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SOME STROMATOPOROIDS FROM THE BOWSPRING LIMESTONE MEMBER (LUDLOVIAN) AND ELMSIDE FORMATION (GEDINNIAN), YASS AREA, NEW SOUTH WALES

By P.K. BIRKHEAD

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SOME STROMATOPOROIDS FROM THE BOWSPRING LIMESTONE MEMBER (LUDLOVIAN) AND ELMSIDE FORMATION (GEDINNIAN), YASS AREA, NEW SOUTH WALES

By P.K. Birkhead*

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ABSTRACT

Five species of stromatoporoids from the Bowspring Limestone Member of the Silverdale Formation are described. One of the species, *Plexodictyon hattonense*, is new. An early Middle Ludlow age is assigned to the Bowspring Limestone Member on the basis of previously reported occurrences of the species.

The two species of stromatoporoids reported from the Elmside Formation are not new. Although one of the species, *Stromatopora foveolata*, has Early Devonian affinity, the other species, *Stachyodes* cf. *S. insignis*, resembles Middle Devonian forms. The occurrence of the genus *Stachyodes* in the Elmside Formation is possibly the oldest reported occurrence of that genus (Gedinnian).

CONTENTS

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INTRODUCTION

When collections were made during study of some stromatoporoids from the Hume Limestone Member of the Silverdale Formation (Birkhead 1976), the Elmside Formation and the Bowspring Limestone Member of the Silverdale Formation were briefly examined for stromatoporoid content. Fifteen stromatoporoid specimens were collected from the two units. The present study completes the description and identification of the stromatoporoid specimens obtained during the visit to the Yass area.

Additional slides, representing two stromatoporoid species and made from specimens collected from the Elmside Formation, were lent by the Geological and Mining Museum of the Geological Survey of New South Wales to the author for study.

Significance of the Described Species

Table 1 summarizes the reported geographic and stratigraphic occurrences of the species described in this article and of species with which they were compared.

Though the number collected from the Bowspring Limestone Member is small, an age of early Middle Ludlow is indicated by the concurrent ranges of the species. The fauna most resembles the early Middle Ludlow stromatoporoid faunas of the Turkestan region of USSR and of Gotland and Estonia.

The Elmside Formation species examined at this time are not sufficient to be age definitive. *Stromatopora foveolata* (Girty) is a cosmopolitan Early Devonian species. It is significant that a species of *Stachyodes* occurs in the Elmside Formation. *Stachyodes* is considered to be a Middle and Late Devonian genus, Eifelian to

TABLE 1

GEOGRAPHIC AND STRATIGRAPHIC OCCURRENCE OF THE DESCRIBED AND COMPARABLE SPECIES

Elmside Formation	*Stromatopora foveolata* (Girty 1895) — Early Devonian rocks, Helderberg, USA; Early Devonian (Gedinnian?), Lilydale, Victoria, Australia. *Stachyodes* cf. *S. insignis* Yavorsky 1963 — Middle Devonian of mid-Asia, USSR.
Bowspring Limestone Member of the Silverdale Formation	*Plexodictyon hattonense* sp. nov. — K_2 Stage (early Middle Ludlow), Estonia; rocks of Ludlow age, Canadian Arctic Islands. *Intexodictyon* cf. *I. perplexum* Yavorsky 1963 — Late Silurian rocks of the Magadan region, USSR. *Anostylostroma conjugatum* (Lesovaya 1970) — Isfara horizon of Ludlow age, Turkestan Range, USSR; Hume Limestone Member, Middle Ludlow of New South Wales, Australia. *Anostylostroma furcatum* (Lesovaya and Zakharova 1970) — Late Silurian, base of the Isfara horizon, Turkestan, USSR. *Parallelostroma maestermyrense* Mori 1970 — Hemse Beds of early Middle Ludlow age, Gotland; Hume Limestone Member, Middle Ludlow, and Limestone L of the Wallace Shale, New South Wales, Australia.

Frasnian (Flügel and Flügel-Kahler 1968). The occurrence in the Elmside Formation is possibly the oldest reported for the genus.

SYSTEMATIC PALAEONTOLOGY

The classification is basically that used by Galloway and St Jean (1957) with additions by Yavorsky (1963) and Nestor (1966). Specimen numbers are those of the Geological and Mining Museum of the Geological Survey of New South Wales.

Order STROMATOPOROIDEA Nicholson and Murie 1879

Family CLATHRODICTYIDAE Kühn 1939

Genus PLEXODICTYON Nestor 1966

Type species: *Plexodictyon katriense* Nestor

Plexodictyon hattonense sp. nov.

