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Some Tasmanian Palaeozoic Corals

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PLATE II

Palaeozoic corals from several Tasmanian localities are described, including two new species, and the ages they indicate are discussed.

UPPER ORDOVICIAN OR SILURIAN

Limestone at the head of the Nelson R.

Plasmoporella sp. indicates that the age of this limestone is within the range of the genus—Upper Ordovician, Valentian, Niagaran.

Chudleigh Limestone, Liena, Mersey R.

Favistella cerioides sp. nov. resembles the Upper Silurian (Ludlow) *Favistella gothlandica* (Edwards and Haime) more closely than the Upper Ordovician species from North America. *Favosites marginatus* sp. nov. does not resemble closely any species described from the Silurian, but comparisons may be made with a rather imperfectly known form from the Upper Ordovician of North America. *Plasmoporella* cf. *convexotabulata* Kiaer is identical morphologically with the Upper Ordovician or Lower Silurian species from the Baltic and China. *Halysites ?chillagoensis* Etheridge has been recorded by Etheridge (1904, p. 38), but has not been re-studied. Thus the age of the Chudleigh limestone at Liena cannot yet be fixed more narrowly than Upper Ordovician or Silurian.

SILURIAN

Gordon R.

Hercophyllum shearsbyi (Sussmilch) and *Entelophyllum* sp. occur in the limestone on the Gordon R.; the former species occurs in beds which are Upper Wenlock or possibly Lower Ludlow at Yass, N.S.W., and the latter is very close to one species from these same Yass beds and to another from the Wenlock and Ludlow of Europe. The age indicated for this limestone on the Gordon R. is thus Upper Wenlock or Lower Ludlow.

SILURIAN OR POSSIBLY DEVONIAN

Blue-grey micaceous shale, yellow weathering

Pleurodictyum megastomum M'Coy occurs in this shale, in specimens without locality labels. It is known from the ?Lower Ludlow shale above the limestone near Bowning, N.S.W., and from the Lower Devonian of New Zealand, and thus indicates a similar age for the Tasmanian shale.

Zeehan

Pleurodictyum sp., which is probably *P. megastomum*, has been recorded from Zeehan (Etheridge, 1896, p. xlii, pl. i, fig. 1) and thus suggests that Ludlow or Lower Devonian beds occur here. From Zeehan I have an unidentifiable Streptelasmid, and, from the Montagu Mine, an internal mould of an unidentifiable *Favosites* sp., with an external mould of an unidentifiable solitary turbinate Rugose coral, in a blue-grey leached shale. Two moulds of similar solitary corals in blue-grey shale are from an unknown locality.

Point Hibbs

Heliophyllum ?chillagoense (Etheridge) resembles the cerioid Middle Devonian *H. tabulatum* (Quenstedt) from the Eifel, and *H. confluens* Hall from the U.S.A., and may thus indicate a Devonian age. However, the species described by Etheridge from Chillagoe, Queensland, was regarded by him as Silurian because *Halysites* occurred in the same great belt of limestone. But Weissermel (1939, p. 104) has lately described *Halysites* from the Lower Devonian (Gedinnian) of the Bosphorus. At Point Hibbs our specimen is associated with *Favosites ?bryani* Jones, a species which occurs elsewhere in the ?Lower and Middle Devonian of N.S.W. and the Lower Middle Devonian of Queensland. Although the Point Hibbs limestone has previously been regarded as Silurian, it is thus possible that it may be Devonian.

The Devonian *Favosites goldfussi* d'Orbigny is probably represented by three specimens whose matrix and preservation are similar to those from Point Hibbs, but which have no locality labels.

SYSTEMATIC DESCRIPTIONS

MADREPORARIA RUGOSA

Family ENTELOPHYLLIDAE Hill, 1940

Genus **Entelophyllum** Wedekind, 1927, p. 22

Entelophyllum, sp. (Pl. 2, figs. 1a, b)

Material. A fragment (F 4195, Australian Museum) embedded in a grey crinoidal limestone from the Gordon R., Tasmania. Silurian.

