Description

Corallum (anthocyathus) a laterally compressed cylinder, up to 4.5 × 2.8 mm in calicular diameter and 6.9 mm tall. One pair of broad, triangular, downward-projecting thecal spines up to 1.3 mm long occurs slightly above basal scar on lateral thecal edges. Spines formed by union and extension of pairs of thecal edge costae (Fig. 14e). Costae equal in width (0.18-0.20 mm) and smooth, separated by narrow (35-40 μm), relatively shallow intercostal furrows. Costae alternate in position with septa. Anthocaulus known from only one specimen, a syntype from east of the North Neptunes. It is poorly preserved (Fig. 14e) but appears to be a short, triangular, cuneiform base without thecal ornamentation.

Septa hexamerally arranged in three cycles, sometimes with several septa of the fourth cycle (24-26 septa). S_{1-2} exsert, approximately 0.17 and 0.13 mm, respectively, and thick, their outer edges separated from the theca by a narrow notch. S_3 much less exsert and thinner. Inner edges of all septa sinuous, becoming progressively more sinuous in higher cycle septa. A single crown of 10 fascicular pali present before S_{1-2}, the two principal septa lacking pali. Fossa moderately deep. Upper edges of pali terminate approximately 0.25 mm below calicular edge. Columella elongate, composed of several twisted papillae interconnected among themselves and to inner edges of pali.

Discussion

Dennant (1906) based *Sphenotrochus emarciatus* var. *perexiguus* upon nine Recent specimens from South Australia, distinguishing it from typical *S. emarciatus* of the Victorian Miocene by its higher GCD:LCD, 1.8 *vs* 1.5-1.66 for the fossil form. Cairns (1989a) treated *I. perexiguus* as a separate species, but now, after having seen additional syntypes (six of nine) and topotypic fossil specimens of *I. emarciatus,* finds no reason to consider them distinct. Three other species pertain to this genus: *I. australis* (Duncan, 1865); *I. kikutii* (Yabe & Eguchi, 1941); and an undescribed species (specimens in AM) known from off Lady Musgrave Island, Queensland (150 m).

Material Examined (all collected by JV)

South Australia: E of North Neptune Is, 45 fms (=82 m), SAM H609(2)/USNM 85701(1), RMNH 18060(1); off Cape Jaffa, 90 fms (=174 m), SAM H610(1), and 130 fms (=238 m), RMNH 18059(1) (all syntypes of *Sphenotrochus emarciatus* var. *perexigua*).

Distribution

Continental shelf of South Australia: east of North Neptune Is and off the South-East; 82-238 m; Victoria (Miocene).

Dunocyathus Tenison-Woods, 1878

35. *Dunocyathus parasiticus* Tenison-Woods, 1878 (Figs 13e, f, 14a, d, Map 15)

Dunocyathus parasiticus Tenison-Woods, 1878: 305, 306, pl. 5, figs 4a, b; Dennant, 1906: 159; Howchin, 1909: 246; Wells, 1958: 266, pl. 1, figs 16, 17; Wells 1984: 213.

Dunocyathus sp., Wells, 1958: 263.

Deltocyathus rotaeformis Tenison-Woods, 1878: 306, 307, pl. 5, figs 2a, b; Dennant, 1906: 154; Howchin, 1909: 245, 246.

Description

Corallum (anthocyathus) tympanoid, up to 6.3 mm in circular calicular diameter and 4.5 mm tall. Base flat to slightly concave and thin, often showing a circular depression corresponding to its attachment to anthocaulus. Costae alternate distinctly in position with septa, sometimes becoming sinuous or bifurcate near basal edge; costae lacking from horizontal base. Costae rectangular in cross section, approximately 0.25 mm wide and 0.10 mm tall, covered with tall, cylindrical granules of variable diameter (*e.g.*, 16-32 μm in diameter). Upper edge of each costa projects slightly above calicular edge. Intercostal areas, those strips of theca directly overlying the septa, about 0.20 mm wide and flat (but not smooth), consisting of a very fine crystalline structure. Anthocaulus invariably embedded in a small bryozoan colony (*Conescharellina* spp., Fig. 13e). Anthocaulus trochoid in shape, up to 3 mm tall, with a 2-3 mm calicular diameter and a short, cylindrical pedicel of about 0.8 mm in diameter. An anthocyathus with an intact anthocaulus in the process of transverse division has not yet been found.

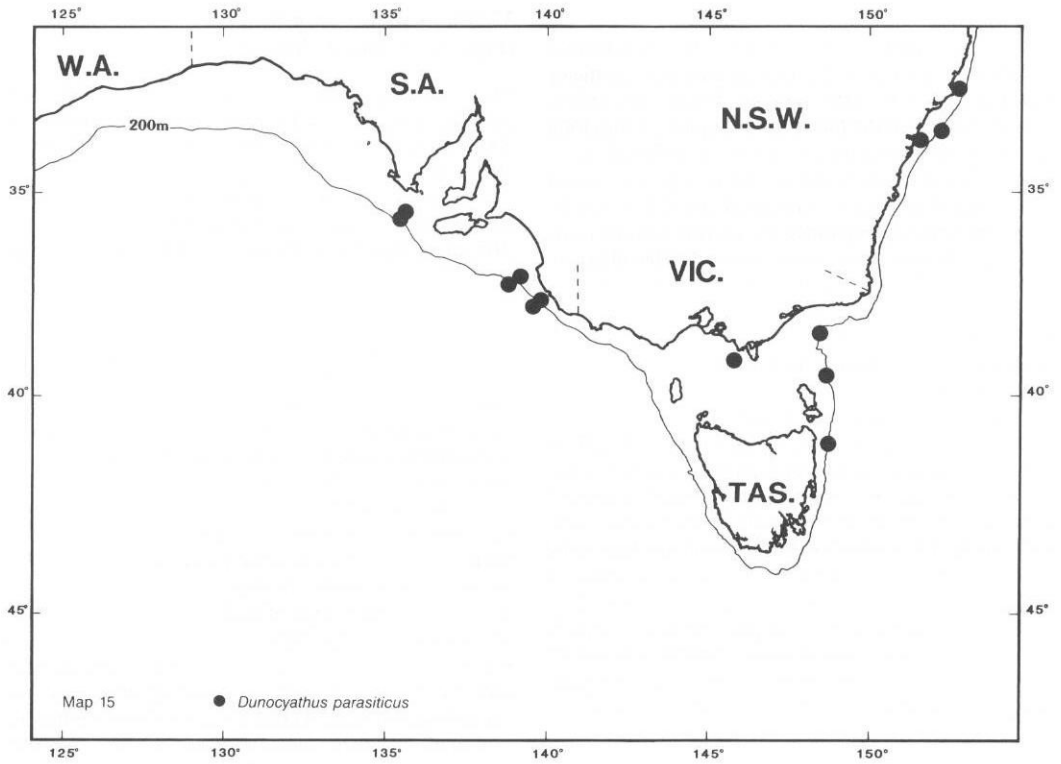
Septa hexamerally arranged in three complete cycles (24 septa), even in anthocaulus stage. S_1 highly exsert, and have moderately sinuous inner edges, each bordered internally by a tall, slender palus about 0.35 mm tall and 0.16 mm wide. S_2 slightly less exsert, with much more sinuous inner edges, and much larger paliform lobes. P_2 up to 0.70 mm tall and 0.33 mm wide and project well above calicular edge but less so than the exsert S_2. S_3 about three-quarters width of S_2 and have moderately sinuous inner edges and no pali. All septa bear 8-10 vertical, radiating ridges on their septal faces (Fig. 13f). Fossa quite shallow, filled with exsert septa and pali and a circular, papillose columella that reaches almost to calicular edge level.

Discussion

Wells (1958) was the first to realize that *D. parasiticus* was the anthocyathus stage of *Deltocyathus rotaeformis. Dunocyathus* is one of two turbinoliid genera having an alternation of costae and septa (the other being *Idiotrochus*).

Material Examined (all South Australian specimens collected by JV)

South Australia: 35 Nm (=64 km) SW of Neptune



Is, 104 fms (=190 m), i.1905, SAM H611(53); Cape Jaffa, 90 fms (=165 m), SAM H612(53)/USNM 85697(8), 85698(1), 130 fms (=238 m), i.1905, SAM H613(5), 300 fms (=549 m), 1905, SAM H614(4); off Beachport, 100 fms (=183 m), 1905, SAM H615(5)/USNM 85696(2), 110 fms (=201 m), SAM H616(4), 150 fms (=275 m), 1905, SAM H617(34), 200 fms (=366 m), SAM H618(6).
Victoria: 'Kimbla' Stns K7/73-70, 64 m, NMV F56961(2), K7/73-27, 183 m, NMV F45910(1).
Eastern Bass Strait: 'Kimbla' Stn 79-K-1-35, 110 m, NMV F56883(1).
Tasmania: BANZARE Stn 115, 128 m, SAM H619(3).

Distribution

Continental shelf and slope of south-eastern Australia from south of Eyre Peninsula, South Australia, to Port Stephens, New South Wales and north-eastern Tasmania; 64-549 m.

Superfamily Flabellicae Bourne, 1905
Family GUYNIIDAE Hickson, 1910

Guynia Duncan, 1872

36. *Guynia annulata* Duncan, 1872
(Figs 14g, h)

Guynia annulata Duncan, 1872: 32, pl. 1, figs 1-8; Cairns, 1979: 164, 165, pl. 32, figs 1-3 (synonymy); Cairns, 1989a: 42, pl. 21f, 22a-e.
Pyrophyllia inflata Hickson, 1910: 1-7, figs 1-4.

Description (South Australian specimens)

Corallum straight to slightly scolecoid and cylindrical, expanding very gradually from base to calice. Largest specimen examined (SAM H621) 8.6mm long and 1.3 mm in calicular diameter. Original or subsequent attachment of corallum unknown; basal portions of all coralla missing. Epitheca bearing two sets of ridges: transverse circumferential ridges on average 0.20 mm apart, and a longitudinal set of eight large (C_1) and eight small (C_2), alternating, corresponding to the 16 septa. The intersections of these ridges form a grid-like pattern of rectangles, with a prominent granule up to 0.1 mm tall usually occurring at each intersection. Within each rectangle is a chalky white thecal spot, which corresponds to an equal-sized, shallow depression on inside of corallum. These spots and depressions do not penetrate the theca of a living specimen, but, in long-dead specimens these areas are the first to erode, resulting in circular pores.

Septa octamerally arranged in two size-classes: eight primary and eight secondary septa. Primary septa nonexsert and with highly sinuous, vertical inner edges.

Primaries 0.15-0.20 mm wide and quite thick (0.06-0.10 mm), increasingly so lower in corallum. Secondary septa much smaller, their thin upper edges recessed as much as 1.0 mm from calicular edge and thus difficult to see in an intact corallum. Secondaries about 0.1 mm wide, only 0.01-0.02 mm thick, and slightly sinuous. Septal face granules apparently lacking. Fossa shallow. Columella a single, twisted lamella or trefoil ribbon 0.17-0.20 mm in width.

Discussion

Guynia is a monotypic genus, distinguished from other guyniid genera by having only one columella lath, no pali, and a total septal complement of 12-16 septa (Cairns 1989a). It is among the smallest of scleractinian corals.

Material Examined (all collected by JV)

South Australia: 'Sta. 9' (?Spencer Gulf), SAM H620(20)/USNM 85700(2); Cape Jaffa, 90 fms (=164 m), SAM H621(1), 130 fms (=238 m), SAM H622(1).

Distribution

South Australia: off Cape Jaffa; ? Spencer Gulf; 164 m, 238 m. Atlantic Ocean, Persian Gulf, Indonesia, Philippines, New Caledonia, Hawaiian Islands; 28-653 m; Dominican Republic (Miocene).

Although *G. annulata* is widespread with an almost cosmopolitan distribution, this is the first record of the species (and the genus) from Australian waters.

Stenocyathus Pourtalès, 1871

37. *Stenocyathus vermiformis* (Pourtalès, 1868) (Figs 14b, c)

Coenocyathus vermiformis Pourtalès, 1868: 133.
Stenocyathus decamera Ralph & Squires, 1962: 11, 12, pl. 4, figs 2-6.
Stenocyathus vermiformis: Cairns, 1979: 168-170, pl. 32, figs 8-10, pl. 33, figs 1, 2 (synonymy); Cairns, 1982: 52, pl. 16, figs 8-11 (map); Veron, 1986: 609, fig.

Description (Victorian and Tasmanian specimens)

Corallum scolecoid, shaped as a gradually expanding cylinder: largest specimen (NMV F57163) 5.0 mm in calicular diameter, 2.4 mm in broken basal diameter, and 14.7 mm long. Coralla firmly attached by broad, stereome-reinforced pedicel. Wall epithecate, bearing numerous fine circumferential ridges. Theca also marked by 24 longitudinal rows of chalky white thecal spots, each row aligned with an interseptal space. Spots circular, about 0.25 mm in diameter, and separated from adjacent spots in the same row by an equal or greater distance than their diameter.

Septa hexamerally arranged in three systems (24 septa). S_1 largest of septa, their very sinuous inner edges extending 0.5-0.6 distance to columella. S_2 about three-quarters width of S_1, also having highly sinuous inner margins. Each S_2 bordered internally by a large, thick palus, equal in width and sinuosity to the S_2 it borders. P_2 separated from S_2 by deep, narrow notches. S_3 equal to or slightly wider than S_2 and equal in thickness, but, because their inner edges are only slightly sinuous, they appear thinner. All septa nonexsert, the calicular theca projecting up to 0.5 mm beyond outer septal edges as a thin, nonseptate rim. Septal and palar faces bear large, triangular granules. Fossa moderately deep, containing a fascicular columella consisting of one twisted lath. Upper margin of columellar elements considerably lower than palar edges.

Discussion

Stenocyathus vermiformis is the only Recent species of the genus (Cairns 1979). It is easily distinguished from the only other guyniid known from Australia, *G. annulata*, by its hexameral symmetry, P_2, and much larger corallum.

Material Examined

Victoria: 'Franklin' Stn Slope 27, 1 500 m, NMV F57163(1)/USNM 85729(1).
Tasmania: 'Franklin' Stn Slope 47, 455 m, NMV F57175(1).

Distribution

Australia: eastern Victoria, eastern Tasmania, New South Wales and southern Great Barrier Reef (Veron 1986: 609); 455 m, 1 500 m. Atlantic Ocean, Subantarctic, New Zealand (Cairns 1982); 80-1 229 m.

Family FLABELLIDAE Bourne, 1905

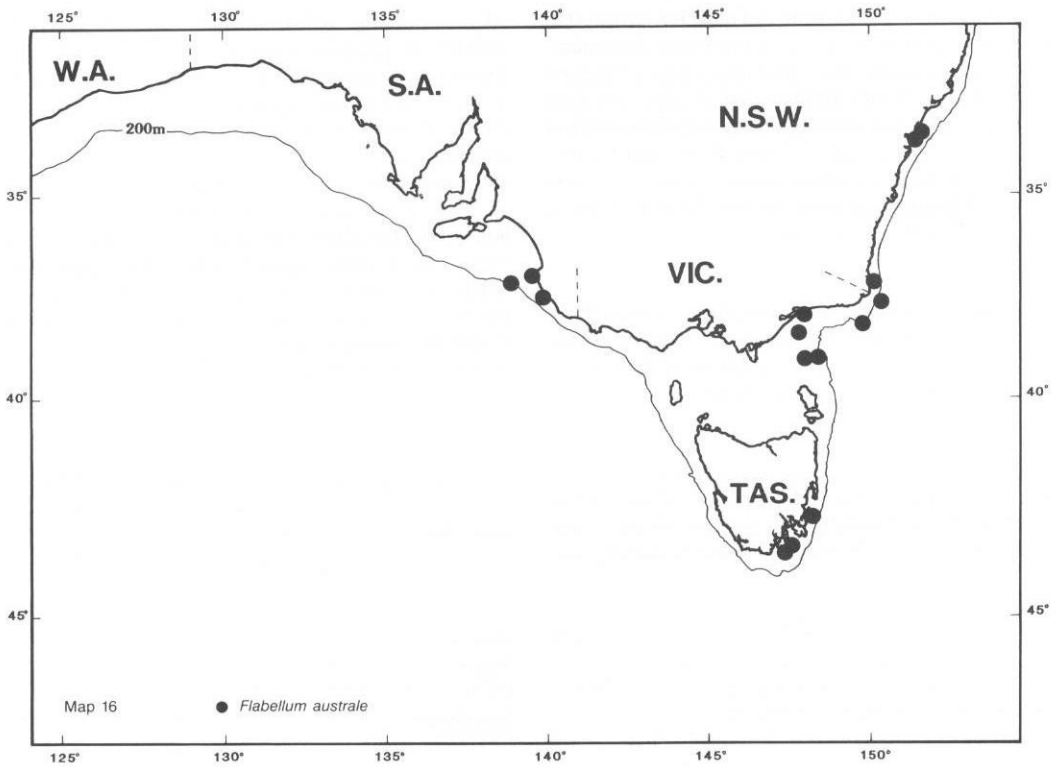
Flabellum Lesson, 1831

38. *Flabellum (Flabellum) australe* Moseley, 1881 (Figs 15a-c, f, Map 16)

Flabellum australe Moseley, 1881: 173, 174, pl. 7, figs 4, 5; Dennant, 1906: 151; Howchin, 1909: 245; Thomson & Rennet, 1931: 41; Cairns, 1989a: 46.
Flabellum pavoninum typical: Hoffmeister, 1933: 2-5 (in part: specimen no. 3); Shepherd & Veron, 1982: 177, fig. 4.54i.
Flabellum pavoninum var. *distinctum:* Hoffmeister, 1933: 5-7 (in part: specimen no. 11).

Description

Corallum triangular, highly compressed (GCD:LCD = 2.2-3.0), and very dense. Angle of thecal edges variable, ranging from 70°-127°; inclination of lateral faces low, 29°-39°. Largest specimen examined (USNM 78510) 72.6 × 26.6 mm in calicular diameter



and 58.4 mm tall, although most specimens examined from South Australia were considerably smaller; many were juveniles only 5-8 mm in GCD that were still attached to the substrate. Thecal edge crests up to 1.8 mm, formed by successive eversions of thecal edges during rapid growth stages. Lateral thecal edges long in relation to height of corallum, with an LEL:H of 0.64-0.82 and a relatively high GCD:H of 1.14-1.38. Thecal faces rough in texture, each bearing 8-12 coarse, rounded costae, which are intersected by numerous, closely spaced, fine, transverse striae. Theca pigmented with reddish brown stripes corresponding to C_{1-3}. Pedicel circular in cross section, 1.8-2.5 mm in diameter, and 3.5-5.5 mm tall.

Septa hexamerally arranged in six cycles, the fifth complete at a GCD of about 25-27 mm, the sixth (192 septa) complete at a GCD of about 57 mm, according to the formula: $S_{1-4} > S_5 > S_6$. Additional pairs of S_7 present in larger specimens, particularly in lateral half-systems (up to 284 septa). Upper calicular edges of S_{1-4} attenuate, but lower in fossa expanding into wide septa, their lower, highly sinuous inner edges creating a deep, narrow fossa. S_5 about half width of S_{1-4} and with relatively straight inner edges that do not attain the columella. S_6 variable in size depending on size of corallum, but usually one-third to one-half width of S_5. Pairs of S_7 rudimentary, if present extending only several mm down theca. Septal faces relatively smooth, covered with small, pointed granules. Columella elongate, about 1.0-1.5 mm wide, composed of the fusion of lower, inner edges of S_{1-4}.

Discussion

Among the Indo-West Pacific species of *Flabellum (Flabellum)* (see Cairns 1989b), *F. australe* is clearly most similar to *F. pavoninum*, the two species being similar in corallum shape and density, thecal colour, and number and symmetry of septa. *F. australe* differs in having a more compressed corallum (*i.e.*, a lower face angle and correspondingly higher GCD:LCD), smaller thecal edge crests (those of *F. pavoninum* are 2.5-3.8 mm tall), and a larger pedicel (that of *F. pavoninum* is only 1.1-1.5 mm in diameter).

Many of Hoffmeister's (1933) *F. pavoninum distinctum* and six specimens of his typical *F. pavoninum* were examined. The two specimens deposited at the USNM pertaining to these two varieties are both *F. australe;* a cursory examination of the remaining specimens, which are deposited at the AM, revealed a mixture of *Flabellum* species.

Material Examined

South Australia: off Cape Jaffa, 90 fms (=165 m), SAM H625(12), 120 fms (=220 m), NMV F56968(1),

130 fms (=238 m), SAM H626(6), 300 fms (=549 m), SAM H627(2), all JV; off Beachport, 100 fms (=183 m), SAM H628(1), over 100 fms, SAM H636(2), 110 fms (=201 m), SAM H629(12), NMV F56969(3), 150 fms (=275 m), SAM H630(2), all JV.
Victoria: 38°25′S, 148°02′E, EGSS 25.ii.1971, NMV F56789(1), 56799(1); E of Lakes Entrance, 26.v.1959, NMV F56794(3)/USNM 85725(1); 'Soela' Stn 33, 442 m, SAM H631(1); 'Soela' Stn 26, 436 m, SAM H632(1).
Eastern Bass Strait: 'Umitaka Maru' Stn 1, 120 m, TM K1126(1); 'Soela' Stn 22, 92 m, SAM H634(1), 637(1).
Tasmania: SSE of Tasman Head, Bruny I., 90-94 fms (=165-172 m), i.1970, TM K426(4); 'Soela' Stn 64, 82 m, SAM H633(2)
New South Wales: off Cronulla, 65-105 m, USNM 78510(42); HMS 'Challenger' Stn 163, off Twofold Bay, 120 fms (=220 m) (data contradictory, see under *Crispatotrochus inornatus*), BMNH 1880.11.25.81 (2 syntypes of *F. australe*); 'south-east coast of Australia', 'Endeavour', USNM 85704(1) (*ex* AM E1273, pt, *F. pavoninum* typical No. 3 of Hoffmeister 1933) and USNM 85703(1) (*ex* AM E1273, pt, *F. pavoninum distinctum* No. 11 of Hoffmeister 1933).

Distribution

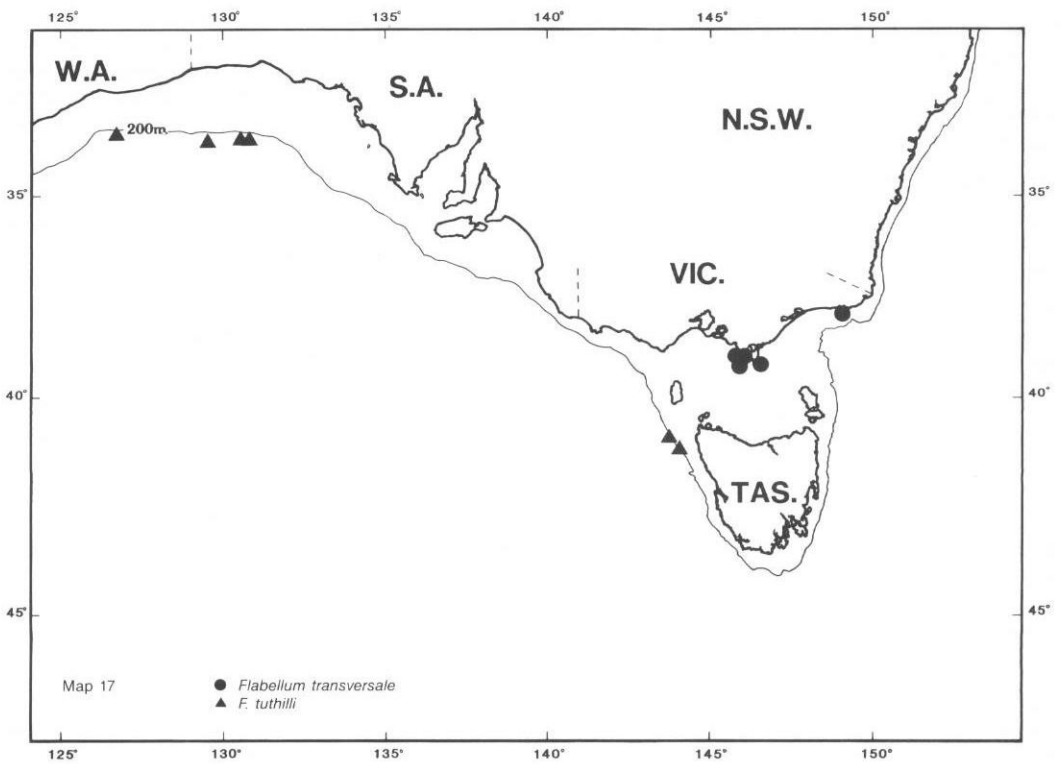
South-eastern Australia: continental shelf and slope from off south-eastern South Australia to Tasmania and New South Wales; 65-549 m.