Plate 1, figures 1-2

Holotype: MMF 21515 from the Bowspring Limestone Member, Hattons Creek.

Paratypes: MMF 21514 from the Bowspring Limestone Member, Booroo Ponds Creek. MMF 21516 from the Bowspring Limestone Member, Hattons Creek.

Comparable species: Plexodictyon katriense Nestor 1966 from the K_2 Stage of early - middle Ludlow age, Estonia; *Plexodictyon waparksi* Stearn 1969 from rocks of Ludlow age, Beechey Island of the Canadian Arctic Islands.

Derivation of name: "hattonense" = reference to the geographic occurrence of the holotype.

Exterior: Coenosteum varies in form from laminar (MMF 21515) to irregular columnar (MMF 21514). One irregular columnar coenosteum 140 mm height and 65 mm in largest diameter. Laminae are partially etched on to weathered surfaces, and papillae are apparent in a few places. Rarely, segments of small canals can be observed on tangential surfaces with a hand lens. Complete astrorhizal systems are not present on coenosteal surfaces. Latilaminae were not observed.

Vertical section: The tissue of skeletal elements is compact, composed of fine specks. The most conspicuous aspect of vertical sections is the development of a zig-zag network of confluent pillar and laminar tissue which lies between widely spaced regular laminae. Pillars and laminae are of equal thickness, averaging 0.05 mm. Regular laminae are spaced 0.34 mm apart, four or five occurring in 2 mm. Above each regular lamina there is a row of circular galleries which represent astrorhizal canals. Astrorhizae occur at regular intervals and do not form columns within the coenosteum. In restricted areas of vertical sections, longer pillars extending through one or two interlaminar spaces are present. The longer pillars occur near the outer portions of coenostea. Galleries are irregularly oval in shape, some approaching a "square" outline where the zig-zag arrangement of tissue is well developed. Galleries average 0.08 mm diameter, but gallery spaces above regular laminae are slightly larger, averaging 0.10 mm diameter. Neither latilaminae nor columnal structures are present.

Tangential section: Approximately half of tangential section areas is tissue. Denser bands of tissue which traverse the sections represent cuts through regular laminae. Pillars appear as "dots" of tissue, some being elongate and interconnected to form a network over the major portion of sections. Because of obliquity of pillars between regular laminae, the average width of pillars in tangential sections appears greater than in vertical sections; average width in tangential sections is 0.10 mm. Galleries anastomose about pillars. Alignment of round pillars and elongate pillars defines vague astrorhizal canal segments. Astrorhizal canals average 0.08 mm width and seem to extend from circular rings of tissue having the same width as canal segments. Astrorhizal structures occur in or near the denser

tissue bands of regular laminae.

Remarks: The Bowspring Limestone Member specimens are similar to *Plexodictyon waparksi* Stearn, but laminae are not as thick and are spaced closer together than those of *P. waparksi*. The areas of vertical sections which rarely show the development of longer pillars resemble the structure exhibited by *Actinodictyon quebecense* Stearn and Hubert 1966. The Bowspring Limestone Member specimens also closely resemble *P. katriense* Nestor, the major difference being that "paralaminae" do not thin out frequently, and long pillars do not occur in *P. katriense*.

Genus INTEXODICTYON Yavorsky 1963

Type species: Intexodictyon perplexum Yavorsky 1963

Intexodictyon cf. *I. perplexum* Yavorsky 1963

Plate 1, figures 3-4

Hypotype: MMF 21518 from the Bowspring Limestone Member, Booroo Ponds Creek.

Other material: MMF 21517, 21619 from the Bowspring Limestone Member, Booroo Ponds Creek.

Exterior: Coenosteal form is best described as irregularly bulbous. A coenosteum measures 150 mm basal diameter and 70 mm height. The surfaces of coenostea are papillate. Astrorhizal structures and mamelons are not present in hand specimen, although irregular, raised ridges occur over deeper weathered portions of coenostea. Laminae and pillars can be detected on weathered vertical surfaces with a hand lens. Latilaminae were not observed on weathered or cut surfaces.

Vertical section: The tissue of skeletal elements is compact, composed of fine specks. A fine fibrosity due to alignment of specks is displayed in a few of the best preserved areas of sections. Laminae are both continuous and discontinuous. Continuous laminae average 0.03 mm thickness, are evenly spaced, eleven or twelve occurring in 2 mm. Discontinuous (secondary) laminae occur between regular laminae and are formed by the spreading and interconnection of pillar tissue. Pillars are short, contorted, and rarely extend the entire distance between regular laminae. Pillars become entangled beneath laminae, sometimes producing a thick infilling of tissue into gallery spaces. Gallery spaces vary considerably in both outline and size. Galleries are oval to irregularly polygonal in form. No well-defined astrorhizal or columnal structures are present.

