SYSTEMATIC DESCRIPTIONS: TABULATA

Subclass TABULATA Milne-Edwards & Haime, 1850

[*nom. transl.* ABEL, 1920, p. 86, and SOKOLOV, 1950a, p. 163, *ex* Zoantharia Tabulata MILNE-EDWARDS & HAIME, 1850, p. lvii, suborder] [=Zoanthaires tabulés MILNE-EDWARDS & HAIME, 1849b, p. 260, vernacular name; Aseptata GRABAU, 1913, p. 943, order; Trichokorallen, Chätokorallen WEISSERMEL, 1927, p. 10, Chaetokorallen WEISSERMEL, 1937, p. 93, vernacular names for Tabulata; Trichocorallia WEISSERMEL, 1939, p. 55, alternative name for Tabulata] [Includes Zoantharia Tubulosa MILNE-EDWARDS & HAIME, 1851, p. 159, section of order; Tabulata Cryptoseptata, Pseudoseptata GERTH, 1921, p. 99, groups; Schizocoralla OKULITCH, 1936b, p. 378, subclass; Tabulata Communicata, Incommunicata SOKOLOV, 1950a, p. 163, 170, divisions; Anthozoa Heliolitida SOKOLOV, 1950a, p. 134, group; ?Hydrozoa Chaetetida SOKOLOV, 1950a, p. 154, 1950b, p. 38, group; Thallocoralla MOORE, 1952, p. 113, order; Hydrozoa Chaetetida SOKOLOV, 1955, p. 97; Heliolitoidea BONDARENKO, 1958, p. 202, subclass; Tabulata Communicata, Incommunicata BONDARENKO, 1962, p. 59, superorders]

Corallum compound, with very slender corallites; septa short, equal, in many genera and in all Heliolitina and Halysitina 12 in number, each commonly a radial longitudinal series of spines; walls with pores in many suborders; tabulae commonly complete, funnel-shaped in some; coenenchyme may separate the tabularia in Heliolitina and Halysitina; microstructure of tufts of microfibers, their axes perpendicular to lower and upper surfaces of growth lamellae; in septal spines the tufts may be aggregated into monacanthine trabeculae; increase lateral (or intermural), peripheral coenenchymal, or axial and bipartite or quadripartite; in extensiform coralla offsets are more numerous in basal planes than in upright parts. *Ord.-Perm.* [One order, Chaetetida, *Ord.-Eoc., Mio.*; another, Favositida, *M.Ord.-U.Perm.*]

?Order CHAETETIDA Okulitch, 1936

[*nom. correct.* HILL, herein, *pro* Chaetetina OKULITCH, 1936b, p. 379, order] [=Chaetetida SOKOLOV, 1939, p. 410, group; ?Hydrozoa Chaetetida SOKOLOV, 1950a, p. 154, 1950b, p. 38, group; ?Lichenariacea SOKOLOV, 1950a, p. 174, order; Hydrozoa Chaetetida SOKOLOV, 1955, p. 97, group; Lichenariida BONDARENKO, 1958, p. 218, order]

Corallum cerioid or in part meandroid, rarely phaceloid with closely spaced corallites; holotheca present on encrusting surfaces; corallites exceptionally slender; where original microstructure of common walls is retained it is tufted, with tufts arranged clinogonally in single ranks of longitudinal monacanths whose axes lie in a median plane that may or may not be marked by denser sclerenchyme; tufts aragonitic in Triassic *"Bauneia"*; walls typically aporose but pores present in Carboniferous Favosichaetetidae; septa absent, but septal spinules present in Cretaceous *Acanthochaetetes*; increase bipartite (and commonly equal), complete, or in meandroid forms, incomplete, or also by offsets arising intramurally, as in Jurassic *Bauneia,* or basally, as in *Chaetetella (Chaetetiporella).* Paleozoic range: *Ord.; ?L.Sil.-U.Perm.* [For post-Paleozoic range, see page F518ff.]

Systematic Position.—The classification of chaetetoids adopted herein can only be regarded as tentative; in hand specimens and even in thin section they are homomorphic with members of several other orders and classes, not only of Coelenterata (Tabulata and Stromatoporoidea), but also of Porifera (Sclerospongiae), Bryozoa (Trepostomata) and Thallophyta (Solenoporaceae). I am regarding them as Anthozoa Tabulata for lack of a better choice. The characters considered proper to the unit can be varied by the addition or subtraction of individual genera so as to make any particular placement more or less persuasive.

Axial, bipartite increase, equal and unequal, complete and incomplete, is commonly regarded as an essential diagnostic feature; it occurs, with different structural detail, in some members of the Scleractinia, Rugosa, and Tabulata Alveolitina, but in these groups is very subordinate to other modes. Other modes may perhaps occur subordinately in Chaetetida, even dominantly in some Mesozoic species, but satisfactory demonstrations are yet lacking in Paleozoic genera.

Septa and any plane of symmetry consequent upon their manner of insertion are commonly considered absent in Chaetetida; yet spines have been described in some Devonian forms (*"Rhaphidopora"* phase of *Pachytheca* SCHLÜTER, 1885b) and in the Jurassic-Cretaceous *Acanthochaetetes* FISCHER, 1970. This apparent absence of septa has been regarded as a strong reason for removing the Chaetetida from the Anthozoa.

Absence of porosity in the walls distinguishes all except one doubtful Paleozoic family (Desmidoporidae PREOBRAZHENSKIY, 1968) of Chaetetida and some Mesozoic species that I regard as only doubtful members of the suborder. Tabulae are common to many orders. Latilaminae are notable in many chaetetoids as in many stromatoporoids, tabulatans, polyzoans, and solenoporaceans.

The possible presence of astrorhizae in Chaetetida has been discussed, most recently by HARTMAN and GOREAU (1972), STEARN (1972), and CUIF *et al.* (1973). CUIF *et al.*, p. 2475, have described three principal types of astrorhizal structures in Mesozoic species, some of which they refer to the Varioparietidae (herein not considered Chaetetida) and others to the Acanthochaetetidae. Star-shaped groupings of corallites dividing by adaxial bipartite increase found in the Late Ordovician *Schizolites* PREOBRAZHENSKIY, 1968, are superficial homomorphs of the astrorhizae of Stromatoporoidea.

Microstructure may well prove determinant. Unfortunately, the walls appear particularly subject to diagenetic alteration, and very considerable experience of diagenesis in carbonate rocks is essential for the systematist who would use this character successfully. The starting point must be STRUVE's (1898) observation that the walls of a specimen referred to the type species of *Chaetetes, C. cylindraceus,* are of clinogonally fibrous columns (=baculi, =monacanthine trabeculae). These are described as in a single rank; and as such they resemble the monacanths in parts of the walls of the Ordovician *Trabeculites* FLOWER, 1961, and the Silurian *Nodulipora* LINDSTRÖM, 1873a, in which, however, segments of wall with fibers directed upward and inward from a median plane into the lumina may in part take the place of solely monacanthine walls.

CUIF (1974, p. 142) remarked that the fibers of aragonite in the skeletons of both recent and Triassic sclerosponges are arranged in spherulites, not in trabeculae; their fibers radiate from centers (points), not from axes of calcification; this distinguishes their skeletons from the trabecular skeletons of Tabulata and Rugosa, and from many Stromatoporoidea. Chaetetida have trabecular walls, which militates against classifying them as a fossil order of sclerosponges as HARTMAN and GOREAU (1972, p. 145) proposed. It does not appear that fibrous structures such as trabeculae or spherulites occur in Solenoporaceae, in which the walls are presumed to have been originally finely granular, or in Bryozoa.

In none of the thin sections of Chaetetida that I have studied are there any indications of the siliceous spicules identified in the coralline sponge *Ceratoporella nicholsoni* (HICKSON, 1911) by HARTMAN and GOREAU (1970, fig. 17), or of their supposed pseudomorphs in the stromatoporoids *Parallelopora mira* NEWELL and *Stromatopora japonica* YABE, also figured by HARTMAN and GOREAU (1970, fig. 15, 16); but this is not to say that deliberate search would not find them. HARTMAN and GOREAU (1970, p. 228) drew attention to the virtual identity of surface features and figured transverse sections of the Jurassic genus *Varioparietes* SCHNORF-STEINER, 1963, with those of *C. nicholsoni,* and noted that serious consideration should be given to the possibility that many genera now assigned to the Chaetetida may indeed be sponges, a possibility emphasized by STEARN, 1972, p. 386. It does not seem to me that evidence has yet been adduced that should cause the transfer of any of the Paleozoic genera listed below under Chaetetida to the Porifera Sclerospongiae HARTMAN and GOREAU, 1970, p. 228. Should pseudomorphs of siliceous spicules appear in microstudies in the future, transfers might then reasonably be made.

On the whole it seems to me that the Paleozoic genera listed below as Chaetetida share common diagnostic features and that, as presently known, these features associate them more closely with Anthozoa Tabulata than with any of the other suprageneric taxa to which it has so far been suggested that they should be assigned.

Family CHAETETIDAE Milne-Edwards & Haime, 1850

[*nom. correct.* NICHOLSON, 1877, p. 377, *pro* Chaetetiniens DE FROMENTEL, 1861; *nom. transl.* DE FROMENTEL, 1861, p. 272, *ex* Chaetetinae MILNE-EDWARDS & HAIME, 1849b, p. 260, tribe of Favositidae] [=Pachythecidae YANET, 1972, p. 43; ?Spinochaetetidae KIM in YANG, KIM, & CHOW 1978, p. 235]

Cerioid or partly meandroid coralla of very slender corallites; new corallites formed by basal increase—paramount in extensiform coralla, e.g., *Chaetetella (Chaetetiporella)*—or more commonly by equal or subequal bipartite division effected by growth from the walls of opposed radial longitudinal plates; meandroid areas develop when these dividing walls do not meet at the axis; tabulae thin, septa absent; but spinules present in Cretaceous *Acanthochaetetes*; mural pores absent; wall microstructure of tufted microfibers; in cerioid (or meandroid) coralla, walls may be amalgamate with or without distinctive median plane, or be constructed of a single series of discrete but contiguous monacanthine trabeculae. *U.Ord.; ?Sil.-?L.Dev.; M.Dev.-Perm.* [For post-Paleozoic ranges, see pages F519-F520.]

Subfamily CHAETETINAE Milne-Edwards & Haime, 1849

[Chaetetinae Milne-Edwards & Haime, 1849b, p. 260, tribe]

Corallum cerioid, corallites prismatic; walls amalgamate without distinctive median plane, or constructed of a single series of discrete but contiguous monacanthine trabeculae. *U.Ord.; ?Sil.-?L.Dev.; M.Dev.-Perm.*

Chaetetes Fischer von Waldheim MS in Eichwald, 1829, p. 197 [**C. cylindraceus*; SD Oakley, 1936, p. 441; †possibly in Eichwald Coll., LGU, Leningrad; Lang, Smith, & Thomas, 1940, p. 35, considered *C. cylindraceus* congeneric if not conspecific with *C. radians* Fischer von Waldheim, 1830 and 1837, p. 160, which was erroneously chosen as type species by Milne-Edwards & Haime, 1850, p. lxi] [=*Chaetites* Michelin, 1844, p. 112, *nom. null.; Chaetetides* Strand, 1928, p. 34, *nom. nov. pro Chaetetes* Fischer von Waldheim, 1837, p. 159, in case this should prove to be different from *Chaetetes* Fischer von Waldheim MS in Eichwald, 1829, p. 197 (Lang, Smith, & Thomas, 1940, p. 35, considered *Chaetetides* unnecessary); *?Dania* Milne-Edwards & Haime, 1849b, p. 261 (type, *D. huronica,* M; †Stokes Coll., ?in Paris; Sil., Drummond I., L. Huron, N.Am.), an uncatalogued specimen labeled *D. huronica,* Drummond I., which may have been used for the schematized Milne-Edwards & Haime, 1851, pl. 18, fig. 2b, was seen in 1975 by Hill in the Milne-Edwards & Haime Coll. of Tabulata in MN, Paris. It has, however, corallites of very large (up to 6.5 mm.) diameter, whereas Milne-Edwards & Haime give diameter as scarcely 1 mm.; *Danaia* Scudder, 1882, p. 101, *nom. null.*]. Corallum massive, subglobular or hemispherical, commonly showing narrow bands of slower growth along which it readily splits into concentric sheets; corallites radially disposed, regular, long, prismatic; common walls without conspicuous median suture line and composed of longitudinal trabeculae; increase frequent, axial, bipartite and complete; tabulae horizontal; septal spines absent; mural pores absent. *?Sil.,* N.Am.; *M.Dev.-Carb.,* Eu.-Asia; *M.Dev.-Penn.,* N.Am.; *Perm.,* N.Am.-Asia.