39. *Flabellum (F.) transversale* Moseley, 1881
(Figs 15d, e, Map 17)

Flabellum transversale Moseley, 1881: 174, pl. 6, figs 6, 6a (*F. elongatum* in caption to plate).
Not *Flabellum transversale:* Thomson & Rennet, 1931: 41 (=*F. impensum*); Yabe & Eguchi, 1942a: 99 (=*Truncatoflabellum* sp.).

Description

Corallum flabellate, having rounded thecal edges and a relatively low range of thecal edge angle: 40°-50°. Largest specimen examined (NMV F56891) 26.8 x 14.6 mm in calicular diameter and 32.3 mm tall, only slightly larger than the holotype, which measures 25.5 × 13.9 mm in calicular diameter and 32.5 mm tall. Pedicel diameter 2.3-2.7 mm. Corallum dense; theca



often heavily encrusted. Calicular edge smooth (not serrate) and only slightly arched.

Septa hexamerally arranged in five cycles according to the formula $S_{1-3} > > S_4 > S_5$; however, pairs of S_5 are often missing in lateral half-systems. For example, the holotype lacks four pairs of S_5, resulting in 88 septa; the largest specimen lacks one pair of S_5, resulting in 94 septa; but some smaller specimens of 18-19 mm GCD have a full complement of 96 septa. S_{1-3} equal in size and by far the largest septa, consisting of low, finely dentate ridges for upper 2-3 mm near calicular edge, but becoming wide septa lower in fossa, their lower, inner edges reaching the columella. S_4 one-third to one-half width of S_{1-3}; S_5 rudimentary, septa of neither cycle attaining the columella. Columella a rudimentary fusion of lower, inner edges of S_{1-3}.

Discussion

Flabellum transversale is remarkably similar to *Rhizotrochus tuberculatus* (Tenison-Woods, 1879), especially to large specimens such as the largest from Tasmania (TM K421). Nonetheless, *F. transversale* is distinguished by lacking rootlets, and by its hexameral symmetry, more compressed and generally larger corallum, and more closely spaced septa.

Among the 28 Recent species attributed to the subgenus *Flabellum (Flabellum)* by Cairns (1989a), four others are known from the Australian/New Zealand region: *F. australe* (above), *F. angiostomum* Folkeson, 1919; *F. knoxi* Ralph & Squires, 1962; and *F. gracile* (Studer, 1877). The first three differ from *F. transversale* in having highly compressed coralla with correspondingly high GCD:LCD and edge angles; the corallum of *F. transversale* is almost campanulate, having a relatively low GCD:LCD ratio and low edge angle. And although *F. gracile* is not laterally compressed, its corallum is more fragile, has fewer septa, and is shaped differently from that of *F. transversale.*

Material Examined

Victoria: HMS 'Challenger' Stn 162, 39°10′S, 146°37′E, Bass Strait near Wilson's Promontory, 38 fms (=70 m), BMNH 1880.11.25.84, holotype of *F. transversale;* 'Kimbla' Stns K7/73-53, 55 m, NMV F56910(1), K7/73-55, 57 m, NMV F56893(1), K7/73-62, 66 m, USNM 85722(1) (*ex* NMV F56899), K7/73-65, 69 m, NMV F56962(2), K7/73-66, 68 m, NMV F 56904(1), K7/73-67, 68 m, NMV F56888(1), K7/73-69, 64 m, NMV F56897(1), K7/73-70, 64 m, NMV F56896(1), K7/73-71, 60 m, NMV F56891(1) (all in vicinity of Wilson's Promontory), K7/73-17, 101 m, NMV F56902(2).

Distribution

Continental shelf of south-eastern Australia: Victoria (mostly in the vicinity of Wilson's Promontory); 55-101 m.

40. *Flabellum (Ulocyathus) tuthilli* Hoffmeister, 1933 (Figs 16a-c, Map 17)

Flabellum tuthilli Hoffmeister, 1933: 7, 8, pl. 1, figs 3-5; Cairns, 1989a: 54.

Description

Corallum campanulate but laterally compressed, resulting in an elliptical calice with a GCD:LCD of 1.3-1.5. Angle of thecal edges changes with height: basally it is high (139°-152°), but 4-6 mm above base the edges turn upward, the thecal edge angle being reduced to 42°- 80°. At point of thecal edge inflection there is a small crest 1.7-2.0 mm high, above which the thecal edges are usually rounded, not acute or further crested. Inclination of rounded thecal faces 49°-61°. Largest specimen known (holotype) 44 × 32 mm in calicular diameter and 28.5 mm tall. Corallum fragile; calicular edges often damaged. Theca white, often porcellaneous, rarely with any developed costae. Calicular edge only very slightly scalloped, the theca rising to an apex about 0.5 mm high at every primary septum and about 0.3 mm high at every secondary and tertiary septum; quaternary septa do not have corresponding apices. Pedicel elliptical in cross section, the greater axis aligned with the principal costae: 1.7-2.2 × 2.5-2.7 mm in diameter and 1.5-2.0 mm tall. Septa octamerally arranged in a variable number of cycles, or stages of cycles, which roughly correlate to GCD. Specimens less than 32 mm GCD often have 64 septa arranged in three size-classes (16:16:32); 35-38 mm GCD, 96 septa, arranged in four size-classes (16:16:32:32), the 32 quaternary septa occurring as pairs flanking secondary (not tertiary) septa; 36-43 mm GCD, 128 septa (16:16:32:64, a full four cycles); and specimens over 43 mm GCD with additional quinary septa up to a total of 144 septa. Primary septa slightly exsert and symmetrically paired across fossa, their sinuous, vertical edges fusing in centre of fossa. Degree of septal edge sinuosity appears to be a function of proximity of opposing septal inner edges: the more closely they approach, the more sinuous they are, the inner edges sometimes forming a short lamella oriented perpendicular to septal edge. Secondary septa about three-quarters width of primaries, slightly sinuous, and attain the columella deep in fossa. Tertiary septa about half width of secondaries and do not merge with columella. Quaternary septa often rudimentary, only extending several mm down thecal face. Septal faces covered with prominent, pointed granules. Fossa deep and narrow (1.2-1.5 mm wide), containing a rudimentary columella consisting of a solid fusion of lower, inner edges of primary and secondary septa.

Discussion

Cairns (1989a) subdivided the subgenus *Flabellum (Ulocyathus)* into three morphological groups, one of

which (containing *F. tuthilli* and five other species) is characterized by having campanulate coralla. *F. tuthilli* is distinguished from the other five species in this group by having octameral rather than hexameral symmetry. *F. tuthilli* is more similar to *F. hoffmeisteri* sp. nov., with which it is compared in the Discussion of that species.

Material Examined

South Australia: Great Australian Bight, 129°28′E, 250-450 fms (=458-824 m), 'Endeavour', USNM 68230(1) (*ex* AM G12284), USNM 68231(1) (*ex* AM G12282) (paratypes no. 9 and 7 respectively of *F. tuthilli*).

Tasmania: 'Soela' Stn 40, 550 m, SAM H638(1); 'Soela' Stn 45, 520 m, SAM H639(2); 'Soela' Stn 51, 520 m, SAM H640(1), 641(14)/USNM 85708(3).

Distribution

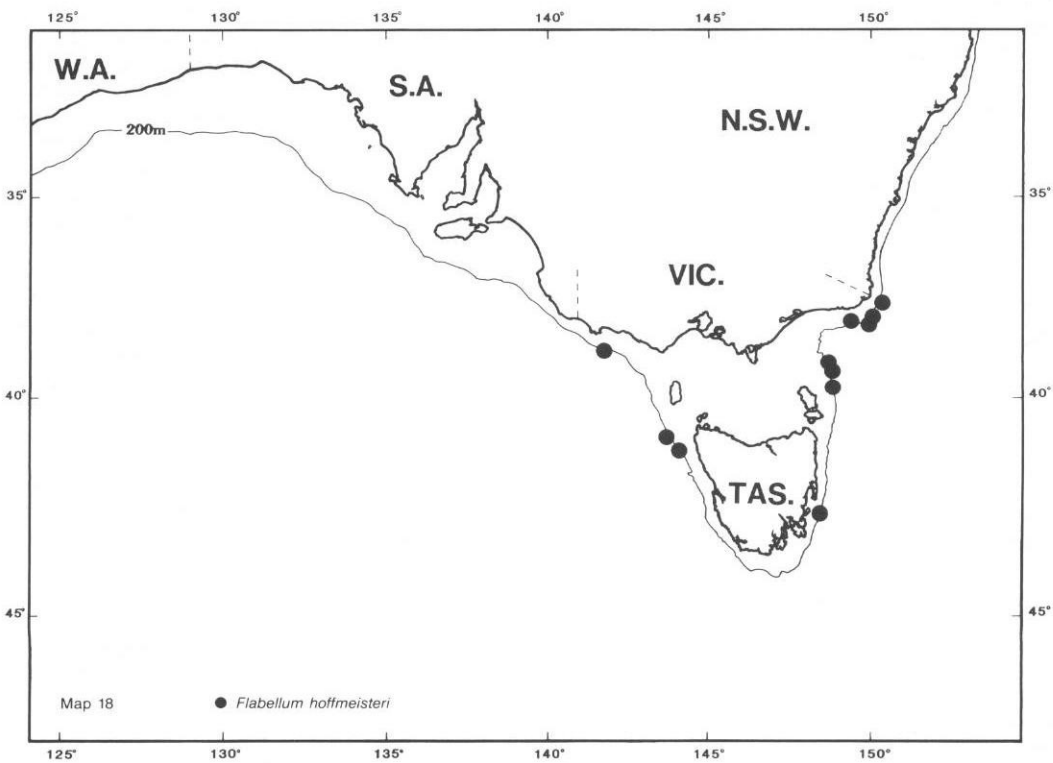
Australia: Great Australian Bight and Southern Ocean west to Western Australia (126°45.5′E), east to 46.5 km west of northern Tasmania; 348-824 m.

41. *Flabellum (Ulocyathus) hoffmeisteri* sp. nov. (Figs 16d-f, Map 18)

Flabellum japonicum: Hoffmeister, 1933: 7, pl. 1, figs 1, 2; Cairns, 1989a: 56, 57, pl. 29j, k.

Description

Corallum campanulate but laterally compressed, having an elliptical calice with a GCD:LCD of 1.50-1.75. Thecal edges straight to slightly carinate (up to 2.7 mm) from base to several mm below calicular edge, at which point the edges lack crests and decrease slightly in edge angle. Angle of carinate thecal edges 85°-105°. Inclination of thecal faces 50°-60°. Largest specimen examined (paratype from 'Soela'-27) 58.7 × 39.2 mm in calicular diameter and 42.7 mm tall. Corallum robust and dense in structure. Theca white, but sectioned by broad, radiating, reddish-brown stripes corresponding to 16 primary costae. Adjacent upper, outer edges of primary septa also characteristically dark brown in colour. Basalmost 80% of theca often worn or encrusted; usually only upper



5-8 mm of theca near calicular edge porcellaneous and well preserved. Calicular edge scalloped, the theca rising to an apex about 1.5 mm high at every primary septum and about 0.3 mm high at every secondary and tertiary septum. Pedicel elliptical in cross section: 1.8-2.0 × 2.3-2.7 mm in diameter and relatively short (about 1.5 mm).

Septa octamerally arranged in four size-classes. Specimens of approximately 41 mm GCD have 96 septa, arranged 16:16:32:32, the 32 quaternary septa occurring in pairs flanking the secondary (not the tertiary) septa, as in *F. tuthilli*. With increasing GCD, additional quaternary septa are added to vacant spaces between primary and tertiary septa, up to 118 septa in largest specimen. Septal morphology as in *F. tuthilli*. Fossa deep and narrow (about 2.6 mm wide), containing a rudimentary columella consisting of the solid fusion of the lower, inner edges of primary and secondary septa.

Discussion

Flabellum hoffmeisteri is very similar to *F. tuthilli* but differs consistently in several characters. It differs in shape, having relatively straight thecal edges that are crested for most of their length. The thecal edges of *F. tuthilli* change in angle slightly above the base and are crested only near the pedicel. This difference in shape results in a higher GCD:LCD for *F. hoffmeisteri*. Secondly, the calicular apices corresponding to the primary septa of *F. hoffmeisteri* are much higher than those of *F. tuthilli*. Thirdly, the primary costae and septa of *F. hoffmeisteri* are pigmented, whereas the entire corallum of *F. tuthilli* is white. Finally, the corallum of *F. hoffmeisteri* is heavy and dense, that of *F. tuthilli* light and delicate.

Flabellum hoffmeisteri differs from *F. japonicum* in having a different septal symmetry, a more compressed corallum, lower calicular apices, and a more robust corallum (Cairns 1989a).

Etymology

Named in honour of John Edward Hoffmeister, author of the report on deep-sea corals collected by the F.I.S. 'Endeavour' off New South Wales, Victoria, South Australia, and Tasmania.

Material Examined

Holotype

Victoria: 'Soela' Stn 27, 452 m, SAM H642(1).

Paratypes

Victoria: 'Soela' Stn 26, 436 m, SAM H644(1); 'Soela' Stn 27, 452 m, SAM H643(31)/USNM 85707(4); 'Kimbla' Stn K7/73-10, 328 m, NMV F56800(2); 'Soela' Stn 28, 656 m, SAM H645(1); Gabo I. to Cape Everard Ground, *ca* 200 fms (=*ca* 366 m), USNM 82012(1) (*ex* AM E5557) (*F. japonicum* of Hoffmeister 1933); 'Soela' Stn 1-85-42, 400-452 m, NMV F56801(1); 'Soela' Stn 2-84-69, 472-478 m, NMV F56782(8); 'Halcyon' Stn 1, 550 m, NMV F56796(1).

Eastern Bass Strait: 'Soela' Stn 2-84-73, 444-474 m, NMV F56783(7); 'Soela' Stn 2-84-66, 448-480 m, NMV F56784(3); 'Soela' Stn 21 (1984), 432 m, SAM H648(3); 'Soela' Stn 19, 660 m, SAM H647(1); 'Soela' Stn 16 (1984), 476 m, SAM H646(7); 'Kimbla' Stn K7/73-41, 421 m, NMV F56790(4).

Tasmania: 'Soela' Stn 5-84-69, 432-460 m, NMV F56828(1); 'Soela' Stn 84-87, 506 m, NMV F56781(12)/USNM 85727(2); 'Soela' Stn 51, 520 m, SAM H649(1); 'Soela' Stn 2-84-81, 510-526 m, NMV F56970(3).

Distribution

South-eastern Australia: Continental slope from east of Gabo I., Victoria, southwards into Tasmanian waters and west to off western Victoria (38°50′S, 141°46′E); mainly 328-660 m, with one record at 110 m off Cape Pillar, Tasmania (Hoffmeister 1933).

Placotrochides Alcock, 1902

42. *Placotrochides scaphula* Alcock, 1902
(Figs 15h, i, Map 14))

Placotrochides scaphula Alcock, 1902: 34, pl. 4, figs 32, 32a; Cairns, 1989a: 78, 79, pls 40l, 41a-e (synonymy).

Description (Victorian specimens)

Corallum (anthocyathus) a laterally compressed cylinder with rounded, parallel thecal edges. Larger specimen 4.8 × 3.3 mm in calicular diameter (GCD:LCD = 1.45), 6.75 mm tall, and 5.0 × 3.3 mm in basal scar diameter. Epitheca thin, composed of wide (0.5 mm), flat costae, separated by very narrow (about 50 μm), shallow intercostal striae. Rows of chevron-shaped growth lines occur on each costa, the apices of the chevrons corresponding to the intercostal striae. Anthocaulus unknown.

Twenty-eight septa occur in larger of two specimens, arranged in three cycles: 11:11:6. Eleven primary septa slightly exsert and have straight inner edges that attain the columella. Secondary septa variable in width: those in lateral sectors almost as large as primaries and reach the columella, but those in or near end sectors only about half width of primaries and do not reach columella. Three pairs of very rudimentary tertiary septa occur in three of the four end sectors. Septal faces bear tiny, pointed granules. Columella large and trabecular, occupying about one-third of LCD.

Discussion

The larger of the Victorian specimens appears to be immature, as judged by its apparently incomplete septal complement and smaller corallum compared with the specimens reported by Cairns (1989a) from the Philippines.

Material Examined
Victoria: 'Franklin' Stn Slope 33, 930 m, NMV F57173(2).

Distribution
Continental slope of south-eastern Australia: south of Point Hincks, eastern Victoria; 930 m. Philippines, Indonesia; 476-1628 m (Cairns 1989a: 79).

This is the first report of the genus from Australian waters.

Rhizotrochus Milne Edwards & Haime, 1848

43. *Rhizotrochus tuberculatus* (Tenison-Woods, 1879), comb. nov.
(Figs 16g-i)

Vasillum tuberculatum Tenison-Woods, 1879: 93, pl. 10, figs 3a, b.
Flabellum tubuliferum Tenison-Woods, 1880: 301 (new synonymy).
Rhizotrochus radiatus Dennant, 1904: 2, 3; Howchin, 1909: 244; Cairns, 1989a: 79 (new synonymy).
Monomyces radiatus: Squires, 1966: 172, pl. 1, figs 1, 2; Shepherd & Veron, 1982: 177, fig. 4.54f.

Description
Corallum campanulate but laterally compressed, resulting in an elliptical calice having a GCD:LCD of 1.4-1.8. Largest specimen known (TM K421) 26.3 × 19.3 mm in calicular diameter and 30.9 mm tall; however, populations more typically 10-15 mm in GCD. Pedicel stout, 2.0-2.7 mm in diameter and equally tall. Corallum further stabilized by a ring of six adventitious rootlets, each corresponding to an S_1. Rootlets round to elliptical in cross section, initially hollow but secondarily filled in with calcium carbonate, about 1.6 mm in greater diameter. Eventually, the rootlets attain the substrate and help stabilize the corallum; however, it is common to find the delicate rootlets broken off, revealing only scars of attachment. The ring of six rootlets occurs in the theca 4-6 mm above the base; however, in approximately one-third of the specimens examined, an additional pair of rootlets is present at a height of about 8.0 mm, occurring on the lateral thecal edges aligned with the principal $S_1$1.

Septa hexamerally arranged in four cycles ($S_{1-2} > S_3 > S_4$) in small specimens (*e.g.*, GCD ≤= 11 mm); but, with increase in corallum size, some S_2 accelerate in size equivalent to that of S_1 and generate accompanying flanking septa. Thus, if the four end half-system S_2 accelerate, the symmetry becomes 16:16:32 (64 septa), and if all six S_2 accelerate, the symmetry is 18:18:36 (72 septa), the latter complement being the most common and characteristic of coralla 15-17 mm in GCD. The largest specimen of GCD 26.3 mm from Tasmania (TM K421) has 18 primary septa and an additional five pairs of quaternary septa for a total of 82 septa, and Dennant (1904) reported a symmetry of 20:20:40 (80 septa) for a specimen of 19 mm GCD. Primary septa nonexsert (in fact, attenuate near calicular edge), and have straight, vertical inner edges that are symmetrically arranged across the fossa, such that the primary septa can be easily counted in pairs. Secondary septa much smaller, about one-quarter width of primaries; tertiary septa rudimentary, approximately one-quarter size of secondaries. Fossa deep and elongate. Columella composed of a diffuse fusion of lower, inner edges of primary septa.

Discussion
Cairns (1989a) discussed *Rhizotrochus* and its five species in the context of his revision of the Philippine ahermatypes. SDC now believes *R. levidensis* Gardiner, 1899, to be a valid species, and *R. radiatus* a junior synonym of *R. tuberculatus*. Although the type was not examined, the original description and figures of *Vasillum tuberculatum* are perfectly consistent with a small, hexamerally symmetrical specimen of *Rhizotrochus radiatus* Dennant, 1904. Furthermore, the type-localities of both species are the same.

In the following year, Tenison-Woods (1880) described another species from Bass Strait, *Flabellum tubuliferum*, which, from its original description, must also be a young *R. tuberculatus*.

Material Examined
Western Australia: Cape Leeuwin, WAM 12090 (1); Augusta, WAM 358-79(1); Point d'Entrecasteaux, WAM 28/33-43(6); Hopetoun, WAM 419-86(1); Ellensbrook, JV, SAM H651(2).
South Australia: West Franklin I., 'rockpools & shallows', WZ, PA 26.i.1983, SAM H652(1); Pearson I., intertidal, SS 26.vi.1973, SAM H653(1); near Partney Shoal, 10-25′ (=3-7.6 m), WZ, KGH 22.i.1986, SAM H654(1); Kirkby I., 20-30′ (=6.1-9.2 m), NH, KGH 31.i.1986, SAM H655(1) ; Osmanli Reef, off Point Tinline, Kangaroo I., 10-20′ (=3-6.1 m), WZ, KGH 25. i. 1989, SAM H723 (3); Point Ellen, Vivonne Bay, Kangaroo I., 8-25′ (=2.4-7.6m), WZ, KGH 26.i.1989, SAM H724(2); Gulf St Vincent, 20 fms (=37 m), JV, SAM H656(8); Newland Head, 20 fms (=37 m), JV, SAM H657(2); Encounter Bay, 20 fms (=37 m), JV, SAM H658(2); lagoon just E of Margaret Brock Reef Lighthouse, off Cape Jaffa, 20-28′ (=6.1- 8.5 m), WZ, KGH, LH 18.ii.1989, SAM H725(1); off Beachport, 40 fms (=73 m), JV, SAM H659(3); Nene Valley, 7′ (=2.1 m), NH 10.i.1981, SAM H661(2); no locality, JV, SAM H660(21)/USNM 85712(4).
Victoria: Pope's Eye, Port Phillip, NMV F56785(5), USNM 82094, 82095(7) (*M. radiatus* of Squires 1966); Ocean Beach, Point Nepean, 10′ (=3 m), NMV F56786(3) (Squires 1966).
Tasmania: NE of Hunter I., 28 fms (=51 m), NS 13.v.1981, TM K1015(1); 7 Nm (=12.8 km) NE of Burnie, 43 m, NWAPS Stn 9, 2.ii.1970, TM K421(1).

Distribution

Southern Australia: continental shelf from Cape Leeuwin, Western Australia, east to Port Phillip Bay, Victoria and north-western Tasmania; 0-73 m.

Suborder Dendrophylliina Vaughan & Wells, 1943
Family DENDROPHYLLIIDAE Gray, 1847

Balanophyllia S. Wood, 1844

44. *Balanophyllia bairdiana* Milne Edwards & Haime, 1848
(Figs 17a-c)

Balanophyllia bairdiana Milne Edwards & Haime, 1848b: 87; Milne Edwards & Haime, 1857: 103; Moseley, 1881: 190-192, pl. 12, figs 4-7; Wells, 1964: 109; Shepherd & Veron, 1982: 178, fig. 4.55a, pl. 20. 1; Veron, 1986: 586, 587, figs 1-5.
(?)*Homophyllia incrustans* Dennant, 1906: 161, pl. 6, figs 3a, b; Howchin, 1909: 247.
(?)*Heteropsammia elliptica* Tenison-Woods, 1878: 339-340, pl. 6, figs 3a, b.

Description

Corallum conical but strongly compressed in larger specimens, resulting in an elliptical calice having a GCD:LCD ratio up to 1.75-2.0. Smaller coralla less compressed, having almost circular calices. Thecal edges rounded. Corallum firmly attached by a thick pedicel about half GCD in size. Largest specimen examined ('Challenger' Stn 162) 28.4 x 13.7 mm in calicular diameter and 32.3 mm tall; however, the holotype of Milne Edwards & Haime (1848b) was stated to be 40 mm tall. Theca thick (about 1.5 mm) and porous, covered by numerous longitudinal rows of fine teeth; in large specimens distinct costae and intercostal striae are not apparent. Basal one to two-thirds of theca covered by a thin, transversely corrugated epitheca.