Tangential section: Tangential sections display a network of interconnected pillar tissue and denser bands of laminar tissue. Where a section is truly tangential through a lamina, pillars appear as "dots" which average 0.05 mm diameter. Where the section is oblique, connections between the entangled pillars present a decidedly *Actinostroma*-like appearance. No astrorhizae are present.

Remarks: The Bowspring Limestone Member specimens compare with *Intexodictyon perplexum* Yavorsky 1963, but continuous laminae are spaced more closely together, and astrorhizal systems are not present as they are in the holotype. One of the Bowspring Limestone Member specimens, MMF 21519, is infiltrated with *Syringopora* sp., resulting in subdued stromatoporoid skeletal structures. *I. perplexum* is known to occur in Late Silurian strata in the Magadan region, USSR.

Genus ANOSTYLOSTROMA Parks 1936

Type species: Anostylostroma hamiltonense Parks

Anostylostroma conjugatum (Lesovaya 1970)

Plate 1, figures 5-6

1970 *Schistodictyon conjugatum* Lesovaya n. sp.: *in* Lesovaya and Zakharova, p.48, pl. 5, figs 1a-1b.

Hypotype: MMF 21522 from the Bowspring Limestone Member, Hattons Creek.

Other material: MMF 21521 from the Bowspring Limestone Member, Booroo Ponds Creek.

Other occurrences: Isfara horizon of Ludlow age, Turkestan Range USSR; Hume Limestone Member of middle Ludlow age, New South Wales.

Exterior: Coenostea are massive. A specimen measured in the field reached 600 m diameter and 70 mm thickness. Astrorhizae and mamelons are not present on coenosteal surfaces. Laminae are etched into weathered surfaces, forming contours around surface irregularities. Latilaminae are not developed on weathered or freshly broken vertical surfaces. Surfaces appear pitted and papillate under inspection with a hand lens.

Vertical section: The tissue of skeletal elements is altered, but in better preserved areas is coarsely fibrous. Altered tissue becomes compact, composed of large specks. Both laminae and pillars are strongly developed. Laminae are continuous, average 0.06 mm thickness but often appear thicker because of spreading pillar tissue on the undersurface of laminae; nine laminae occur in 2 mm. Pillars are short; many are funnel shaped and appear Y-shaped in vertical section; some are normal short pillars, and a few are superposed through two or three laminae. Tissue of upper portions of many pillars spreads at the base of the next succeeding lamina and interconnects them. Pillars average 0.17 mm height and 0.11 mm width at their base. Galleries are oval to semicircular, the form resulting from the interconnection of the Y-shaped pillars. Galleries average 0.16 mm height and 0.23 mm basal length. No astrorhizal structures are present. Columnar structures are absent, although laminae undulate gently over irregularities in growth of the coenosteum.

Tangential section: Fifty per cent of tangential section areas is tissue. Cross sections of coarse fibres and specks give a falsely maculate (cellular) appearance to the tissue over some areas of

tangential sections. Laminar bands of tissue contour irregularities of the coenosteum. Pillars are round, irregular, elongate, and many are connected. Pillars sometimes form erratic rings of tissue near their junctions with bands of laminae. Pillars vary in thickness, averaging 0.13 mm. Oblique portions of tangential sections show tangled masses of interconnected pillar and laminar tissue. Astrorhizae are absent.

Remarks: The Bowspring Limestone Member specimens conform to the description of the holotype (Lesovaya and Zakharova 1970) with the exception that the basic microstructure of tissue is fibrous, not compact.

Anostylostroma furcatum (Zakharova and Lesovaya 1970)

Plate 1, figures 7-8

1970 *Schistodictyon furcatum* Zakharova and Lesovaya, n. sp.; *in* Lesovaya and Zakharova p.49, pl. 5, figs 3a-3b; pl. 6, figs 3a-3b.

Hypotype: MMF 21520 from the Bowspring Limestone Member, Booroo Ponds Creek.

Other occurrence: Late Silurian, Isfara horizon, Andygen River Basin, northern slope of Turkestan Range, USSR.

Exterior: The coenosteum is massive with a bulbous shape. Length of the collected specimen is 100 mm, width 75 mm, and height 60 mm. segments of astrorhizal canals can be identified on weathered tangential surfaces of the coenosteum with a hand lens. Pillars and laminae are discernible on weathered vertical surfaces. Papillae and, rarely, small mamelons are observable. No latilaminae are present on the coenosteum.