Description. The fragment is of two corallites, in part cylindrical and in part in contact and cerioid, the more complete corallite being 13 mm. in diameter in one section and 16 mm. in a section 13 mm. higher. There are 38 major septa which extend almost to the axis, and there rotate slightly, leaving an axial space about 2 mm. in diameter, and 38 minor septa extending just over half way to the axis. Both orders have a few carinae, either opposite or alternate, near the inner margin of the dissepimentarium, where they are also somewhat dilated. The

dissepiments are small, frequently geniculate in cross-section, and are rather globose in vertical section. The tabulae are incomplete, and consist of tabellae arranged in three series; those of the outermost and axial series are sagging, but the intermediate series is of highly arched plates capping one another.

Remarks. The specimen is closer to the genotype, which is from the Wenlock and Ludlow of Europe, than to any other of the described species, but it differs from the genotype in the slight dilatation and carination of the septa. It is quite close to *E. latum* Hill (1940, p. 413) from the Wenlock or Ludlow of Glenbower, N.S.W., but *E. latum,* like the genotype, is without carinae.

The age indicated is Wenlock or Ludlow.

The family and genus have already been discussed (Hill, 1940, p. 410; Hill and Jones, 1940, p. 188) in connection with their Australian representatives.

Family FAVISTELLIDAE Hill, 1939

Genus **Favistella** Hall, 1847, p. 275

Favistella cerioides, sp. nov. (Pl. 2, figs. 2a, b)

Holotype. F 5487 (Australian Museum 717), Chudleigh limestone, Liena, Mersey R., Tasmania. Upper Ordovician or ?Silurian. On the label the locality is written 'Siena'.

Diagnosis. Cerioid *Favistella* with corallites about 5 mm. in diameter, about 18 major septa, short minor septa, and slightly domed or horizontal, close tabulae.

Description. The corallum is cerioid; the corallites are unequal, varying from 1 mm. to 7 mm. in diameter, the average being about 5 mm. Increase is intermural. The common wall between two corallites may be 0·75 mm. thick. It contains a median dark line, and the stereozone on each side of this has been formed by the lateral dilatation of the bases of the septa. There are 18 smooth-sided and rather flexuous thin major septa, extending to or almost to the axis, and 18 very short lamellar minor septa alternating with them. There are no dissepiments. The tabulae are complete, slightly domed, the domes sometimes sagging at the axis, or horizontal, about 10 in 5 mm.

Remarks. The corallites are larger, and there are more septa than in the American Upper Ordovician species; but are similar to those of *Favistella gothlandica* (Edwards and Haime, 1851, pl. xiv, fig. 2) from the Silurian of Gotland. Our species differs from the latter however in the closer spacing of the tabulae. *F. kassariensis* (Dybowski; Weissermel), from the Silurian of the Baltic States, has very highly domed tabulae with upturned edges, and thus differs from our species. Lindstrom (1888) lists *Columnaria gothlandica* Edwards and Haime from *f*, beds equivalent to the Lower Ludlow.

The family and genus have already been discussed (Hill, 1939, p. 241) in connection with their Australian representatives.

Family HELIOPHYLLIDAE

Typical Genus: **Heliophyllum** Hall MS. in Dana

Rugose corals in which the septa are carinate, with vertical carinae either opposite or alternate; the septa are long, and extend unequally and rather flexuously towards the axis, sometimes being thickened in the tabularium; the tabular floors are horizontal or slightly concave or domed, and are usually of tabellae; the dissepiments are small and globose.

Remarks. This family is represented in the Couvinian of the Eifel by *Ceriophyllum* Wedekind, which (see below) is probably, a synonym of *Heliophyllum*, and in the Hamilton of U.S.A. and Canada by *Heliophyllum* Hall. The forms placed in *Ceriophyllum* by Wedekind differ from *Heliophyllum halli* in having their septal carinae alternate on each side of the septum instead of opposite, and in having the structure of their tabularia rather more open, with the tabular floors predominately domed, instead of almost equally horizontal or concave or domed. The family may have been derived from the Silurian *Entelophyllidae*. Both have carinate septa and a wide tabularium, but in the *Entelophyllidae* the tabular floors are almost constantly domed, with axial insinkings, while in the *Heliophyllidae* the tabular floors are less regular and may be domed or sagging. Cross-bar carinae are common in the *Heliophyllidae*, but are not known in the *Entelophyllidae*.