Septa hexamerally arranged in five complete cycles. Small specimens, such as those reported by Shepherd & Veron (1982), have only four cycles of septa (48 septa), whereas large specimens, such as the one reported by Moseley (1881), have a partial sixth cycle of septa, occurring as pairs of S_6 in the four end half-systems (108 septa). S_{1-2} equal in size, slightly exsert, and quite narrow (0.2 mm wide), independent but not quite attaining the columella. Inner edges of S_{1-2} vertical, straight, and entire; septal faces not porous. S_3 also independent and nonporous, with entire inner edges, and about two-thirds width of S_{1-2}. Remaining septa arranged according to Pourtalès Plan. S_4 small, about 0.8 mm wide, and slightly porous, with dentate to laciniate inner edges. S_5 adjacent to S_3 are similar in size and shape to S_4. S_5 adjacent to S_1 or S_2 are larger, about the size of an S_3, and fuse with the smaller S_5 in its quarter-system, forming a single lamella before the S_4, which extends to the columella. Pairs of fused S_5 lamellae within each half-system curve toward each other, but do not quite meet in a position before the S_3. Fossa deep, elongate, and broad: approximately one-third width of calice. Columella elongate and spongy, approximately 2.5 mm wide.

Discussion

The holotype and only known specimen of *Homophyllia incrustans* Dennant, 1906, is apparently lost, but its original description and illustrations indicate that it was a juvenile ('spat') of a larger species, perhaps a *Balanophyllia* or *Culicia*. Both genera are known to be epithecate at this early stage of development. A preference for an identification with *Balanophyllia* is based on the apparent Pourtalès Plan of the holotype. Likewise, although the type has not been examined, the original description and figures of *Heteropsammia elliptica* Tenison-Woods, 1878, are indistinguishable from *B. bairdiana*.

Material Examined

Victoria: Cape Woolamai, Phillip I., 24-31 m, 26.i.1970, NMV F56812(1), 'apricot colour when alive'; The Pinnacles, 1 Nm (=1.8 km) off Cape Woolamai, 15.xi.1970, NMV F56813(1); 'Kimbla' Stns K7/73-65, 69 m, NMV F56898(3), F56906(1), K7/73-66, 68 m, NMV F56901(3), K7/73-67, 68 m, NMV F56890(1), K7/73-68, 68 m, NMV F56803(4), K7/73-69, 64 m, NMV F56905(5), K7/73-71, 60 m, NMV F56907(3) (all from W and SW of Wilson's Promontory); HMS 'Challenger' Stn 162, near Wilson's Promontory, 38 fms (=70 m), BMNH 1880.11.25.139 (Moseley 1881); E of Lakes Entrance, 26.v.1959, NMV 56795(2); 'Kimbla' Stn K7/73-24, NMV F56830(4); S side of Gabo I., 25 m, 16.ii.1973, NMV F56822(12)/USNM 85724(3), 25 m, 17.ii. 1973, NMV F56802(3), 23 m, 16.ii.1973, NMV 56806(3); Gabo I., no date, SAM H662(6), 'orange colour'.
Eastern Bass Strait: Erith I., Kent Group, v.1974, NMV F56820(1).
Tasmania: Burnie, NWAPS, 26.i.1970, TM K423(1); 8 Nm (=14.6 km) NE of Burnie, NWAPS, 45 m, 2.ii.1970, TM K422(1); 'Hai-Kung' Stn 1, 68 m, NMV F56797(1).
New South Wales: Port Jackson, BMNH 1973.11.2.1(1).
Queensland: Thomas I., USNM 85711(6).

Distribution

Continental shelf of south-eastern and eastern Australia: north-western Tasmania, Bass Strait, Victoria (west to Phillip I.), New South Wales, and Queensland north to Thomas I., 23-70 m. Also ? Gulf St Vincent, South Australia (type-locality of *Homophyllia incrustans* Dennant).

45. *Balanophyllia dentata* Tenison-Woods, 1879
(Figs 17d-g)

Balanophyllia dentata Tenison-Woods, 1879: 98, 99, pl. 10, figs 1, 1a.
[?]*Balanophyllia dilatata* Dennant, 1904: 10, pl. 1, figs 2a, b.

Description (holotype)

Corallum ceratoid, 9.0 × 7.5 mm in calicular diameter, 14.5 mm tall, and attached by a robust pedicel 5.1 mm in greater diameter. Specimen dead when collected and therefore somewhat deteriorated. Thin epitheca extends almost to calicular edge, heavily encrusted with bryozoans and serpulids; costae obscured. Septa hexamerally arranged in four complete cycles: S_{1-2} equal in size, the S_{3-4} arranged in the Pourtalès Plan. S_{1-2} moderately exsert (1 mm), with thick upper edges and thin, entire inner edges. S_{1-2} not broad, extending only about 0.4 distance to epicentre in upper calice. S_3 smallest and least exsert septa, having regularly dentate to laciniate inner edges. S_4 about half as exsert as S_{1-2}, meeting in pairs before S_3 in each half-system and extending slightly farther into columella than S_{1-2}. Inner edges of S_4 also regularly dentate to laciniate, like the S_3. Fossa deep. Columella an elliptical, spongy mass attached to lower, inner edges of $S_{1-2,4}$.

Discussion

In addition to the holotype, two previously unreported specimens from off Port Jackson (BMNH 1883.11.29.71,72) were also examined. The larger of the two (13.2 × 7.0 mm in calicular diameter), has an elongate calice and 84 septa, including an almost complete fifth cycle. The smaller (10.6 × 7.0 mm in calicular diameter), also with an elongate calice, has 56 septa. The distribution of *B. dentata* thus overlaps that of *B. bairdiana* and the larger specimens of *B. dentata* resemble *B. bairdiana* in shape and septal number. *B. dentata* is nonetheless distinguished by the finely laciniate inner edges of its higher cycle septa (*i.e.*, S_{3-5}), its relatively narrow S_{1-2}, and smaller adult corallum.

Although the type was not examined, the original description and figures of *B. dilatata* Dennant, 1904, agree with the holotype of *B. dentata*. Points of similarity include: an encrusted theca, 48 septa, dentate higher cycle septa, and, coincidentally, about the same calicular diameter (*i.e.*, 9 × 7 mm) as the type. The types of both species were collected from 'southern Australia'.

Material Examined

'Southern Australia', holotype of *B. dentata*, Macleay Museum; off Port Jackson, New South Wales, BMNH 1883.11.29.71,72(2).

Distribution

Australia: ?Port Phillip Bay, Victoria (probable type-locality of *B. dilatata*) ; Port Jackson, New South Wales; depth-range unknown.

Notophyllia Dennant, 1899

46. *Notophyllia recta* Dennant, 1906
(Figs 17h, 18a, d)

Notophyllia recta Dennant, 1906: 163 (in part: pl. 5, figs 4a, b; not specimens from Cape Jaffa); Howchin, 1909: 248 (in part: not specimens from Cape Jaffa); Boschma, 1952: 239-245 (in part: pl. 1, figs 4-8, 13, 17, 21-26).

Description

Corallum (anthocyathus) cuneiform, almost rectangular in lateral view, with parallel to only slightly divergent, rounded thecal edges. Largest specimen examined (USNM 83013) 5.4 × 2.9 mm in calicular diameter and 5.3 mm tall. Calice elliptical, GCD:LCD 1.8-1.9. Base even more compressed (pinched) than thecal faces; basal scar as large as calicular diameter. Theca white and porous, uniformly covered by small spines not segregated into costae. Epitheca lacking. Anthocaulus unknown.

Septa decamerally arranged in two or three cycles, depending on corallum size: 10:10, in specimens of 2-4 mm GCD; 10:10:8, in larger specimens of approximately 5 mm GCD. Primary septa slightly exsert and extend about two-thirds distance to columella in upper calice; however, extreme lower, inner edges do fuse with columella. Secondary septa of lateral sectors slightly less exsert and about three-quarters width of primaries, their lower, inner edges also merging with the columella deep in fossa. Secondary septa in four end-sectors rudimentary, only about 0.3 mm wide. Tertiary septa, which occur only as pairs in four end sectors of larger coralla, of about equal width to secondary septa in those sectors and usually fuse to those secondary septa deep within fossa. Inner edges of all septa straight. Fossa shallow, containing an elongate, thin, lamellar columella, joined by the lower, inner edges of the primary and secondary septa low in fossa.

Discussion

Although Dennant's (1906) type material could not be found, it is reasonable to assume that the two much larger worn specimens from off Cape Jaffa, 238 m, pertain to *N. etheridgi*, not *N. recta*.

Dennant's original description cited 26 septa per calice; however, his illustration clearly shows 28 septa, the latter number being more consistent with the symmetry of the species and all subsequently examined specimens.

Five species of *Notophyllia* have been described: *N. semivestita*, *N. gracilis*, and *N. aperta*, all described by Dennant (1899b) from the Miocene of Victoria, and the Recent *N. recta* Dennant, 1906 and *N. etheridgi* Hoffmeister, 1933. A sixth, undescribed species occurs off Western Australia (specimens in SAM). The two Recent described species are distinguished from the three fossil species by their decameral rather than hexameral symmetry. Based on a series of 39 specimens of *Notophyllia* collected from three localities off southern New South Wales and Victoria, Boschma (1952) concluded that *N. etheridgi* was a junior synonym of *N. recta*, simply representing the larger adult stage, with more septa in total but fewer major septa. We disagree with this conclusion, believing them to be two distinct species. *N. recta* differs in having a consistently smaller corallum, virtually parallel thecal edges, fewer septa (28 *vs* 48), and much larger secondary septa. The lower, inner septal edges of *N. recta* fuse with the columella deep in the fossa, whereas those of *N. etheridgi* do not.

Material Examined

Western Australia: King George Sound, 22-28 fms (=40-51 m), JV, SAM H665(1).
South Australia: 32 Nm (=58.5 km) SSW of St Francis I., 35 fms (=64 m), AM G12672(2).
Eastern Bass Strait: 'Kimbla' Stn 79-K-1-35, 110 m, NMV F56884(4)/USNM 85752(1); 'Soela' Stn 22, 92 m, SAM H719(1).
New South Wales: 'Kapala' Stn 78-27-01, 264 m, USNM 83013(2).

Distribution

Continental shelf of southern and south-eastern Australia: King George Sound, Western Australia, Great Australian Bight, South Australia, and eastern Bass Strait north to Eden, New South Wales; 40-174 m; continental slope: New South Wales off Broken Bay, 264 m, and at 32 km north-east of Port Jackson, 458 m.

47. *Notophyllia etheridgi* Hoffmeister, 1933
(Figs 18b, c)

Notophyllia recta Dennant, 1906: 163 (in part: specimens from Cape Jaffa); Howchin, 1909: 248 (in part: specimens from Cape Jaffa); Boschma, 1952: 239-245 (in part: pl. 1, figs 1-3, 9-12, 14-16, 18-20, 27-30).
Notophyllia etheridgi Hoffmeister, 1933: 13, 14, pl. 4, figs 1-3.

Description

Corallum (anthocyathus) cuneiform, with straight thecal edges, a straight, tapered corallum base, and relatively lamellar thecal faces. Edge angle about 35°; face angle about 15°, producing an elliptical calice having a GCD:LCD of 2.0-2.5. Largest specimen known 12.5 × 6 mm in calicular diameter and 13.5 mm in height, with a base width of 4.0 mm. Theca white and minutely porous, covered by numerous, closely spaced, longitudinal rows of small granules. Granular rows, taken individually or in groups, do not correspond to septa. Epitheca absent. Anthocaulus unknown.

Septa decamerally arranged in four cycles, the fourth often incomplete, often resulting in 48 septa: 10:10:20:8. Primary septa narrow (about 1.5 mm wide) and only slightly exsert, with straight, vertical inner edges that fuse to columella. Remaining septa much smaller, all approximately the same size (0.4 mm wide), except for the secondary septa of the 4 end-sectors, which are larger (approximately 1.1 mm wide). The four pairs of quaternary septa are developed only adjacent to tertiary septa in the end half-sectors. Fossa deep, elongate, and spacious. Columella a thin lamella of approximately same thickness as a primary septum.

Discussion

Notophyllia etheridgi is distinguished from its congeners by its highly compressed corallum and large number of septa. It is compared with *N. recta* in the Discussion of that species.

Although not apparent from the 10 specimens examined, it is probable from examination of representatives of the other four described species of *Notophyllia* that young specimens of all *Notophyllia* undergo transverse fission, evidenced by a straight, V-shaped scar across the base of each specimen. When the bases of *N. etheridgi* are examined closely, the characteristic pinched thecal faces can be seen, indicative of transverse division. The generic diagnosis should thus be amended to reflect this mode of asexual reproduction, common in many other ahermatypic coral genera (Cairns 1989c). All of the specimens described heretofore are thus considered to be the terminal, free anthocyathus stage of the asexual division process.

Material Examined

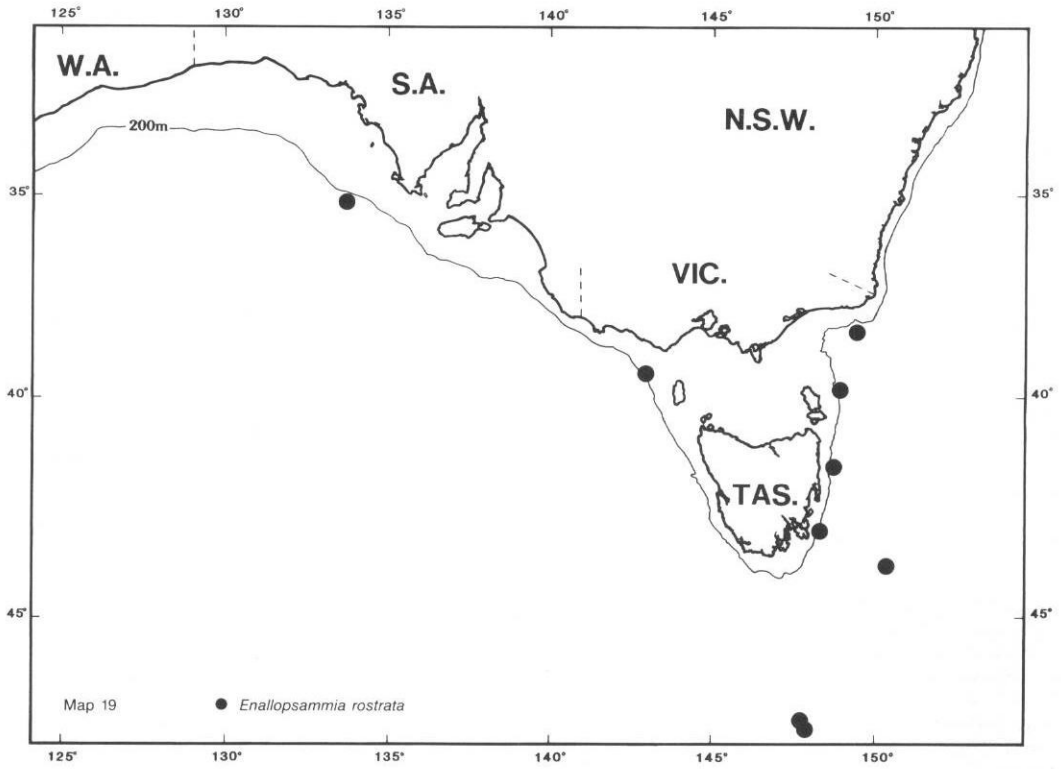
Eastern Bass Strait: 'Kimbla' Stn 79-K-1-38, 73 m, NMV F56886(2)/USNM 85723(1).
New South Wales: off Eden, 20-24 fms (=37-44 m), 'Endeavour', USNM 68229(2) (*ex* AM E5537; paratypes of *N. etheridgi*).

Distribution

Australia: south-eastern continental shelf: eastern Bass Strait north to off Eden, New South Wales; 37-174 m; off Cape Jaffa, South Australia, 238 m (Dennant 1906).

Enallopsammia Michelotti, 1871

48. *Enallopsammia rostrata* (Pourtalès, 1878)
(Figs 18e-i, Map 19)



Amphihelia rostrata Pourtalès, 1878: 204, pl. 1, figs 4, 5.

Enallopsammia rostrata: Cairns, 1979: 186-188, pl. 37, figs 2, 3, 6; Cairns, 1982: 57, pl. 18, figs 1-4 (synonymy); Cairns, 1984: 27-28.

Description

Corallum flabellate and massive, the largest Australian specimen examined 16 cm tall and 4.3 cm in basal branch diameter. Branching frequent and extratentacular; branch anastomosis common. Dead coralla often create niches for other corals, bryozoa, sponges, gastropods, crustaceans, and serpulids. Coenosteum covered by longitudinal costae of equal width, separated by deep, narrow intercostal striae, giving branches a distinctive striate appearance.

Calices 5-6 mm in diameter, occurring only on one face of corallum, uniserially on distal branches. Calices circular to teardrop-shaped, the elongation caused by a prominent adcauline to lateral costoseptal rostrum formed by the enlargement of five or six septocostae. Septa hexamerally arranged in three to four cycles (24-36 septa). S_{1-2} equal in size and extend to the columella. S_3 slightly shorter, pairs of S_3 in each half-system fusing to adjacent S_2 near columella. Pairs of S_4, if present, also merge to adjacent S_3, but higher in fossa. Columella circular, papillose to spongy.

Discussion

Enallopsammia rostrata is the only species in its genus to have unifacial corallites and rostrate calices, although rostra are not always present (Cairns 1984).

Material Examined

South Australia: 'Longva III' Stn 49, 909 m, SAM H717(1).

Victoria: 'Derwent Venture' Stn 2, 732-1 098 m, USNM 85730(1) (*ex* NMV F57077); 'Kimbla' Stns K7/73-5, 823 m, NMV F57155(1).

Eastern Bass Strait: K7/73-42, 640 m, NMV F57180/USNM 85732(1).

Tasmania: 'Soela' Stn 16 (1987), 1 090-1 150 m, TM K1125(1); FRV 'Challenger' Stn 2, 960 m, TM K1124(1).

Cascade Plateau: 'Labrador' Stn 2, 1 050-1 100 m, SAM H729(1).

Distribution

Australia: southern and south-eastern continental slope from South Australia (133°48′E) east to eastern Tasmania, the Cascade Plateau and the eastern approaches to Bass Strait; 640-1 150 m. Cosmopolitan except for eastern Pacific and off continental Antarctica: 229-2 165 m.

Although Cairns (1982) reported this species from the South Tasmanian Rise, the above records are the first from Australia proper.

TABLE 1. Scleractinian species recorded from South Australia, Victoria and Tasmania, with indications of extralimital distribution and depth-range.

	Areas (see Key)											Depth (m)	
Species (* endemic to Australia)	1	2	3	4	5	6	7	8	9	10	11	Australia	Elsewhere
Fungiacyathus paliferus		X					X					457-823	75-522
**F. dennanti*			X	X								190-238, 720-770	
Letepsammia formosissima			X	X	X		X	X	X			128-457	97-470
**Coscinaraea marshae*	X	X										0-20	
**C. mcneilli*	X	X	X		X							0-33	
Plesiastrea versipora	X	X	X	X	X	X	X					0-30	0-30
**Culicia australiensis*	X	X	X	X								3-238	
**C. hoffmeisteri*	X	X	X	X	X							0-29	
**Astrangia atrata*		X	X	X	X							9-40	
Scolymia australis	X	X	X	X		X	X					0-16.8	?
Anthemiphyllia dentata	X			X	X	X	X					128-272	75-522
**Caryophyllia planilamellata*		X	X	X								128-714, 1 220	
C. sarsiae				X					X	X	X	400, 930-1 150	520-2 200
**Crispatotrochus inornatus*				X	X							146-220	
**Paraconotrochus zeidleri*				X	X							457-520	
Conotrochus cf. funicolumna				X			X	X				442	165-600
Aulocyathus recidivus			X	X							X	128-399, 1 000	366
**Paracyathus vittatus*			X									31	
Stephanocyathus platypus			X	X	X				X			183, 560-1 219	622-913
**Stephanocyathus* sp.				X								520	
Stephanocyathus spiniger		X					X					366	120-560
Deltocyathus magnificus			X	X			X					150-170, 1 500	88-522
Desmophyllum cristagalli	X	X	X	X	X		X	X	X	X	X	37-1 281	35-2 460
Solenosmilia variabilis	X	X	X	X	X		X		X	X	X	640-1 150	220-2 165
**Trematotrochus verconis*			X									73-101	
**T. alternans*	X	X	X	X	X							27-238	
**Holcotrochus scriptus*			X		X							9-185	
**H. crenulatus*		X	X									40-101	
**Platytrochus laevigatus*	X	X	X									22-51, ?165	
**P. hastatus*	X	X	X	X								27-148	
**Platytrochus parisepta*			X									40, 201	
**Australocyathus vincentinus*	X	X	X									16-148	
Peponocyathus australiensis			X			X	X	X	X	X		339, 549	44-635
**Idiotrochus emarciatus*			X									82-238	
**Dunocyathus parasiticus*			X	X	X							64-549	
Guynia annulata			X				X	X		X		164, 238	28-653
Stenocyathus vermiformis				X	X	X			X	X	X	455, 1 500	80-1 229
**Flabellum australe*			X	X	X							65-549	
**F. transversale*				X								55-101	
**F. tuthilli*	X	X		X								348-824	
**F. hoffmeisteri*				X								110, 328-660	
Placotrochides scaphula				X			X					930	476-1 628
**Rhizotrochus tuberculatus*	X	X	X	X								0-73	
**Balanophyllia bairdiana*			?	X	X	X						23-70	
**B. dentata*				?	X							?	
**Notophyllia recta*	X			X	X							40-174, 458	
**N. etheridgi*			X	X	X							37-174, 238	
Enallopsammia rostrata		X		X								640-1 150	229-2 165

Key to Table 1

1. Southern Western Australia
2. South Australia west of Eyre Peninsula
3. South Australia east of Eyre Peninsula
4. Victoria, Bass Strait and Tasmania
5. New South Wales
6. Queensland (including Great Barrier Reef and Torres Straits)
7. Indo-West Pacific (including Red Sea, Indian Ocean, Japan, Philippines, Indonesia)
8. Central to eastern Pacific
9. New Zealand
10. Atlantic Ocean
11. Subantarctic and Antarctic Regions (of Cairns 1982: 60, map 4)

Zoogeography

The zoogeography of the scleractinian corals of south-eastern Australia is poorly known. Vaughan & Wells (1943: 88) wrote: 'The waters off the southern and southeastern coasts of Australia from the Great Australian Bight through Bass Strait to the latitude of Brisbane . . . have in depths from 18 to 915 meters, a distinctive [scleractinian] fauna of over 50 species of which only 14 are identical with species of other faunas.' Squires (1961: 18) gave a list of 41 species recorded from the South Australian Shelf (southern Western Australia to New South Wales), observing that this fauna was not related to the coral faunas of temperate regions but was largely unique and autochthonous, which he attributed to 'a great many of the endemic genera' having been autochthonous in the Tertiary of Victoria.

Below, we offer a preliminary analysis of the zoogeographic relations of the south-eastern Australian scleractinian fauna. Although our principal study covers only South Australian, Victorian and Tasmanian species, our findings agree with those of Vaughan & Wells (1943) and Squires (1961), that there is indeed pronounced endemism in the scleractinians of southern Australian waters.

Endemic Species

Of the 48 species listed from South Australia, Victoria and Tasmania (Table 1), 30 (62.5%) are known only from Australia. Whereas endemism appears pronounced, its degree varies with depth, being highest among those species occurring wholly or largely on the continental shelf and lowest amongst those occurring wholly or largely on the continental slope (Table 2).

Among the 30 Australian endemics found in South Australia, Victoria and Tasmania, one *(Coscinaraea marshae)* is essentially Western Australian. Of the remaining 29, all occur in eastern South Australia (19) or Victoria/Tasmania (19) or in both regions, with 13 species occurring in western South Australia, 11 in southern Western Australia, 12 in New South Wales and two in Queensland. There thus seems to be a distinctive endemic scleractinian fauna concentrated in south-eastern Australia that becomes attenuated westwards and northwards. In New South Wales and Queensland this attenuation is accompanied by the appearance of other species, such as the 10 or so known only from the New South Wales shelf and the eight endemic to, or occurring, south to the south Queensland shelf (Tenison-Woods 1878, Wells 1964).

TABLE 2. Relation of endemicity to depth.

