nevertheless shared by the *Microporella*-like genus *Diporula*.

The fossil and Recent specimens appear to be conspecific although complete ovicells are lacking in the fossil specimens. Brown (1952) missed seeing the ascopore clearly but did mention a "perforation in the proximal lip of the orifice suggestive of a median sinus". The ascopore is very evident in Uttley material at the N.Z. Geological Survey. Brown (1952) described the ovicell (base only) as occupying most of the frontal shield but in both the Uttley colonies and the present material it is not the case — it appears to be a variable feature. The only differences between the fossil and Recent specimens are in spine number (four in the fossil) and in zooidal size — the Recent zooids are larger and more convex, and the overlap in dimensions is quite small. Brown (1952) gives the zooidal length as 0.60-0.70 mm and the Uttley material measures 0.66-0.86 x 0.55-0.75 mm, whereas Recent zooids are proportionately longer.

Calloporina Neviani, 1895

TYPE SPECIES: *Cellepora decorata* Reuss, 1848

Calloporina angustipora (Hincks)

Microporella diadema f. *angustipora* Hincks, 1885: 249.
Calloporina angustipora: Brown 1954a: 561; Gordon 1984: 104 (*cum syn.*).

MATERIAL EXAMINED: NZOI: Stns B482, B483, B484, B487, B488, B498, C868, C869, C871, D268, D269, D270, D272, D273, E817, E820, Q686. DPG: Manukau Harbour.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Manukau Harbour and Heads, Mount Maunganui, Napier (Pliocene to Recent), Wanganui (Upper Pliocene to Recent), Cook Strait, Marlborough Sounds, Tasman Bay, Chatham Islands, Otago Peninsula, Puysegur Bank; 0-235 m.

Fenestrulina Jullien, 1888

TYPE SPECIES: *Cellepora malusii* Audouin, 1826

Fenestrulina personata (MacGillivray) (Plate 32, A)

Microporella malusii var. *personata* MacGillivray, 1883a: 131; 1889: 275; Jelly 1889: 187.

MATERIAL EXAMINED: NZOI Stn E820.

DISTRIBUTION: Puysegur Bank; 220 m. Also Victoria.

DESCRIPTION: Colony tiny, encrusting. Zooids small, 0.29-0.60 x 0.21-0.49 mm, hyaline, the frontal shield with a smooth marginal band of calcification delimiting a larger central area with small, simple, scattered pores. Orifice more or less semicircular, lacking oral spines, the ascopore at some distance from it, suboval, non-denticulate. Ovicell prominent, the endooecial surface tubercular and sparsely pitted, bordered by a smooth, thin peripheral rim of ectooecium which rises up on the proximal face of the ovicell where it fuses with a similar peristomial rim which embraces the orifice. One distal and two lateral pore-chambers present.

REMARKS: This unusual species is unique in the genus *Fenestrulina* in having a peristome in fertile zooids. MacGillivray (1883a, 1889) does not show the marginal band of calcification and describes and illustrates the ascopore as large, but in other features the present specimens agree. These occurred at a single station only on colonies of *Orthoscuticella fissurata* Levinsen.

Fenestrulina incompta Gordon (Plate 32, B)

Fenestrulina malusii incompta Gordon, 1984: 107.

MATERIAL EXAMINED: NZOI Stns B489, B493, B498, B616, E796, M778, Q686.

DISTRIBUTION: Kermadec Ridge, Cook Strait, Milford Sound, Dagg Sound, Breaksea Sound, Puysegur Bank; 20-251 m.

REMARKS: In view of the more or less consistent combination of characters over a wider distribution, I have decided to raise the original taxon to species rank. *Fenestrulina incompta* differs from *F. malusii sensu stricto* in its larger average zooidal size, the single row of pores between the orifice and ascopore, consistent occurrence of mostly four oral spines on all non-ovicelled zooids (never two), and flared, circular ascoporal rim.

Seeing specimens from a wider geographic area, however, allows some comment on intraspecies variation in *F. incompta*. Whereas in the holotype specimen, for example (illustrated in Gordon 1984: plate 41, D), the orificial rim is rather squared in outline and the four oral spines are set somewhat distally, in colonies from the mainland New Zealand shelf, the lateral pair may occur more proximally, permitting their retention in ovicelled zooids. Colonies from Stn Q686 (Stephens Hole, Cook Strait) have zooids with three or four spines and may also have a short carina just proximal to the ascopore (Plate 32, B).

Fenestrulina multicava n.sp. (Plate 32, C)

MATERIAL EXAMINED: NZOI Stns B484, B488.

DISTRIBUTION: Puysegur Bank, south-west South Island; 124-164 m.

DESCRIPTION: Colony encrusting. Zooids 0.59-0.81 x

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0.47-0.98 mm, the frontal shield more or less evenly pitted by small occluded pores. Orifice with four oral spines, the bases of the proximal pair appearing in ovicelled zooids. Ascopore centrally placed at some distance from the orifice, small, lunate and denticulate, within a thin circular to oral rim. Ovicell smooth-textured, with an uneven surface and tiny peripheral areolae.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-505.

TYPE LOCALITY: NZOI Stn B488, Puysegur Bank, 46°28.7'S, 166°14.3'E, 164 m.

REMARKS: The pores in this species are at first quite large as the frontal shield develops, appearing as a coarse reticulum. *Fenestrulina harmeri* Winston and Heimberg, 1986 from Indonesia is uniformly porous with a centrally placed ascopore but the pores are coarse and stellate and the ovicell has radial ribbing with conspicuous marginal areolae. The developing frontal shield appears much as in *F. multicava*, however.

Fenestrulina microstoma Moyano, 1983 from Chile appears similar but there is an imperforate area proximal to the non-denticulate ascopore and oral spines are rare. The ovicell has "short marginal costae".

The species name *multicava* is derived from the Latin adjective *multicavus*, meaning porous.

Fenestrulina specca n.sp. (Plate 32, D, E)

MATERIAL EXAMINED: NZOI Stns E820, M763, M773, M778, M779, M791, M793.

DISTRIBUTION: Milford Sound, Puysegur Bank; 20-220 m.

DESCRIPTION: Colony encrusting, or largely free and subfrondose, unilamellar. Zooids 0.38-0.64 x 0.21-0.51 mm, hyaline/porcellanous, the frontal shield quite smooth, with two rows of pores between orifice and ascopore, pores around the margin, and a few scattered pores centrally. Orifice with four, sometimes three, oral spines; ascopore more or less centrally located, broadly C-shaped, minutely denticulate, lacking a rim. Ovicell subglobular, very smooth, imperforate except for marginal areolae; a pair of spines on ovicelled zooids.

HOLOTYPE: Colonies, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-506.

PARATYPE: NZOI, type number P-725, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn M763, Milford Sound, 44°36.2'S, 167°49.7'E, 27 m.

REMARKS: This species is close to *Fenestrulina malusii sensu stricto* yet may be distinguished by a combination of features — mostly four oral spines on autozooids, never two; paired oral spines on ovicelled zooids; more numerous ovicellular areolae; scattered pores frontally.

A colony from Stn E793 on the coast south of Milford Sound is a puzzle — it looks like a cross between *F. incompta* and *F. specca* (Plate 33, A). I cannot assign it to any particular species.

The name *specca* is an Anglosaxon noun, used in apposition, meaning spot, alluding to the spotted appearance of the frontal wall.

Fenestrulina thyreophora (Busk) (Plate 33, B-F)

Lepralia thyreophora Busk, 1857: 172.
Microporella malusii var. *thyreophora*: MacGillivray 1889: 275.
Fenestrulina malusii pulchra Gordon, 1984: 107.
Fenestrulina pulchra: Moyano 1985a: 86.

MATERIAL EXAMINED: NZOI Stns B468, B482, B490, E793, E820, M774, M776, M779, M791, M795; also Stn S237, Edwardson Sound, 45°56.0'S, 166°39.0'E; and NMNZ specimens from South Cape, Stewart Island.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Auckland Harbour, Wellington, Hokitika, Chatham Rise, Milford Sound, Dusky Sound, Fiordland coast, Puysegur Bank, Stewart Island; 0-253 m. Also Victoria, and Juan Fernandez archipelago.

DESCRIPTION: Colony encrusting. Zooids 0.29-0.62 x 0.21-0.51 mm, porcellanous, the frontal shield somewhat variable, with a lateral bank of gymnocystal calcification that encroaches frontally to varying degrees, especially in zooids nearer the colony centre but even in ovicelled zooids, delimiting a scutiform area; frontal pores in 1-2 rows between the orifice and ascopore, complex, with many radii and subradii. No oral spines. Ascopore widely C-shaped and barely non-denticulate. Ovicell subglobular, smooth with peripheral areolae. Ancestrula not tatiform but resembling later zooids.

REMARKS: This is a historically little-known species. It was first described by Busk (1857) from material occurring on a branching bryozoan, *Malakosaria sinclairii*, from an unstated New Zealand locality. Hincks (1880: 212, 213, plate 45, fig. 1) mentioned it but his figure is clearly not of the same species, for it lacks the scutiform area and has three oral spines on some of the zooids. Busk's (1857) illustration matches the present NZOI material precisely except in two features — first, the scutiform area is variable in extent, being either exactly as depicted by Busk or less circumscribed because of the more proximal occurrence of the peripheral bank of calcification; secondly, Busk described and depicted the ovicell as "faintly punctuated". This is puzzling. It is certainly not the case in the present material, including NMNZ colonies on *Malakosaria sinclairii*, nor is it the case in MacGillivray's (1889) Victorian specimens which are like the NZOI colonies in having a perfectly smooth ovicell with marginal areolae.

Having now seen specimens of unmistakable *F. thyreophora*, it is obvious that colonies from Goat Island Bay, Leigh, identified by me (Gordon 1972b, c) as *Fenestrulina malusii* var. *thyreophora* (Plate 34, A, B) cannot be this species. They appear to be a morphotype

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of *F. disjuncta* Hincks (Gordon 1984) but bear some similarities to *F. incompta* over parts of its range. Busk (1857), himself, compared *F. thyreophora* to *F. cornuta* (d'Orbigny, 1841, 1847) which lacks, however, a definitive scutiform area defined by the edge of a calcareous layer, and has four oral spines on autozooids.

It now seems apparent that *F. pulchra* Gordon is a junior synonym of *F. thyreophora*. Both species have the same type of complex pore and the differences are minor. The holotype specimen of *F. pulchra* has a proportionally shorter, rimmed ascopore and better-developed frontal pores and there is no scutiform area *per se* in any zooid though there is a very narrow band of calcification around the margin of most zooids. Since the two taxa are conspecific then the question arises as to what induces the "scutiform" condition. Both Busk's (1857) and the NZOI "scutiform" colonies occurred on erect bryozoan colonies, in the latter case on *Euthyroides episcopalis* and on a finely branching red alga growing with *E. episcopalis*.

Moyano's (1985a) record of this species (as *F. pulchra*) from Juan Fernandez (along with that of *Micropora mortenseni*, another neozelanic species) is most interesting. It shows at least the genetic stability of the characteristics of this form over a wider geographic area than within the Australasian region, including the arrangement of pores distal to the orifice, which appears to be a reliable feature. Moyano's specimens did not indicate the possibility of a scutiform area which might otherwise support conspecificity with *F. thyreophora*. I agree with Moyano's raising of the subspecies to species rank.

Station D170 yielded a puzzling colony resembling a cross between *F. pulchra* and possibly *F. disjuncta* (Plate 34, C). It has the rimmed ascopore, complex pores and distal pore arrangement of *F. pulchra* but has a more rugose ovicell and, most surprisingly, a lateral pair of oral spines that are retained in ovicelled zooids. There is also only a single row of pores between the orifice and ascopore. It would seem to be a morphotype of *F. pulchra*. It also bears a resemblance to *F. majuscula* Hayward, 1980, an encruster of kelp holdfasts at Port Stanley, Falkland Islands. Like *F. thyreophora*, it is smooth and porcellanous and has zooids with a lateral pair of oral spines or these may be missing. Hayward described the pores as large and stellate, so they could be like those of *F. thyreophora*. The zooidal dimensions are larger than in *F. thyreophora* and, importantly, the ancestrula is tatiform, with ten peripheral spines.

Fenestrulina disjuncta (Hincks)

Microporella malusii Form *disjuncta* Hincks, 1885: 249; Jelly 1889: 187.
[?] *Fenestrulina malusii* var. *thyreophora*: Gordon 1972b: 342; 1972c: 453.

MATERIAL EXAMINED: NZOI Stns B482, B493, C871, D270, D273, E804, E817, E820, M776, M778, M780, M782, M797, Q686.

DISTRIBUTION: Kermadec Islands, Cook Strait, Marlborough Sounds, Tasman Bay, Milford Sound, Breaksea Sound, Puysegur Bank; 10-635 m.

REMARKS: As mentioned in the remarks under *F. thyreophora*, a species from Goat Island Bay, Leigh (Plate 34, A, B), ascribed by me (Gordon 1972b, c) to *F. thyreophora*, may be a morphotype of *F. disjuncta*.

Fenestrulina gelasinoides Gordon

Fenestrulina gelasinoides Gordon, 1984: 106.

MATERIAL EXAMINED: NZOI Stns B484, B487, B488, D270, D272, D273, E796, E804, E817, E820, E828, Q686.

DISTRIBUTION: Kermadec Ridge, Cook Strait, Tasman Bay, Fiordland coast, Breaksea Sound, Puysegur Bank; 62-251 m.

Fenestrulina reticulata Powell (Plate 34, D)

Fenestrulina reticulata Powell, 1967: 298.

MATERIAL EXAMINED: NZOI Stns B477, B483, B484, B487, B488, B489, B493, C857, C868, C869, C871, D254, D269, D270, D273, E817, E820, E828, Q686; also Separation Point, Abel Tasman National Park (coll. M. Bradstock).

DISTRIBUTION: Three Kings Islands, Cook Strait, Marlborough Sounds, Tasman Bay, Fiordland coast, Breaksea Sound, Puysegur Bank; 20-235 m.

DESCRIPTION: Colony encrusting. Zooids 0.40-0.50 x 0.30-0.38 mm, the frontal shield more or less evenly perforated by pores sunken between a continuous network of ridges; superimposed on this is typically a higher, transverse, crest between the orifice and ascopore which is generally continuous with a similar, slightly lower ridge around the ascopore or on one side of it. Orifice with four oral spines. Ascopore reniform with a thin narrow rim. Ovicell rugose, imperforate except for numerous peripheral areolae. Ancestrula tatiform, with nine spines.

REMARKS: This species is immediately characterised by its rugose appearance.

Family CALWELLIIDAE MacGillivray, 1887

Calwellia Wyville Thomson, 1858

Colony erect, bifurcating, anchored by rhizoids. Zooids back to back in alternating decussate pairs; each zooid with a distal dilatation and a proximal tubular portion that runs along the lateral boundary between the pair of zooids below it. Orifice oval or semicircular, with lateral processes. Ascopore simple. Ovicell prominent, with membranous ectooecium. Uniporous mural septula present.

TYPE SPECIES: *Calwellia bicornis* Wyville Thomson, 1858

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Calwellia gracilis Maplestone (Plate 34, E, F)

Calwellia gracilis Maplestone, 1882: fig. 9; Jelly 1889: 33; Harmer 1902: 310; Canu & Bassler 1929: 462.
Calwellia bicornis: [?] Levinsen 1909: 262; [?] Canu & Bassler 1929: 462; Bassler 1953: 226; Uttley & Bullivant 1972: 53.

MATERIAL EXAMINED: NZOI Stns B482, B493, B495, E820, M778.

DISTRIBUTION: Milford Sound, Breaksea Sound, Puysegur Bank; 84-220 m. Also Victoria.

DESCRIPTION: colony erect, dichotomously branching, the zooids opposite and decussate, arranged back to back in pairs; each zooid in two parts, a distal dilatation which houses the polypide and a proximal tubular portion which runs along the lateral margin of the pair of zooids below; chitinous and flexible at the junction of the two parts; dilatation 0.38-0.60 x 0.21-0.26 mm, the frontal shield smooth, imperforate, except for a pair of pores at the proximal corners of the orifice and a smaller, circular ascopore suborally. Orifice with a straight proximal rim; flanked by a pair of hollow, generally truncated, tubercles; a pair of distolateral pores. Ovicells with smooth endooecium and membranous ectooecium.

REMARKS: Confusion surrounds the respective identities of *Calwellia bicornis* and *C. gracilis*, which are indeed separate species; *C. gracilis* has sometimes been misidentified as *C. bicornis* (e.g., Uttley & Bullivant 1972).

Calwellia bicornis was formally described by Wyville Thomson (1858). [The paper in which the description appeared was reproduced, unauthored, as a so-called abstract (lacking illustrations) in the *Quarterly Journal of Microscopical Science*, volume 7, pages 143-154, in the same year.] In the description he referred to the dilatation as triangular. MacGillivray's (1880) illustration of *C. bicornis* certainly shows markedly triangular zooids (like those of *C. bicornis* from the Chatham Islands) but unlike those of *C. gracilis*. Harmer (1902) referred to this triangular shape in *C. bicornis* as a distinction from the more slender zooids of *C. gracilis*. The present material of *C. gracilis* is identical to Harmer's (1902) illustrations, in which the proximal rim of the orifice is straight. Levinsen's (1909) illustrations are puzzling. They appear identical to those of Harmer (1902) except for a concave proximal rim and a pair of pores at the distal end of the tubular portion of a zooid. In his remarks, Levinsen intimated that he was able to examine both species and that *C. gracilis* differs "from *C. bicornis* for one thing in having a simple operculum with a straight proximal margin." His illustrations do not resemble those of MacGillivray (1880), however, and since his illustrated specimen came not from Australia but from Hawke Bay, New Zealand, perhaps a third, similar, species is involved.

As Harmer (1902) pointed out, MacGillivray's (1886) reference to *Calwellia gracilis* is not of this species, since it is aviculiferous. MacGillivray later (1890b) referred to it as *Notamia gracilis)*.

Calwellia uniserialis Powell, 1967 is unusual. Although superficially uniserial, it is in reality biserial, each zooid having a proximal tubular portion which traverses the zooid immediately adjacent to it, connecting to the next zooid below. Inasmuch as the zooids have a distal dilatation and a tubular proximal portion they are like *Calwellia* species. However, the arrangement of zooids is very different from that of *C. bicornis* or *C. gracilis* and more akin to that of *Ichthyaria*. The type species, *I. oculata* Busk, 1884, has biserially arranged zooids facing on the same aspect as in *C. uniserialis*, and there is even more of a similarity to *I. profunda* d'Hondt, 1981.

Malakosaria Goldstein, 1882

Colony erect, bifurcating, anchored by rhizoids. Zooids bi- or quadriserial, back to back, alternating, lacking a proximal tubular portion. Orifice with straight proximal rim, flanked by lateral processes. Ascopore transversely elongate. Pore-chambers present distal to orifice.

TYPE SPECIES: *Onchopora sinclairii* Busk, 1857

REMARKS: The genus *Onchopora*, introduced by Busk (1855), has been shown by Harmer (1957) to be a junior subjective synonym of *Margaretta* Gray. At its original introduction it included two species referable to *Margaretta* and a third conspecific with *Tetraplaria ventricosa*. *Onchopora sinclairii* Busk, 1857, was later selected by Canu and Bassler (1929) as the type species of *Onchopora*, which of course is not possible since this species was not included when the genus was first introduced. Goldstein (1882) independently redescribed *O. sinclairii* as *Malakosaria pholaramphos*, not realising that the two species were synonymous. Goldstein's generic name is available for *O. sinclairii* which, like Canu and Bassler (1929) and Bassler (1953), I would separate from *Calwellia* because of the lack of a proximal tubular portion to each zooid.

Malakosaria sinclairii (Busk)

Onchopora sinclairii Busk, 1857: 172; 1876: 116; 1879: 193; 1884: 103; d'Hondt & Redier 1977: 217; d'Hondt 1979b: 61; 1984b: 99.
Malakosaria pholaramphos Goldstein, 1882: 43.
Calwellia sinclairii: Waters 1889: 17; Jelly, 1889: 33; Hamilton 1898: 194; Harmer 1902: 312; 1957: 826; Uttley & Bullivant 1972: 53; Gordon, 1984: 107.
Calwellia sinclairi: Levinsen 1902: 9; 1909: 260.
Onchopora sinclairi: Canu & Bassler 1929: 462; Bassler 1953: 226.

MATERIAL EXAMINED: NZOI Stn E793.

DISTRIBUTION: Kermadec Ridge, Northland, Chatham Rise, Akaroa, Fiordland coast. Also Australia, and Marion, Heard, and Kerguelen Islands; 64-3610 m.

REMARKS: *Urceolipora dentata* MacGillivray, 1885a, belongs to this genus. Waters (1889) suggested an affinity with *Calwellia sinclairii*, Levinsen (1909) referred it to the Onchoporidae, and Harmer (1902) included it in *Calwellia*. *Malakosaria dentata* is biserial, with the zooids alternating back to back up the branches, but in all other features resembles zooids of *M. sinclairii*.

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Onchoporoides Ortmann, 1890

Colony erect, unilamellar, flabellate, dichotomously branching in one plane, anchored by a basal stem and rhizoids. Zooids with pores along the margins and between the ascopore and orifice; tubercles and a spine present. Ovicell large, globular, with membranous ectooecium.

TYPE SPECIES: *Carbasea moseleyi* Busk, 1884

Onchoporoides moseleyi (Busk) (Plate 35, A)

Carbasea moseleyi Busk, 1884: 56; Levinsen, 1909: 75.
Flustra moseleyi: Jelly 1889: 102.
Onchoporoides moseleyi: Ortmann 1890: 12; Canu & Bassler 1929: 463; Bassler 1953: 226.
Carbasea moselyi [sic]: Hamilton 1896: 27; Hutton 1904: 295.
Ichthyaria moseleyi: Levinsen 1902: 9.

MATERIAL EXAMINED: NZOI Stn E827; also Stn S204, Hikurangi Trough east of Cook Strait, 42°10.5'S, 175°59.4'E, 2677 m.

DISTRIBUTION: Kermadec Trench, Hikurangi Trough, head of Solander Trough (western approaches to Foveaux Strait); 526-2677 m.

DESCRIPTION: Colony erect, to 52 mm high, unilamellar, flabellate, dichotomously branching in one plane, tapering proximally to a stem with numerous anchoring rhizoids. Zooids large, 0.74-1.32 x 0.42-0.86 mm, the frontal shield smooth, with pores along part or much of the length of each margin, and continuous around the distal side of the orifice; a pair of pores also between the orifice and ascopore. Orifice high arched, the proximal rim almost straight, very gently concave; a pair of short, insignificant tubercles at the proximo-lateral corners, and a mid-distal non-articulated spine directed distally. Ascopore simple, circular. Ovicell large, visible to the naked eye, the endooecium faintly and evenly textured, the ectooecium membranous except for a thinly calcified region basally. Several uniporous mural septula present in a row along each lateral wall. Down each outer lateral margin of a colony runs a calcified, composite, rootlet cord; these converge at the proximal end of the colony to form a short stem which frays proximally into numerous individual rhizoids. Ancestrula long (about 2 mm) and narrow, tapering insensibly into the two anchoring rhizoids which support it, with a membranous frontal wall and no ascopore or spines.

REMARKS: There are some puzzling discrepancies between Busk's (1884) description and the present material. Busk showed several pores proximal to the orifice and illustrated no ascopore. Inasmuch as the frontal shield is very thin and hyaline, the ascopore can be overlooked in transmitted light, but the numerous pores are puzzling. Busk's illustrations were based on a single, stained specimen, so it is possible that the staining has highlighted spots which do not, in fact, correspond to pores. In some zooids of one NZOI colony, for example, there are circular (or spherical) structures under the frontal shield which could be taken to be pores except that these are more proximal and not as regularly disposed as Busk depicted. Busk also failed to mention a distal spine. The "horse-shoe shaped mark" on the frontal shield described by Busk is, as Levinsen (1909: 264) mentioned, the basal outline of an ovicell.

Busk's (1884) colony came from the Kermadec region so it is unlikely the present material is not conspecific.

The basal rhizoids of the present colonies each attach to a foraminiferan grain — collectively these anchor the colony. A feature which also appears universal is a membranous covering over the back of the colony with a cavity between it and the basal walls of the zooids. Since this membrane is absent from very small colonies, it is evidently associated with and formed by the amphipods which live under it. Whether this benefits or troubles the bryozoan is not known.

Family MARGARETTIDAE Harmer, 1957

Colony erect, branching, articulated, the zooids 4-10 serial. Frontal shield textured with ridges, granulations, and pores, with a median ascopore; primary orifice semicircular to suboval, bordered by a peristome which is proximally inflated, and projecting, in fertile zooids. No avicularia. Ovicell peristomial. Ancestrula erect, resembling adult zooids, with a chitinous attachment portion proximally.

Margaretta Gray, 1843

Characters as for family.

TYPE SPECIES: *Cellaria cereoides* Ellis & Solander, 1786

Margaretta barbata (Lamarck) (Plates 1, H; 35, B-D)

Cellaria barbata Lamarck, 1816: 136; Milne Edwards 1836: 178.
Cellaria hirsuta Lamouroux, 1816: 126; 1824: 178.
Margaretta cereoides: Gray 1843: 293.
Tubucellaria barbata: d'Orbigny 1852: 336; Pergens 1887: 90: Waters 1905: 6.
Onchopora hirsuta: Busk 1855: 320.
Margaretta barbata: Hutton 1873: 101; 1880: 196; d'Hondt 1979a: 15.
Tubucellaria hirsuta: MacGillivray 1880: 52: Busk 1884: 100; MacGillivray 1887a: 202; Hutton 1891: 103; Hamilton 1898: 194; Hutton 1904: 296; Levinsen 1909: 306; Stach 1935a: 344; Macken 1958: 106.
Margaretta hirsuta: Harmer 1957: 837; Bock 1982: 378.

MATERIAL EXAMINED: NZOI: Stns B480, B482, B493, B495, B611, B616, M780, M789; NMNZ: South Cape, Stewart Island; DPG: Cape Reinga, Makara, Lyall Bay, Kaikoura.

DISTRIBUTION: Cape Reinga, Makara, Wellington, Cook Strait, Kaikoura, Milford Sound, Doubtful Sound, Dagg Sound, Breaksea Sound, Puysegur Bank; 40-274 m. Also Victoria (Lower Pliocene to Recent).

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DESCRIPTION: Colony erect, bushy, with 4.5–11-mm-long internodes connected by chitinous joints. Zooids 4-serial, in alternating back-to-back pairs; 1.00-1.15 x 0.49-0.64 mm, the frontal shield with a longitudinally aligned network of low, granular ridges separated by shallow sulci in which are minute pseudopores. Primary orifice roundly semicircular, obscured by a peristome, often subtubular or spoutlike, that is ridged with a granular rim. A small, circular ascopore occurs midfrontally near the base of the peristome; flanking it distally is a pair of 4–5-mm-long chitinous bristles. No avicularia or oral spines. Brood chamber peristomial, the peristome swollen all round proximally with a narrower, upturned, spout-like distal portion. Ancestrula like later zooids, erect, attached by a short, chitinous, tubular portion.

REMARKS: This is one of the most distinctive bryozoans to wash up on Cook Strait beaches. In life it is pinkish orange. It occurs along with catenicellids, *Amathia wilsoni*, *Dimetopia* species and *Cellaria hirsuta*, all cast ashore in reasonably large quantities after southerly storms. It would have been just such material that Andrew Sinclair, M.D., collected when he visited New Zealand in 1841. This was described by Gray (1843) (upon Sinclair's return to England), who introduced the genus *Margaretta* at this time. He erroneously attributed the New Zealand specimens to *Cellaria cereoides* Ellis and Solander, 1786, but the New Zealand species had previously been collected from Australian waters during the cruise of Charles-Alexandre Lesueur and François Peron in 1800-1804 and named *Cellaria barbata* by Lamarck (1816) [several months before Lamouroux (1816) independently named the same species *Cellaria hirsuta* (d'Hondt 1979a).] Thus the type-species of *Margaretta* had been misidentified. As such, a case is required to be made to the ICZN to designate the type species (Article 70b, Ride *et al.* 1985).

Harmer (1957) has pointed out that *Onchopora* Busk, 1855, is partly synonymous with *Margaretta*. When first introduced, *Onchopora* included three species, two of which are attributable to *Margaretta* and the third, *O. mutica*, of uncertain affinities. Busk (1857) later added another species to *Onchopora*, *O. sinclairii*, which Canu and Bassler (1929) invalidly chose as the type-species of *Onchopora*.

Onchopora sinclairii, a calwelliid species (Harmer 1957) is not congeneric with *Onchopora mutica* (the only possible type-species, by elimination, of *Onchopora*) for the type of jointing shown by Busk (1855) in *O. mutica* is not found in calwelliids. Yet *Onchopora* is still being used by bryozoan workers as a genus of Calwelliidae or even of Onchoporidae (e.g., d'Hondt 1975, 1981; David and Pouyet 1986). According to Harmer (1957), the unique specimen of *O. mutica* may be a young colony of *Tetraplaria ventricosa*, in which case *Onchopora* would be a senior synonym of *Tetraplaria* Tenison-Woods. Thanks to the courtesy of P.J. Chimonides, I have examined *O. mutica* and agree that it is conspecific with, and therefore a senior synonym of, *Tetraplaria ventricosa*. Thus *Onchopora* is potentially reinstatable as a valid genus. Note, however, that Article 69(b) of the Code (Ride *et al.* 1985) states: "Elimination of all but one of the originally included nominal species from a nominal genus or subgenus does not in itself constitute type fixation." For stability, therefore, *Onchopora* is best left forgotten.

The reference of Hutton (1880) to *Onchopora hirsuta* applies to *Cellaria hirsuta*. Hutton (1877) mistakenly thought that Busk (1855) had established a new cellariid genus based on *C. hirsuta*.

Superfamily CELLEPOROIDEA Johnston, 1838

REMARKS: In an earlier publication (Gordon 1984) I mistakenly attributed the Celleporoidea and Celleporidae to Lamouroux (1821). In fact, Lamouroux's taxon was "Ordre ... Celléporées" and would not qualify. Johnston (1838) appears to be the earliest author of Celleporidae as a family-group taxon.

Family HIPPOPORIDRIDAE Vigneaux, 1949

Colony encrusting, two-dimensional to nodular, often on gastropod shells inhabited by hermit crabs. Zooids with scattered frontal perforations and/or marginal areolae. Orifice somewhat bell-shaped, with a broad rounded poster separated from the anter by a constriction and distinct condyles. No oral spines. Zooidal cystids and/or polypides sexually dimorphic. Avicularia adventitious and/or vicarious. Ovicell present or absent. Small basal pore-chambers present.

REMARKS: Pouyet (1973) noted similarities in zooidal and colonial morphology between *Hippoporidra* Canu and Bassler and celleporids and raised Vigneaux's (1949) subfamily Hippoporidrinae to family rank. I agree with her on both of these points and here include the Hippoporidridae in the superfamily Celleporoidea. As I have suggested on another occasion (Gordon 1984:122), I consider this family to include *Hippopodinella* (=*Odontoporella*) as well as *Hippoporidra*. Both genera tend to be associated with hermit-occupied gastropod shells, and both have sexually dimorphic zooids in which male polypides have non-ciliated smaller lophophores with fewer tentacles (Gordon 1968; Cook 1968a). Cook (1985) has also pointed out the similarities between *Hippoporidra* and *Cleidochasma* auctt. (Phidoloporidae) the latter of which may comprise more than one genus.

Odontoporella Héjjas, 1894

Colony encrusting. Zooids with large orifice in proportion to the area of frontal shield; marginal areolar pores only; orifice with poster broader than anter or as wide. Avicularia adventitious, situated near the margins, with complete pivot-bar. Zooidal polypides sexually dimorphic, the male lophophore smaller, unciliated,

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with fewer tentacles, the zooidal cystid unmodified. Ovicells absent, embryos brooded internally. Numerous small basal pore-chambers present.

TYPE SPECIES: *Lepralia adpressa* Busk, 1854

REMARKS: Héjjas (1894) introduced *Odontoporella* for three unrelated species — *Lepralia adpressa* Busk, 1854, *L. anisostoma* Reuss, 1874, and *L. odontostoma* Reuss, 1874. Unfortunately this generic name seems to have been overlooked since its publication — it is not listed in Bassler's (1953) treatise, for example — but it was validly introduced and requires type fixation. The question is, which of the three species should be chosen as the type of the genus? *Lepralia anisostoma* and *L. odontostoma* are both Miocene species and have been assigned to *Emballotheca* and *Hippoporina* respectively (e.g., David and Pouyet 1974) though neither genus is appropriate. From their illustrations the former seems more like a *Hippoporina* (lacking the "lyrula" of *Emballotheca*) and the latter a *Lepraliella* (with a smooth frontal shield). The first-named species of *Odontoporella* is Recent, better-known, and a better choice for type species. It is already the type species of *Hippopodinella* Barroso, 1924, a relatively small genus, and less disruption to nomenclature would result from choosing *L. adpressa* as type-species of *Odontoporella*. According to Article 67(k) of the Code (Ride *et al.* 1985), "The fact that a nominal species is already the type species of a nominal genus ... does not prevent it from being fixed as the type species of another. The genus-group names are then objective synonyms of one another." I therefore choose *Lepralia adpressa* Busk, 1854, as type species of *Odontoporella* Héjjas, which genus becomes an objective senior synonym of *Hippopodinella* Barroso.

Lepralia lata (Busk, 1856), included in this genus (by generic synonymy) ever since Canu and Bassler (1930) first coined the combination *Hippopodinella lata*, differs in several features from the type-species, as several workers have pointed out (*see* Powell 1967), viz., an evenly perforated frontal shield, presence of ovicells, and lack of avicularia. Accordingly, Bishop and Hayward (in press) have proposed the new genus *Hagiosynoda*, with type-species *H. lata*, and other included species *H. cupulata* (Manzoni, 1870b), *H. kirchenpaueri* (Heller, 1867), and *H. strophiae* (Canu and Bassler, 1930). [These may not all be distinct. Schmid (1989: 48), for example, has shown that *H. kirchenpaueri* is a junior synonym of *H. lata*.] It is here retained in the Hippoporidridae.

Odontoporella adpressa (Busk) (Plate 35, E)

Lepralia adpressa Busk, 1854: 82; 1856: 178.
Hippopodinella adpressa: Livingstone 1929: 95; Powell 1967: 345 (*cum syn.*); Gordon 1968: 633; 1972a: 508.

MATERIAL EXAMINED: NZOI: Stns B455, C857, D253, D269. DPG: Colonies from Goat Island Bay, Leigh, and Point Jerningham, Wellington Harbour.

DISTRIBUTION: Off Spirits Bay, Hauraki Gulf, Bay of Plenty (Slipper Island), Wellington Harbour, Cook Strait, Marlborough Sounds, Tasman Bay, Kahurangi Shoals; 0-58 m. Also New Caledonia, Andaman Sea, Indian Ocean, Falkland Islands, Chile.

DESCRIPTION: Colony encrusting, often overgrowing itself, mostly occurring on hermit-occupied gastropod shells. Zooids 0.42-0.77 x 0.25-0.64 mm, the frontal shield quite convex, granular with radial ridges and furrows, and imperforate except for marginal areolae. Orifice large in proportion to the area of frontal shield which surrounds it, longer than wide, bell-shaped overall, with the broad, rounded poster wider than or as wide as the anter; condyles well developed; no oral spines. Avicularia adventitious, 0-3 per zooid, suboral, with a very thin, complete, cross-bar and roundly triangular rostrum; situated near the colony margins. Zooidal polypides with 15-16 lophophoral tentacles. Male zooids externally indistinguishable from autozooids but have smaller polypides with four long and four short unciliated tentacles. Ovicells absent; embryos develop internally, attaining 0.17 mm long prior to liberation. Numerous small basal pore-chambers (or recesses between buttresses) present.

REMARKS: Gordon (1968, 1970, 1972a) has described the ecology and reproductive activity of this species. In the warm-temperate waters of northern New Zealand it appears to breed year round (based on the presence of male polypides) with an apparent spring peak. Living colonies are beige to pale tan (moderate orange-yellow (7.5YR 8/8) on the Munsell Color Chart), with deep yellowish-pink (5R 6/11) embryos and larvae. Colonies occur almost exclusively on calcareous substrata (mostly hermit-occupied gastropod shells, rarely crab carapaces), rarely on rock or glass. Only 3% of 200 *O. adpressa* colonies at Goat Island Bay occurred on shells without hermit crabs and no live gastropod shell was ever found encrusted by this species.

Family CELLEPORIDAE Johnston, 1838

Buffonellaria Canu & Bassler, 1917

TYPE SPECIES: *Hippothoa divergens* Smitt, 1873

Buffonellaria regenerata (Powell)

Stephanosella regenerata Powell, 1967: 278.
Buffonellaria regenerata: Gordon 1984: 118.

MATERIAL EXAMINED: NZOI Stns B455, C871, D272, D273, Q686.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Marlborough Sounds, Cook Strait, Tasman Bay, Kahurangi Shoals; 10-240 m.

Buffonellaria biavicularis (Powell)

Christinella biavicularis Powell, 1967: 286.
Buffonellaria biavicularis: Gordon 1984: 117.

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MATERIAL EXAMINED: NZOI Stns B487, B488, B490, B616, D273.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Manawatu Coast, Cook Strait, Tasman Bay, Dagg Sound, Dusky Sound, Puysegur Bank; 75-490 m.

Buffonellaria turbula n.sp. (Plate 35, F)

MATERIAL EXAMINED: NZOI Stns B457, B477, B482, B484, B487, B488, B489, B611, D269, D270, D273, D274, E796, E804, E820, Q686.

DISTRIBUTION: Cook Strait, Tasman Bay, Kahurangi Shoals, Fiordland, Puysegur Point; 27-251 m.

DESCRIPTION: Colony encrusting, the zooids evenly disposed only at the growing margin, overgrowing and jumbled through frontal budding elsewhere. Zooids 0.49-0.98 x 0.32-0.49 mm, convex, the frontal shield smooth, with marginal areolae. Orifice with stout, blunt condyles accentuating the shallow V-shaped sinus making it appear deep and narrow. Avicularia of two kinds — a large frontal avicularium on one side suborally, with stout cross-bar and frontally directed triangular rostrum; also a larger subvicarious avicularium in the zooidal margins, broadly spatulate, the opesia small, separated by a complete pivot bar from a proportionately larger rostral area. Ovicell prominent, opening above the orifice, with a large frontal exposure of endooecium.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-507.

PARATYPE: NZOI, type number P-726, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn C843, Cape Palliser, 41°38.5'S, 175°17.2'E, 53 m.

REMARKS: *Buffonellaria turbula* is reminiscent of the type species, *B. divergens*, with a similar ovicell and two kinds of avicularia — none of these is spatulate, however, and the orificial sinus is wider than in *B. turbula*.

The species name is a diminutive Latin noun used in apposition. It means turmoil and alludes to the jumbled appearance of zooids over most of the colony.

Galeopsis Jullien, *in* Jullien & Calvet, 1903

TYPE SPECIES: *Galeopsis rabidus* Jullien, *in* Jullien & Calvet, 1903

Galeopsis porcellanicus (Hutton)(Plate 1, M; 36, A-C)

Pustulipora porcellanica Hutton, 1873: 102; 1880: 198.
Porina grandipora Waters, 1887a: 59.
Haswellia auriculata: Hutton 1891:106; Hamilton 1898:196; Hutton 1904: 298.
Haswellina auriculata: Livingstone 1929: 78.
Spiroporina grandipora: Brown 1952: 215.
Haswellina pentagona: Macken 1958: 105.
Haswellina grandipora: Gordon & Ballantine 1977: 126.

MATERIAL EXAMINED: NZOI: Stns B455, B483, B498, B611, C857, D269, D270, D272, D273, E817, E820, Q686. DPG: Colonies from Cape Rodney and Pakiri Beach (drift), Hauraki Gulf, and Boulder Bank, Nelson.

DISTRIBUTION: Three Kings Islands, Hauraki Gulf, Cook Strait, Tasman Bay, Kahurangi Point, Puysegur Bank; 0-235 m. Also Plio-Pleistocene of Hawkes Bay.

DESCRIPTION: Colony erect from an encrusting base, attaining 4 cm high and 5.5 cm across, repeatedly dichotomising, resembling a miniature stagshorn coral, cream to yellowish-cream in colour, branch diameter 0.60-1.45 mm between bifurcations, 2.32-4.57 mm at bifurcations. Zooids 0.40-0.62 x 0.13-0.43 mm, arranged quincuncially; encrusting zooids resembling erect zooids though mostly lacking a peristomial bridge and spiramen, and the frontal shield rather more textured; erect zooids arranged in whorls of 4-7, each whorl alternating with the ones above and below, and the zooids in disconnected longitudinal series; frontal shield more or less smooth, with 2-4 small areolae along each margin. Orifice with a small but distinct U-shaped sinus flanked by a pair of condyles. Adjacent to the orifice in encrusting zooids is one or a pair of avicularia each with a complete cross-bar, directed nearly distally; these are more columnar where a peristomial bridge, delimiting a large spiramen, occurs between them (some such bridges lack one or both avicularia; in erect branches the same arrangement obtains, with zooids mostly bearing a peristomial bridge though this can be lacking; at first the spiramen is large, but, with secondary calcification, branch diameter increases, the primary orifice and ovicellular opening become sunken, and the spiramen diminishes in size. Ovicell occurring in encrusting as well as erect zooids, with a smooth tabulate area and a short labellum. Polypides with 13-14 tentacles.

