THE AUSTRALIAN TABULATE CORAL GENUS *HATTONIA*

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ABSTRACT. *Hattonia* Jones, reinterpreted on type and topotype material of *Hattonia etheridgei* Jones, the type species, is a Silurian and Devonian favositid. It is characterized by distant groups of tabulae developed at the same level throughout the corallum and by pores which are confined to these levels. The genus is endemic to eastern Australia. Two new species, *H. fascitabulata* from the lower Gedinnian of New South Wales and *H. spinosa* from the Emsian of north Queensland, are referred to it.

FAVOSITID-LIKE tabulate corals with tabulae developed at the one level throughout their corallum have a global distribution and are referred to a variety of genera. Many of these genera are in urgent need of revision before their taxonomic and stratigraphic significance can be assessed. One such genus is *Hattonia*, originally referred to the family Chaetetidae by Jones when he first described it in 1927. Subsequently it has been variously referred to the Chaetetidae, Favositidae, or Lichenariidae by authors revising the genus without access to the type material. Re-examination of the holotype, further collections of the type species from the type locality and elsewhere, and recent discovery of other species referable to the genus have allowed more precise definition of this genus and a better understanding of its taxonomic position and distribution.

All measurements of corallite diameter are made diagonally angle to angle, median dark line to median dark line (as seen in transmitted light). Wall thickness is given as the total thickness of the dividing wall at the mid-point of the side. Specimens prefixed UQF are housed in the Palaeontological collections of the Department of Geology and Mineralogy, University of Queensland, Brisbane; those prefixed MMF are stored at the Geological and Mining Museum, Sydney, New South Wales. Permission to publish (for J. W. Pickett) was granted by the Under Secretary, New South Wales Department of Mines.

Family FAVOSITIDAE Dana, 1846
Genus HATTONIA Jones, 1927

Hattonia Jones 1927, p. 438; Lang, Smith and Thomas 1940, p. 65; Bassler 1944, p. 48; Sokolov 1947, p. 1767, *pars*; 1949, p. 83, *pars*; Lecompte 1952, p. 517; Sokolov 1955, p. 154, *pars*; Hill and Stumm 1956, p. F455; Mironova 1957, p. 88, *pars*; Sokolov 1962, p. 222, *pars*; Scharkova *in* Bogdanov 1963, p. 149, *pars*; Hill, Playford and Woods 1967, p. d6.

Type species (by monotypy): *Hattonia etheridgei* Jones, 1927, from the 'Barrandella Shale' (upper part of the Silverdale Formation, Link 1970), Hatton's Corner, Yass, New South Wales; Middle Ludlow (Jaeger 1967; Link 1970).

Revised diagnosis. Massive favositid corals with small corallites; tabulae in groups of 2 to 4 (rarely singly or in 5 or 6), at similar levels in adjacent corallites and indeed throughout the corallum; mural pores large, always associated with the groups of tabulae; septal apparatus absent or developed as several rows of short spines.

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Discussion. Hattonia was originally referred to the family Chaetetidae (rather than the Favositidae) as Jones (1927) considered mural pores and septal structures to be lacking. Hill and Stumm (1956) followed Jones without comment. However, as early as 1944 Bassler remarked in a consideration of various poorly known tabulates that he 'suspected that a tangential section . . . will show favositoid characters' (p. 48) and included the genus in the Favositidae. This he did, however, without ever having seen material belonging to the genus.

A second species, *Hattonia marinae* Sokolov, 1947, p. 1766, figs. 1, 2, from the Upper Silurian, Southern Fergana, U.S.S.R., was referred to the genus by Sokolov in 1947. (Precise details of locality and stratigraphic horizon are lacking. The age is variously given as Wenlock, Wenlock–Ludlow, Upper Silurian.) In so doing, Sokolov amended the definition of the genus so that forms referred to it should bear mural pores in a single row. He concluded that *Hattonia* could not belong to the Chaetetidae because of the occurrence of intermural budding in the type species, although the two features emphasized by Jones—absence of pores and lack of septal structures—both indicate affinity with that family. Sokolov considered that mural pores are likely in *H. etheridgei*, but had escaped Jones's notice because of the inferior quality of his thin sections. The figures given by Jones, according to Sokolov, even suggest the presence of pores. Sokolov concluded that *Hattonia* belonged to the Favositidae, to which he continued to refer it (1955, 1962). In 1952 Lecompte placed *Hattonia* in the family Lichenariidae, believing mural pores and septal apparatus to be lacking. Sokolov (1955, p. 236) disagreed with this, pointing out that the group became extinct before Upper Ordovician times.

