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BY

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THE MIDDLE DEVONIAN RUGOSE CORALS OF QUEENSLAND, II.: THE SILVERWOOD-LUCKY VALLEY AREA.

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THE MIDDLE DEVONIAN RUGOSE CORALS OF QUEENSLAND, II.

THE SILVERWOOD-LUCKY VALLEY AREA.

By DOROTHY HILL, M.Sc., Ph.D.

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PLATES II. AND III.

SUMMARY.—The Rugose coral fauna of the Silverwood Series is described, and is considered to indicate a Lower Middle Devonian (Couvinian) age. The fauna is allied to that of the Nemingha limestone of New South Wales.

The four limestones from which Rugose corals are described below occur with others more marmorised in the Silverwood Series of the Darling Downs (Richards and Bryan, 1924, p. 58). The limestones form disconnected lenses almost at the top of the andesitic tuffs and lavas forming the lower part of the Silverwood series. They are all thought to be on the same horizon; immediately above them is a curious agglomeratic rock made up of fragments of these fossiliferous limestones in a groundmass of andesitic tuff, like the "agglomerate" associated with the Nemingha limestone of New South Wales. Six hundred feet above this agglomerate is a conglomerate, still in the andesitic tuff series. The upper part of the Silverwood series consists of banded cherts and shales.

The Silverwood limestone fauna contains the following Rugosa:—

Family ACANTHOPHYLLIDAE.

Acanthophyllum sp. cf. *mansfieldense* (Dun). Barnes Qy. (?).

Acanthophyllum sp. cf. *dianthus* (Goldfuss; Le Maître). Limestone Siding; portion 107, parish Wildash (Elbow Valley).

Acanthophyllum sp. Silverwood.

Family DISPHYLLIDAE.

Prismatophyllum latum sp. nov. Barnes Qy.

Prismatophyllum densum sp. nov. Lomas North.

Family FAVISTELLIDAE.

Fasciphyllum aff. *conglomeratum* (Schlüter). Limestone Siding.

Family MUCOPHYLLIDAE.

Pseudamplexus sp. Limestone Siding; Lomas North.

?Chlamydophyllum sp. Limestone Siding.

Family SPONGOPHYLLIDAE.

Spongophyllum halysitoides var. *minor* var. nov. Limestone Siding; Lomas North.

Xystriphyllum dunstani (Etheridge). Lucky Valley.

Xystriphyllum insigne sp. nov. Barnes Qy.; Limestone Siding; Lomas North.

Family STREPTELASMIDAE.

Streptelasma sp. Limestone Siding.

Age of the Fauna.—*Acanthophyllum* sp. cf. *mansfieldense* is closest to Lower Devonian forms, but bears some resemblance to Couvinian species. *A. dianthus* (Le Maître) occurs at the boundary between Coblenzian and Couvinian in France. *Prismatophyllum latum* is close to Couvinian forms from North America; *P. densum* is closest to the German Frasnian *P. ananas* Goldfuss, *Frech,* but has resemblances to the American Middle Devonian *P. sedgwicki* Ma, and to the Victorian (Lower Devonian?) *P. approximans* (Chapman). *Fasciphyllum conglomeratum* is characteristic of the Givetian of Germany. The Mucophyllidae resemble those of the Lower Devonian of Europe. *Spongophyllum halysitoides* occurs in the Nemingha and Moore Creek limestones of New South Wales. *Xystriphyllum dunstani* is characteristic of the Couvinian Clermont limestones in Queensland, and *X. insigne* occurs at Attunga, New South Wales, on a horizon regarded by Etheridge as almost certainly equivalent to the Moore Creek limestone. Streptelasmidae are known from the Ordovician to the Devonian. Thus the fauna would seem most reasonably placed as Couvinian, and is possibly Lower Couvinian. It shows no very close relation to any European or American fauna, however; *Spongophyllum halysitoides* occurs with *Pseudamplexus* sp. at Beedle's Freehold (por. 163, par. Nemingha), which is practically the type Nemingha limestone, and this is the closest comparison that can be made with other Australian faunas, as Richards and Bryan (1924, p. 99) have already pointed out.

Family ACANTHOPHYLLIDAE.

Acanthophyllidae Hill, 1939a, p. 220; 1939b, p. 56.

Genus *Acanthophyllum* Dybowski.

Acanthophyllum Dybowski, 1873, p. 339; 1874, p. 493.

Acanthophyllum; Hill, 1939a, p. 222; 1939b, p. 56.

Genolectotype (chosen Schlüter, 1889, p. 38); *Cyathophyllum heterophyllum* Edwards and Haime. Middle Devonian, Eifel.

Diagnosis.—Large, simple Rugosa with a wide dissepimentarium of small, highly-arched dissepiments, with shallowly concave, axially deepened tabulae, and with long but unequal major septa. The axial ends of the major septa are arranged in groups in the tabularium, and are straight, or curved vortically, the curvature differing in degree from group to group; the cardinal septum is typically short, and one septum, not a proto-septum, extends to the axis. The septa show different types of modification; they are frequently much dilated, either in the dissepimentarium, or more rarely in the tabularium, or in both; towards the periphery they may be thin and lined with lateral dissepiments; in the tabularium they are sometimes waved and carinate.

Range.—Fairly common in the Lower Devonian of Europe, and very common in the Middle Devonian of Europe. Lower and Middle Devonian of Australia.

Acanthophyllum sp. cf. *mansfieldense* (Dun).

(Plate II., figs. 1a, b.)

Material.—One specimen, F. 3412, University of Queensland Collection. Silverwood (probably from Barnes' Qy., Morgan Park).

Description.—A fragment 30 mm. in diameter and 5 mm. in length of the calical end of a corallite shows 20 major septa, 17 mm. long, extending unequally almost to the axis, alternating with 20 minor septa 14 mm. long. The septa of both orders are much dilated, in contact in a zone about 4 mm. wide, beginning 2 mm. outside the inner ends of the minor septa, but with narrow interseptal alleys between them outside this zone, in which lateral dissepiments are present, or inosculating dissepiments; in the peripheral regions the thick septa may be partly replaced by stacks of naic dissepiments. In the tabularium the septa are carinate. The tabular floors are concave, with a median notch, and the tabellae are not arched. The dissepimental floors representing old calical margins are flat peripherally and steeply inclined into the tabularium. The dissepiments are small, unequal, and rather elongate.

Remarks.—The fragment resembles the Coblenzian Acanthophyllids in the great thickness of the septa and their naic degeneration, but in having lateral dissepiments it is similar to the Couvinian forms called *Rhopalophyllum* by Wedekind. It appears closer to *A. mansfieldense* (Dun; Hill, 1939a, p. 223, pl. xv., figs. 1-3) from the Lower Devonian of Loyola, Victoria, than to any other figured *Acanthophyllum,* but identity is not complete.

Acanthophyllum sp. (Plate II., fig. 2.)

Cyathophyllum sp., Richards and Bryan, 1924, p. 97, Elbow Valley.

Material.—One fragment F 3413, University of Queensland Collection, embedded in matrix, from Limestone Siding. One thin section, F 3414, from por. 107, parish Wildash (Elbow Valley), Silverwood.

Diagnosis.—*Acanthophyllum* with a narrow peripheral stereozone, and with septa almost straight and equally dilated.