C. (Chaetetes). Corallites polygonal, not rounded-polygonal, in transverse section. *?Sil.,* N.Am. (Mich.); *M.Dev.,* Asia(Kuzbas-Kazakh.); *M. Dev.-Carb.,* Eu.(USSR-G.Brit.)-Asia(C.Asia-Arctic-China-Japan-Indoch.); *M.Dev.-Penn.,* N.Am.; *Perm.,* N.Am.-Asia (Japan-Karakorum).——Fig. 330,*3c.* **C. (C.) cylindraceus,* M.Carb., environs of Moscow, ext. view, ×? (Eichwald, 1829).——Fig. 330,*3a,b. C. (C.) tenuiradiatus* Sokolov, Visean (Serpukhov substage), NW. part Moscow Basin, R. Prishka; *a,b,* transv., long. secs., ×4.0 (Sokolov, 1955).

C. (Boswellia) Sokolov, 1939, p. 411 [**Chaetetes boswelli* Heritsch, 1932, p. 221; OD; †thin sections, P1019, UG, Graz, specimen destroyed *fide* Heritsch, 1932, p. 221]. Corallum hemispherical, corallites radially arranged; differs from *C. (Chaetetes)* by having irregularly thickened common walls to its exclusively prismatic corallites, which commonly have rounded-polygonal and somewhat corrugated transverse outline interiorly [see also Weyer, 1967b, p. 1156]. *M. Dev.*(rare)-*Carb.,* Eu.(Serbia-Ger.-Moscow Basin-Donbas-Urals)-C.Asia.——Fig. 330,*2a,b.* **C. (B.) boswelli* (Heritsch), L.Carb.(Visean), W. Serbia, Ivovik; *a,b,* transv. secs., ×0.7 (Heritsch, 1932).

?Carnegiea Girty, 1913, p. 313, *nom. nov. pro Carnegia* Girty, 1907, p. 40, *non Carnegia* Holland, 1896, a lepidopteran [**Carnegia bassleri* Girty, 1907, p. 40; OD; †61920, USNM, Washington] [=*Carnedgiea* Sokolov, 1955, p. 100, *nom. null.*]. Corallum small, sheet-like to lenticular; corallites rather closely tabulate, with incomplete, bipartite increase creating open meandering chambers; walls moderately thick. [Insufficiently known; originally considered stromatoporoid.] *U.Carb.(Wu-shan Ls.),* Asia(China, near Liang-ho-k'ou, E.Szechwan).

Chaetetella Sokolov, 1962c, p. 172 [**C. filiformis*; OD; †type in Mus. Paleont. Lab., LGU, Leningrad *fide* Sokolov, 1950b, p. 70] [=*Chaetetella* Sokolov, 1939, p. 411, *nom. nud.,* genus diagnosed but no species described or figured; *Chaetetella* Sokolov, 1950b, p. 70, *nom. nud.,* type species designated but not described or figured]. Corallum thin, in sheets with basal holotheca; increase dominantly basal, offsets arising at periphery of corallum; above base, corallites parallel, very slender, with very sparse axial bipartite increase; mural pores and septal spines absent; tabulae thin, horizontal. *U.Ord.,* Asia(NE.USSR)-?N.

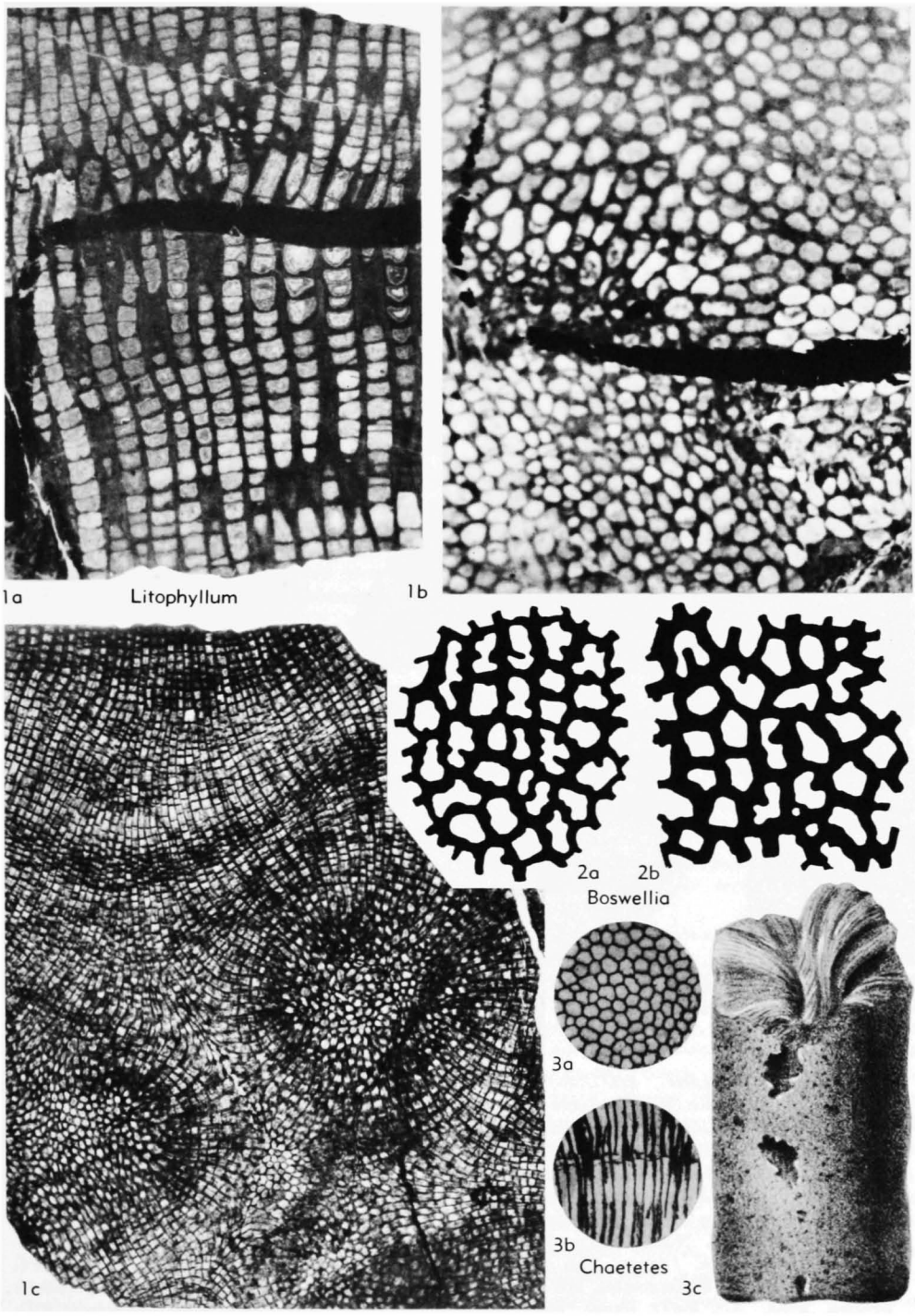


FIG. 330. Chaetetidae (p. *F*508-*F*511).

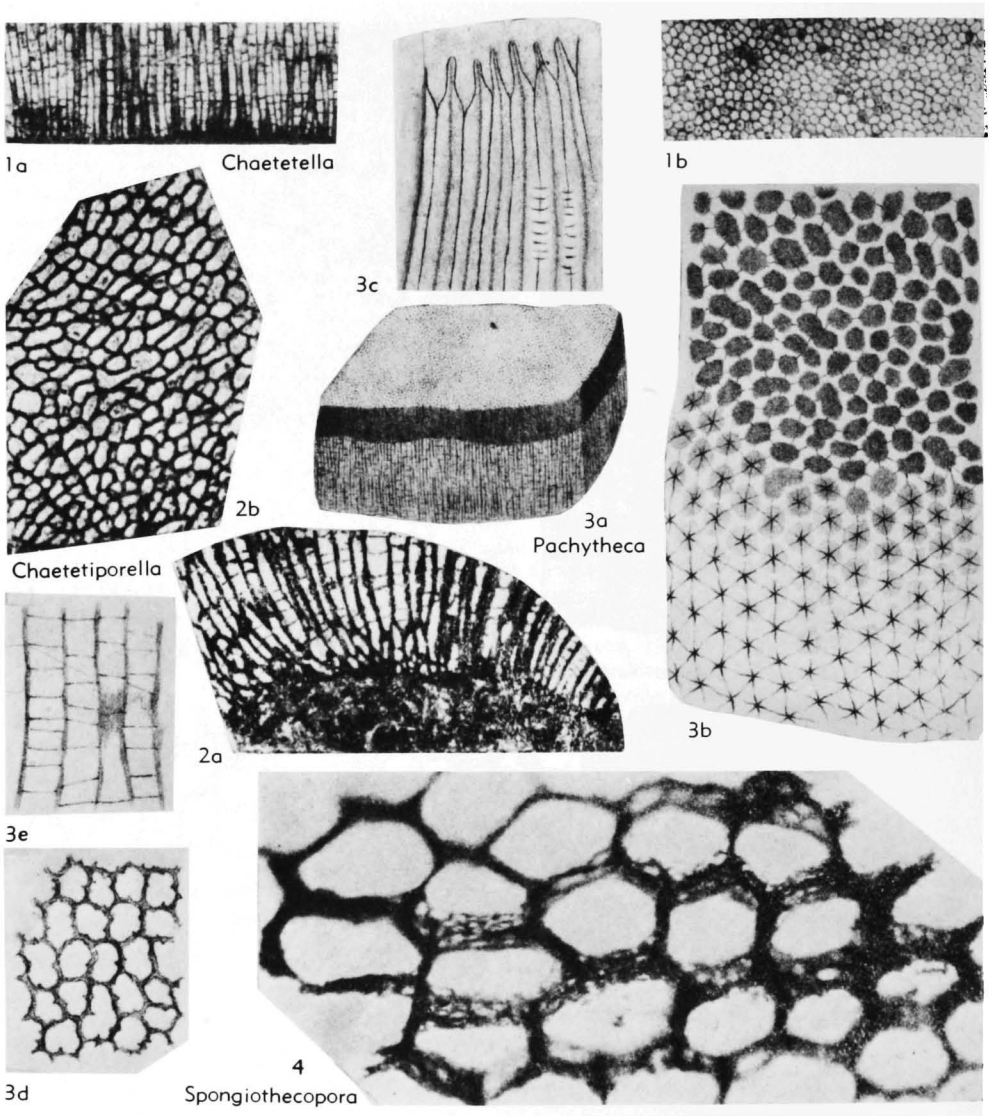


FIG. 331. Chaetetidae (p. F510-F511).