A re-examination of the holotype of *H. etheridgei* substantiates the remarks made by both Bassler and Sokolov on the structure and family position of the genus. Mural pores are definitely present, mostly occurring between the pairs of tabulae. In all species now referred to the genus this same association of groups of tabulae and mural pores is seen. Structures which might be termed 'lateral tabulae' by analogy with the lateral dissepiments of some rugosans, in that they do not cross the lumen, but are blister-like in longitudinal section (see text-fig. 1*a*, *b*, *e*), are reminiscent of syringoporoids, particularly when these are opposite one another (text-fig. 1*a* and Pl. 104, figs. 1, 3), and give the impression of a syrinx. These 'lateral tabulae', when they occur, usually lie between adjacent mural pores, like a syrinx communicating with that of the adjacent corallite. However, such corallites have only been seen to communicate with the lumen of a corallite with normal tabulae. Structures which present a syrinx-like appearance in transverse section prove to be sections of domed or saucered tabulae, with no vertical continuity. Further, a 'lateral tabula' may occasionally span a mural pore (text-fig. 1*a*, *b*), thus disrupting communication between syrinx-like structures of adjacent corallites. These are favositoid rather than syringoporoid features, according to Hill and Jell (1970) who summarized the important features which may be used in distinguishing the superfamilies Favositoidea and Syringoporoidea. The usually flat tabulae, occasional septal spines, and direct communication between the lumina through the mural pores are strongly indicative of favositoid affinities. *Hattonia* is distinguished from other favositids by the grouped tabulae, occurring at similar levels through the colony and the association of mural pores with these levels.

Grouping of tabulae in tabulate corals has been discussed by Tong-Zyui (1965, p. 44), who ascribes it to periodic growth, pointing out that there is often a thickening of skeletal elements corresponding to the halts in growth. This last is not exclusive to tabulates, as it also occurs in rugose corals. Although the growth of *Hattonia* may have been periodic, the grouping of the tabulae and their association with the mural pores is a genotypic feature, and not in any way imposed by external factors such as climate or seasons. In *H. fascitabulata* thickening of the walls does seem to be associated with rate of growth, but grouping of the tabulae is quite independent of this thickening. Tong-Zyui also points out that 'level' tabulae, i.e. those occurring at similar levels in adjacent corallites, have been reported in many genera of tabulates; *Dictyofavosites*, *Hattonia*, *Dania*, *Laceripora*, *Paleofavosites*, *Mesosolenia*, *Favosites*, *Squameofavosites*, *Sapporipora*, *Pachyfavosites*, *Parastriatopora*, *Echyropora*, and *Caliapora*. The occurrence of this feature in such a variety of genera obviously does not imply consanguinity. On the other hand, those genera which for other reasons are held to be closely related (*Favosites*, *Pachyfavosites*, *Squameofavosites*, *Dictyofavosites*) seem, with the exception of *Dictyofavosites*, to indicate that 'level' tabulae may have arisen independently.

Dictyofavosites Chernyshev, 1951 with type species *D. salairicus* Chernyshev, 1951, p. 37, pl. 9, figs. 1–2 from the Lower Devonian (given as Upper Silurian by Chernyshev), above the mouth of the rivulet Khvoshchevki, River Pavlova, Salair, Kuznets Basin, U.S.S.R., is characterized by distant tabulae developed at the same level in adjacent corallites throughout the corallum and by mural pores occurring in regularly spaced series along the length of the corallite without relation to the tabular levels. Thus we do not consider it a synonym of *Hattonia* as did Sokolov (1947, 1955) when he referred *H. marinae* Sokolov, 1947, p. 1766, figs. 1, 2 to it. This latter species is more closely related to *D. salairicus* than to *H. etheridgei*. Similarly, the two species referred tentatively to *Hattonia* by Scharkova (1963), *H. elegans* and *H. parvula*, from the Lower Ludlow of the River Kulun-Bulak and the River Ayagus respectively, of the southern slopes region of Tarbagatay, U.S.S.R., do not show the grouping of tabulae and the associated mural pores which we consider characteristic of *Hattonia*, although the tabulae do occur at similar levels through the colony, as in *H. marinae*. These three Russian species seem to be closely related to each other, but they are not congeneric with *H. etheridgei*.

The longitudinal section of the holotype of *Favosites* (*Salairia*) *peetzi* figured by Chernyshev (1951, p. 38, pl. 9, figs. 5, 6) from the Lower Devonian of Salair, Kuznets Basin, U.S.S.R., and type species of his subgenus *Salairia*, suggests the presence of paired tabulae. However, one of us (J. S. J.) has examined the original slide and considers this appearance is due to the recrystallization of the specimen. The preservation is too poor to determine if mural pores are associated with these levels. It seems probable that this species is not related to *Hattonia*; Sokolov (1962) continued to consider it a subgenus of *Favosites*.

Species referred to Hattonia:

Hattonia etheridgei Jones, 1927.
Hattonia fascitabulata sp. nov.
Hattonia spinosa sp. nov.

Species not referred to Hattonia:

Hattonia marinae Sokolov, 1947, p. 1766, figs. 1, 2; 1949, p. ?, figs. ?; 1955, p. 154, figs. 27*a*, *b*; 1962, p. 222, fig. 18.
Hattonia elegans Scharkova *in* Bogdanov, 1963, p. 149, pl. 22, figs. 3–6.
Hattonia parvula Scharkova *in* Bogdanov, 1963, p. 150, pl. 23, figs. 1, 2.