Description (of a transverse section).—At a diameter of 15 mm., just below the calice, 27 major septa alternate with 27 minor septa; at the periphery those of both orders are dilated so as to be in contact in a peripheral stereozone about 1 mm. wide; thence to their inner ends all the septa are rather dilated and almost straight, the dilatation being approximately equal; many are wavy or perhaps carinate, or with a slight swelling at the axial end; except for the two on either side of the counter septum, which are very long, the axial ends of the minor septa project just beyong the dissepimentarium, which is about 4 mm. wide. The axial ends of the major septa are long and unequal, but straight, and arranged in groups in the manner characteristic of the genus. The tabularium is about 6 mm. wide.

Remarks.—Only transverse sections are available. They have a very close resemblance to *Cyathophyllum dianthus* Goldfuss of Le Maître, 1934, p. 153, pl. v., figs. 13-14 (not necessarily of Goldfuss or any other author) from the Chaudefonds Limestone of France, which is regarded by Le Maître as the equivalent of the uppermost Coblenzian and lowest Couvinian of Germany and of the upper part of F_2 and G_1 in Bohemia.

Acanthophyllum sp. (Plate II., figs. 3a-c.)

Material.—F 3415, University of Queensland Collection. Silverwood.

Diagnosis.—*Acanthophyllum* in which the wavy septa are so dilated as to be in contact in the outer three-quarters of the dissepimentarium.

Description.—The corallum is large, and cylindrical or ceratoid. At a diameter of about 20 mm. there are 33 uncurved major septa interdigitating at the axis. alternating with minor septa which extend two-thirds of the way to the axis. The septa are so dilated as to be in contact to form a peripheral stereozone in the outer three-quarters of the dissepimentarium, and inside this they remain considerably dilated. They are wavy in transverse section. The tabulae are close, concave with a median notch, and incomplete. The dissepiments of the inner part of the dissepimentarium are inclined at about 45°.

Remarks.—This specimen might be the same species as the one described immediately above, but it shows very much greater septal dilatation. I know of no figure with which is could be closely compared; the dilatation is different from all other Acanthophyllids.

Family DISPHYLLIDAE.

Disphyllidae Hill, 1939a, p. 224.

Genus *Prismatophyllum* Simpson.

Prismatophyllum Simpson, 1900, p. 218.

Prismatophyllum; Lang and Smith, 1935, p. 558, *q.v.* for synonymy.

Prismatophyllum; Hill, 1939a, p. 229, *q.v.* for review of range and species.

Genotype.—*Prismatophyllum prisma* Lang and Smith, *loc. cit.* Lower Middle Devonian. Onondaga Limestone, Falls of Ohio, U.S.A.

Diagnosis.—Cerioid Rugose corals with septa which may or may not reach the axis; tabulae typically differentiated into a horizontally disposed axial series and an axially inclined periaxial series; and typically with numerous, small, globose dissepiments.

Range.—Lower, Middle, and Upper Devonian. For details, see Hill *loc. cit.*

Prismatophyllum latum sp. nov. (Plate II., figs. 4a, b.)

Phillipsastraea cf. *grandis* Dun, Richards and Bryan, 1924, p. 99, pl. xv., fig. 5. Barnes Qy. (near Morgan Park), Silverwood. Lower Middle Devonian.

Holotype.—F 3417, University of Queensland Collection, figured *loc. cit.*

Diagnosis.—*Prismatophyllum* with numerous septa, the major septa being but little longer than the minor; with a wide dissepimentarium and globose tabellae arranged in concave tabular floors.

Description.—The corallum is cerioid, one small fragment only of an apparently spreading corallum being known. The corallites are unequal, the largest being 15 mm. in diameter; the smaller corallites are found round the edges of the larger, as if by intermural increase. The walls dividing the corallites are thin, and difficult to see in the hand specimen. There are about 44 septa in the larger corallites, rather closely spaced and thinner near the periphery than near the tabularium,

and slightly carinate. The major septa are but little longer and thicker than the minor septa, extending just within the tabularium, which has about one third the diameter of the larger corallites, but more than this in smaller corallites. The tabular floors are slightly concave, and the tabellae are rather large and arched, and distant. The dissepiments are globose, fine and numerous, horizontally based or slightly inclined towards the periphery in the outer series, but steeply inclined towards the axis near the tabularium. They do not always extend completely across an interseptal loculus; many inosculate.

Remarks.—Of all the described species of *Prismatophyllum*, this species is closest to *P. chalkii* (Chapman) from the Lower or Middle Devonian limestone of Lilydale, Victoria, from which it differs only in having nearly twice the number of septa for any given diameter of corallite. It resembles also the American Couvinian *P. anna* Whitfield, Stewart (1938, pl. 9, figs. 11, 12) and *P. truncatum* Stewart (1938, pl. 10, figs.1, 2), but has thinner walls.

Prismatophyllum densum sp. nov. (Plate II., figs. 5a, b.)

Holotype (only specimen known).—F 3416, University of Queensland Collection. "Large Tryplasma Horizon," Silverwood—i.e., from either Morgan Park, Limestone Siding, or Lomas North; the matrix and preservation suggest to W. H. Bryan that it is from Lomas North. Couvinian, Lower Middle Devonian.

Diagnosis.—*Prismatophyllum* with clisioid axial structure and numerous very long carinate septa, not dilated at the inner edge of the dissepimentarium.

Description.—The holotype is a flat fragment 14 x 7 x 3 cm. Individual corallites are from 5 to 10 mm. in diameter, with an average of 8 mm. The corallites are polygonal with straight or gently curved walls, which may in places in the transverse sections, have a minor zig-zagging, the median dark line moving a little towards the axis of the corallite at the septal bases. Increase was not observed. The 19 or 20 very long major septa are waved, but their general course is straight from the wall to the axis, where they interdigitate, and sometimes twist slightly. The alternating minor septa are a little more than half as long as the major septa, and are also waved. All the septa are fairly thin, without any zonal thickening. There are six or seven series of dissepiments, all save the innermost being rather broadly and horizontally based; the inner series is more steeply inclined towards the axis. The tabularium is about one-third the width of the corallite, and has two series of tabellae, the outer series of horizontally disposed but concave plates, and the inner of convex, dissepiment-like plates arranged to form an axial dome.

Remarks.—Only three other species of *Prismatophyllum* have a clisioid axial structure—the Victorian *P. approximans* (Chapman, 1914. pl. xlvii., figs. 5, 6) from the Thomson River, the American Middle Devonian *P. sedgwicki* (Edwards and Haime, Ma, 1937, pl. iii., fig. 3), and the German Frasnian *P. ananas* (Goldfuss, Frech, 1885, pl. iii., fig. 14). *P. densum* differs from *approximans* in not having the septa dilated to a spindle section, and in having the outer series of taballae horizontal instead of inclined. It differs from *sedgwicki* Ma similarly, and in the greater length of the septa; from *ananas* Frech it differs only in the greater number and density of the septa and in the slightly greater size of the individual corallites. It is thus closest to the Frasnian *ananas*.

Family FAVISTELLIDAE (or COLUMNARIIDAE).

Typical Genus:—*Favistella* Hall, 1847.

Cerioid or sub-phaceloid Rugosa with complete tabulae and short minor septa, sometimes with a single, impersistent series of elongate, and usually vertically inclined dissepiments between the septa.