Vertical section: The tissue of skeletal elements is finely fibrous. Laminae are dominant over pillars in vertical section. Laminae average 0.08 mm thickness; approximately twelve laminae occur in 2 mm. Pillars are short, many diverge upward to form Y-shapes, some diverge and interconnect to form a tissue network at the base of the next succeeding lamina, and some pillars are superposed through two or three laminae. Most galleries have a rectangular outline, but some are oval. Galleries average 0.22 m length, 0.11 mm height. Low mamelon columns formed of gently undulating laminae occur infrequently in vertical sections. Poorly developed astrorhizal structures occupy mamelon columns; segments of astrorhizal canals which appear as longer gallery spaces extend away from axes of columns; astrorhizal tubes are not defined in the columns. Dissepiments rarely occur in gallery spaces.

Tangential section: Bands of laminar tissue contour irregularities of development of the coenosteum. Laminae form rings around positions of the small mamelons. Pillars are circular, vermicular, to irregular in shape. Pillars average 0.11 m thickness, and near laminar tissue become interconnected, forming a network of pillar tissue which integrates with the laminar tissue. Astrorhizae occupy the central portion of the mamelons. Astrorhizal canals average 0.10 mm width and radiate from a central tube of the same

diameter as the width of the canals. Skeletal tissue occupies 60 per cent of tangential sections.

Remarks: The specimen collected from the Bowspring Limestone Member compares with the variants from the "base of the Isfara horizon along the right slope of the Isfara Valley" (Lesovaya and Zakharova 1970). The laminae are thinner and more closely spaced than those of the holotype, and the diameter of the astrorhizal tube is not as great. Where tops of pillars interconnect beneath a lamina, structures are produced which resemble similar structures of species of *Intexodictyon*, but such development is rare in the New South Wales specimen.

Family STROMATOPORIDAE Winchell 1867

Genus PARALLELOSTROMA Nestor 1966

Type species: Stromatopora typica Rosen

Parallelostroma maestermyrense Mori 1970

Plate 2, figures 3-5

1970 *Parallelostroma maestermyrense* n. sp.; Mori, p.134, pl. 16, figs 1-4; pl. 24, figs 5-6.

Hypotypes: MMF 21525, 21526 from the Bowspring Limestone Member, Booroo Ponds Creek.

Other material: MMF 21523, 21524 from the Bowspring Limestone Member, Booroo Ponds Creek.

Other occurrences: The Hemse Beds of early Middle Ludlow age, Gotland; the Hume Limestone Member, Derringullen Creek, Yass area, New South Wales; Limestone L of the Wallace Shale, Cheesemans Creek area, New South Wales.

Exterior: Coenostea are thickly laminate to irregularly bulbous in form. A bulbour specimen measures 55 mm height, 100 mm diameter. Laminar forms reach a thickness of 40 mm. The surface of weathered coenostea is pitted and papillate. Some weathered vertical surfaces exhibit well-defined, thick laminae and pillars, but no astrorhizae were observed on tangential surfaces. Latilaminae are not well defined. Mamelons are not present on coenosteal surfaces.

Vertical section: The tissue of skeletal elements is altered but is basically maculate (cellular, melanospheric). Reticulation of laminae and pillars varies from poorly defined to being well-defined within individual coenostea. Laminae are thick, average 0.17 mm, are composed of microlaminae. The microlaminae are layers of maculae arranged in such manner as to produce a poorly defined microreticulate structure. Galleries are oval to subrectangular in shape, averaging 0.11 mm in height and varying from 0.11 mm to 0.67 mm in length. Some U-shaped galleries occur in areas of the coenosteum where reticulation of pillars and laminae is poorly developed. Pillars are both short and long. Short pillars average 0.12 mm length and 0.12 mm width. Long pillars reach a

length of 0.45 mm. Dissepiments are present but not frequent in some of the larger galleries. Longer galleries may represent portions of astrorhizal tubes and canals, but definite astrorhizal structures were not observed.

Tangential section: Approximately 50 per cent of tangential sections is formed of tissue. Galleries are irregular to circular in outline and in some areas anastomose about the pillars. Rudimentary, sporadically occurring astrorhizae are indicated by irregular canal segments radiating from a central region which contains two or three small central tubes. The central tubes have a maximum diameter of 0.14 mm. The canals diverge away from centres of astrorhizae and become incorporated into regular gallery spaces. Overall diameter of astrorhizae is 0.39 mm. Pillars are irregular, vermicular, to circular in form. Pillars range from 0.11 mm to 0.23 mm in thickness. A few dissepiments connect pillars.