Distribution: Wenlock to Emsian of eastern Australia.

Hattonia etheridgei Jones, 1927

Plate 103, figs. 1–5; Plate 104, fig. 1; Plate 105, fig. 1

1927 *Hattonia etheridgei* Jones, p. 438, pl. 12, figs. 1–3.
1944 *Hattonia etheridgei* Jones; Bassler, p. 48, figs. 12, 13.
1952 *Hattonia etheridgei* Jones; Lecompte, p. 517, fig. 35.
1956 *Hattonia etheridgei* Jones; Hill and Stumm, p. F455, fig. 345 (3*a*, *b*).

Holotype. Specimen and three slides UQF 7200 (No. A15 of Jones's Collection) from the 'Barrandella Shale' (upper part of the Silverdale Formation of Link, 1970), Hatton's Corner, Yass, New South Wales; Middle Ludlow (Jaeger 1967; Link 1970).

Diagnosis. Hattonia with slender corallites (0·8 to 1·0 mm occasionally up to 1·4 mm in diameter), dividing walls thin (0·5 to 0·1 mm); tabulae mostly grouped in distant pairs with associated large circular mural pores; septal spines absent.

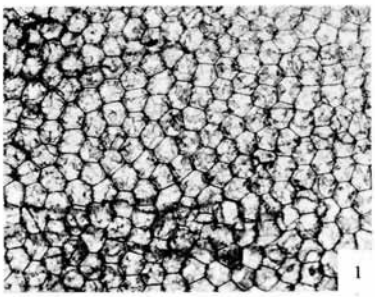
Description of holotype. The holotype is a fragment 7 × 6 × 5 cm of a large massive favositid colony. The weathered surface shows a distinct and regular lamellation transverse to the length of the corallites (Pl. 103, fig. 3). The lamellae correspond to the development of the tabulae at the one level throughout the corallum. The corallites are slender and polygonal (four- to seven-sided but more commonly six-sided), the sides are nearly always straight. The corallites range from 0·8 to 1·0 (mean 0·92) mm in diameter. The wall is quite thin, 0·05 to 0·1 mm thick in the centre of the faces and widening slightly towards the angles. In longitudinal section the corallite walls are parallel and straight or slightly curved. The tabulae tend to be grouped in pairs 0·4 to 0·5 mm apart with the pairs 1·6 to 1·9 mm apart, and are developed at the same level in adjacent corallites. In places the pair may not be developed, or only the top or bottom tabula of the pair is present. In others, another plate may be developed between the pair and may be based on only one wall, based on the wall on one side and the tabula beneath, or based on two tabulae. Mural pores are developed in a single series in the centre of the faces between the paired tabulae. They are circular, 0·25 to 0·3 mm in diameter and in transverse section occasionally show a median diaphragm. Recrystallization has obscured the microstructure of the wall. In places small dark patches which do not project into the lumen are seen in tangential sections of the wall; these may represent the bases of septal spines.

EXPLANATION OF PLATE 103

Figs. 1–3. *Hattonia etheridgei* Jones, holotype, UQF7200 from the 'Barrandella Shale' (Upper part of Silverdale Formation), Hatton's Corner, Yass, New South Wales, Middle Ludlow. 1, transverse thin section, × 4. 2, longitudinal thin section. Mural pores can be observed in several places, e.g. at the left between the tabulae of the top pair, between the first and second and the second and third corallites (arrow), × 4. 3, weathered surface, × 1.

Fig. 4. *Hattonia etheridgei* Jones, paratype, UQF35754 from probably the 'Hume Limestone' (top of Silverdale Formation), Limestone Creek, a tributary of Derringullen Creek, near Yass, New South Wales, Middle Ludlow. Longitudinal thin section showing less regular arrangement of tabulae, × 4.