Genus **Heliophyllum** Hall MS. in Dana

Heliophyllum Hall MS in Dana, 1848, p. 356; see Lang, Smith and Thomas, 1940, p. 66.
Ceriophyllum as *Keriophyllum* (sic) Wedekind, 1923, pp. 27, 34; genotype, *C. heiligensteini* Wedekind, 1923, p. 34; text-figs. 3a, b on p. 27. Lower Middle Devonian, Heiligenstein, the Eifel, Germany.

Genotype. Heliophyllum halli Edwards and Haime, 1850, p. lxix (see Lang, Smith and Thomas, *loc. cit.*), Middle Devonian, Hamilton group: Moscow, York and Seneca Lake, New York, U.S.A.

Diagnosis. Simple or compound Rugosa with long septa with vertical carinae either opposite or alternate, with major septa extending flexuously in the tabularium almost to the axis, and with small dissepiments, and flat, gently domed or sometimes also slightly concave, tabulae.

See remarks under family.

Heliophyllum chillagoense (Etheridge)

Cyathophyllum chillagoensis Etheridge, 1911, p. 4, pl. D, figs. 1, 2, Silurian [?], Chillagoe, Queensland.

Diagnosis. Cerioid *Heliophyllum* with alternate carinae and close, domed tabulae.

Heliophyllum ?chillagoense (Etheridge). (Pl. 2, figs. 3a, b)

Material. One specimen in the collection of the Geological Survey of Tasmania, from Point Hibbs.

Description. The corallum is cerioid, the corallites being unequal, up to 18 mm. in diameter, the average being about 15 mm. New corallites probably arise by peripheral increase, as they tend to have circular walls. There are about 24 major septa extending almost to the axis, slightly flexuous in the tabularium, and 24 minor septa extending two-thirds of the way to the axis; both orders may be dilated in the dissepimentarium, and both are carinate with carinae perpendicular to the inclination of the dissepiments, and alternate on either side of the septum. The dissepiments are small in the inner parts, but larger towards the periphery; their inclination is towards the axis in the inner parts, but gently towards the periphery in the peripheral region. The area of divergence is also shown in the traces of the septalcarinae in median vertical section of the corallite. The tabulae are incomplete and very close, the tabular floors being horizontal or slightly domed.

Remarks. The specimen appears to differ from *Heliophyllum chillagoense* only in having thicker septa, and may indeed belong to this species. The North Queensland holotype has been regarded as Silurian, because of the occurrence of *Halysites* in the same great limestone belt. But Weissermel (1939, p. 100) has described

species of *Halysites* from the Gedinnian (Lower Devonian) of the Bosphorus. Because of this Chillagoe anomaly, the Tasmanian specimen cannot be regarded as reliable as an indicator of age. *Billingsastraea billingsi nevadensis* Stumm (1937, pl. 55, fig. 9), from the Lower Middle Devonian of Nevada, U.S.A., differs from our species in being astraeoid, but its internal structure is very similar. In its alternate carinae our specimen resembles the European Couvinian *H. tabulatum* (Quenstedt) rather than the Hamilton American *H. confluens* Hall.

Family PYCNACTIDAE Hill, 1940

Genus **Hercophyllum** Jones, 1936b, p. 53

Hercophyllum shearsbyi (Sussmilch). (Pl. 2, fig. 4)

Cyathophyllum shearsbyi Sussmilch (ex Etheridge MS), 1914, fig. 143, facing p. 44. Limestone Ck., Bowning District. Silurian.

Hercophyllum shearsbyi (Sussmilch) Jones, 1936*b*, p. 54, pl. v, figs. 1a-g; pl. vi, figs. 1a-g; pl. vii, figs. 1h, i; 2.