REMARKS: There can be no question that *Pustulipora porcellanica* (Hutton 1873) is a senior synonym of *Porina grandipora* (Waters 1887a). Hutton (1891:106) specifically included both of these species in the synonymy of *Haswellia auriculata* Busk, 1884. [Hutton's (1891) citation of the synonymy was carelessly rendered as "*Porina grandiporosa* [*sic*], Waters, Quar. Jour. Geol. Soc., 43 [*sic* for 44], 59."] In the event, *Haswellia auriculata* Busk is not the same species as *P. porcellanica*, but is a junior synonym of *Vincularia pentagona* d'Orbigny, 1842, 1847, according to Brown (1952).

Galeopsis pentagonus (d'Orbigny) is presently known in the New Zealand region only from the Kermadec Ridge (Gordon 1984, 1985), Chatham Rise, and Puysegur Bank, whereas the commoner mainland species, the one that would have been encountered by Hutton, is *G. porcellanicus*. Since there is no Hutton specimen of *Pustulipora porcellanica*, I have chosen a large drift colony from Pakiri Beach, Hauraki Gulf, collected by me in 1968, as NEOTYPE (type number H-541), held at the N.Z. Oceanographic Institute, DSIR, Wellington.

The large spiramen of *G. porcellanicus* is reminiscent of the arrangement in *Galeopsis megaporus* Moyano,

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1985a, but that species has a wide shallow sinus and lacks an encrusting phase in its astogeny.

Colonies from NZOI Stns E817 and E820 lack peristomial bridges but are otherwise like typical *G. porcellanicus*.

Galeopsis polyporus (Brown) (Plates 1, G; 36, D-G)

Spiroporina polypora Brown, 1952: 216.
Haswellina polypora: Uttley & Bullivant 1972: 34.
Galeopsis polyporus: Gordon 1984: 117.

MATERIAL EXAMINED: NZOI Stns B455, B482, B483, B484, B485, B487, B488, B490, B493, B611, B616, C852, C857, C868, C871, D269, D270, D272, D274, E796, E817, E820, E821, M778, M780, M783B, M789, M793, Q686; also Stn C851, 40°40.4'S, 174°43.6'E, off the Manawatu coast. DPG: Colonies from Manukau Harbour.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Manukau Harbour, Mount Maunganui, Cook Strait, Marlborough Sounds, Tasman Bay, Kahurangi Point, Chatham Rise, Fiordland, Puysegur Bank, Otago Shelf; 0-318 m. Also Middle Miocene of Southland and Plio-Pleistocene of Wanganui.

REMARKS: The differences between the encrusting and erect phases of this species have been commented on by Gordon (1984). One additional point can be mentioned here — in the encrusting phase, the normally small chambers of the tiny adventitious avicularia can be considerably expanded and occur subvicariously between autozooids at the colony margin (Plate 36, G).

Galeopsis brevissimus (Hayward) (Plate 37, A-C)

Tessaradoma brevissima Hayward 1981: 49.

MATERIAL EXAMINED: NZOI Stns D221, D222, D226, E782, E800, E821, P927, P929, P942; also Stn C620, east of Chatham Island, 43°40.0'S, 174°47.0'W, 752 m, and Stn F900, on the continental slope east of Great Barrier Island, 36°13.0'S, 176°23.0'E, 754 m.

DISTRIBUTION: NE North Island continental slope, Challenger Plateau, off eastern Chatham Rise, Puysegur Bank; 549-1029 m.

DESCRIPTION: Colony initially encrusting, the zooids arranged quincuncially, giving rise to erect, dichotomous branches in which the zooids are four-serial and alternating; branch diameter 0.42-1.07 mm. Zooids 0.34-1.32 x 0.21-0.75 mm, smooth-shielded, with small sparse areolae along each margin. Orifice with a broad shallow sinus and insignificant condyles, somewhat concealed by an aviculiferous peristome with a pseudosinus or, more commonly, the tips of the avicularian rostra are fused, delimiting a spiramen; the peristome sometimes quite spout-like and projecting. Additional to the small peristomial avicularia are tiny oval avicularia not much larger than the areolae from which they arise; large spatulate avicularia with a large rostral foramen and shelf occur sporadically; all avicularia have complete cross-bars. Ovicell recumbent, subglobular, with a semicircular to crescentic fenestra.

REMARKS: This species occurs on hydroids, sponge spicules, and similar substrata in the deep sea. Basal parts of colonies have quite a number of small adventitious avicularia and the peristomes may be markedly tubular.

Although Hayward (1981) included this species in *Tessaradoma*, it is a typical *Galeopsis*. *Tessaradoma* species have a tubiform spiramen separated from the peristome and the zooids tend to be granular and furrowed.

Galeopsis mimicus n.sp. (Plate 37, D-E)

Galeopsis sp. Gordon 1986: 14.

MATERIAL EXAMINED: NZOI Stns Q693, S374; also Stn Q694 off Westland, 42°48.2'S, 169°53.5'E, 520 m.

DISTRIBUTION: Off Westland; 297-520 m.

DESCRIPTION: Colony initially encrusting, linear, zooids arranged quincuncially, giving rise to erect branches in which the zooids are alternately verticillate, six per whorl; branch diameter 0.51-0.73 mm. Zooids 0.34-0.68 x 0.14-0.32 mm, smooth-shielded, with small areolae along each margin. Orifice with a distinct U-shaped sinus and small condyles, somewhat concealed by an aviculiferous peristome with a pseudosinus or the tops of the avicularian rostra are fused, delimiting a spiramen; the peristome not excessively projecting. Additional to the small peristomial avicularia are tiny oval avicularia, each arising from an areola; all have a complete cross-bar; larger spatulate avicularia not seen. Ovicell in encrusting and erect zooids, recumbent, with a very narrow, crescentic, fenestra. Ancestrula encrusting, 0.24 x 0.16 mm, suboval, roundly tapered proximally, with ?9 spines around the circular opesia.

HOLOTYPE: Colony encrusting echinoid spine, in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-513.

PARATYPE: NZOI, type number P-729, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn Q693, off the coast of Westland north of Gillespie Point, 42°50.4'S, 169°58.7'E, 297 m.

REMARKS: This species is very similar to *G. brevissimus*, but may be distinguished by the parallel-sided U-shaped sinus of the primary orifice, the narrowly crescentic ovicellular fenestra, and the arrangement of zooids in whorls in erect parts of colonies. *Galeopsis mimicus* has so far been found only on the aboral spines of the frontal notch of the echinoid *Spatangus multispinus* Mortensen, with other bryozoans (*Arachnoidella echinophilia, Nolella ?stipata, Triticella nodosa, Celleporella delta, Schizomavella aurita, Crisia* sp.).

The species name *mimicus* is a Latin adjective meaning imitative and alludes to the similarity to *G. brevissimus*, especially in the form of the peristome.

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Galeopsis pentagonus (d'Orbigny)

Vincularia pentagona d'Orbigny, 1842: plate 10, figs 4-6; 1847: 21.
Spiroporina pentagona: Brown 1952: 213 (*cum syn.*).
Galeopsis pentagonus: Gordon 1984: 116 (*cum syn.*); 1985: 178; Moyano 1985a: 90 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stn E821.

DISTRIBUTION: Kermadec Ridge, Chatham Rise, Puysegur Bank; 40-549 m; Lower Oligocene of Oamaru, Middle Miocene of Southland, Pliocene of Wanganui and Hawkes Bay. Also Tasmania (Late Miocene to Recent), Juan Fernandez Island, magellanic South America, Falkland Islands.

REMARKS: *Galeopsis pentagonus* is not yet positively known from Australia. *Galeopsis victoriensis* (Kirkpatrick, 1888), from Port Phillip, Victoria, is similar, but there are 8-12 zooids in each whorl, no peristomial avicularia, and occasional spatulate avicularia are present.

Galeopsis adherens n.sp. (Plate 37, F, G)

MATERIAL EXAMINED: NZOI Stns B488, B493.

DISTRIBUTION: Breaksea Sound, Puysegur Bank; 84-164 m.

DESCRIPTION: Colony wholly encrusting, small, the zooids arranged pluriserially. Zooids 0.34-0.68 x 0.22-0.34 mm, smooth-shielded, with 3-4 areolae along each margin. Primary orifice with a moderate, rounded V-shaped sinus and small condyles, concealed by a well-developed recumbent peristomial rim in which is a circular to oval thin-rimmed spiramen set at some distance from the peristomial opening; 0-2 avicularia occur in the peristome, with complete cross-bar and triangular rostrum; no other avicularia present. Ovicell recumbent, with a tiny crescentic to oval fenestra and descending labellum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-512.

TYPE LOCALITY: NZOI Stn B493, entrance to Breaksea Sound, Fiordland, New Zealand, 45°34.4'S, 166°39.1'E, 84 m.

REMARKS: The species name alludes to its totally encrusting habit.

Lagenipora Hincks, 1877

TYPE SPECIES: *Celleporella lepralioides* Norman, 1868

Lagenipora ferocissima Gordon (Plate 38, A-E)

Lagenipora ferocissima Gordon, 1984: 119.

MATERIAL EXAMINED: NZOI Stn Q702.

DISTRIBUTION: Kermadec Ridge, continental shelf off Westport; 235-490 m.

REMARKS: The western South Island colony lacks the extreme spination of Kermadec colonies. It agrees in characters of the peristome, primary orifice, and ovicell, however, and has sufficient tuberculation to warrant inclusion in *L. ferocissima*.

Lagenipora pinnacula (Hayward) (Plate 38, F-H)

Celleporina pinnacula Hayward, 1980: 716.

MATERIAL EXAMINED: NZOI Stns B482, B484, B487, B488, B616, D270, E796, E804, E817, E820, E828, Q686.

DISTRIBUTION: Cook Strait, Tasman Bay, Fiordland, Puysegur Bank; 62-220 m; also Gough Island, mid-South Atlantic Ocean.

DESCRIPTION: Colony small, encrusting to sub-pisiform. Zooids (excluding peristome) relatively large, 0.42-0.79 x 0.19-0.43 mm, with tubular peristomes up to 0.53 mm long, smooth-shielded, with small marginal areolae. Primary orifice somewhat pyriform, 0.085-0.11 x 0.064-0.088 mm, the anter and poster not set off by condyles. Peristome cylindrical, except in periancestrular zooids which are hemicylindrical, the rim with points (inwardly curved in periancestrular zooids) and a pair of tiny avicularia, with a narrow triangular rostrum. No other avicularia. Ovicell small, protruding from the distal side of the peristome into which it opens, with a row of peripheral excavations in the broad tabula and the proximal rim labellum-like.

REMARKS: The present material very closely agrees with Hayward's (1980) description and illustrations except in the periancestrular zooids. The ancestrula is overgrown in the present specimens which precludes comparison. Hayward (1980) described it as oval, with a semicircular opesia surrounded by spines.

Celleporina Gray, 1848

TYPE SPECIES: *Lepralia hassallii* Johnston, 1847

Celleporina conescharellinoides n.sp. (Plate 39, A)

MATERIAL EXAMINED: NZOI Stns B482, B484, Q729.

DISTRIBUTION: West of Kahurangi Point; Puysegur Rank; 88-195 m.

DESCRIPTION: Colony encrusting, to about 4 mm diameter. Zooids suberect to recumbent, somewhat squat, 0.51-0.75 x 0.49-0.62 mm, smooth-shielded, with 2-4 tiny areolae along each margin. Primary orifice longer than wide, 0.14-0.17 x 0.11-0.13 mm, almost parallel-sided, with a V-shaped sinus flanked by well-developed condyles; on either side of the orifice is a peristomial lappet, of which one or both has a rounded subapical avicularium with a complete cross-bar. Spatulate avicularia (0.21-0.24 mm long) not abundant; the palatal foramen is proportionally large, with a reduced shelf. Ovicell large, recumbent, with an extensive tabulate area with marginal perforations; no labellum. Ancestrula (including peristome) 0.53 mm long, 0.43 mm wide, proximally rounded, smooth-walled, with a

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high, flared peristome completely concealing the transversely oval orifice which lacks condyles; spines absent.

HOLOTYPE: One mature colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-508.

TYPE LOCALITY: NZOI Stn Q729, west of Kahurangi Point, 40°51.8'S, 171°28.0'E, 195 m.

REMARKS: This species encrusts tiny pebbles/large grains, almost concealing them. The overall impression is superficially that of a conescharellinid (hence the species name), enhanced by the peristomial lappets, the shape of the primary orifice, the presence of a pore distal to the orifice, and the presence of marginal kenozooids. The early astogeny is typically celleporid, with no reversal of zooidal orientation.

Celleporina conescharellinoides resembles *C. costazii*, which has, however, pronounced ovicellular ribbing and triangular rostra on the avicularia.

Celleporina costazii (Audouin)

Cellepora costazii Audouin, 1826: 237.
Celleporina costazii: Harmer 1957: 901 (*cum syn.*); Gordon 1984: 114 (*cum syn.*).

MATERIAL EXAMINED: NZOI Stns B482, B484, B495, C871, D270, D272, D273, E820, Q686.

DISTRIBUTION: Kermadec Ridge, Cook Strait, Tasman Bay, Puysegur Bank; 0-220 m. Also Red Sea, Sri Lanka, Timor, Indonesia, Easter Island; Quaternary of Tasmania.

Celleporina grandis n.sp. (Plates 1, K; 39, B,C)

MATERIAL EXAMINED: NZOI Stns B472, B482, B488, B493, D249, D251, D255, D260, E820; also Stn C759, Three Kings Islands, 34°11.7'S, 172°9.9'E, 99 m; Stn H69, Foveaux Strait, 46°37.5'S, 167.53.9'E, 54 m; specimens in collection of Portobello Marine Laboratory.

DISTRIBUTION: Three Kings Islands, Tasman Bay, Westland, Fiordland coast, Puysegur Bank, Otago Shelf, Foveaux Strait; 17-220 m.

DESCRIPTION: Colony large, erect, branching, to 13 mm thick and about 5.0 cm high. Zooids recumbent to suberect, smooth-shielded, with 3-4 moderate-sized areolae along each margin. Primary orifice about as wide (0.15 mm) as long, with a broad rounded sinus and blunt condyles. Peristome present suborally, tall and projecting, with a small oval avicularium at its summit, similar avicularia occur interzooidally, although these are probably peristomial avicularia which have been encroached upon by expanding branch diameter through frontal budding; each has a cross-bar with a tiny ligula. Spatulate avicularia vary in size (0.12 - 0.41 mm long not including the chamber) and are adventitious to vicarious accordingly; with an extensive palatal shelf, high-walled rostrum, and remarkably stout ligula on the cross-bar. Ovicell recumbent to subimmersed, with a (sometimes weakly defined) exposure of ectooecium with only a hint of peripheral pitting; no labellum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, Wellington type number H-509.

PARATYPE: NZOI, type number P-727, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn B482, Puysegur Bank, 46°08.8'S, 166°06.0'E, 88 m.

REMARKS: The large size of the colony and the stout ligulae on the spatulate avicularia are distinctive characteristics. *Celleporina excisa* Harmer, 1957, from Indonesia is very similar in both of these features but has two types of ligulate avicularia (circular and spatulate), the peristome is not as tall, and the peristomial avicularium is to one side of the mid-line.

Celleporina sinuata n.sp. (Plate 39, D-F)

MATERIAL EXAMINED: NZOI Stns B480, B487, B489, B490, B616, D252, D253, D272, D273, D274, E817, E820, E828, M763, M774, M775, M776, M779, M780, M782, M795, M797, M799, Q686; also Stn C759, Three Kings Islands, 34°11.7'5, 172°9.9'E, and Stn H69, Foveaux Strait, 46°37.5'S, 167°53.9'E.

DISTRIBUTION: Three Kings Islands, Cook Strait, Tasman Bay, Fiordland, Puysegur Bank, Foveaux Strait; 8-235 m.

DESCRIPTION: Colony encrusting, nodular. Zooids 0.38-0.56 x 0.19-0.28 mm, erect, recumbent only at the growing edge; smooth-shielded, with conspicuous marginal areolae. Primary orifice about as long as wide, 0.096-0.128 x 0.096-0.109 mm, with a broad, rounded-V-shaped sinus in which is a median convexity giving the sinus almost a W shape. Peristome very tall proximally, surmounted by an oval to suboval avicularium with a complete cross-bar and denticulate rostrum; the sides of the peristome as lateral wings, either evenly sloping from top to bottom or produced abruptly forward on each side subapically before descending towards the distolateral corners of the orifice. Spatulate avicularia 0.21-0.28 mm long, with an extensive palate and high-arched rostral rim; the pivot-bar is very near the proximal end, delimiting a relatively small opesia. Ovicell recumbent, subglobular, with an extensive tabula, small peripheral pores, and short peripheral radii; there is no labellum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-511.

PARATYPE: NZOI, type number P-728, from Stn E820, Puysegur Bank, 46°35.0'S, 165°58.0'E, 220 m.

TYPE LOCALITY: NZOI Stn D273, Cook Strait, 40°45.0'S, 173°49.5'E, 75 m.

REMARKS: A pisiform colony from Stn E820 lacks a definitive convexity in the sinus but in all other features

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is identical with other West Coast material.

Celleporina granum (Hincks, 1881) is very similar but, according to Brown's (1952) description of the neotype, the sinus is V-shaped and the tabula is "finely perforate".

Celleporina podistra n.sp. (Plate 40, A)

MATERIAL EXAMINED: NZOI Stns B493, C869, C871, Q686.

DISTRIBUTION: Marlborough Sounds, Cook Strait, Breaksea Sound; 35-205 m.

DESCRIPTION: Colony encrusting, nodular. Zooids 0.42-0.64 x 0.28-0.40 mm, smooth-shielded, with marginal areolae. Primary orifice about as wide (ca. 0.11 mm) as long, with a rounded V-shaped sinus. Peristome bluntly rounded, with a relatively large, circular to subcircular avicularium on its inner face immediately subapically, with a complete cross-bar and toothed rostral rim. Occasional spatulate avicularia present, 0.19 -0.26 mm long. Ovicell subglobular, the tabula with perforations and radii variable, either like the spokes of a wheel or more fan-like.

HOLOTYPE: Colony, in collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-510.

TYPELOCALITY: NZOI Stn C869, Tory Channel, 41°13.0'S, 174°17.1'E, 35 m.

REMARKS: The species name is a Greek noun meaning foot-trap and alludes to the appearance of the toothed peristomial avicularium. A colony from Stn C871 (Queen Charlotte Sound), evidently this species, has a smaller such avicularium, less clearly toothed.

Celleporina tubulata (Uttley & Bullivant) (Plate 40, B-D)

Haswellina tubulata Uttley & Bullivant, 1972: 35.

MATERIAL EXAMINED: NZOI Stn Q686; also holotype specimen zb191, Canterbury Museum; and paratype specimen P-164, NZOI.

DISTRIBUTION: Cook Strait, Chatham Rise; 69-205 m.

DESCRIPTION: Colony encrusting, forming small flat colonies. Zooids 0.40-0.53 x 0.19-0.38 mm, smooth-shielded, but, because of proportionally larger areolae in younger zooids, lateral walls may have a faintly tubercular surface. Primary orifice with a deep, rounded-V-shaped poster with no condyles; obscured by a high peristome in which are small, bilateral avicularia with triangular rostrum and thin cross- bar. Rare spatulate avicularia not large, about 0.13 mm long, with relatively large palatal lumen and smaller shelf. Ovicell recumbent, the tabula with radiating peripheral ribs and pores; a well-developed labellum is present.

REMARKS: This species is clearly not a "*Haswellina*" (i.e., *Galeopsis* in the sense intended by Uttley & Bullivant (1972) — there is no peristomial spiramen, and the lack of definitive orificial condyles would be unusual for *Galeopsis*.

Celleporina tubulata bears a marked similarity to the Oligocene species *C. lichenoporoides* Brown, 1952, of which I have examined the holotype. Orifice, ovicell, and avicularia appear to be identical but the holotype is not well preserved enough to be certain.

Celleporina proximalis (Uttley & Bullivant) (Plate 40, E-F)

Osthimosia proximalis Uttley & Bullivant, 1972: 49.

MATERIAL EXAMINED: NZOI Stns C869, E820, Q686; also Stn C843 off Cape Palliser, 41°38.5'S, 175°17.2'E, 53 m; Canterbury Museum, holotype zb200, of *Osthimosia proximalis*.

DISTRIBUTION: Cook Strait, Marlborough Sounds, Chatham Islands, Puysegur Bank; 35-220 m.

DESCRIPTION: Colony small, 2-3 mm diameter, pisiform, or larger (10 cm) with concentric ridges, encrusting around hydroid stems. Zooids erect, with only the distal half of each zooid visible, with conspicuous marginal areolae in younger zooids. Primary orifice 0.106 x 0.085 mm, with a distinct V- to U-shaped sinus and well-developed condyles, becoming hidden by a peristome that is proximally very tall, with lateral extensions around the orifice to the ovicell. On the inner face of the peristome, below the often prolonged apical tip, is a more or less circular avicularium, with toothed rostrum and complete cross-bar. Spatulate avicularia are not known. Ovicell with conspicuous flabellate radii in the tabula; no labellum.

REMARKS: Because of the radiate sculpturing of the ovicell, I include this species in *Celleporina* instead of *Osthimosia*. *Schizoporella cribrillifera* Hincks, 1885, from hydroids in Cook Strait has an identical ovicell and narrow orificial sinus; however, he shows spatulate avicularia, which are otherwise unknown in *C. proximalis*, and marked lateral grooves on the frontal wall.

Celleporina hemiperistomata (Gordon)

Lagenipora hemiperistomata Gordon 1984:119.

MATERIAL EXAMINED: NZOI Stns B482, B488, B490, E820, M779.

DISTRIBUTION: Kermadec Ridge, Milford Sound, Dusky Sound, Puysegur Bank.

REMARKS: I originally included this species in the genus *Lagenipora* on the basis of the near-tubular peristome and lack of orificial condyles. Having now been able to compare a wider variety of *Celleporina* species, in which these characters are variable, I now believe that inclusion in *Celleporina* is more appropriate.

Osthimosia Jullien, 1888

TYPE SPECIES: *Cellepora eatonensis* Busk, 1881 (by synonymy)

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Osthimosia bicornis (Busk) (Plate 41, A)

Cellepora bicornis Busk, 1881: 354; 1884:202.
Osthimosia bicornis : Rogick 1959: 14 (*cum syn*); Hayward 1980: 717; Gordon 1984: 120 (*cum syn.*)

MATERIAL EXAMINED: NZOI: Stn B482. BM(NH): Syntype colony 1887.12.9.799.

DISTRIBUTION: Kermadec Ridge, Chatham Rise, Puysegur Bank, 55-475 m. Also magellanic South America, Prince Edward Island, Marion Island, Antarctica.

REMARKS: As with Kermadec material, the present specimens comprise larger, encrusting, colonies rather than the small pisiform colonies described by Busk (1881, 1884) and Rogick (1959), but zooidal features accord well. However, in both Pleistocene and Recent colonies of the New Zealand material the orificial sinus is consistently wider than in syntype material of *O. bicornis*.

Osthimosia amplexa n.sp (Plate 41, B-E)

MATERIAL EXAMINED: NZOI Stns B482, B490, B498, E820; also Stn H69, Foveaux Strait, 46°37.5'S, 167°53.9'E, 54 m.

DISTRIBUTION: Cook Strait, Dusky Sound, Puysegur Bank, Foveaux Strait; 44-220 m.

DESCRIPTION: Colony small, pisiform, to larger and encrusting. Zooids vary according to colony size, 0.23-0.94 x 0.21-0.66 mm, recumbent to erect, smooth-shielded to laterally furrowed, with obvious marginal areolae. Primary orifice variable according to the size of a zooid in the colony or the size of the colony, 0.10-0.21 mm wide and long, with a wide deep U-shaped sinus. Peristome surrounding the orifice, mostly low in older colonies or parts of colonies but can be prolonged, with a subapical avicularium that is at some distance from the apex when the peristome is long; the avicularium rounded, with a complete cross-bar, an incipient ligula, and often a toothed rostrum; often emplaced to one side of the mid-line. Spatulate and lingulate avicularia common, 0.068-0.41 mm long and 0.042-0.34 mm wide, a shelf occupying about half the palatal area, and incipient ligula present or absent. Ovicell subglobular, soon immersed, the tabula small, imperforate, sometimes reduced to a tiny foramen, the ovicell opening widely above the primary orifice; peristome generally with a pair of processes which cross the face of the ovicell, usually enclosing the tabula but sometimes fusing proximal to it.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-514.

PARATYPE: NZOI, type number P-730, from same locality as the holotype, and from Stn E820, Puysegur Bank, 46°35.0'S, 165°58.0'E, 220 m.

TYPE LOCALITY: NZOI Stn B482, Puysegur Bank, 46°08.8'S, 166°06.0'E, 88 m.

REMARKS: Pisiform colonies, encountered on branching bryozoans of the genera *Caberea* and *Dimetopia*, have proportionally longer peristomes and much smaller dimensions than larger encrusting colonies that they appear quite distinct. But the details of zooids, orifices, avicularia, and ovicells are identical, and intermediate-sized colonies have intermediate zooidal dimensions, so that it appears that the pisiform colonies must be conspecific with the larger colonies.

The species name derives from the Latin meaning embracing and alludes to the peristomial processes enclosing the ovicellular tabula.

Osthimosia turrita n.sp. (Plates 41, F,G; 42, A,B)

MATERIAL EXAMINED: NZOI Stns B484, B487, B488.

DISTRIBUTION: Chatham Rise, Puysegur Bank; 124-475 m.

DESCRIPTION: Colony encrusting, nodular, to 8 mm across and 5 mm high. Zooids recumbent to erect, 0.32-0.45 mm wide, somewhat barrel-like, with a high, tubular peristome. Primary orifice 0.17-0.21 mm long and 0.13-0.17 mm wide, with a distinct sinus flanked by stout condyles. Peristome rim produced into 2-5 processes, usually 4, most of which are apically aviculiferous, with a roundly triangular rostrum and thin cross-bar. Spatulate avicularia are somewhat pyriform in outline, with an extensive palatal shelf and tiny ligula generally on the cross-bar. Ovicell rapidly becoming concealed, in ontogeny, by the peristome which grows over and above it, with a tiny apical foramen and median frontal suture.

HOLOTYPE: Colony, in the collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-517.

PARATYPE: NZOI, type number P-731, from same locality as holotype.

TYPE LOCALITY: NZOI Stn B484, Puysegur Bank, 46°05'S, 166°21.0'E, 124 m.

REMARKS: This distinctive species is immediately recognisable by the turreted, tubular peristome which differs from that of *O. cyclops* Uttley and Bullivant, 1972 which has only a pair of peristomial processes with a short V-shaped bridge between.

Osthimosia mysterium n.sp. (Plate 42, C-G)

MATERIAL EXAMINED: NZOI Stn E796.

DISTRIBUTION: Fiordland coast, near the entrance to Dagg Sound; 226-251 m.

DESCRIPTION: Colony tiny, 2 mm diameter, more or less parallel-sided with a flat top, the zooids radiating outwards from the vertical axis of the colony. Zooids horizontally recumbent on each other, 0.53- 0.68 x 0.23-0.38 mm, smooth-shielded to faintly textured, with small sparse, marginal areolae. Primary orifice transversely oval, 0.074-0.081 mm long and 0.096-0.11 mm wide, with a barely defined poster and no condyles, completely concealed by the encircling peristome. Peristome thick-walled, not much raised above the

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colony surface, with a small subcircular avicularium deep inside on the proximal face and typically another similar avicularium on the outer rim opposite; small kenozooids between zooids also with a similar avicularium. Spatulate avicularia 0.17-0.24 mm long and 0.10-0.13 mm wide, the palatal shelf twice as long as the lumen.

Ovicell becoming rapidly concealed, with only a narrow free edge of ectooecium appearing beneath a layer of thick calcification in which may be an apical avicularium.

HOLOTYPE: Unique colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-516.

TYPE LOCALITY: NZOI Stn E796, near entrance to Dagg Sound, Fiordland, 45°20.0'S, 166°45.5'E, 226-251 m.

REMARKS: The species name is a Latin noun in apposition, alluding to the concealing of the primary orifice, inner peristomial avicularium, and ovicell by the peristome. This is assumed to be a species of *Osthimosia* although the orifice lacks any trace of a sinus and condyles.

Osthimosia avicularis n.sp. (Plates 42, H; 43, A)

MATERIAL EXAMINED: NZOI Stn B490.

DISTRIBUTION: Dusky Sound, Fiordland; 148 m.

DESCRIPTION: Colony erect from an encrusting base. Zooids immersed, erect. Primary orifice sunken, 0.11-0.39 mm long and 0.10-0.13 mm wide, with a wide, rounded-V-shaped sinus and small condyles. Peristome completely surrounding primary orifice, not raised above the colony surface, lacking any consistently associated peristomial avicularium, though there may be tiny circular avicularia scattered sparsely in the interzooidal areas between adjacent orifices. "Spatulate" avicularia abundant, of two kinds — a nearly parallel-sided lingulate kind, from tiny (0.13 x 0.042 mm) to quite long (0.49 x 0.17 mm), with long palatal foramen; and a larger (ca. 0.53 x 0.25 mm not including the chamber), triangular, vicarious avicularium, also with a long palatal shelf, a somewhat triangular palatal foramen, and an incipient ligula or thickening on the proximal side of the cross-bar. Ovicell becoming concealed by secondary calcification, the ectooecium with a small, transverse fenestra; no labellum.

HOLOTYPE: Unique colony fragment, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-515.

TYPE LOCALITY: NZOI Stn B490, Dusky Sound, Fiordland, 45°44.3'S, 166°44.8'E, 148 m.

REMARKS: The species name alludes to the abundance of avicularia which is perhaps its most distinctive feature.

Family PHIDOLOPORIDAE Gabb & Horn, 1862

REMARKS: This family name takes precedence over Reteporidae (Smitt 1868), Schizoreteporidae (as Schizoreteporinae) (Gregory 1893), Sertellidae (Jullien and Calvet 1903), and Hippellozoonidae and Lepraliellidae (Vigneaux 1949).

Dating from Smitt (1868) the family name Reteporidae has been in common use, even after the more recent introduction of Sertellidae by Jullien and Calvet (1903) and its subsequent adoption by later authors (e.g., Lagaaij 1952; Cook 1968b). *Retepora*, the type genus of Reteporidae, has an interesting history, part of which was documented by Harmer (1933). It is an old name as applied to Bryozoa, originally dating from a work of Imperato (1599), and thus pre-Linnean. Other workers since Linnaeus (1758) have used *Retepora* for the same or similar types of colony form as did Imperato, but there came to be some confusion as to what the type-species of *Retepora* actually constituted, once the concept of type-species became important.

As Harmer (1933) noted, Lamarck (1801) used *Retepora* for two species — *Millepora reticulata* Linnaeus, 1758 and *M. cellulosa* Linnaeus, 1767 (not the same as *M. cellulosa* Linnaeus, 1758, according to Harmer (1933)). Smitt (1868) subsequently chose *M. reticulata* as the type-species of *Retepora* and, as pointed out by Lagaaij (1952), that selection must stand, the contrary conclusions of Canu and Bassler (1917) and Harmer (1933) notwithstanding. *Millepora reticulata* is actually a species of Tubuliporata (Lamouroux 1821; Smitt 1868; Borg 1926; Harmer 1933; Lagaaij 1952), corresponding to what is known today as *Frondipora reticulata* (Borg 1926; Harmelin 1976a). *Frondipora* had been introduced by Link (1807) for the same two species included by Lamarck (1801) in *Retepora*. Thus, assuming the validity of *Retepora* Lamarck, *Frondipora* would have been a junior synonym.

In the event, Lamarck's (1801) genus *Retepora* was not a valid introduction for it was a junior homonym of *Retepora* Soldani, 1795 (Neave 1940), evidently a genus of Protozoa. Soldani's genus has been overlooked in previous discussions of *Retepora* by bryozoologists.

Brodiella Uttley & Bullivant, 1972

TYPE SPECIES: *Schizoporella longispinata* Busk, 1884

Brodiella longispinata (Busk)

Schizoporella longispinata Busk, 1884: 163.
Rhynchozoon scintillans: Powell 1967a: 360 (*cum syn.*).
Brodiella longispinata: Uttley & Bullivant 1972: 36; Hayward & Cook 1983: 120; Gordon 1984: 126.
Escharina longispinata: Lopez Gappa 1981b: 29.

MATERIAL EXAMINED: NZOI: Stns B473, B479, B483, B487, B488, B490, C868, D269, D270, D272, D273, E792, E796, E803, E804, E817, E820, E821, E828, M779, M783B, M784B, Q686. DPG: Totaranui, Abel Tasman National Park.

DISTRIBUTION: Kermadec Ridge, Three Kings Islands, Hauraki Gulf, Cook Strait, Tasman Bay, Chatham Rise,

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Westland near Gillespie Point, Fiordland, Puysegur Bank; 10-549 m. Also Strait of Magellan, eastern South Africa.

REMARKS: Three species of *Brodiella* are now recognised, the others being *B. armata* (Hincks) from the Mediterranean, Madeira, and SW Britain, and *B. ignota* Hayward and Cook from eastern South Africa.

Rhynchozoon Hincks, 1895

TYPE SPECIES: *Lepralia bispinosa* Johnston, 1847

Rhynchozoon paa Uttley & Bullivant.

Rhynchozoon paa Uttley & Bullivant, 1972: 48; Gordon 1984: 125.

MATERIAL EXAMINED: NZOI: Stns C856, C857, C869, C871, D262, D270, D273, Q686. DPG: Totaranui, Abel Tasman National Park.

DISTRIBUTION: Kermadec Ridge, Hauraki Gulf, Marlborough Sounds, Cook Strait, Tasman Bay, Chatham Rise; 0-412 m.

Rhynchozoon larreyi (Audouin) (Plate 43, B-D)

Cellepora (?) *larreyi* Audouin, 1826: 239.
Cellepora exigua MacGillivray, 1860: 167; 1883b: 193.
Rhynchozoon larreyi: Harmer 1957: 1074; Balavoine 1959: 277; Powell 1967: 362; 1969: 361; Uttley & Bullivant 1972: 47; Gordon & Ballantine 1977: 127; Ristedt & Schuhmacher 1985: 168.
Rhynchozoon (?) *lareyi* [*sic*]: Unsal & d'Hondt 1979: 624.

MATERIAL EXAMINED: NZOI: Stns B468, B472, B484, B487, B489, B493, B498, B616, C871, D253, D269, D270, D272, D273, E817, E820, E828, M774, M780, M782, M783B, M794, Q686, S397B. DPG : Whangarei Heads, Goat Island Bay, Hauraki Gulf, Waitemata Harbour, Manukau Harbour and Heads, Mount Maunganui, Oaonui, Wellington Harbour, Kaikoura.

DISTRIBUTION: Spirits Bay, Whangarei Heads, Hauraki Gulf, Waitemata Harbour, Manukau Harbour and Heads, Mount Maunganui, Oaonui, Wellington Harbour, Cook Strait, Tasman Bay, Kaikoura, Mernoo Bank, Chatham Islands, Hokitika, off Gillespie Point, Milford Sound, Dagg Sound, Breaksea Sound, Puysegur Bank; 0-235 m. Also Victoria, Lord Howe Island, Indonesia, Sri Lanka, Red Sea, Turkey.

DESCRIPTION: Colony encrusting. Zooids recumbent at the growing margin (0.42-0.88 x 0.34-0.58 mm) to suberect and irregularly disposed in the colony centre; frontal shield smooth or somewhat textured, often porcellanous, with 2-5 areolae along each margin. Primary orifice wider (0.096 - 0.39 mm) than long, the distal beading well developed. Peristome variable; if lacking a suboral avicularium, the rim often develops as three mucrones, the largest median, sloping into the frontal wall with the other two lateral to the orifice, smaller and more pointed; these three umbones becoming less pronounced with secondary calcification and the orifice may appear more irregular. If a suboral avicularium is present, one of the lateral umbones may be suppressed and the median suboral one may be lower and offset to one side; additional, smaller, processes may occur around the orifice and on the frontal wall of secondarily calcified zooids. Oral spines not seen. Suboral avicularium large, orientated transversely, with complete cross-bar and triangular mandible; a squared process projects from the proximal corner of the avicularium into the space above the zooidal operculum.

Additional avicularia may occur frontally, typically one per zooid, the mandible acute, generally directed proximally, or obliquely so. Ovicell recumbent, becoming subimmersed in secondary calcification, with a frontal exposure of endooecium and a very short, wide labellum.

REMARKS: *Rhynchozoon larreyi* in the New Zealand region is variable. Some features are more pronounced in some colonies than in others. Intertidal and shallow-water (to 100 m) colonies, for example, develop secondary calcification sooner, and closer to the colony margin, than colonies at 200 m. Also some colonies have a greater frequency of suboral avicularia than others. In the form of the primary orifice and arrangement of peristomial processes, however, they are otherwise very similar.

Rhynchozoon crenulatum (Waters)

Rhynchopora crenulata Waters 1887b: 195.
Rhynchozoon crenulatum: Gordon 1984: 125.

MATERIAL EXAMINED: NZOI Stn C869.

DISTRIBUTION: Kermadec Ridge, Tory Channel; 10-125 m. Also New South Wales.

REMARKS: The present material has more swollen-appearing avicularian chambers than the Kermadec colonies in the NZOI collection.

Additionally, the Tory Channel specimens have frontal avicularia. These are elongate, with distally tapering sides and a rounded rostrum; the palatal foramen occupies two-thirds of the palatal area, and a small shelf occupies the remaining third. Waters (1887b) illustrated similar avicularia, but described the palatal foramen as "slit-like". There are also smaller, circular, avicularia frontally, such as Waters (1887b) also depicted but did not mention.

Rhynchozoon inclemens n.sp. (Plate 43, E,F)

MATERIAL EXAMINED: NZOI Stns Q701, Q702, S395.

DISTRIBUTION: Continental shelf off Cape Foulwind; 178-296 m.

DESCRIPTION: Colony small, encrusting small pebbles. Zooids 0.43-0.62 x 0.44-0.53 mm, smooth-shielded with 2-3 areolae along each margin. Orifice ~ 0.12 mm wide, not concealed, with V-shaped sinus and angular condyles. No peristome *per se*, but 2-3 very prominent spicate projections adjacent to the orifice, giving the

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colony a burr-like appearance; one of the laterally placed projections has an avicularium at its base, with a triangular mandible and complete cross-bar. Ovicells with broad flat tabula, no labellum.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-525.

PARATYPE: NZOI, type number P-737, from NZOI Stn S395, 41°27.8'S, 171°06.8'E, 178 m.

TYPE LOCALITY: NZOI Stn Q702, off Cape Foulwind, 41°23.1'S, 170°51.8'E, 255-296 m.

REMARKS: The species is distinguished by the long processes around the orifice, to which the species name, meaning merciless, alludes.

Hippellozoon Canu & Bassler, 1917

Colony erect, branching, fenestrate. Zooids opening on one face only, areolar pores few, mostly proximal. Primary orifice beaded, with broad poster and stout condyles; secondary orifice with median pseudosinus. Oral spines present. No spiramen or oral avicularia. Adventitious avicularia frontal and fenestral. Ovicell widely open.

TYPE SPECIES: *Retepora novae zelandiae* Waters, 1895

REMARKS: Ryland (1984) has pointed out that *Hippellozoon* is doubtfully distinguishable from *Schizoretepora* Gregory (1893).

Hippellozoon novaezelandiae (Waters) (Plate 43, G)

Retepora novae zelandiae Waters, 1895: 270; Levinsen 1909: 83; Livingstone 1929: 91.
Hippellozoon novae zelandiae: Canu & Bassler 1917: 55; Harmer 1933: 621; 1934: 523.
Hippellozoon novae-zelandiae: Brown 1952: 344.
Hippellozoon novaezelandiae: Powell 1967: 356.

MATERIAL EXAMINED: NZOI: Stn D269; also Stn C759, Three Kings Islands, 34°11.7'S, 172°9.9'E, 99 m. DPG: Poor Knights Islands (coll. R.V. Grace).

DISTRIBUTION: Three Kings Islands, Poor Knights Islands, Wanganui coast, Cook Strait; 33-118 m. Also Middle Miocene of Southland.

DESCRIPTION: Colony erect, fenestrate, initially calyciform. Zooids with a smooth to granular frontal shield, with 1-2 areolar pores mid-frontally towards the proximal end of the zooid; rarely with marginal areolae. Primary orifice longer than wide, with broad, rounded poster delimited from the anter by a pair of stout condyles; the secondary orifice with a median pseudosinus. Oral spines six in developing zooids; only the most proximal pair remains in older zooids. Frontal avicularium occurs medially, proximal to the orifice, with complete cross-bar and triangular rostrum with upturned tip, directed laterally, proximally, or obliquely so; intrafenestral avicularia are of similar form. The basal surface of the branches with raised lines (vibices) which converge at fenestrae. Ovicell widely open. Ancestrula tatiform, the elevated opesial area surrounded by nine spines.

REMARKS: In life this species is orange. It is illustrated in colour by Doak (1971: plate 32) and Westerskov and Probert (1981: plate 13).