Range.—The family is known from the Upper Ordovician of Europe and America, the Silurian of Europe, and the Devonian (but not the Upper Devonian) of Europe and Australia.

Remarks.—The group here considered has already been discussed in some detail (Hill, 1939a, p. 240) when it was thought doubtful that the genotype of *Columnaria* (*C. sulcata* Goldfuss) from the Middle Devonian of Germany belonged to the same genus as the species *C. alveolata* Goldfuss from the Ordovician of America, on which most authors have interpreted *Columnaria* Goldfuss, and which is synonymous with *Favistella stellata* Hall, 1847, the genotype of *Favistella.* Smith is still of the opinion (*in litt.*) that *sulcata* is of the same genus as *alveolata*; but Weissermel (*in litt.*) considers, like myself, that *sulcata* is a Disphyllid. The matter is still in abeyance, and while the family relation of *sulcata* is in doubt, it seems best to take *Favistella,* on the nature of whose type we all agree, as the type genus for the family around *alveolata* Goldfuss. For the genera considered to belong to this family, see Hill *loc. cit.*

Genus *Fasciphyllum* Schlüter.

Fasciphyllum Schlüter, 1885, p. 52; 1889, p. 305 (47).

Fasciphyllum ; Lang and Smith, 1935, p. 548.

Genotype (by designation).—*"Fascicularia?" conglomerata* Schlüter, 1880, p. 147, Givetian, Eifel, Germany.

Diagnosis.—Phaceloid Rugosa; the slender corallites have a narrow stereozone, a single series of elongate dissepiments between the long major and short minor septa, and distant, complete, sagging tabulae.

Range.—Lower Devonian of Eastern Alps; Middle Devonian of the Eifel and Queensland.

Remarks.—The genus has been discussed by Hill (1939a, p. 241). The large dissepiments suggest relation to the Spongophyllidae, but in the Favistellidae dissepiments arise between the septa, and do not cause the septa to become discontinuous, as in the Spongophyllidae.

Fasciphyllum aff. *conglomeratum* (Schlüter).

(Plate II., figs. 6a-c.)

"Fascicularia?" conglomerata Schlüter, 1880, p. 147; 1881, p. 220, p. ix., figrs. 1-4. Givetian, Eifel, Germany.

Fasciphyllum conglomeratum Schlüter, 1885b, p. 52.

Holotype.—Schlüter's types are probably at Bonn. The diagnosis given below is based on his figures *loc. cit.*

Diagnosis (for *conglomeratum* Schlüter).—*Fasciphyllum* with corallites about 3 mm. in diameter.

Description (of Silverwood specimen, from Limestone Siding, F 3418, University of Queensland Collection).—The specimen is a small

fragment 5·5 x 3·5 x 1·5 cm., in a re-crystallised, fine-grained, white limestone. The corallum is phaceloid, the corallites varying in diameter from 2 to 3·5 mm., and in distance apart from 0 to 3 mm. The twelve major septa extend from the wall to the axis, where in some corallites they appear to touch; the minor septa are short. The septa never show discontinuity; they are all stout, and their bases are expanded to form a narrow peripheral stereozone. There is a single series of dissepiments, the bases of the more elongate being more steeply inclined than the others. In one or two places there may have been a second but incomplete series of dissepiments. The tabulae are complete, sagging, and rather distant.

Remarks.—The resemblance between the Silverwood specimen and the German species is very striking, but its preservation is so poor that a direct equation to the German form is too great an assumption. According to Lang and Smith (1935, p. 548), *F. conglomeratum* probably reaches its maximum in the *Stringocephalus* limestone, but apparently occurs also in the Crinoid Shales. Kayser (1923, p. 198) regards the latter as the base of the Givetian in Germany, and the former as its main development. The Lower Devonian species *F. syringoporoides* (Charlesworth, 1914, p. 366, pl. xxxi., fig. 1) from the Alps has corallites only 1 mm. in diameter.

Family MUCOPHYLLIDAE.

Typical Genus: *Mucophyllum* Etheridge.

Simple Rugose corals with the approximately equal compact major and minor septa dilated and in contact so that dissepiments are entirely suppressed, and with complete and distant tabulae.

Range.—Ludlovian of Gotland and New South Wales; Lower Devonian of Europe; and Middle Devonian of Germany.

Remarks.—The other genera placed in this family are *Pseudamplexus* Weissermel and those listed below with references and genotypes, as possible synonyms of *Pseudamplexus*. They are the Ludlovian *Pseudomphyma* of Gotland and *Mucophyllum* of New South Wales; the Lower Devonian *Pseudamplexus* and its synonym *Pselophyllum* of Europe; and the Middle Devonian *Aspasmophyllum* of Germany. All of these forms have major septa very little longer than the minor septa; *Mucophyllum* and *Aspasmophyllum* are patellate forms, as is one species of *Pseudomphyma*, but most of the forms placed by Wedekind in *Pseudomphyma* and all *Pseudamplexus* are turbinate to cylindrical. The family as thus understood is a small one; in fact, examination of the type specimens may show that all the genera are synonymous.

Its relations to the other Silurian and Devonian groups characterised by a wide peripheral stereozone are not yet clear in all cases. The Silurian genera *Gyalophyllum* Wedekind (1927) and *Zelophyllum* Wedekind (1927) both have a stereozone of holacanthine septa set in lamellar sclerenchyme (Hill, 1936) and are, therefore, related to *Rhabdocyclus* Lang and Smith (1939, p. 152, *nom. nov.* for *Acanthocyclus* Dybowski) and *Tryplasma*; but it is possible that by a closer packing of the trabeculae, the Mucophyllidae, with compact lamellar septa, have arisen from the Rhabdocyclidae with rhabdacanthine septa.

The Wenlock "*Chonophyllum*" *patellatum* (Schlotheim) of Europe and the Wenlock and Ludlow *Kodonophyllum* Wedekind of Europe and

the Ludlow compound *Circophyllum* Lang and Smith (1939, p. 153, *nom. nov.* for *Rhysodes* Smith and Tremberth, 1927) of Gotland all have long major septa, those of the first and third meeting at the axis to form an axial structure; these three may be related to the Mucophyllidae, as their septal structure is very similar; but Lang and Smith have considered *Kodonophyllum* to be derived from *Xylodes,* by dilatation of the septa. Other Silurian genera, with narrow peripheral stereozones and long minor septa, are not here considered in relation to the Mucophyllidae.

Chonophyllum Edwards and Haime from the Ludlovian of Gotland (genotype *Chonophyllum perfoliatum* Goldfuss, with which *Omphyma flabellata* Wedekind, 1927, pl. 17, figs. 3, 4, also from the Ludlovian of Gotland, is probably synonymous) differs from the Mucophyllidae in the great length of the septa and in the very wide stereozone being cellular by reason of the incomplete dilatation of the septa. It has no axial structure.

The French Lower Devonian *Briantia* Barrois has long minor septa and closely resembles the Silurian *Kodonophyllum*. *Chlamydophyllum* Pocta from the Lower Devonian of Bohemia has amplexoid major septa; i.e., above the tabulae they are long and meet at the axis, but between the tabulae they shorten. It is possibly related to the Mucophyllidae. The "Chonophylla" described from Bohemia by Pocta appear to include more than one genus, but in all, the dilated septa are broken down so that spaces occur in them, much as in *Chonophyllum* s.s.