Am.(Arctic Can.); *M.Dev.*, Eu.(Urals)-Asia(C. Asia-Kuzbas); *Carb.*, Eu.(Moscow Basin-Donbas-Timan-Urals-Brit. I.-France)-Asia(C. Asia-China); *Miss.-Penn.*, N.Am. [*Fide* NORFORD, 1971, p. 4, Arctic Canada Ordovician species is *Chaetetipora.*]

C. (Chaetetella). Corallum cerioid, not meandroid. *U.Ord.*, Asia-?N.Am.; *M.Dev.*, Eu.-Asia; *Carb.*, Eu.-Asia; *Miss.-Penn.*, N.Am.——FIG. 331,*1a,b*. **C. filiformis*; L.Carb. (Visean, Oka substage, Mikhaylov horizon), R. Okhomlya, NW. part of Moscow Basin; *a,b,* long., transv. secs., ×6 (Sokolov, 1962c).

C. (Chaetetiporella) SOKOLOV, 1950b, p. 81 [**C. crustacea*; OD; †in ?coll. 7825, TsGM, Leningrad] [=*C. (Chaetetiporella)* SOKOLOV, 1939, p. 411, *nom. nud.*]. Corallites large, of irregular and meandroid outline in transverse section. *L.Carb.(Visean),* Eu.(Moscow Basin, Donbas). ——FIG. 331,*2a,b*. **C. (C.) crustacea; a,* Voronezh distr., Zhuravka, long. sec., ×4; *b,* Kurst distr., Valuyki, transv. sec., ×4 (Sokolov, 1950b).

Litophyllum ETHERIDGE, 1899a, p. 178 [**Amplexopora konincki* ETHERIDGE & FOORD, 1884, p. 178; OD; †F1408A, GSQ, Brisbane] [=*Cyclochaetetes* SOKOLOV, 1955, p. 100 (type, *C. grandis,* OD; †158, coll. 599, VNIGRI, Leningrad; M.Dev., Vorkuta, USSR); *Lithophyllum* SOKOLOV, 1955, p. 518, *nom. null.; ?Spinochaetetes* KIM in YANG,

KIM, & CHOW, 1978, p. 235 (type, *S. insolens*, OD; †Gct 554-555, GB, Guiyang; M.Dev., Guanziyao, Guizhou [Kweichow])]. Corallum massive, large; common walls of normally prismatic corallites regularly thickened, especially at angle of prisms, so that interior transverse outline is smoothly rounded or oval; mural pores absent; septal spinules ?absent; tabulae horizontal, may be at same levels in neighboring corallites; increase bipartite, equal or unequal, dividing walls growing toward one another from opposite sides of corallite, or of angle between faces of prisms. *M.Dev.*, Australia(New S.Wales-Queensl.)-Eu.(Belg.-Urals-U.K.-Ger.)-Asia (Kazakh.-C. Asia-Kuzbas-Indoch.-?Kweichow).——FIG. 330,*1a,b*. *L. grandis* (SOKOLOV), Eifel., USSR, Vorkuta; *a,b,* long., transv. secs., ×4.0 (Sokolov, 1955; photographs courtesy J. Jell).——FIG. 330,*1c*. **L. konincki* (ETHERIDGE & FOORD), Burdekin F., N. Queensl., Burdekin Downs, sec., ×4.0 (Hill, Playford, & Woods, 1967; UQF6906).

Pachytheca SCHLÜTER, 1885b, p. 144, *non Pachytheca* HOOKER, 1861, a plant [**P. stellimicans*; M; syntypes 138a,b, 204, SCHLÜTER Coll., IP, Bonn; =*Calamopora stromatoporoides* ROEMER, 1883, p. 459] [?=*Rhaphidopora* NICHOLSON & FOORD, 1886, p. 390 (type, *Calamopora crinalis* SCHLÜTER, 1880b, p. 281, OD; syntypes 192, SCHLÜTER Coll. (26), IP, Bonn; M.Dev., Hillesheim syncline, Eifel, Ger.), see SCHLÜTER, 1889, p. 401; *Raphidiopora* YABE, 1910, p. 4, *nom. null.; Rhaphidiopora* STEARN, 1972, p. 375, *nom. null.*]. Massive, tabular; corallum of two growth-types ?(layers), one of thin-walled, six-sided very slender prismatic corallites, tabulate and without mural pores [but with septal spines in *Rhaphidopora crinalis* var. *aculeata* NICHOLSON & FOORD, 1886, p. 392], the other of similar corallites, with walls so thickened as to fill the lumina with yellow ?sclerenchyme. [See YANET, 1965, p. 17. Also see HARTMAN & GOREAU, 1970, p. 228, who drew attention to morphological similarities to *Merlia,* a recent coralline sponge.] *M.Dev.*, Eu.(Eifel, Ger.-U.K.-N.Urals).——FIG. 331,*3a-c*. **P. stellimicans,* Ger.; *a,* ext. view of fragment, showing thick-walled layer above and thin-walled layer below, ×1; *b,* oblique transv. sec. showing thick-walled layer below, thin-walled layer above, ×18; *c,* long. sec. through thick-walled layer, ×18 (Schlüter, 1889).——FIG. 331,*3d,e*. *?P. crinalis* (SCHLÜTER), Ger., Soetenich, Eifel; *d,e,* transv., long. secs., ×12 (Nicholson & Foord, 1886).

?**Spongiothecopora** SOKOLOV, 1955, p. 496 [**S. fallax*; OD; †152, coll. 599, VNIGRI, Leningrad] [=*Spongiothecopora* SOKOLOV, 1939, p. 410, *nom. nud.*]. Like *Chaetetes,* with prismatic corallites with axial bipartite increase and tabulae, but walls without trabeculae or median suture line and possessing a fine, irregularly reticulate or spongy structure. [Insufficiently known, one species only.] *L.Carb.(Visean),* Eu.(Moscow Basin).——FIG. 331,*4*. **S. fallax,* holotype, S. part Moscow Basin; oblique view of thin section, ×15 (Sokolov, 1955).

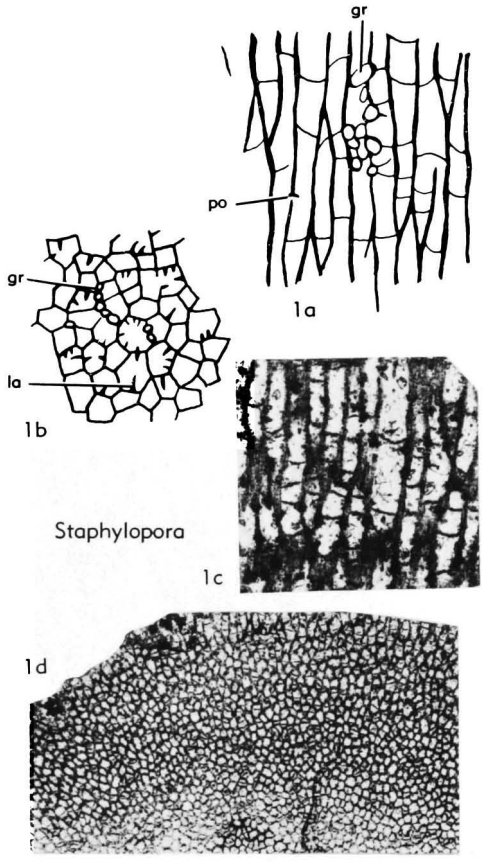


FIG. 332. Chaetetidae (p. *F*511).

?**Staphylopora** LE MAÎTRE, 1956b, p. 1654 [**Favosites? chaetetiformis* LE MAÎTRE, 1947, p. 71; OD; †?148 (or 149), LE MAÎTRE Coll., GFC, Lille]. Nodular colonies of slender prismatic corallites, increase axial, bipartite, subequal, complete; common walls with median dark plane; septal spines sparse, mural ?pores sparse, tabulae complete, thin; sparse, rounded cellules ?(commensals) present in groups, apparently replacing normal walls. [See FONTAINE, 1966a, p. 11. Not well known.] *?L.Dev.-M.Dev.*, Australia(Queensl.-New S.Wales); *M. Dev. (Eifel.-Givet.),* N. Afr. (Moroc.)-Asia (Indoch.).——FIG. 332,*1a-d*. **S. chaetetiformis* (LE MAÎTRE), holotype, Givet., Moroc., Ouihalane, Tafilelt; *a,b,* long., transv. secs., diag., *gr,* grape-like cellules in platoons, *la,* radial longitudinal lamina indicating axial increase, *po,* mural ?pore (Le Maître, 1956b); *c,d,* long., transv. secs., ×8.0, ×3.2 (Le Maître, 1947).

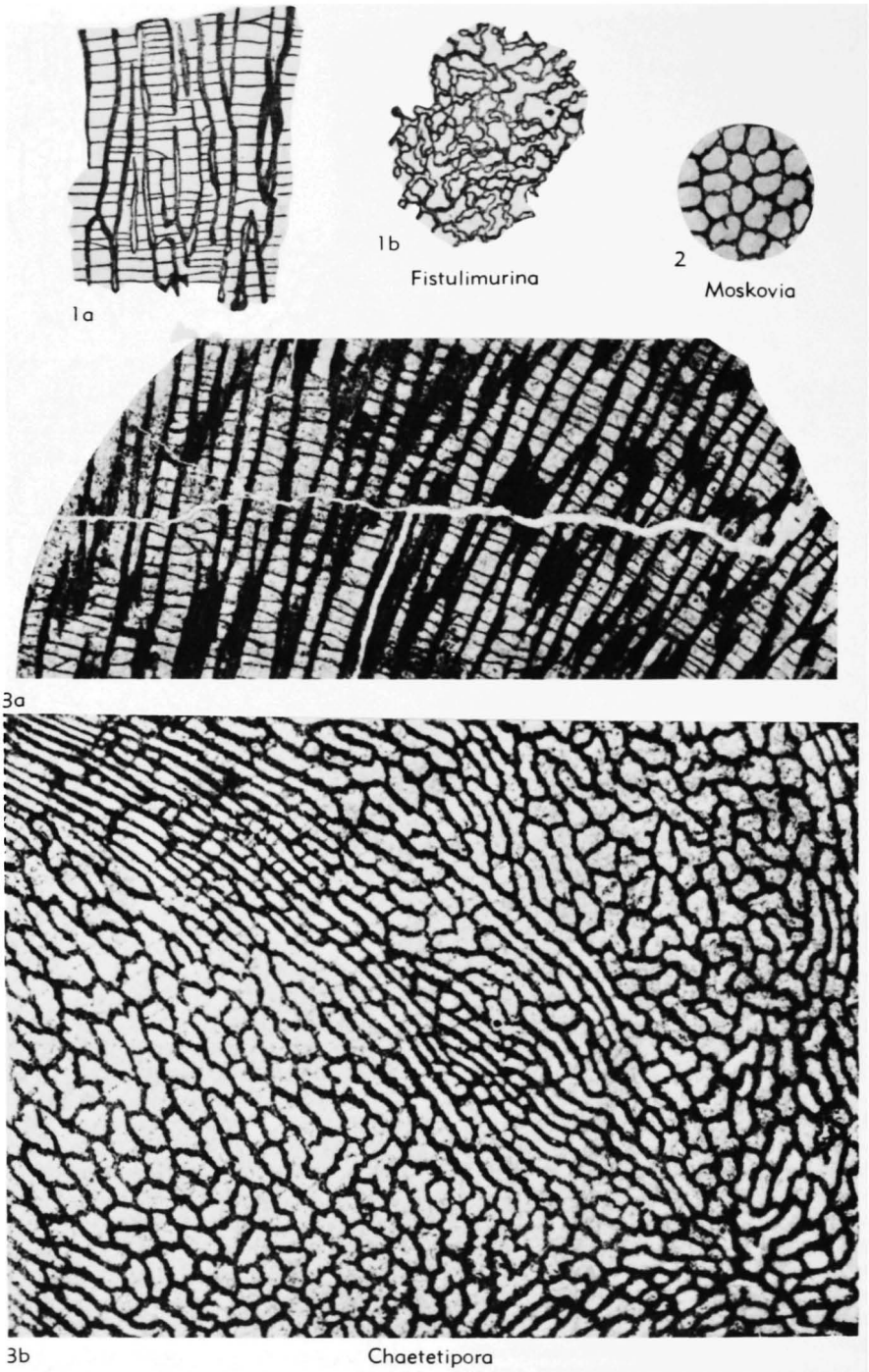


FIG. 333. Chaetetidae (p. *F513*).