Remarks: The study specimens conform to the holotype descriptions except for the presence of some long pillars which develop near the basal portions of coenostea. One specimen, MMF 21523, is brecciated. Part of the matrix composition is coarse sand size particles of quartz and biotite mica, indicating a higher energy depositional site such as a channel.

Genus STROMATOPORA Goldfuss 1826

Type species: Stromatopora concentrica Goldfuss 1826

Stromatopora foveolata (Girty 1895)

Plate 2, figures 1-2

1895 *Syringostroma foveolatum* sp. nov.; Girty, p.295, pl. 6, figs 8-9.

Hypotypes: MMF 21528, 21527, 15821, 15820 from the Yass area, New South Wales.

Other occurrences: Early Devonian (Helderberg) USA; Early Devonian (Siegenian), Lilydale, Victoria, Australia; Early Devonian, Gippsland, Victoria, Australia.

Comparable species: Stromatopora (Parallelopora?) lilydalensis Ripper 1937 from Early Devonian rocks at Lilydale, Victoria.

Exterior: Fragments of specimens indicate an irregular laminar form for coenostea. Weathered surfaces are smooth. Traces of laminae and papillae can only be discerned with a hand lens. No latilaminae or astrorhizal features were observed on surfaces of the fragmented specimens.

Vertical section: The tissue of skeletal elements is coarsely maculate (cellular). Average diameter of a maculam is 0.05 mm. Pillar and laminar tissue is amalgamate. Pillars are both short and long, some reaching a length of 4.5 mm. Pillars average 0.17 mm width. Laminae are continuous over parts of vertical sections, discontinuous over other parts. Continuous laminae are defined

by rows of gallery spaces. A microreticulation of maculae, which make up the pillars and laminae, is evident in the better preserved areas of vertical sections. Laminae average 0.16 mm thickness. Eight laminae occur in 2 mm. Galleries are circular to irregularly elongate in outline and average 0.14 mm in height. Gallery spaces have a more irregular form near the basal portion of coenosteal skeleton networks where some have a U-shaped outline. Perithecal tissue of a contorted nature occurs in basal portions of coenostea. Pseudozooidal tubes are frequent, composed of superposed galleries which are separated by dissepiments. Dissepiments are 0.016 mm thick. Astrorhizal structures are represented in vertical sections by more elongate gallery spaces which extend from some of the pseudozooidal tubes. Columnar astrorhizal structures are present, but they are not frequent.

Tangential section: Galleries are circular in outline, averaging 0.11 mm diameter. Pillars anastomose about galleries, averaging 0.12 mm thickness. Segments of astrorhizal canals are frequent over tangential sections. Complete astrorhizae were observed in one transverse section, MMF 15821. Astrorhizal canals average 0.17 mm width and extend from two or three central tubes with the same diameter as the width of the canals. Astrorhizal canals interconnect with those of adjacent astrorhizae. Overall diameter of an astrorhiza is approximately 4.0 mm with centres spaced 4.8 mm apart. Approximately 60 per cent of tangential sections is tissue.

Remarks: Where laminae are discontinuous and pillars are long and joined by dissepiments, the New South Wales specimens display attributes of species of *Parallelopora*. Where continuous laminae are present the specimens have typical *Stromatopora* skeletal structure. Because laminae are apparent over most of thin section areas of the Elmside Formation specimens and round pillars are seldom observed in tangential sections, the Elmside Formation species is retained in the genus *Stromatopora*. Vertical sections of coenostea in which long pillars are developed resemble vertical sections of *Stromatopora lilydalensis* Ripper, but *S. lilydalensis* does not have astrorhizae. Philip (1962) assigned *S. lilydalensis* to the genus *Parallelopora*.

Family IDIOSTROMATIDAE Nicholson 1886

Genus STACHYODES Bargatzky 1881

Type species: Stachyodes verticillata (McCoy 1851)

Stachyodes cf. *S. insignis* Yavorsky 1963

Plate 2, figures 6-8

1963 *Stachyodes insignis* sp. nov.; Yavorsky, p.77, pl. 27, figs 1-3; pl. 28, figs. 10; pl. 29, fig. 7.

Hypotype: MMF 15561 from the Elmside Formation, Yass area, New South Wales.

Other occurrences: Middle Devonian of mid-Asia, USSR.

Exterior: Individual specimens free from matrix have not been examined. Exterior form, ascertained from thin section, is ramose, dendritic. Many coenostea also encrust coralla of dendroid tabulate corals. Maximum and minimum dimensions of coenostea are not obtainable, but dimensions of a typical specimen measured from thin section were 27 mm length and 5 mm diameter.