"*Chonophyllum perfoliatum*" auct. non Goldfuss from the Frasnian of France and the Giveto-Frasnian of England has a small continuous axial structure, but septa like the Silurian *Chonophyllum*.

In *Amplexus* (*Coelophyllum*) *eurycalyx* Weissermel (1894, p. 634, Diluvial of Germany), *Tryplasma liliiforme* Etheridge (1907, p. 95, Ludlovian of New South Wales), and *Pseudomphyma expansa* Wedekind (Soshkina, 1937, p. 56, from the Middle Ludlow of the Urals) there is a group with an expanded calical rim, wide but not very thick, which may well be related to the Mucophyllidae. *Mucophyllum* differs from it only in the much greater thickness of the expanded calical rim. Etheridge, by placing the New South Wales species in *Tryplasma* has suggested the relations of the group to be with that family; but in the septa the trabeculae are closely packed as in the Mucophyllidae. Weissermel, by placing his species in *Amplexus* (*Coelophyllum*), suggested a relation to the German Middle Devonian *Amplexus*-like group later called *Cyathopaedium* by Schlüter (1889, p. 5) with which the American Guelph (Lower Ludlow) *Pycnostylus* Whiteaves (1884, p. 2) may be synonymous. I have seen no European specimens of this group, but think that some of the other Australian Ludlovian and Devonian species placed by Etheridge in *Tryplasma* may belong to it.

Genus *Pseudamplexus* Weissermel.

Pseudamplexus Weissermel, 1897, p. 878.

? Aspasmophyllum F. Romer, 1880, p. 184. Monotype, *Aspasmophyllum crinophilum* Romer, 1880, *id.* Middle Devonian, possibly Crinoid shales at the base of the Givetian, Gerolstein, the Eifel.

? Mucophyllum Etheridge, 1894, p. 11. Monotype, *Mucophyllum crateroides,* Etheridge, *id.*, pls. iii., iv., Upper Silurian, Yass, N.S.W.

Pselophyllum Pocta, 1902, p. 82. Genosyntypes (from Lower Devonian, F_2, Koneprus): *Pselophyllum obesum* Barrande MS in Pocta *id.*, *Pselophyllum bohemicum* Barrande in Pocta *id.*, and *Pselophyllum vestitum* Barrande in Pocta *id.* Genolectotype, here chosen, *Pselophyllum bohemicum.*

? Pseudomphyma Wedekind, 1927. p. 34, p. 37. Genotype by designation *Pseudomphyma profunda* Wedekind *id.*, pl. 6, figs. 8-10, Upper Silurian (Lidlovian), Storungs, Gotland.

Genotype (by monotypy).—*Zaphrentis Ligeriensis* Barrois, 1889, p. 52, pl. iii., fig. 1. Lower Devonian. Erbray, France.

Diagnosis.—Large simple Rugosa with sub-equal short major and minor septa dilated and in contact to form a peripheral stereozone in lieu of a dissepimentarium, and with a wide tabularium of distant, horizontal, complete tabulae.

Remarks.—Weissermel's genus *Pseudamplexus* was overlooked until he himself referred to it (1939) in discussing forms like *Pselophyllum*, when he proposed, in view of his original definition, that *Pseudamplexus* should be set aside until *Amplexus* was proved polyphyletic, one group coming from *Columnaria* and another from *Zaphrentis*, both by the operation of the amplexoid trend; *Pseudamplexus* could then be used for the latter group. But he named a single species *Zaphrentis ligeriensis*, as belonging to the genus, giving its bibliographic reference; according to my reading of the Rules of Nomenclature, this makes *Pseudamplexus* a valid genus—a designated actual species is the ultimate reference for a genus, not an author's definition of a genus. *Zaphrentis ligeriensis* is congeneric if not conspecific with *Pselophyllum bohemicum*, the genolectotype of *Pselophyllum*. It appears therefore that *Pselophyllum* must be retired to the synonymy of *Pseudamplexus.*

The genera here listed as possible synonyms have been considered in the remarks on the family. The species here regarded as of the genus are, in addition to the genotype:—Pocta's three Lower Devonian syntypes of *Pselophyllum*; *Aspasmophyllum ligeriensis* (Barrois), Charlesworth (1914, p. 352, pl. xxx., fig. 1) from the Lower Devonian of the Eastern Alps; *Tryplasma princeps* Etheridge (1907, p. 97) from the Upper Silurian or Lower Devonian of Molong District, New South Wales; and the ?Couvinian specimen from Silverwood described below.

Septal Structure.—From a study of Pocta's figures, and thin sections of the Silverwood form, I conclude that in this genus the septa consist of a single series of rhabdacanths (Hill, 1936) much expanded laterally and very closely placed, fine lamellar sclerenchyme being interwoven with the "rods" of the rhabdacanths. *Pseudamplexus* thus shares rhabdacanths with the Rhabdocyclidae; but holacanths have not been observed, and the lamellar sclerenchyme is not continuous from one septum to the next, as in the Rhabdocyclidae. The structure of the septa in *"Chonophyllum" patellatum* and in *Kodonophyllum* is very similar; but there appears to be a slightly different grouping of the "rods" in the rhabdacanths.

Pseudamplexus sp. (Plate III., figs. 1a-c.)

Tryplasma princeps; Richards and Bryan, 1924, p. 98, pl. xv., figs. 3, 4, Middle Devonian, Silverwood, Queensland.

non Tryplasma princeps Etheridge, 1907, p. 97, Upper Silurian (or Lower Devonian) of Molong District, N.S.W.

Material.—F 3419-20, University of Queensland Collection. Lomas North, Silverwood, near Warwick, Queensland.

Diagnosis.—Large trochoid *Pseudamplexus* with septa up to 10 mm. long.

Description.—Only fragments of coralla are known, usually crossed by many small faults. The specimen (F 3419) figured by Richards and Bryan is a truncated and vertically broken fragment 30 mm. in diameter at its broken base, and 60 mm. at least at its obliquely cut upper surface, which is 50 mm. from the lower. It has a large rootlet 5 mm. wide, broken off at 20 mm. from its origin, with an axial cavity, and walls about 2 mm. thick. The calice is not known, nor the apex, nor the epitheca.

The septa are 8 mm. long in the upper section of this fragment, and major septa cannot be distinguished from minor septa; the septa are very thick, 4 in a space of 10 mm., and 28 in less than a half section of the corallum; about 2 mm. of their axial ends are free laterally and there is no indication that the inner margins are denticulate or acanthine. Their nature in the early part of the corallite and in the calice is unknown. They consist of a single series of almost horizontal uncurved trabeculae, directed upwards at a very slight angle. The trabeculae are about 0·5 mm. from the lower inclined surface to the upper, and extend laterally to the sides of the septa. Each appears to consist of rather sparsely developed bundles of fibres, each bundle like a rod issuing obliquely upwards from the axis of the trabecula, but quickly curving outwards and proceeding to the side of the septum so that the longest portion is normal to the axis of the trabecula. Connecting these "rods" in the body of the septum is finely lamellar sclerenchyme, curving among the rods at right angles to the course of the rods. In some weathered surfaces this lamellation is more distinct at regular and somewhat larger intervals, and gives the repeatedly scalloped appearance so clearly shown in Pocta's (1902) figures of *Pselophyllum*. The lamellar sclerenchyme is not continuous from septum to septum; the lamellation runs from the axial parts of the septa back towards the peripheral parts, almost to the epitheca, before turning sharply towards the corresponding lamellae of a neighbouring septum (as in Pocta, 1902, pl. 109, figs. 1, 2). The peripheral stereozone dilates slightly but gradually toward the upper part of the corallum. The tabulae are complete, horizontal, and somewhat irregular in distance apart, varying from 2 to 4 in 5 mm. They are somewhat dilated.