Subfamily CHAETETIPORINAE Sokolov, 1955

[Chaetetiporinae SOKOLOV, 1955, p. 99]

Coralla cerioid or in part meandroid; in some common walls a weakly distinctive

median plane; wall trabeculae may fail to remain contiguous; increase bipartite, may be incomplete, whereby meandroid regions develop; tabulae thin; septa absent; mural pores absent. *?U.Ord.; M.Dev.; Carb.*

Chaetetipora Struve, 1898, p. 93 [**C. confluens*; SD Sokolov, 1950b, p. 62; †in ?uncatalogued old coll. of Struve in LGI, Leningrad *fide* Sokolov, 1950b, p. 62] [?=*Fistulimurina* Sokolov, 1947b, which see]. Differs from *Chaetetes* by the irregular curving meandroid cross section of the corallites; increase bipartite, for the most part incomplete; tabulae in meandroid corallites may be incomplete and pass into tabellae. *?U.Ord.*, N. Am.(Ellesmere I.-Alaska); *M.Dev.*, USSR(Urals-Vorkuta-C.Asia); *Carb.*, Eu.(G.Brit.-Ger.-Urals-Moscow Basin-Donbas)-Asia(C.Asia-Viet Nam-China).——Fig. 333,*3a,b*. *C. loxonema* Sokolov, holotype, L.Carb.(up. Visean), Ukrainian SSR, Voroshilovgrad distr., Velikotskoe; *a,b*, long., transv. secs., ×4 (Sokolov, 1950b).

Fistulimurina Sokolov, 1947b, p. 957 [**F. cavernosa*; OD; †?in coll. 7825, TsGM, Leningrad; lectotype by Sokolov, 1950b, p. 103] [?=*Chaetetipora* Struve, 1898, which see]. Corallum convex or encrusting, basal holotheca may be well developed; walls with distinct longitudinal swellings representing trabeculae that may become discrete, and are commonly with axial canal ?(=zone of recrystallization); mural suture may be present; pseudoseptal processes numerous; adaxial increase always incomplete, creating open meandrine chambers; tabulae horizontal or incomplete. [Insufficiently figured.] *L.Carb.(Visean)*, Eu.(Donbas-Moscow Basin).——Fig. 333,*1a,b*. **F. cavernosa*, R. Don, Kazanskaya; *a,b*, transv., long. secs., ×4 (Sokolov, 1947b).

Subfamily MOSKOVIINAE Sokolov, 1955

[Moskoviinae Sokolov, 1955, p. 100]

Coralla subcerioid, corallites cylindroprismatic, with narrow longitudinal spaces where contiguity is incomplete; increase axial bipartite, complete. *Carb.*

Moskovia Sokolov, 1950b, p. 83 [**M. distincta*; OD; †in coll. 7825, TsGM, Leningrad] [=*Moskovia* Sokolov, 1939, p. 410, *nom. nud.*, genus summarily described and figured but no species named]. Corallum spherical; corallites radially arranged, partly contiguous, with median suture line, partly free, leaving calices rounded-polygonal; interstitial longitudinal spaces; walls fully independent, conspicuous median suture line which commonly diverges at corners of corallites; increase axial bipartite, complete; tabular horizontal; septal spines and mural pores absent. [Confirmation that the "interstitial spaces" are not artifacts of diagenesis of the common wall is desirable.] *Carb.*, Eu.(Moscow Basin-Urals-Timan)-C.Asia.——Fig. 333,*2*. **M. distincta*, holotype, ?U.Carb., Moscow Basin, Voronezh distr., Ol'khovsk reg., Kostovo, transv. sec., ×4 (Sokolov, 1962c).

Family CRYPTOLICHENARIIDAE Sokolov, 1959

[Cryptolichenariidae Sokolov in Sokolov & Mironova, 1959, p. 1150]

Corallum cerioid and nodular or phaceloid with very closely spaced and very slender corallites without connecting tubuli; walls aporose; aseptate; increase axial bipartite, effected by conjunction of opposed axial edges of radial longitudinal laminae arising in symmetrical pairs; tabulae complete, commonly horizontal. *Ord.*

Cryptolichenaria Sokolov, 1955, p. 233 [**C. miranda*; OD; †92, coll. 599, VNIGRI, Leningrad]. Corallum cerioid, rather small, spreading or nodular; corallites slender, radially diverging, of irregularly polygonal or somewhat rounded section; walls fused, not of uniform thickness; increase bipartite, two opposed wall processes grow to join one another from either side of an angle of a corallite; septal spines and mural pores absent; tabulae thin, slightly sagging, numerous to absent [see Sokolov & Tesakov, 1963, p. 90]. *L.Ord.(up. Chunya)*, Asia(N. Sib. Platf.)-?N.Am.(Can.-Texas-Md.); *U.Ord.(Ashgill.)*, Eu.(Est.).——Fig. 334,*1a,b*. **C. miranda*, L.Ord.(up. Chunya), USSR, N.Sib.Platf., R. Moyero; *a,b*, transv., long. secs., ×8 (Sokolov & Tesakov, 1963).

Amsassia Sokolov & Mironova, 1959, p. 1151 [**A. radugini* Mironova in Sokolov & Mironova, 1959, p. 1152; OD; †511 A-2, coll. 902, SNIIGGIMS, Novosibirsk]. Corallum phaceloceroid, lumpy nodular or hemispherical, of medium size; corallites long, uniform, either completely adpressed and of polygonal transverse section, or more or less adjoining and of oval outline with triangular spaces between corallites; walls comparatively thin, quite independent, compact, homogeneous, without pores or connecting tubuli; septa absent; increase bipartite, by conjunction of axial ends of symmetrically arranged wall processes; commonly one of the processes is significantly longer than the other; tabulae horizontal, complete, for the most part rare. [Possibly tetradiinan]. *M.Ord.-U.Ord.*, Asia(Shoria Mts.-Salair-Altay Mts.-N.Kazakh.).——Fig. 334,*3a,b*. **A. radugini* Mironova, holotype, low. U.Ord.(Amsass Suite), W.Sib., Shoria Mts.; *a,b*, transv., long. secs., ×4 (Sokolov & Mironova, 1959).

Porkunites Klaamann, 1966, p. 22 [**Calophyllum amalloides* Dybowski, 1873c, p. 377; †Co1853, Dybowski Coll., EGM, Tallinn]. Corallum phaceloid, increase axial, bipartite, unequal; corallites

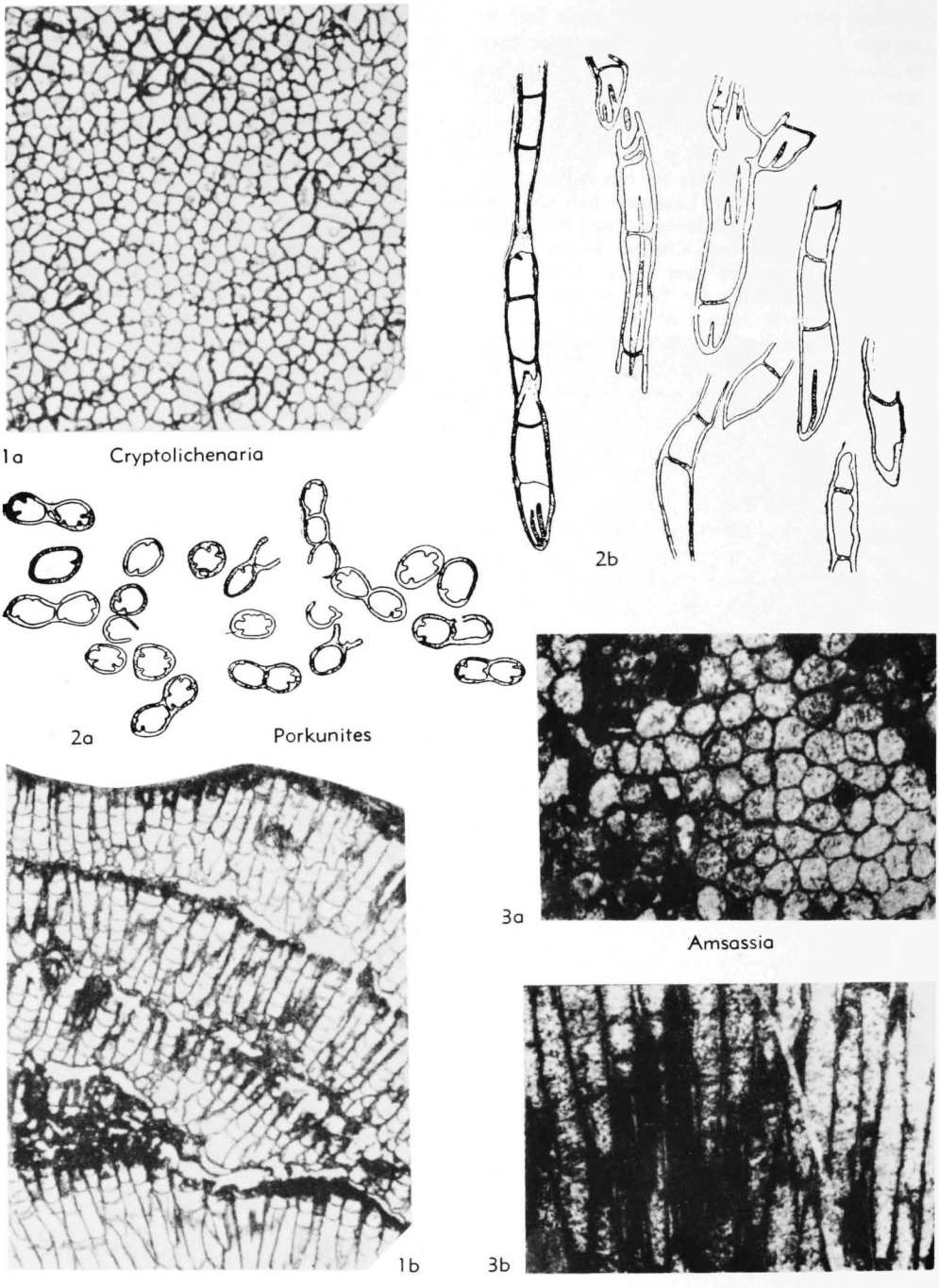


FIG. 334. Chaetetidae (p. *F*513-*F*515).

irregularly rounded or rounded-elliptical in cross section; commonly two corallites are laterally contiguous or three to five may be united in short ranks; walls thick, aporose, aseptate; tabulae horizontal, sparse. *U.Ord.(Ashgill.)*, Eu.(Est.).—— FIG. 334,*2a,b*. **P. amalloides* (DYBOWSKI), holo-

type, Porkuni, E.Est., Akhula (=Affel of Dybowski); *a,b,* transv., long. secs., ×5 (Klaamann, 1966).