Phidolopora Gabb & Horn, 1862

Colony erect, branching, fenestrate. Zooids opening on one face only, areolar pores few, proximal and lateral. Primary orifice beaded, transversely oval with a weak sinus and indistinct condyles; secondary orifice with sinus or spiramen. Oral spines present. Avicularia suboral, frontal, and basal, or some of these infrequent. Ovicell widely open proximally, lacking a fissure but often with a median convexity.

TYPE SPECIES: *Phidolopora labiata* Gabb & Horn, 1862

Phidolopora avicularis (MacGillivray) (Plate 43, H)

Retepora avicularis MacGillivray, 1883c: 288; 1884: 103; 1885: 16.
"Retepora" avicularis: Brown 1952: 350 (*cum syn.*); 1954b: 432.
Phidolopora avicularis: Powell 1967a: 357.

MATERIAL EXAMINED: NZOI Stns B493, B611, M779, M793; also Stn C759, Three Kings Islands, 34°11.7'S, 172°9.9'E, 99 m.

DISTRIBUTION: Three Kings Islands, Milford Sound, Breaksea Sound, Dusky Sound; 30-99 m. Also Victoria, New South Wales, Middle Miocene of Southland.

DESCRIPTION: Colony erect, fenestrate, the branches 0.21-1.07 mm wide between bifurcations, the fenestrae 0.76-2.69 mm long and 0.12-0.96 mm wide. Zooids 1-8-serial, 0.44-0.58 x 0.14-0.36 mm, smooth-shielded, the boundaries marked by raised lines (vibices) frontally and dorsally, with 1-3 small areolae proximally and/or laterally. Primary orifice transversely oval with a weak sinus and indistinct condyles; secondary orifice with a median spiramen; oral spines present in mature zooids, usually one on each side, commonly two on the fenestrular side in zooids bordering the fenestrae. Avicularia of three kinds — rarely a very tiny one adjacent to the spiramen; commonly a large frontally projecting avicularium occupying most of the frontal wall, the rostral tip prominently hooked; and a similar avicularium dorsally at the proximal end of most fenestrae. Ovicell recumbent, becoming immersed in secondary calcification, lacking a frontal fissure, opening widely, the proximal rim sometimes with a median projection.

REMARKS: *Phidolopora* is a small genus of only a few species (*see* Powell 1967a). *P. avicularis* has many features in common with *P. pacifica*, including the dorsal, axial avicularia (*see* Robertson 1908 : plate 24, fig. 82).

Reteporella Busk, 1884

REMARKS: *Reteporella* is here considered to be a senior

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synonym of *Sertella* Jullien (Jullien and Calvet 1903). *Reteporella* was established by Busk (1884), as a subgenus of *Retepora*, for two open-branched species. Harmer (1934) likewise distinguished the two genera on the basis of colony form — *Reteporella* has open branching, *Sertella* (formerly *Retepora*, in part) is reticulate. This introduces a problem in dealing with the present material, for there are two species from southwestern South Island that have the open branching of *Reteporella* but otherwise are indistinguishable from the *Sertella* species in the collection. Were the type species of *Reteporella*, *R. flabellata*, reticulate, it would be included without hesitation in *Sertella* (or vice versa!). The "antenniform spines" of *R. flabellata* [and other *Reteporella* species (see Harmelin 1976b, and Hayward and Cook 1979)] are distinctive, but are also found in *Schizoretepora tessellata*, and *Triphyllozoon hirsutum* (Busk 1884), so are not restricted to *Reteporella*. It is difficult to accept fenestrate/non-fenestrate branching as a generic feature when there are no established correlated zooidal characters (as in *Reteporellina*, for example). Hillmer (1979) has also pointed out the difficulty in separating *Reteporella* from "*Retepora*", and his photos of *Reteporella graeffei*, for example, show how fusion between branches may occur in *Reteporella* as in *Sertella*.

Reteporella gracilis n.sp. (Plate 44, A,B)

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Off the entrance to Dagg Sound, Fiordland; 993-1003 m.

DESCRIPTION: Colony erect, dichotomously branching, non-reticulate, the branches biserial, about 0.64 mm diameter. Zooids 0.59-0.96 mm long, about 0.32 mm wide, the shield surface textured, with a few scattered areolar pores and faint, irregular, vibices. Primary orifice transversely oval, the poster gently concave, delimited from the anter only by the small lateral condyles. Secondary orifice with near-median labial suture and spiramen; a small circular avicularium adjacent to the distal end of the labial suture; a pair of spine bases present laterally in ovicelled zooids, with an additional spine base on the outer margin of ordinary zooids. Frontal avicularia small, not >0.15 mm long, subcircular to elongate-oval with complete cross-bar, the longer avicularia having a moderate palatal shelf. Ovicell with a small frontal fissure and no labellum. Dorsal surface of colony like the frontal surface, with similar avicularia and vibices.

HOLOTYPE: Unique colony fragment, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-520.

TYPE LOCALITY: NZOI Stn E800, off entrance to Dagg Sound, 45°20.5'S, 166°41.5'E, 1003-993m.

REMARKS: The unique specimen is unattached basally and comprises only three bifurcations so the overall size and form that may be attained are not known. The species name (Latin, slender) refers to the small branch diameter.

Reteporella syrtoxylon n.sp. (Plate 44, C-E)

MATERIAL EXAMINED: NZOI Stn E821.

DISTRIBUTION: Puysegur Bank; 549 m.

DESCRIPTION: Colony erect, dichotomously branching, non-reticulate, the branches 2-6-serial, 0.63-1.92 mm diameter. Zooids 0.47-0.58 mm long, about 0.32 mm wide, the frontal shield smooth, convex, especially in older zooids, with scattered areolae and irregular vibices. Primary orifice transversely oval, the poster gently concave; condyles not seen. Secondary orifice with a median mucro with descending grooves on the oral side; a short labial suture on one side with a spiramen proximally; a pair of spine bases present laberally in both ordinary and ovicelled zooids; developing zooids have five spine bases. No labial avicularium; frontal and dorsal avicularia triangular, 0.19-0.34 mm long, with extensive flat palate and a short ligula from the cross-bar into the small palatal foramen; no other avicularia. Ovicell with a longitudinal groove (not a fissure) on the well-developed labellum. Dorsal surface of colony with vibices and numerous frontal-type avicularia.

HOLOTYPE: A 19-mm-high colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-522.

PARATYPE: NZOI, type number P-735, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn E821, Puysegur Bank, 46°43.5'S, 165°46.5'E, 549 m.

REMARKS: The species name is derived from the Greek adjective *syrtos*, washed along, and the noun *xylon*, wood, and alludes to the driftwood shape of the holotype colony.

Reteporella ligulata n.sp. (Plates 1, J; 45, A)

MATERIAL EXAMINED: NZOI Stns B488, B489, E821.

DISTRIBUTION: Puysegur Bank; 164-549 m.

DESCRIPTION: Colony erect, reticulate, the branches 2-4-serial, 0.42-0.75 mm across or wider where branches fuse, the fenestrae 0.81-2.03 mm long and 0.36-0.88 mm wide. Zooids 0.40-0.51 mm long, about 0.25 mm wide, the frontal shield somewhat textured, smoothly granular to uneven-surfaced, with 4-6 marginal areolae. Primary orifice with broad, almost straight, proximal margin, the condyles somewhat projecting. Secondary orifice with a short labial suture and spiramen medially; a small circular avicularium adjacent to the suture; no oral spines in "mature" zooids. Frontal avicularia of three kinds — a large avicularium, with a prominent chamber, projecting frontally on many zooids, the opesia tiny, slit-like, the triangular rostrum with a triangular foramen into which projects a long ligula from the cross-bar; palatal shelf moderately developed, the tip of the rostrum usually with two projections and median groove; smaller, circular or triangular avicularia also present; usually only one of these three avicularia

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per zooid; the lateral avicularia which are directed into the fenestrae are very narrowly triangular. Ovicell with a long median fissure not extending on to the well-developed labellum. Dorsal surface of colony coarsely granular, with vibices and tiny circular or rounded-triangular avicularia.

HOLOTYPE: Fragments of one colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-521.

PARATYPE: NZOI, type number P-734, from NZOI Stn E821, Puysegur Bank, 46°43.5'S, 165°46.5'E, 549 m.

TYPE LOCALITY: NZOI Stn B489, Puysegur Bank, 46°39.0'S, 165° 57.0'E, 198 m.

REMARKS: This species superficially resembles *R. fissa* (MacGillivray) which, however, lacks an ovicellular labellum and has a pair of apical processes from the sides of the labial suture.

The species name alludes to the ligula on the crossbar of the large avicularia.

Reteporella constricta (Powell) (Plate 45, B)

Sertella constricta Powell, 1967a: 352.

MATERIAL EXAMINED: NZOI Stns B488, B489, E817, E820.

DISTRIBUTION: Three Kings Islands, Puysegur Bank; 84-235 m.

DESCRIPTION: Colony encrusting, reticulate, the branches 2-3-serial, 0.53-0.85 mm across or wider where branches fuse, the fenestrae 0.42-2.16 mm long, and 0.17-1.07 mm wide. Zooids 0.21-0.47 mm long, about 0.23 mm wide, the frontal shield uneven-surfaced, coarsely granular, with 4-6 marginal areolae. Primary orifice transversely oval, the poster gently concave, the condyles projecting. Secondary orifice with a median to submedian short labial suture and tiny spiramen; a small circular avicularium adjacent to the suture; 0-2 spine bases present in older zooids. Frontal avicularia of two kinds — a triangular type which is variable in size — larger when immediately subjacent to the spiramen, often directed laterally, or obliquely so, the palatal shelf medially constricted; this same type of avicularium smaller where it occurs on the sides of zooids beside fenestrae, or, if proximal on the zooidal frontal wall, lacking the palatal constriction; occasionally small subcircular avicularia occur frontally; typically only one avicularium per zooid additional to the labial one. Ovicell with a median fissure and very short, straight or concave labellum. Dorsal surface granular, with vibices, and sparse, tiny round avicularia.

REMARKS: The most distinctive feature of this species is the palatal constriction in the triangular avicularia.

Reteporellina Harmer, 1933

Colony erect, branching, sometimes anastomosing but never tightly fenestrate. Zooids without oral spines; peristomes often subtubular and protruding, with marginal or internal processes, with an open or closed pseudosinus. Frontal avicularium typically present. Ovicell with proximal lateral processes between which is an inset labellum.

TYPE SPECIES: *Retepora denticulata* Busk, 1884

Reteporellina conservatrix n.sp (Plate 45, C,D)

MATERIAL EXAMINED: NZOI Stns B489; E793.

DISTRIBUTION: Coast south of Milford Sound, Puysegur Bank; 198-253 m.

DESCRIPTION: Colony erect, dichotomously branching, non-reticulate, the branches 0.68-1.00 mm diameter, arising from a short "trunk" 1.65 mm diameter with a short basal expansion. Zooids 3-5-serial, 0.53-0.68 x 0.32-0.36 mm, the frontal shield, initially nearly smooth, with distinct outlines, becoming granular, delineated by vibices. Primary orifice about as wide as long, with beaded distal rim, broad rounded poster, and lateral condyles. Secondary orifice projecting, with prominent lateral walls; a median pseudosinus which opens into a shaft. On some zooids a suboral avicularium set transversely in the frontal wall immediately subjacent to the pseudosinus; no other avicularia. Ovicell subimmersed, visible as a bulge, with a short, grooved, labellum between the lateral processes. Dorsal surface of colony granular, with vibices delineating zooidal boundaries; no avicularia.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-523.

PARATYPE: NZOI, type number P-736, from NZOI Stn B489, Puysegur Bank, 46°9.30'S, 165°57.0'E, 198 m.

TYPE LOCALITY: NZOI Stn E793, Fiordland coast, 44°40.5'S, 167°32.0'E, 143-253 m.

REMARKS: The species name is derived from the Latin, she who preserves, alluding to the conservative display of generic features in this species.

Reteporellina sagitta n.sp. (Plates 45, E,F; 46, A)

MATERIAL EXAMINED: NZOI Stn E800.

DISTRIBUTION: Off the entrance to Dagg Sound, Fiordland; 993-1003 m.

DESCRIPTION: Colony erect, dichotomously branching, non-reticulate, the branches 0.53-0.96 mm diameter. Zooids 3-serial, 0.79-1.28 x 0.34-0.53 mm, the frontal shield granular, each zooid clearly delineated by raised lines (vibices), with only 2-3 tiny areolar pores. Primary orifice just a little wider than long, with beaded distal rim and broad, deep, rounded-V-shaped poster and small, rounded condyles. Secondary orifice somewhat projecting, with the lateral walls more prominent, especially in ovicelled zooids, and somewhat grooved internally; a median pseudosinus which opens into a shaft. Avicularium born frontally, with triangular rostrum directed orally; the opesia tiny, slit-like, with adjacent excavation for receiving the reflexed man-

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dible; the rostral palate extensive, with a small foramen. Ovicell subimmersed, visible as a bulge, with a deep median groove extending into the short labellum between the lateral processes. Dorsal side of colony like the frontal — the zooids clearly delineated by vibices, the surface granular, with an identical avicularium on the back of each zooid.

HOLOTYPE: Unique colony fragment, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-524.

TYPE LOCALITY: NZOI Stn E800, Fiordland, 45°20.5'S, 166°41.5'E, 993-1003 m.

REMARKS: The species name is a Latin noun in apposition, meaning arrow, and alludes to the arrow-head appearance of the avicularia.

Chevron n.gen.

Colony a small V, with zooids opening almost all around. Zooids with low, subtubular peristome with pseudosinus or labial suture and spiramen; primary orifice with beaded distal wall, broad shallow sinus, and moderately developed condyles. No oral spines. Frontal avicularia present. Ovicell lacking perforations and labellum.

TYPE SPECIES: *Chevron prestoni* n.sp.

REMARKS: A new genus is here established for two unusual species of deep-sea phidoloporids. Both have a roughly chevron or V shape, with zooids opening almost all around the two limbs of the V. One of the two species is not yet known to occur off western South Island but is described below in order to compare it with the type species and to further exemplify the morphological features of the genus, which has a number of characters reminiscent of *Reteporellina.*

Chevron prestoni n.sp. (Plate 46, B-E)

sertellid n.gen. *et* sp. Gordon 1987: 103.

MATERIAL EXAMINED: NZOI Stns E784, P927, P929, P942; also Stn E881, off Ahipara, 35°20.0'S, 172°15.0'E, 1286 m; Stn P939, southwestern slope of Challenger Plateau, 41°20.4'S, 166°54.8'S, 1760 m; Stn S147, head of Bounty Trough, 44°30.1'S, 174°18.8'E, 760 m; Stn U197, Lord Howe Rise, 34°09.8'S, 163°36.7'E, 1186 m.

DISTRIBUTION: Lord Howe Rise, western shelf of North Island, Challenger Plateau, Bounty Trough; 760-1760 m.

DESCRIPTION: Colony V-shaped, the limbs of the V diverging at an angle of 48-77° (mostly around 67°), the longest dimension 6 mm; branch diameter 0.70-1.28 mm. Zooids 6-7-serial, opening on all but the inner face of the V, 0.61-0.75 x 0.26-0.43 mm, the frontal shield with a granular cryptocystal area, indicating the extent of the hypostegal coelom, perforated by 1-2 minute areolar pores, bordered by a smooth area of gymnocyst. Primary orifice suborbicular, a little wider than long, with a broad shallow sinus and shoulder-like condyles. Peristome projecting, with lateral processes and a median pseudosinus and descending canal. Frontal avicularium resembling a pocket, the rostral and opesial areas small, roundly triangular, equally divided by the cross-bar. Ovicell prominent, subglobular, smooth and imperforate, with lateral processes and sometimes a hint of a labellum or this lacking. Ancestrula flask-shaped, resembling later zooids, evidently not encrusting. In mature colonies, kenozooids occur terminally and along the inner sides of the V. Each bears a small avicularium similar to the frontal avicularia.

HOLOTYPE: A 6-mm-long colony, in collection the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-518.

PARATYPE: NZOI, type number P-732, from NZOI Stn P929, southwestern slope of Challenger Plateau, 40°42.8'S, 167°56.0'E, 1029 m.

TYPE LOCALITY: NZOI Stn P927, southwestern slope of Challenger Plateau, 40°50.1'S, 168°14.8'C, 1005-1009 m.

REMARKS: Rootlets have not been seen in any of the alcohol-preserved material and it is not clear how the ancestrula or colony occurs on the substratum (foraminiferal ooze). Inasmuch as the most proximal zooids in large colonies have occluded orifices, it would seem likely that the pointed proximal end inserted into the substratum.

The species is named in honour of my father, Sgt Harry Preston, USMC, who died fighting for his country, 28 October 1944. His memory is alluded to in the generic name also.

Chevron winifredae n.sp. (Plates 1, I; 46, F,G)

MATERIAL EXAMINED: NZOI Stns E417 (45°12.0'S, 171°49.0'E, 860 m), F753 (44°45.0'S, 174°30.0'E, 765 m), S140 (44°33.9'S, 174°51.2'E, 750 m), S147 (44°30.1'S, 174°18.8'E, 760 m), S150 (45° 46.0'S, 174°24.5'E, 1640 m), S153 (45°21.1'S, 173°35.8'E, 1386 m).

DISTRIBUTION: Head of Bounty Trough, eastern South Island; 750-1640 m.

DESCRIPTION: Colony the shape of a wide-open V, the limbs of the V diverging at an angle of 98-142° (mostly around 128°), the longest dimension 6 mm, generally less; branch diameter 0.64-1.39 mm, attaining 12 series of zooids. Zooids opening on all but the inner face of the V, 0.64-0.75 x 0.24 - 0.43 mm, the frontal shield as for *C. prestoni* but, instead of a pseudosinus, there is a labial suture and spiramen, the latter occurring at or near to the base of the peristome. Frontal avicularium with acutely triangular, projecting rostrum, some avicularia larger than others. Ovicell prominent though recumbent, smooth, with a convex proximal margin in which is a small pit; the lateral processes not pronounced. Ancestrula similar to later zooids. Kenozooids disposed as in *C. prestoni*; the avicularia like the larger frontal avicularia.

HOLOTYPE: A 6-mm-long colony, in collection of the

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N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-519.

PARATYPE: NZOI, type number P-733, from NZOI Stn F753, head of Bounty Trough, 44°45.0'S, 174°30.0'E, 765 m.

TYPE LOCALITY: NZOI Stn S147, head of Bounty Trough, 44°30.1'S, 174°18.8'E, 760 m.

REMARKS: Although *Chevron winifredae* does not occur in the western South Island samples, it is described here for comparison with *C. prestoni*, from which it is easily separated, by eye, by the wider angle of divergence of the arms of the V, as well as by zooidal details. Interestingly, the peristome in *Chevron* may have either a pseudosinus or a labial suture and spiramen, as in other phidoloporid genera (e.g., *Reteporellina, Triphyllozoon*).

The species is named for my mother.

Superfamily CONESCHARELLINOIDEA Levinsen, 1909

Colony rooted, conical or discoidal to lanceolate or cruciform; or erect and semierect from a small encrusting base. Budding of zooids primarily from frontal shields which are exposed in the growing region and around orifices. Exposed calcareous walls cryptocystidean (interior) with outer hypostegal coelom. Zooidal orifice with or without condyles and sinus. Avicularia, kenozooids and extrazooidal calcification generally present. Ovicell, when present, generally prominent, not closed by the zooidal operculum, smooth or porous.

REMARKS: This superfamily was first proposed by d'Hondt (1985). Although I (Gordon 1985) earlier included the Conescharellinidae in the Celleporoidea, I now believe this family, along with the Lekythoporidae and Orbituliporidae may be justifiably allied in one superfamily because of the orientation of the zooids, with interior walls and frontal budding. Nevertheless this superfamily must be regarded as close to the Celleporoidea.

Cook and Lagaaij (1976) showed very clearly the marked similarities between two of these families. While the type species [*O. petiolus* (Londsale, 1850) (syn. *O. haidingeri* Stoliczka, 1862)] and other species of *Orbitulipora* (*see* Gregory 1893; Waters 1919; Canu and Bassler 1920, 1923; Cheetham 1966), the little-known genus *Batoporella* (Héjjas, 1894), and *Xaveropora* Malecki, 1962) have bilaterally compressed colonies (orbituliporiform), others like *Batopora, Atactoporidra,* and *Lacrimula* (*see* Cook 1966, 1981; Labracherie 1975; Hayward and Cook 1979) have conical to subconical (conescharelliniform) colonies. Similarly, in the Conescharellinoidea, there are both orbituliporiform genera (*Flabellopora, Zeuglopora*) and conescharelliniform genera (*Conescharellina, Conescharellinopsis, Trochosodon*).

[D'Hondt (1981) tentatively included his new conescharelliniform genus *Sphaerulobryozoon* in the Orbituliporidae but asserted that its relationships were closer to *Fedora* and *Fedorella* (*see* Silén 1947) in that the anchoring peduncle emerges from the broad end of the "tubular" colony, not the apex. Silén (1947) denied a close relationship between *Fedora* and *Fedorella* and others of the Mamilloporidae in which they were previously included (Canu & Bassler 1927, 1929). Perhaps the superfamily Mamilloporoidea proposed by d'Hondt (1985) could include two families — the Mamilloporidae, comprising such forms as *Mamillopora, Anoteropora,* and *Stenosipora,* and a new family based on *Fedora, Kionidella,* and *Sphaerulobryozoon. Fedorella* is different again, having 'frontal astogeny' (Cook and Lagaai) 1976).]

D'Hondt (1985) actually established two superfamilies from these groups — Orbituliporoidea and Conescharellinoidea. Because the Conescharellinidae, as a family-group taxon, was introduced before the Orbituliporidae, and because a case can be made for reducing the latter family to a subfamily of the former (*see* later), Conescharellinoidea is used here instead of Orbituliporoidea. D'Hondt included the Lekythoporidae in the Celleporoidea and, indeed, Cook and Hayward (1983) and Moyano (1985b) emphasis a close relationship between the Lekythoporidae and Celleporidae. Nevertheless, I believe that lekythoporids must be linked with other such "reverse-oriented", interior-walled, species. The following new genus provides conceptual support for such an alliance.

Family LEKYTHOPORIDAE Levinsen, 1909

Colony erect or semi-erect from a small encrusting base. Zooids appearing reversed from 'normal' orientation, the orifice terminal, the vertical calcified walls of most or all post-ancestrular zooids formed, by frontal or interzooidal budding, as interior (cryptocystidean) walls, with outer, hypostegal, coelom. Avicularia oral and/or interzooidal. Ovicell peristomial, smooth, or with frontal area and/or pores.

REMARKS: Although this family has a wide Southern Hemisphere distribution (Cook and Hayward 1983; Moyano 1985b), it has not been definitely recorded from New Zealand before; Cook and Hayward (1983) refer to a specimen of *Turritigera stellata* Busk in the British Museum (Natural History) with a doubtful provenance from New Zealand. This species is otherwise known from South Africa, South America, and Antarctica.

Jugescharellina n.gen.

Colony erect, unbranched, with rootlets and small encrusting base. Zooids with projecting peristomes all round a central axis. Tatiform ancestrula and perianc-estrular zooids affixed to substratum; all post-ancestrular zooids with reverse orientation. Primary orifice with broad deep sinus; condyles small. Avicularia peristomial only. Ovicells unknown.

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TYPE SPECIES: *Jugescharellina elongata* n.sp.

Jugescharellina elongata n.sp (Plate 47, A-E)

MATERIAL EXAMINED: NZOI Stns P927, P929.

DISTRIBUTION: Challenger Plateau; 1005-1029 m.

DESCRIPTION: Colony erect, rod-like, to 5 mm high and 1.06-1.50 mm diameter, unbranched, with zooids opening all around a central axis; initially more or less conical, becoming elongate with age; affixed by an oval tatiform ancestrula (0.26 x 0.23 mm) with seven spines around the opesia and by the immediately periancestrular zooids as well as by fine rootlets; older colonies lacking ancestrular region, supported by rootlets only. Zooids 0.38-0.75 x 0.21-0.41 mm, projecting somewhat; the calcified surface tubercular, with a rootlet pore proximally. Primary orifice with broad deep sinus and small condyles; peristome subtubular, with a broad proximal pseudosinus, and the lateral edges more pronounced, each bearing a small round avicularium with thin cross-bar. No oral spines; no other avicularia. Many zooids have a pronounced bulge with a pit in it adjacent to the peristomial pseudosinus; the bulge is solid carbonate and not an ovicell. Ovicells or other reproductive structures have not been found.

HOLOTYPE: Rooted colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, type number H-526.

PARATYPE: NZOI, type number P-738, 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 is a very puzzling species. Young conical colonies which have lost the ancestrular portion look conescharellinid. Indeed, at first I thought they were, but the presence of a small encrusting base and the absence of associated kenozooids, avicularia, and extrazooidal calcareous tissue make this species a lekythoporid.

The calcareous bulge, externally superficially resembling a peristomial ovicell, is puzzling. The associated pore (pit) is reminiscent of that which obtains in conescharellinids, in the same position adjacent to the orifice, from which the ovicell is budded. Evidently, then, the bulge and pore are an indication of potentially fertile zooids which have not produced (or lost) ovicells in the present material.

The early astogeny is of particular interest, for it shows that zooidal orientation is reversed immediately upon budding from the ancestrula. Two zooid buds are produced from the ancestrula in *J. elongata*; these, and two other zooids frontally budded behind, attach to a foraminiferan test. Thus the ancestrula and the proximal ends of four autozooids form the narrow attachment surface of the young colony, which becomes further (or entirely, if the ancestrular region becomes eroded) supported by rhizoids. This type of astogeny may be unique in the Lekythoporidae — Cook and Hayward (1983) note that in "*Lekythopora* and *Poecilopora* zooids are budded distally from the ancestrula for only one or two astogenetic generations". Lekythoporid ancestrulae have scarcely been illustrated; however Moyano (1985b) photographed the ancestrula of *Catadysis pygmaea*. It is very different from that of *Jugescharellina elongata* — it is lageniform, with a concealed sinusoid primary orifice, and aviculiferous peristome. Early astogeny is like that of *J. elongata* insofar as the first zooid from the ancestrula (budded dorsolaterally) has a reversed orientation.

Rootlet pores and rootlets have not been described in lekythoporids before but it is not an unlikely feature for this type of habitat (foraminiferal ooze), and is found in deep-sea representatives of many other normally encrusting families.

The prefix of the generic name is derived from the Latin verb to join, and alludes to the conceptual linking of the Lekythoporidae and Conescharellinidae through *Jugescharellina*.

Family ORBITULIPORIDAE Canu & Bassler, 1923

Colony conical to erect-discoidal, anchored by a rootlet(s) which emerges from an apical or radial tube comprising kenozooids and/or extrazooidal tissue. Budding of zooids from topologically frontal shields, which are exposed only around the orifice and antipically. Primary orifice suborbicular, with or without condyles, the proximal margin nearly straight to markedly convex. Peristome little developed to projecting, the secondary orifice often in the centre of the zooid. Interzooidal avicularia present or absent. Ovicell prominent, perforated or smooth.

REMARKS: The one consistent feature that distinguishes this family from the Conescharellinidae is the apical or radial tube associated with the anchoring rhizoid(s). Otherwise the overlap in characters is such that the Orbituloporidae probably ought to be considered only as a subfamily of Conescharellinidae

Batopora Reuss, 1867

Colony spherical, conical, or subdiscoidal. Zooids and/or peristomes projecting, the primary orifice orbicular to semicircular; zooids may be arranged in more than one layer. Axial tube with or without associated kenozooids. Avicularia present or absent, with or without cross-bars. Ovicell globular, smooth.

TYPE SPECIES: *Batopora stoliczkai* Reuss, 1867

REMARKS: The genus *Batopora*, as indeed the whole family, is badly in need of revision, notwithstanding the valuable and important works of Cook (1966), and Cook and Lagaaij (1976). Hayward and Cook (1979) also indicated the need for a revision of genera. The character states of genera either overlap or suites of species united in one genus show contradictory charac-

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ters; for example, *Batopora* and *Lacrimula* both presently include species with or without orificial condyles, interzooidal avicularia, and avicularian cross-bars. *Batopora* further includes species with or without secondary overgrowth, external or internal adapical tube, projecting peristomes, and symmetrical and/or porous ovicells. I suspect several genera are involved, perhaps including one for the following new species.

Batopora pulchrior n.sp (Plates 47, F, G; 48, A)

MATERIAL EXAMINED: NZOI Stns P927, P929, P937, P939, P942; also Stn E881, off Cape Maria van Diemen, 35°20.0'S, 172°15.0'E, 1286 m; and Stn S151 Bounty Trough, 45°45.8'S, 174°30.5'E, 1586 m.

DISTRIBUTION: Off the north-west tip of New Zealand, Challenger Plateau, head of Bounty Trough; 914-3347 m.

DESCRIPTION: Colony more or less conical, attaining 1.71 mm diameter (Stn P937). The apex comprising a tube 0.21-0.38 mm diameter with internal spoke-like radii; from the full diameter of the tube issues a single rootlet up to 3.6 mm long, sometimes fimbriated terminally; no other rootlets occur; there are no kenozooids associated with the tube but a number of tiny avicularia occur instead. Zooidal orifices with projecting peristomes, often with acute processes on the rims; primary orifice suborbicular, the anter and poster separated by a pair of angled condyles; older orifices in the colony often occluded. Tiny avicularia occur interzooidally between areolar pores; all avicularia have only mandibular pivots, not cross-bars. Ovicell prominent, hyperstomial, with a large smooth exposure of endooecium. Antapical surface comprising the convex frontal shields of zooids with furrows and areolar pores between; zooidal calcified surface granular and or ridged; zooids 0.57-0.83 x 0.38-0.46 mm.

HOLOTYPE: In collection of the N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-527.

PARATYPE: NZOI, type number P-739, from Stn P929, Challenger Plateau, 40°42.8'S, 167°56.0'E, 1029 m, and Stn P937, flank of Challenger Plateau, 41°19.2'S, 166°27.9'E, 3253-3347 m.

TYPE LOCALITY: NZOI Stn P927, Challenger Plateau, 40°50.1'S, 168°14.8'E, 1005-1009 m.

REMARKS: This species emphasises the close relationship between the Orbituloporidae and Conescharellinidae. It is reminiscent of *Trochosodon* species but differs in having only a single apical tube and avicularia lacking cross-bars. *Batopora pulchrior* also differs from the type-species, *B. stoliczkai*, which has globular colonies, urn-shaped zooids, interzooidal and axial kenozooids, no orificial condyles, and no avicularia. The few *Batopora* species with avicularia (e.g., *B. clithridiata* — *see* Cook and Lagaaij 1976) have avicularian cross-bars. From these differences I conclude that *B. pulchrior* is probably not correctly placed in *Batopora* and may [along with some other recent forms, e.g., *Batopora* sp. (d'Hondt 1986)] warrant a new genus.

The species name *pulchrior* is a comparative Latin adjective meaning more beautiful.

Family CONESCHARELLINIDAE Levinsen, 1909

Colony conical to lanceolate or horizontally cruciform, anchored by rootlets in soft sediments. Budding of zooids from topologically frontal shields, which are exposed only around the orifice and antapically. Primary orifice often sinusoid, with condyles. Avicularia and kenozooids typically present. Ovicells, when present, directed antapically, not closed by the zooidal operculum.

REMARKS: The conescharelliniform genera of this family (*Conescharellina*, *Conescharellinopsis*, *Trochosodon*) are not well circumscribed. *Conescharellina*, in particular, is variable, exhibiting, among its species, tall conical, to flat discoidal colonies, zooids arranged in vertical rows with furrows between or both these features lacking, symmetrical or asymmetrical ovicells, and a broad flat antapical region with either kenozooidal chambers or avicularia or this region reduced. The lack of clear definition of *Conescharellina* has made it difficult to circumscribe *Trochosodon*, for example.

Conescharellina d'Orbigny, 1852

Colony conical to discoidal, the apex directed towards the substratum. Zooids with frontal shields exposed around the orifices, and antapically where new zooids are being budded. A central core of kenozooids and/or avicularia present; some externally appearing kenozooids with crescentic openings. Avicularia with cross-bars, typically adjacent to the orifices which are sinusoid and condylate. Ovicells hyperstomial, smoothly calcified.

TYPE SPECIES: *Conescharellina angustata* d'Orbigny, 1852

Conescharellina angulopora (Tenison-Woods) (Plate 48, B)

Lunulites angulopora Tenison-Woods, 1880: 7.
Conescharellina angulopora: Levinsen 1909: 311; Livingstone 1924: 205 (*cum syn.*); Gordon 1985: 173 (*cum syn.*)

MATERIAL EXAMINED: NZOI Stns B458, B496, C871, Q701, Q729.

DISTRIBUTION: Kermadec Ridge, Dargaville Coast, western Cook Strait, Westport coast; 58-248 m. Also Bass Strait, New South Wales, Queensland.

DESCRIPTION: Colony up to 4.0 mm diameter, squatly conical, or tending to discoidal with increasing diameter: height up to 2.1 mm. The apical side of the colony appearing somewhat irregular, with surface granulations, the periancestrular area uneven, with some occluded orifices and relatively small avicularia. Zooidal

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orifices not in regular radial rows, longer than wide, bordered by a smooth raised collar-like peristomial rim which is less apparent in older zooids or worn colonies; sinus narrow, delimited by conspicuous condyles. a triangular avicularium adjacent to the distal border of each orifice, with 1-3 ligulae on the rostral side of the cross bar in many avicularia. Scattered throughout the colony are C-shaped kenozooidal openings, each associated with a pair of smaller avicularia. Orifices, avicularia, and kenozooidal openings all larger towards the colony periphery. Ovicells present (only developing ones seen). The antapical side of the colony with a central flat area up to 1.4 mm diameter of round kenozooidal openings, flanked by a deflexed periphery of zooids whose frontal shields (0.68-0.77 x 0.25-0.34 mm) are completely exposed. No antapical avicularia.

REMARKS: This species is the commonest species of *Conescharellina* in New Zealand waters.

Conescharellina pala n.sp. (Plate 48, C, D)

MATERIAL EXAMINED: NZOI Stn C871; also Stn C793, off Coromandel Peninsula, 36°39.9'S, 176°02.0'E, 132 m. and Stn C849, Manawatu Coast, 40°07.3'S, 175°07.3'E, 15 m.

DISTRIBUTION: Off Coromandel Peninsula, Manawatu Coast, Tory Channel; 15-132 m.

DESCRIPTION: Colony up to 3.5 mm diameter, more or less discoidal; height up to 1.1 mm. The apical side of the colony convex, not markedly so, thesurface granular, with circular excavations evidently corresponding to rootlet chambers, numerous tiny round avicularia, and openings of autozooids. Periphery of colony more or less serrate because of projecting peristomes — these more or less spout-like, mostly with a median channel. Primary orifice longer than wide, with a distinct U-shaped sinus and condyles. Avicularia not placed in any discernible pattern, but generally a pair proximal to and either side of the peristomial spout and 1-2 distal to the orifice with one or more elsewhere on the zooid, each tiny, more or less circular, with a complete cross-bar. Ovicells not seen. Areolar pores occur interzooidally and elsewhere. Antapical side of colony with a broad, central, flat or concave area dimpled with numerous chambers (and intervening grooves) of tiny avicularia like those on the apical side; the central core of the colony being filled with layer upon layer of these avicularian chambers instead of kenozooidal chambers, flanked by a periphery of zooids whose exposed frontal shields measure 0.47-0.73 x 0.32-0.36 mm.

HOLOTYPE: Colony, in collection of the N.Z. Oceanographic Institute, DSIR, Wellington, type number H-528.

PARATYPE: NZOI, type number P-740, from NZOI Stn C793, off Coromandel Peninsula, 36°39.9'S, 176°02.0'E, 132 m, and Stn C871, Tory Channel, 41°14.4'S, 174°09.1'E, 66 m.

TYPE LOCALITY: NZOI Stn C849, Manawatu Coast, 40°40.0'S, 175°07.3'E, 15 m.

REMARKS: Few species of *Conescharellina* are known from the New Zealand region (Gordon 1985); *C. pala* is immediately distinguished by its channelled spout-like peristomes and aviculiferous antapical surface. *Pala* is a Latin noun meaning shovel and alludes to the peristome.

Trochosodon Canu & Bassler, 1927

Colony conical, the apex with distinct, round, kenozooidal chambers, directed towards the substratum. Zooids with frontal shields exposed around the orifices, and antipically where new zooids are being budded; peripheral peristomes projecting. Central core of heterozooids much reduced or absent. Crescentic kenozooidal openings may occur. Avicularia with cross-bars, generally peristomial, as well as sub-apical and interzooidal. Ovicell, if present, with radial sculpturing.

TYPE SPECIES: *Trochosodon linearis* Canu & Bassler, 1927.

Trochosodon mosaicus n.sp (Plate 48, E, F; 49, A-C)

MATERIAL EXAMINED: NZOI Stns E784, P926, P927, P937, P942, Q696, Q699, Q719, S395, S400; also Stn E891 off the Kaipara coast, 36°40.0'S, 173°27.0'E, 1282 m, Stn F753, Mernoo Saddle, 44°45.0'S, 174°30.0'E, 765 m; and Stn S154, Bounty Trough, 45°24.2'S, 173°59.8'E, 1373 m.

DISTRIBUTION: Challenger Plateau, shelf and slope off Kaipara, Buller, and Westland, Mernoo Saddle; 178-3347 m.

DESCRIPTION: Colony conical to triangular in profile, typically wider than high, the maximum recorded diameter 3.10 mm (Stn E891) and height 2.24 mm (Stn F753), the adapical side flat to concave. Apex with 2-3 large round kenozooidal openings, somewhat funnel-like, with a number of subcircular avicularia and areolar pores, all irregularly disposed. Zooidal orifices quincuncial, somewhat spout-like proximally, often with a single small avicularium with cross-bar at the edge of the rim mid-proximally. Primary orifice with broadly V-shaped proximal rim and no condyles. Ovicells not seen. Antapical surface comprising mainly or wholly the convex frontal shields of zooids with furrows and areolar pores between; zooidal surface evenly "hammered" or reticulate in appearance; zooids 0.44-1.00 x 0.32-0.58 mm. In large colonies the central area is occupied by small convex, kenozooidal chambers; avicularia are not present.

HOLOTYPE: In collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-529.

PARATYPE: NZOI, type number P-741, from NZOI Stn Q696, Westland shelf, 42°34.8'S, 169°30.8'E, 960 m, and Stn Q699, Challenger Plateau, 41°08.9'S, 170°20.6'E, 698 m.

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TYPE LOCALITY: NZOI Stn P927, Challenger Plateau, 40°50.1'S, 168°14.8'E, 1005-1009 m.

REMARKS: The specific name refers to the appearance of the colony surface imparted by the reticulation of the zooidal shields. This feature and the single (often lacking) peristomial avicularium are key characters to look for in sorting local *Trochosodon* species.

Trochosodon multiarmatus (Maplestone) (Plate 49, D-F)

Bipora multiarmata Maplestone, 1909: 268.
Conescharellina multiarmata: Livingstone 1924: 212.

MATERIAL EXAMINED: NZOI Stns P926, P927, P942; also Stn E882, off Dargaville, 36°00.0'S, 172°42.0'E, 1217 m; Stn F753, Mernoo Saddle, 44°45.0'S, 174°30.0'E, 765 m; Stn S140, Bounty Trough, 44°33.9'S, 174°51.2'E, 750 m; Stn S152, Bounty Trough, 45°52.3'S, 174°04.9'E, 1676 m; Stn S154, Bounty Trough, 45°24.2'S, 173°59.8'E, 1373.

DISTRIBUTION: Continental slope off Dargaville, Challenger Plateau, Mernoo Saddle, head of Bounty Trough; 750-1676 m. Also continental slope off Port Jackson, New South Wales.

DESCRIPTION: Colony subconical to domed in profile, typically wider than high, the maximum recorded diameter 2.91 mm (Stn P927) and height 1.92 mm (Stn F753), the basal side more or less flat. Apex with 2-4 large, round kenozooidal openings, somewhat funnel-like, with numerous subcircular avicularia with cross-bars, and a few tiny areolar pores, all irregularly disposed. Zooidal orifices quincuncially arranged, sometimes weakly aligned in nearly straight vertical series, the peristome developed on both sides of the orifice; primary orifice with a broad U-shaped "sinus" defined by a pair of stout condyles but not reflected in the operculum which is widely roundly V-shaped proximally. Ovicell very prominent, thin-walled with a frontal exposure of endooecium. Avicularia generally abundant; typically one either side of the secondary orifice at the level of the sinus or proximal to it; numerous other avicularia interzooidally. Antapical surface comprising a central area of avicularian chambers, with the convex frontal walls of zooids surrounding it; zooidal calcified surface evenly "cobbled" or granular; zooids 0.47-1.07 x 0.36-0.53 mm.

REMARKS: The dimensions of the New Zealand specimens accord precisely with those given by Maplestone (1909). His illustrations emphasise the vertical arrangement of zooidal orifices rather more, however, and he describes the peristome as irregular. Most puzzlingly he described the antapical surface as having "No indication of the position of the zooecia" which is not the case in the New Zealand material.