Remarks. A partly beekitised specimen (F 4211, Australian Museum), from the Gordon R., is referable to this species, which with its genus and family has recently been fully discussed (Hill, 1940, p. 401).

Unidentifiable Rugosa

External moulds

A fragment 20 x 20 mm. of an external mould of a solitary, turbinate Rugose coral, showed well-marked longitudinal striation and transverse growth rings. It was preserved in a leached blue-grey sandy shale from the Montagu Mine, Zeehan.

Two other fragments, G1 and G2 of similar external moulds, in a blue-grey shale one 30 x 30 mm., of solitary, turbinate Rugose corals, also showing marked longitudinal striation, are without locality labels.

Streptelasmid

A thin section was made of a solitary, trochoid Rugose coral softened by weathering, in a blue-grey shale from Zeehan; it showed 30 major septa with 30 alternating ragged minor septa of unequal length, and no dissepiments, at a diameter of about 13 mm. The corallum was rather compressed (F 37801, Australian Museum). It is probably a Streptelasmid, and may be the species giving the moulds described above. It is no safe indication of age, Streptelasmids being known from the Upper Ordovician to the Middle Devonian.

Madreporaria Tabulata

Genus **Pleurodictyum** Goldfuss

Pleurodictyum Goldfuss, 1829, p. 113

Genoholotype. P. problematicum Goldfuss, 1829, p. 113, pl. xxxviii, figs. 18a-g. Lower Devonian, Eifel District and Nassau, Germany.

Diagnosis. Massive corals with thick walls pierced by mural pores, and with septa represented by low ridges with one or more rows of low spines; the calical floors are frequently furnished with small spines. The genotype usually has a worm cast through it.

Remarks. The genotype is known only in casts in sandstone; and, from the topotypes before me, I cannot be sure that tabulae were present. Lang, Smith, and Thomas (1940, p. 102) have considered with Hall and others that *Michelinia* de Koninck and its subgenera are synonymous with *Pleurodictyum,* and these genera are tabulate. The distinction between them and thick-walled *Favosites* has not yet been made clear, and the whole group is in need of revision. Nicholson's (1879, p. 149) researches on an American species he regarded as a *Pleurodictyum* with its own tissues preserved, showed that it possessed intramural canals in addition to mural pores. He observed that intramural canals were not present in *Favosites,* but were known in *Columnopora* and *Lyopora.* The internal moulds of *P. problematicum* which I have studied, however, give no indication of the presence of intramural canals.

Pleurodictyum megastomum M'Coy. (Pl. 2, fig. 5)

?Pleurodictyum megastomum M'Coy, 1867, Upper Silurian, Upper Yarra District, Victoria. *Nomen nudum.*

Pleurodictyum megastomum Dun, Chapman, 1921, p. 216, pl. ix, figs. 4-6: *quo vide* for list of records and localities.

Diagnosis. Low, hemispherical or explanate *Pleurodictyum* with corallites up to 10 mm. in diameter, average about 6 mm., each with about 25 low septal ridges studded with one or more series of low spines; the calical floors have irregularly arranged low spines.

Remarks. This Australian Upper Silurian (Ludlow?) and New Zealand Lower Devonian species is known only from moulds. It has already been adequately described, particularly by Foerste (1888, p. 132, pl. xiii, fig. 22) and Shirley (1938, *Q.J.G.S.,* p. 463). Two internal moulds in a yellow-weathering blue-grey shale with mica are in the collection sent from Tasmania, but their locality is not stated. They are labelled S10 and 7 11. One is 40 mm. in diameter and the other 30. The smaller shows the septal ornament well, and is figured herein (pl. 2, fig. 5). They indicate the Upper Silurian or the Lower Devonian. A third specimen in a grey-blue shale, also without locality, shows two poorly preserved specimens with corallites the same size as the others. The specimen figured from Zeehan by Etheridge (1896, pl. i, fig. 1) might well be this species.