?Family DESMIDOPORIDAE Preobrazhenskiy, 1968

[Desmidoporidae PREOBRAZHENSKIY, 1968, p. 90]

Corallum cerioid or in part meandroid, may be caespitose in places; corallites rounded-polygonal to meandering in cross section, may be grouped in concentric and radial arrangements in places within the corallum; walls trabecular and nodular or plane in cross section; mural pores present; septal spines absent; increase axial, bipartite by growth of one dividing wall or conjunction of two opposed laminae. *U.Ord.(Ashgill.); M.Sil.(Wenlock.); M.Dev.(Eifel.).*

Desmidopora NICHOLSON, 1886, p. 289 [**D. alveolaris*; M; syntypes, C10152, AU, Aberdeen, *fide* BENTON, 1979]. Corallum nodular to spreading; corallites slender; some are rounded-polygonal in transverse section, others in places lack one or more side walls so that they form meandroid series of two or more; walls may appear nodular in transverse section, no median suture line visible; walls with mural pores at angle between faces of corallites; septal elements absent; tabulae complete and horizontal where walls are complete, incomplete in the serially confluent corallites [see FRITZ, 1939, p. 512; TESAKOV, 1960, p. 48; PREOBRAZHENSKIY, 1968, p. 90]. *M.Sil.(Wenlock.),* Eu.(Eng.-Ukraine); *M.Dev.(Eifel.),* Asia(Tien Shan).——FIG. 335,*3a,b.* **D. alveolaris,* syntype, Eng., Dudley; *a,b,* long., transv. secs., ×4 (Hill, n; Univ. Aberdeen, coll. no. C10152b).

Nodulipora LINDSTRÖM, 1873a, p. 14 [**N. acuminata*; M; syntypes Cn699a, 700a, 1048, 21349, 21513-21515, 21547, RM, Stockholm]. Corallum not large, with tubular holdfasts and basal stolons; cerioid or in places meandroid; calical surface may show stellate channels like astrorhizae; corallites slender, walls moniliform in transverse section ?(composed of a single series of longitudinally discontinuous or continuous monacanthine trabeculae); mural pores midwall and at angles; septal spines absent; tabulae thin, horizontal or slightly convex, may be continuous through pores; increase axial, bipartite. *M.Sil.(Wenlock.),* Eu.(Gotl.).——FIG. 335,*2a-c.* **N. acuminata,* Gotl., Hall; *a,* side view, ×1; *b,* transv. sec., ×10; *c,* long. sec., ×4 (Lindström, 1896b).

Schizolites PREOBRAZHENSKIY, 1968, p. 90 [**S. floriformis*; OD; †1a,b,v, coll. 8427, TsGM, Leningrad]. Corallum hemispherical or caespitose, large; corallites cylindroprismatic, radiating from numerous centers of increase; walls thick, fused, not broken up into separate trabeculae, but perforated by large pores with or without a pore plate; tabulae horizontal, complete or in places incomplete; increase bipartite, complete. *U.Ord.(Ashgill.),* NE.USSR.——FIG. 335,*1a,b.* **S. floriformis,* holotype, Omulevsk Mts., Kolyma R. basin; *a,b,* long., transv. secs., ×4 (Preobrazhenskiy, 1968).

?Family TIVERINIDAE Hill, new family

[=Barrandeolitidae SOKOLOV, 1965, p. 7, *nom. nud.,* based on genus only summarily diagnosed]

Corallum partly fasciculate and partly cerioid (in part alveolitoid) or cerioid and in part alveolitoid; corallites very slender, rounded, alveolitoid or polygonal in transverse section; walls thin, microtexture lamellate; mural pores absent; increase axial and bipartite, by symmetrically growing septal ridges of alveolitoid type; lateral or peripheral increase may also occur. *M.Sil.-L.Dev. (Tiverian).*

Tiverina SOKOLOV & TESAKOV, 1968, p. 203 [**T. vermiculata*; OD; †1, coll. 483, IGG, Novosibirsk]. Corallum fasciculate, phaceloceroid or cerioid; corallites very slender, round, alveolitoid or polygonal in transverse section; walls thin, microtexture lamellate; mural pores absent; tabulae complete, horizontal or oblique; increase axial and bipartite, by symmetrically growing septal ridges of alveolitoid type, or lateral or peripheral. *L.Dev. (Tiverian),* Eu. (Podolia)-Asia (Taymyr).——FIG. 336,*2a,b.* **T. vermiculata,* holotype, Chortkov horizon in Ivane Beds, Podolia; *a,b,* long., transv. secs., ×5 (Sokolov & Tesakov, 1968).

"**Barrandeolites** SOKOLOV & PRANTL in SOKOLOV, 1965, p. 7 fn., *nom. nud.*"; genus summarily diagnosed, "massive alveolitoid corallum, formed of somewhat compressed thin corallites lacking pores," type species not described or figured [**Chaetetes? bowerbanki* MILNE-EDWARDS & HAIME AUCTT., from Kopanina beds of Czechoslovakia, *non* MILNE-EDWARDS & HAIME from Dudley, England; OD, see SOKOLOV & TESAKOV, 1968, p. 203; †no types designated or described or illustrated]. Diagnostic features of genus incorporated in SOKOLOV and TESAKOV's comparison with *Tiverina* SOKOLOV & TESAKOV, 1968, p. 202; it differs from *Tiverina* in having constantly cerioid, never cerioid-fasciculate growth form and more distinctly axial bipartite increase of alveolitoid type. The name awaits validation. *M.Sil.-U.Sil.(Ludlov.),* Eu. (Czech.-Podolia-Eng.)-?Australia (Queensl.).——FIG. 336,*1. "Chaetetes?" bowerbanki* MILNE-EDWARDS & HAIME, M.Sil.(Wenlock.), Dudley, Eng.; sec., ×4 (Hill, n; UQF35303).

?Family LAMOTTIIDAE Sokolov, 1950

[Lamottiidae SOKOLOV, 1950a, p. 164]

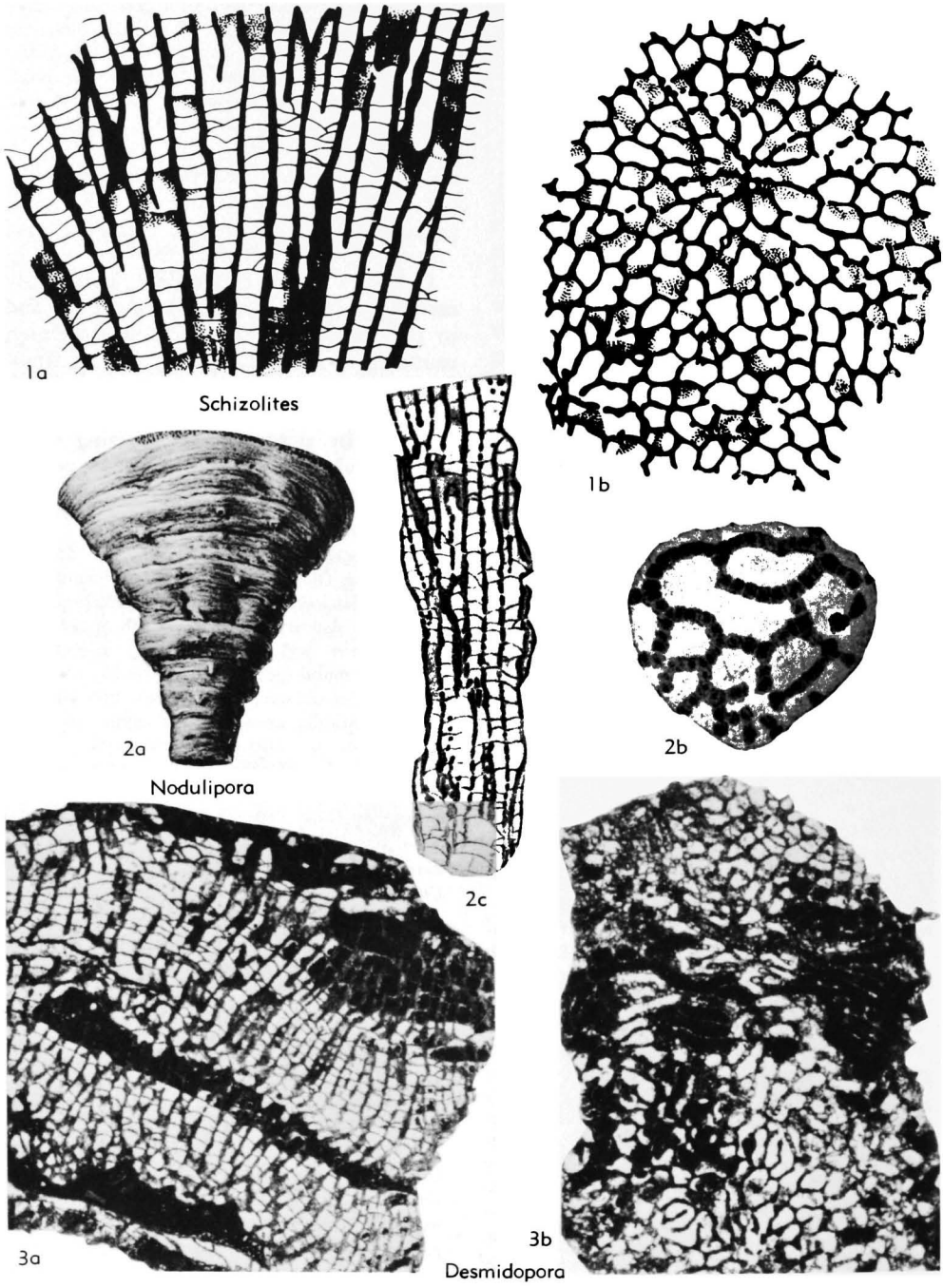


FIG. 335. Desmidoporidae (p. F515).

Corallum cerioid, large; corallites slender; walls thin, in some conditions of diagenesis traversed by radial longitudinal planes of clarity; aporose and aseptate; tabulae distant, slightly sagging; increase ?lateral. *M.Ord. (top of low. Chazy.).*

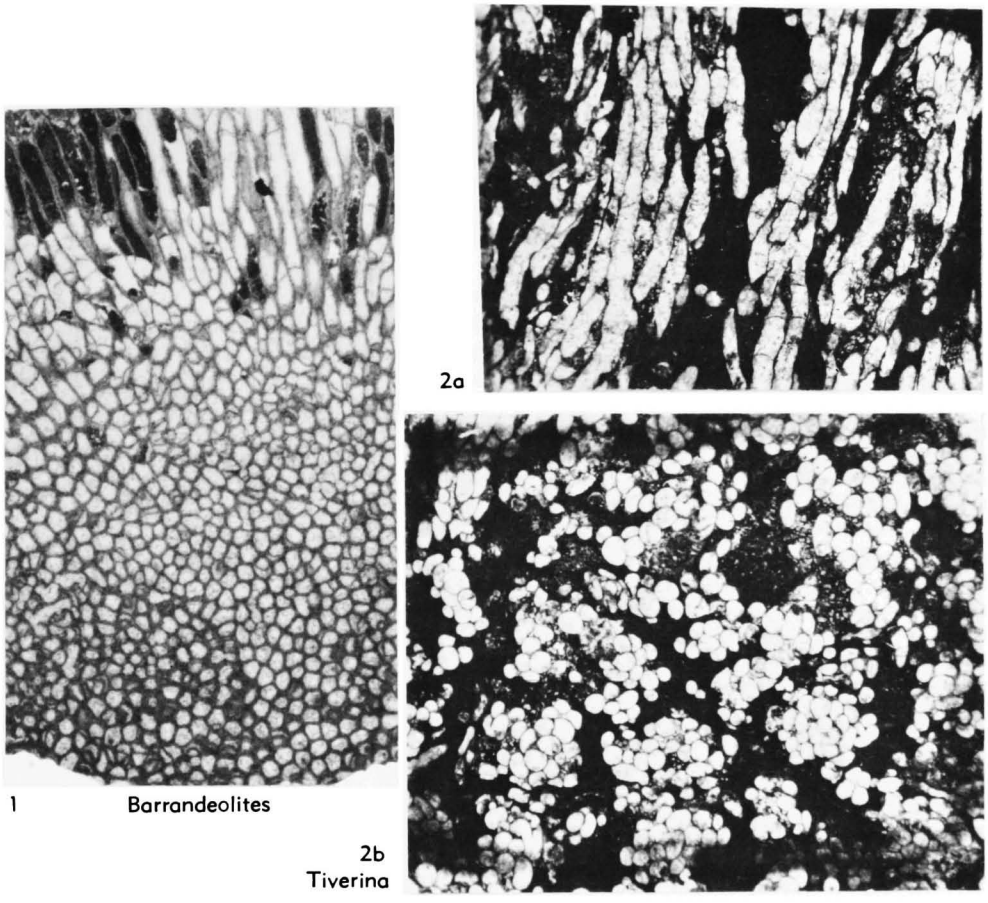


FIG. 336. Tiverinidae (p. *F*515).