Remarks.—As nothing is known of the calical characters or the apical parts of this form, it is thought better not to give it a specific name. The lamellation seen in the septa is thought to be growth lamellation, and its structure and origin is believed to be that described by Hill (1936) in *Rhabdocyclus*. Though in the Rhabdocyclidae and the Mucophyllidae the septa are rhabdacanthine, in the Mucophyllidae as opposed to the Rhabdocyclidae, the rhabdocanths are extremely close together, and the lamellar sclerenchyme is not continuous from septum to septum.

A fragment (F 3421) from Limestone Siding, figured by Richards and Bryan (1924, pl. xv., fig. 1) as an undescribed Rugose coral with features common to *Tryplasma* and *Mucophyllum*, may be a portion of the calice of our *Pseudamplexus* sp. It has the same septal structure, but the calical rim seems to be very expanded, and the tabularium is probably much narrower than in our *Pesudamplexus* sp., so that the fragment may represent a second species.

A specimen in the Australian Museum from Beedle's Freehold (pcr. 163, par. Nemingha), Moonbi, New South Wales—i.e., from the type locality for the Middle Devonian Nemingha Limestone—may well be our species, but it is a calical fragment only, and indicates that there was a sudden expansion in diameter of the corallite at the base of the calice, although the later increase in diameter of the calice was at approximately the same rate as that of the corallum previously. This type of calice was figured for *P. ligeriensis* by Barrois (1889, pl. 3, fig. 1). A second specimen in the Australian Museum, F 741, also from the Nemingha Limestone, is *Pseudamplexus* sp., but it differs from the Silverwood form in being sub-cylindrical. The specimen from the Moore Creek limestone of Attunga, mentioned by Etheridge as *Tryplasma princeps*, has not been traced, but its affinities may be with *Pseudamplexus*.

The Silverwood form differs from the Lower Devonian Bohemian *P. bohemicus* and *P. vestitum* and the Lower Devonian Alpine "*Aspasmophyllum ligeriensis*" in the smaller width of its peripheral stereozone, and from the Lower Devonian Bohemian *P. obesum* in the greater width of its stereozone. In shape of corallum it closely resembles *P. obesum*. It differs from the French Lower Devonian *P. ligeriensis* (Barrois) in its greater size and more expanding shape.

Richards and Bryan identified the Silverwood form with *Tryplasma princeps* Etheridge from the Upper Silurian or Lower Devonian of the Molong District, New South Wales; but while *princeps* is probably *Pseudamplexus* it has a much narrower stereozone than the Silverwood form, and a more cylindrical habit.

Genus CHLAMYDOPHYLLUM Pocta.

Chlamydophyllum Pocta, 1902, p. 134.

Genotype (by monotypy).—*Chlamydophyllum obscurum* Pocta, *id.*, pl. 114, fig. 2; pl. 115, figs. 2-5. Lower Devonian, F_2, Koneprus, Bohemia.

Diagnosis.—Simple Rugosa, trochoid at first, later cylindrical with much rejuvenescence, and swollen distally; calice funnel-shaped; with a wide peripheral stereozone formed by lateral contact of the dilated major and minor septa; in the tabularium the axial ends of the major septa are unequal, usually long, straight or of irregular curvature, and many have clubbed ends; they may unite at the axis in the proximal parts of the corallum, and on the surfaces of the tabulae in the distal parts, being then withdrawn between tabulae; the tabulae are complete and horizontal; the cardinal fossula is clearly visible by the pinnate arrangement of the septa in the tabularium.

Remarks.—Pocta states (p. 136) that the septa of the genotype consist of vertical lamellae parallel to their surfaces. Possibly this is a similar growth lamination to that described above for *Pseudamplexus*. Mlle. Le Maître (1934, p. 160) has identified with Pocta's species a specimen from the Upper Coblenzian or Lower Couvinian of Chaudefonds, France, which has major septa with ends inrolled at the axis, incomplete, domed tabellae, and a septal structure quite similar to that of *Pseudamplexus*. Further illustrations of topotypes are necessary to a complete understanding of the genus. *Zaphrentis cornuvaccinum* Penecke (1894, p. 593, pl. vii., figs. 10-12) which is the commonest species of the *barrandei*-Limestone (Upper Coblenzian) of Graz, may

be generically related to *Chlamydophyllum obscurum* or to the specimen from Silverwood described below.

The genus is here considered as a possible member of the Mucophyllidae, as it has the shape, peripheral stereozone, and septal structure of that family; but it differs from the members of the family (*s.s.*) in that its septa are amplexoid (Hill, 1935, p. 502) and not confined to the peripheral stereozone.

? *Chlamydophyllum* sp. (Plate III., figs. 2a-d.)

Material.—A single specimen from Silverwood, probably from Limestone Siding. F 3422, University of Queensland Collection.

Description.—A specimen in a rock mass is assumed, from the fragments into which it was broken, to have been turbinate, with an everted calicular platform round a calicular pit. The diameter at the platform is about 50 mm., and there are about 70 septa. Outside the tabularium the septa are so dilated as to be in contact to form a peripheral stereozone, whose width increases with the height of the corallum, forming the platform 10 or 12 mm. wide. A section taken near the floor of the calice shows alterating major and minor septa; the inner third or half of the minor septa is less dilated than the rest, and free laterally; the major septa are unequal, attaining almost to the axis, irregular in curvature, and frequently somewhat swollen at their axial ends. The septa are rhabdacanthine, with very close rhabdacanths, and a rich development of "rods," so that lamellar sclerenchyme does not appear important; in transverse section of the corallum the growth lamellae curve round the inner ends of the septa, and run back towards the epitheca almost parallel with the median plane of the septa. The "rods" curve outwards rapidly, and for a considerable part of their length are directed normally to the surfaces of the septa. A fossula is not distinguishable in this incomplete section. A vertical section shows the distant, flat, somewhat dilated tabulae, whose upper surfaces carry sections of the dilated septa. They appear to have down-turned margins.

Remarks.—The determination of this specimen is doubtful, both because of the poverty of material and the uncertainty regarding the characters of *Chlamydophyllum.* Our specimen is not known to form an axial structure by its conjoined septal ends, as in the genotype; but it is incomplete, the apical portion being unknown. The length of the septa precludes our placing it in *Pseudamplexus,* although its shape, stereozone, and septal structure is similar.

Family SPONGOPHYLLIDAE.

See Hill, 1939b, p. 58.

Genus *Spongophyllum* Edwards and Haime.

Spongophyllum Edwards and Haime, 1851, p. 425.

Spongophyllum; Jones, 1929, p. 88, *q.v.* for comparison with *Endophyllum.*

Spongophyllum; Hill, 1939b, p. 58, *q.v.* for review of genus.