	Wholly or mainly shelf	Shelf and slope extensively	Wholly or mainly slope
Endemic	20	6	4
Non-endemic	2	6	10

Non-endemic Species

Of the 48 species known from South Australia, Victoria and Tasmania, 18 (37.5%) occur beyond Australia. Seven of these are widespread (cosmopolitan), and all seven known from the Atlantic (those known also from the Arctic/Subantarctic are asterisked): *Caryophyllia sarsiae, *Desmophyllum cristagalli, *Solenosmilia variabilis, Peponocyathus australiensis, Guynia annulata, *Stenocyathus vermiformis,* and **Enallopsammia rostrata.* One species, *Aulocyathus recidivus,* is additionally known only from the subantarctic Macquarie Ridge. Another species, *Stephanocyathus platypus*, is additionally known only from off New Zealand. The remaining nine species have broader distributions in the Indo-Pacific: *Fungiacyathus paliferus, Letepsammia formosissima, Plesiastrea versipora, Scolymia australis, Anthemiphyllia dentata, Stephanocyathus spiniger, Deltocyathus magnificus, Conotrochus funicolumna* and *Placotrochides scaphula.*

Thus, of the non-endemic species, the largest group is the Indo-Pacific element (nine spp. or 50%), followed by the cosmopolitan element (seven spp., 38.9%), and the New Zealand and Subantarctic elements, with one species (5.5%) each. Of the 18 species, only two are in Australia confined to the continental shelf, the reef-forming *Plesiastrea versipora* and *Scolymia australis*. These two shallow-water species are the only ones of the Indo-Pacific group in which the Indo-Pacific populations and those of southern Australia are known to be geographically continuous. In most others of the group there are extensive gaps in distribution between the Indo-Pacific and southern Australia, along both the western and eastern coast of Australia, gaps that further collecting may show to be unreal.

Wiedenmayer (1989), in a zoogeographical analysis of the sponge fauna of Bass Strait, found a strong affinity with that of the Indo-Pacific, a significant representation of cosmopolitan species (which he called the Tethyan element), a weak affinity with the New Zealand fauna and almost none with the Subantarctic-Antarctic faunas. Although the present study is not strictly comparable (for Wiedenmayer's samples were all from depths no greater than 79 m and from the Bass Strait region only), the relative degrees of zoogeographic affinity shown by the south-eastern Australian scleractinians are remarkably similar to Wiedenmayer's findings in the sponges, notably the significant cosmopolitan element and the virtually non-existent links with New Zealand and the Subantarctic-Antarctic regions.

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REFERENCES

ALCOCK, A. 1891. Natural history notes from H. M. Indian Marine Survey Steamer 'Investigator', Commander R. F. Hoskyn, R. N., commanding. No. 21. Note on the results of last season's deep-sea dredging. *The Annals and Magazine of Natural History* (6)**7**: 1-8.

ALCOCK, A. 1893. On some newly-recorded corals from the Indian Seas. *Journal of the Asiatic Society of Bengal* (2)**62**(2): 138-149.

ALCOCK, A. 1894. On some new and rare corals from the deep waters of India. *Journal of the Asiatic Society of Bengal* (2)**63**(2): 186-188.

ALCOCK, A. 1902. Report on the deep-sea Madreporaria of the 'Siboga' Expedition. *Siboga-Expeditie* **16**a: 1-52.

BEST, M. B. & HOEKSEMA, B. W. 1987. New observations on scleractinian corals from Indonesia. 1. Free-living species belonging to the Faviina. *Zoologische Mededelingen* **61**(27): 387-403.

BOSCHMA, H. 1952. Madreporarian corals of the genus *Notophyllia*. *Proceedings. Koninklijke Nederlandse Akademie van Wetenschappen. Amsterdam* (C)**55**(3): 238-247.

BOURNE, G. C. 1900. Anthozoa. Pp. 1-84 *in* 'Treatise on Zoology'. Part 2. Ed. E. R. Lankester.

BOURNE, G. C. 1905. Report on the solitary corals collected by Professor Herdman at Ceylon 1902. Pp. 187-242 *in* 'Report to the government of Ceylon on the pearl oyster fisheries in the Gulf of Manaar'. Supplement 29. Ed. W. A. Herdman. Ray Society: London.

BRÜGGEMANN, F. 1877. Notes on stony corals in the collection of the British Museum. 3. A revision of the Recent solitary Mussaceae. *The Annals and Magazine of Natural History* (4)**20**: 300-313.

CAIRNS, S. D. 1979. The deep-water Scleractinia of the Caribbean and adjacent waters. *Studies on the Fauna of Curaçao* **57**(180): 1-341.

CAIRNS, S. D. 1981. Marine flora and fauna of the northeastern United States. Scleractinia. *National Oceanic and Atmospheric Administration Technical Report, National Marine Fisheries Service Circular* 438: i-iii, 1-15.

CAIRNS, S. D. 1982. Antarctic and Subantarctic Scleractinia. *Biology of the Antarctic Seas* XI. *Antarctic Research Series* **34**(1): 1-74.

CAIRNS, S. D. 1984. New records of ahermatypic corals (Scleractinia) from the Hawaiian and Line Islands. *Occasional Papers of the Bernice Pauahi Bishop Museum* **25**(10): 1-30.

CAIRNS, S. D. 1989a. A revision of the deep-water Scleractinia of the Philippine Islands and adjacent waters. Part I: Fungiacyathidae, Micrabaciidae, Turbinoliinae, Guyniidae, and Flabellidae. *Smithsonian Contributions to Zoology* **486**: 1-136.

CAIRNS, S. D. 1989b. An application of discriminant analysis to Indo-Pacific *Flabellum* (Coelenterata: Scleractinia). *Memoirs of the Association of Australasian Palaeontologists* **8:** 61-68. (Fifth International Symposium on Fossil Coral Reefs, Brisbane).

CAIRNS, S. D. 1989c. Asexual reproduction in solitary Scleractinia. *Proceedings of the Sixth International Coral Reef Symposium, Townsville* **2**: 641-646.

CAIRNS, S. D. 1991. A revision of the ahermatypic Scleractinia of the Galapagos and Cocos Islands. *Smithsonian Contributions to Zoology* **504**: 1-44.

CHEVALIER, J.-P. 1987. Ordre des Scléractiniaires: Systématique. Pp. 679-753 *in* 'Traité de Zoologie'. Vol 3. Ed. P.-P. Grassé. Masson: Paris.

COTTON, B. C. 1961. 'South Australian Mollusca: Pelecypoda'. 363 pp. Govt Printer: Adelaide.

DANA, J. D. 1846. Zoophytes. Pp. 1-740 *in* 'United States Exploring Expedition during the years 1838-1842 under the command of Charles Wilkes'. Vol. 7. Lea & Blanchard: Philadelphia.

DENNANT, J. 1899a. Descriptions of new species of corals from the Australian Tertiaries, 1. *Transactions and Proceedings and Report of the Royal Society of South Australia* **23**: 112-122.

DENNANT, J. 1899b. Descriptions of new species of corals from the Australian Tertiaries, 2. *Transactions and Proceedings and Report of the Royal Society of South Australia* **23**: 281-287.

DENNANT, J. 1901. Descriptions of new species of corals from the Australian Tertiaries, 3. *Transactions and Proceedings and Report of the Royal Society of South Australia* **25**: 48-53.

DENNANT, J. 1902a. Descriptions of new species of corals from the Australian Tertiaries, 4. *Transactions and Proceedings and Report of the Royal Society of South Australia* **26**: 1-6.

DENNANT, J. 1902b. Descriptions of new species of corals from the Australian Tertiaries, 5. *Transactions and Proceedings and Report of the Royal Society of South Australia* **26**: 255-264.

DENNANT, J. 1904. Recent corals from the South Australian

and Victorian coasts. *Transactions and Proceedings and Report of the Royal Society of South Australia* **28**: 1-11.

DENNANT, J. 1906. Madreporaria from the Australian and New Zealand coasts. *Transactions and Proceedings and Report of the Royal Society of South Australia* **30**: 151-165.

DUNCAN, P. M. 1865. A description of some fossil corals from the South Australian Tertiaries. *The Annals and Magazine of Natural History* (3)**16**: 182-187.

DUNCAN, P. M. 1870. On the Madreporaria dredged up in the expedition of H.M.S. 'Porcupine'. *Proceedings of the Royal Society of London* **18**: 289-301 (noticed in *The Annals and Magazine of Natural History* (4)**5**: 286-298).

DUNCAN, P. M. 1872. On the structure and affinities of *Guynia annulata* Duncan, with some remarks on the persistence of Palaeozoic types of Madreporaria. *Philosophical Transactions of the Royal Society of London* **162**: 29-40.

DUNCAN, P. M. 1873. A description of the Madreporaria dredged up during the expeditions of H.M.S. 'Porcupine' in 1869 and 1870. Pt 1. *Transactions of the Zoological Society of London* **8**(5): 303-344.

DUNCAN, P. M. 1876. Notice of some deep-sea and littoral corals from the Atlantic Ocean, Caribbean, Indian, New Zealand, Persian Gulf, and Japan & c. Seas. *Proceedings of the Zoological Society of London:* 428-442.

EGUCHI, M. 1968. 'The hydrocorals and scleractinian corals of Sagami Bay collected by His Majesty the Emperor of Japan'. xv + 221 pp. Mazuren: Tokyo.

EGUCHI, M. 1973. On some new or little known corals from Japan and Australia. *Publications of the Seto Marine Biological Laboratory, Kyoto (Second International Symposium on Cnidaria)*: 81-86.

ELLIS, J. & SOLANDER, D. 1786. 'The natural history of many curious and uncommon zoophytes collected from various parts of the globe by the late John Ellis'. 206 pp. Benjamin White and Sons: London.

FAUSTINO, L. A. 1927. Recent Madreporaria of the Philippine Islands. *Philippine Bureau of Science Monograph* **22**: 1-310.

FOLKESON, F. 1919. Results of Dr E. Mjöberg's Swedish Scientific Expeditions to Australia 1910-1913, part 22: Madreporaria. *Kungliga Svenska Vetenskapsakademiens, Handlingar* **59**(1): 1-23.

GARDINER, J. S. 1899. On the solitary corals, collected by Dr A. Willey. Pp. 161-170 *in* 'Zoological results based on material from New Britain, New Guinea, Loyalty Islands and Elsewhere collected during the years 1895, 1896, and 1897'. Vol. 2. Ed. A. Wiley.

GARDINER, J. S. 1904. The turbinolid corals of South Africa, with notes on their anatomy and variation. *Marine Investigations of South Africa* **3**(4): 97-129.

GARDINER, J. S. 1929. Turbinolidae and Eupsammidae. *British Antarctic (Terra Nova) Expedition, 1910. Natural History Reports, Zoology* **5**(4): 121-130.

GARDINER, J. S. & WAUGH, P. 1938. The flabellid and turbinolid corals. *Scientific Reports. The John Murray Expedition 1933-34* **5**(7): 167-202.

GERTH, H. 1923. Die Anthozoenfauna des Jungtertiärs von Borneo. Beiträge zur Geologie Ost-Asiens und Australiens. *Sammlung Geological Reichsmuseum, Leiden* **1**(10): 37-136.

GRAVIER, C. 1915. Note préliminaire sur les Madréporaires recueillis au course des croisières de la Princesse-Alice et de l'Hirondelle II, de 1893 à 1913 inclusivement. *Bulletin de l'Institut Océanographique, Monaco* **12**(304): 1-22.

GRAY, J. E. 1847. An outline of an arrangement of stony corals. *The Annals and Magazine of Natural History* (1)**19**: 120-128.

GREGORY, J. W. 1900. The corals: Jurassic fauna of Cutch. *Palaeontologia Indica (Calcutta)* (9)**2**(2): 1-195 (not seen).

HAIME, J. 1852. *In* 'Catalogue raisonné des fossiles nummulitiques du Comté de Nice'. Ed. Bellardi. *Mémoires Société Géologie* (2)**4**: 279-290 (not seen).

HICKSON, S. J. 1910. On a new octoradiate coral, *Pyrophyllia inflata* (new genus and species). *Memoirs and Proceedings of the Manchester Literary and Philosophical Society* **54**(3): 1-7.

HOFFMEISTER, J. E. 1933. Report on deep-sea corals obtained by the F.I.S. 'Endeavour', on the coasts of New South Wales. Victoria, South Australia and Tasmania. *Zoological (Biological) Results of the Fishing Experiments carried out by F.I.S. 'Endeavour' 1909-10* **6**(1): 1-16.

HOWCHIN, W. 1909. Notes on the discovery of a large mass of living coral in Gulf St. Vincent, with bibliographical references to the Recent corals of South Australia. *Transactions and Proceedings and Report of the Royal Society of South Australia* **33**: 242-252.

LAMARCK, J. B. P. A. DE M. DE. 1801. 'Système des animaux sans vertèbres, ou tableau général des classes, des ordres et des genres de ces animaux'. 432 pp. Paris.

LAMARCK, J. B. P. A. DE M. DE. 1816. 'Histoire Naturelle des Animaux sans Vertèbres. 2. Histoire des Polypes'. 586 pp. Paris.

LESSON, R.-P. 1831. 'Illustrations de Zoologie'. 3 pp. Arthur Bertrand, Libraire-Editeur: Paris.

MARENZELLER, E. VON. 1888. Über einige japanische Turbinoliiden. *Annalen des (K.K.) Naturhistorischen (Hof) Museums. Wien* **3**: 15-22.

MARENZELLER, E. VON. 1904. Steinkorallen. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer 'Valdivia' 1898-1899* **7**(3): 261-318.

MICHELOTTI, J. 1871. *In* 'Matériaux pour servir à la paléontologie du terrain tertiaire du Piémont'. Ed. E. Sismonda. *Memorie della Reale Accademia delle Scienze di Torino* (2)**25**: 257-361.

MILNE EDWARDS, H. & HAIME, J. 1848a. Recherches sur les Polypiers. Mémoire 2. Monographie des Turbinolides. *Annales des Sciences Naturelles* (3)**9**: 211-344.

MILNE EDWARDS, H. & HAIME, J. 1848b. Recherches sur les Polypiers. Mémoire 3. Monographie des Eupsammides. *Annales des Sciences Naturelles* (3)**10**: 65-114.

MILNE EDWARDS, H. & HAIME, J. 1849a. Recherches sur les Polypiers. Mémoire 4(2). Monographie des Astreides. *Annales des Sciences Naturelles* (3)**11**: 233-312.

MILNE EDWARDS, H. & HAIME, J. 1849b. Recherches sur les Polypiers. Mémoire 4(3). Monographie des Astreidae. *Annales des Sciences Naturelles* (3)**12**: 95-197.

MILNE EDWARDS, H. & HAIME, J. 1850. Recherches sur les Polypiers. Mémoire 5. Monographie des Oculinides. *Annals des Sciences Naturelles* (3)**13**: 63-110.

MILNE EDWARDS, H. & HAIME, J. 1857. 'Histoire naturelle des coralliaires ou polypes proprement dits'. Vol. 2, 633 pp. Roret: Paris.

MOSELEY, H. N. 1876. Preliminary report to Professor Wyville Thomson ... on the true corals dredged by the H.M.S. 'Challenger' in deep water between the dates Dec.

30th, 1870, and August 31st, 1875. *Proceedings of the Royal Society of London* **24**: 544-569.

MOSELEY, H. N. 1881. Report on certain hydroid, alcyonarian and madreporarian corals procured during the voyage of the H.M.S. 'Challenger', in the years 1873-1876. Pt 3. On the deep-sea Madreporaria. *Report of the Scientific Results of the Voyage of H.M.S. Challenger 1873-76, Zoology* **2**: 127-208.

ORBIGNY, A. C. V. D. D'. 1849-1852. 'Prodrôme de Paléontologie Stratigraphique Universelle des Animaux Mollusques et Rayonnés'. 3 vols. V. Masson: Paris (not seen).

ORTMANN, A. E. 1890. Die Morphologie des Skeletts des Steinkorallen in Beziehung zur Koloniebildung. *Zeitschrift für Wissenschaftliche Zoologie, Leipzig* **50**: 278-316 (not seen).

POURTALÈS, L. F. DE. 1868. Contributions to the fauna of the Gulf Stream at great depths. *Bulletin of the Museum of Comparative Zoology, Harvard College* (2)**1**(7): 121-141.

POURTALÈS, L. F. DE. 1871. Deep-sea corals. *Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College* **4**: 1-93.

POURTALÈS, L. F. DE. 1878. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico, by the United States Coast Survey steamer 'Blake', Lieutenant-Commander C. D. Sigsbee, U.S.N., commanding. Corals. *Bulletin of the Museum of Comparative Zoology, Harvard College* **5**: 197-212.

QUOY, J. R. C. & GAIMARD, J. P. 1833. 'Voyage de découvertes de l'Astrolabe exécuté par ordre du Roi, pendant les années 1826-1827-1828-1829, sous le commandement de M. J. Dumont d'Urville'. Zoologie, 4. 390 pp. J. Tastu: Paris.

RALPH, P. M. & SQUIRES, D. F. 1962. The extant scleractinian corals of New Zealand. *Zoology Publications from Victoria University of Wellington* **29**: 1-19.

SARS, M. 1872. On some remarkable forms of animal life from the great deeps off the Norwegian coast. *In* 'University Program for the First Half-Year 1869'. 82 pp. Ed. G. O. Sars. Brogger & Christie: Christiana.

SCACCHI, A. 1835. Notizie intorno alle conchiglie ed a zoofiti che si trovano nelle vicinanze de Gravina in Puglia. *Annali Civili del Regno delle Due Sicilie* **7**: 5-18 (not seen).

SCLATER, W. L. 1886. On a new madreporarian coral of the genus *Stephanotrochus* from the British seas, with notes on its anatomy. *Proceedings of the Zoological Society of London, 1886:* 128-136.

SEGUENZA, G. 1864. Disquisizioni paleontologiche intorno ai Corallarii fossili delle rocce terziarie del distretto di Messina. *Memorie della Reale Accademia delle Science di Torino* (2)**21**: 399-560.

SHEPHERD, S. A. & VERON, J. E. N. 1982. Stony corals (Order Scleractinia or Madreporaria). Pp. 169-178 *in* 'Marine Invertebrates of Southern Australia'. Part 1. Eds. S. A. Shepherd & I. M. Thomas. Govt Printer: Adelaide.

SMITH, W. D. 1913. Contributions to the stratigraphy and fossil invertebrate fauna of the Philippine Islands. *Philippine Journal of Science* (A)**8**(4): 235-300.

SQUIRES, D. F. 1958. The Cretaceous and Tertiary corals of New Zealand. *Palaeontological Bulletin, New Zealand Geological Survey* **29**: 1-107.

SQUIRES, D. F. 1960. Scleractinian corals from Norfolk I. Cable. *Record of the Auckland Institute and Museum* **5**(3): 195-201.

SQUIRES, D. F. 1961. Deep-sea corals collected by the Lamont Geological Observatory. 2. Scotia Sea corals. *American Museum Novitates* **2046**: 1-48.

SQUIRES, D. F. 1966. Port Phillip Survey 1957-1963. Scleractinia. *Memoirs of the National Museum of Victoria* **27**: 167-174.

SQUIRES, D. F. & KEYES, I. W. 1967. The marine fauna of New Zealand: scleractinian corals. *New Zealand Department of Scientific and Industrial Research Bulletin* **185**: 1-46.

SQUIRES, D. F. & RALPH, P. M. 1965. A new scleractinian coral of the genus *Flabellum* from New Zealand, with a new record of *Stephanocyathus*. *Proceedings of the Biological Society of Washington* **78**: 259-264.

STOKES, L. & BRODERIP, W. J. 1828. Note (Description of *Caryophyllia smithii* n. sp). *Zoological Journal* **3**: 485-486.

STUDER, T. 1877. Ubersicht der Steinkorallen aus der Familie der Madreporaria aporosa, Eupsammina, und Turbinaria, welche auf der Reise S.M.S. Gazelle um die Erde gesammelt werden. *Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin 1877*: 625-654.

TATE, R. 1890. On the discovery of marine deposits of Pliocene age in Australia. *Transactions and Proceedings and Report of the Royal Society of South Australia* **13**: 172-180.

TENISON-WOODS, J. E. 1878. On the extratropical corals of Australia. *Proceedings of the Linnean Society of New South Wales* **2**(4): 292-341.

TENISON-WOODS, J. E. 1879. On three new genera and one new species of Madreporaria corals. *Proceedings of the Linnean Society of New South Wales* **3**: 92-99.

TENISON-WOODS, J. E. 1880. On a new species of *Flabellum*. *Proceedings of the Linnean Society of New South Wales* **5**: 301.

THOMSON, J. A. & RENNET, N. 1931. Alcyonaria, Madreporaria and Antipatharia. *Scientific Reports, Australasian Antarctic Expedition* (C)**9**(3): 1-46.

TIZARD, R. N., MOSELEY, H. N., BUCHANAN, J. Y. & MURRAY, J. 1885. Narrative. *Report of the Scientific Results of the Voyage of H.M.S. Challenger 1873-76* **1**(2): 510-1100.

TOTTON, A. K. 1952. Notes on some little-known corals from N.W. and South Australia. *The Annals and Magazine of Natural History* (12)**5**: 975-979.

VAUGHAN, T. W. 1905. A critical review of the literature on the simple genera of the Madreporaria Fungida, with a tentative classification. *Proceedings of the United States National Museum* **28**: 371-424.

VAUGHAN, T. W. 1907. Recent Madreporaria of the Hawaiian Islands and Laysan. *Bulletin of the United States National Museum* **59**: 1-222.

VAUGHAN, T. W. 1918. Some shoal-water corals from Murray Island (Australia), Cocos-Keeling Islands, and Fanning Island. *Papers from the Department of Marine Biology of the Carnegie Institution of Washington* **9**: 49-234.

VAUGHAN, T. W. & WELLS, J. W. 1943. Revision of the suborders families and genera of the Scleractinia. *Special Papers, Geological Society of America* **44**(15): 1-363.

VERCO, J. C. 1912. Shells from the Great Australian Bight. *Transactions of the Royal Society of South Australia* **36**: 206-232.

VERCO, J. C. 1935. 'Combing the Southern Seas'. 174 pp., + App. 24 pp. The Mail Newspapers Ltd: Adelaide.

VERON, J. E. N. 1986. 'Corals of Australia and the Indo-Pacific'. 644 pp. Angus & Robertson: Sydney.

VERON, J. E. N. & MARSH, L. 1988. Ahermatypic corals of Western Australia: records and annotated species list. *Records of the Western Australian Museum Supplement* **29**: i-v, 1-136.

VERON, J. E. N. & PICHON, M. 1980. Scleractinia of eastern Australia, Pt 3. Families Agariciidae, Siderastreidae, Fungiidae, Oculinidae, Merulinidae, Mussidae, Pectiniidae, Caryophylliidae, Dendrophylliidae. *Monograph Series, Australian Institute of Marine Science* **4**: 1-422.

VERON, J. E. N., PICHON, M. & WIJSMAN-BEST, M. 1977. Scleractinia of eastern Australia, Pt 2. Families Faviidae, Trachyphylliidae. *Monograph Series, Australian Institute of Marine Science* **3**: 1-233.

VERRILL, A. E. 1865. Classification of Polyps. *Communications of the Essex Institute* **4**(9): 145-152.

WELLS, J. W. 1935. Notes on some turbinolian corals. *The Annals and Magazine of Natural History* (10)**16**: 529-535.

WELLS, J. W. 1955. Recent and subfossil corals of Moreton Bay, Queensland. *Papers. Department of Geology. University of Queensland* (n.s.) **4**(10): 1-18.

WELLS, J. W. 1956. Scleractinia. Pp. 328-444 *in* 'Treatise on Invertebrate Paleontology'. F, Coelenterata. Ed. R. C. Moore. University of Kansas Press: Lawrence, Kansas.

WELLS, J. W. 1958. Scleractinian corals. *British, Australian and New Zealand Antarctic Research Expedition* [BANZARE] *1929-1931. Reports* (B)**6**(11): 257-275.

WELLS, J. W. 1959. Notes on Indo-Pacific scleractinian corals, Pts 1 and 2. *Pacific Science* **13**(3): 286-290.

WELLS, J. W. 1962. Two new scleractinian corals from Australia. *Records of the Australian Museum* **25**(11): 239-242.

WELLS, J. W. 1964. Ahermatypic corals from Queensland. *Papers. Department of Zoology. University of Queensland* **2**(6): 107-121.