Fig. 5. *Hattonia etheridgei* Jones, MMF15779 from the Mirrabooka Formation, Cheesemans Creek, west of Orange, New South Wales, Upper Wenlock. Transverse thin section showing a number of average corallites, × 4.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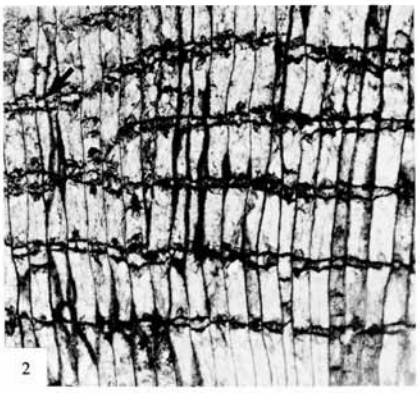
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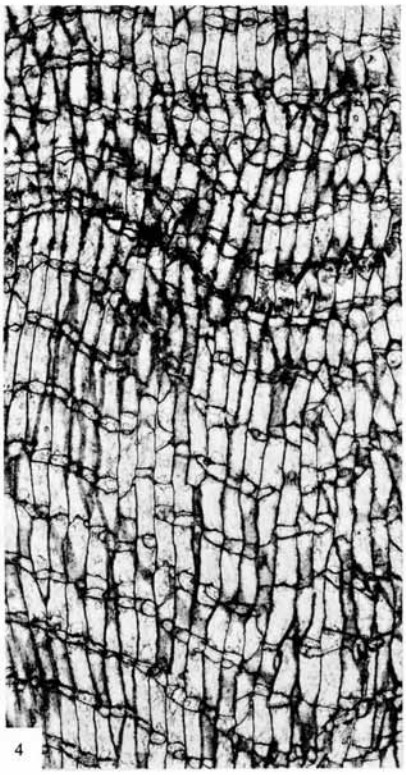
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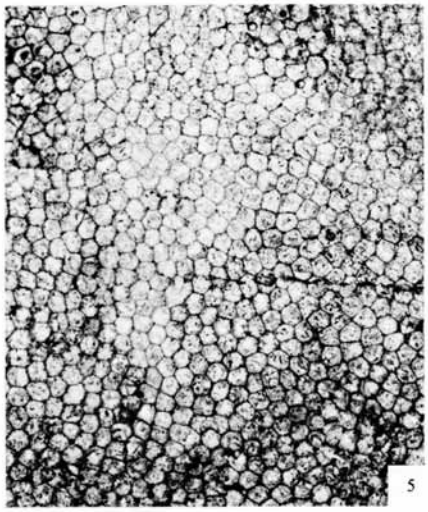
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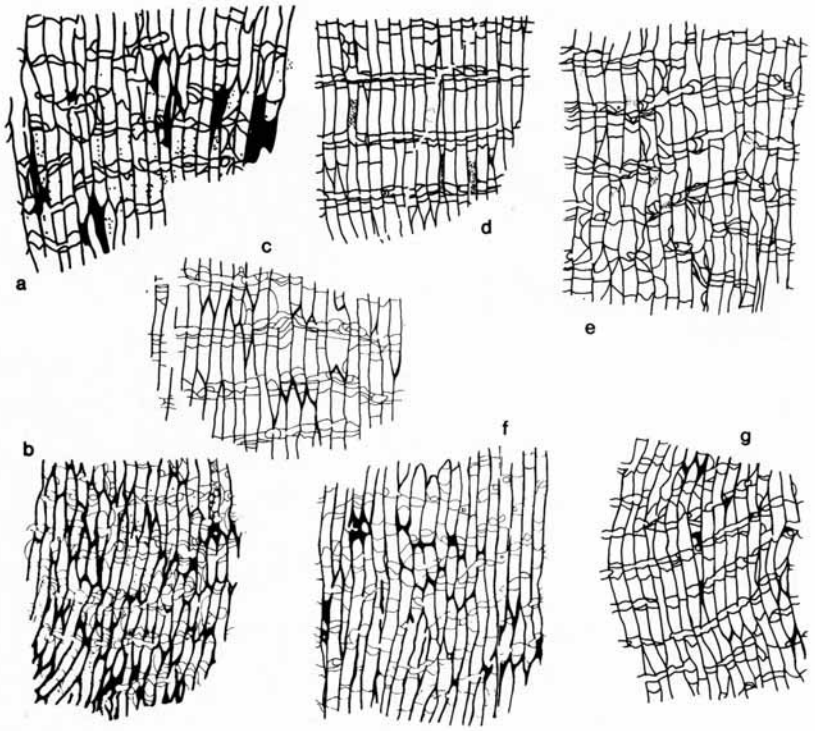
PICKETT and JELL, *Hattonia*

Supplementary material. Five paratypes from Jones's collection, now sectioned; these are UQF3755 and Bristol University, Department of Geology Collection 6771 from the type locality, UQF3756 and UQF6471 from Derringullen Creek, near Yass, New South Wales, probably from the 'Hume Limestone' (top of Silverdale Formation), and UQF3754 from Limestone Creek, a tributary of Derringullen Creek, probably also from the same horizon. MMF15745 from the 'Hume Limestone', Derringullen Creek, and MMF15763, MMF15766, MMF15768, MMF15774, MMF15775, MMF15779, and MMF15785 from Limestone Member D, Mirrabooka Formation, Cheesemans Creek, west of Orange, New South Wales, of probable Wenlock age (Sherwin 1971).