Axial section: Tissue of skeletal elements is tubulate (Galloway and St Jean 1957, p.47; Stearn 1966, p.78). The tubules permeate the tissue in such manner as to impart a melanospheric (Stearn 1966) or granulose texture when sectioned. Laminae and pillars are not well defined in axial sections. A single axial tube is not present in the Elmside Formation specimens. Instead multiple tubes are present which entwine and interconnect throughout the length of the coenostea. Average diameter of coenosteal tubes is 0.07 mm. Longer segments of the tubes are observed near the periphery of coenostea where the tubes open to the exterior. Some tube segments near the periphery of coenostea contain thin dissepiments. Tissue occupies approximately 80 per cent of section areas.

Cross section: Laminae and pillars are not definable in cross sections. Tissue of skeletal elements is entirely amalgamated and connected. Cross sections are distinguished from axial sections by having an overall circular outline, and a majority of the gallery spaces, being transects of the multiple tubes, have a more circular cross section than do the gallery spaces of axial sections. Multiple tubes of equal diameter, 0.07 mm, are present.

Remarks: The figures and description of the holotype indicate a greater regularity of pillar and laminae development than in the present material. The holotype also has an axial tube which is more easily distinguished from tubes of lesser diameter. In the Elmside Formation specimens, multiple tubes develop within the coenosteum, none of which can be definitely distinguished as an "axial" tube. The presence of the genus *Stachyodes* in the Gedinnian Elmside Formation is one of the earliest occurrences of that genus to be reported.

COLLECTING LOCALITIES

Booroo Ponds Creek: 2 km northwest of Yass. GR 18856971, Goulburn 1:250,000 (Brunker and Offenburg 1968). Bowspring Limestone Member of the Silverdale Formation.

Hattons Creek: 2 km northwest of Yass. GR 18856978, Goulburn 1:250,000 (Brunker and Offenburg 1968). Bowspring Limestone Member of the Silverdale Formation.

Elmside Formation: 1.6 km south of Boorowa turnoff of Hume Highway, GR 18507020, Goulburn 1:250,000 (Brunker and Offenburg 1968).

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PLATE 1

Figure 6 is x9.3; all other figures are x16.7

Figure 1. *Plexodictyon hattonense* sp. nov. Vertical section; holotype, slide No. MMF 21515 V. Bowspring Limestone Member.

Figure 2. *Plexodictyon hattonense* sp. nov. Tangential section; holotype, slide No. MMF 21515 T. Bowspring Limestone Member.

Figure 3. *Intexodictyon* cf. *I. perplexum* Yavorsky 1963. Vertical section; hypotype, slide No. MMF 21518 V. Bowspring Limestone Member.

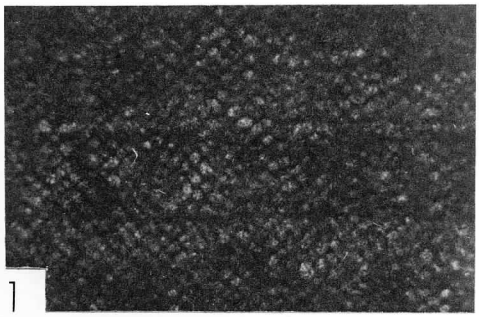
Figure 4. *Intexodictyon* cf. *I. perplexum* Yavorsky 1963. Tangential section; hypotype, slide No. MMF 21518 T. Bowspring Limestone Member.

Figure 5. *Anostylostroma conjugatum* (Lesovaya 1970). Vertical section; hypotype, slide No. MMF 21522 V. Bowspring Limestone Member.

Figure 6. *Anostylostroma conjugatum* (Lesovaya 1970). Tangential section; hypotype, slide No. MMF 21522 T. Bowspring Limestone Member.

Figure 7. *Anostylostroma furcatum* (Zakharova and Lesovaya 1970). Vertical section; hypotype, slide No. MMF 21520 V. Bowspring Limestone Member.