WELLS, J. W. 1984. Notes on Indo-Pacific scleractinian corals, 10. Late Pleistocene ahermatypic corals from Vanuatu. *Pacific Science* **38**(3): 205-219.

WIEDENMAYER, F. 1989. Demospongiae (Porifera) from northern Bass Strait, southern Australia. *Memoirs of the Museum of Victoria* **50**(1): 1-242.

WIJSMAN-BEST, M. 1977. Indo-Pacific coral species belonging to the subfamily Montastreinae Vaughan & Wells, 1943 (Scleractinia- Coelenterata) Pt 1. The genera *Montastrea* and *Plesiastrea. Zoologische Medelingen* **52**(7): 81-97.

WOOD, S. V. 1844. Descriptive catalogue of the Zoophytes from the Crag. *The Annals and Magazine of Natural History* (1)**13**: 10-21.

YABE, H. & EGUCHI, M. 1932. Notes on a fossil turbinolian coral, *Odontocyathus japonicus* nov. sp., from Segoe near Takaokamachi, Province of Hyuga. *Japanese Journal of Biology and Geography, Tokyo* **9**(3-4): 149–152.

YABE, H. & EGUCHI, M. 1937. Notes on *Deltocyathus* and *Discotrochus* from Japan. *Science Reports of the Tôhoku (Imperial) University* (2) *(Geology)* **19**(1): 127-147.

YABE, H. & EGUCHI, M. 1941. Corals of Toyama Bay. *Bulletin of the Biogeographical Society of Japan* **11**(12): 102-104.

YABE, H. & EGUCHI, M. 1942a. Fossil and Recent *Flabellum* from Japan. *Science Reports of the Tôhoku (Imperial) University* (2) *(Geology)*, **22**(2): 87-103.

YABE, H. & EGUCHI, M. 1942b. Fossil and Recent simple corals from Japan. *Science Reports of the Tôhoku (Imperial) University* (2) *(Geology)*, **22**(2): 105-178.

ZIBROWIUS, H. 1974a. *Caryophyllia sarsiae* n. sp. and other recent deep-water *Caryophyllia* (Scleractinia) previously referred to little-known fossil species *(C. arcuata, C. cylindracea). Journal of the Marine Biological Association of the United Kingdom* **54**(4): 769-784.

ZIBROWIUS, H. 1974b. Scléractiniaires des îles Saint Paul et Amsterdam (sud de océan Indien). *Téthys* **5**(4): 747-777.

ZIBROWIUS, H. 1980. Les scléractiniaires de la Méditerranée et de l'Atlantique nord-oriental. *Mémoires de l'Institut Océanographique. Monaco-ville* **11**: 1-284.

Appendix 1

Checklist Of The Recent Scleractinia From South Australia, Victoria And Tasmania

Order Scleractinia Bourne, 1900

Suborder Fungiina Verrill, 1865
- Superfamily Fungiicae Dana, 1846
  - Family Fungiacyathidae Chevalier, 1987
    - *Fungiacyathus (Fungiacyathus) paliferus* (Alcock, 1902)
    - *Fungiacyathus (Bathyactis) dennanti* Cairns & Parker, sp. nov.
  - Family Micrabaciidae Vaughan, 1905
    - *Letepsammia formosissima* (Moseley, 1881)
- Superfamily Agariciicae Gray, 1847
  - Family Siderastreidae Vaughan & Wells, 1943
    - *Coscinaraea marshae* Wells, 1962
    - *Coscinaraea mcneilli* Wells, 1962

Suborder Faviina Vaughan & Wells, 1943
- Superfamily Faviicae Gregory, 1900
  - Family Faviidae Gregory, 1900
    - *Plesiastrea versipora* (Lamarck, 1816)
  - Family Rhizangiidae d'Orbigny, 1851
    - *Culicia australiensis* Hoffmeister, 1933
    - *Culicia hoffmeisteri* Squires, 1966
    - *Astrangia atrata* (Dennant, 1906), comb. nov.
  - Family Mussidae Ortmann, 1890
    - *Scolymia australis* (Milne Edwards & Haime, 1849)
  - Family Anthemiphylliidae Vaughan, 1907
    - *Anthemiphyllia dentata* (Alcock, 1902)

Suborder Caryophylliina Vaughan & Wells, 1943
- Superfamily Caryophylliicae Dana, 1846
  - Family Caryophylliidae Dana, 1846
    - *Caryophyllia planilamellata* Dennant, 1906
    - *Caryophyllia sarsiae* Zibrowius, 1974
    - *Crispatotrochus inornatus* Tenison-Woods, 1878
    - *Paraconotrochus zeidleri* Cairns & Parker, gen. et sp. nov.
    - *Conotrochus* sp. *cf. C. funicolumna* (Alcock, 1902)
    - *Aulocyathus recidivus* (Dennant, 1906)
    - *Paracyathus vittatus* Dennant, 1906
    - *Stephanocyathus (S.) platypus* (Moseley, 1876)
    - *Stephanocyathus (S.)* sp.
    - *Stephanocyathus (A.) spiniger* (Marenzeller, 1888)
    - *Deltocyathus magnificus* Moseley, 1876
    - *Desmophyllum cristagalli* Milne Edwards & Haime, 1848
    - *Solenosmilia variabilis* Duncan, 1873
  - Family Turbinoliidae Milne Edwards & Haime, 1857
    - *Trematotrochus verconis* Dennant, 1904
    - *Trematotrochus alternans* Cairns & Parker, sp. nov.
    - *Holcotrochus scriptus* Dennant, 1902
    - *Holcotrochus crenulatus* Dennant, 1904
    - *Platytrochus laevigatus* Cairns & Parker, sp. nov.
    - *Platytrochus hastatus* Dennant, 1902
    - *Platytrochus parisepta* Cairns & Parker, sp. nov.
    - *Australocyathus vincentinus* (Dennant, 1904) gen. et comb. nov.
    - *Peponocyathus australiensis* (Duncan, 1870)
    - *Idiotrochus emarciatus* (Dennant, 1906)
    - *Dunocyathus parasiticus* Tenison-Woods, 1878
- Superfamily Flabellicae Bourne, 1905
  - Family Guyniidae Hickson, 1910
    - *Guynia annulata* Duncan, 1872
    - *Stenocyathus vermiformis* (Pourtalès, 1868)
  - Family Flabellidae Bourne, 1905
    - *Flabellum (Flabellum) australe* Moseley, 1881
    - *Flabellum (Flabellum) transversale* Moseley, 1881
    - *Flabellum (Ulocyathus) tuthilli* Hoffmeister, 1933
    - *Flabellum (Ulocyathus) hoffmeisteri* Cairns & Parker, sp. nov.
    - *Placotrochides scaphula* Alcock, 1902
    - *Rhizotrochus tuberculatus* (Tenison-Woods, 1879), comb. nov.

Suborder Dendrophylliina Vaughan & Wells, 1943
- Family Dendrophylliidae Gray, 1847
  - *Balanophyllia bairdiana* Milne Edwards & Haime, 1848
  - *Balanophyllia dentata* Tenison-Woods, 1879
  - *Notophyllia recta* Dennant, 1906
  - *Notophyllia etheridgi* Hoffmeister, 1933
  - *Enallopsammia rostrata* (Pourtalès, 1878)

Appendix 2

List Of Collectors

AB, A. J. Bruce; AG, A. Gackle; AM, A. McGifford; BH, B. Hutchings; DW, D. Wheenan; EGSS, East Gippsland Scallop Survey; EH, E. Hanks; ES, E. Spano; FM, F. Moorhouse; FW, F. Wittwer; GN, G. Newton; HH, H. M. Hale; IK, I. C. Kowanko; IT, I. M. Thomas; JV, J. C. Verco; JVo, J. Voorwinde; JW, J. Window; JWa, J. Watson; KGH, K. L. Gowlett-Holmes; KS, K. Sheard; LH, L. Hobbs; MC, M. Church; MK, M. Keough; NH, N. Holmes; NS, N. Smith; NWAPS, NW (Tasmanian) Acid Plant Survey; PA, P. Aerfeldt; PR, P. Reilly; RB, R. Bentley; RS, R. V. Southcott; SAFD, South Australian Fisheries Department; SS, S. A. Shepherd; TM, T. Morony; WR, W. Rumball; WZ, W. Zeidler.

Appendix 3

Station-List Of Vessels

(Station numbers in parentheses are not original, but have been invented for the purposes of the present paper)

Station	Lat.°S	Long.°E	Depth(m)	Date
FV Adelaide Pearl (KGH)				
(1)	34°03′	125°31′	1011-1020	31.vii.1988
RV Bluefin				
(1)	41°38′	148°35′	713	28.iii.1984
FRV Challenger				
(1)	40°45′	143°30′	860-1060	9.i.1982
(2)	(off Eaglehawk Neck, Tas.)		960	4.iii.1982
(3)	40°23′	148°40′	1144	13.v.1983
(4)	41°54′	144°25′	963	24.vi.1983
FV Comet (WZ, KGH)				
(1)	33°19′	128°05′	240	14.i.1989
(2)	33°17′	127°52′	180	16.i.1989
FV Derwent Venture				
(1)	43°45′	143°40′	915-1190	4-8.v.1986
(2)	39°23′	143°-	732-1098	ix.1986
(3)	41°06′	143°50′	1098-1281	ix.1986
RV Franklin				
Slope 27	38°25.0′	149°0.0′	1500	22.vii.1986
Slope 32	38°21.9′	149°20.0′	1000	23.vii.1986
Slope 33	38°19.6′	149°24.3′	930	23.vii.1986

Slope 34	38°16.4′	149°27.6′	800	23.vii.1986
Slope 40	38°17.7′	149°11.3′	400	24.vii.1986
Slope 45	42°02.2′	148°38.7′	800	27.vii.1986
Slope 46	42°00.2′	148°37.7′	720	27.vii.1986
Slope 47	41°58.6′	148°38.8′	500	27.vii.1986
FRV Hai-Kung				
(1)	40°49.8′	146°31.3′	68	4.ii.1981
FV Halcyon				
(1)	38°50′	141°46′	550	6.iii.1980
(2)	37°45′	139°41′	705, 677-714	24.x.1981
FRV Kapala				
K75-09-03	29°52′	153°43′	502	10.x.1975
K75-09-08	29°26′	153°49′	457	12.x.1975
K76-24-01	33°42′	151°52′	457	20.xii.1976
K78-27-01	33°44′	151°48′	264	11.xii.1978
HMAS Kimbla				
K7/73-5	38°24.5′	149°25.5′	823	21.xi.1973
K7/73-7	38°17.3′	149°25′	640	21.xi.1973
K7/73-8	38°16′	149°26′	512	21.xi.1973
K7/73-10	38°05.6′	149°24.5′	328	21.xi.1973
K7/73-17	37°54.5′	149°03′	101	22.xi.1973
K7/73-24	(off eastern Victoria)		?	20-26.xi.1973
K7/73-27	38°27′	148°24.5′	183	23.xi.1973
K7/73-37	39°02.0′	148°36.5′	256	23.xi.1973
K7/73-41	39°44.5′	148°49′	421	24.xi.1973
K7/73-42	39°45.3′	148°54′	640	24.xi.1973
K7/73-46	39°32′	148°52′	201	24.xi.1973
K7/73-47	39°32.5′	148°51.5′	274	24.xi.1973
K7/73-53	39°10.9′	146°37.2′	55	25.xi.1973
K7/73-55	39°08.5′	146°49′	57	25.xi.1973
K7/73-60	39°03.5′	146°14.4′	49	26.xi.1973
K7/73-62	39°00.3′	146°05.9′	66	26.xi.1973
K7/73-65	39°10.1′	145°59.8′	69	26.xi.1973
K7/73-66	39°14.7′	146°00′	68	26.xi.1973
K7/73-67	39°14.6′	145°52.4′	68	26.xi.1973
K7/73-68	39°15′	145°45′	68	26.xi.1973
K7/73-69	39°11.8′	145°45′	64	26.xi.1973
K7/73-70	39°05.1′	145°45.6′	64	26.xi.1973
K7/73-71	39°00.2′	145°44.7′	60	26.xi.1973
79-K-1-33	39°40.3′	148°46.5′	293-329	27.iii.1979
79-K-1-34	39°38.7′	148°49.4′	770	27.iii.1979
79-K-1-35	39°28.4′	148°41.8′	110	28.iii.1979
79-K-1-38	39°22.4′	148°35.5′	73	29.iii.1979
80-K-5-47	39°03′	143°51′	86	7.x.1980
80-K-5-48	39°01.1′	143°49.2′	82	7.x.1980
FV Labrador (KGH)				
(1)	44°00′	150°28′	740-1100	9.ii.1990
(2)	43°51′	150°22′	1050-1100	21.ii.1990
(3)	43°47′	150°29′	990-1150	25.ii.1990

FV Longva III (KGH)				
49	35°07′	133°48′	909	15.xi.1989
Nimbus (AB)				
12	26°32′	153°45′	–	vii.1968
55	26°27′	153°50′	270-272	1968
FRV Sarda				
(1)	38°43.4′	141°27.7′	150-156	20.x.1981
FV Saxon Progress (DW)				
(1)	36°30′	137°10′	*ca* 1000	vii.1989
(2)	35°06.97′	133°45.89′	916	8.ix.1989
FV Silent Victory (0, WR; 1-5, KGH, TM, PR)				
(0)	(32-35 Nm off Beachport, SA)		1220	27-29.xi.1987
(1)	37°45′	139°45′	300-412	14.xii.1987
(2)	37°53.67′	139°47.91′	330-570	14.xii.1987
(3)	37°50.71′	139°50.11′	150-170	15.xii.1987
(4)	37°48.6′	139°30.94′	1000-1060	15.xii.1987
(5)	37°48.61′	139°29.74′	933-1098	16.xii.1987
FV Silver Gull				
(1)	39°19′	147°27′	63	1.x.1983
FRV Soela (x.1984 survey, WZ)				
(0)	47°29′	148°30′	1056-1066	17.iii.1986
(00)	(off St Patrick's Head, Tas.)		*ca* 1000	12-15.vii.1986
1-85-42	38°01.7′	150°04.9′	452-480	3.ii.1985
2-84-66	39°18′	148°44′	448-480	3.v.1984
2-84-69	38°02′	150°05′	472-478	4.v.1984
2-84-73	39°04′	148°38′	444-474	6.v.1984
2-84-81	40°54′	143°43′	520-526	9.v.1984
3-84-77	42°43′	148°25′	506	25.xi.1984
5-84-69	42°42.3′	148°24.3′	432-460	24.i.1984
16(1984)	39°21′	148°46′	476	12.x.1984
16(1987)	41°34.7′	148°44.6	1090-1150	9.v.1987
19	39°16′	148°44′	660	13.x.1984
21(1981)	33°02′ -33°01′	127°49′ -127°48′	78	2.xii.1981
21(1984)	39°04′	148°39′	432	13.x.1984
22	39°00′	148°25′	92	14.x.1984
26	37°37′	150°17′	436	14.x.1984
27	37°59′	150°05′	452	14.x.1984
28	38°08′	149°59′	656	14.x.1984
30	38°06′	149°46′	190	14.x.1984
33	38°10′	149°52′	442	15.x.1984
34	38°16′	149°19′	446	15.x.1984
40	40°57′	143°47′	550	18.x.1984
45	41°14′	144°07′	520	19.x.1984
51	41°15′	144°08′	520	20.x.1984
64	43°25′	147°32′	82	22.x.1984
84-87	42°43′	148°25′	506	25.vi.1984

MT Sprightly				
73-2051	40°50.6′	148°46.5′	399	26.iii.1973
FV Tuna Endeavour				
(1)	38°19′	140°20′	800-1100	5.viii.1983
Umitaka Maru				
(1)	39°	148°	120	7.i.1968
RV Vema				
18-105	38°46′	141°30′	369	
FV Zeehan				
(1)	(WSW of Portland, Vic.)		567-586	i.1981
BANZARE				
76	35°18′	118°15′	62	21.iii.1930
115	41°03′	148°42′	128	24.iii.1931

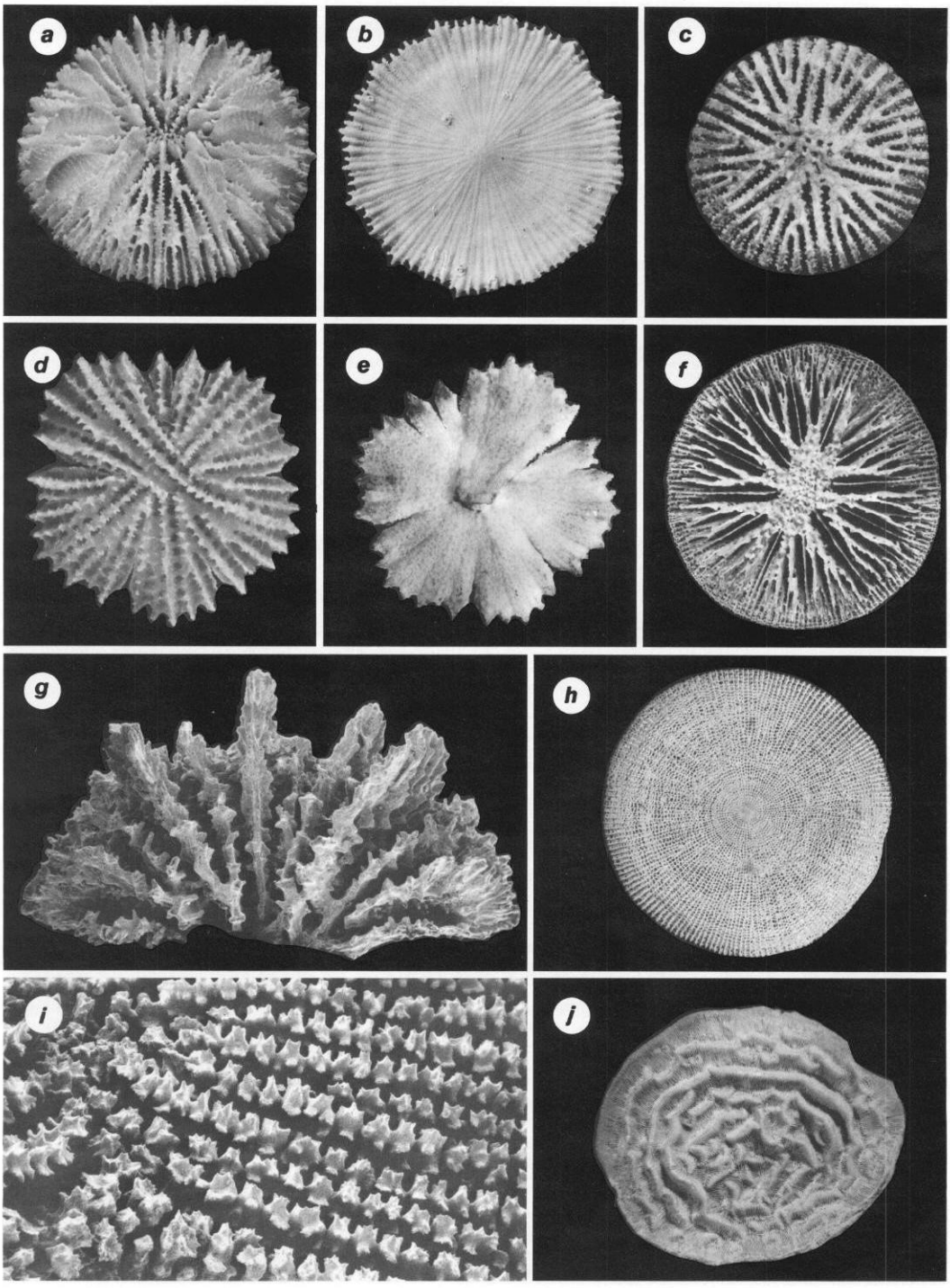

FIGURE 1. **a, b,** *Fungiacyathus paliferus:* a, specimen reported by Yabe & Eguchi (1942b) from station 412 off Japan, TIUS 58913, × 2.5; b, syntype from 'Siboga' 153, ZMA 1171, × 2.5. **c**, syntype of *Fungiacyathus beaumariensis*, NMV P27131, × 8.4. **d, e, g,** *Fungiacyathus dennanti:* d, e, holotype, 'Kimbla' 79-34, NMV F56882, calicular (× 4.5) and basal (× 4.3) views; g, a typical fragment of a paratype from 35 Nm (=64 km) SW of Neptune Is, 104 fms (=190 m), USNM 85676, (*B. symmetrica* of Dennant 1906) × 19.1. **f, h,** syntype of *Letepsammia formosissima* from HMS 'Challenger' 192, BMNH 1880.11.25.155, both × 1.1. **i, j,** *Coscinaraea marshae:* i, paratype, USNM 68364, detail of septal granulation, × 19; j, paratype, USNM 68363, chaliciform corallum, × 0.43.

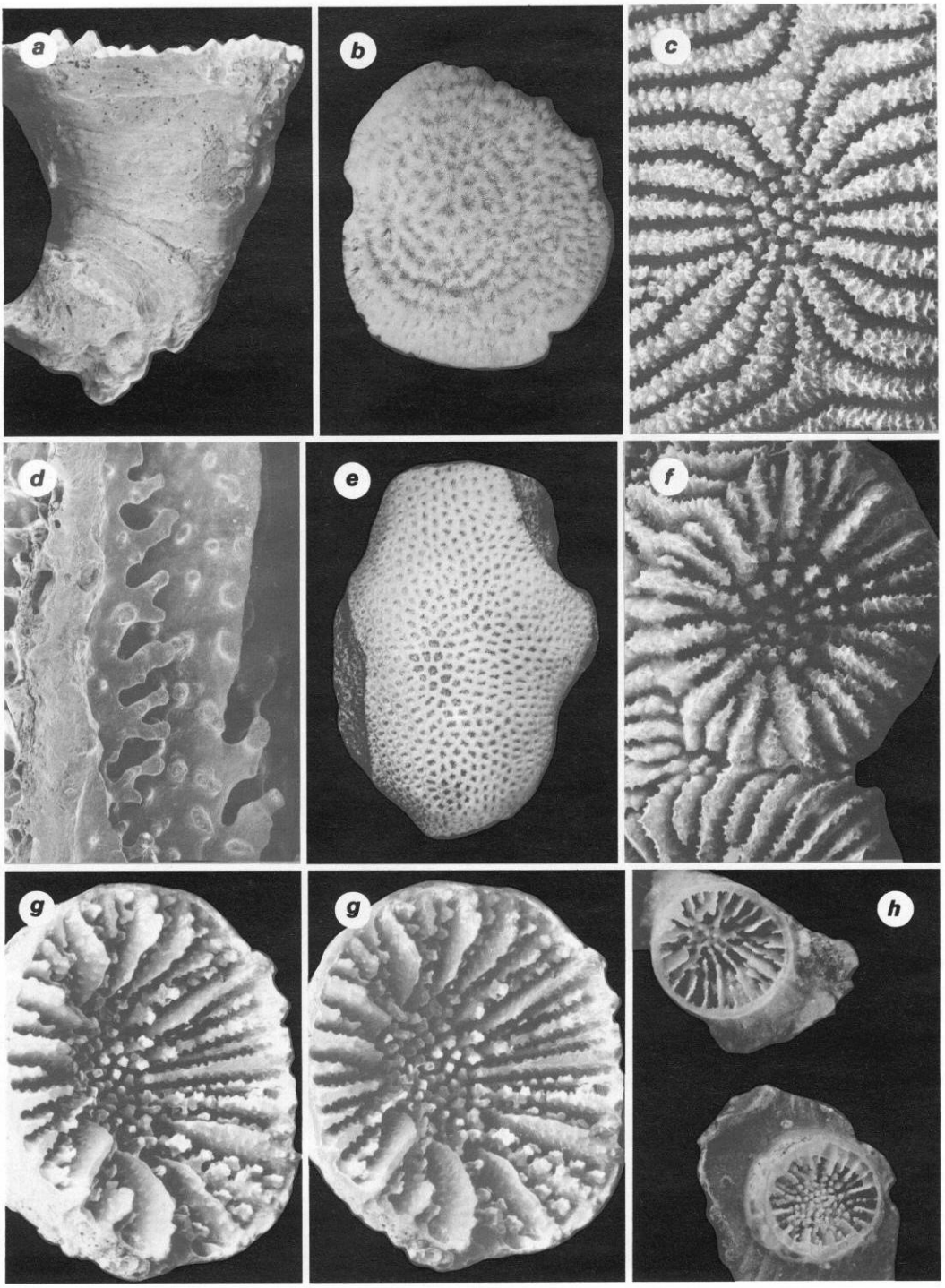

FIGURE 2. **a, d, g,** *Culicia australiensis* from Backstairs Passage, 17-22 fms (=31-40 m), USNM 85675: a, lateral view showing epitheca, × 7.5; d, fractured calice revealing a laciniate S_4 before a broader S_2 in background, × 30; g, stereo view of calice showing relative sizes of septal cycles and columella, × 8.8. **b, c,** *Coscinaraea mcneilli:* b, colony from Frederick I., W.A., WAM 132-85, × 0.43; c, paratype, USNM 82549, calice and septocostae, × 12.9. **e, f,** *Plesiastrea versipora:* e, *P. urvillei* reported by Squires (1966), USNM 83004, × 0.34; f, off Franklin I., USNM 85672, calice, × 12. **h,** two syntypes of *Culicia quinaria,* Macleay Museum, × 5.