Variation in supplementary material. The largest specimen from the Yass area, MMF15745, measures $12 \times 10 \times 13$ cm, but is part of a much larger corallum. The variation in features such as size of corallites, thickness of wall and diameter of mural pores is similar to the holotype. The disposition of the tabulae in other specimens (UQF3755, MMF15745) is less regular than in the holotype. In these, although paired tabulae are frequent, they occur more commonly in groups of three or four, and the number of tabulae of irregular shape is much greater (see text-fig. 1). The Mirrabooka Formation specimens show some



TEXT-FIG. 1. Arrangement of tabulae in *Hattonia* spp., ×2·5 approx.: (*a*) *H. spinosa* sp. nov., UQF63993, Emsian, Pandanus Creek, north Queensland. (*b*) *H. fascitabulata* sp. nov., MMF14761, Gedinnian, west of Yass, New South Wales. (*c*, *d*, *e*) *H. etheridgei* Jones, MMF15774, MMF15766, MMF15768, Mirrabooka Formation, Cheesemans Creek, New South Wales. (*f*) *H. etheridgei* Jones, MMF15745, 'Hume Limestone', Derringullen Creek, west of Yass, New South Wales. (*g*) *H. etheridgei* Jones, UQF3755, Formation uncertain, Hatton's Corner, Yass, New South Wales.

differences from those from Yass, though these are too slight to warrant recognition even as a subspecies. They are:

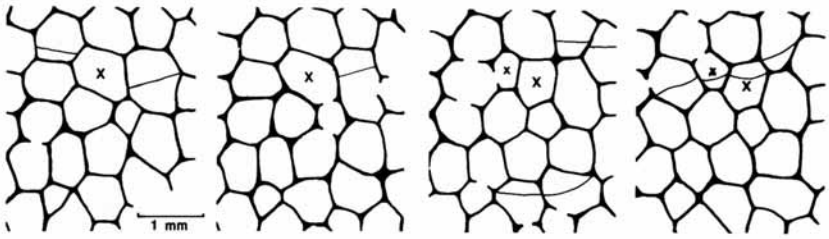
(i) The average distance between the groups of tabulae is greater, usually over 2 mm and occasionally exceeding 3 mm.

(ii) Rarely, an isolated corallite conspicuously larger than its fellows may occur. The normal diameter is very close to 1 mm, and the size is remarkably constant, so that a larger corallite is quite noticeable. The largest observed has a diameter of 1·4 mm (MMF15763).

(iii) Occasionally, one side wall may fail to develop, so that two adjacent corallites together present an hour-glass shape in transverse section, reminiscent of *Multisolenia*. This degree of communication between corallites is much greater than that through the mural pores. In longitudinal section this is expressed by the absence of the wall for 5 mm or so (see Pl. 104, fig. 1).

The largest specimen also comes from this locality, an incomplete colony measuring $42 \times 29 \times 12$ cm (MMF15785). The specimens from the Mirrabooka Formation are the oldest known representatives of the genus and here they form the dominant element of the fauna, in both number and size of colonies. The age (Sherwin 1971) is Upper Wenlock. Certainly the beds are overlain by sediments containing halysitids (Limestone Member E), whereas these do not occur as high as the Silverdale Formation in the Yass sequence. Other corals occurring in Limestone Member D are not helpful in establishing a correlation, on the basis of our present knowledge of the faunas. Other species present include *Phaulactis* sp. nov., *Tryplasma* cf. *derrengullenensis* Etheridge Jr., *Favosites* spp. (a large and a small species, neither closely comparable with any described from Australia so far), *Alveolites* sp., *Heliolites* cf. *daintreei* Nicholson and Etheridge (a form not closely comparable with any of the 'groups' of Jones and Hill 1940), *Propora conferta* Edwards and Haime and stromatoporoids.

Increase. All specimens of *H. etheridgei* examined are fragments of mature colonies, in which division of the corallites is rare. Serial sections made at intervals of 0·2 mm through specimens from Cheesemans Creek (MMF15779) and Derringullen Creek (MMF 15745) revealed only one corallite which appears to be dividing (see text-fig. 2). Even a distance of 0·2 mm between sections was insufficient to disclose all details of division, which is accomplished in this interval, i.e. less than one-fifth of the corallite diameter. The parent corallite in the second section figured gives no indication (not even greater size) that the division is about to occur.



TEXT-FIG. 2. Division in *Hattonia etheridgei* Jones: MMF15745 from Derringullen Creek, west of Yass, New South Wales. The sections are separated by an interval of 0·2 mm. The separation of the new corallite from the parent is entirely accomplished within this short interval.

Hattonia fascitabulata sp. nov.

Plate 105, figs. 2–3

Holotype. MMF14761 from the Lower Gedinnian Elmside Formation (Link 1970), 1·2 km south of the Hume Highway, 0·8 km west of the junction with the Boorowa road, west of Yass, New South Wales (GR185701, Goulburn 1:250,000 sheet). Only a single specimen is known.

Diagnosis. *Hattonia* with mostly six-sided corallites 0·5 to 0·7 mm in diameter; thick walls (up to 0·20 mm); mural pores almost as wide as the sides of the corallites (0·2 to 0·22 mm in diameter); tabulae occurring in groups of three to six; septal apparatus virtually absent.