Family FAVOSITIDAE

Genus **Favosites** Lamarck

Favosites bryani Jones

Favosites bryani Jones, 1937, p. 96, pl. xv, figs. 3-6, Lower Middle Devonian, Taemas; Hill and Jones, 1940, p. 190, pl. v, figs. 2a, b, ?Lower Devonian, Molong District.

Diagnosis. Favosites with corallites about 1 mm. in diameter, moderately thick-walled and polyhedric, with long, slender, sharply-pointed septal spines, sometimes opposite, one row of circular mural pores, and fairly numerous tabulae, which are mostly complete.

Remarks. A specimen (pl. 2, fig. 6) from Point Hibbs appears to belong to this species; its spines are, however, more horizontal than inclined. It suggests a Lower or Middle Devonian age for the Point Hibbs beds.

Favosites goldfussi d'Orbigny

Favosites goldfussi d'Orbigny, Jones, 1936*a*, p. 19; Devonian, the Eifel.

Diagnosis. *Favosites* with corallites 2-2·5 mm. in diameter, with moderately thick walls, and numerous blunt septal spines with a slight upward inclination, sporadically developed; with round mural pores, in two or three alternating rows on each face; and with numerous tabulae, 3 or 4 in 3 mm.

Remarks. Three specimens, one pyriform (pl. 2, fig. 7), have matrix and preservation similar to that of *F. ?bryani* from Point Hibbs, although their labels gave no locality except Tasmania. They are considerably altered, but agree fairly well with the Devonian *F. goldfussi*, although there are points of resemblance also to the Silurian *F. gothlandicus*. Lecompte (1939, p. 83) has recently given details of European members of *F. goldfussi*, and Hill and Jones (1940, p. 191) of some Australian members.

Favosites marginatus sp. nov. (Pl. 2, figs. 8a, b)

Material. Two specimens (F 5486 C6, and F 5486 C3, Australian Museum) from the Chudleigh Limestone, Liena, Mersey R., of which the former is the holotype. Upper Ordovician or Silurian.

Diagnosis. Pyriform *Favosites* with corallites 0·5 to 3 mm. in diameter and moderately thick walls crenulate in transverse section, with short horizontal septal spines, and with rather rare pores at the margins of the septal faces.

Description. The corallum is pyriform, the larger fragment being 7 cm. tall and 4 cm. wide. The corallites vary in diameter from 0·05 mm. to over 3 mm., the smaller corallites occurring at the angles of the larger. The walls of each corallite are separated from neighbours by a median dark line, and the common wall is about 0·25 mm. thick. In transverse section the walls are usually crenulate, but not in vertical section; numerous short, sharp, horizontal spines are present, a vertical series arising from each projecting crenulation; it is possible that each series has a narrow lamellar base. Mural pores appear to be confined to the margins of the faces near but not through the angles; they are slightly oval, and are about 0·25 mm. wide, and two, but not three, corallites intercommunicate by each. The tabulae are horizontal or slightly domed or sagging, and are rather distant, about 10 in 10 mm.

Remarks. The crenulation of the walls and the position of the pores distinguishes this from all other species. The spines are not unlike those of *Columnaria? halli* Nicholson of Lambe (1901, pl. vi, fig. 2a) from the Upper Ordovician of Canada; and Nicholson (1879, p. 201) considered that mural pores might be present in his species.

MADREPORARIA HELIOLITIDA Jones and Hill, 1940

Genus **Plasmoporella** Kiaer

Plasmoporella Kiaer, 1899, p. 34.

Camptolithus Lindstrom, 1899, p. 99, genotype, *Lyellia papillata* Rominger, 1876, Silurian, Niagaran: Point Detour, Lake Huron, Michigan, U.S.A.

Genotype. *P. convexotabulata* forma *typica* Kiaer, 1899, p. 35, pl. v, figs. 9-11. Silurian (?Ordovician), Étage 5 of Kiaer, Gasteropodkalk: Stavnaestangen and other localities, Norway.

Diagnosis. Heliolitida in which the reticulum consists of globose testae; with domed tabulae, complete or incomplete; and with discrete trabeculae throughout the tissue.