Genotype (by monotypy).—*Spongophyllum sedgwicki* Edwards and Haime, *loc. cit.;* 1853, p. 242, pl. lvi., fig. 2, 2a-e [Middle] Devonian [or Frasnian], Torquay.

Diagnosis.—Cerioid Rugosa in which the tabularium is narrow and the tabulae close and slightly concave, the minor septa are degenerate,

and lonsdaleoid dissepiments may be developed in an irregular peripheral zone when the major septa are discontinuous.

Remarks.—The genus as interpreted by Hill *loc. cit.* contains five Upper Silurian and six Middle Devonian species.

Spongophyllum halysitoides Etheridge.

Spongophyllum halysitoides Etheridge, 1918, p. 49, pl. vii.

Spongophyllum halysitoides; Jones, 1932, p. 56.

Holotype (by monotypy).—In the Australian Museum Collection. Nemingha Limestone, road near Beedle's Farm, Moonbi, co. Inglis, New South Wales. Upper Middle Devonian.

Diagnosis.—*Spongophyllum* in which septa are frequently entirely absent, even from the tabularium.

Remarks.—This species is known from Moore Creek, near Tamworth, New South Wales (F 6760, Australian Museum Collection), in addition to the type locality. Its corallites are 4-6 mm. in diameter, and in many the major septa are absent as well as the minor, so that the interrupted sections of dissepiments and tabulae give the corallites the appearance of a rose, in transverse section. The septal bases of neighbouring corallites are usually opposite, and are somewhat swollen, so that in sections of the walls a *Halysites* appearance is obtained.

Spongophyllum halysitoides var. *minor*, var. nov.

(Plate III., figs. 3a, b.)

Spongophyllum cf. *halysitoides* Etheridge, Richards and Bryan, 1924, p. 99, pl. xvii., figs. 1, 2; Limestone Siding and Lomas North, near Silverwood, Queensland.

Spongophyllum halysitoides; Jones, 1932, p. 56, *partim*; i.e., Silverwood specimens, text-fig. 2.

Holotype.—F 3423, University of Queensland Collection. Limestone Siding, near Silverwood. Couvinian, Lower Middle Devonian. Figured herein, and Richards and Bryan *loc. cit.*

Diagnosis.—*Spongophyllum halysitoides* with small corallites from 2 to 4 mm. in diameter.

Description.—The external form of the cerioid corallum is unknown. only weathered sections of fragments having been collected. Individual corallites are from 2 to 4 mm. in diameter, usually 3 mm., and are 5 or 6 sided, the sides being straight or but slightly curved in transverse section. The septal bases are less frequently opposite than in *halysitoides* itself, so that the walls are slightly wavy rather than halysitoid. There are 22-26 septal bases in each corallite; in some corallites no other trace of septa can be seen; but frequently 12 or 13 more or less discontinuous major septa may be traced from the wall almost to the axis. Minor septa have been observed only as septal bases. Each septal base is swollen and in contact with its neighbour, the greatest dilatation being in its median part. The tabularium is narrow—only about 0·5 mm. in diameter—and contains complete, slightly concave tabulae, about 10 in a space of 5 mm. The dissepiments are very large, their angle of inclination increasing towards the axis; one or two series only are developed.

Remarks.—The difference in size between the two Silverwood specimens described as the variety *minor* and the two Tamworth specimens is

constant, the corallites of the Silverwood forms being just over half as large. Further, in the Silverwood specimens the septal bases of neighbouring corallites are more often alternate than opposite. The tabularium of the Tamworth type has nearly one-third the diameter of the corallites. It is here thought that the characters of the Silverwood specimens indicate that they are a variety of the Tamworth type.

Spongophyllum forms two groups in time—one Upper Silurian and the other Middle Devonian—but neither possesses a distinctive feature. *Halysitoides* and its variety *minor* form a special group, being the only forms known to show complete disappearance of the septa so frequently that such absence is a diagnostic character. The Tamworth limestones bearing *S. halysitoides* are probably Givetian. The variety occurs in the Lomas North Limestone, Silverwood (F 3424, University of Queensland Collection) in addition to the type locality.

Genus *Xystriphyllum* Hill.

Xystriphyllum Hill, 1939b, p. 62.

Genotype (by designation).—*Cyathophyllum dunstani* Etheridge, 1911, p. 3, pl. A, figs. 1, 2. Douglas Creek, Clermont, Queensland. Couvinian, Lower Middle Devonian.

Diagnosis.—Cerioid Rugose corals with long major septa and well-developed minor septa, and with close, concave tabulae, and globose dissepiments.

Remarks.—See Hill *loc. cit.* for the four species previously included in this Lower and Middle Devonian genus. The association of *X. dunstani* with *Spongophyllum cyathophylloides* Etheridge, two species of similar dimensions, was there remarked; and the similar association at Silverwood of *Spongophyllum halysitoides* var. *minor* with a new species of *Xystriphyllum* described below gives rise to the speculation that *Spongophyllum* may be a genomorph of *Xystriphyllum* formed by the poor development of the septa in the dissepimentarium.

Xystriphyllum dunstani (Etheridge). (Plate III., figs. 4a, b.)

Cyathophyllum dunstani Etheridge, 1911, p. 3, pl. A, figs. 1, 2.

Xystriphyllum dunstani; Hill, 1939b, p. 62.

Lectotype (chosen Hill, *id*).—Cl. 6, Geological Survey of Queensland Collection. Couvinian. Douglas Creek, Clermont.

Diagnosis.—*Xystriphyllum* with long, unequal major septa interdigitating in the tabularium; in some corallites the minor septa may be lost and lonsdaleoid dissepiments may arise.

Remarks.—A specimen in the Collection of the Geological Survey of Queensland from Mullin's Paddock, Lucky Valley, Silverwood, although much re-crystallised, is placed without hesitation in this species, which has recently been fully described in these proceedings. The corallites are from 6-8 mm. in average diameter, and 17 or 18 long major septa which interdigitate at the axis alternate with minor septa nearly three-quarters as long. The walls are thick, and the outermost series of dissepiments is larger and more globose than the rest. There are indications of lonsdaleoid dissepiments, but the difference in thickness between major and minor septa is not so great as in topotypes. The Clermont locality is probably Upper Couvinian.

Xystriphyllum insigne sp. nov. (Plate III., figs. 5a, b.)

Holotype.—F 3425, University of Queensland Collection. Limestone Siding, Silverwood, Queensland. Couvinian, Lower Middle Devonian.

Diagnosis.—*Xystriphyllum* with small corallites, 2 or 3 mm. in diameter.

Description.—No complete corallum has been found; the largest fragment is 7 x 3 x 3 cm. The corallum is cerioid and the individual corallites are usually 3 mm. in diameter, though a few are 4 mm., and some may be 2 mm. The walls between corallites are rather thick (0·5 mm.), the septal bases of neighbouring corallites are alternate or subopposite. The 12 or 13 major septa extend from the wall, without curvature, almost to the axis, where they may be slightly interdigitated; in some corallites two opposite septa appear to be joined at the axis. The minor septa are two-thirds to three-quarters as long as the major septa in the type; no vertical discontinuity was observed in either order, but both are slightly waved. The tabularium is about one-third as wide as the corallite and the tabulae are complete and sagging, rather distant. There are three or four series of globose dissepiments, the inner series being more steeply inclined than the outer.