Figure 8. *Anostylostroma furcatum* (Zakharova and Lesovaya 1970). Tangential section; hypotype, slide No. MMF 21520 T. Bowspring Limestone Member.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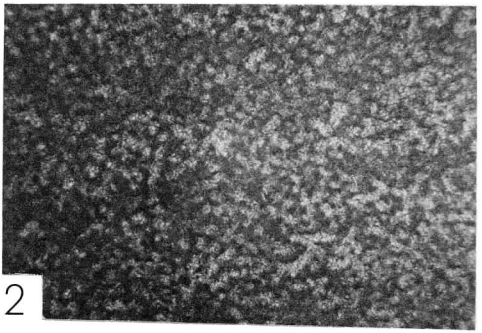
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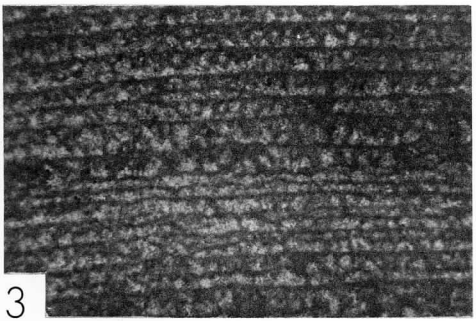
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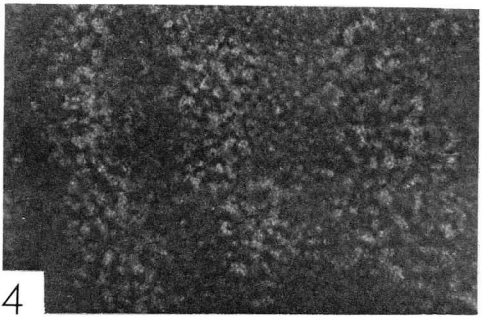
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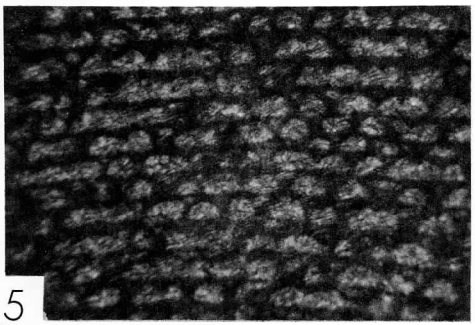
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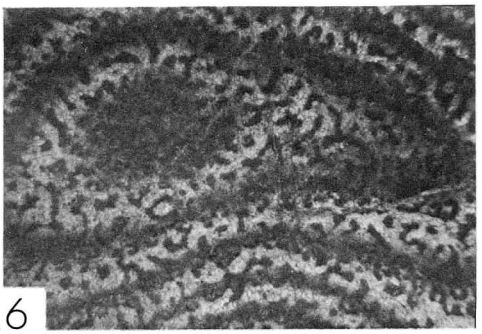
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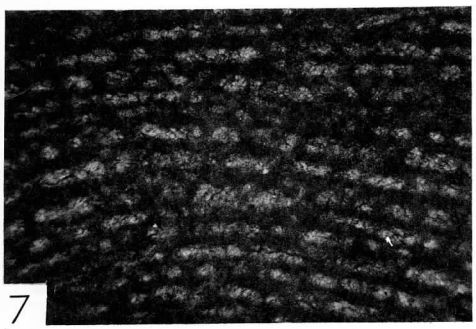
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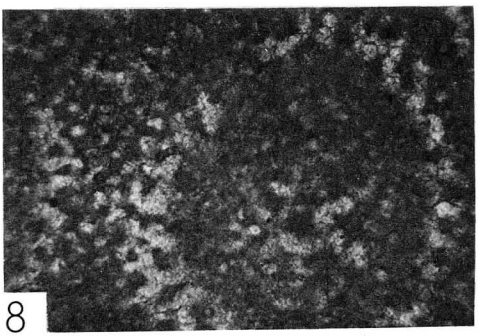
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PLATE 2

Figures 1-4 and 6 are x16.7; figures 5 and 7 are x9.3
figure 8 is x35.4

Figure 1. *Stromatopora foveolata* (Girty 1895). Vertical section; hypotype, slide No. MMF 21528 V. Elmside Formation.

Figure 2. *Stromatopora foveolata* (Girty 1895). Tangential section; hypotype, slide No. MMF 21528 T. Elmside Formation.

Figure 3. *Parallelostroma maestermyrense* Mori 1970. Vertical section; multilayered type tissue shown; hypotype, slide No. MMF 21526 V. Bowspring Limestone Member.

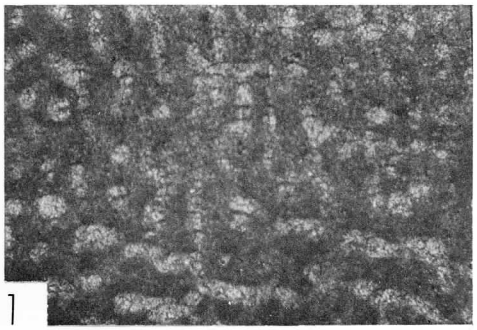
Figure 4. *Parallelostroma maestermyrense* Mori 1970. Tangential section; hypotype, slide No. MMF 21525 T. Bowspring Limestone Member.