Description. Details of the appearance of the corallum are not known. The holotype is an eroded, rounded fragment 11 × 10 × 7·5 cm. The corallites are slightly sinuous; this and zones of thickening and pigmentation indicate that the surface of the corallum was undulose. The corallites are four- to six-sided, regular in size, being 0·5 to 0·7 mm in maximum diameter, rarely reaching as much as 0·8 mm. The walls are generally thickened, more so in the angles than on the sides, so that the lumen varies from polygonal in the rarer unthickened areas to sub-rounded in areas of considerable thickening. In unthickened areas the wall is just under 0·1 mm thick at the centre of the face, in thickened areas it may reach 0·2 mm. The walls, especially where thickened, show a central light line in transmitted light, somewhat wider than the usual dark line in other favositids: this is, however, a feature of the preservation rather than a result of a structural difference. Between this central clear line and the lumen the wall is fibrous with the fibres normal to the surface of the wall. The boundary between the clear central line and the outer fibrous area is not distinct. Growth lines normal to the fibres parallel the inner edge of the lumen and at low magnification give the wall a lamellar appearance. Mural pores are rounded or slightly elongated vertically, 0·20 to 0·22 mm in diameter. They occur always in a zone of tabulae, and at the same level throughout the colony. There is only one per side of a corallite, as the pores are almost as wide as the sides. Pores occur on several faces of one corallite at the same level, resulting in a localized apparent meandroid pattern in transverse section (see Pl. 105, fig. 2). No pore plates have been recognized.

Septal structures are poorly developed, being reduced to rare septal spines, which occur in vertical rows. These have a patchy distribution through the colony. They are short, scarcely reaching 0·2 mm, and less than 0·1 mm in diameter, and so inconspicuous that their presence was overlooked until the larger spines of *H. spinosa* were seen. Tabulae occur in groups of up to six, the most common number being four. The distance apart both of tabulae within a group and of adjacent groups varies considerably. In the former case the tabulae are usually less than 0·5 mm apart or as close as 0·1 mm, but even up to 0·7 mm. The latter measured most accurately as the distance apart of the mural pores, is 2 to 4·5 mm. Tabulae are very thin and their shape is variable in the extreme. They may be concave, convex, may bear a marked angular downward deflection, or even sit blister-like on the wall. In this latter case the upper and lower points of attachment, as observed in longitudinal section, frequently lie above and below a mural pore.

Remarks. Where the walls are thickened at the angles the transverse sections of *H. fascitabulata* are similar to those of *Pachyfavosites* Sokolov but where unthickened the polygonal corallites resemble the thicker-walled corallites of *H. etheridgei*. This rounding of the lumen by the thickening of the wall especially at the angles is considered of no more than specific significance. The slender corallites and generally thick walls as well as the more irregular grouping of commonly four tabulae at various levels distinguish *H. fascitabulata* from the type species of the genus.

TABLE 1. Comparative values of various parameters for three species of *Hattonia*.

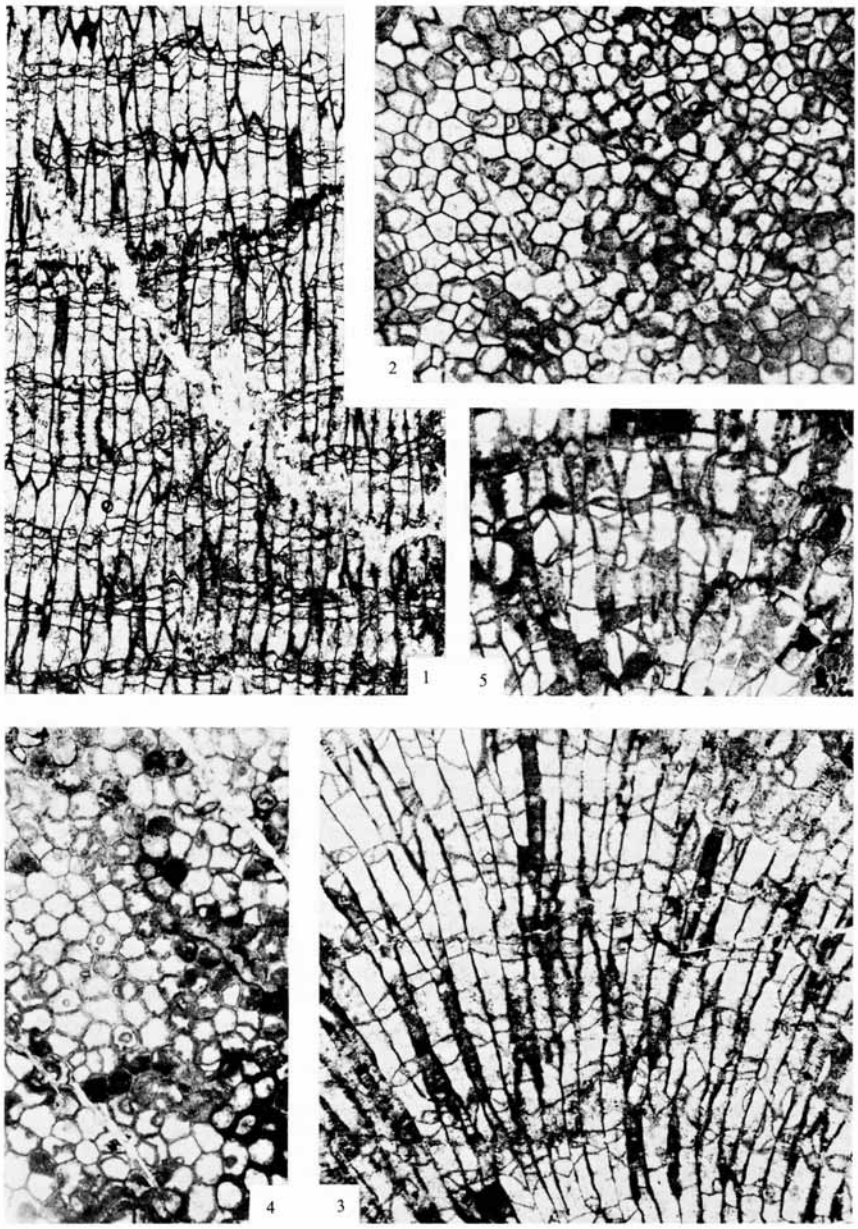
Species	Corallite diameter	Wall thickness	Mural pore diameter	Interval between grouped tabulae	Interval between tabular groups
H. etheridgei	0·8–1·0	0·05–0·1	0·25–0·3	0·4–0·5	1·6–1·9
H. fascitabulata	0·5–0·7	0·07–0·2	0·2–0·22	0·1–0·5	2·0–4·5
H. spinosa	0·9–1·4	0·1–0·15	0·25–0·3	0·4–0·5	1·5–2·5