Lamottia RAYMOND, 1924, p. 76 [**L. heroensis*; OD; † not traced in MCZ, Cambridge]. Corallum cerioid, corallites slender, prismatic; walls thin, in some conditions of diagenesis traversed by radial longitudinal light planes, but aporose; aseptate; tabulae distant, slightly sagging; increase ?lateral ?(by confluence of supposed mural processes) [see FLOWER, 1961, p. 39, fn.; OKULITCH, 1936a, p. 63]. *M.Ord.(low.Chazy.)*, N.Am.(Vt.-N.Y.).—— FIG. 337,*1a,b*. **L. heroensis*, topotype, top of low. Chazy., Day Point Ls., Vt., 2 mil. SW. of South Hero; *a,b*, transv., long. secs., ×4 (Hill, n; USNM no. 91002).

?Family LICHENARIIDAE Okulitch, 1936

[*nom. correct*. SOKOLOV, 1950a, p. 175, *pro* Lichenaridae OKULITCH, 1936a, p. 67] [=Lichenariida SOKOLOV, 1950a, *nom. correct*. BONDARENKO, 1958, p. 218, *pro* Lichenariacea SOKOLOV, 1950a, p. 175, order]

Small cerioid; corallites slender, walls imperforate (*fide* original description, but DUNCAN in FLOWER, 1961, p. 39, footnote, states mural pores near edges of walls in the types); aseptate; tabulae sparse, horizontal and complete; offsets interstitial or arising along periphery from underside of corallites (*fide* original description). *M. Ord.*

[The name genus of this family is also the name genus of an order; but in view of uncertainty as to presence or absence of pores and of the nature of the increase, whether bipartite as in Chaetetina or lateral or calicular and peripheral as in Favositicae, the ordinal name is not used in this *Treatise*.]

Lichenaria WINCHELL & SCHUCHERT, 1895, p. 83 [**L. typa*; OD; † type material 42947, 42949, USNM, Washington]. Corallum small, hemispherical, cerioid, attached; in some, fasciculate in places; with slender prismatic corallites having

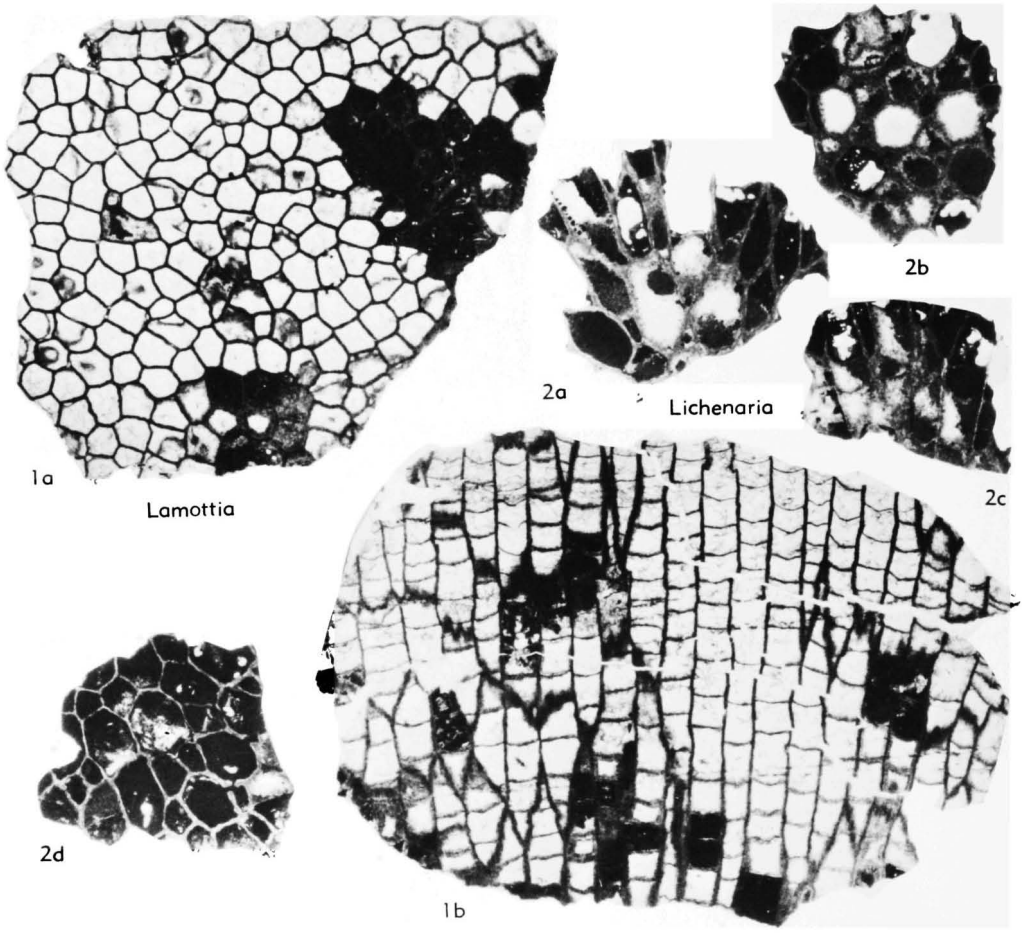


FIG. 337. Lamottiidae (1); Lichenariidae (2) (p. *F*517-*F*518).

thin, radially tufted walls (mural pores at angles, *fide* DUNCAN in FLOWER, 1961, p. 39, footnote); tabulae sparse, horizontal and complete; aseptate; offsets arise either interstitially or along periphery from underneath the parent corallite. *M.Ord. (Blackriver.)*, USA(Minn.).——FIG. 337,*2a-d*. **L. typa*, syntypes, Decorah F.; *a,c*, oblique secs.; *b,d*, transv. secs. showing mural pores, ×4 (Hill, n; USNM no. 42949). [Research on type material and topotypes required; the "cotypes" figured herein are probably *Paleofavosites* TWENHOFEL, 1914, p. 24.]

POST-PALEOZOIC CHAETETIDA

There are in the Jurassic and Cretaceous, and sparsely in the Triassic and Eocene, fossils which appear in hand specimens to be referable to either Chaetetida, Stromatoporida, or the red algal Solenoporaceae. They are very finely basaltiform and commonly have latilaminar growth. HUDSON (1960, bibliography, p. 198) defined a great many genera referable to the Stromatoporida (including the Sphaeractinoidea) and showed that vertical, continuous or discontinuous pillars with clinogonal or orthogonal fibers were characteristic of them, the pillars being connected by vertical screens continuous or discontinuous vertically, and commonly with short segments of these screens developed on the same level throughout the skeleton; thin tabular structures also connected the pillars and screens. PETERHANS (1929a, p. 11) had earlier identified a number of genera and species which were reasonably referable to the red algal Solenoporaceae, and his work has been accepted with some reservations by JOHNSON (1964). These are characterized by thin, commonly

crenulate walls that are discontinuous in horizontal zones, and which have thin tabulalike structures commonly aligned in neighboring "tubuli." FISCHER (1970) has recently reviewed the post-Paleozoic "Chaetetidae," with helpful descriptions of type specimens of type species. CUIF *et al.* (1973) considered that astrorhizae of three kinds occurred in a few different species of Mesozoic Chaetetida.

In my opinion, the following genera may be reasonably referred to the Chaetetida, some doubtfully, as indicated. Because of their age, the post-Paleozoic forms are not included in the stratigraphic distribution chart for the Tabulata.

Family CHAETETIDAE Milne-Edwards & Haime, 1850

[For synonymy and diagnosis of family, see page F507]

Atrochaetetes CUIF & FISCHER, 1974, p. 7 [**A. tamnifer*; OD; †in MN, Paris]. Walls moderately thick, aporose; horizontal skeletal elements developed as thick rings of sclerenchyme whose fibers indicate centripetal and distal growth; septal spines not observed; increase commonly peripheral, exceptionally adaxial and bipartite. *Trias.(Carn.)*, Asia Minor.

Bauneia PETERHANS, 1927, p. 389 [**Monotrypa multitabulata* DENINGER, 1906, p. 63; M; †in DENINGER Coll., Univ. Freiburg, Ger.; up.Jur. (Tithon.), Sardinia; =*Chaetetes capri 1* DE ANGELIS D'OSSAT, 1905, p. 12, *fide* FISCHER, 1970, p. 176, † Royal geological museums (Rome or Naples), Portland.(Tithon.), Capri, Italy] [?=*Pseudomonotrypa* RESHETKIN, 1926, p. 58, for two or more species from the Crimean Jurassic; see YAVORSKIY, 1947, p. 22. FISCHER (1970, p. 174) stated that no type species has been chosen. I have been able to consult neither RESHETKIN's nor YAVORSKIY's work.]. Corallum large, with indistinct growth latilaminae; corallites very slender; walls thick, giving rounded internal section; walls without discontinuities or pores, microstructure fibrous, pinnate in longitudinal section; tabulae scarce, subhorizontal, not on same level in neighboring corallites; increase dominantly intermural, at angles of corallites; rarely with axial increase bipartite. *Jur.(Oxford.-Portland.)*, Eu. (Italy).

?Blastochaetetes DIETRICH, 1919, p. 211 [**Chaetetes capilliformis* MICHELIN of DIETRICH; orig. usage? DIETRICH based his genus on specimens from the Oxfordian of Chatel-Censoir, Yonne, France, that he referred to MICHELIN's species; DIETRICH's types have been interpreted by FISCHER (1970) as a new species of *Bauneia*, and if DIETRICH's description of his specimens may be taken as his designation of them as types, then *Blastochaetetes* would become a senior synonym of *Bauneia* PETERHANS, 1927. However, FISCHER recognized *Chaetetes capilliformis* MICHELIN, 1844, p. 112 (†in MICHELIN Coll., MN, Paris, Oxford., Saint-Mihiel, Meuse, France) as type specimen. MICHELIN's specimen, judging from FISCHER's figures of it, may well be stromatoporoid, though no undoubted astrorhizal tubuli are seen; there seem to be vertical pillars of clinogonal fibers, connected by curtains as in stromatoporoids. CUIF *et al.* (1973) referred to *Blastochaetetes* a species to which they ascribed astrorhizae. However, I have not studied the material myself, and I append a translation of FISCHER's diagnosis]. Chaetetidae showing discontinuities in the walls, of which the zones of growth are more or less clear and of which the tubes, which may communicate with one another, multiply indifferently by fissiparous division and by intraparietal gemmation (transl. from French). *Trias.(Carn.)*, Asia Minor; *Jur.(Bathon.)-U.Cret.*, Eu.(France-Italy).