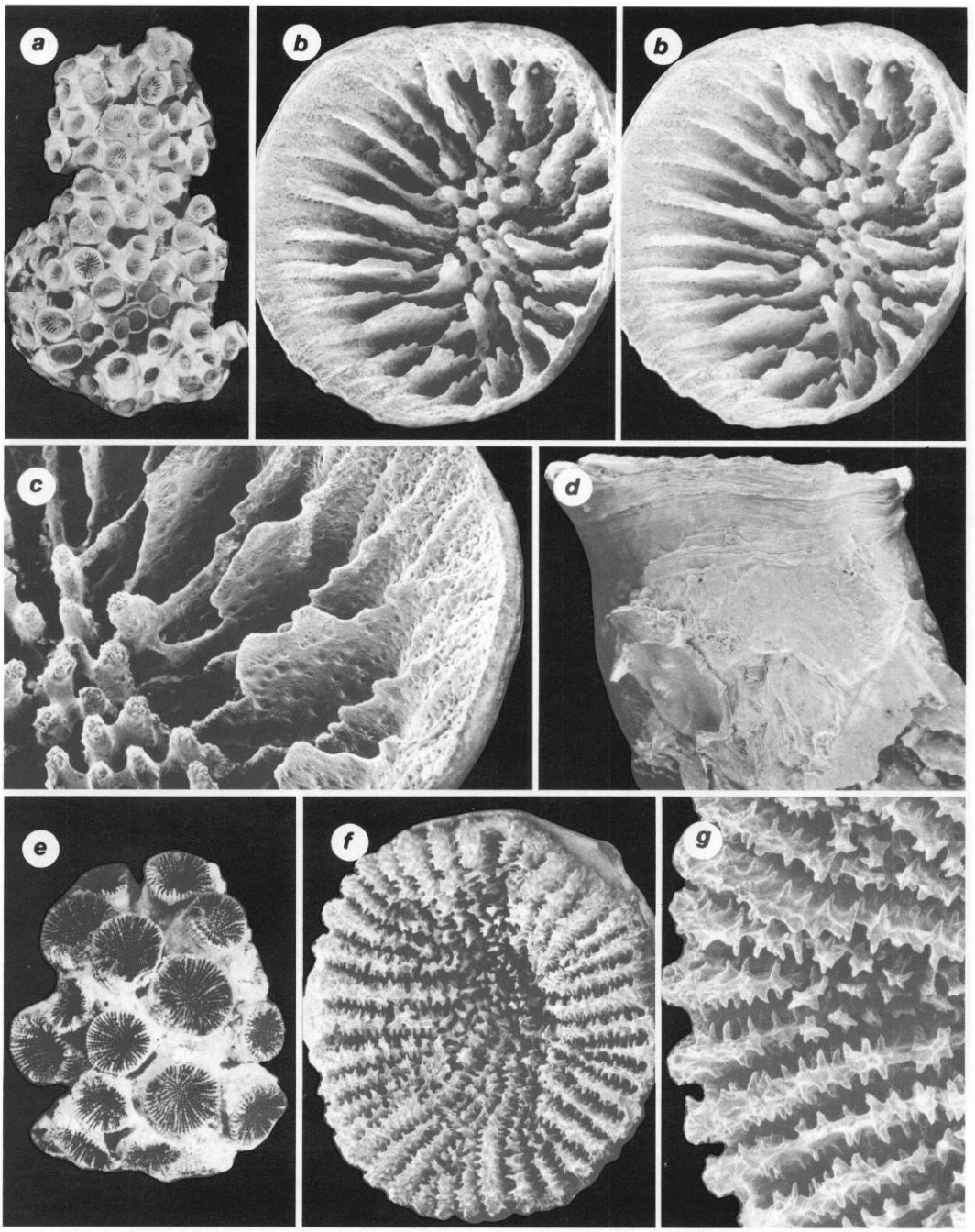

FIGURE 3. **a-d,** *Culicia hoffmeisteri:* a, off Kirkby I., SAM H413a, largest colony, × 0.76; b-d, topotypic specimen from Pope's Eye, Victoria, USNM 53416, stereo view of calice (× 10.1), enlargement of columella and septal faces (× 20), and lateral view of epithecate corallum (×10.1). **e-g,** *Astrangia atrata:* e, colony from Bass Strait, SAM H445, × 1.7; f, g, from Backstairs Passage, 22 fms (=40 m), USNM 85673, calice (× 8.1) and detail of septal face dentition (×21).

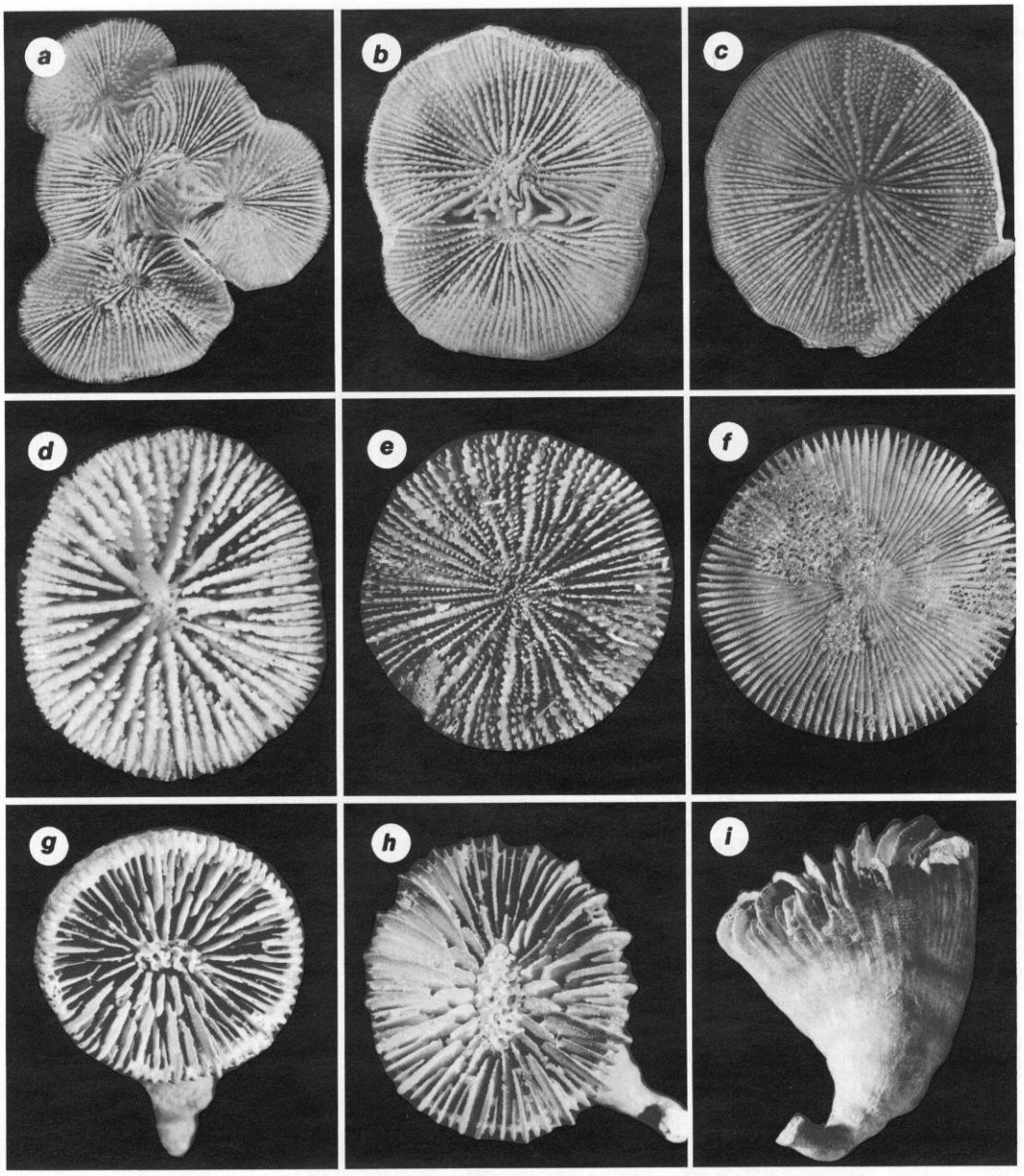

FIGURE 4. **a-d,** *Scolymia australis:* a, c, specimens from Reevesby I., SAM H464, one having six calicular centres (× 0.9), the other one (× 1.0); b, east of Blyth I., SAM H471, corallum with two calicular centres joined by lamellar plates, × 1.2; d, Port Blanche, SAM H455, typical growth form with only one mouth, × 1.9. **e, f,** *Anthemiphyllia dentata* from 'Kimbla' 7/73-37, NMV F57153, both × 1.9. **g-i,** *Caryophyllia planilamellata:* g, specimen from off Cape Jaffa, 300 fms (=549 m) having 18 pali, SAM H505, × 2.0; h, i, *C. clavus* of Wells (1958), BANZARE 115, SAM H516, × 1.75, × 1.4, respectively.

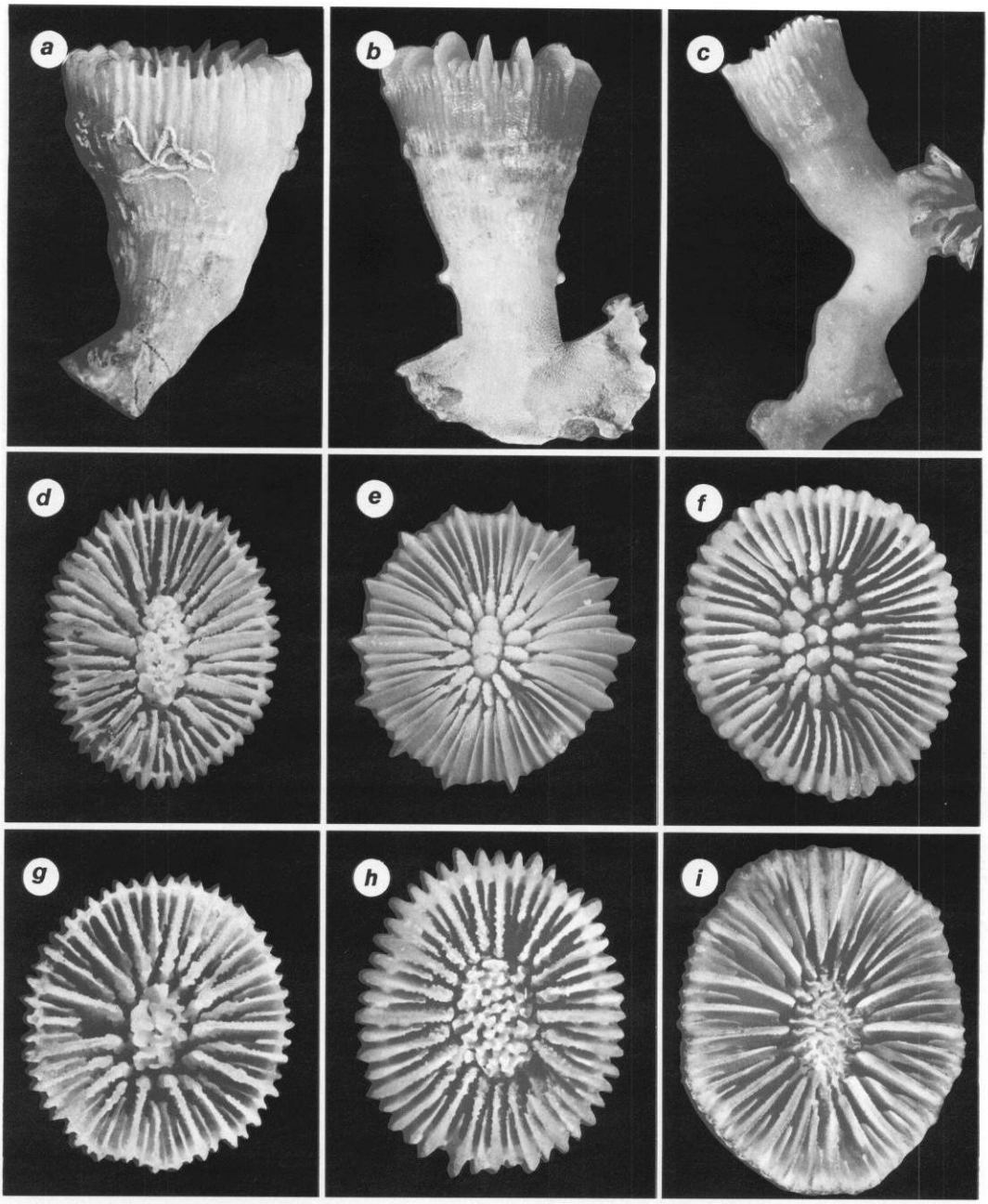

FIGURE 5. **a, d, g, h,** *Crispatotrochus inornatus:* a, d, *Cyathoceras cornu* of Hoffmeister (1933), AM E4657, lateral (× 2.2) and calicular (× 2.7) views; g, paralectotype of *Cyathoceras cornu* Moseley (1881), HMS 'Challenger' 163, BMNH 1880.11.25.60, × 4.3; h, holotype of *C. inornatus,* Macleay Museum, × 4.7. **b, c, e, f,** *Caryophyllia sarsiae:* b, e, 'Franklin' 33, NMV F57172, lateral (× 1.9) and calicular (× 2.5) views of specimen with 14 pali; c, f, 'Soela' 16 (1987), lateral (× 1.0) and calicular (× 1.5) views of a specimen with 13 pali, TM K1120. **i,** *Paraconotrochus zeidleri,* holotype showing relatively well-developed pali, SAM H520, × 2.3.

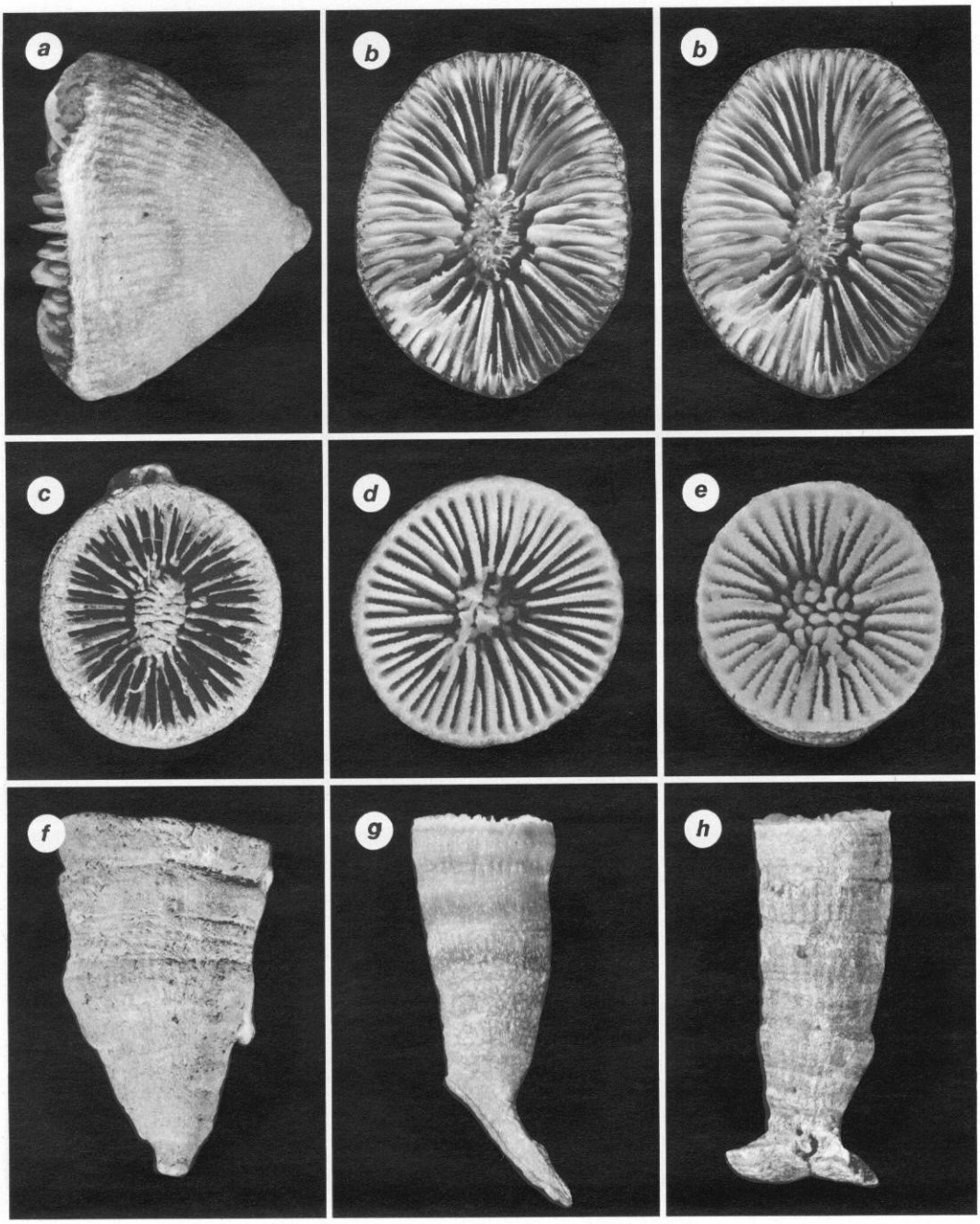

FIGURE 6. **a, b,** paratype of *Paraconotrochus zeidleri* from 'Soela' 51, SAM H521, lateral and stereo calicular views of specimen lacking pali, both × 2.5. **c, f,** *Conotrochus* sp. *cf. C. funicolumna,* 'Soela' 33, SAM H525, calicular (× 2.2) and lateral (× 1.9) views of corallum. **d, e, g, h,** *Aulocyathus recidivus:* d, g, *Ceratotrochus typus* of Wells (1958), BANZARE 115, SAM H527, calicular (× 4.7) and lateral (× 2.5) views of same corallum; e, h, 'Franklin' 32, NMV F57169, calicular (× 5.2) and lateral (× 2.8) views of same corallum.

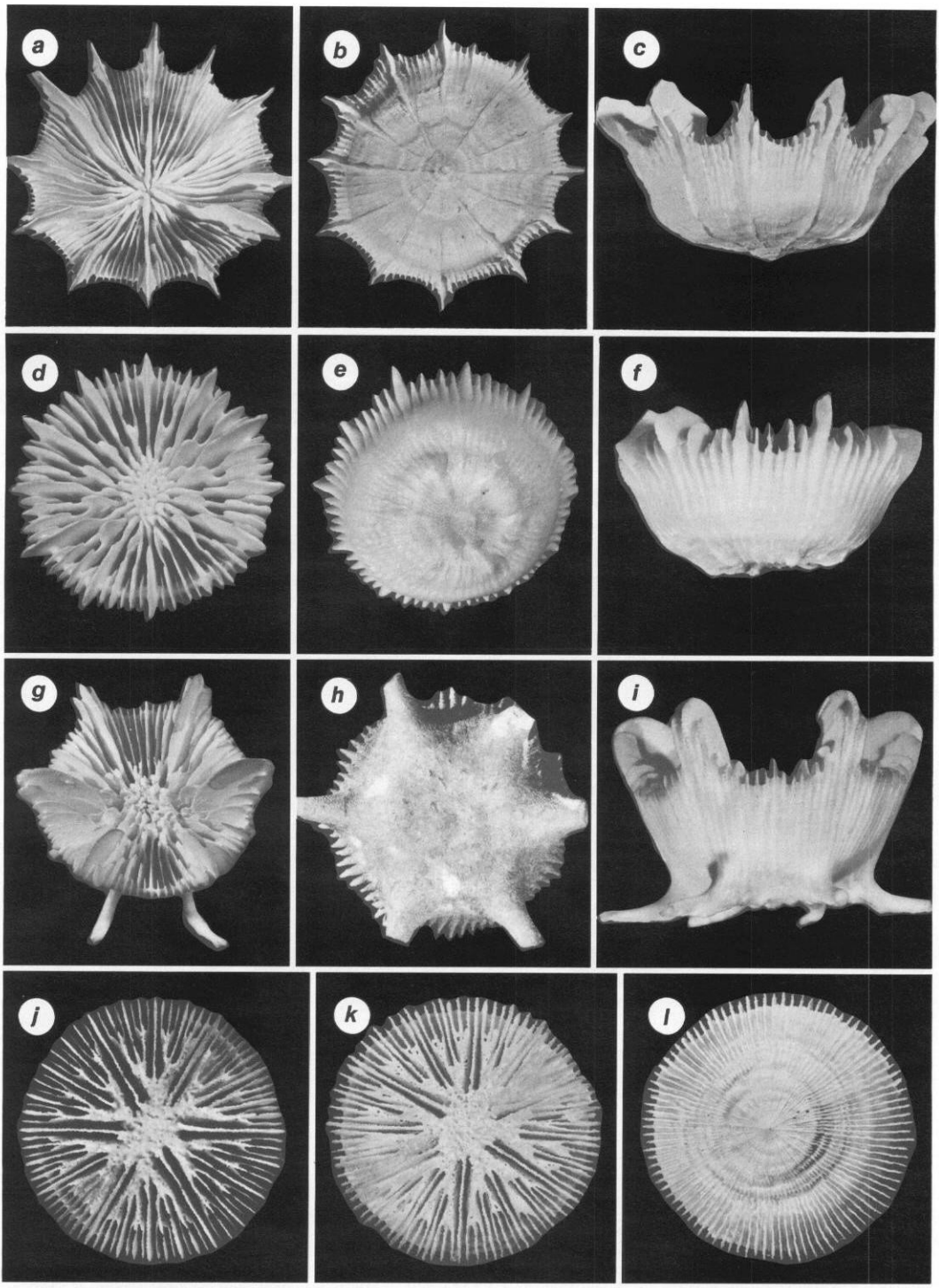

FIGURE 7. **a-c,** calicular, basal, and lateral views of *Stephanocyathus platypus*, 'Silent Victory' 5, SAM H530, × 0.64, × 0.66, × 0.82, respectively. **d-f,** calicular, basal, and lateral views of *Stephanocyathus* sp., 'Soela' 51, SAM H534, × 1.3, × 1.3, × 1.5, respectively. **g-i,** *Stephanocyathus spiniger:* g, i, *Odontocyathus sexradii* of Hoffmeister (1933), AM E3730 (now USNM 85318), calicular (× 1.2) and lateral (×1.5) views; h, *Stephanocyathus 'tatei'*, Bird Rock Cliffs, Torquay, Victoria, Miocene, USNM 353577, × 2.0. **j-l,** *Deltocyathus magnificus:* j, l, calicular and basal views of holotype, BMNH, both × 1.3; k, 'Franklin' 27, NMV F57164, × 1.1.