Trochosodon urnalis n.sp. (Plate 50, A)

MATERIAL EXAMINED: NZOI Stns P929, P932, P937, P939; also Stn S138, Bounty Trough, 44°35.4'S, 174°49.6'E, 785 m; Stn S140, Bounty Trough, 44°33.9'S, 174°51.2'E, 750 m; and Stn S153, Bounty Trough, 45°21.1'S, 173°35.8'E, 1386 m.

DISTRIBUTION: Continental shelf off Westport, Challenger Plateau, head of Bounty Trough; 750-4059 m.

DESCRIPTION: Colony having a knobbly appearance owing to the extent to which the zooids project from it, up to 2.91 mm diameter and 2.03 mm high. Apex typically eroded except in the smallest colonies where it comprises three to several closed kenozooids, with adjacent areolar pores and no avicularia — large (or small) rootlet pores are not in evidence. The distal halves of zooids project from the colony, each somewhat swollen in appearance, the orifice more or less terminal, with peristomial lappets laterally and a pair of small avicularia with delicate cross-bars distolaterally; primary orifice longer than wide, with broad deep "sinus" delimited by angular condyles, the proximal margin of the operculum merely broadly V-shaped. No other avicularia. Ovicells not seen. Antapical surface very irregular, comprising the projecting distal ends of zooids; the zooidal calcified surface lightly "cobbled"; zooids 0.53-0.86 x 0.44-0.64 mm.

HOLOTYPE: In collection of N.Z. Oceanographic Institute, DSIR, Wellington, New Zealand, type number H-530.

PARATYPE: NZOI, type number P-742, from the same locality as the holotype.

TYPE LOCALITY: NZOI Stn S138, head of Bounty Trough, 44°35.4'S, 174°49.6'E, 785 m.

REMARKS: In the swollen, urn-shaped appearance of the zooids (hence the specific name), *T. urnalis* is reminiscent of *Bipora ampulla* Maplestone, 1909. That species has, however, an extensive, concave though mammillated, antapical surface. Livingstone (1924) included it in *Conescharellina*.

Crucescharellina Silén, 1947

Colony branching, extending in the horizontal plane from an astogenetically older central point, supported by rhizoids which arise from circular or crescentic openings on the same side as the orifices. Zooids granular-tubercular, the orifice with rounded V-shaped sinus/poster delimited by small condyles; the peristome variably developed or lacking. Avicularia small, adventitious, sometimes also large and spatulate, the former on one or both surfaces of the colony made up of topologically frontal walls of zooids and/or avicularian chambers. Ovicells unknown.

TYPE SPECIES: *Crucescharellina japonica* Silén

REMARKS: This genus is a senior synonym of *Agalmatozoum* Harmer, 1957. The type species, *A. decussis*, and *C. japonica* correspond in details of colonial and zooidal morphology except that Silén (1947) describes *C. japon-*

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ica as having the entire aborificial surface made up of avicularia (see Silén 1947: fig. 34) which may be a misunderstanding — it is certainly not the case in *A. decussis* or the following new species.

Crucescharellina jugalis n.sp. (Plates 1, E; 50, B-E)

MATERIAL EXAMINED: NZOI Stns P941, P942; also Stn E881, off Cape Maria van Diemen, 35°20.0'S, 172°15.0'E, 1286 m; Stn E882, off Dargaville coast, 36°00.0'S, 172°42.0'E, 1217 m; Stn F874, northeast of Cape Runaway, 37°18.0'S, 178°11.0'E, 1357 m.

DISTRIBUTION: Northwestern shelf and slope of North Island, northeastern Bay of Plenty, Challenger Plateau; 914-1463 m.

DESCRIPTION: Colony fundamentally somewhat H-shaped, with the cross-piece of the H longer than the sides which are angled and initiate successive bifurcations, all in the horizontal plane; additional branches can arise from the cross-piece, but later than from the sides. Orificial side with peristomes, avicularia, and rootlets, facing the substratum. Peristome more or less circular, ~ 0.15 mm diameter, scarcely raised above the colony surface; primary orifice sunken, the poster sinus-like, delimited by a pair of condyles. Kenozooidal openings small, circular, ~ 0.075 mm. Adventitious avicularia tiny, subcircular with complete cross-bar. Zooids granular-tubercular, their outlines discernible aborificially partly by the distribution of areolar pores, 0.59-1.07 x 0.25-0.53 mm. Aborificial calcified surface granular - tubercular, made up of topologically frontal zooidal shields; nearly featureless, with sparse areolar pores and no avicularia. No ovicells.

HOLOTYPE: In collection of the N.Z. Oceanographic Institute, DSIR, Wellington, type number H-531.

PARATYPE: NZOI, type number P-743, from Stn E882, off Dargaville coast, 36°00.0'S, 172°42.0'E, 1217 m.

TYPE LOCALITY: NZOI Stn P941, flank of Challenger Plateau, 41°15.2'S, 167°07.2'E, 1457-1463 m.

REMARKS: This species is similar to *C. decussis* in colony form though not as regularly radiating. Branches of *C. jugalis*, as in *C. japonica*, are narrowest proximally, where they may be a single zooid thick, widening to two zooids in thickness, with kenozooids and avicularia interpolated between, especially before a bifurcation. Kenozooids in *C. japonica* and *C. decussis* may develop a calcareous shelf in the circular opening, becoming C-shaped (a "lunoecium" in the terminology of some authors) — such a modification is lacking in *C. jugalis*. *Crucescharellina decussis* alone has large spatulate avicularia.

The species name *jugalis* is a Latin adjective meaning pertaining to a yoke and alludes to the appearance of the unbroken colony. Very young colonies have not been seen. Cook (1981) illustrated a very young colony of an indeterminate species (*Agalmatozoum* sp.) from Cape York, Australia. It is cruciform in shape.

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INDEX

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PLATES

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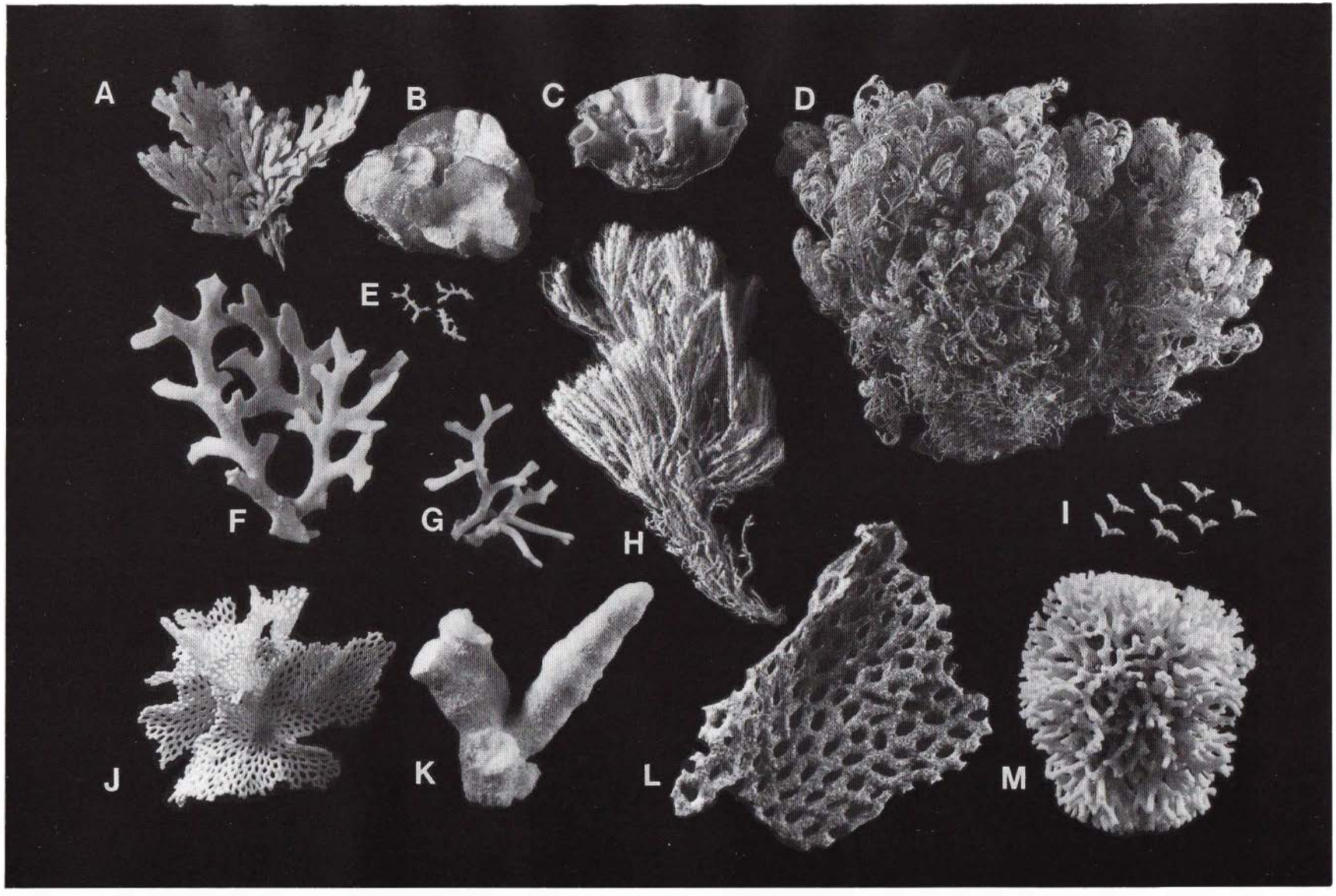

PLATE 1. A, *Euthyroides episcopalis* (Busk) (Stn S237). B, *Euthyroides jellyae* Levinsen (Chetwode Islands, Marlborough Sounds). C, *Smittoidea maunganuiensis* (Waters) (Stn M778). D, *Cribricellina* (*Paracribricellina*) *cribraria* (Busk) (Lyall Bay, Wellington). E, *Crucescharellina jugalis* n.sp. (Stn P941). F, *Adeonellopsis yarraensis* (Waters) (Stn E820). G, *Galeopsis polyporus* (Brown) (Stn M783B). H, *Margaretta barbata* (Lamarck) (Stn B493). I, *Chevron winifredae* n.gen., n.sp. (Stn S147, 44°30.1'S, 174°18.8'E, Bounty Trough). J, *Reteporella ligulata* n.sp (Stn B489). K, *Celleporina grandis* n.sp. (Stn B482). L, *Hippoporina retepora* n.sp. (Stn F146, 53°00'S, 172°45'E, Campbell Plateau). M, *Galeopsis porcellanicus* (Hutton) (Pakiri Beach, Hauraki Gulf). (All specimens natural size).

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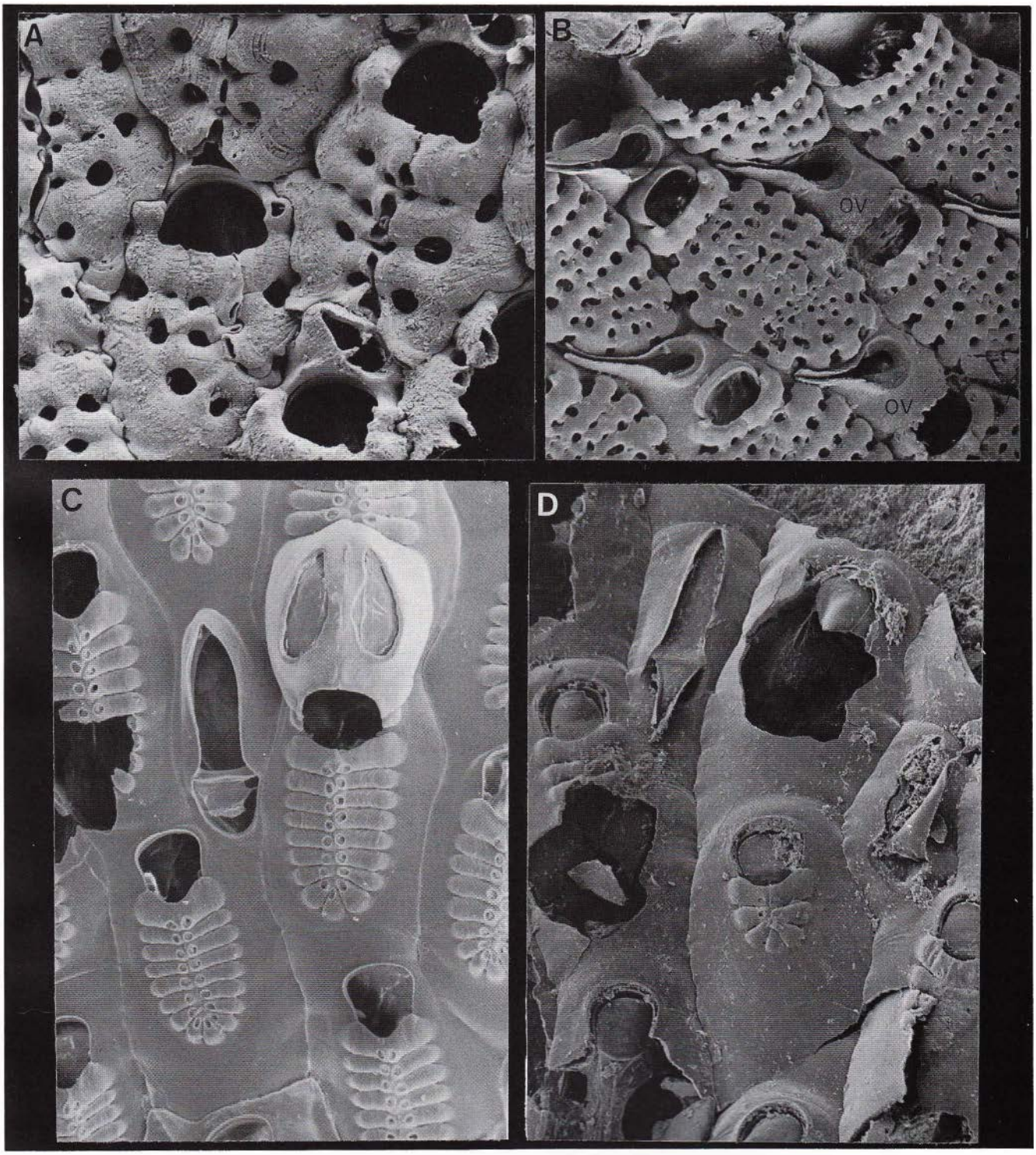

PLATE 2. A, *Cribralaria austrinsulensis* n.sp. (Stn B493). B, *Cribralaria curvirostris* Silén: part of holotype, from type collection no. 387, Zoological Museum, University of Uppsala (Bonin Islands, Japan). C, *Figularia mernae* Uttley & Bullivant (Stn B488). D, *Figularia ?mernae*: basal, encrusting zooids of a partly encrusting, partly erect, frondose colony (Stn E821).

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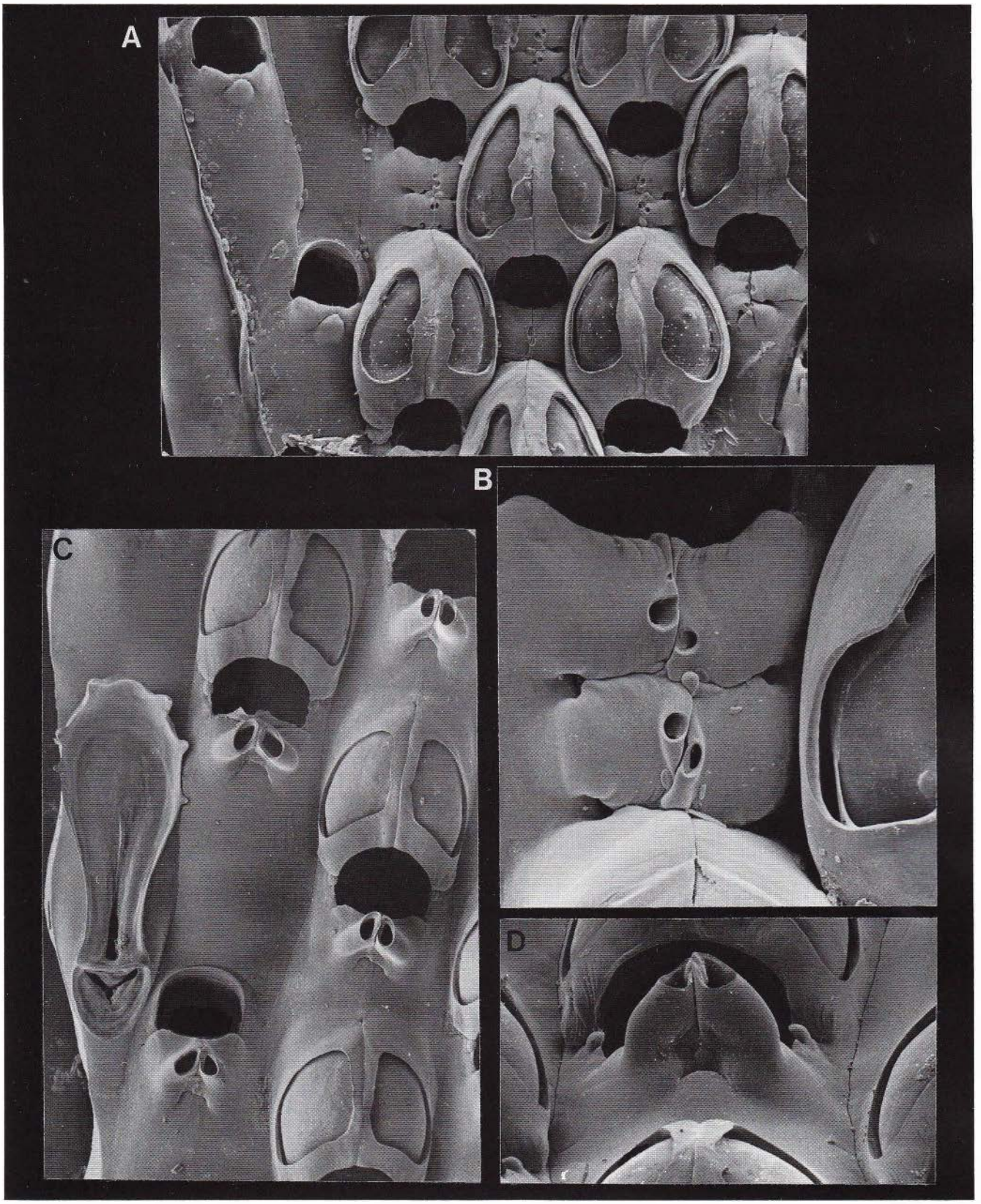

PLATE 3. A, B, *Euthyroides episcopalis* (Busk): A, part of fertile lobe near the left-hand margin of the lobe; B, spinocyst of a female zooid (Edwardson Sound, Fiordland). C, D, *Euthyroides jellyae* Levinsen : D, tilted, to show how the preoral spines project frontally (Poor Knights Islands).

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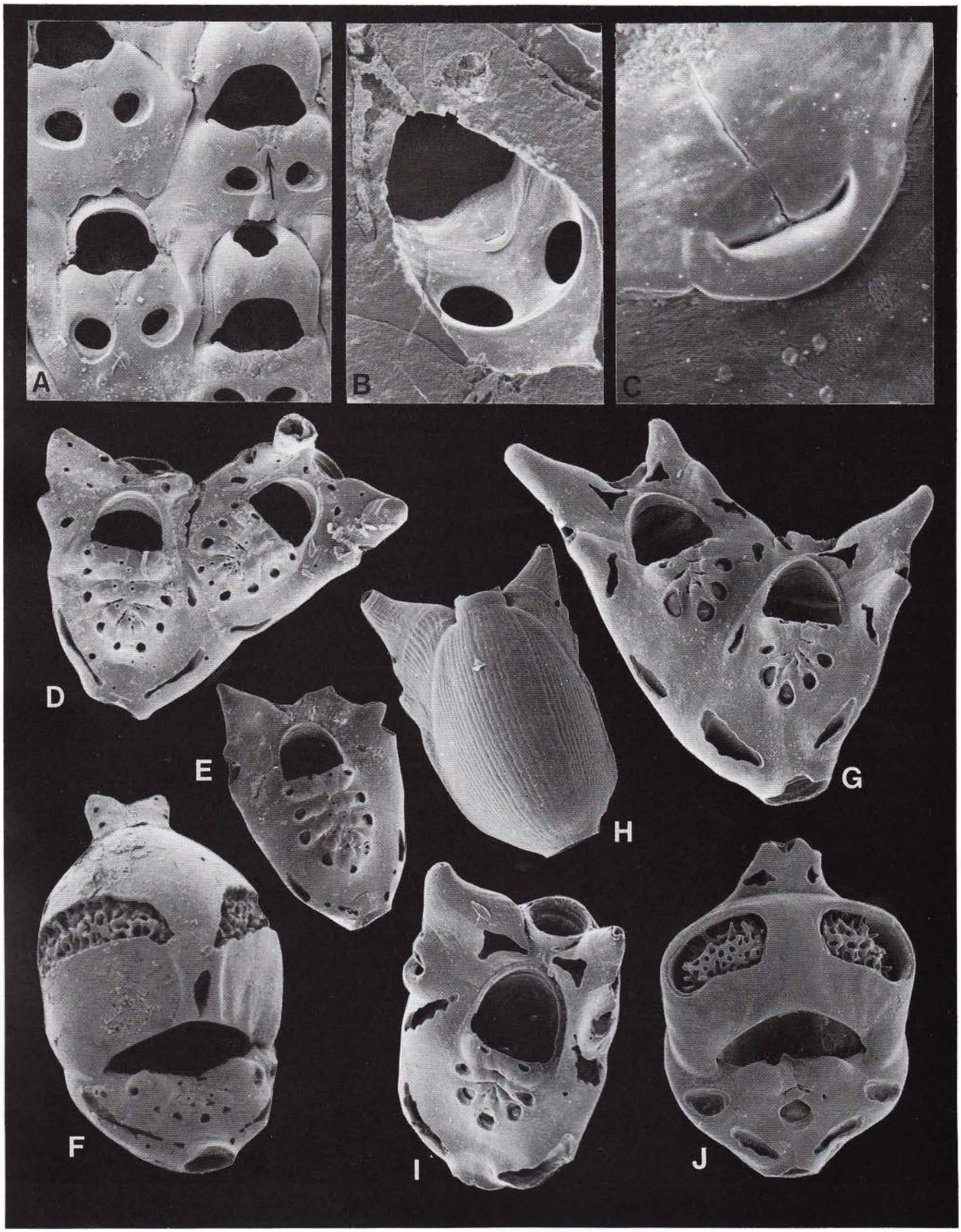

PLATE 4. A-C, *Eurystomella foraminigera* (Hincks): A, a group of zooids, two ovicelled; the arrow indicates a tiny spine and adjacent sutures; B, C, inner zooidal wall showing, in C, the sutures between the orificial costae and, proximally, parallel fibrous ultrastructure (Stn D273). D-F, *Costaticella hastata* (Busk) (D, F, Stn M778; E, Stn E820). G-J, *Costaticella solida* (Levinsen) (drift, Wainuiomata River Mouth).

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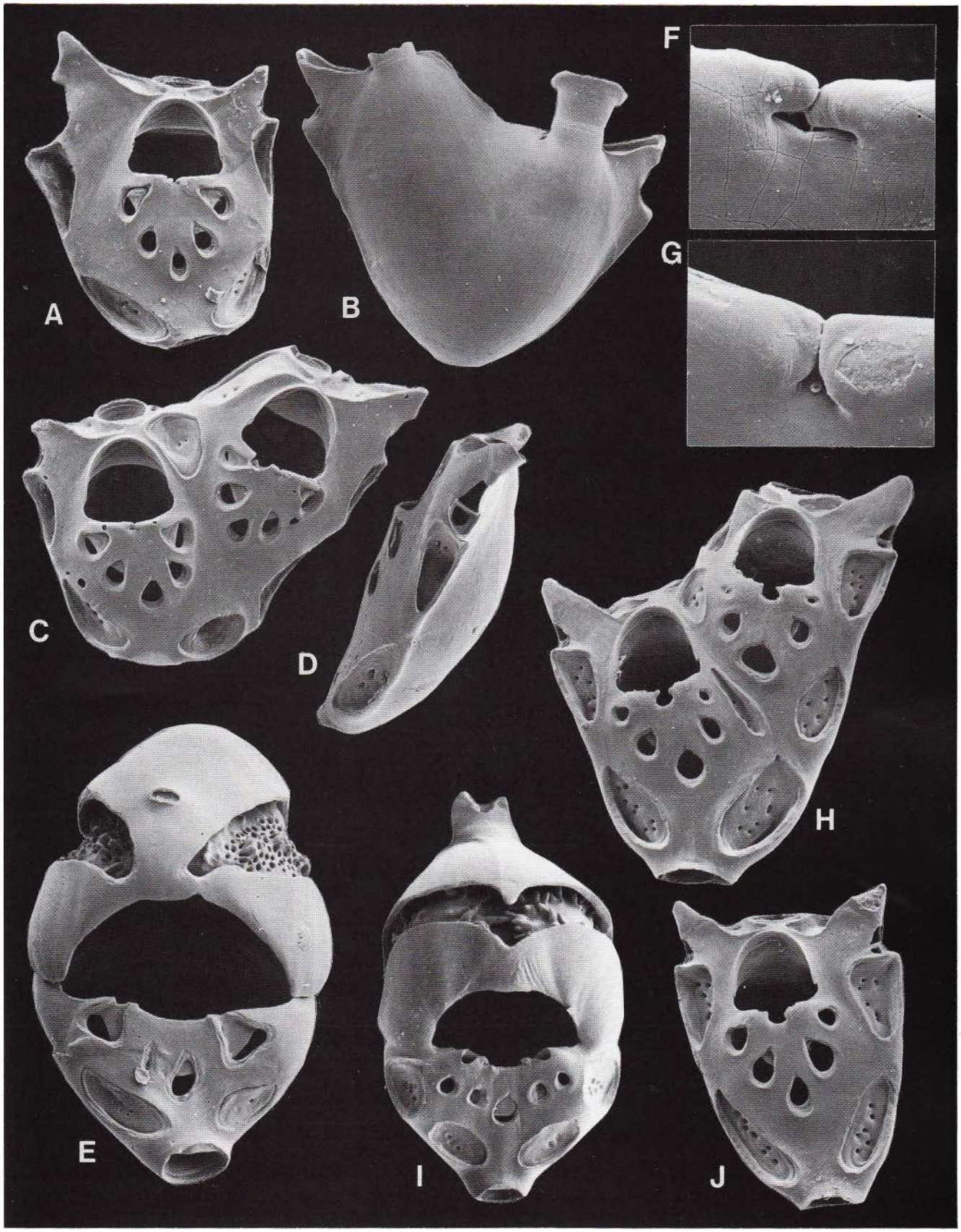

PLATE 5. A-G, *Orthoscuticella margaritacea* (Busk): F, G, vestigial spines and pore (Three Kings Islands). H-J, *Orthoscuticella fissurata* (Levinsen) (H, J, Pz 19, Hutton Collection, NMNZ, Lyall Bay, Wellington; I, Stn E820).

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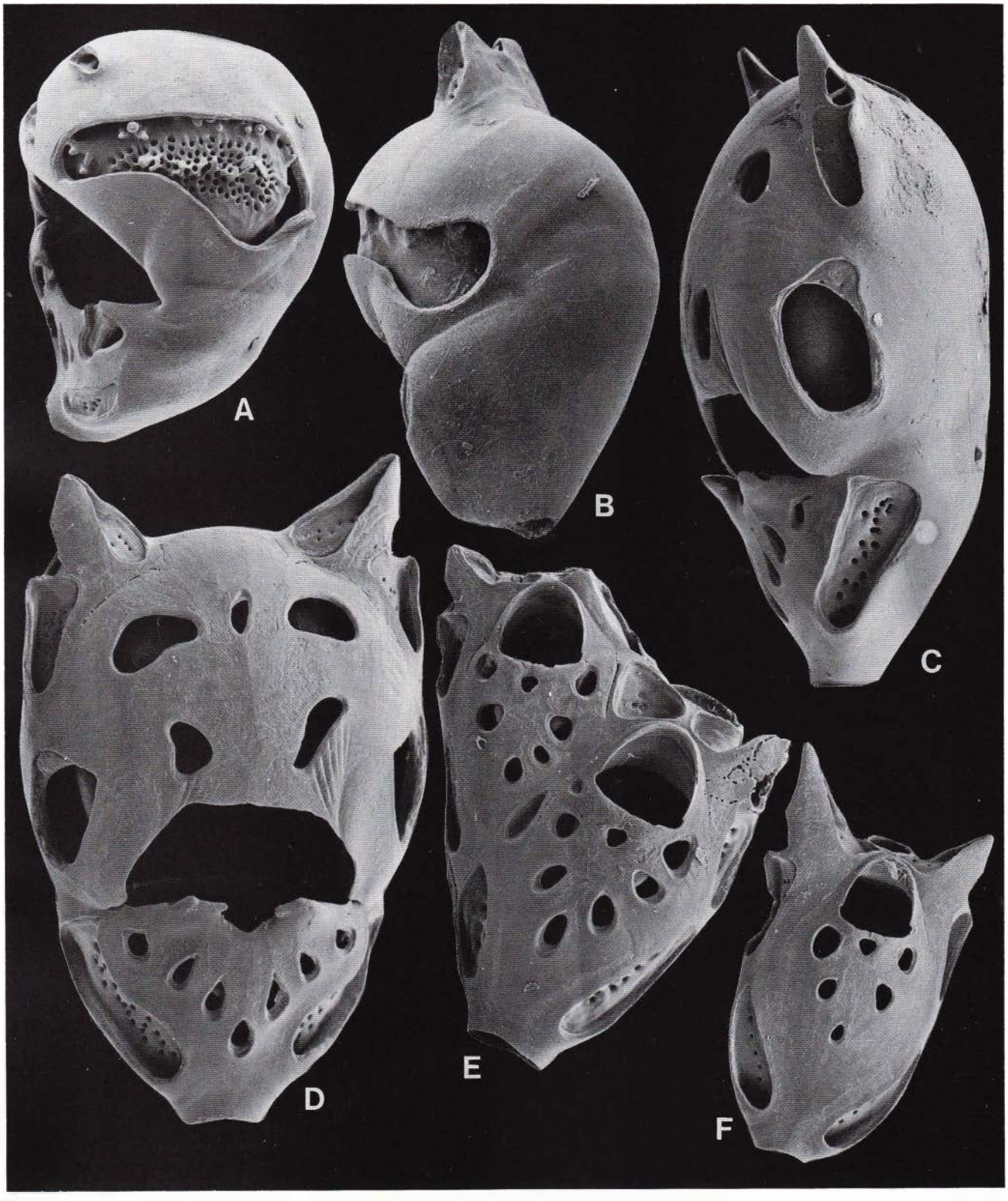

PLATE 6. A, *Orthoscuticella margaritacea* (Busk): Lateral view of fertile segment (Three Kings Islands). B, *Orthoscuticella fissurata* (Levinsen): lateral view of fertile segment (Lyall Bay, Wellington. C-F, *Orthoscuticella ventricosa* (Busk): lateral and frontal views of fertile segment, and bizooidal and unizooidal segments (Pz 415, NMNZ, Bligh Sound, Fiordland).

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PLATE 7. A-D, *Orthoscuticella innominata* n.sp.: B, C, showing variation in the distal fenestra(e) of the fertile segment (Oteranga Bay, Cook Strait).

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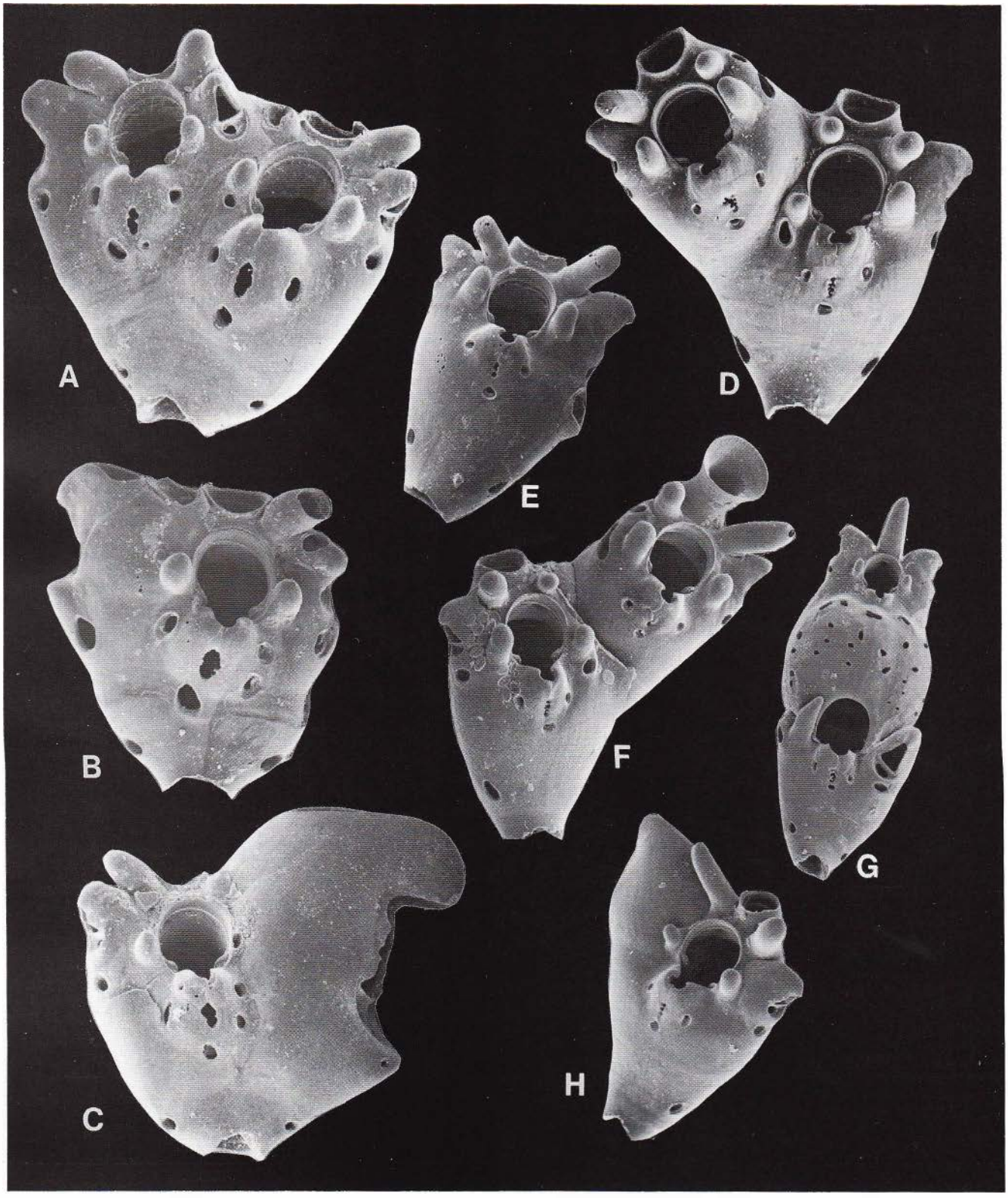

PLATE 8. A-C, *Claviporella aurita* (Busk): A, a bizooidal segment, showing the mid-distal avicularium; B, C, unizooidal segments showing variations in the size of distolateral avicularia (South Cape, Stewart Island). D-H, *Claviporella pulchra* MacGillivray: notice the presence of a mid-lateral branch foramen in E and the absence of a mid-distal avicularium in F (D, Museum of Victoria, Point Danger, Victoria; E, Stn B493; F, H, Stn B480; G, Stn B493.

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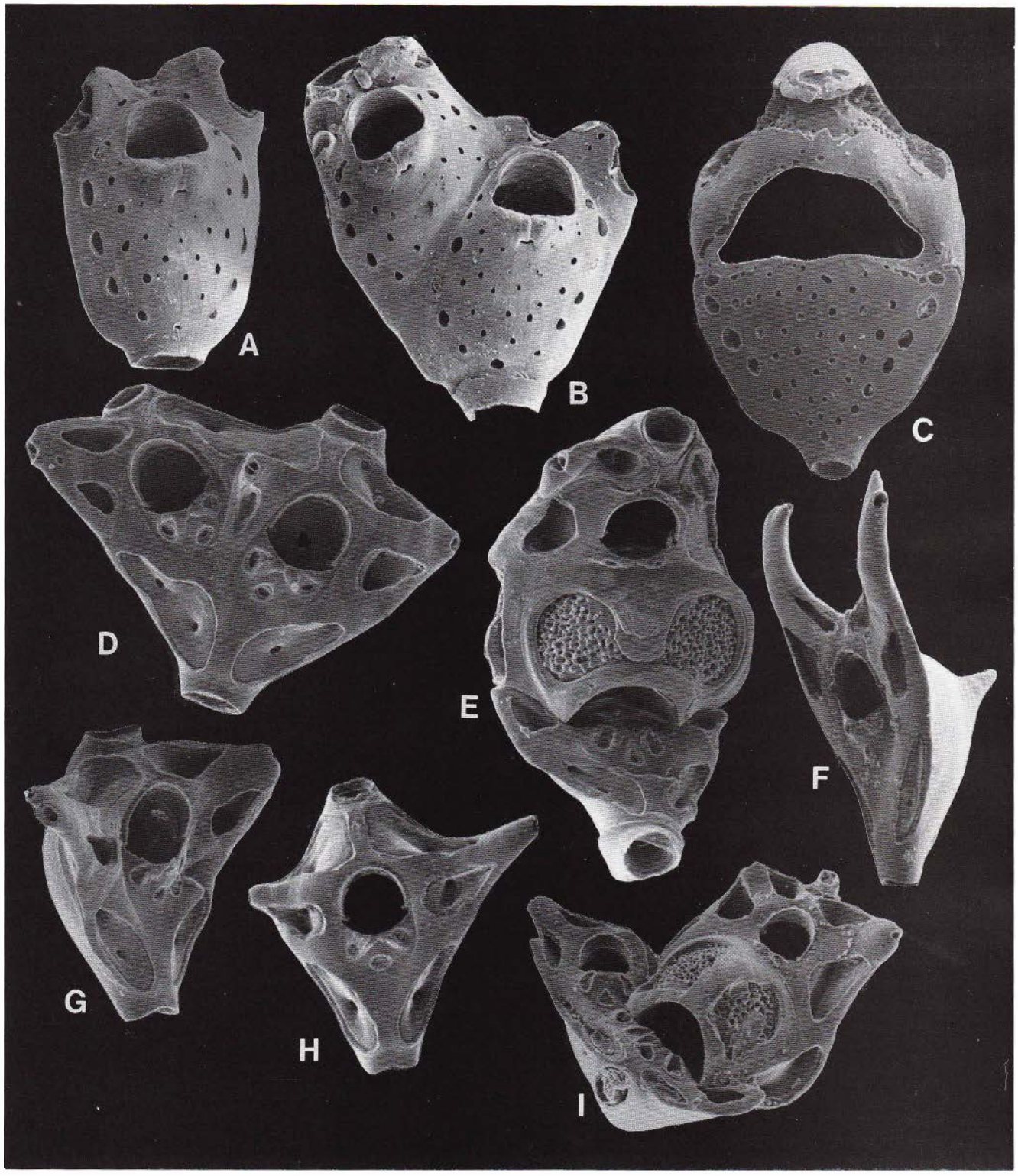

PLATE 9. A-C, *Cribricellina (Paracribricellina) cribraria* (Busk) (A, B, Stn B488; C, Stn B493). D-I, *Pterocella scutella* (Hutton) : F-H, profiles of unizooidal segments; E, rare bizooidal, and I, trizooidal fertile segments (D, E, G, I, Stn B493; E, H, Stn E820).