EXPLANATION OF PLATE 104

Fig. 1. *Hattonia etheridgei* Jones, MMF15774 from the Mirrabooka Formation, Cheesemans Creek, west of Orange, New South Wales, Upper Wenlock. Longitudinal thin section showing increased number of tabulae in some groups, 'lateral' tabulae, and missing sections of wall, × 4.

Figs. 2, 3. *Hattonia spinosa* sp. nov., Holotype, UQF50894, Martins Well Limestone Member, Broken River Formation, at Martins Well, 8 km north-west of Pandanus Creek homestead, north Queensland, Emsian. 2, transverse thin section, × 4. 3, longitudinal thin section, × 4.

Figs. 4, 5. *Hattonia spinosa* sp. nov., paratype UQF63992, same loc. as figs. 2, 3. 4, transverse thin section, × 4. 5, longitudinal thin section, × 4.



PICKETT and JELL, *Hattonia*

Hattonia spinosa sp. nov.

Plate 104, figs. 2–5

1967 *Hattonia* sp. nov. Hill, Playford and Woods, p. d6, pl. D3, fig. 5*a*, *b*.

Holotype. UQF50894 from the Emsian (Jell 1968; Strusz 1972) Martins Well Limestone Member, Broken River Formation, at Martins Well, 8 km north-east of Pandanus Creek homestead, north Queensland (GR611847 Clarke River 1:250,000 sheet).

Other material. Three specimens UQF63992, UQF63993, and UQF63994, from the same locality.

Diagnosis. *Hattonia* with numerous short horizontal septal spines; mural pores oval, in a single vertical series in the centre of each face; tabulae tending to be grouped in pairs with incomplete or sometimes complete tabulae between pairs.

Description. The holotype is an abraded part (10 × 10 × 15 cm) of a tall corallum with corallites radiating upwards and outwards from its base. The distal surface of the colony was probably domed. The other specimens are fragments of probably similar coralla. The corallites are polygonal, four- to six-sided, the sides in some being a little curved between the angles, and are 0·9 to 1·4 (mean 1·02) mm in diameter. The walls vary in thickness from 0·1 to 0·15 mm in the centre of the faces and thicken towards the angles, which in some become rounded. In transverse section the wall consists of a thin median dark line (as seen in transmitted light) which is the same width throughout but discontinuous and may be represented by a line of closely spaced dark spots, and a wider zone of lighter-coloured material on either side which thickens towards the angles. In most places the microstructure of the wall is not obvious; however, in parts where the central dark line is represented by dark points, lighter tissue on either side seems to consist of fibres radiating outwards from these points. In longitudinal section, tangential sections of the wall show a fibrous structure with the fibres directed upwards and inwards from the angles towards the centre of the faces. Whether the fibres are grouped into trabecular bundles or are all parallel is not known. This structure resembles that seen in the Australian species of *Squameofavosites*. Juvenile corallites develop by the insertion of a new partition across the angle of an adult corallite. Septa are represented by numerous short, blunt, nearly horizontal septal spines arranged in two or three subopposite to alternating vertical series on each face. Each spine seems to have a median dark line and is possibly trabeculate. The mural pores are commonly oval 0·25 to 0·3 mm in width and 0·3 to 0·35 mm in height, or less commonly circular, 0·3 mm in diameter. They are arranged up to 2·5 mm apart in a single vertical series in the centre of each face and seem to be developed at the same level as the tabulae. The tabulae are grouped in pairs and tend to be at or nearly at the same level in adjacent corallites. However, there is only a general regularity in their arrangement and local disparities are common. The lower tabula of a pair is usually saucered and the upper horizontal or arched; they are usually 0·4 to 0·5 mm apart. Only occasionally are there any tabulae developed between those of a pair. The pairs are 1·5 to 2·5 mm apart and sometimes incomplete tabulae are developed between them, which are commonly convex in longitudinal section and are usually based above and below on the one wall.