Figure 5. *Parallelostroma maestermyrense* Mori 1970. Vertical section; the smaller magnification shows the extent of the laminar structures; hypotype, slide No. MMF 21526 V. Bowspring Limestone Member.

Figure 6. *Stachyodes* cf. *S. insignis* Yavorsky 1963. Oblique cross section; hypotype, slide No. MMF 15561. Elmside Formation.

Figure 7. *Stachyodes* cf. *S. insignis* Yavorsky 1963. Axial section (slightly oblique); hypotype, slide No. MMF 15561. Elmside Formation.

Figure 8. *Stachyodes* cf. *S. insignis* Yavorsky 1963. Axial section; the larger magnification shows dissepiments in peripheral tubes and the tubulose tissue; hypotype, slide No. MMF 15561. Elmside Formation.



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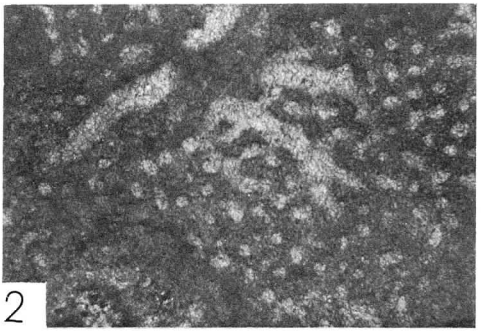

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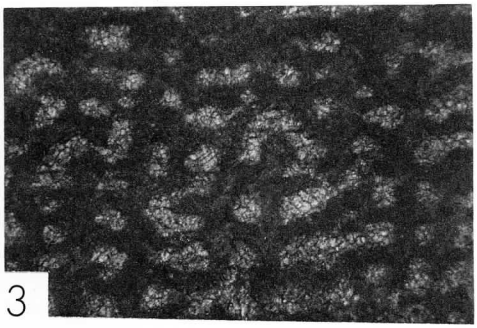

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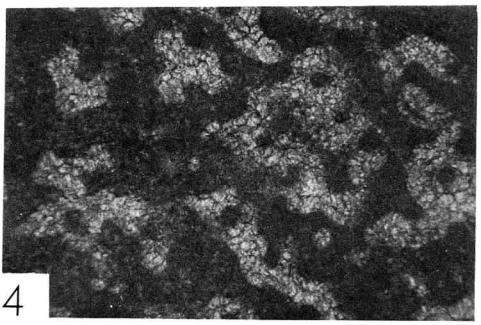

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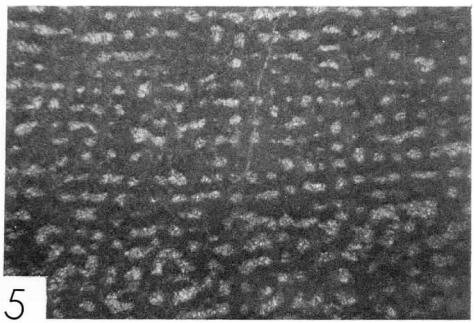

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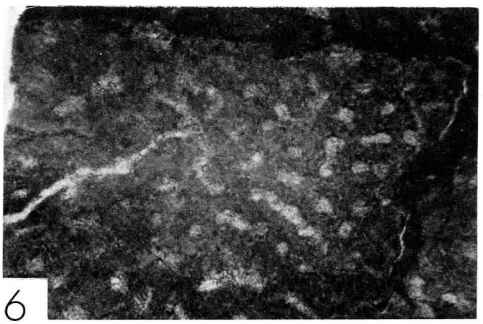

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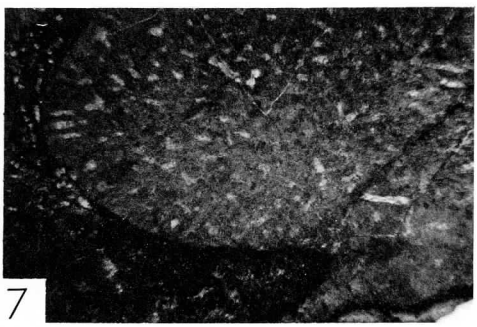

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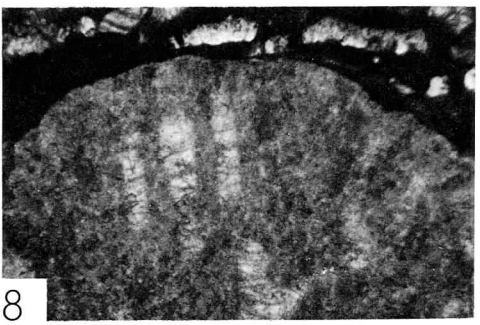

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