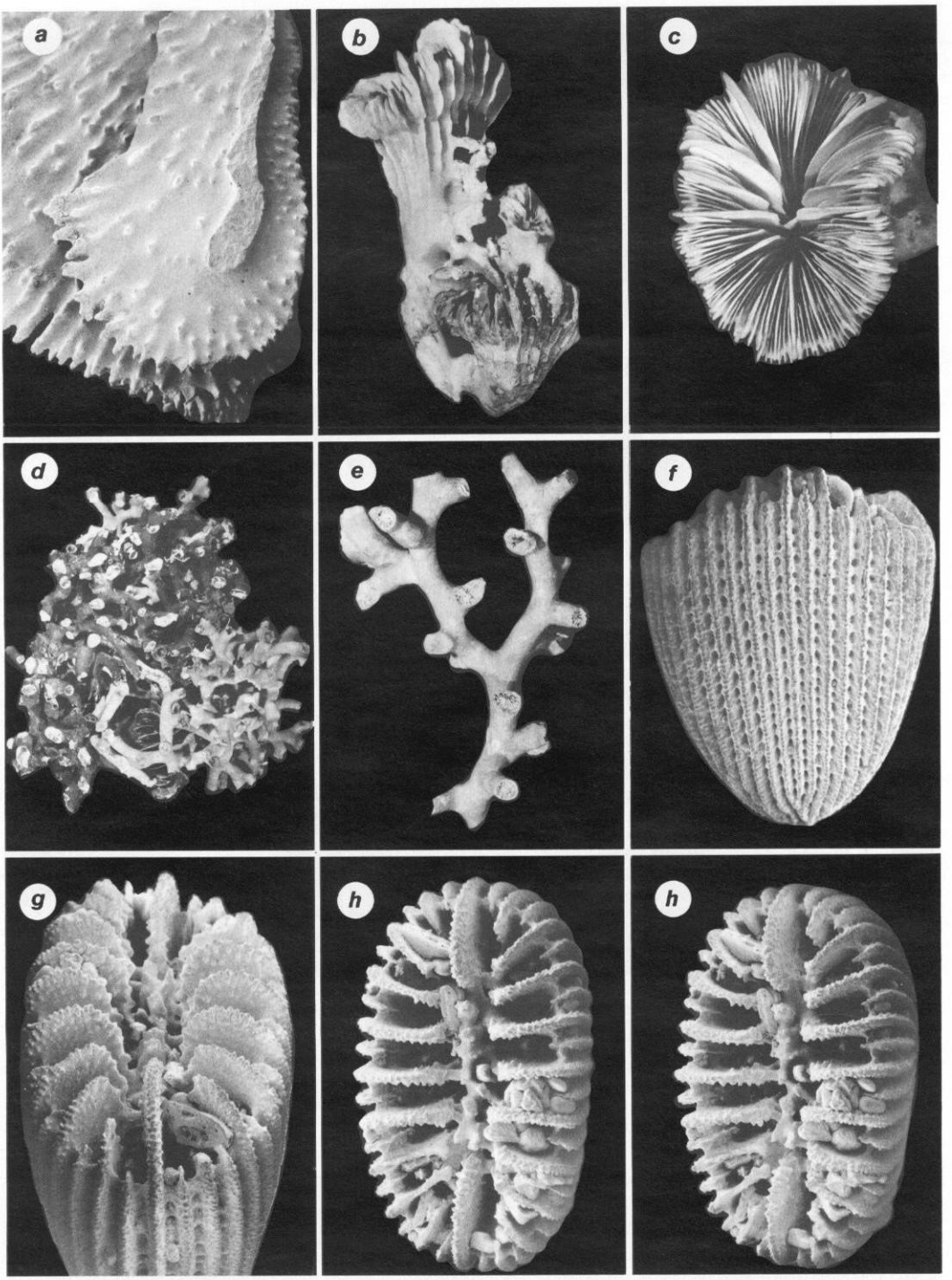

FIGURE 8. **a,** *Deltocyathus magnificus,* 'Silent Victory' 3, SAM H540, corallum fragment showing cross section of a broken wall and a C_4 costoseptal face, × 14.5. **b, c,** *Desmophyllum cristagalli* reported by Hoffmeister (1933): b, AM E4660 (now USNM 85319), × 0.64; c, AM E5541 (now USNM 85320), × 1.05. **d, e,** *Solenosmilia variabilis:* d, 'Soela' Stn 00, TM K1127, bushy corallum, × 0.37; e, one of Hoffmeister's (1933) specimens from Great Australian Bight, AM G12259 (now USNM 85682), × 0.72. **f-h,** paratypes of *Trematotrochus alternans:* f, off Beachport, 49 fms (=90 m), SAM H558, lateral view showing semiporous theca, × 15.5; g, h, Gulf St Vincent, 17 fms (=31 m), USNM 85688, oblique calicular (× 17) and stereo calicular (× 13.5) views.

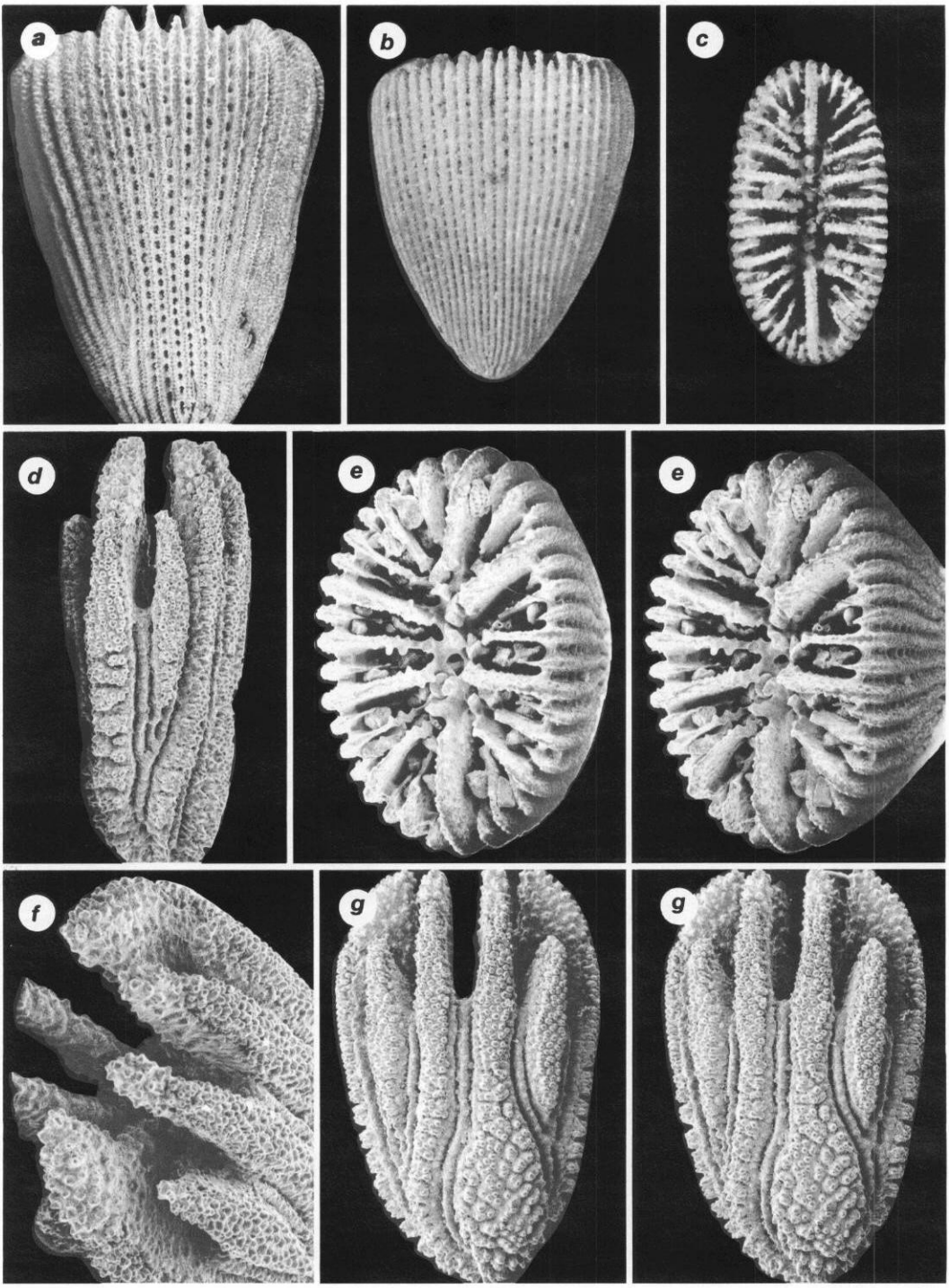

FIGURE 9. **a, e,** *Trematotrochus verconis,* Beachport, 49 fms (=90 m), USNM 85684, lateral (× 13.3) and stereo calicular (× 16.1) views of same corallum. **b, c,** paratype of *Trematotrochus alternans* (paralectotype of *Conocyathus compressus,* AM G7024), × 7.6, × 9.1, respectively. **d, f, g,** *Holcotrochus scriptus* from Kangaroo I., 59 fms (=108 m), USNM 85687: edge (×29), calicular (×44), and stereo calicular (×28) views.

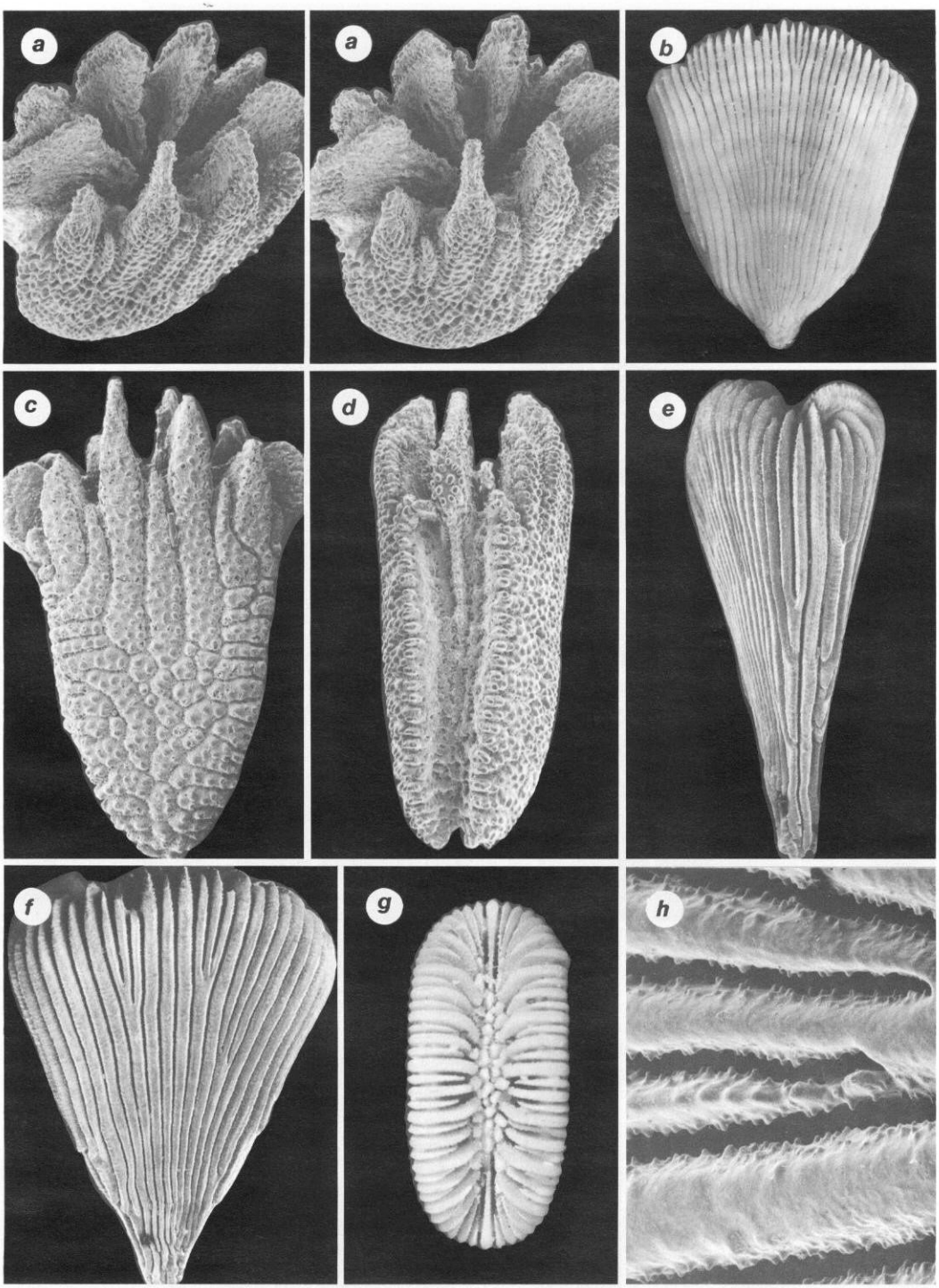

FIGURE 10. **a, c, d,** *Holcotrochus crenulatus* from Kangaroo I., 55 fms (=101 m), USNM 85692: stereo calicular (×29), lateral (×26), and edge (× 28) views, the latter showing the broad edge sulcus. **b, e-h,** *Platytrochus laevigatus:* b, paratype from St Francis I., 15-20 fms (=27-37 m), (*P. compressus* of Dennant, 1904), SAM H570, corallum face with five costal trifurcations, × 4.9; e, f, h, paratype from Gulf St Vincent, USNM 85695: edge view (× 9.5), lateral view with only three costal trifurcations (× 8.6), and enlargement of one costal trifurcation (× 81); g, holotype from St Francis I., SAM H569, × 5.5.

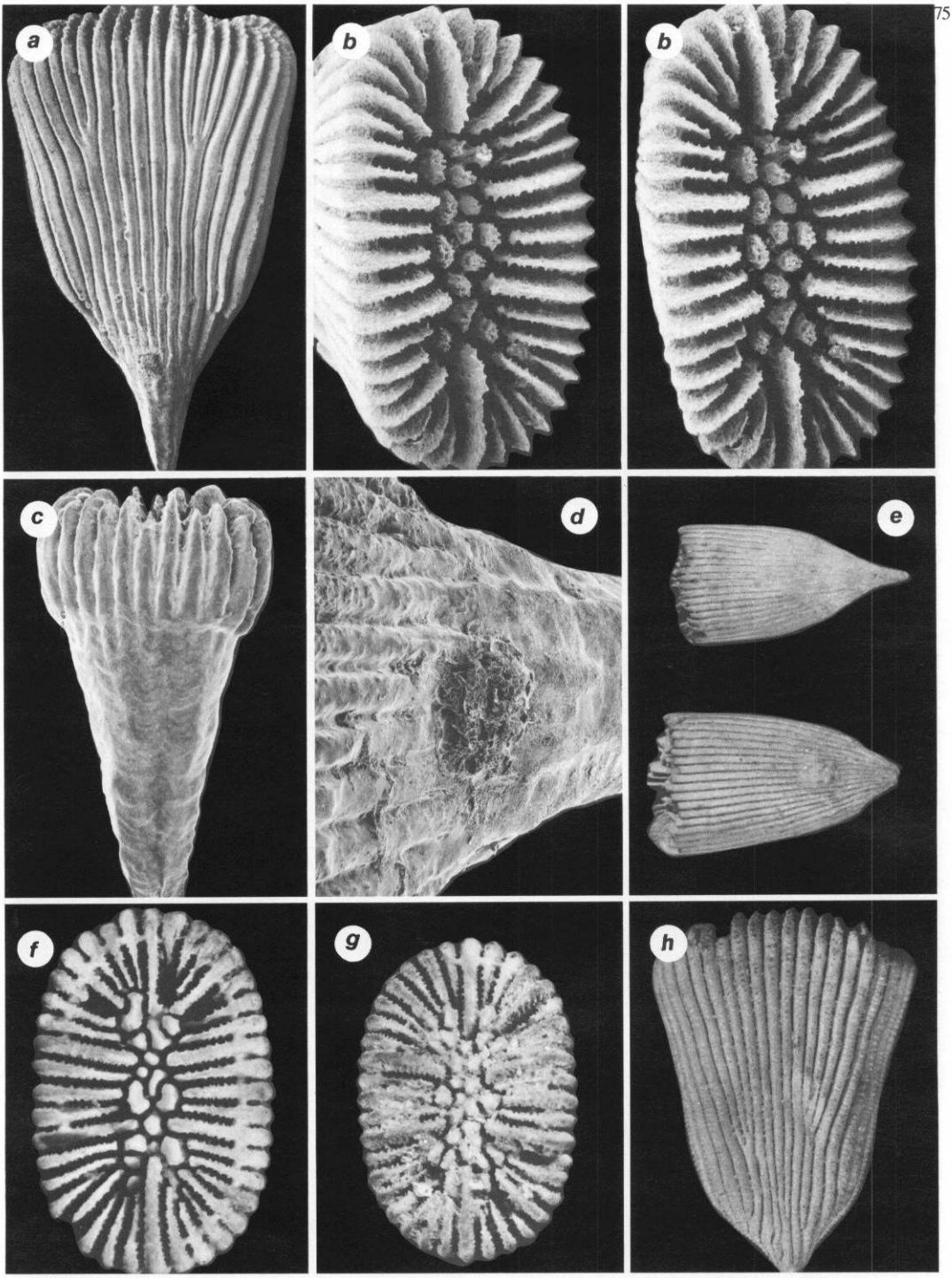

FIGURE 11. **a-f,** *Platytrochus hastatus:* a, b, d, specimen from St Francis I., 35 fms (=64 m), USNM 85690: lateral view showing the typical two costal trifurcations (× 12.4), stereo calicular view (× 19.8), and an enlargement of the smooth, noncostate, basal section of corallum (× 59); c, USNM 85690 (data as above), smooth basal theca of a juvenile, × 28; e, f, syntypes of *P. hastatus,* NMV P27094, × 4.8, × 12.2, respectively. **g, h,** *Platytrochus airensis,* holotype, NMV P27093, × 7.8, × 7.6, respectively.

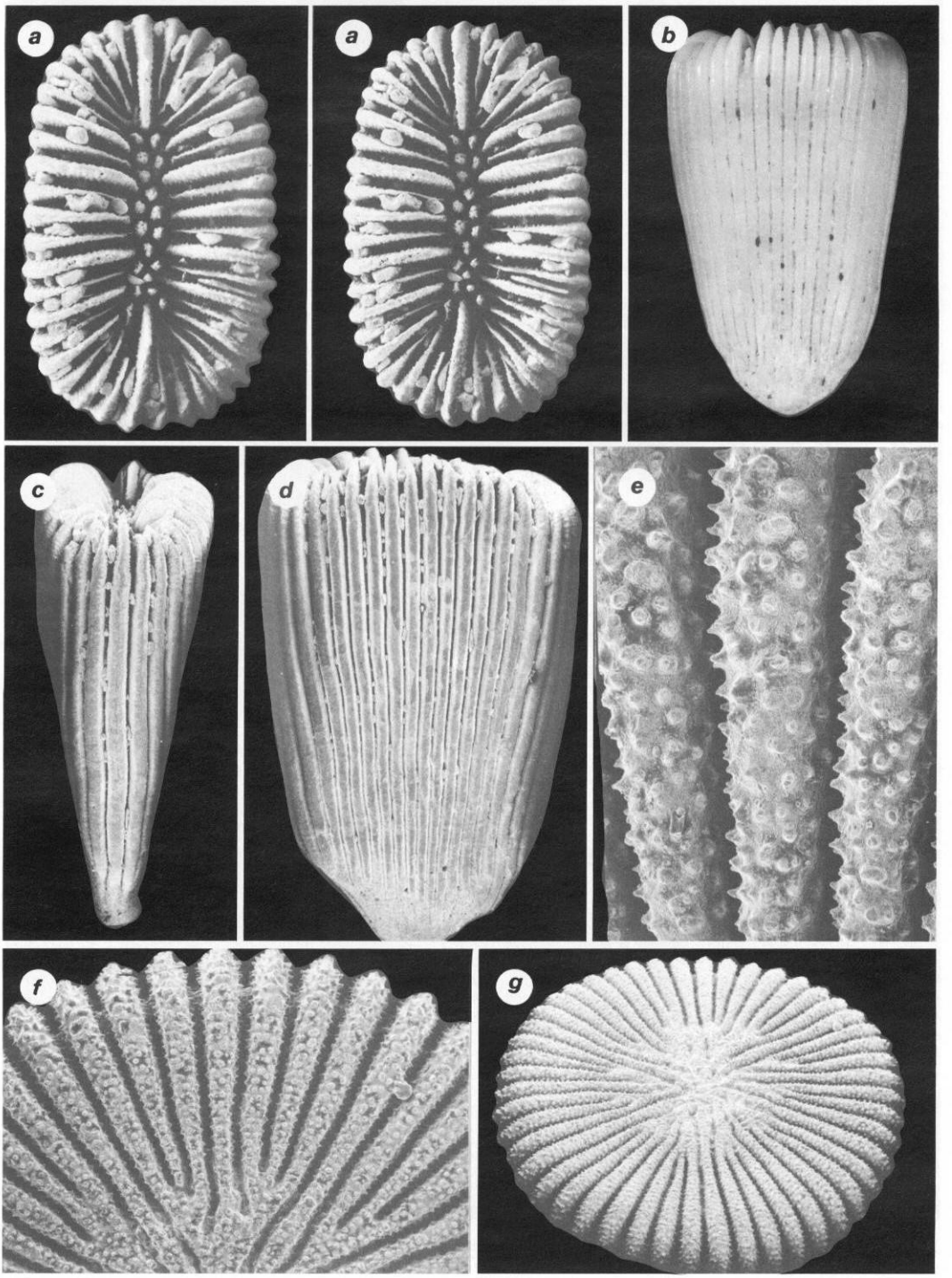

FIGURE 12. **a-d,** *Platytrochus parisepta* a, c, d, paratype from Backstairs Passage, 22 fms (=40 m), USNM 85691: stereo calicular (× 12.3), edge (× 9.9), and lateral (× 10.3) views; b, holotype, SAM H589, × 7.0. **e-g,** *Australocyathus vincentinus,* paratype from Gulf St Vincent, USNM 85699: various magnifications of granular costae and corallum base, × 50, × 14, and × 7.1, respectively.

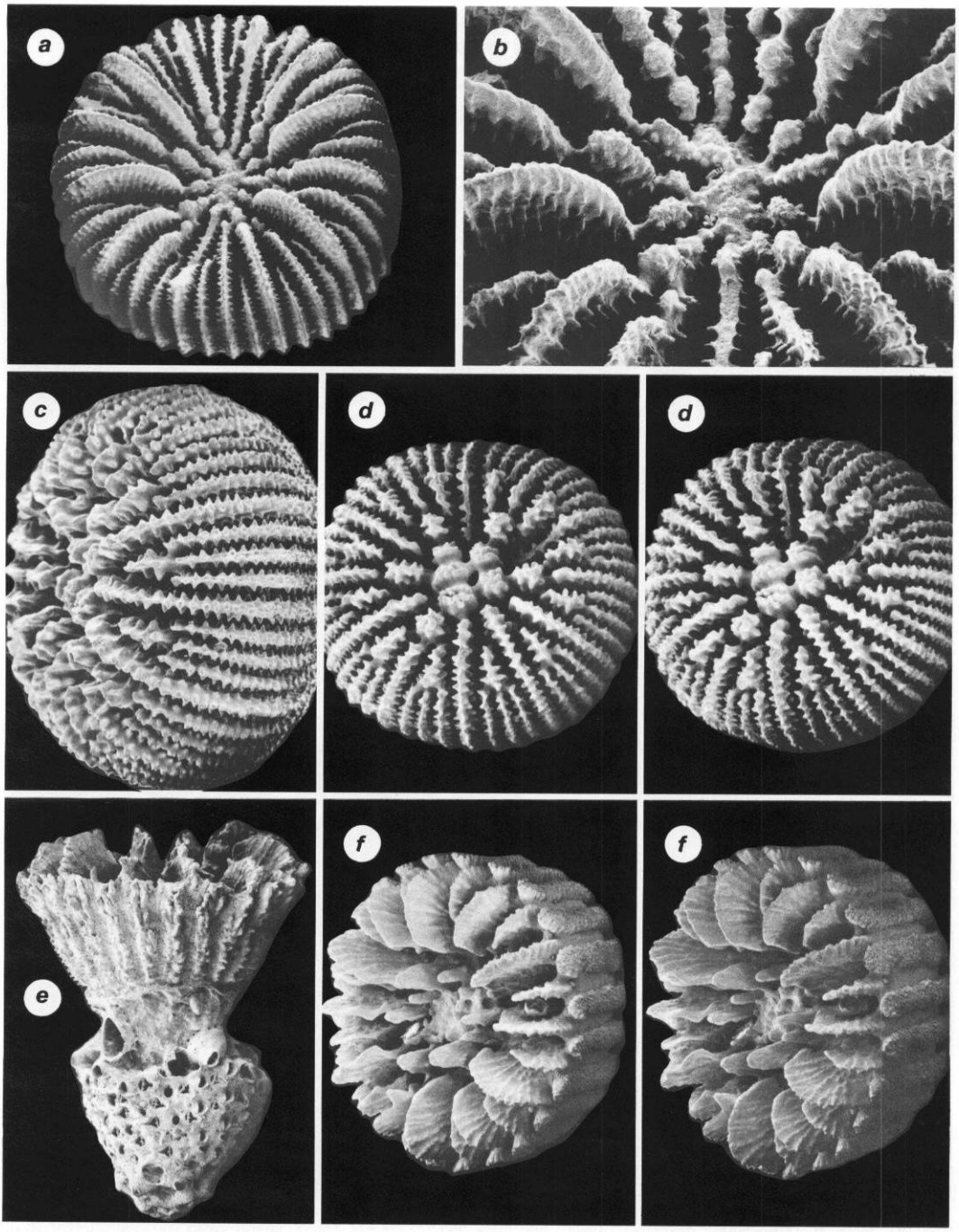

FIGURE 13. **a-b,** calicular views of *Australocyathus vincentinus* from Gulf St Vincent, USNM 85699, × 6.9, × 17.3, respectively. **c, d,** *Peponocyathus australiensis,* MUSORSTOM 2-33, from the Philippines (see Cairns, 1989a), USNM 81836: lateral (× 12.7) and stereo calicular (× 10.2) views. **e, f,** *Dunocyathus parasiticus* from off Cape Jaffa, 90 fms (=165 m), USNM 85698: e, anthocaulus stage basally encrusted by bryozoans, × 14.2; f, stereo calicular view of anthocyathus, × 11.