Pseudoseptifer FISCHER, 1970, p. 170, as subgenus of *Chaetetes* [**Chaetetes beneckei* HAUG, 1883, p. 174; OD; † thin sections in HAUG Coll., Museum, Strasbourg; up.Lias., environs of Roverè di Velo, prov. Verona, Italy; see PETERHANS, 1929d, p. 119]. Corallum large, with indistinct growth latilaminae; corallites very slender, internal section polygonal to rounded; walls without discontinuities or pores; microstructure fibrous, pinnate in longitudinal section; tabulae numerous, distally convex, not on same level in neighboring corallites; increase dominantly axial, one to five incipient dividing walls projecting simultaneously into lumen, rarely intermural. *Jur.(up.Lias.-Portland.)*, Eu.(Italy-Aus.-Yugo.).

Family ACANTHOCHAETETIDAE Fischer, 1970

[Acanthochaetetidae FISCHER, 1970, p. 199]

Massive coralla with slender corallites with thick, lamellate walls; septal spinules holacanthine; tabulae complete or incomplete, may be thickened in continuity with sclerenchyme of walls; increase axial, bipartite, subequal; intermural increase rare. *U.Jur.-U.Cret.; Eoc.*

Acanthochaetetes FISCHER, 1970, p. 199 [**A. seunesi*; OD; †in MUNIER-CHALMAS Coll., MN, Paris] [=*Acantochaetetes* IVANOVSKIY, 1973b, p. 267, *nom. null.*]. Corallum of slender prismatic thick-walled corallites, the thickening rounding the inner angles of the prism; walls show growth lamellae disposed as in clinogonally fibrous walls, but show no trace of fibers; holacanthine spinules pass through the lamellae and project into the lumen in close but somewhat irregular longitudinal rows; midwall discontinuities ?absent, tabulae

complete, horizontal or concave, some thickened by lamellae in continuity with those of walls; increase by subequal bipartite division by radial longitudinal plates, also, less commonly, intermural. Astrorhizalike convergencies of corallites may also occur. [See also FISCHER & LAFUSTE, 1973, p. 320; CUIF *et al.*, 1973, p. 2475.] *U.Jur.(Oxford.)-U.Cret.(Cenoman.)*, Eu.(France-Italy).

Diplochaetetes WEISSERMEL, 1913, p. 84 [**D. longitubus*; M; † not traced, Eoc., Bogenfels, SW. Afr.]. Corallum large, corallites commonly radially disposed, with internal section polygonal to rounded; walls continuous, of ?growth lamellae parallel to elongation of corallite; tabulae distally concave, may be grouped and complete or incomplete; increase axial, bipartite, one or two dividing laminae occurring simultaneously; wall structure insufficiently known [see FISCHER, 1970, p. 205]. *Eoc.*, SW.Afr.

Septochaetetes RIOS & ALMELA, 1944, p. 24 [**Chaetetes (S.) eocenus*; OD; † Inst. geol. min., Madrid]. Corallum of slender corallites, radially disposed, with internal section polygonal to oval; walls of almost constant thickness, without pores or discontinuities; one to six septal spines (or rudimentary dividing laminae) in any one section; tabulae variable; increase axial, bipartite, and also intermural. [Insufficiently known; see FISCHER, 1970, p. 204.] *Eoc.(?mid.Lutet.)*, Eu.(Spain).

GENERA HERE REJECTED FROM CHAETETIDA

In my opinion the following genera with names suggesting relationship to *Chaetetes* are better referred to the red algal Solenoporaceae because of their fine-textured walls that are commonly crenulate and may have alternating horizontal bands of discontinuity and continuity throughout the skeleton: *Parachaetetes* DENINGER, 1906, p. 65; *Pseudochaetetes* HAUG, 1883, p. 175; and *Ptychochaetetes* KOECHLIN, 1947, p. 4. Three genera founded by SCHNORF-STEINER, 1963, mainly on the microstructure of the walls as apparent in thin sections, were translated as subgenera of the genus *Ptychochaetetes* KOECHLIN, 1947, by FISCHER (1970, p. 192), who thought the present appearance of the microstructure of the walls to be original, but in my view it is a result of the action of diagenesis on solenoporacean walls. These are: *Axiparietes* SCHNORF-STEINER, 1963, p. 1125; *Granatiparietes* SCHNORF-STEINER, 1963, p. 1127; and *Varioparietes* SCHNORF-STEINER, 1963, p. 1119. SCHNORF-STEINER founded the family Varioparietidae SCHNORF-STEINER (1963, p. 1118) for these three genera and *Ptychochaetetes* KOECHLIN, 1947. HARTMAN and GOREAU (1970, p. 228) drew attention to the similarity between surface features and thin sections of these forms with the coralline sponges *Ceratoporella* and *Merlia*, and suggested the possibility that the Varioparietidae and the Paleozoic *Pachytheca* SCHLÜTER, 1885b, may be sponges.

Order TETRADIIDA Okulitch, 1936

[*nom. correct.* SOKOLOV, 1962c, p. 252, *pro* Tetradina OKULITCH, 1936b, p. 378, order] [=Tetradiacea SOKOLOV, 1950a, p. 174, order]

Corallum compound, corallites very slender, typically quadrate in section; increase axial and quadripartite, four radial longitudinal laminae extend from the walls to meet at axis, whereby four offsets are produced which may or may not separate; walls aseptate, aporose; tabulae complete, horizontal, sparse. *M.Ord.-U.Ord.*

Family TETRADIIDAE Nicholson, 1879

[Tetradiidae NICHOLSON, 1879, p. 23] [=Tetradidae OKULITCH, 1935, p. 49]

Corallum cerioid, tollinoid or phaceloid; holothecate; cerioid coralla may be large and subspherical (or hemispherical and spreading) or may be ramose with calices opening on all surfaces of branches or ramose with calices opening only at distal ends of sticklike branches; corallites quadrate in section, increase axial, quadripartite and complete or incomplete; walls aseptate and aporose; tabulae complete, sparse, horizontal. *M.Ord.-U.Ord.*

Tetradium DANA, 1846b, p. 701, *non Tetradium* SCHMIDT, 1874, which SCHMIDT suggested may be an Ordovician conulariid [**T. fibratum* SAFFORD, 1856, p. 237; SD SAFFORD, 1856, p. 237, who first referred species to the genus; † not traced] [=*Prismostylus* OKULITCH, 1935, p. 62 (type, *Chaetetes columnaris* HALL, 1847, p. 68, OD; † 643/1, AMNH, New York; low.Trenton Ls., Sugar R., Lewis Co., N.Y.); *Prismatostylus* LANG, SMITH, & THOMAS, 1940, p. 105, *nom. van.*; *Tetradites* SOKOLOV, 1950a, p. 174, *nom. nud.*] [see SOKOLOV, 1955, p. 246; WEYER, 1967a, p. 924]. Corallum cerioid and subspherical, spreading or ramose; calices may open distally or on all surfaces of branches; prismatic, four-sided slender corallites completely fused one to another; increase axial, four radial longitudinal plates grow

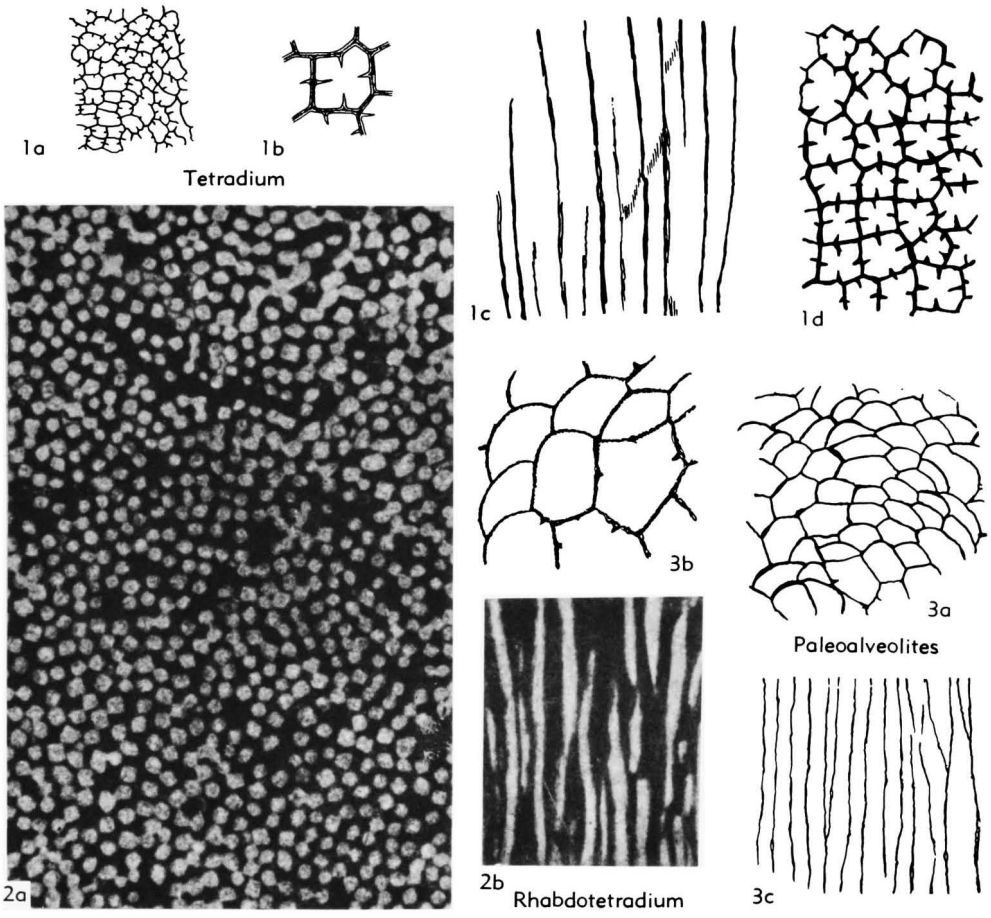


FIG. 338. Tetradiidae (1, 2); Paleoalveolitidae (3) (p. *F520-F523*).

to the axis from opposite faces; short processes for a subsequent division may appear before completion of the earlier division. Pores and septal spines absent; tabulae complete, sparse, horizontal. *M. Ord.-U.Ord.*, cosmop.——FIG. 338,*1a-d*. **T. fibratum* SAFFORD, U.Ord., N.Am., Tenn.; *a,b,d*, transv. secs., ×2.0, ×6.0, ×4.0, *c*, long. sec., ×4.0 (Bassler, 1932).

The genera *Paratetradium, Rhabdotetradium,* and *Phytopsis* have been considered to be synonyms of *Tetradium,* from which they differ only in growth form (WEBBY & SEMENIUK, 1971, p. 250); but paleoecological investigations (that could well support this view) have yet to be undertaken.