Remarks. The genus differs from *Propora* only in the tabulae, which are domed and complete or incomplete, in contrast to the complete, horizontal or sagging plates in *Propora.* It occurs in Étage 5 in Norway (Upper Ordovician or Lower Silurian), in the Lower Silurian of China (Yoh, 1932, p. 69), and in the Niagaran of U.S.A. (Lindstrom, 1899, p. 101).

Plasmoporella cf. **convexotabulata** Kiaer. (Pl. 2, fig. 9)

Material. One thin section cut from F 5486 C3 (Australian Museum), from the Chudleigh Limestone, Liena, Mersey R., Tasmania. Upper Ordovician or Silurian.

Diagnosis. Plasmoporella with moderately long septa, loose tissue and complete, distant, domed tabulae.

Remarks. The one thin section is almost identical with the typical variety of the genotype from the Upper Ordovician or Lower Silurian of Norway.

Plasmoporella sp. (Pl. 2, figs. 10a, b)

Material. One fragment from the limestone at the head of the Nelson R., Tasmania, collected by W. R. Browne. Upper Ordovician or Silurian.

Diagnosis. Plasmoporella in which the domed tabular floors are formed by numerous very small, close tabellae.

Description. The tabularia are about 1 mm. in diameter, and are distant about 1 mm. or less. The twelve septa in each tabularium are rather thick, extending from one-third to one-half of the way to the axis of each tabularium, and projecting into the reticulum for an equal distance. There are numerous discrete trabeculae based on the testae, and some on the tabellae. The tabular floors are domed, and the tabellae are very numerous, small and close. The testae are also numerous and small, and are highly globose.

Remarks. The fragment differs from the known species in the character of the tabellae, which are smaller, closer, and more globose than in the others, and in the slightly greater length of the septa. It indicates for the limestone containing it an age covered by the range of the genus, which is from the Étage 5 of Norway (Upper Ordovician or Lower Silurian), to the Niagaran (Wenlock) of America.

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PLATE II

All figures x2 diameters approximately, unless otherwise indicated.

FIG. 1.—*Entelophyllum* sp. F 4195, Australian Museum, from a grey crinoidal limestone on the Gordon R., Silurian. *a*, transverse and *b*, vertical section.

FIG. 2.—*Favistella cerioides* sp. nov. Holotype, F 5487, Australian Museum, T. Stephens Coll., Chudleigh Limestone, Liena, Mersey R., Upper Ordovician or Silurian. *a*, transverse and *b*, vertical section.

FIG. 3.—*Heliophyllum ?chillagoense* (Etheridge) Tasmanian Geological Survey Coll., Point Hibbs, ?Devonian. *a*, transverse and *b*, vertical section.

FIG. 4.—*Hercophyllum shearsbyi* (Sussmilch). F 4211, Australian Museum, limestone on the Gordon R., Wenlock or Ludlow. Transverse section.

FIG. 5.—*Pleurodictyum megastomum* M'Coy. 7 11, Tasmanian Geological Survey Coll., Tasmania. Internal mould, x1·5 diameters.