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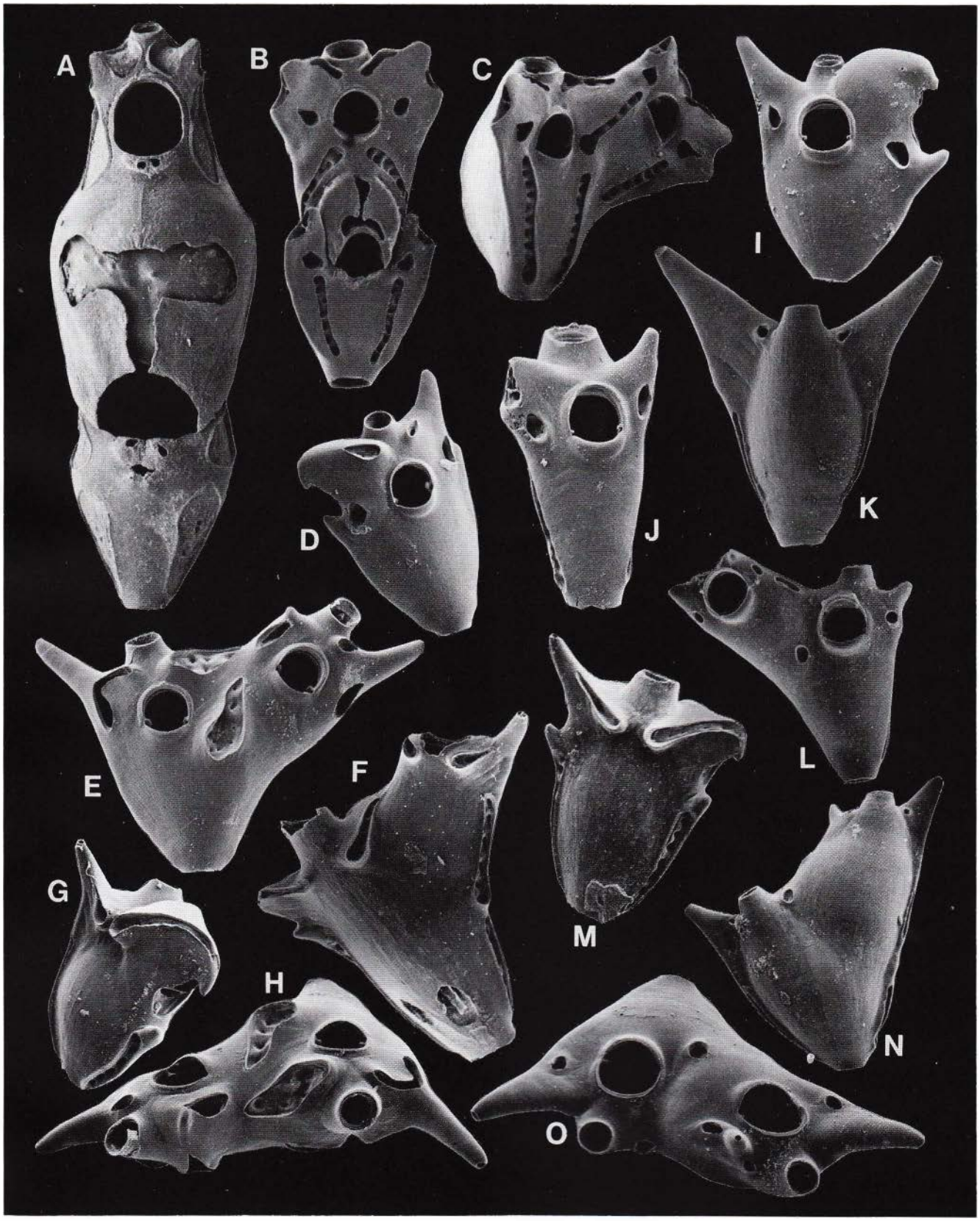

PLATE 10. A, *Talivittaticella problematica* (d'Hondt): fertile segment (Stn E800). B, C, *Scalicella crystallina* (W. Thomson) (Stn E820). D-H, *Cornuticella trapezoidea* Powell (Stn B498). I-O, *Cornuticella taurina* (Busk) (J-L, N-O, Oteranga Bay, Cook Strait; M, Stn B493).

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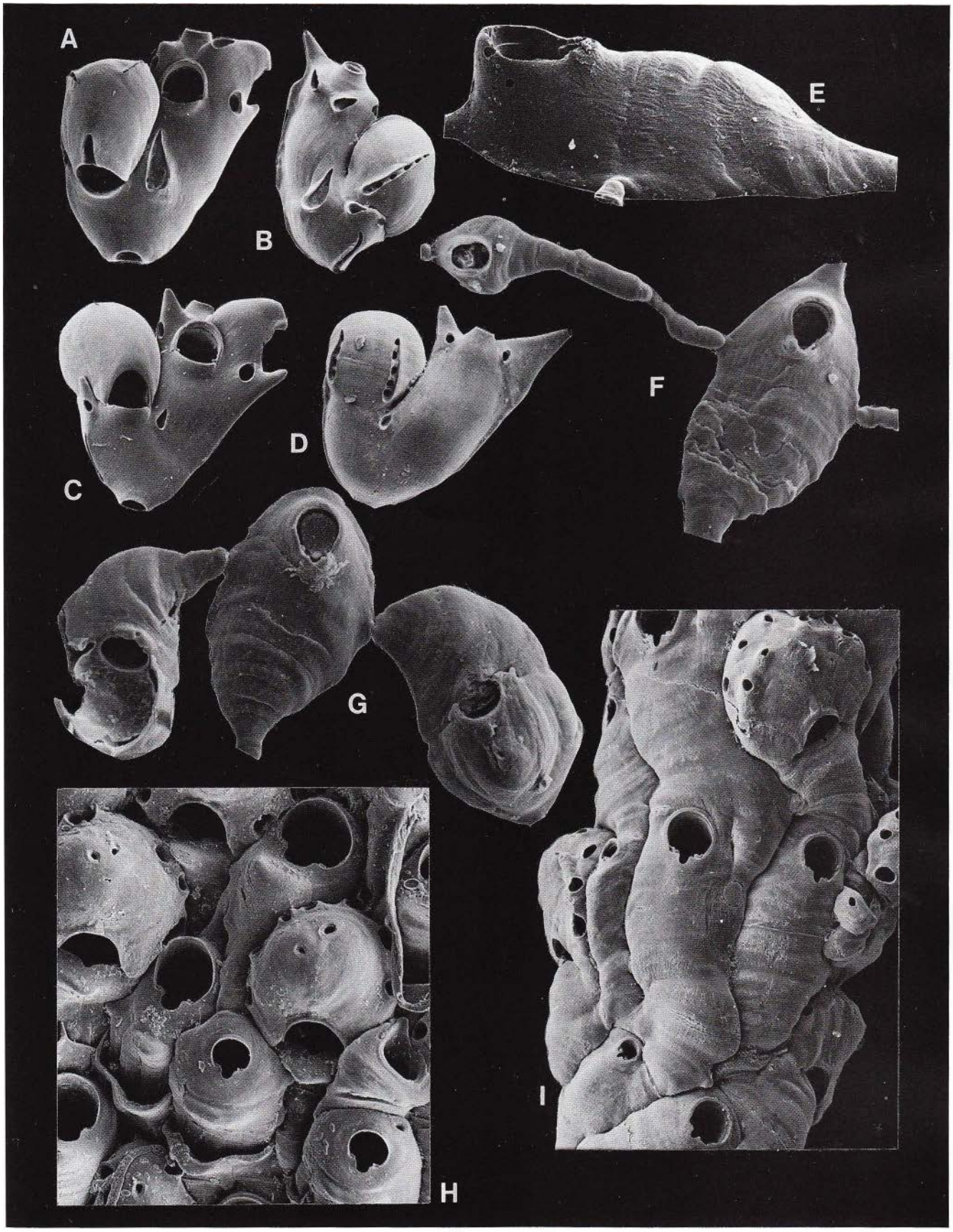

PLATE 11. A, B, *Cornuticella trapezoidea* Powell (Stn B498). C, D, *Cornuticella taurina* (Busk) (Oteranga Bay, Cook Strait). E-G, *Hippothoa flagellum* (Stn B488). H, *Celleporella (Antarctothoa) bathamae* (Ryland & Gordon) (Stn C868). I, *Celleporella (Antarctothoa) delta* (Ryland & Gordon) (Stn S368).

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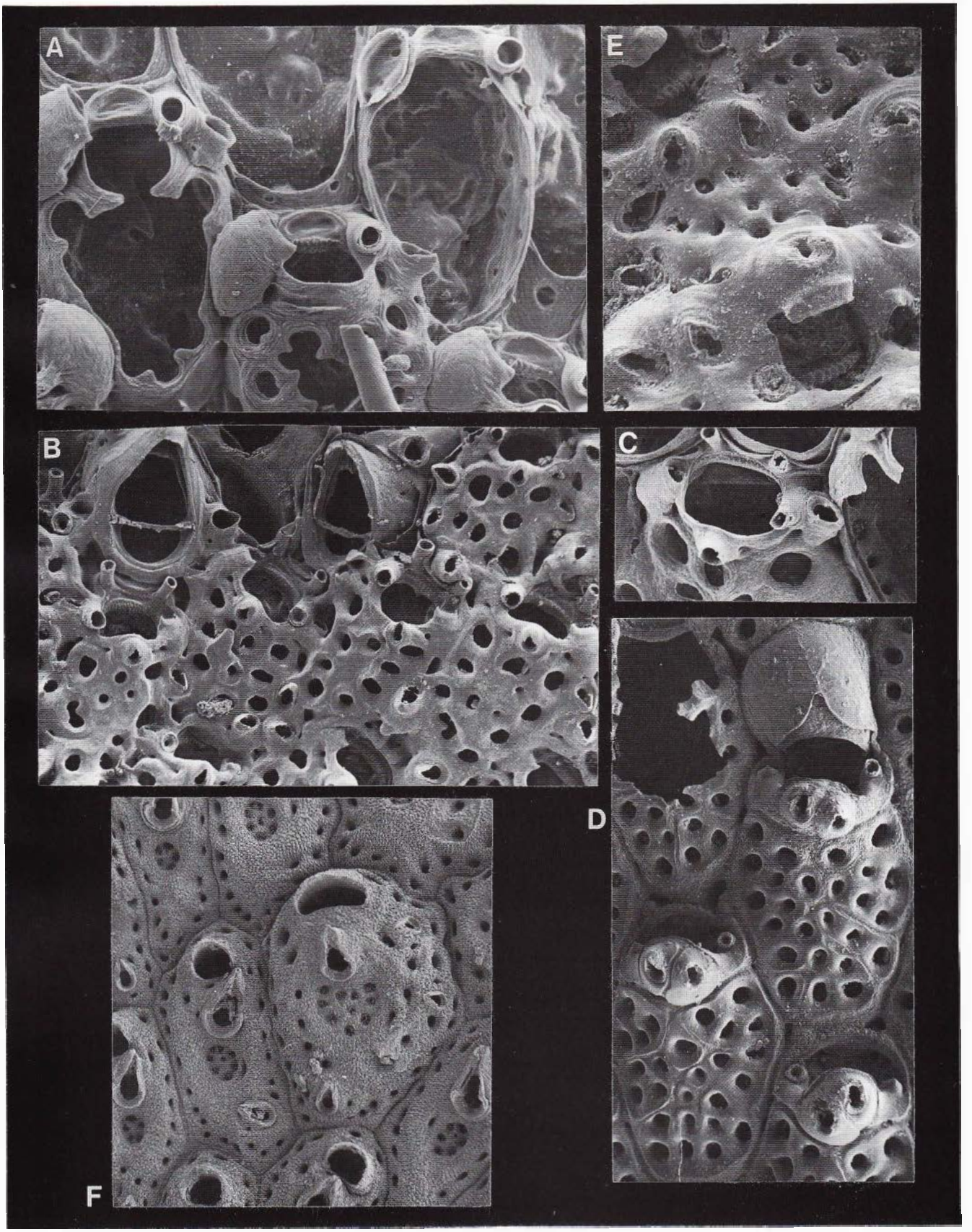

PLATE 12. A-C, *Arachnopusia unicornis* (Hutton): showing orificial development of C, non-ovicelled, and A, ovicelled zooids (B, Stn B490; A, C, Stn H69, Foveaux Strait, 46°37.5'S, 167°53.9'E, 50 m). D, *Arachnopusia perforata* (Maplestone) (Stn E796). E, *Arachnopusia quadralabia* Uttley & Bullivant (part of paratype P-158, NZOI, from the Chatham Islands). F, *Adeonellopsis yarraensis* (Water): with gonozooid (Stn E820).

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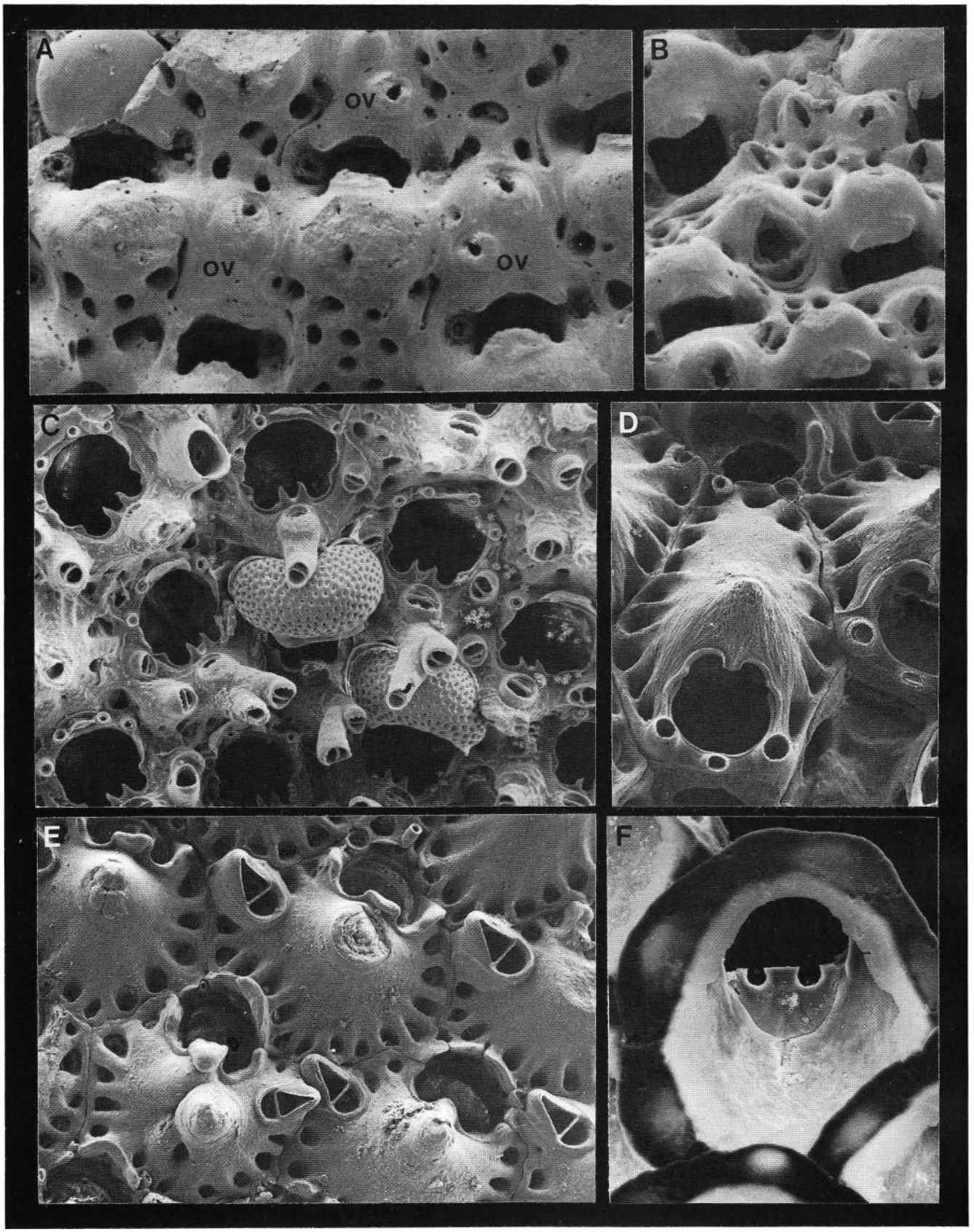

PLATE 13. A, B, *Arachnopusia quadralabia* Uttley & Bullivant: A, ovicelled zooids, with the secondary calcification removed from one ovicell, exposing the ectooecium; B, showing one of the larger type of adventitious avicularia (Stn B482). C, *Mobunula bicuspis* (Hincks) (Stn D273). D-F, *Exochella armata* (Hincks): D, at growing margin; F, inner side of frontal wall showing the small umbonuloid area and pseudolyrula (D, E, Stn E809, F, Stn D273).

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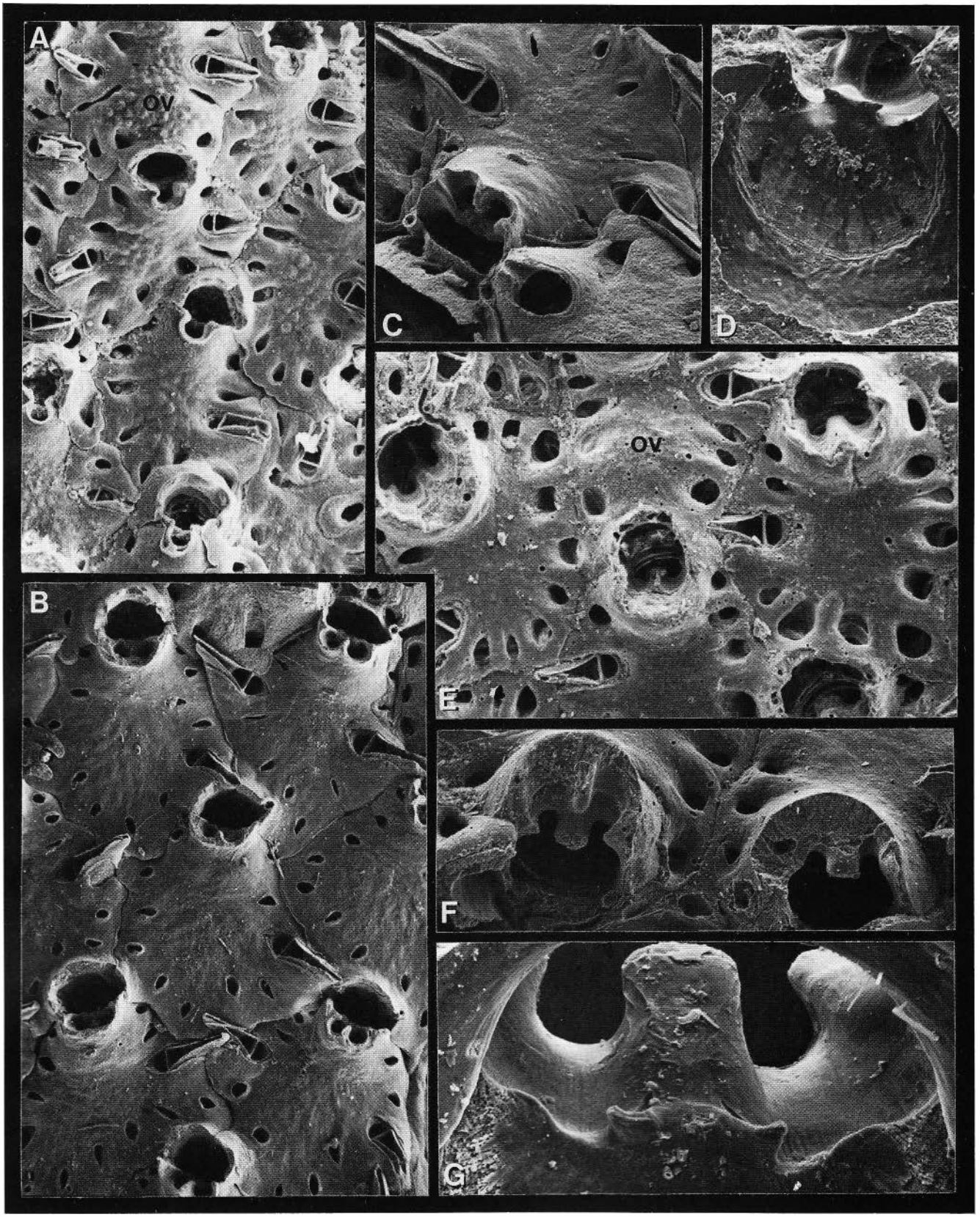

PLATE 14. A, *Exochella conjuncta* Brown (Stn D273). B-D, *Exochella jullieni* n.sp. (Stn D273). E-G, *Exochella levinseni* n.sp. (Stn B616).

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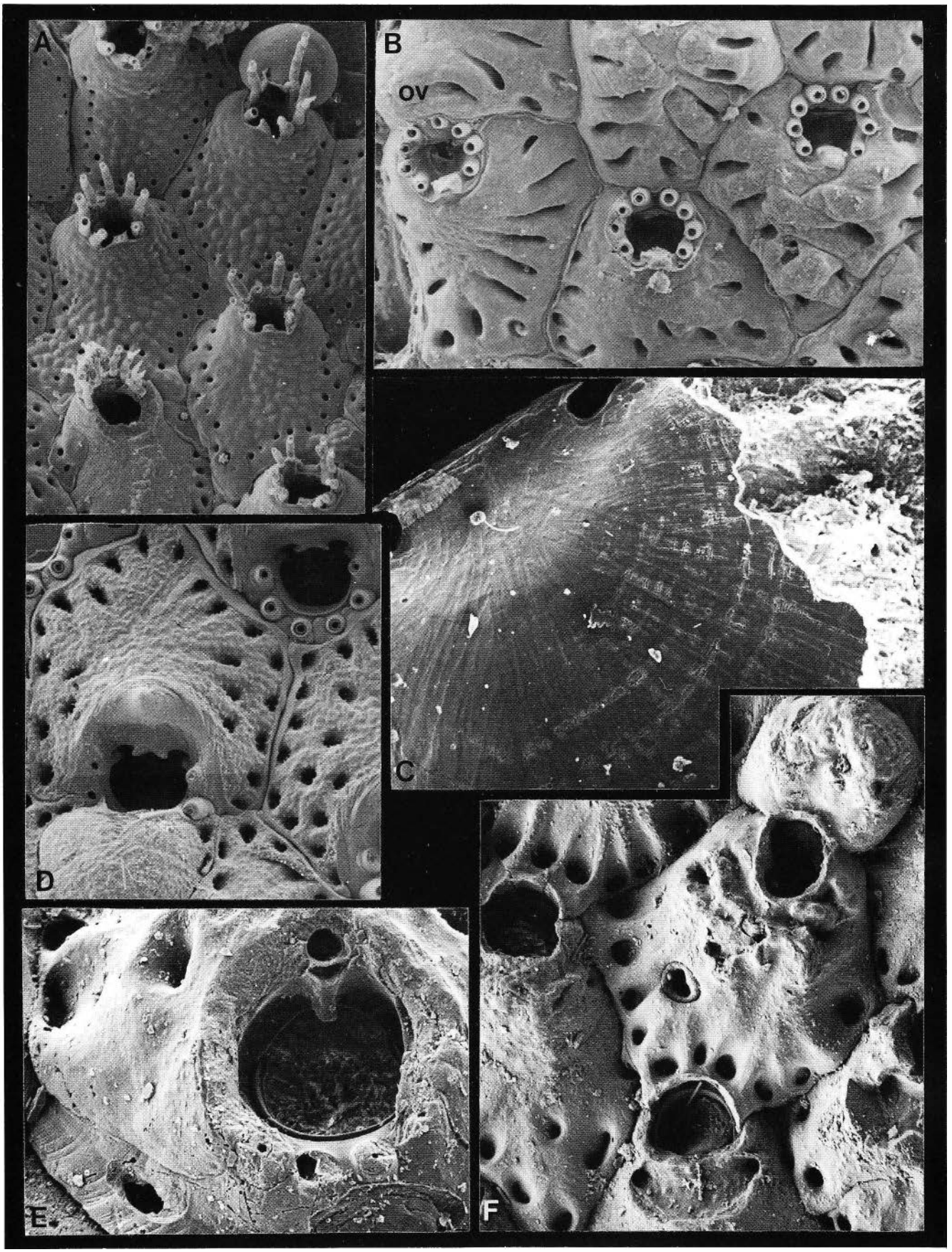

PLATE 15. A-C, *Escharella spinosissima* (Hincks) (A, Stn B490; B, Stn B488; C, Stn E297). D, *Escharella immersa* (Fleming) (BMNH 1936.12.30.369 part, Thornely Collection, Liverpool Bay, U.K.). E, F, *Allerescha dubia* n.sp. (Stn B482).

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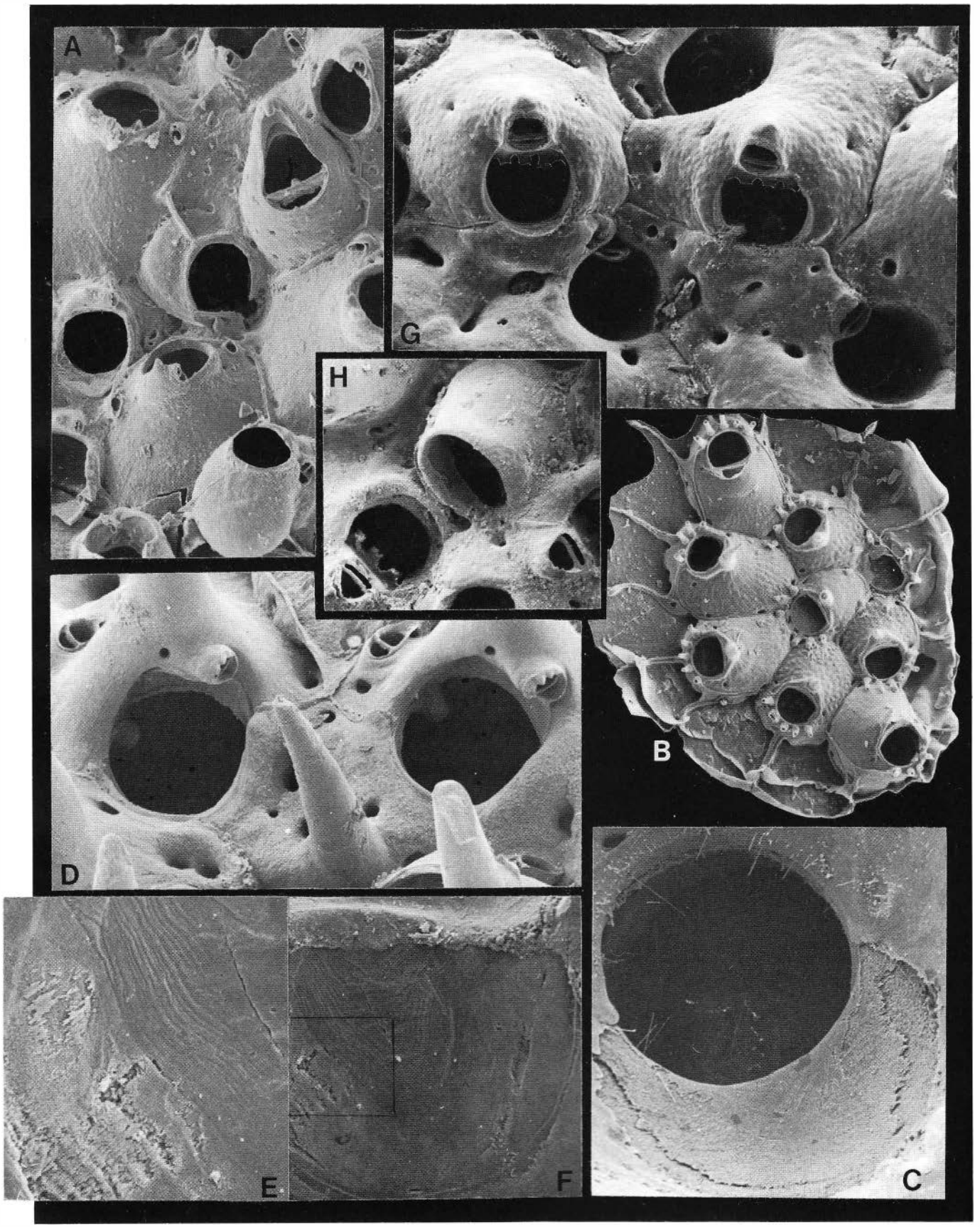

PLATE 16. A-C, *Celleporaria agglutinans* (Hutton) (Stn B490). D-F, *Celleporaria cristata* (Lamouroux) (Museum of Victoria, part of syntype, H659, of *Cellepora lirata* MacGillivray): F, the area of inner frontal wall delimiting the frontal membrane with the boxed part more magnified in E to show the ultrastructure. G, H, *Celleporaria emancipata* n.sp. (Stn B488).

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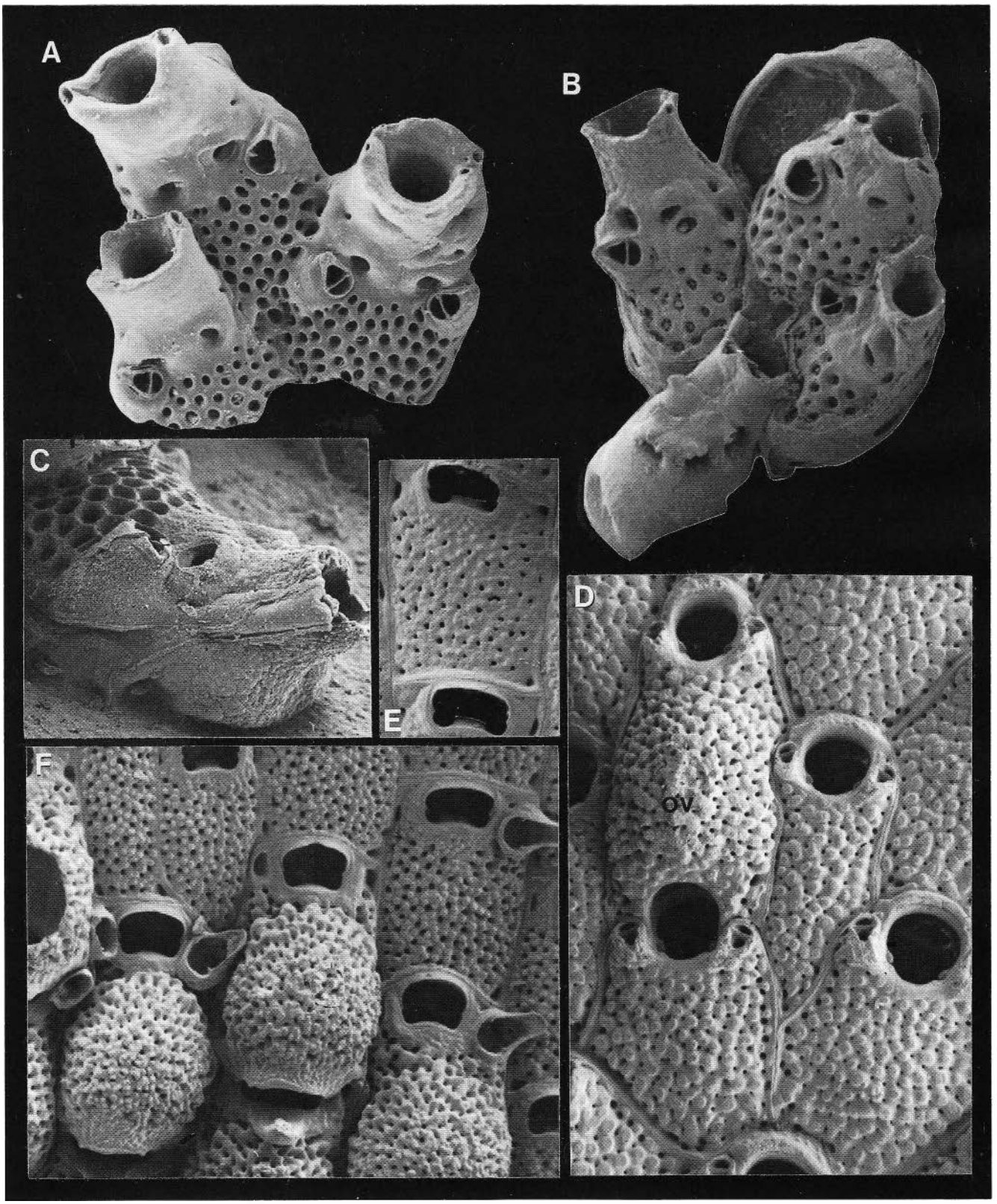

PLATE 17. A-C, *Didymosella conchicola* n.sp : B, small ancestrulate colony; C, ovicelled zooid (A, C, Stn B490; B, Stn B482).. D, *Cosciniopsis vallata* (Uttley & Bullivant) (Stn Q686). E, F, *Emballotheca waipukurensis* (Waters) : E, notice the lyrula development (E, Stn D273; F, Stn Q686).

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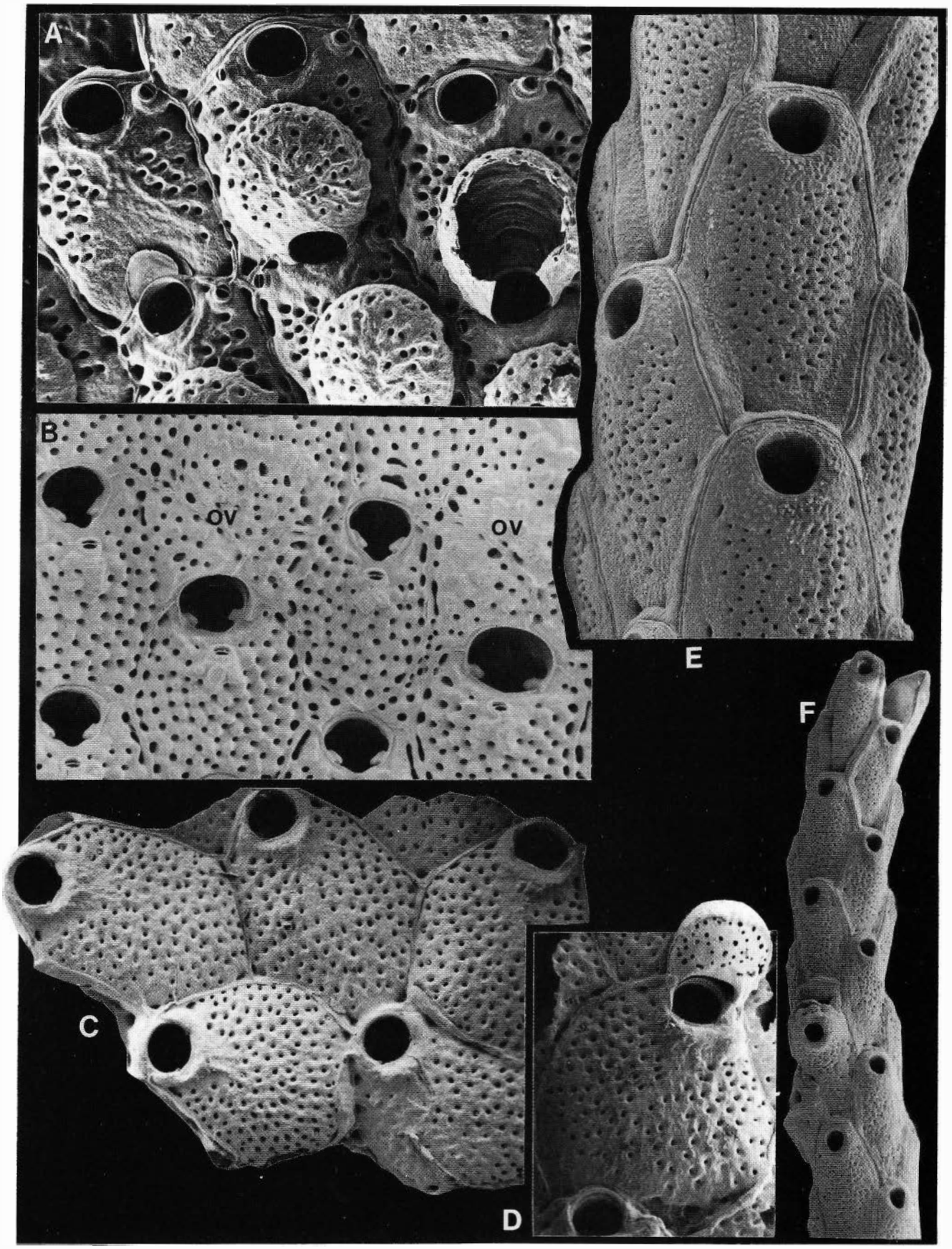

PLATE 18. A, *Calyptotheca janua* (Livingstone) (Stn S398). B, *Calyptotheca immersa* (Powell) (Stn C856). C, D, *Hippothyris ordinaria* n.sp. (Stn E800). E, F, *Hippoporina powelli* n.sp. (Stn D226).

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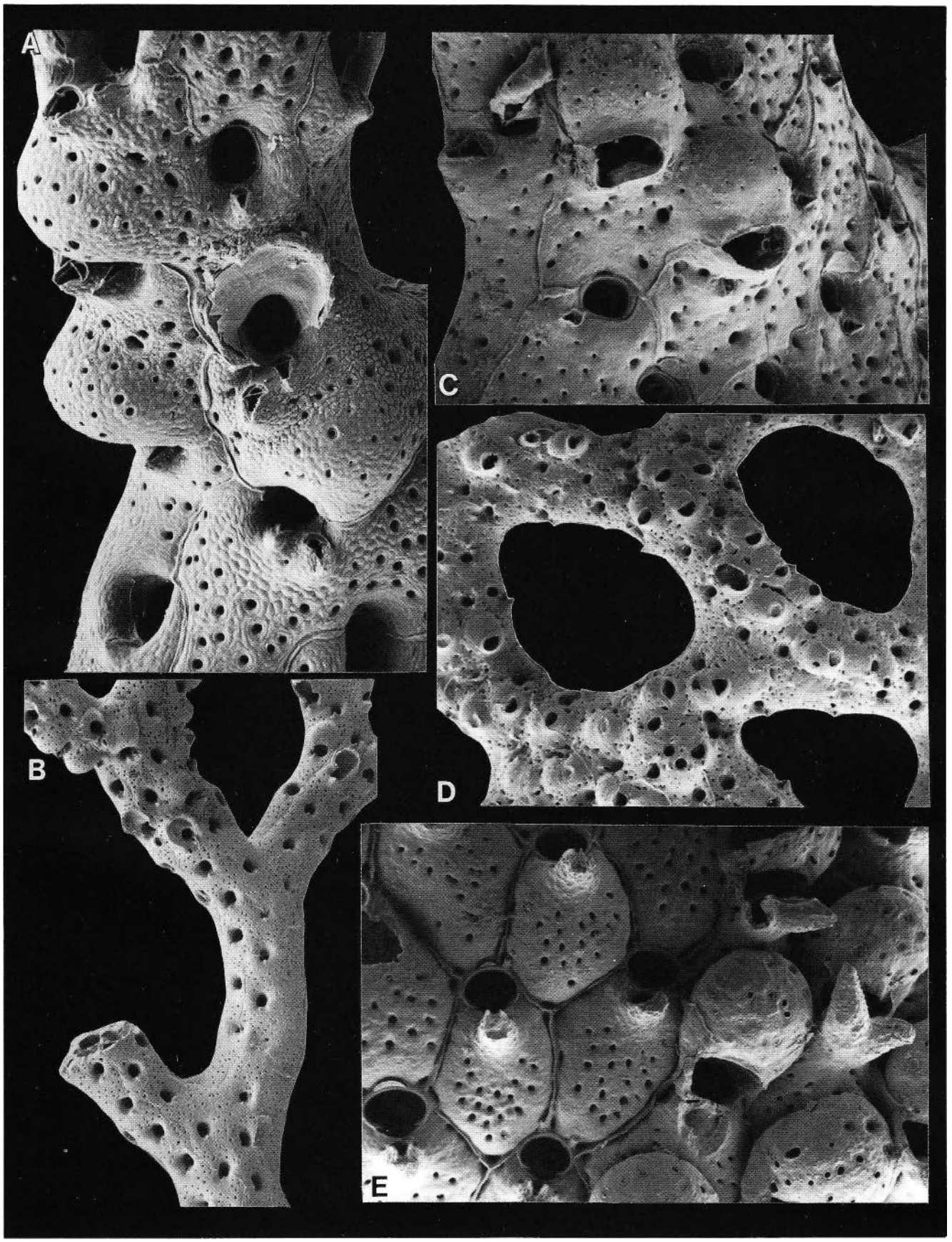

PLATE 19. A, B, *Hippoporina ozalea* n.sp. (Stn E793). C, D, *Hippoporina retepora* n.sp. (Stn E821). E, *Metroperiella mucronifera* (Powell) (Stn M795).

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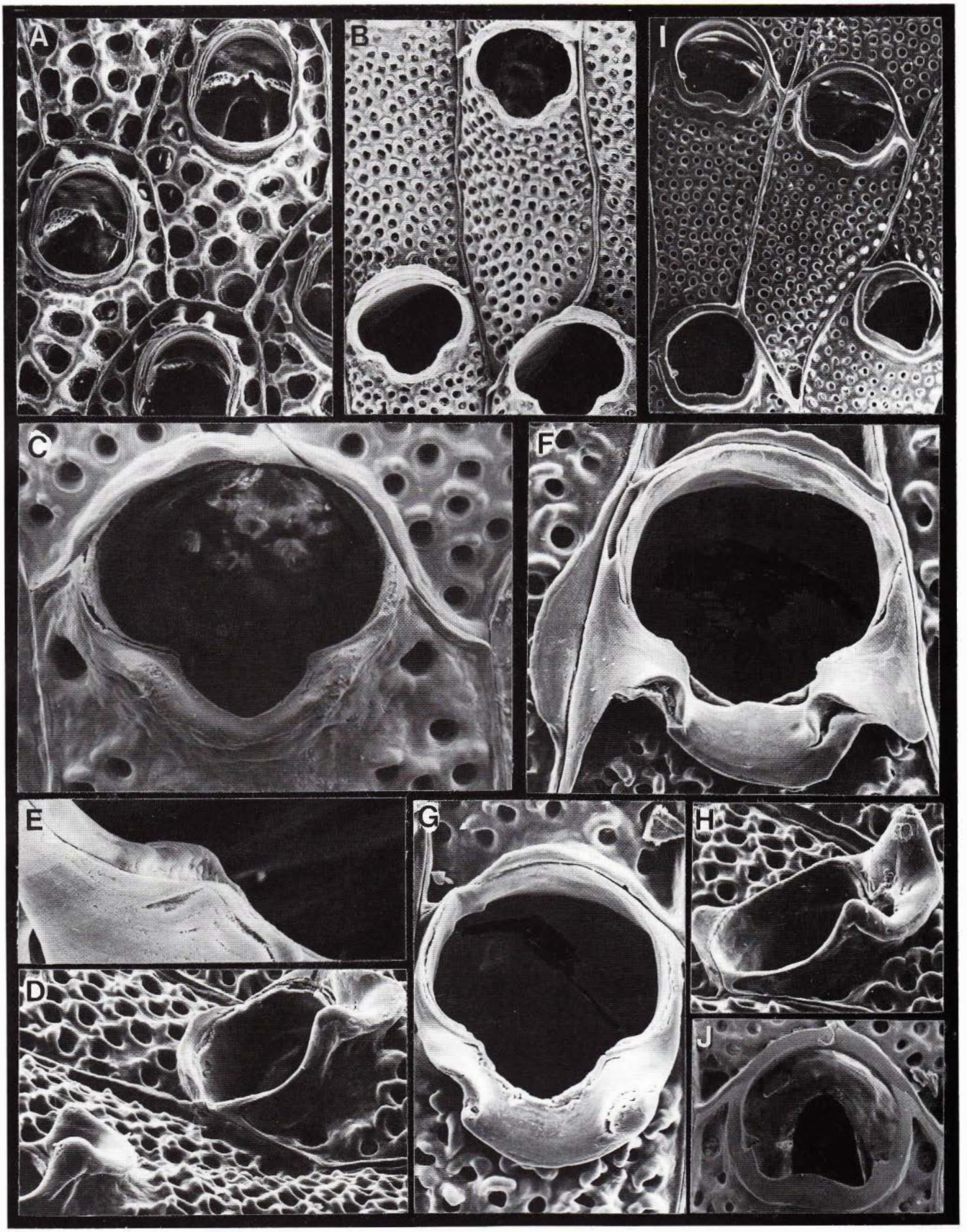

PLATE 20. A, *Cryptosula pallasiana* (Moll) (Nelson Harbour). B-H, *Watersipora subtorquata* (d'Orbigny): C, D, F-H, variations in the shape of the orifice, E, an orificial condyle (Wellington Harbour). I, J, *Watersipora arcuata* Banta (Nelson Harbour).