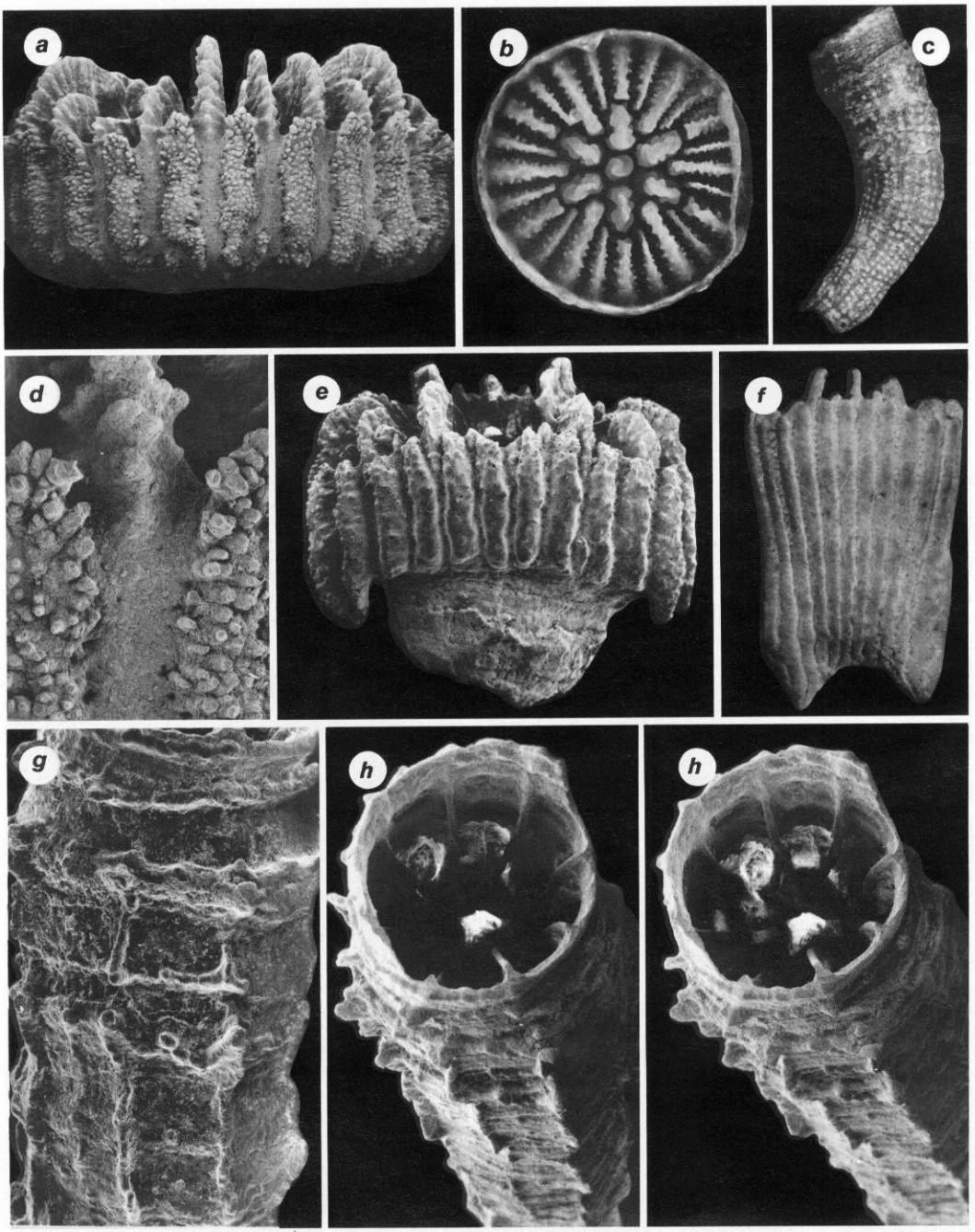

FIGURE 14. **a, d,** *Dunocyathus parasiticus* from Cape Jaffa, 165 m, USNM 85698, lateral views showing alternation of septa and costae, × 16.1, × 60, respectively. **b, c,** *Stenocyathus vermiformis*, 'Franklin' 27, NMV F57163, calicular (×8.4) and lateral (×3.1) views, the latter showing characteristic rows of thecal spots. **e, f,** *Idiotrochus emarciatus* (syntypes of *I. e.* var. *perexiguus* from E of Neptune Is, 45 fms (=82 m)): e, USNM 85701, anthocyathus showing edge crests and vestigial anthocaulus, × 19.8; f, RMNH18060 lateral view of well-developed anthocyathus, × 7.6. **g, h,** *Guynia annulata*, ?Spencer Gulf, USNM 85700: lateral view showing irregular costae (× 54) and stereo calicular view of columella and internal thecal cavities (× 43).

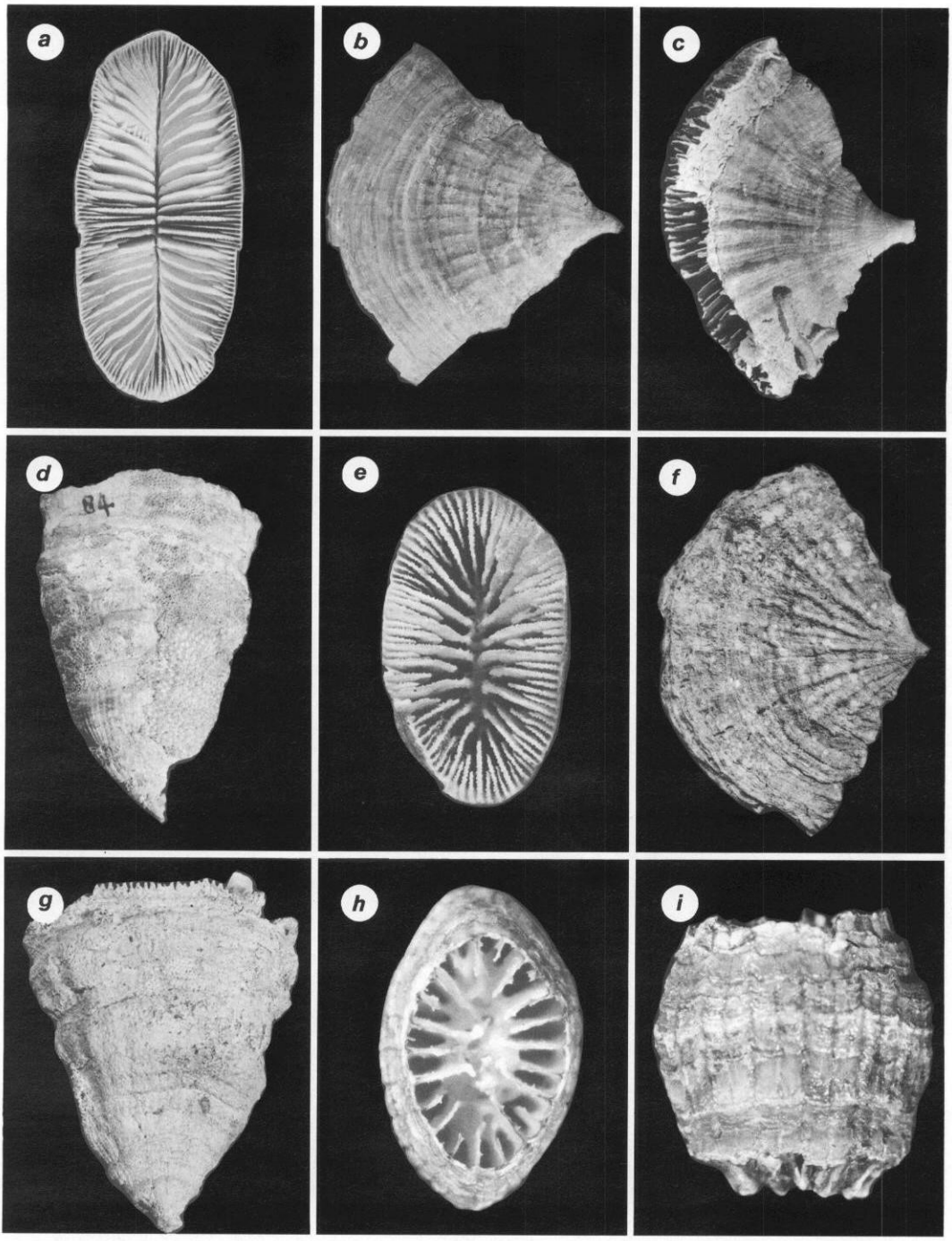

FIGURE 15. **a-c, f,** *Flabellum australe:* a, b, syntype from HMS 'Challenger' 163, BMNH 1880.11.25.81, calicular (× 0.85) and lateral (× 0.78) views; c, off Cape Jaffa, 90 fms (=165 m), SAM H625, × 1.4; f, off Cronulla, New South Wales, 65-105 m, USNM 78510, lateral view showing robust primary costae, × 0.77. **d, e, g,** *Flabellum transversale:* d, e, lateral and calicular views of holotype, HMS 'Challenger' 162, BMNH 1880.11.25.84, × 1.5, × 2.0, respectively; g, 'Kimbla' K7/73-71, NMV F56891, × 1.6. **h, i,** *Placotrochides scaphula* from 'Franklin' 33, NMV F57173: calicular (× 7.2) and lateral (× 6.5) views.

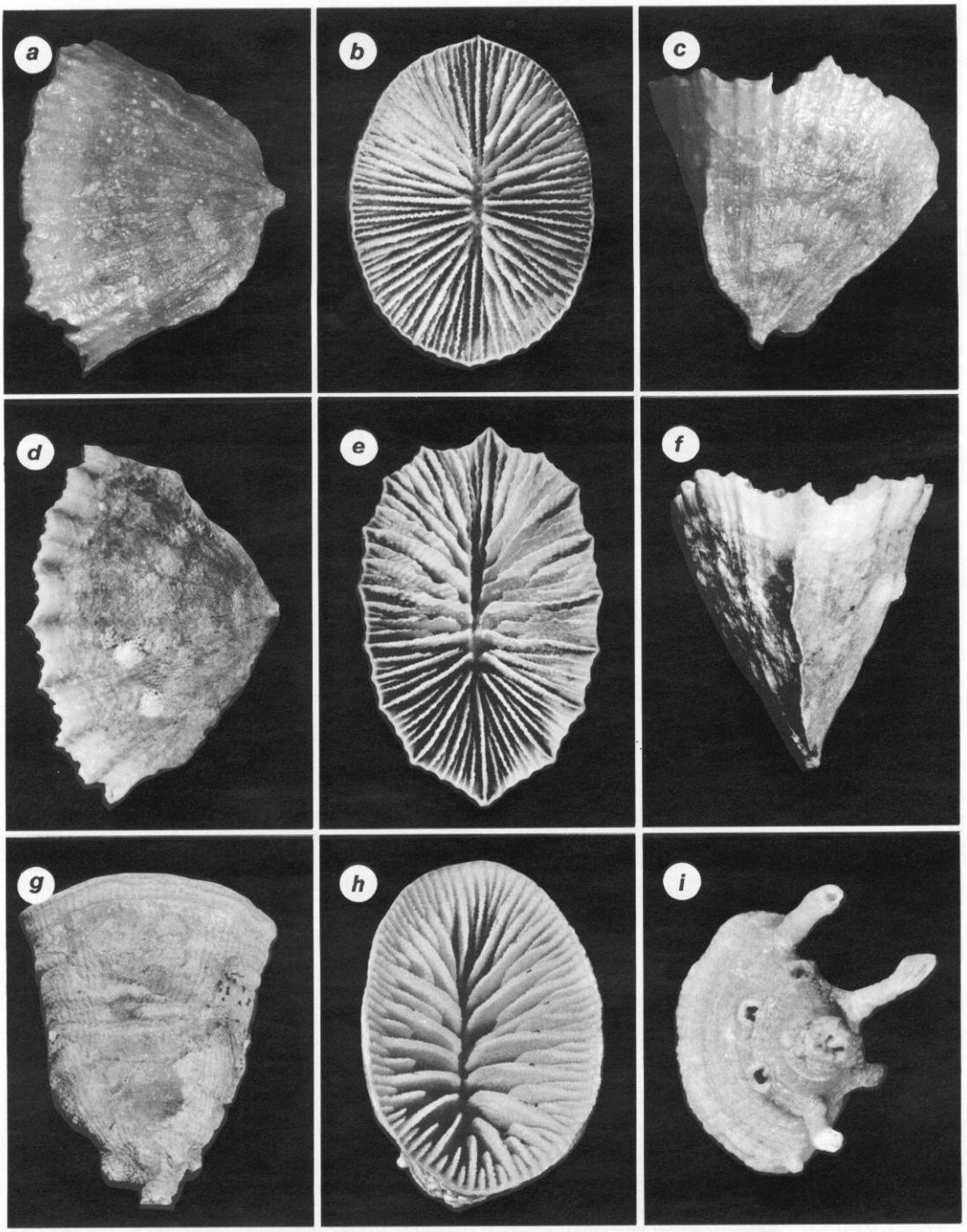

FIGURE 16. **a-c,** *Flabellum tuthilli:* a, c, 'Soela' 51, SAM H640, lateral (× 1.15) and oblique edge (× 1.2) views; b, paratype #7 from 'Endeavour', USNM 68231, calicular view, × 1.3. **d-f,** paratype of *Flabellum hoffmeisteri* from 'Soela' 27, SAM H643, lateral (× 0.96), calicular (× 1.15), and edge (× 1.4) views. **g-i,** *Rhizotrochus tuberculatus:* g, h, large specimen from off Burnie, north-west Tasmania, TM K421, lateral (× 1.5) and calicular (× 1.9) views; i, basal view of specimen from Gulf St Vincent, 20 fms (=37 m) showing 6 + 2 rootlets, SAM H656, × 2.9.

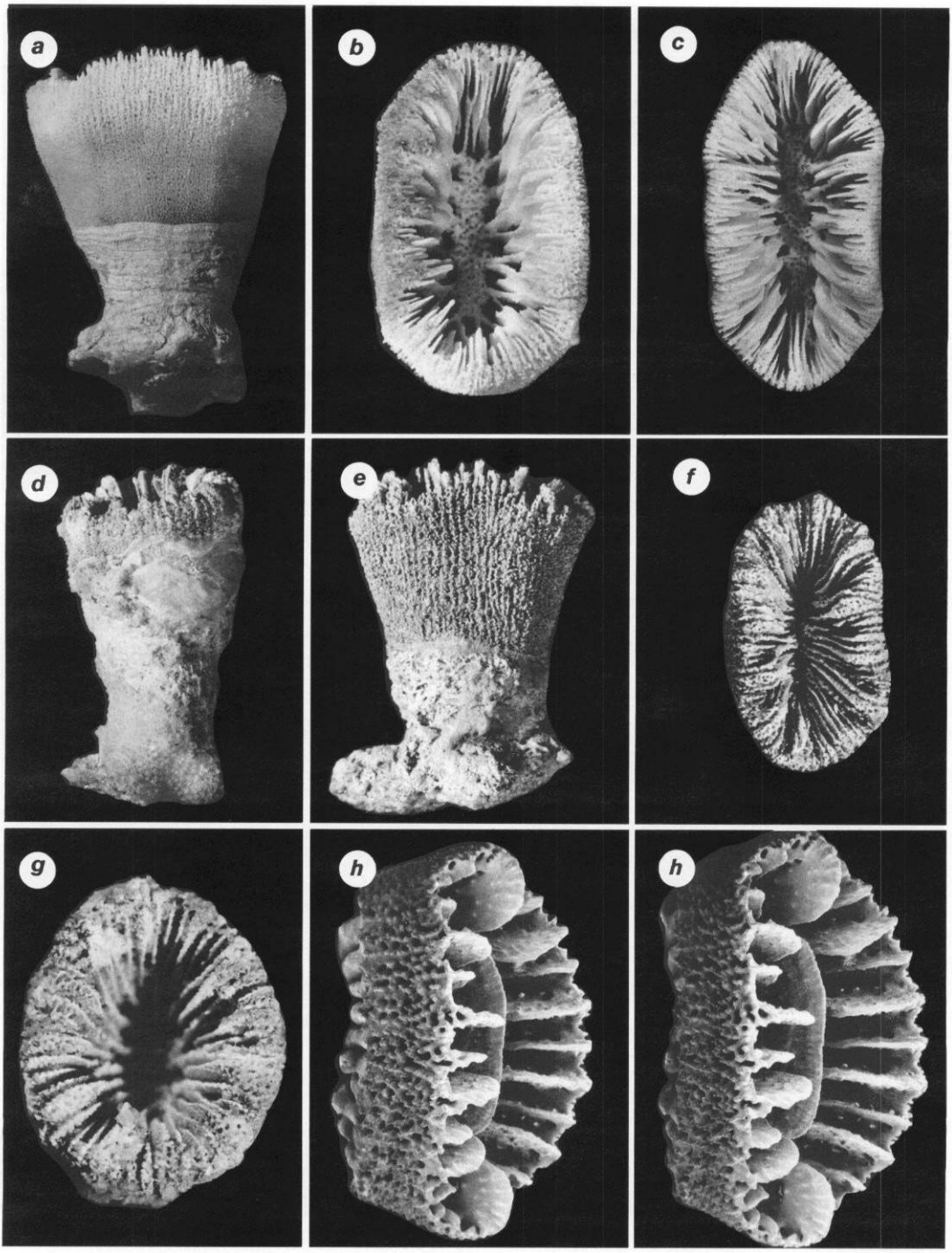

FIGURE 17. **a-c,** *Balanophyllia bairdiana:* a, b, off Gabo I., SAM H662, lateral and calicular views, both × 1.7; c, HMS 'Challenger' 162 (specimen reported by Moseley, 1881), BMNH 1880.11.25.139, × 1.8. **d-g,** *Balanophyllia dentata:* d, g, lateral (× 2.9) and calicular (× 5.5) views of holotype, Macleay Museum; e, f, lateral and calicular views of specimen from off Port Jackson, BMNH 1883.11.29.71, × 2.9, × 3.2, respectively. **h,** *Notophyllia recta* from 'Kimbla' 79-K-1-35, NMV F56884, stereo calicular view, × 12.2.

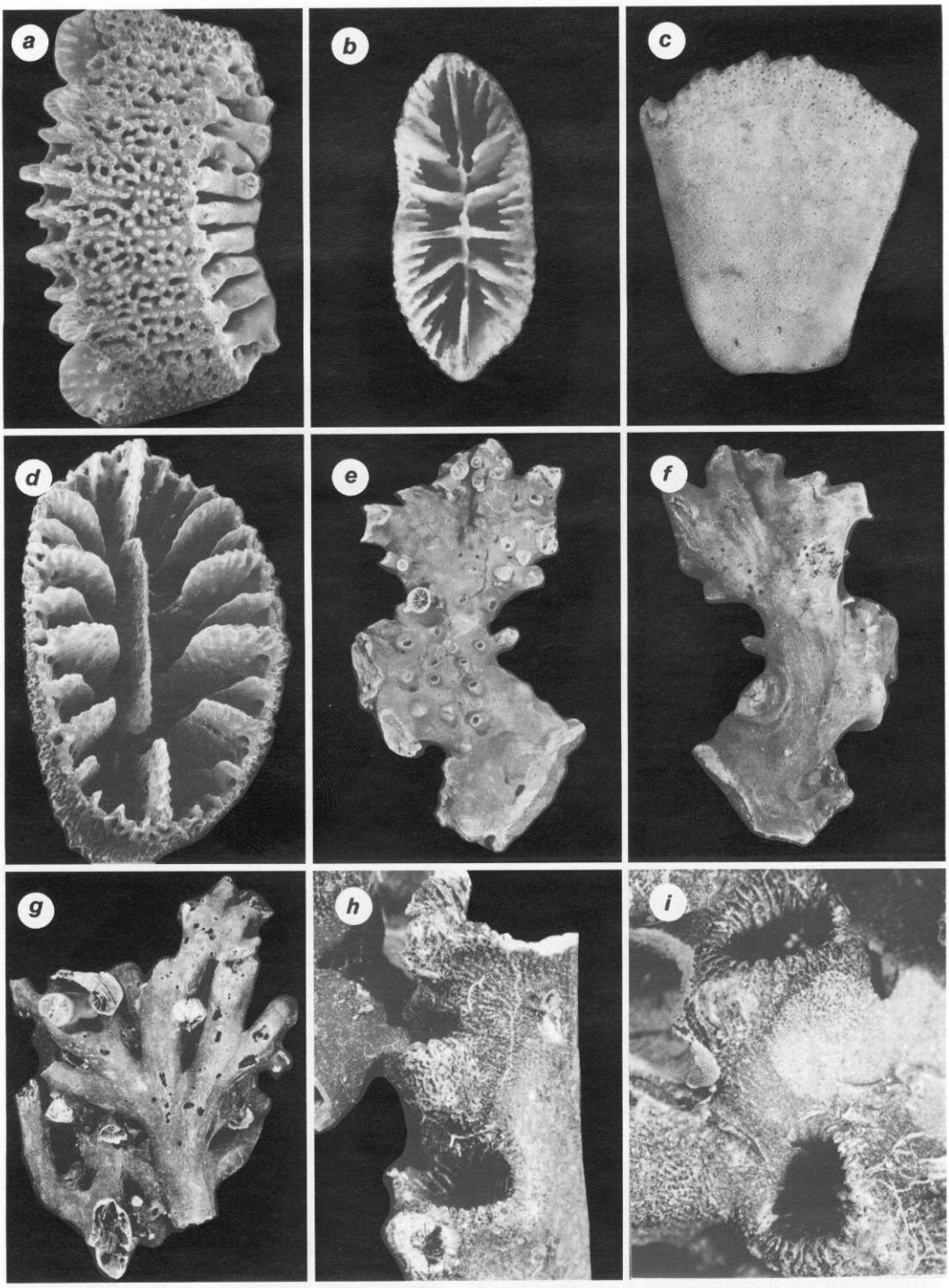

FIGURE 18. **a, d,** *Notophyllia recta* from 'Kimbla' 79-K-1-35, NMV F 56884, lateral view of anthocyathus showing basal scar (× 12.2) and oblique calicular view (× 12.9). **b, c,** paratype of *Notophyllia etheridgi*, 'Endeavour', USNM 68229, calicular (× 4.3) and lateral (× 3.8) views. **e-i,** *Enallopsammia rostrata:* e, f, calicular and acalicular faces of colony from south-east of Eaglehawk Neck, Tasmania, 960 m, TM K1124, both × 0.35; g-i, 'Soela' 16 (1987), TM K1092: g, acalicular face showing costal striae, × 0.51; h, i, enlargements of several rostrate calices, × 3.1, × 3.5, respectively.