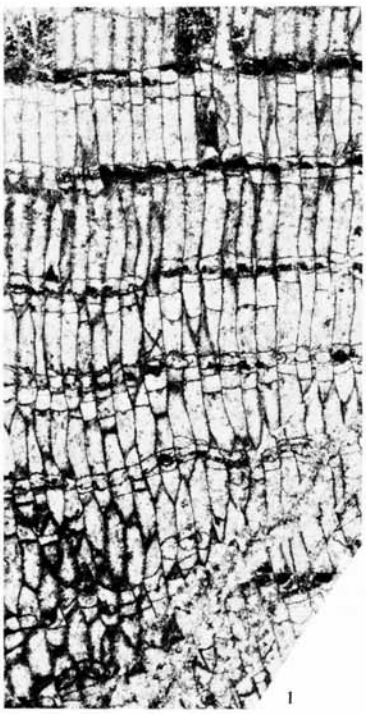
Remarks. Commensal worm tubes similar to those in *Favosites duni* (Etheridge Jr.) are seen occasionally in the wall at or near the angles of the corallites.

This species differs from the type species in its slightly larger corallites, more numerous septal spines, although their absence in the holotype of the type species may be due to the recrystallized nature of the specimen, less regularity in the arrangement of the tabulae and the more common incomplete tabulae between tabular pairs.

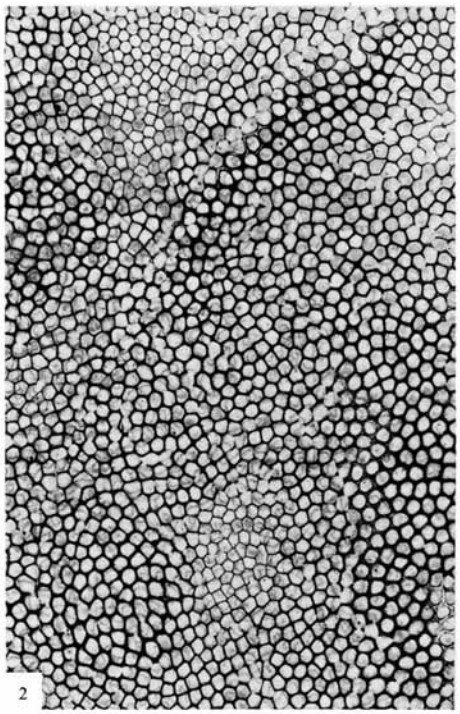
EXPLANATION OF PLATE 105

Fig. 1. *Hattonia etheridgei* Jones. MMF15766 from the Mirrabooka Formation, Cheesemans Creek, west of Orange, New South Wales, Upper Wenlock. Longitudinal thin section showing regular disposition of tabulae, × 4.

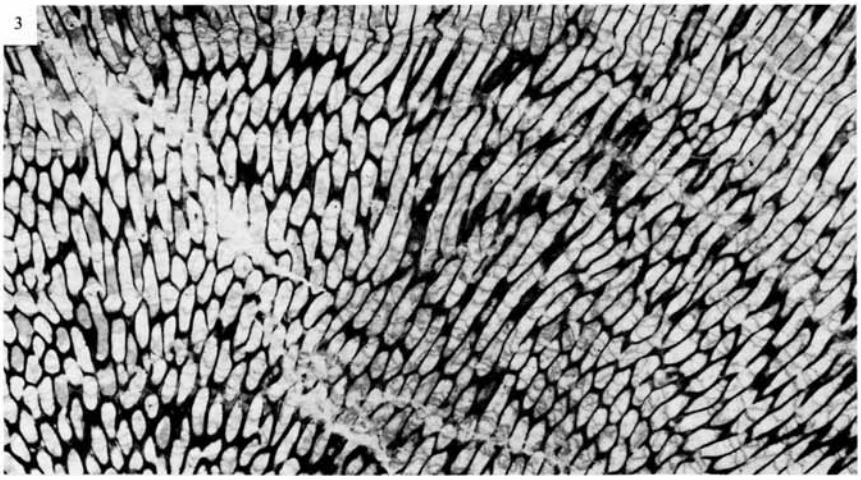
Figs. 2, 3. *Hattonia fascitabulata* sp. nov., holotype, MMF14761 from the Elmside Formation, 1·2 km south of the Hume Highway, 0·8 km west of the junction with the Boorowa road, west of Yass, New South Wales, Gedinnian. 2, transverse thin section, × 4. 3, longitudinal thin section, × 4.



1



2



3

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