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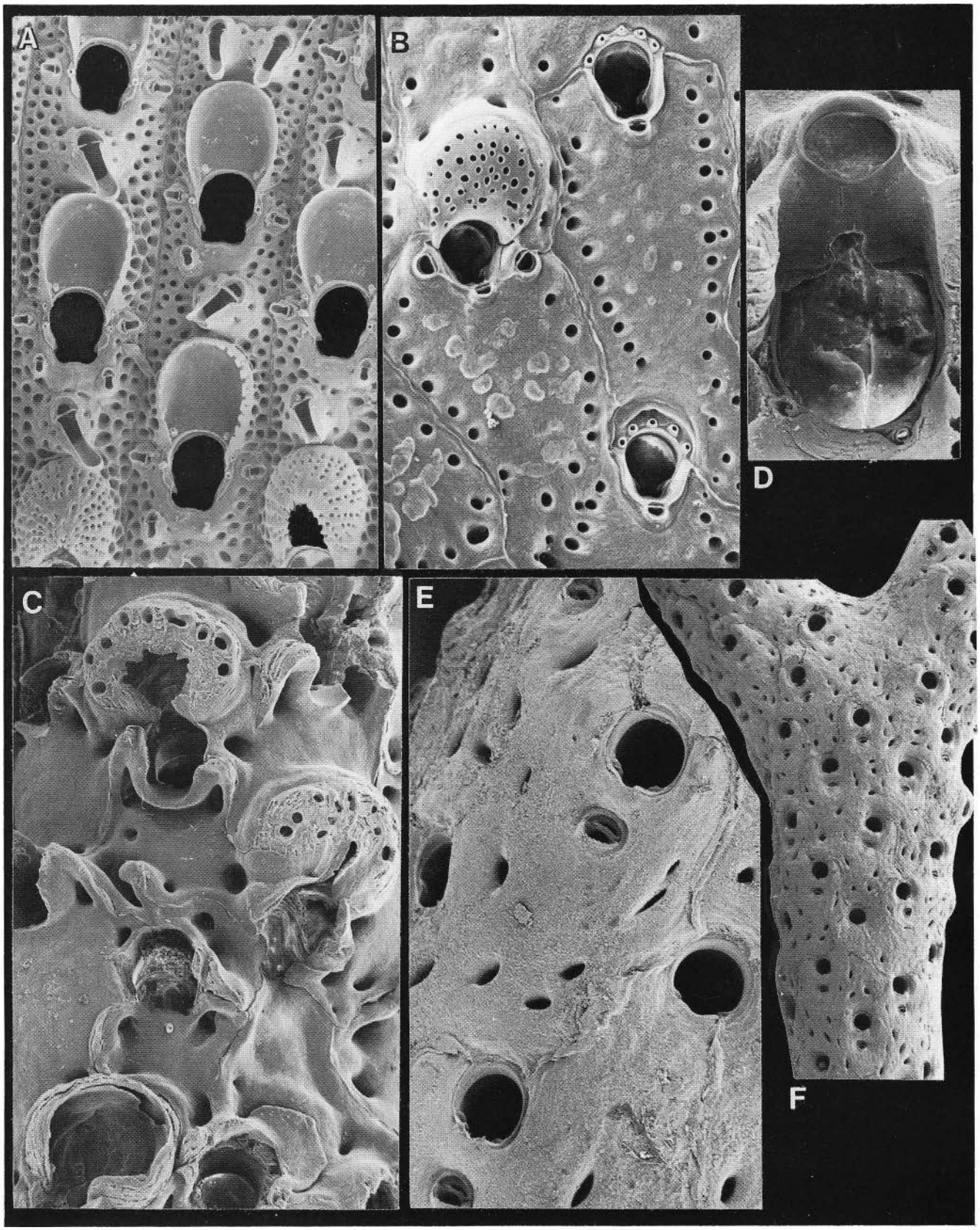

PLATE 21. A, *Hippomenella vellicata* (Hutton) (Stn B490). B, *Schizomavella incurvata* (Uttley & Bullivant) (Stn E821). C, D, *Schizomavella aurita* n.sp. (Stn S371). E, F, *Schizomavella pansa* n.sp. (Stn E793).

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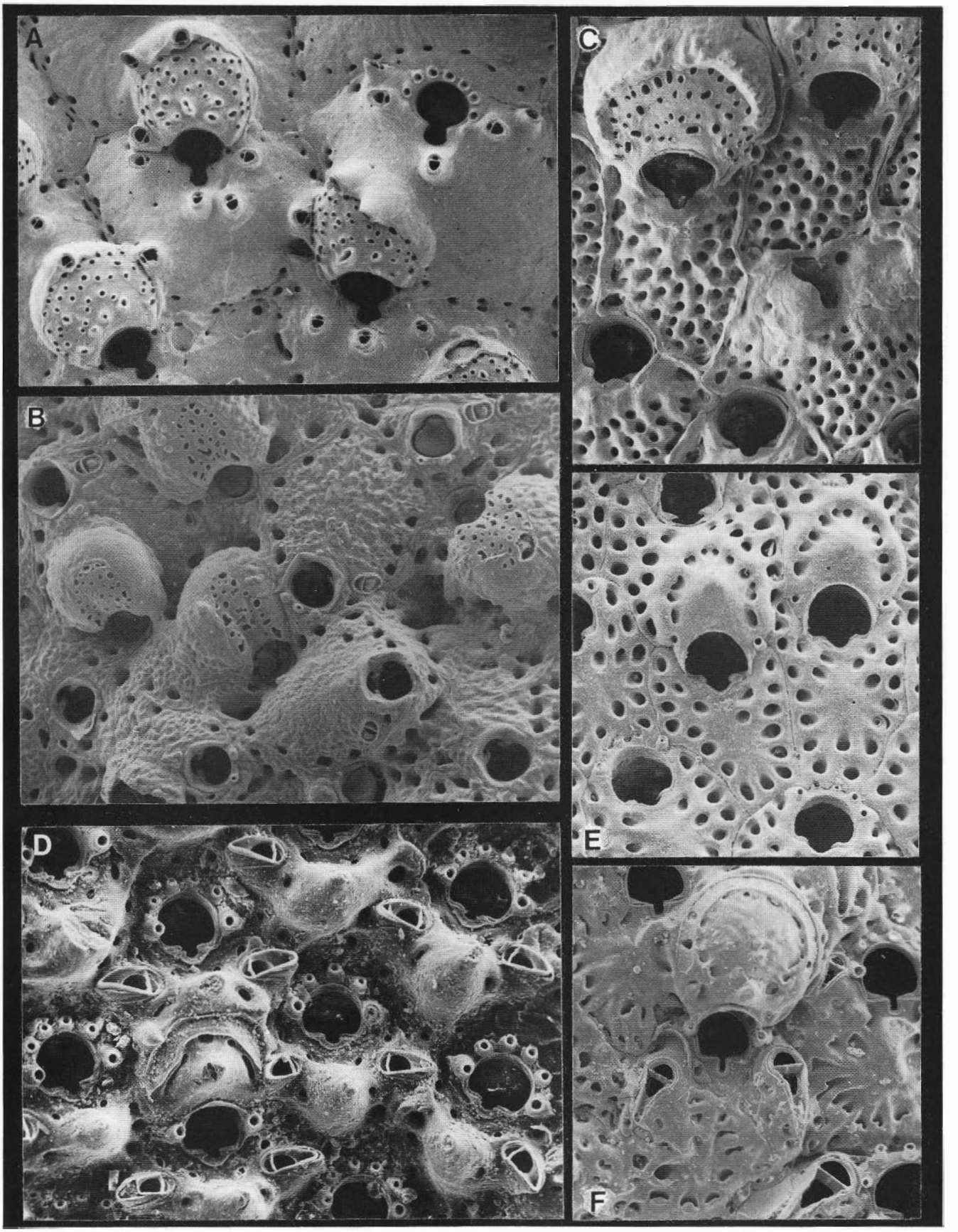

PLATE 22. A, *Schizomavella virago* n.sp. (Stn E821). B, *Schizomavella trachoma* n.sp. (Stn B487). C, *Schizoporella aotearoa* n.sp. (Stn M780). D, *Chiastosella umbonata* n.sp. (Stn C869). E, *Chiastosella watersi* Stach (Stn D273). F, *Chiastosella enigma* Brown (Stn B488).

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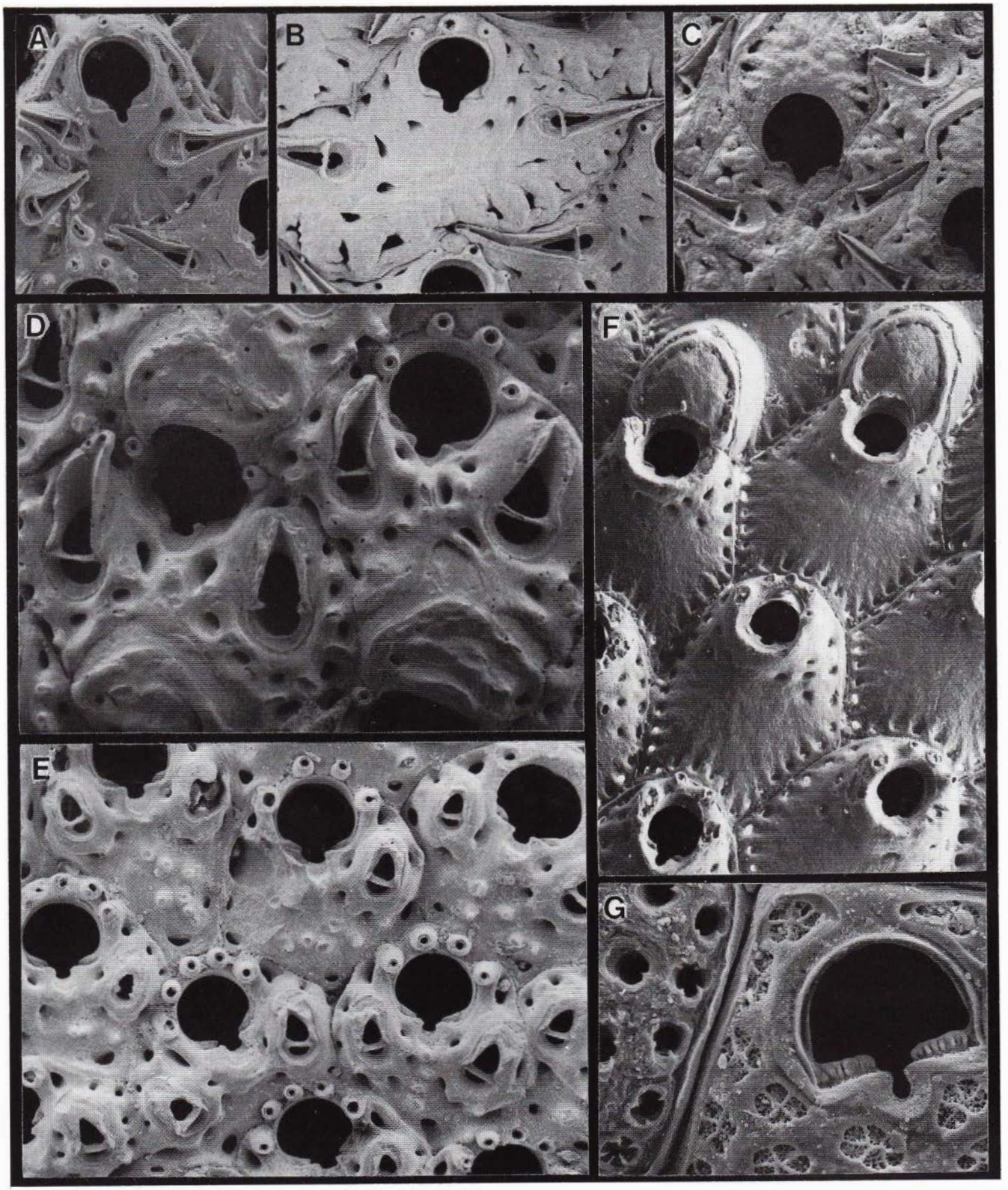

PLATE 23. A-C, *Chiastosella duplicata* n.sp.: A, zooid near growing margin; B, more developed zooid, C, ovicelled zooid (A, Stn B488; B, C, Stn E821). D, E, *Chiastosella exuberans* n.sp. (D, Stn E803; E; Stn E804). F, *Chiastosella dissidens* n.sp. (Stn B616). G, *Cribellopora napi* n.sp. (Stn Q686).

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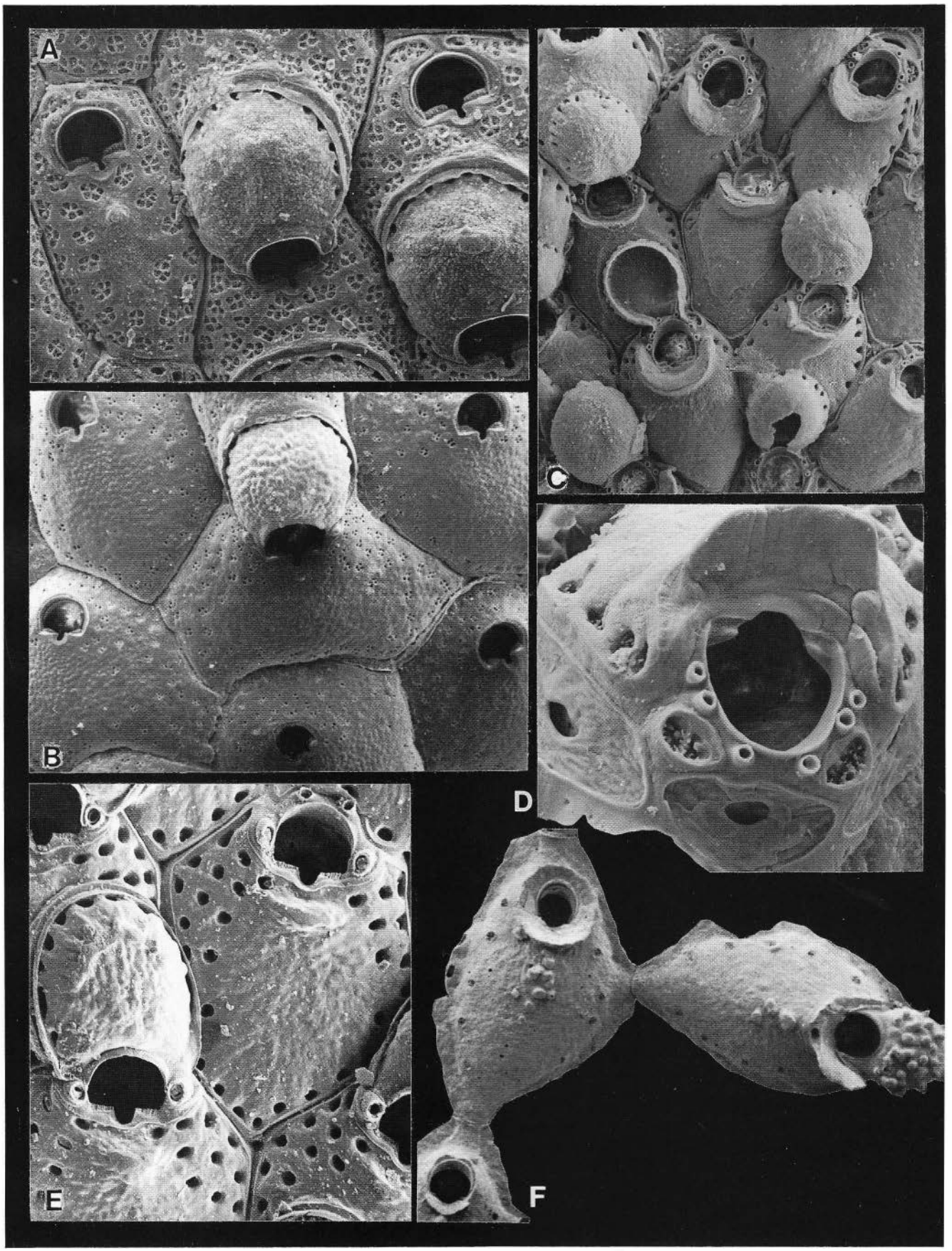

PLATE 24. A, *Cribellopora napi* n.sp. (Stn Q686). B, *Cribellopora siri* n.sp. (Stn E821). C, D, *Phonicosia oviseparata* (Brown) (Stn B493). E, *Phonicosia styphelia* n.sp. (Stn B493). F, *Nimba verrucosa* n.sp. (Stn E820).

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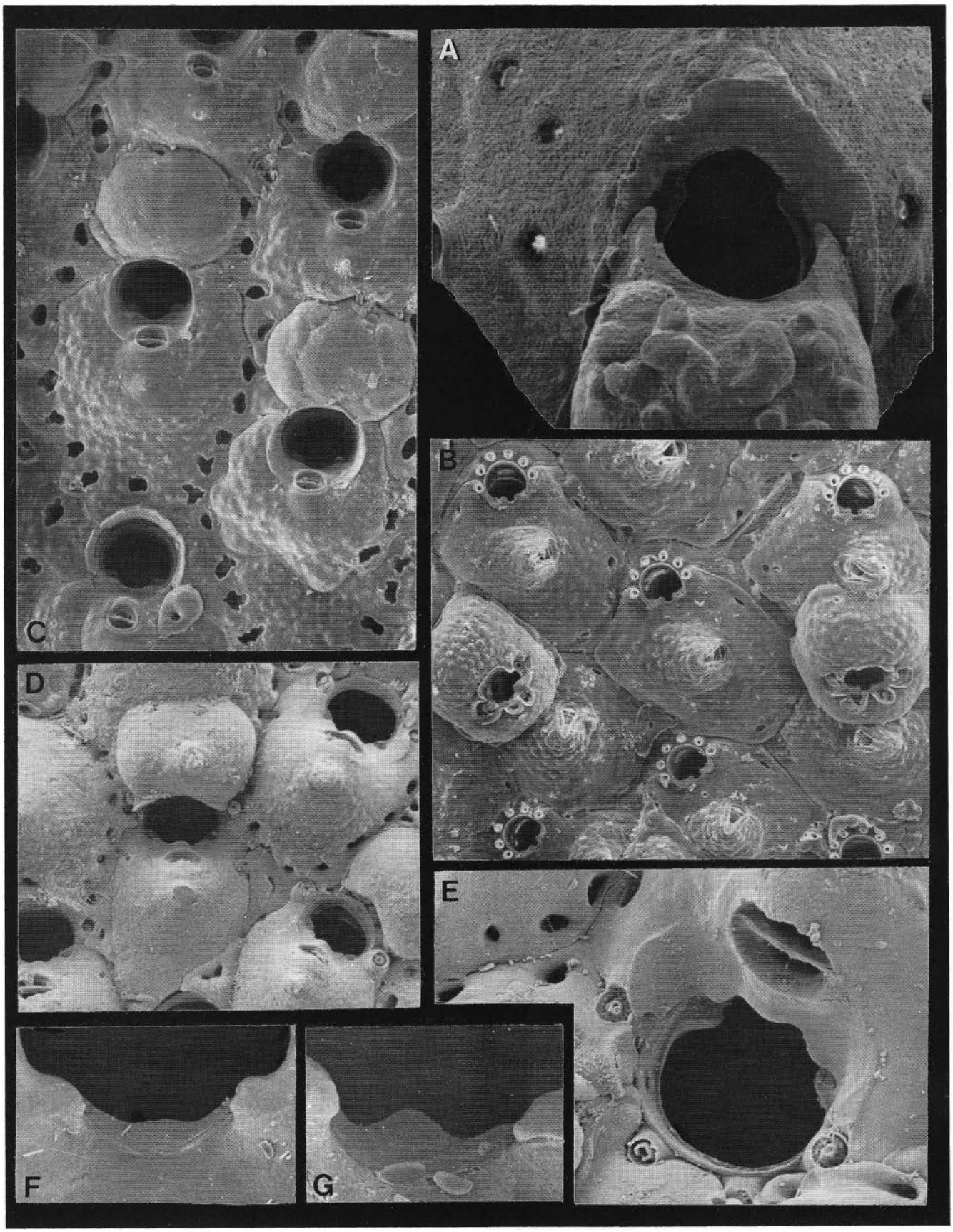

PLATE 25. A, *Nimba verrucosa* n.sp. (Stn E820). B, *Buffonellodes madrecilla* n.sp. (Stn B488). C, *Buffonellodes improvisa* (Uttley & Bullivant) (Stn B455). D-G, *Aimulosia australis* (Jullien) (*ex* Jelly Collection, Manchester Museum): F, G, interior views of orificial sinus, condyles, and "*dent arrondie*" (Beagle Channel, Tierra del Fuego).

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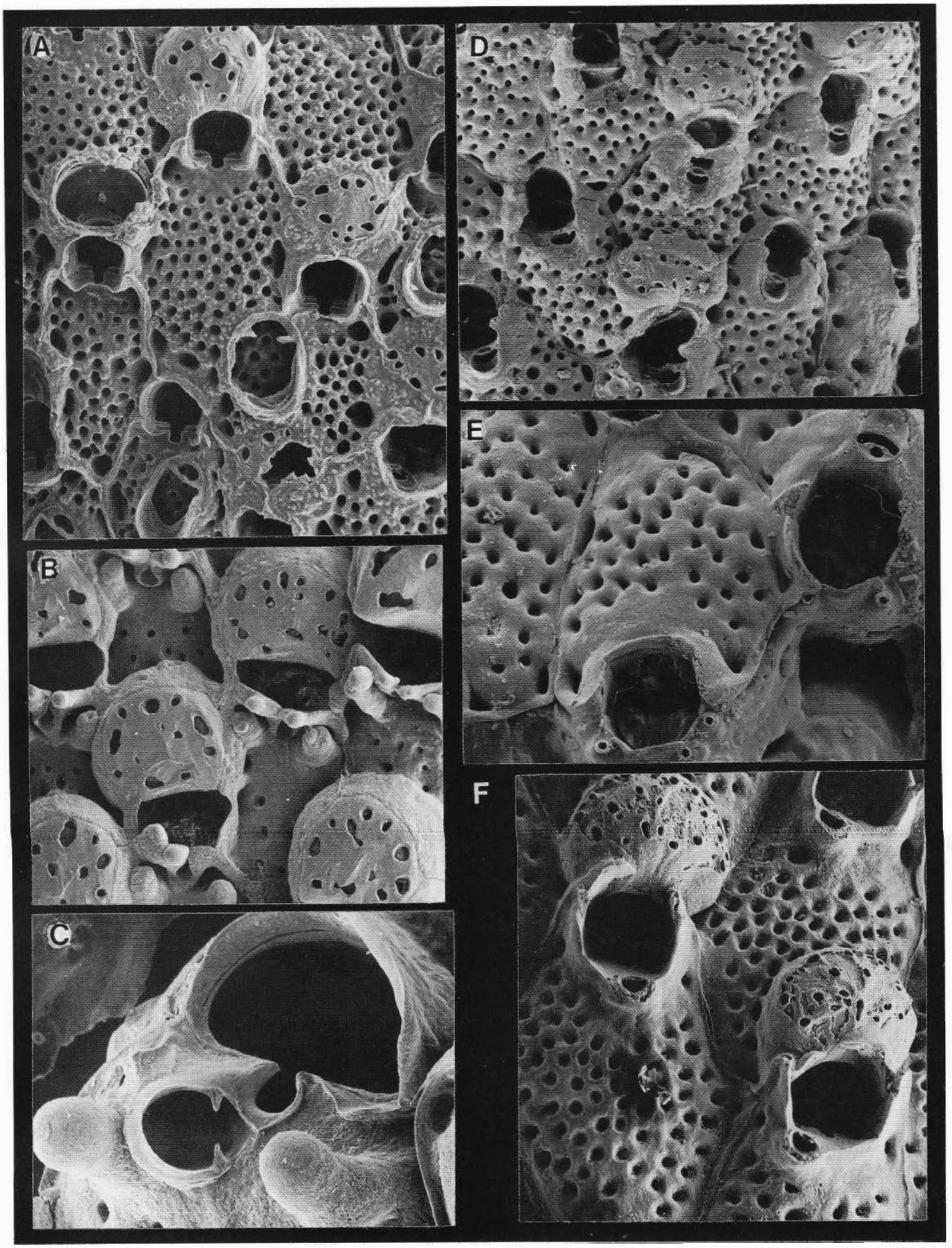

PLATE 26. A, *Schizosmittina cinctipora* (Hincks) (Stn Q686). B, C, *Schizosmittina maplestonei* (MacGillivray) (Queenscliff, Victoria). D, E, *Schizosmittina conjuncta* (Uttley & Bullivant) (Stn M775). F, *Schizosmittina bicornis* n.sp. (Stn Q702).

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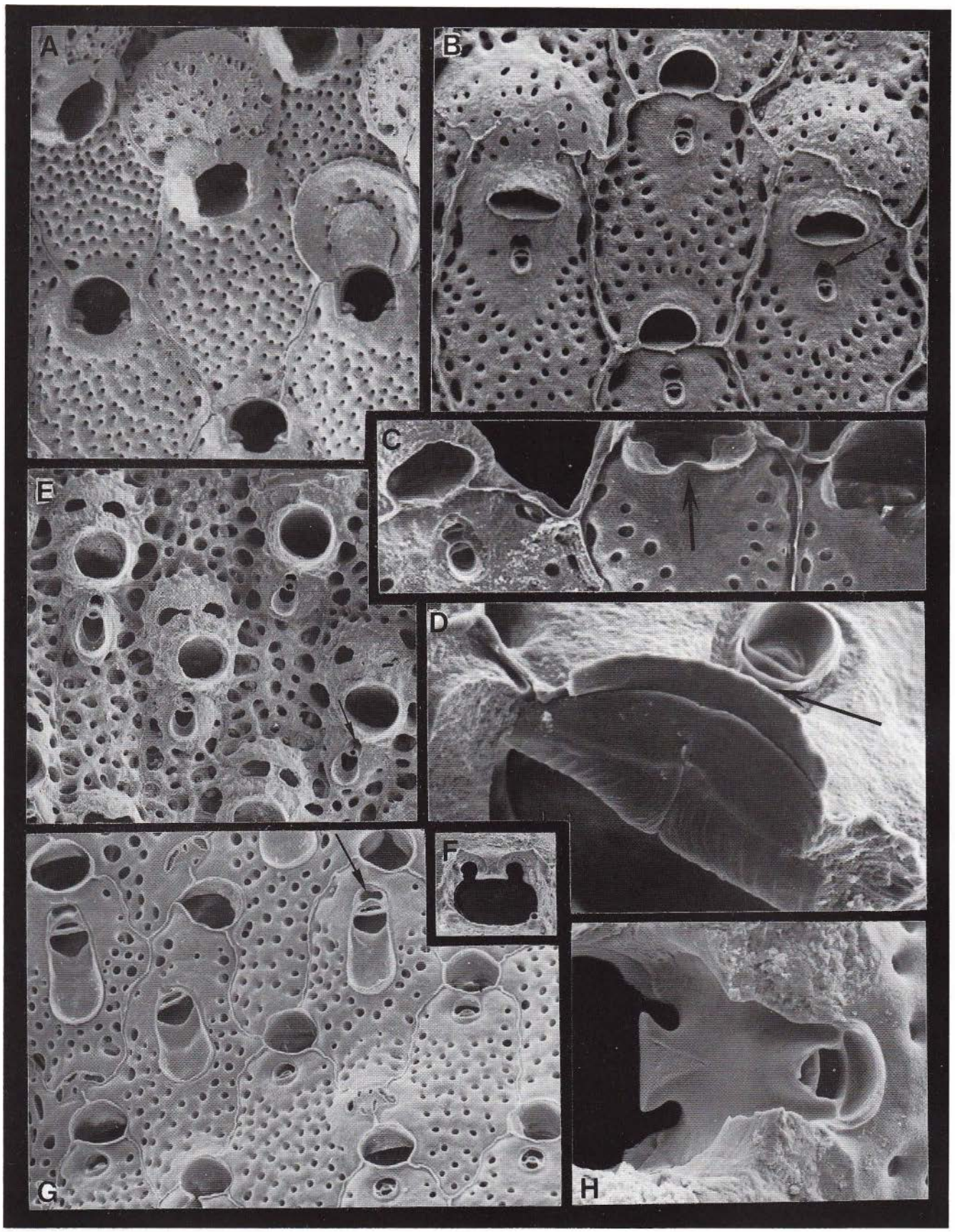

PLATE 27. A, *Schizosmittina melanobater* n.sp. (Stn B484). B-D, *Dittomesia crispa* n.gen., n.sp. (Stn E821). E, F, *Smittina purpurea* (Hincks) (Stn D262). G, H, *Smittina personata* (Hincks): G, showing three partly concealed ovicells and variations in the suboral avicularia (Stn B488). (All arrows indicate entrances to spiramina).

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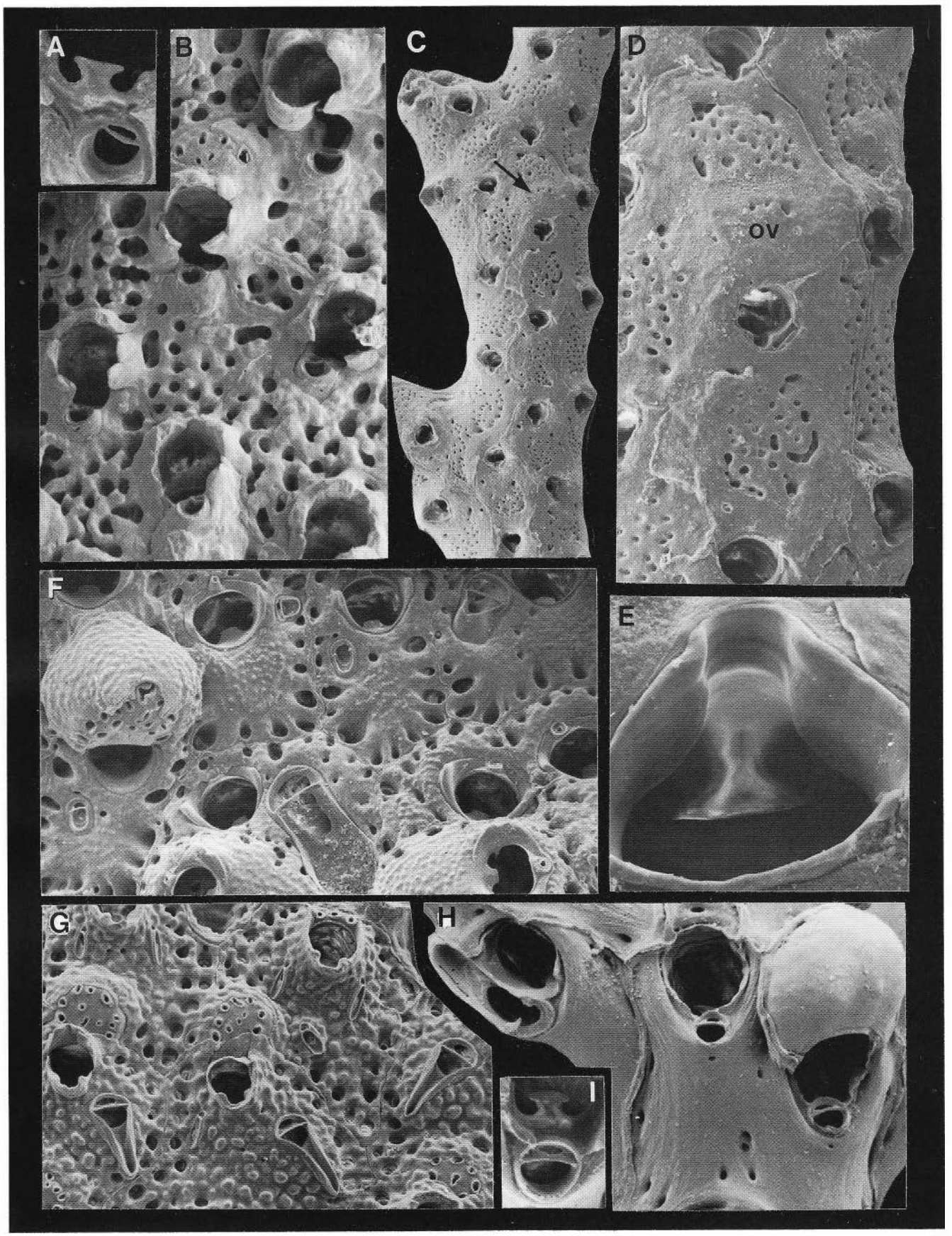

PLATE 28. A, B, *Smittina palisada* n.sp. (Stn Q686). C-E, *Prenantia dichotoma* n.sp.: D, the concealed ovicell arrowed in C (Stn B488). F, *Parasmittina delicatula* (Busk) (Separation Point). G, *Parasmittina aotea* (Brown) (Stn B488). H, I, *Julianca retia* n.gen., n.sp. (Stn E821).

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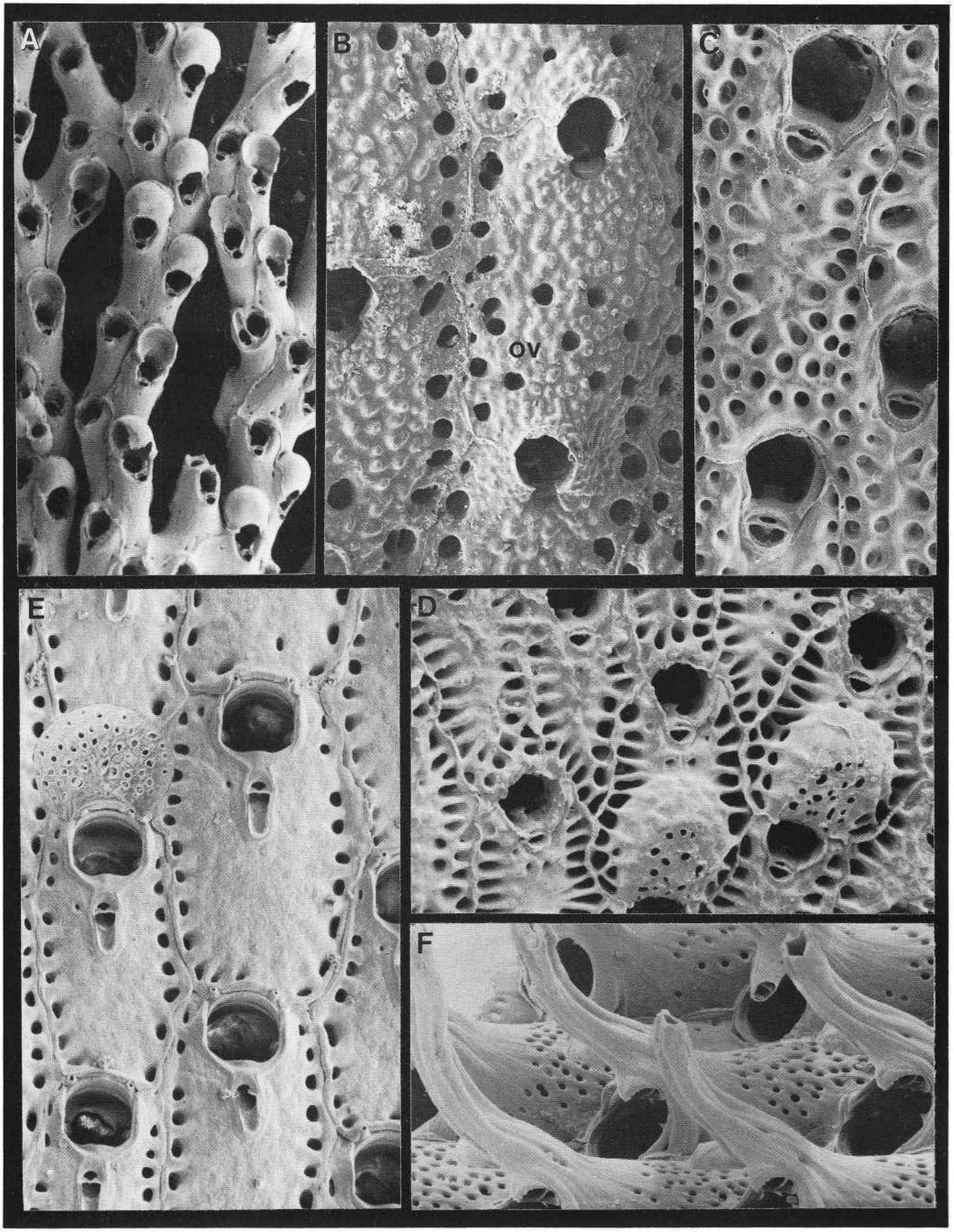

PLATE 29. A, *Julianca retia* n.gen., n.sp. (Stn E821). B, *Smittoidea discoveriae* Powell (Stn E820). C, D, *Smittoidea maunganuiensis* (Waters): C, part of holotype specimen 4362, Waters Collection, Manchester Museum (Chatham Islands); (D, Stn M778). E, *Hippomonavella flexuosa* (Hutton) (Stn D273). F, *Mucropetraliella ligulata* Stach (Stn M779).

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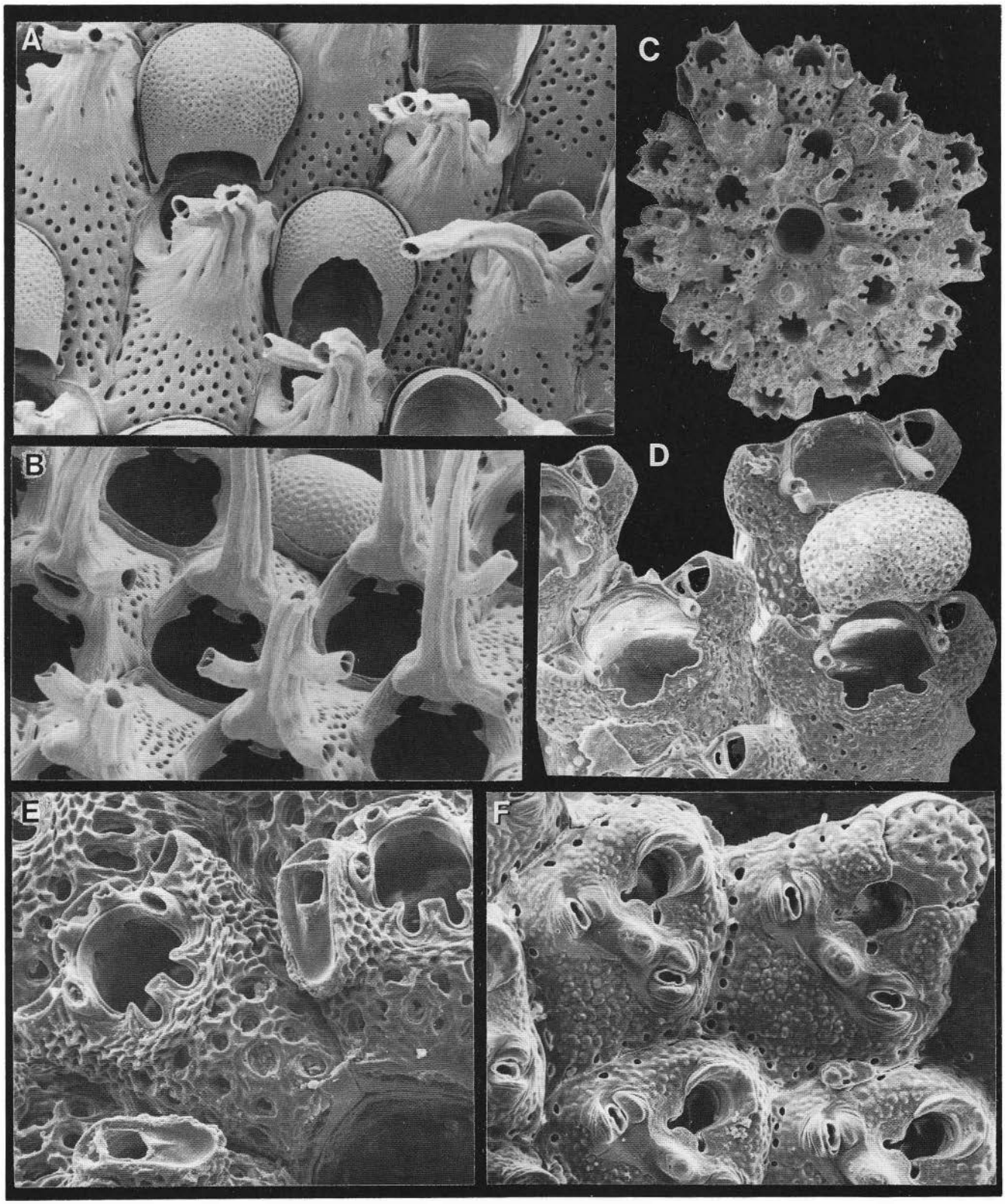

PLATE 30. A, B, *Mucropetraliella ligulata* Stach (Stn M779). C-E, *Riscodopa parva* n.gen., n.sp. (C, E, Stn ?; D, Stn S153, 45°21.1'S, 173°35.8'E, Bounty Trough). F, *Crepidacantha kirkpatricki* Brown (Stn D273).