Remarks.—All specimens are badly preserved. At Silverwood, in addition to the type locality, the species occurs at Lomas North, while much re-crystallised material doubtfully placed in it has been collected from Barnes' Qy. and Oakey Creek. It also occurs in the Tamworth District, New South Wales, on the Manilla road, 15 miles from Tamworth (i.e., near Attunga), where it is associated with *Litophyllum koninckı* Etheridge and Foord. This outcrop was considered by Etheridge (1899, p. 182) as almost certainly on the same horizon as the Moore Creek and Woolomol Limestones. These are probably Givetian.

Family STREPTELASMIDAE.

Typical Genus: *Streptelasma* Hall.

Simple Rugosa without dissepiments; the septa are at first dilated throughout, but later extreme dilatation is confined to a narrow peripheral stereozone; the axial edges of the major septa are denticulate, and may interweave to form an axial structure; the tabulae are domed, and complete or incomplete.

Range.—Ordovician and Silurian of Europe and America; Lower Devonian of France; Middle Devonian of North America and Australia.

Remarks.—I include in this family the European Ordovician *Dybowskia* Wedekind (1927, p. 18) which has short major septa and complete, distant tabulae, and which, according to Scheffen (1933, p. 16) occurs also in the Silurian and Devonian of North America; the European and American *Streptelasma* of the Ordovician, Silurian, and Devonian; and the two possibly synonymous Ordovician Baltic genera *Grewingkia* and *Kiaerophyllum* listed below, in which the denticulate axial ends of the septa unite to form a wide axial structure. The value of these generic names is doubtful; all the morphologies seem to belong to a connected series, and all have a long and wide distribution. *Dinophyllum* Lindström from the European Middle Silurian is possibly a member of this family. It has, however, a much larger fossula than typical members, and the axial ends of the septa do not appear to be

denticulate. Possibly three American Devonian genera founded by Simpson (1900) might be Streptelasmids—*Enterolasma* (Helderberg = Lower Devonian); *Kionelasma* (Niagaran to Upper Helderberg = Wenlock to top of Lower Devonian); and *Scenophyllum* (Onondaga = Couvinian).

Genus *Streptelasma* Hall.

Streptoplasma [sic] Hall, 1847, pp. 17, 49, 69-71.

Streptelasma Hall, 1847, explanation to pl. iv., &c.

? *Grewingkia* Dybowski, 1873, p. 384 (genolectotype, chosen Wedekind, 1927, p. 18, *Grewingkia formosa* Dybowski, 1873, p. 132), Ordovician, Baltic States.

? *Dybowskia* Wedekind, 1927, p. 18 (genotype by designation *D. prima* Wedekind *id.*), Ordovician, Gotland.

? *Kiaerophyllum* Wedekind, 1927, p. 17 (genotype by designation *K. kiaeri* Wedekind *id.*), Ordovician, Gotland.

Streptelasma; Smith, 1930, p. 311.

Streptelasma; Cox, 1937, p. 2.

Genolectotype.—*Streptoplasma* (sic) *corniculum* Hall, 1847, p. 69, pl. 25. figs. 1a-d. Trenton Formation of Trenton Falls, &c., New York State. See Cox *loc. cit.*

Diagnosis.—As for family.

Remarks.—As noted under remarks on the family, I cannot see the wisdom of separating the genera listed above, since the morphological differences are only of degrees, and all are widespread and long ranged.

Streptelasma sp. (Plate III., fig. 6.)

Material.—One specimen, F 3426, University of Queensland Collection. Silverwood. Probably from Limestone Siding.

Description.—In an obliquely transverse section 9 mm. in diameter, 34 major septa extend about two-thirds of the way to the axis, and alternate with an equal number of minor septa a little over 1 mm. long; at their peripheral ends both orders are dilated and in contact to form a narrow stereozone about 1 mm. wide; in the tabularium the dilatation of the septa is less; the axial edges of the major septa are denticulate, and the irregular denticulations form a loose spongy border to an axial space about 1 mm. in diameter, which is almost free of septal ends. From their cut plates, the tabulae appear to be domed and rather distant. There are no dissepiments.

Remarks.—The denticulate axial edges of the septa and the narrow peripheral stereozone clearly indicate that this specimen is a *Streptelasma*; it is too incomplete to be given a specific name; possibly an examination of specimens of the American Devonian genera *Enterolasma, Kionelasma,* and *Scenophyllum* would give some correlations.

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EXPLANATION OF PLATES.

PLATE II.

All specimens are from the Middle Devonian (Couvinian) of the Silverwood District, S.E. Queensland, and are now in the Collection of the Department of Geology of the University of Queensland.

All figures (except fig. 7) approximately by $1\frac{2}{3}$ diameters.

Fig. 1. *Acanthophyllum* sp., cf. *mansfieldense* (Dun), F3412, Barnes' Qy. 1a. Transverse section. 1b. Vertical section.

Fig. 2. *Acanthophyllum* sp. F3413. Limestone Siding. Transverse section.

Fig. 3. *Acanthophyllum* sp. F3415. Silverwood. 3a. Transverse section. 3b. Vertical section. 3c. Tangenitial section of septa.

Fig. 4. *Prismatophyllum latum* sp. nov. F3417. Barnes' Qy. Holotype.

Fig. 5. *Prismatophyllum densum* sp. nov. F3416. "Large *Tryplasma* horizon." 5a. Transverse section. 5b. Vertical section. Holotype.

Fig. 6. *Fasciphyllum* aff. *conglomeratum* (Schlüter). F3418. Limestone Siding. 6a. Vertical section. 6b, c. Transverse section.

Fig. 7. *Fasciphyllum conglomeratum.* (Schlüter). Givetian, Eifel. Diagrammatic sections, after Lang and Smith. x 4 diameters.

Plate III.

All specimens are from the Middle Devonian (Couvinian) of the Silverwood District, S.E. Queensland, and are now in the Collection of the Department of Geology of the University of Queensland.

All figures approximately by 1⅔ diameters.

Fig. 1. *Pseudamplexus* sp. F3420, Lomas North. 1a. Transverse section of septa. 1b. Median vertical section of a septum. 1c. Tangential section of septa.