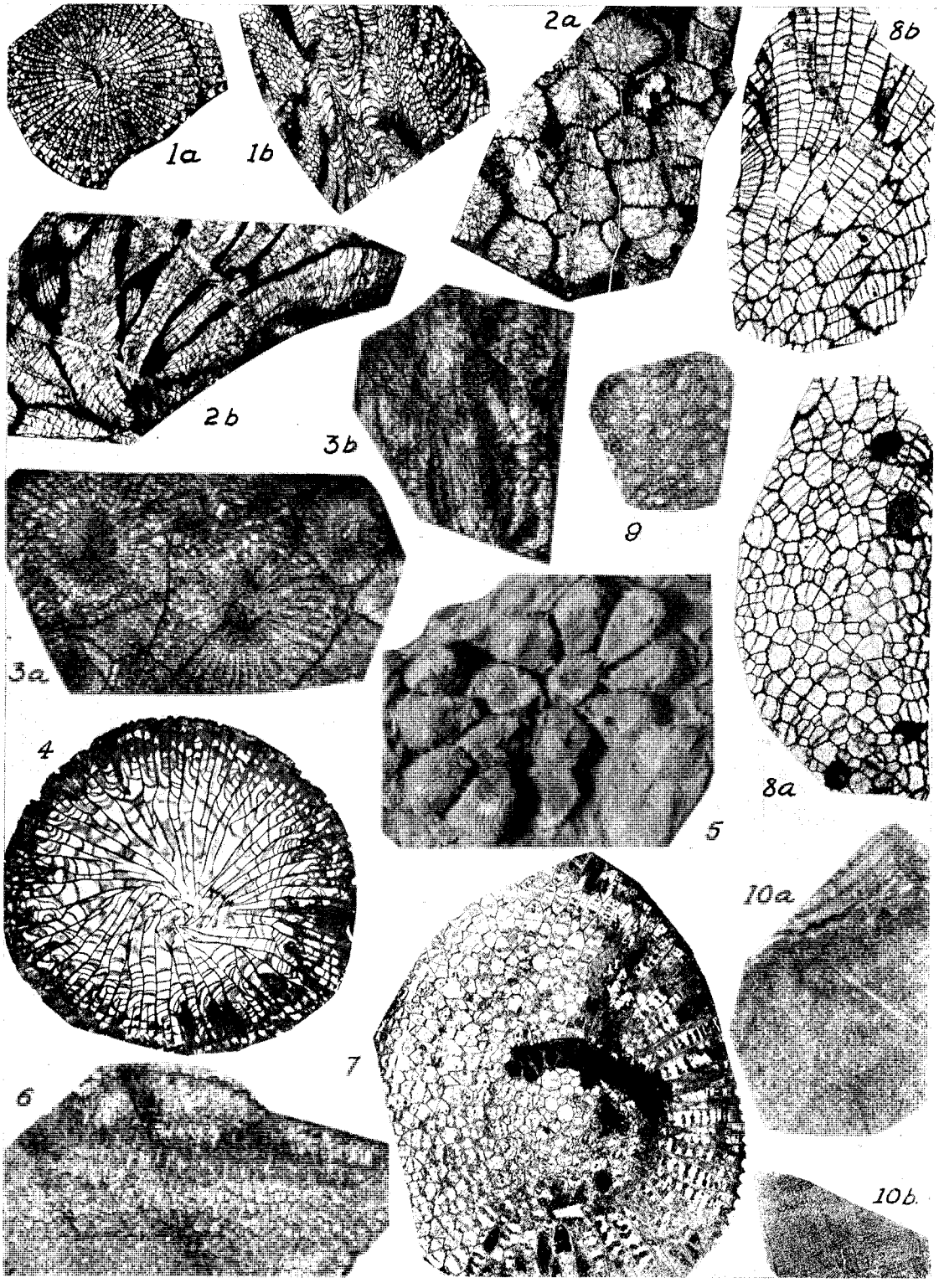
FIG. 6.—*Favosites ?bryani* Jones. Tasmanian Geological Survey Coll. Point Hibbs, ?Devonian. Section.

FIG. 7.—*Favosites ?goldfussi* d'Orbigny. Tasmanian Geological Survey Collection, Tasmania. ?Devonian. Section. x1·6 diameters.

FIG. 8.—*Favosites marginatus* sp. nov. Holotype. F 5486 C6, Australian Museum, T. Stephens Coll., Chudleigh Limestone, Liena, Mersey R., Upper Ordovician or Silurian. *a*, transverse, *b*, vertical section.

FIG. 9.—*Plasmoporella* cf. *convexotabulata* Kiaer. Thin section from F 5486 C3, Australian Museum, T. Stephens Coll., Chudleigh Limestone, Liena, Mersey R., Upper Ordovician or Silurian.

FIG. 10.—*Plasmoporella* sp. W. R. Browne Coll., limestone at the head of the Nelson R., Upper Ordovician or Silurian. *a*, transverse and *b*, vertical section.


1a
1b
2a
8b
2b
3b
9
3a
8a
4
5
10a
7
6
10b