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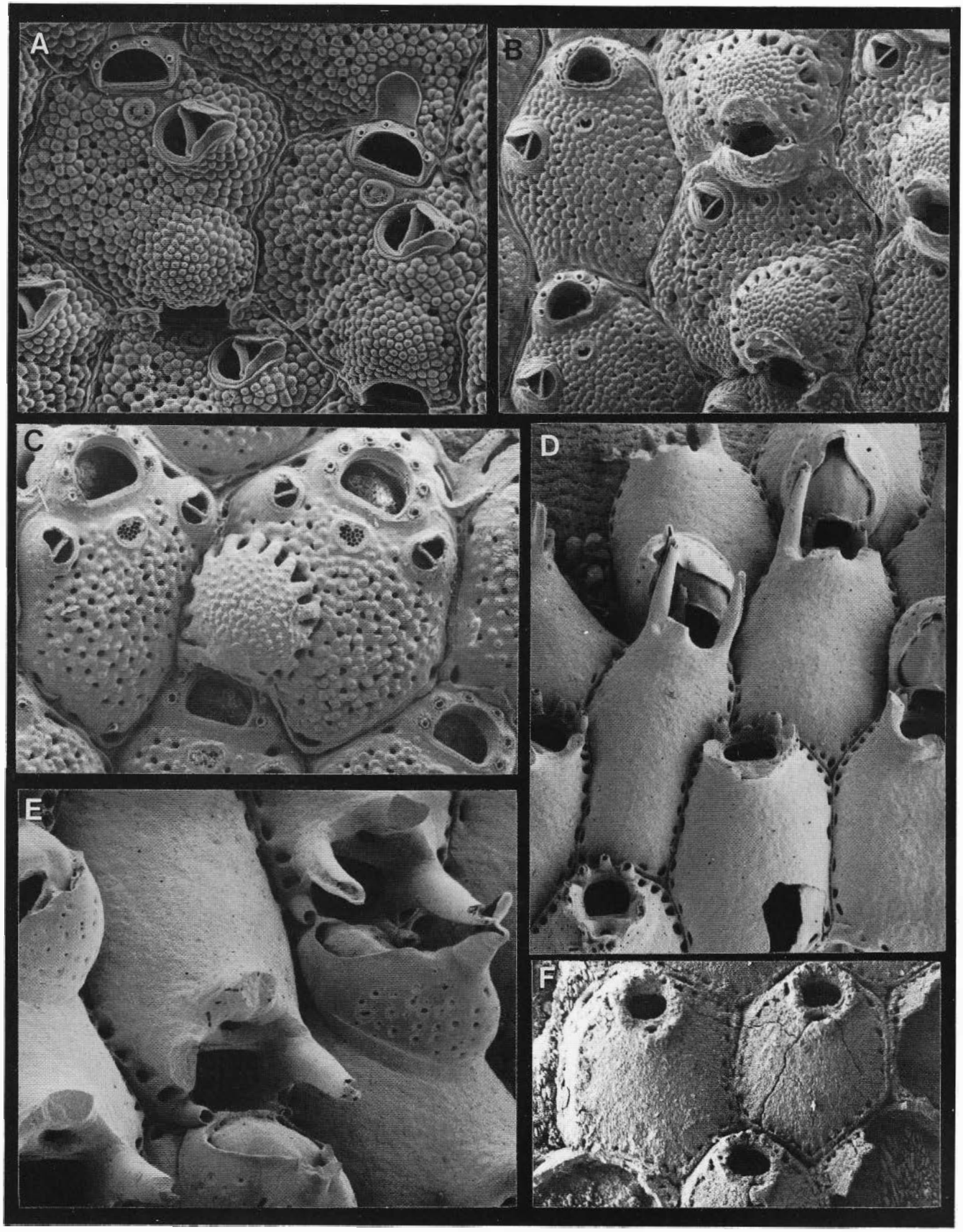

PLATE 31. A, *Microporella agonistes* Gordon (Stn C843). B, *Microporella diademata* (Lamouroux) (Stn E821). C, *Microporella speculum* Brown (Stn M793). D-F, *Chronocerastes otakauensis* (Brown) (D, E, Stn E821; F, N.Z. Geological Survey, Everett's Quarry near Oamaru, Lower Oligocene).

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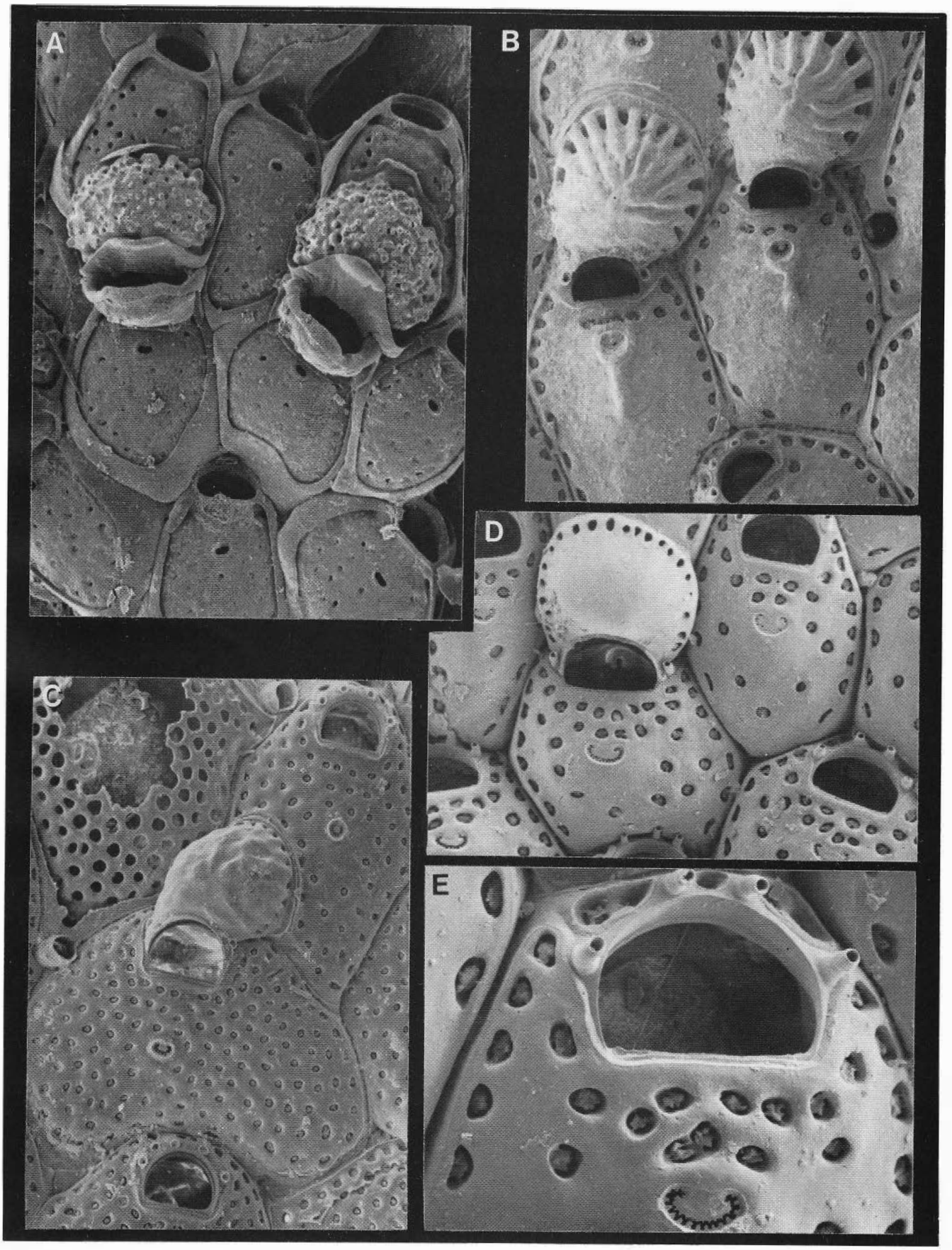

PLATE 32. A, *Fenestrulina personata* (MacGillivray) (Stn E820). B, *Fenestrulina incompta* Gordon (Stn Q686). C, *Fenestrulina multicava* n.sp. (Stn B488). D, E, *Fenestrulina specca* n.sp. (Stn M778).

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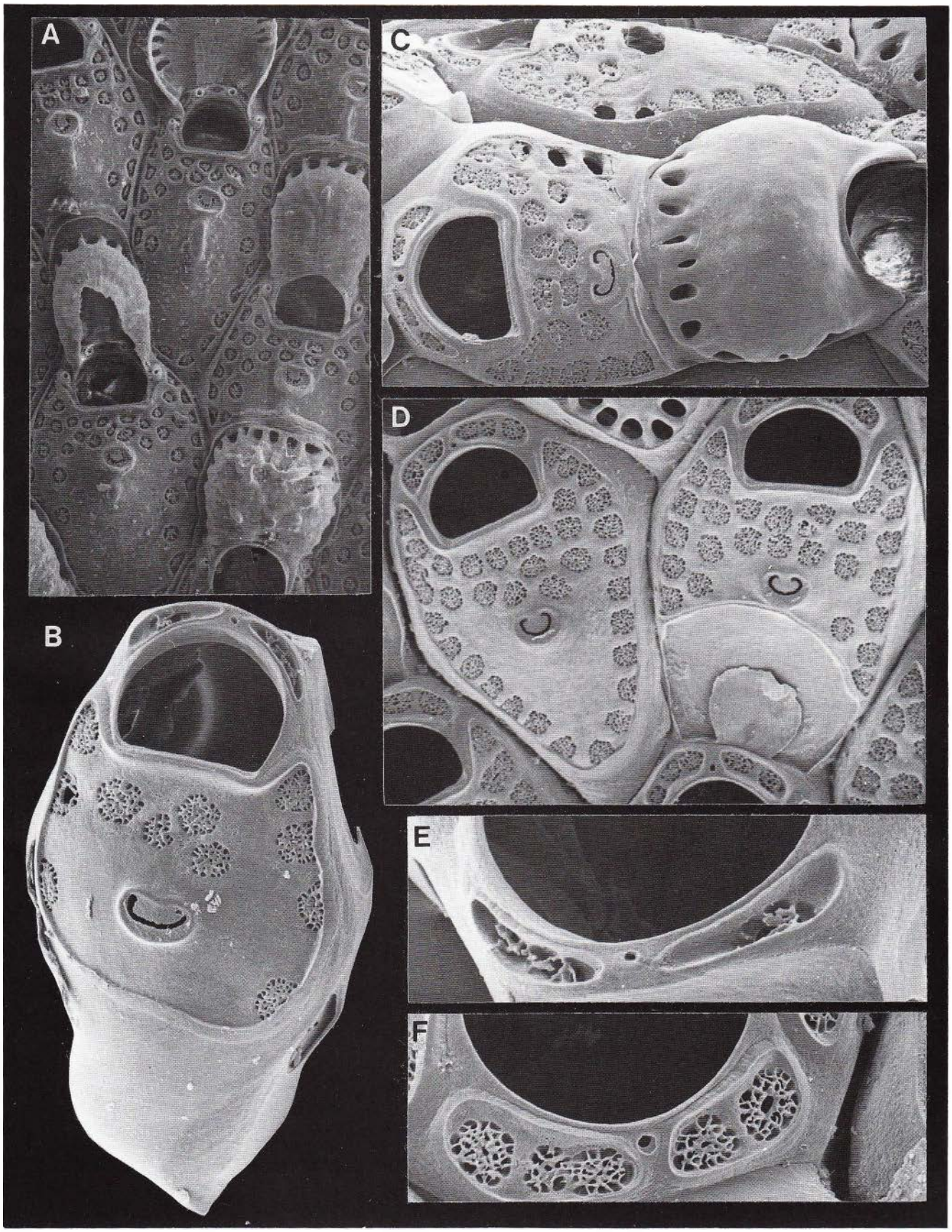

PLATE 33. A, *Fenestrulina* sp. (Stn E793). B-F, *Fenestrulina thyreophora* (Busk): B, showing the scutiform area typical of Busk's (1857) taxon; E, F, pores distal to the orifice in zooids shown in B and D, respectively (B, E, Stn S237; C, South Cape, Stewart Island; D, F, part of holotype colony H-277 (NZOI) of *Fenestrulina malusii pulchra* from Lyall Bay, Wellington).

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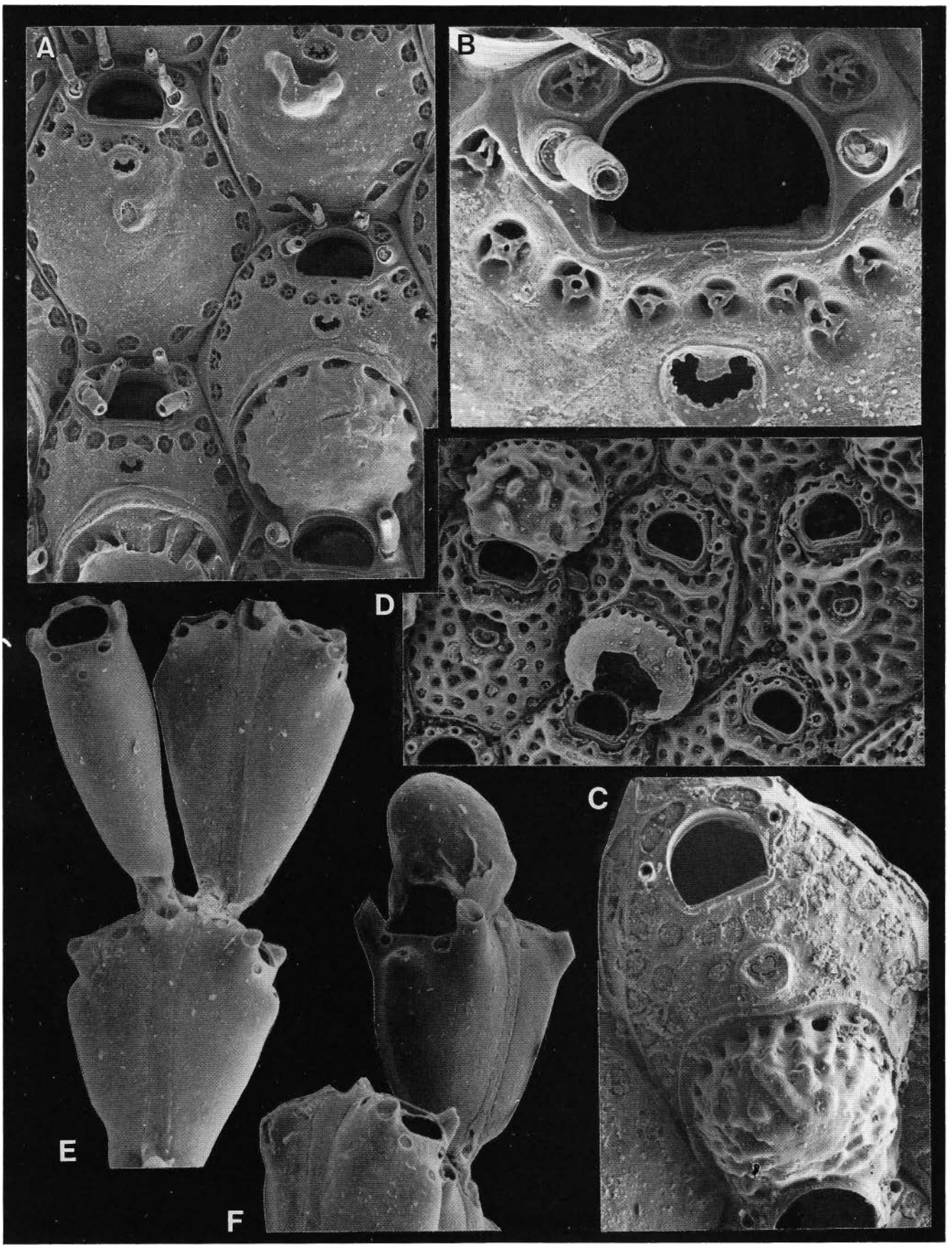

PLATE 34. A, B, *Fenestrulina* cf. *disjuncta* (Hincks) (Goat Island Bay, Leigh). C, *Fenestrulina ?thyreophora* (Busk) (Stn D270). D, *Fenestrulina reticulata* Powell (Stn C869). E, F, *Calwellia gracilis* Maplestone (Stn B493).

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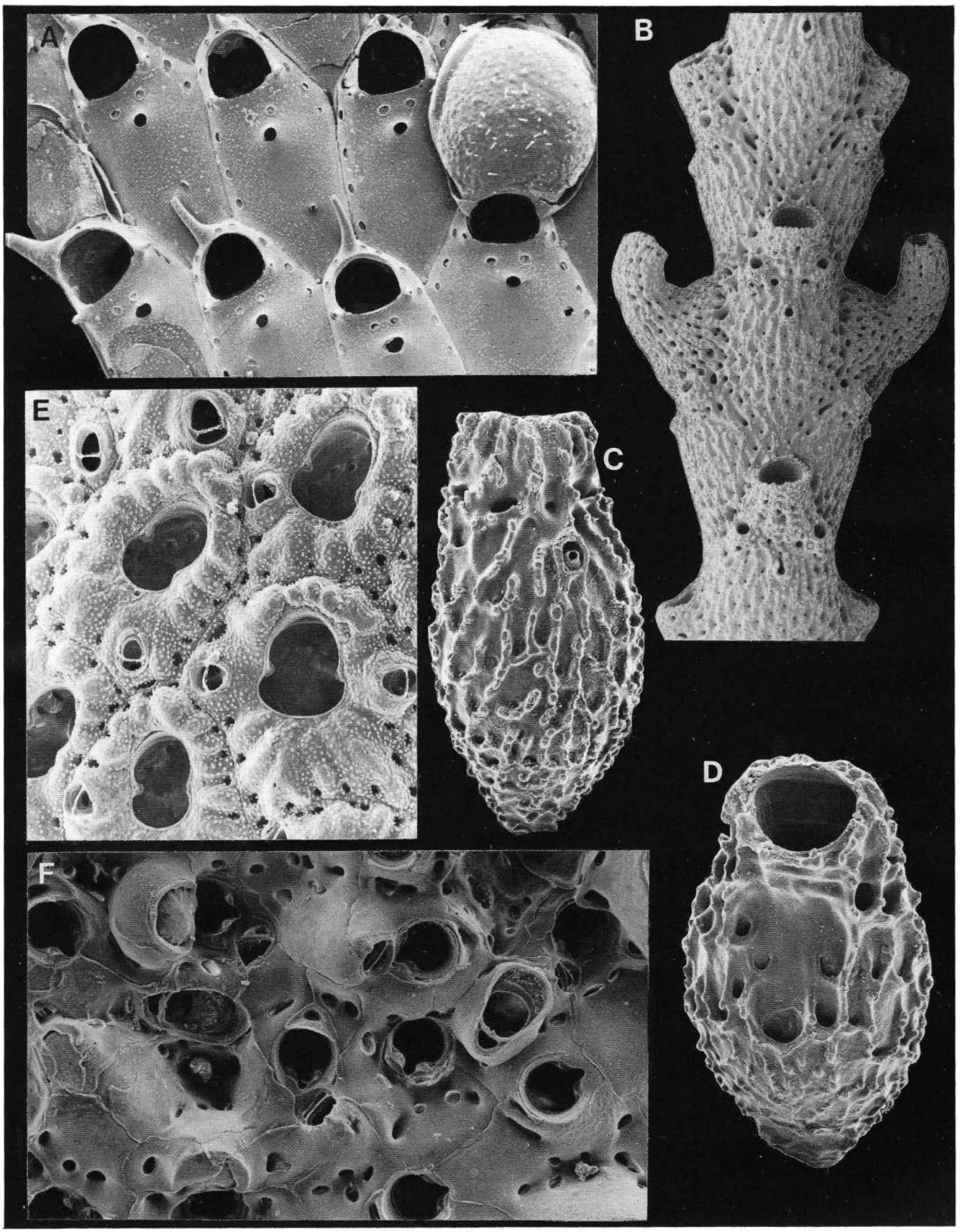

PLATE 35. A, *Onchoporoides moseleyi* (Busk) (Stn E827). B-D, *Margaretta barbata* (Lamarck): B, part of branch segment with two fertile peristomes; C, frontal, and D, dorsal views of ancestrula (B, Stn M789; C, D, South Cape, Stewart Island). *E*, *Odontoparella adpressa* (Busk) (Stn ?). F, *Buffonellaria turbula* n.sp. (Stn D269).

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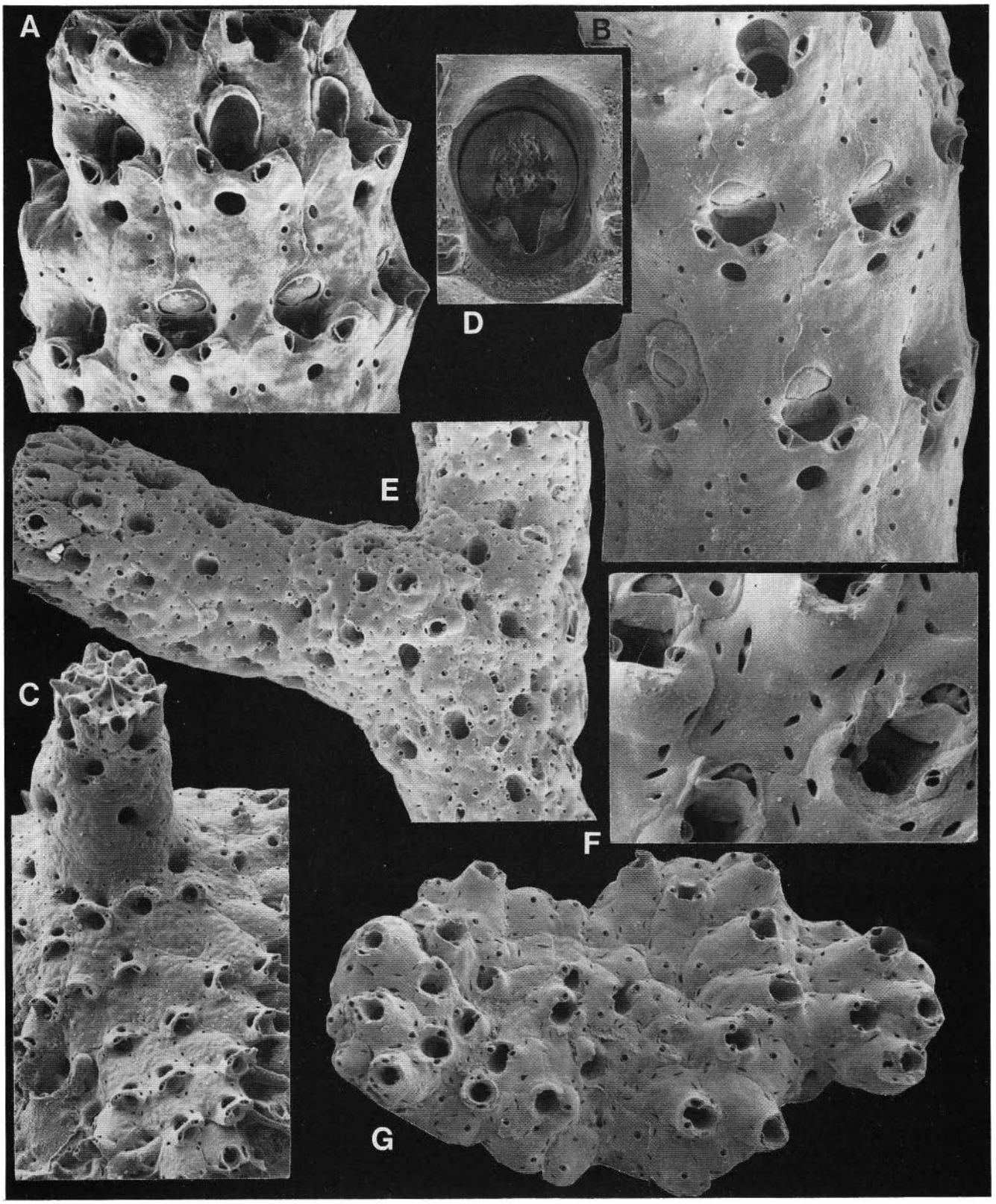

PLATE 36. A-C, *Galeopsis porcellanicus* (Hutton): A, zooids at branch tip; C, erect branch from an encrusting base (A, Boulder Bank, Nelson; B, Separation Point; C, Oaonui). D-G, *Galeopsis polyporus* (Brown): F, ovicelled zooids from an encrusting base; G, young colony (D, Stn B488; E, G, Stn C851, off the Manawatu coast; F, Stn C868).

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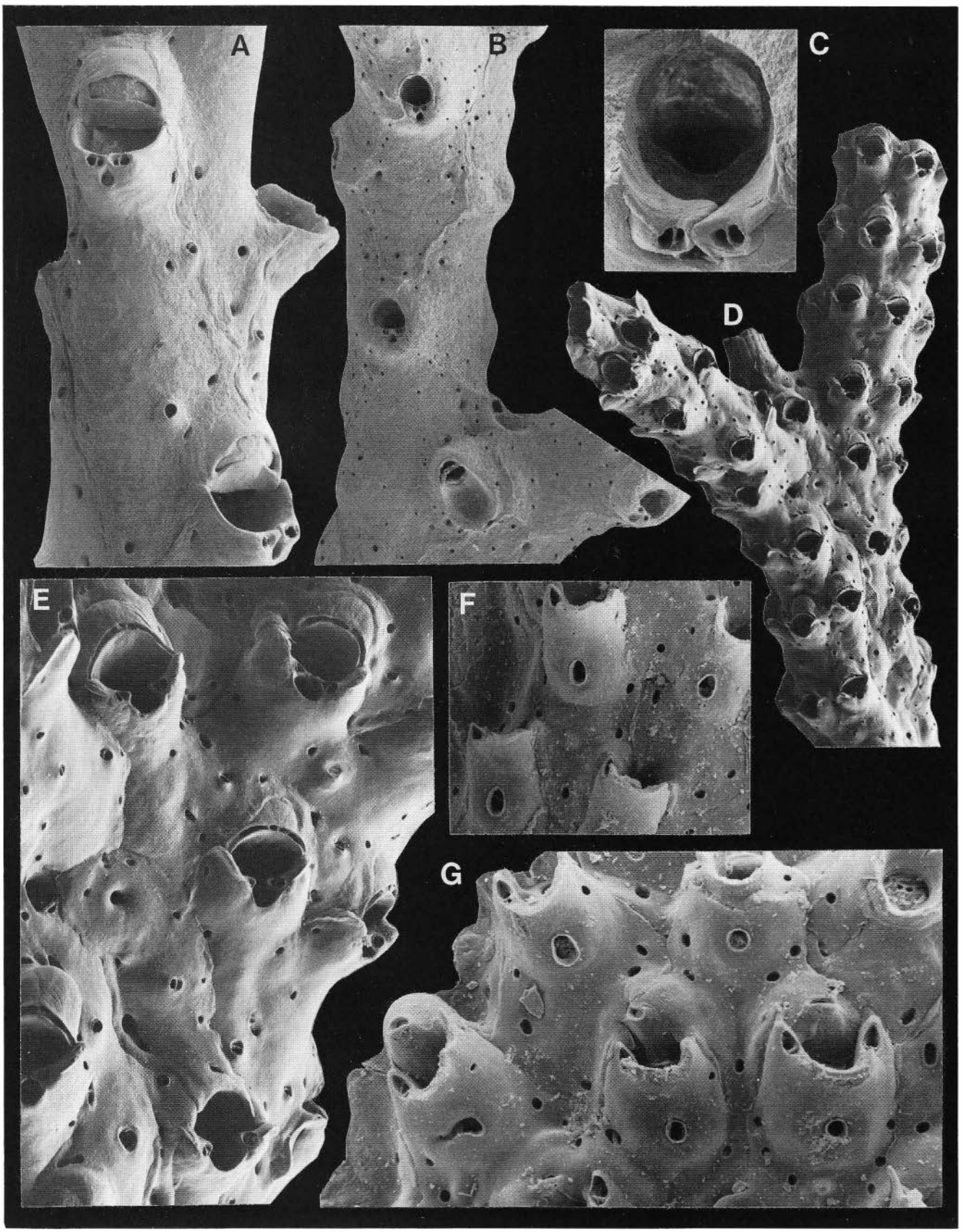

PLATE 37. A-C, *Galeopsis brevissimus* (Hayward) (Stn P927). D, E, *Galeopsis mimicus* n.sp.: D, encrusting and erect portions on a spine of *Spatangus multispinus* (Stn Q693). F, G, *Galeopsis adherens* n.sp.: F, infertile and G, ovicelled zooids (Stn B493).

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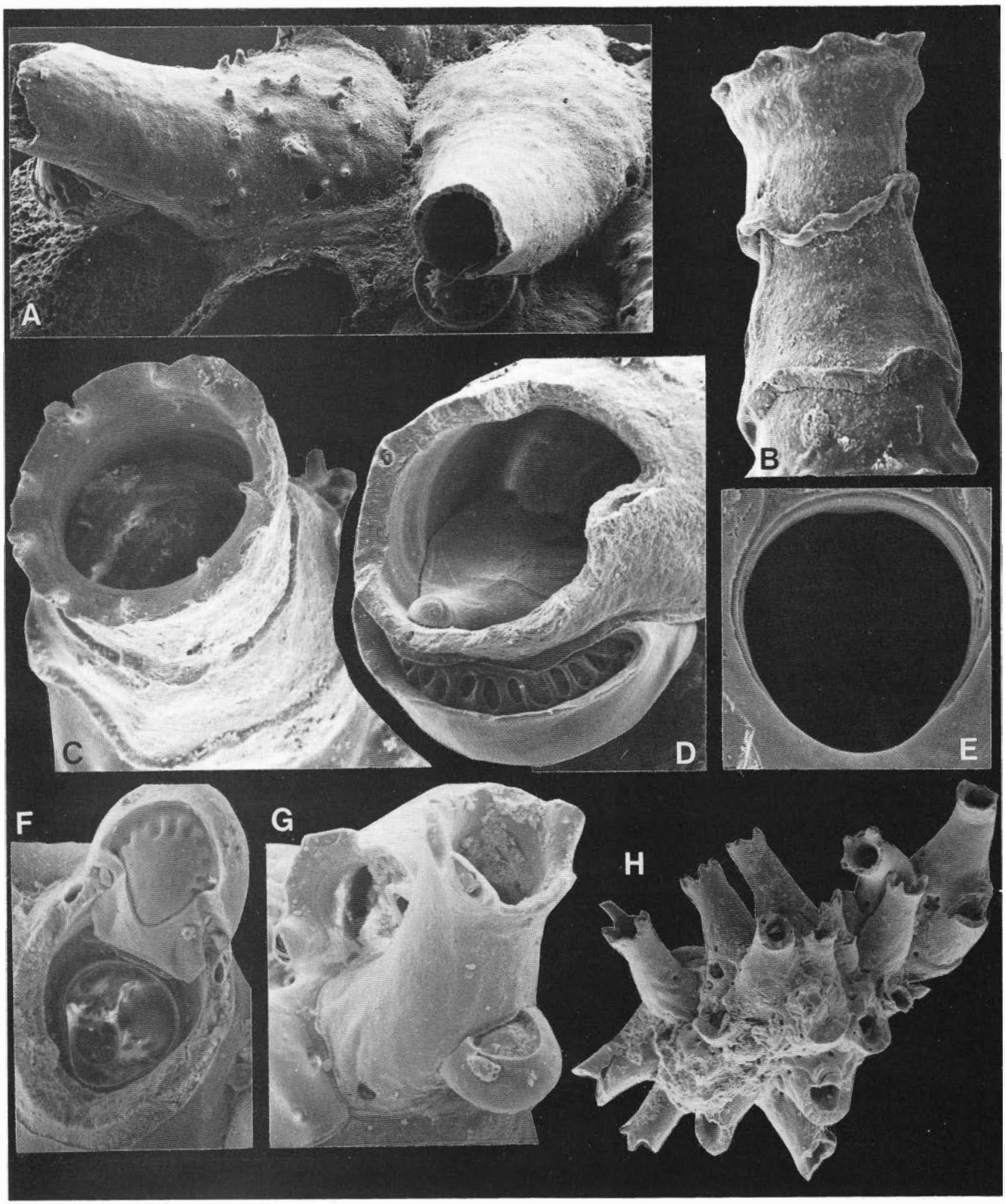

PLATE 38. A-E, *Lagenipora ferocissima* Gordon: B, C, intact peristome in profile and top view; D, ovicell with narrower tabula than usual (A, Stn Q702; B-E, holotype, NZOI H-285, Kermadec Ridge). F-H, *Lagenipora pinnacula* (Hayward) (Stn B488).

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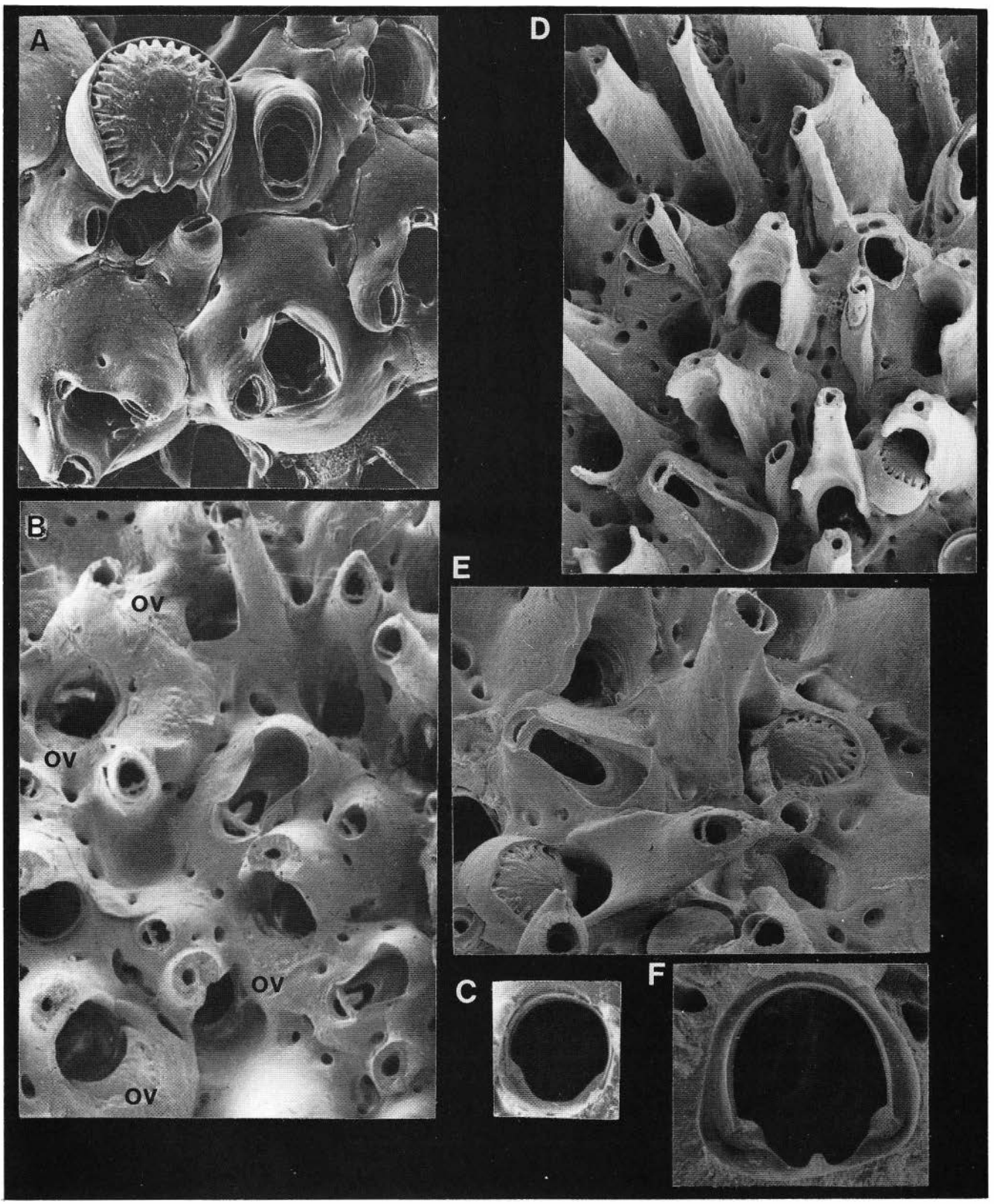

PLATE 39. A, *Celleporina conescharellinoides* n.sp. (Stn Q729). B, C, *Celleporina grandis* n.sp. (Stn E820). D-F, *Celleporina sinuata* n.sp. (D, Stn C759, Three Kings Islands; E, F, Stn H69, Foveaux Strait).

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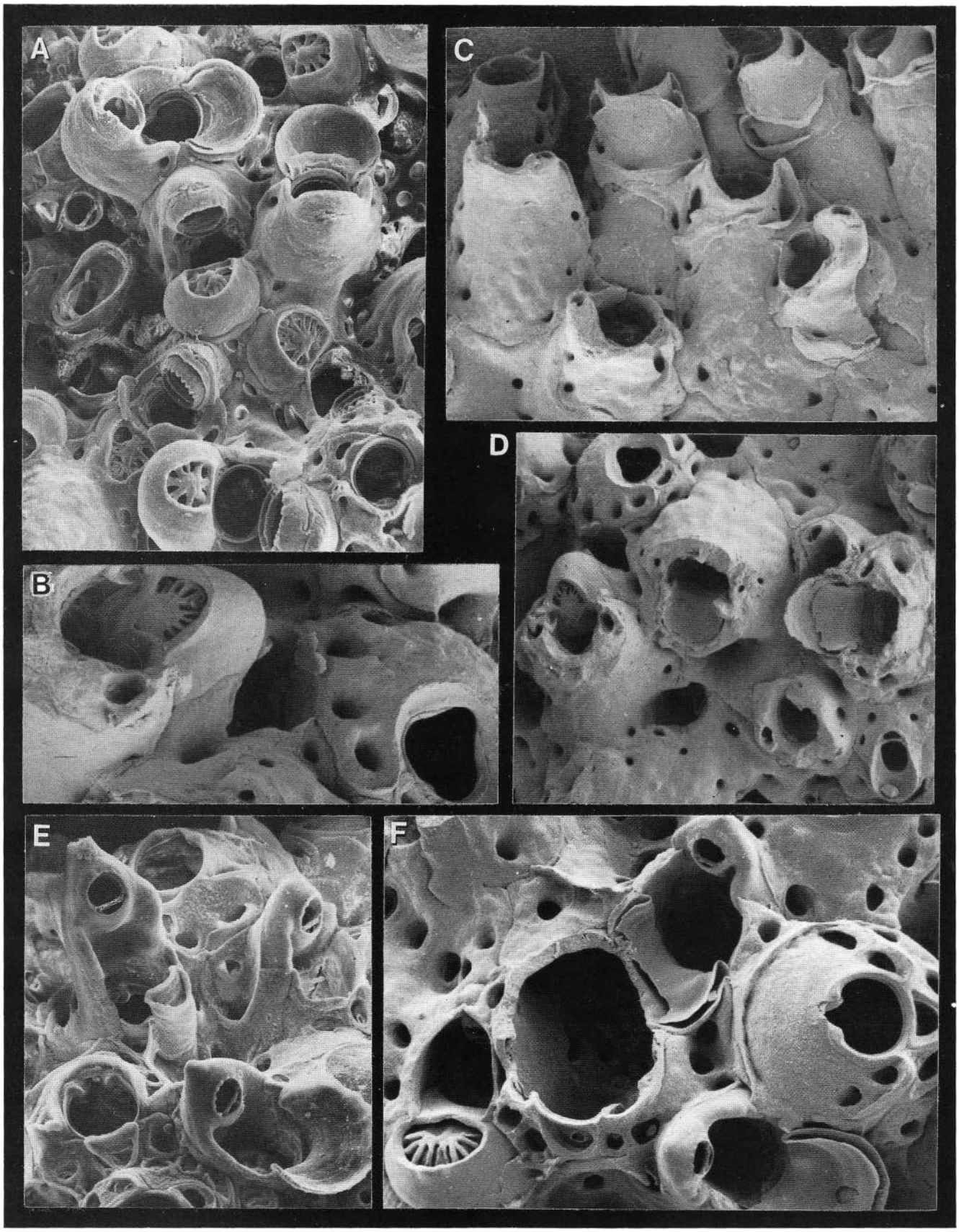

PLATE 40. A, *Celleporina podistra* n.sp. (Stn C869). B-D, *Celleporina tubulata* (Uttley & Bullivant) (Stn Q686). E-F, *Celleporina proximalis* (Uttley & Bullivant) (E, Stn C843, off Cape Palliser; F, Stn E820).