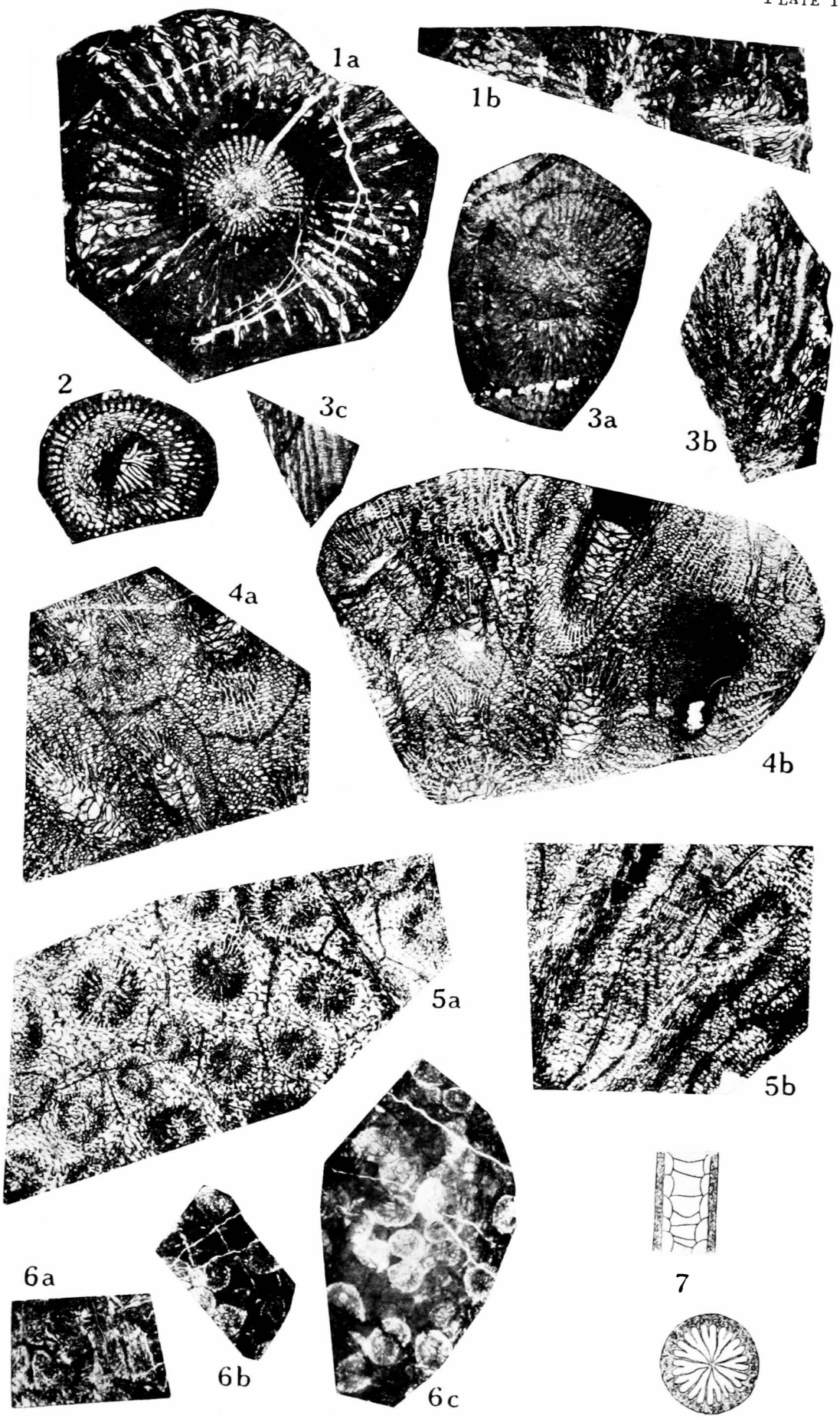
Fig. 2. ? *Chlamydophyllum* sp. F3422. ? Limestone Siding. 2a. Transverse section. 2b. Part of vertical section. 2c. Tangential vertical section of septa. 2d. Transverse section of septa.

Fig. 3. *Spongophyllum halysitoides* var. *minor* var. nov. F3423. Holotype. Limestone Siding.

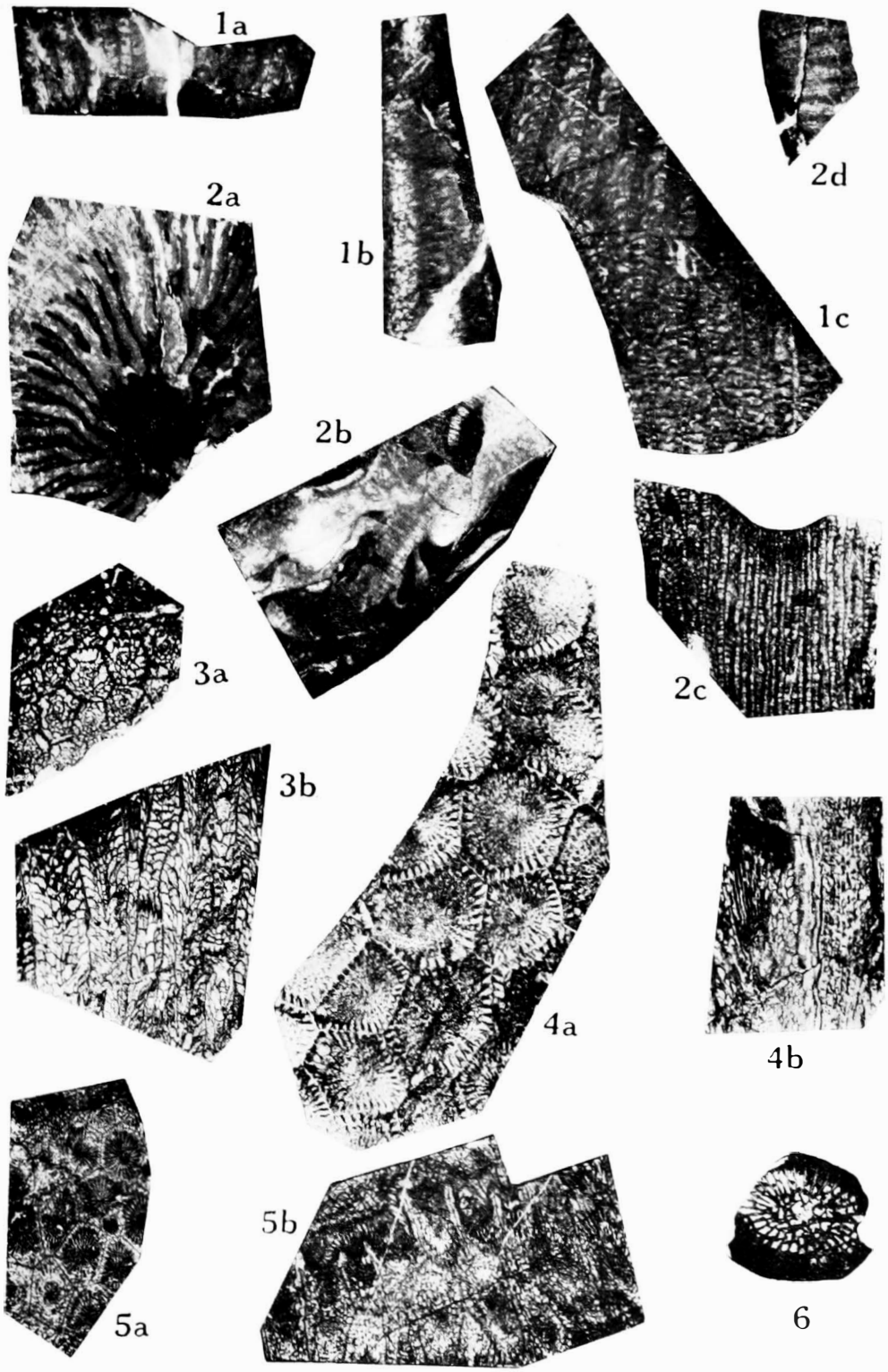
Fig. 4. *Xystriphyllum dunstani* (Etheridge). Geol. Surv. Colln. Mullin's Paddock, Lucky Valley.

Fig. 5. *Xystriphyllum insigne* sp. nov. F3425. Holotype. Limestone Siding.

Fig. 6. *Streptelasma* sp. F3426. ? Limestone Siding.



Middle Devonian Rugose Corals.



Middle Devonian Rugose Corals.