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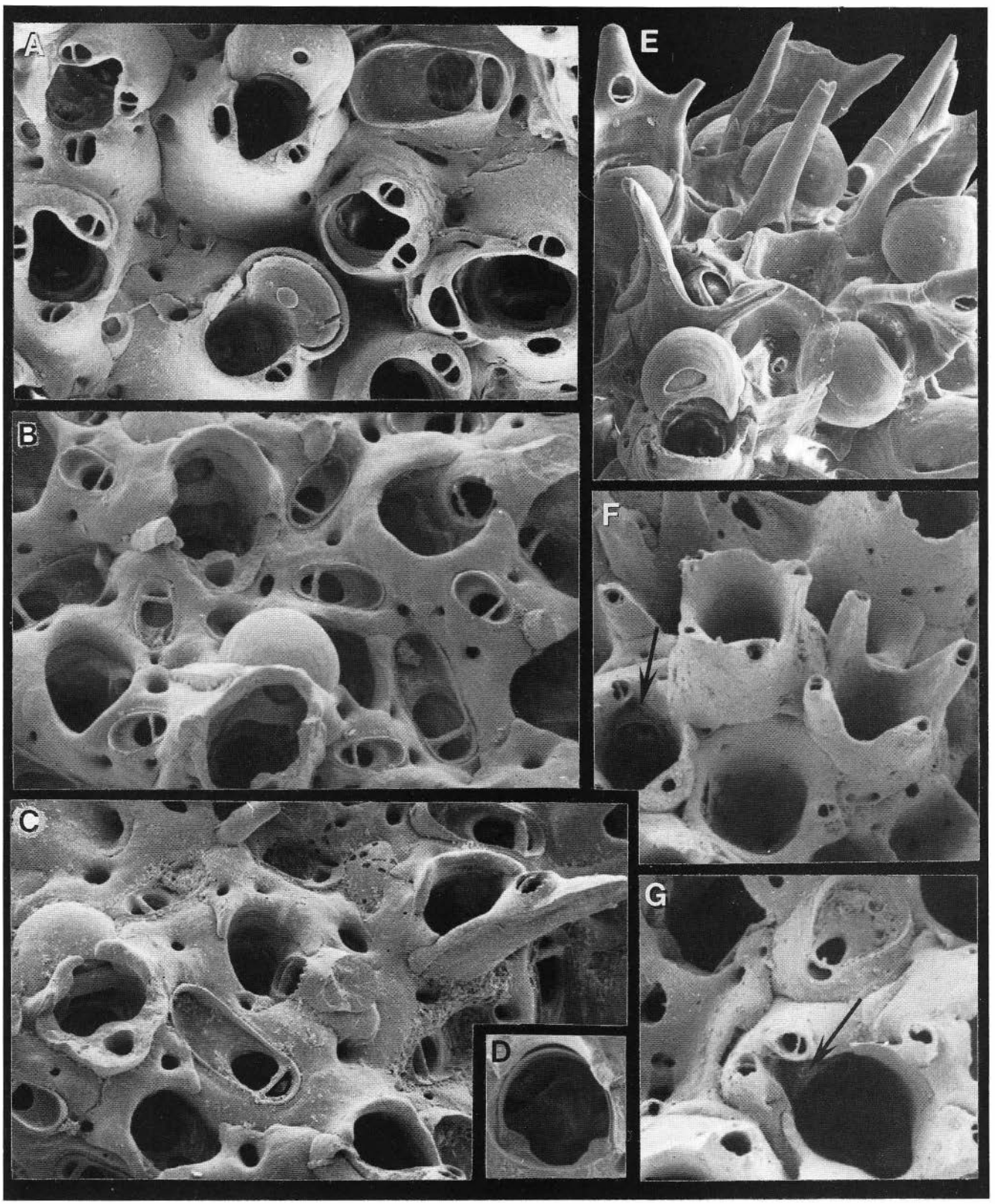

PLATE 41. A, *Osthimosia bicornis* (Busk) (Stn B482). B-E, *Osthimosia amplexa* n.sp.: B, D, zooids in a thickly encrusting colony; C, E, zooids in small, pisiform colonies, the ovicells not yet with an embracing rim of calcification frontally (B, D, Stn B482; C, E, Stn E820). F, G, *Osthimosia turrita* n.sp.: showing spatulate avicularium at top (F, G,) and a concealed ovicell (arrows) (Stn B484).

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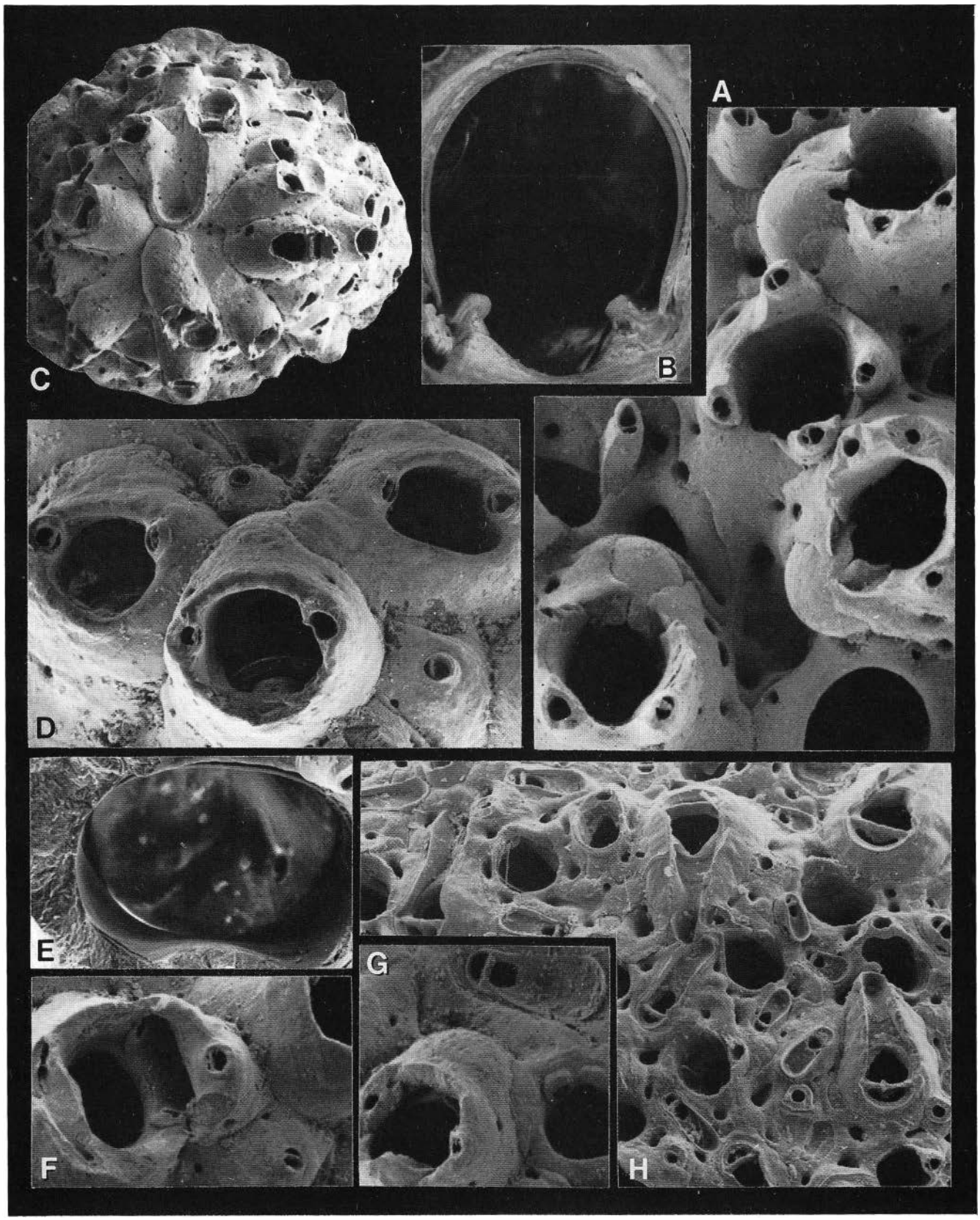

PLATE 42. A, B, *Osthimosia turrita* n.sp.: B, showing development of three ovicells (Stn B484). C-G, *Osthimosia mysterium* n.sp. : unique holotype colony, showing zooids with concealed ovicells (D, F, G) (Stn E796). H, *Osthimosia avicularis* n.sp. (Stn B490).

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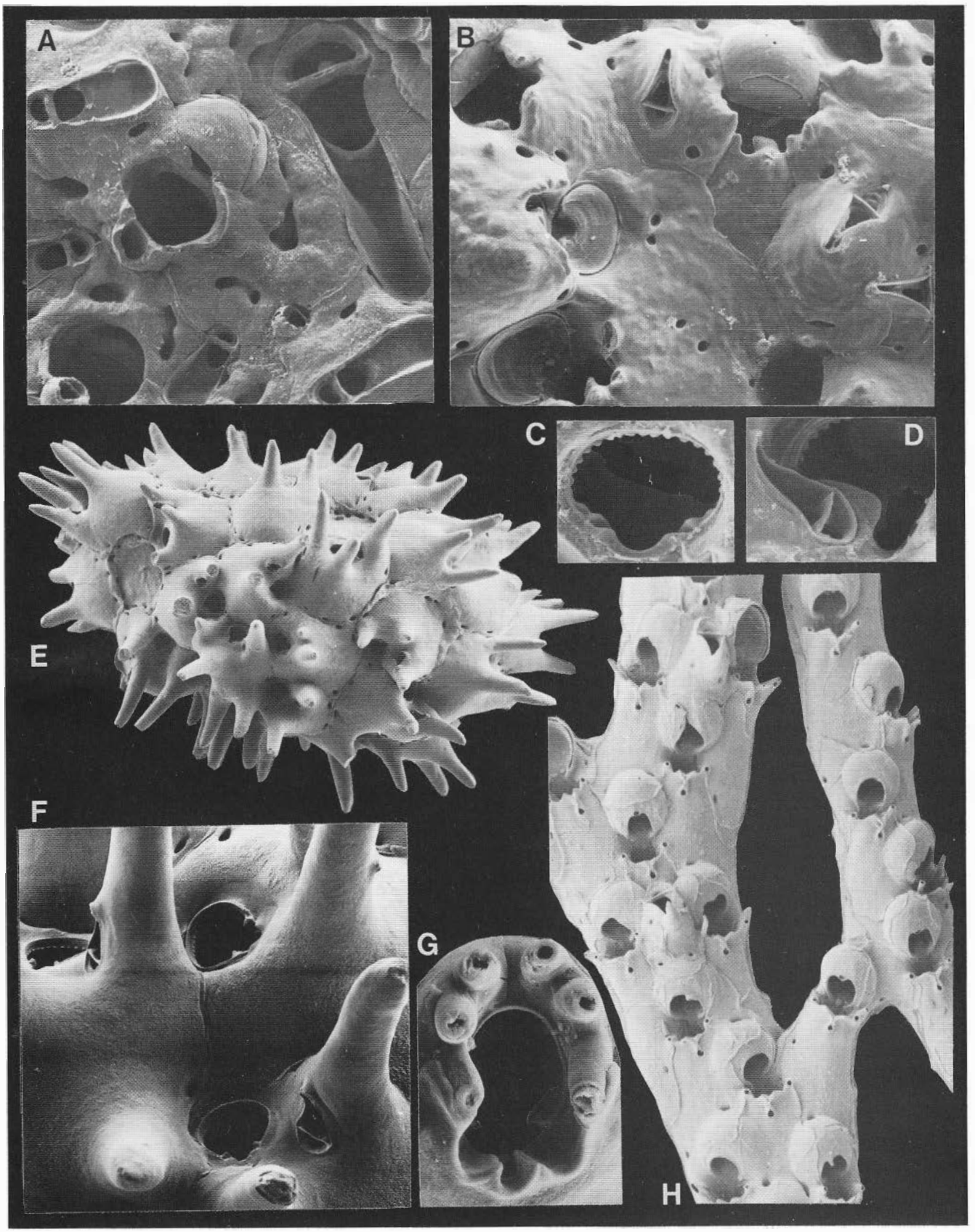

PLATE 43. A, *Osthimosia avicularis* n.sp. (Stn B490). B-D, *Rhynchozoon larreyi* (Audouin) (B, Stn B487; C-D, Stn B493). E, F, *Rhynchozoon inclemens* n.sp. (Stn Q702). G, *Hippellozoon novaezelandiae* (Waters) (Stn D269). H, *Phidolopora avicularis* (MacGillivray) (Stn M793).

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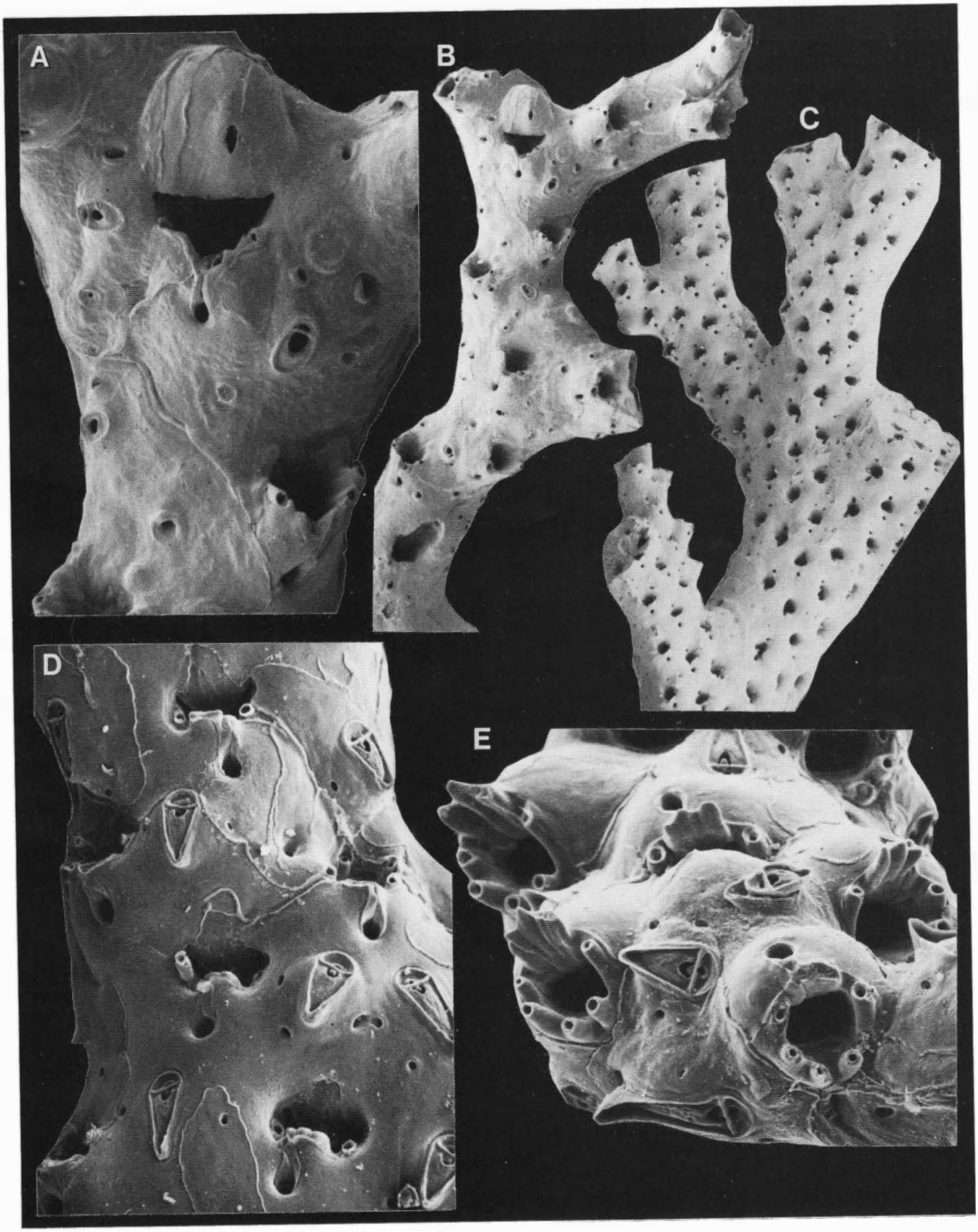

PLATE 44. A, B, *Reteporella gracilis* n.sp. (Stn E800). C-E, *Reteporella syrtoxylon* n.sp. (Stn E821).

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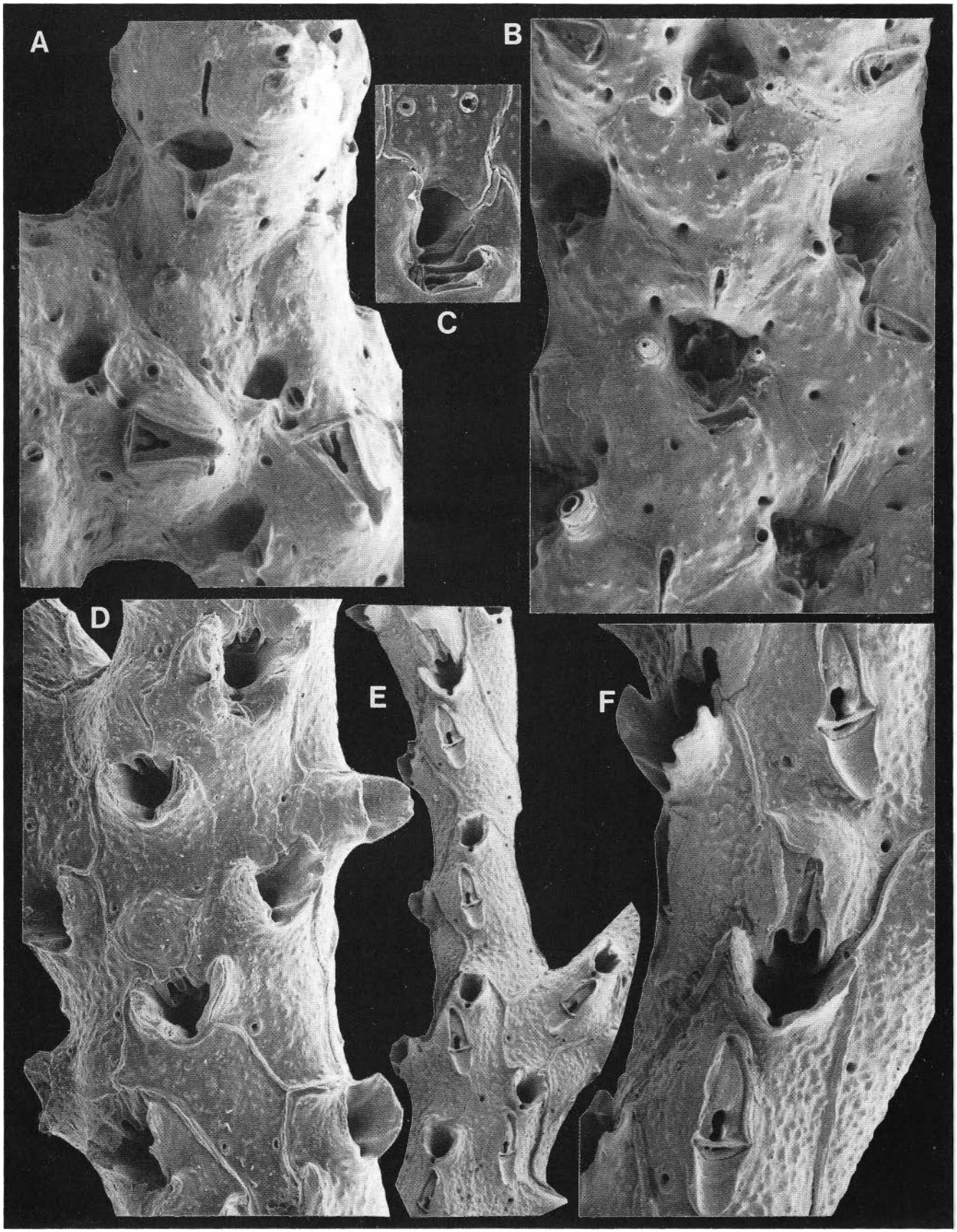

PLATE 45. A, *Reteporella ligulata* n.sp. (Stn E821). B, *Reteporella constricta* (Powell) (Stn E820). C, D, *Reteporellina conservatrix* n.sp. (Stn E793). E, F, *Reteporellina sagitta* n.sp. (Stn E800).

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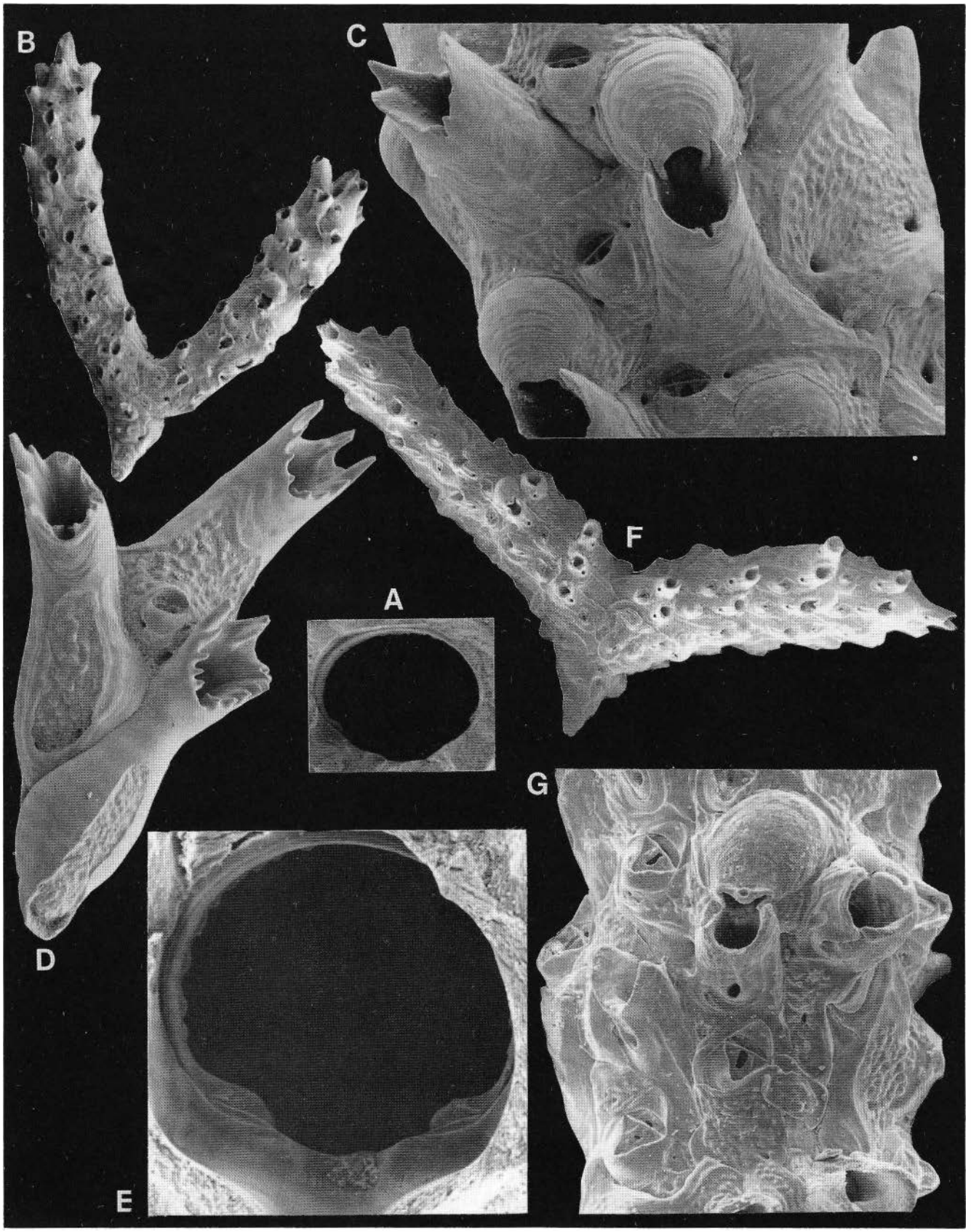

PLATE 46. A, *Reteporellina sagitta* n.sp. (Stn E800). B-E, *Chevron prestoni* n.gen., n.sp.: D, ancestrula and first two zooids (Stn P927). F, G, *Chevron winifredae* n.gen., n.sp. (Stn S153, 45°21.1'S, 173°35.8'E, Head of Bounty Trough).

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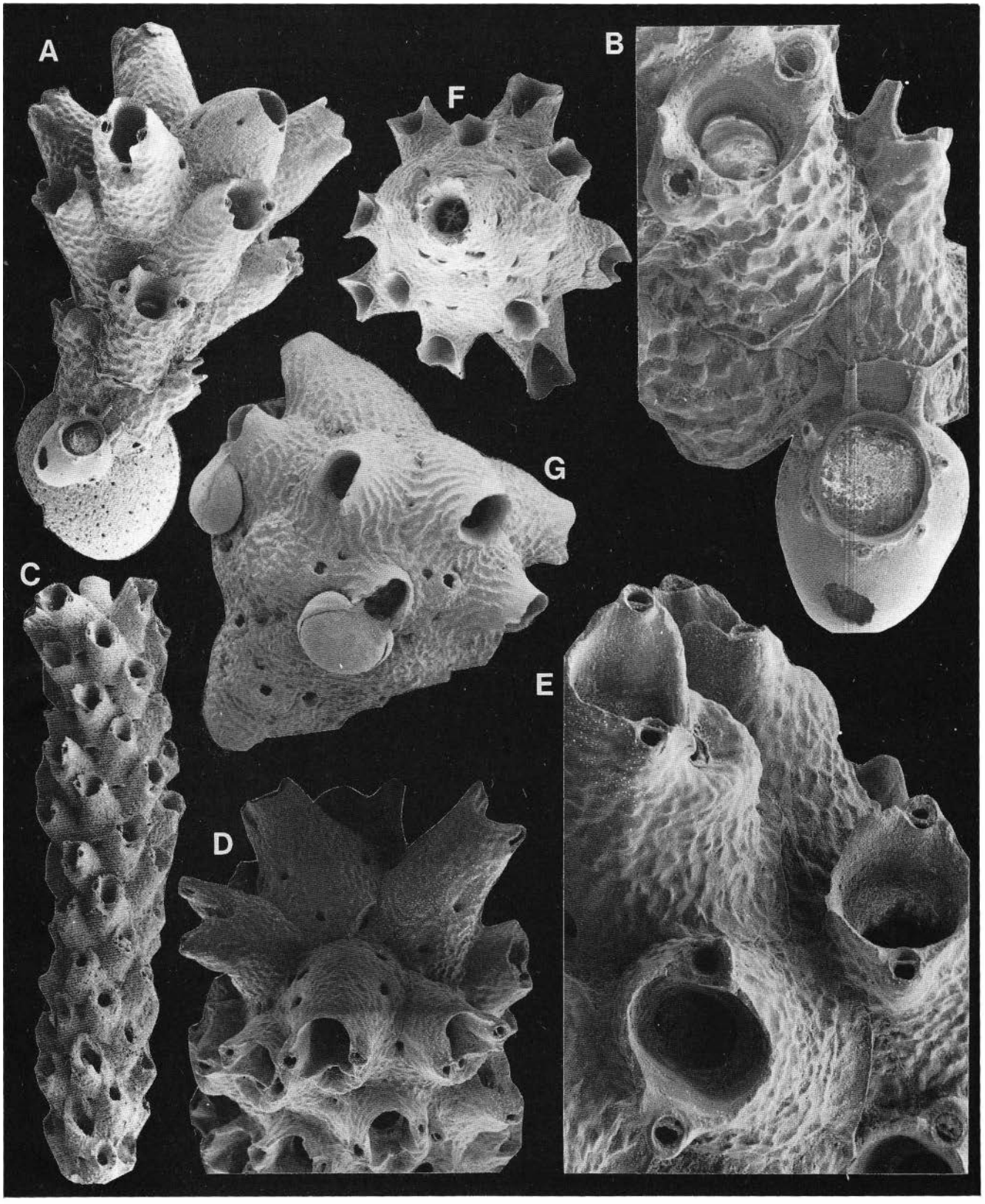

PLATE 47. A-E, *Jugescharellina elongata* n.gen., n.sp.: A, young ancestrulate colony on foraminiferan grain; B, same, magnified; C, old colony with eroded proximal end; D, distal end of a colony; E, close-up of zooids near distal end (Stn P927). F, G, *Batopora pulchrior* n.sp. (F, Stn P927; G, Stn P937).

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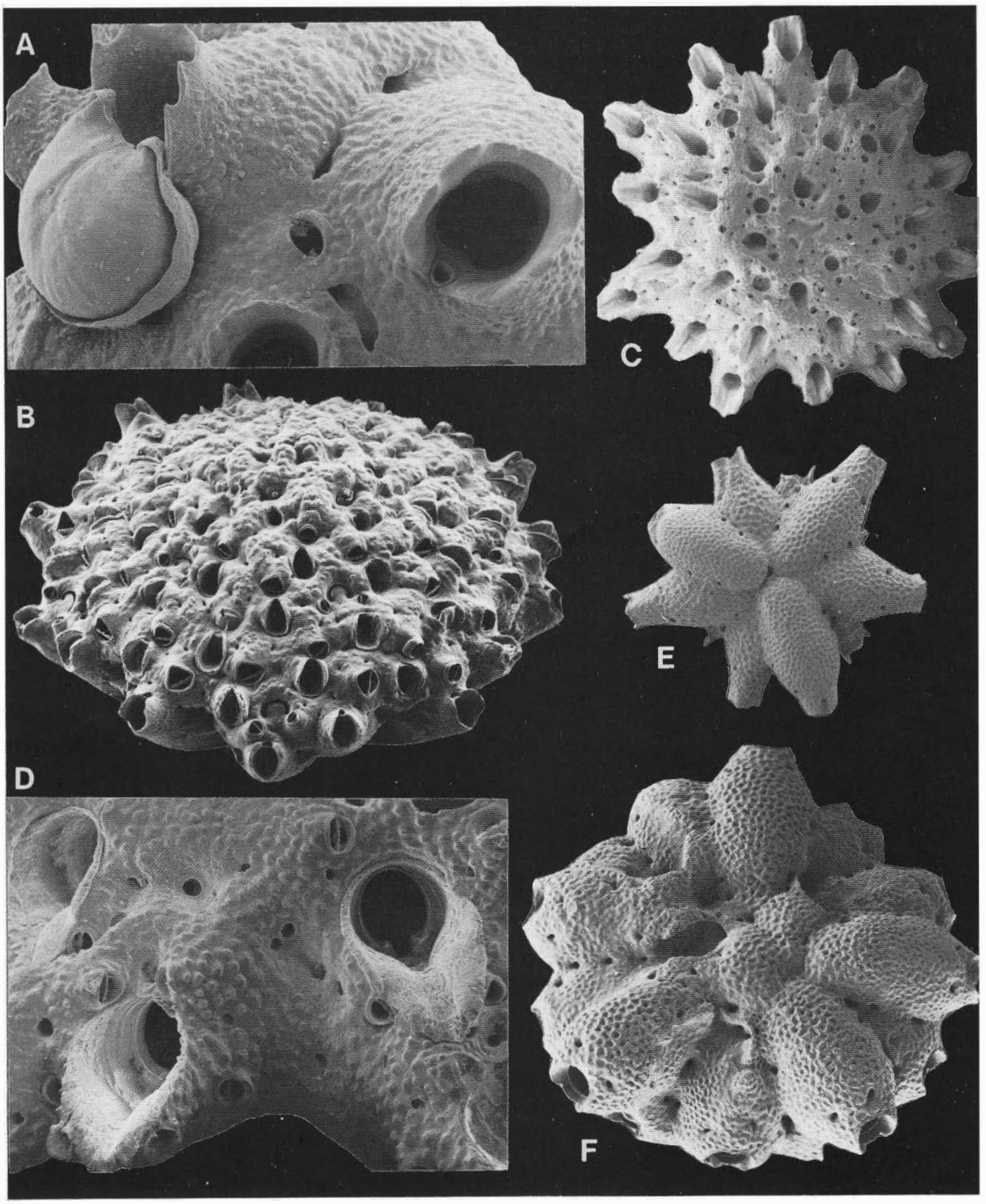

PLATE 48. A, *Batopora pulchrior* n.sp. (Stn P927). B, *Conescharellina angulopora* (Tenison-Woods) (Stn Q729). C, D, *Conescharellina pala* n.sp. (C, Stn C793; D, Stn C849). E, F, *Trochosodon mosaicus* n.sp. (E, Stn P927; F, Stn Q699).

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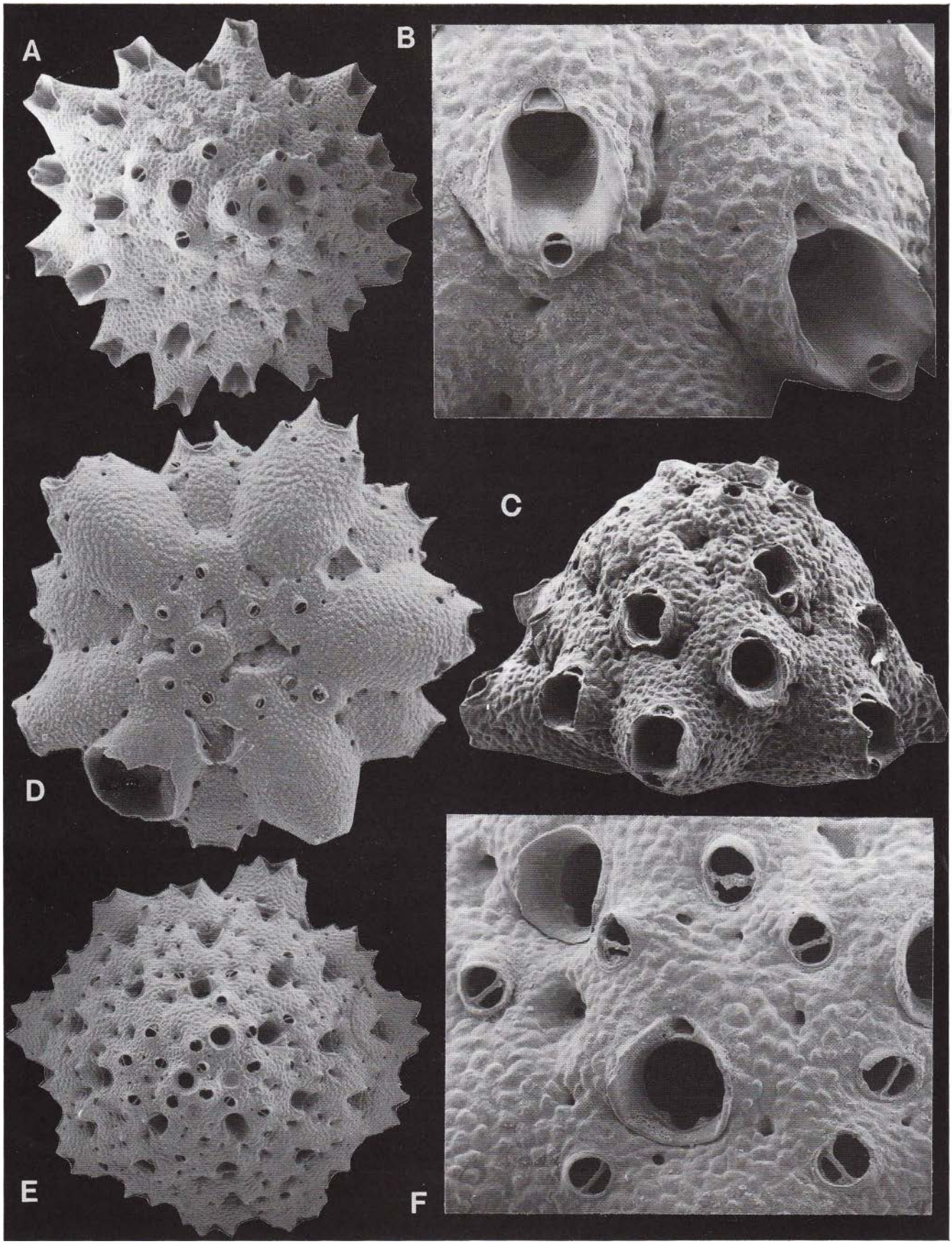

PLATE 49. A-C, *Trochosodon mosaicus* n.sp. (A, B, Stn P927; C, Stn P937). D-F, *Trochosodon multiarmatus* (Maplestone) (D, Stn S154, Bounty Trough; E, F, Stn P927).

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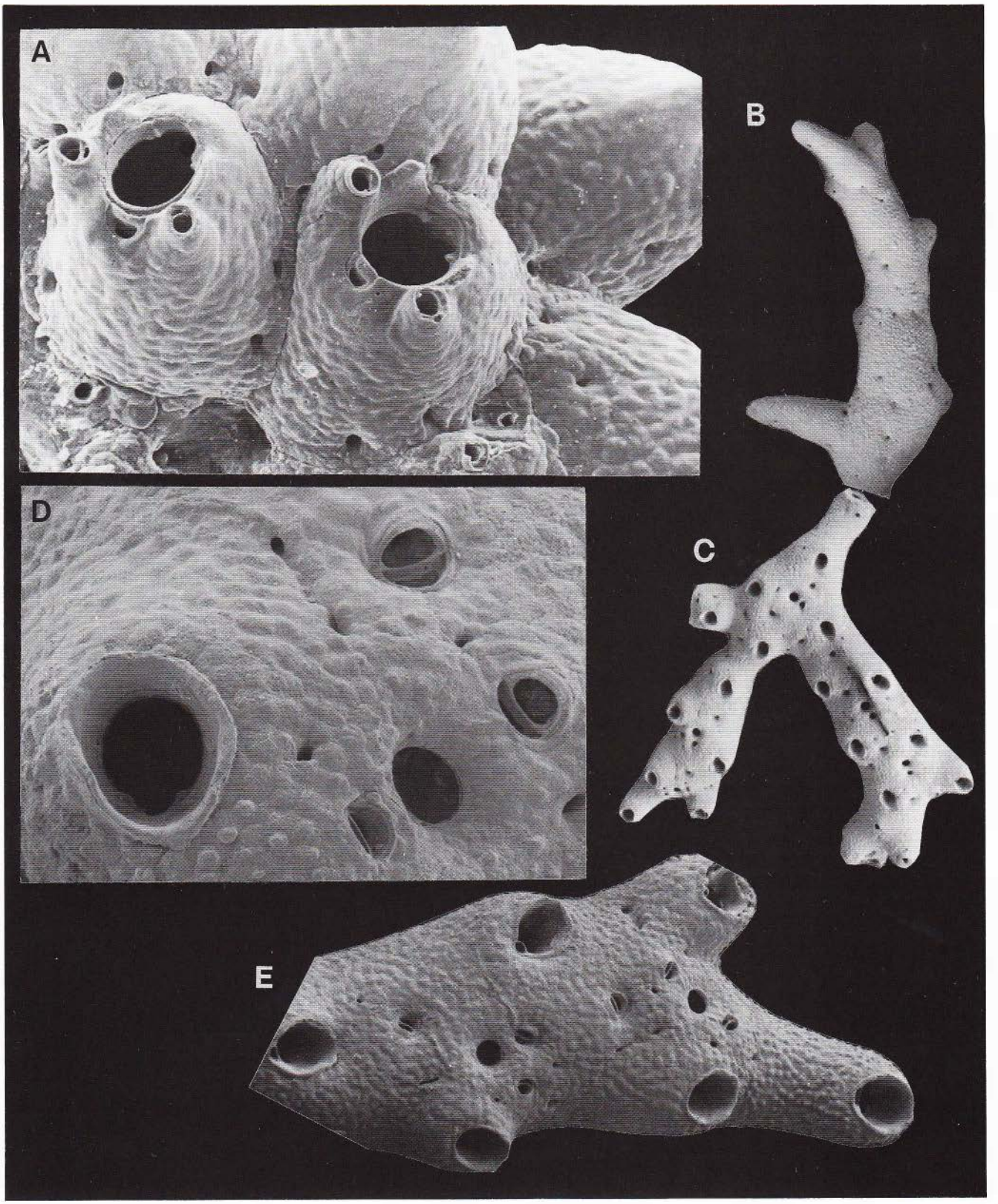

PLATE 50. A, *Trochosodon urnalis* n.sp. (Stn S153, Bounty Trough). B-E, *Crucescharellina jugalis* n.sp.: B, abfrontal, C, frontal views of branches (Stn P941).

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