Paratetradium SOKOLOV, 1955, p. 249 [**Tetradium halysitoides* RAYMOND, 1913, p. 49; OD; † 7839, Natl. Type Coll., GSC, Ottawa]. Corallum tollinoid, with corallites arranged in chains or irregular networks consisting of two or three or more rows of corallites separated by empty spaces; calices confined to distal ends of rows; corallite walls relatively thin; increase by division, four (or uncommonly two) radial longitudinal plates growing from the wall to join at the axis; no mural pores or septal spines; tabulae rare, thin, horizontal. *M.Ord.-U.Ord.*, Asia(Sib.Platf.)-N.Am.(Ont.-Que.-Tenn.-Ind.-Ky.-Pa.); *M.Ord.*, Australia(New S. Wales); *U.Ord.*, Eu.(Urals).——FIG. 339,*2a,b*. **P. halysitoides* (RAYMOND), M.Ord.(low.Lowville), Can., Carden, Ont.; *a,b*, ext. views, ×2.1, ×1.1 (Raymond, 1913).

Phytopsis HALL, 1847, p. 38 [**P. cellulosum*; SD SOKOLOV, 1955, p. 520; †339, NYSM, Albany]. Corallum composed of small number of corallites compactly accreted by their walls and growing as long cluster encased in holotheca forking at intervals; walls thick; increase axial quadripartite, offsets do not separate; secondary radial longitudinal

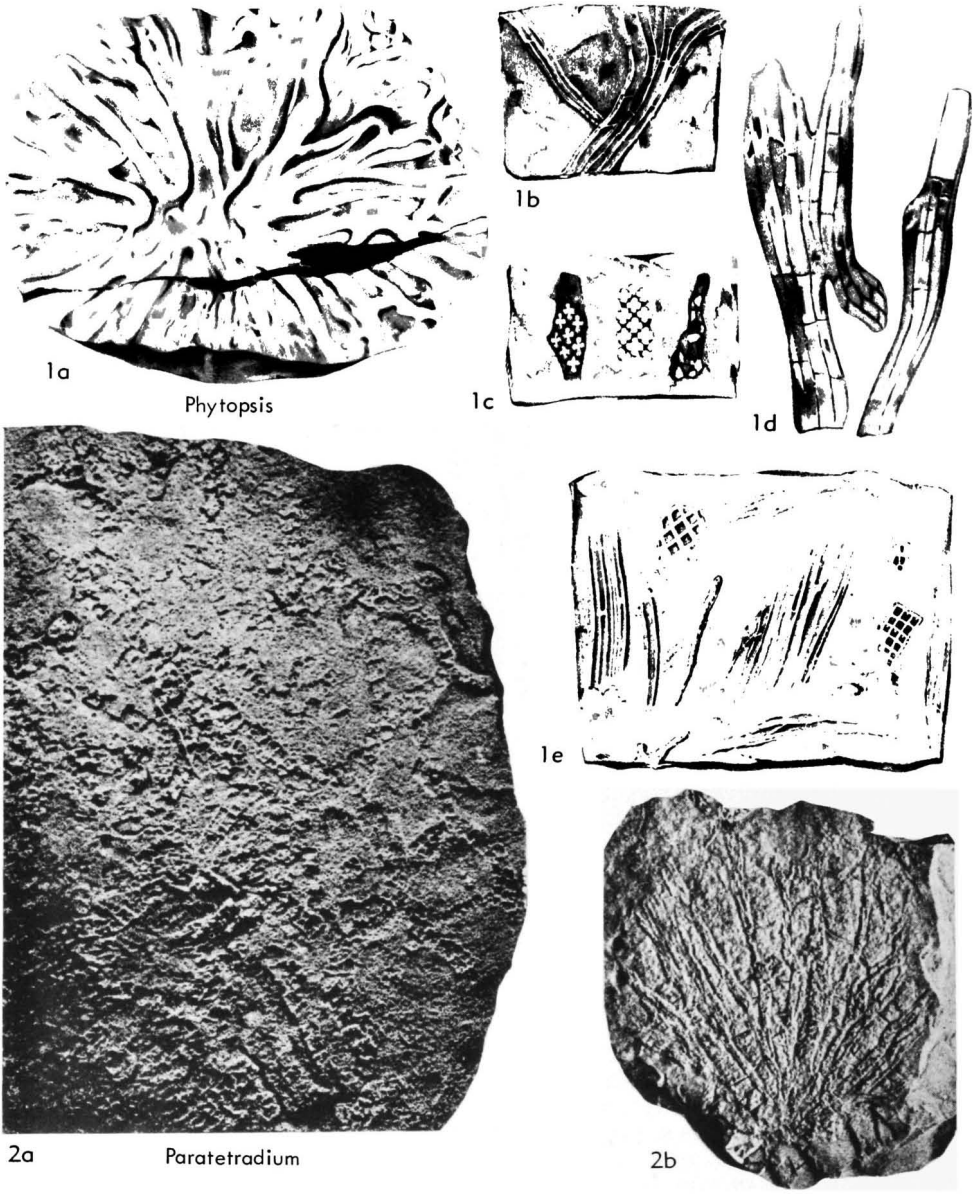


FIG. 339. Tetradiidae (p. *F521-F522*).

plates may be present; tabulae sparse, horizontal [see also WALKER, 1972b, p. 2509]. *M.Ord.* (base)-*U.Ord.*, N.Am.(N.Y.-Okla.); *M.Ord.*, Australia(New S.Wales)-Asia(E.Sib.).——FIG. 339, *1a-e*. **P. cellulosum*, M.Ord., N.Y.; *a-e*, ext. view and natural secs., ×? (Hall, 1847).

Rhabdotetradium SOKOLOV, 1955, p. 247 [**R. nobile*; OD; †91, coll. 599, VNIGRI, Leningrad]. Corallum phaceloid, corallites long and meandering, prismatic, rounded-prismatic, or rarely cylindrical; increase quadripartite, four longitudinal radial plates grow to join at axis and the four corallites thus formed then quickly diverge from one another; rarely bipartite; secondary radial plates seldom seen; walls thin; tabulae rare to absent. *M.Ord.*, N.Am.(Md.-Tenn.-Ky.-Okla.-Va.)-Australia(New S.Wales-Tasm.); *U.Ord.*, N.Am. (Greenl.-Alaska)-Eu. (Est.)-Asia (Sib. Platf.-Taymyr-NE.USSR).——FIG. 338,*2a,b*. **R. nobile*, holotype, U.Ord.(Dolbor.), USSR, W.Sib.Platf.,

basin of R. Stony Tunguska; *a,b,* transv., long. secs., ×4.0 (Sokolov, 1955).

Family PALEOALVEOLITIDAE Okulitch, 1935

[Paleoalveolitidae Okulitch, 1935, p. 64]

Corallum with fingerlike outgrowths; corallites with quadripartite axial increase, in axial parts of branches corallites polygonal rather than quadrangular in section; in peripheral parts corallites open obliquely to surface and are alveolitoid in section; walls thin, aporose and aseptate; tabulae thin, complete. *M.Ord.*

Paleoalveolites Okulitch, 1935, p. 64 [**Tetradium carterense* Bassler, 1932, p. 196; OD; †108,886 (not found), syntypes 78737, USNM, Washington] [=*Kentlandia* Shrock in Shrock & Raasch, 1937, p. 537 (type, *K. imbricata,* OD; †501, Geol. Museum, Univ. Wisconsin; M.Ord., Lowville Ls., Kentland, Ind.]. Corallum with digitate outgrowths; corallites in narrow axial parts of branches polygonal more commonly than quadrangular in section, in peripheral parts alveolitoid; walls thin, with median dense plane; aseptate and aporose; tabulae flat. *M.Ord.(?Lowville),* N.Am. (Tenn.-Ind.).——Fig. 338,*3a-c.* **P. carterensis* (Bassler), Bolanian, low. Carter's Ls., Tenn.; *a,b,* transv. secs., ×3.7, ×7.4; *c,* long. sec., ×3.7 (Bassler, 1950).

Order SARCINULIDA Sokolov, 1950

[*nom. transl. et correct.* Sokolov, 1962c, p. 240, *pro* Sarcinulina Sokolov, 1950a, p. 169, suborder; Sarcinulacea Sokolov, 1955, p. 208, order] [=Lioporina Sokolov, 1950a, p. 172, suborder]

Cerioid, cerioid and ramose, phacelocerioid, tollinoid or astreoid coralla with slender corallites; tabularia communicating by more or less rounded interseptal spaces or by connecting canals or channels on coenenchymal platforms; septa short, stout basally, equal or in some alternate in size, each a radial longitudinal palisade of subhorizontal to steeply inclined conjunct or discrete monacanths; tabulae horizontal, (or, in *Uralopora,* infundibuliform). *?L.Ord.; M.Ord.-Dev.*

Family BILLINGSARIIDAE Okulitch, 1936

[*nom. correct.* Sokolov, 1950a, p. 164, *pro* Billingsaridae Okulitch, 1936a, p. 60]

Corallum cerioid or partly astreoid; corallites slender; septa short, stout, in some alternating in size, each a series of near-vertical large monacanths; communication between neighboring tabularia rare to absent; tabulae horizontal; axial trabeculae may occur, forming discontinuous axial structure. *M.Ord.; ?U.Ord.-L.Sil.*

Subfamily BILLINGSARIINAE Okulitch, 1936

[*nom. transl.* Hill, 1955, p. 246, *ex* Billingsaridae Okulitch, 1936a, p. 60]

Billingsariids with discontinuous monacanthate axial structure. *M.Ord.-low. U. Ord.*

Billingsaria Okulitch, 1936a, p. 60 [**Columnaria parva* Billings, 1859a, p. 428; OD; syntype, 1003, Natl. Type Coll., GSC, Ottawa]. Corallum cerioid ?(or astreoid), hemispherical or encrusting; corallites with commonly 16 short septa, in some alternating in size; septal trabeculae coarse, dilated wedgewise to form thick wall; vertical trabeculae may develop at axes of corallites; mural pores absent; common tissue between tabularia absent or stout vertical trabeculae only; tabulae complete, horizontal, but may be drawn upward at axial trabeculae. *M.Ord.,* N.Am.(Que.-N.Y.-Tenn.)-Asia (Sib. Platf.-Altay)-Australia (Tasm.-New S. Wales)-Eu.(Ayrshire,U.K.), *low.U.Ord.,* Asia(Altay).——Fig. 340,*1a,b.* **B. parva* (Billings), M. Ord.(Chazy.), N.Y., Valcour. I.; *a,b,* long., transv. secs., ×4.8, ×6.7 (Okulitch, 1936a).

Subfamily FOERSTEPHYLLINAE Hill, new subfamily

Corallum cerioid; median suture plane commonly distinct; septa very short, subequal, wedge-shaped in transverse section, each consisting of a single series of upwardly inclined conjunct or discrete ?monacanths; wall pores if present very sparse, simple, very small rounded spaces between neighboring septa; tabulae thin, horizontal. *M.Ord.(Chazy.); ?U.Ord.-L.Sil.*

Foerstephyllum Bassler, 1941, p. 1961 [**Columnaria? halli* Nicholson, 1879, p. 200; OD; syntypes, named holotype by Jull, 1976a, p. 381, thin sections 6690, 6690a, Natl. Type Coll., GSC, Ottawa; ?=*Tubipora striatula* Rafinesque, 1817, p. 359, M.Ord., Glen Falls, Hudson R., N.Y., †not traced, see Wells, 1958, p. 242] [*?=Qianbeilites* Ge & Yü, 1974, which see]. Corallum cerioid; increase lateral; common walls with dense median plane; septal insertion random; septa short, obtuse, subequal longitudinal ridges with spinose axial edges, ?(each a single series of contiguous subhorizontal trabeculae); mural pores ?absent or very sparse; tabulae horizontal, complete [see Jull, 1976a, p. 384]. *M.Ord.(Chazy.-Trenton.); ?U.Ord.(Richmond.),* N.Am.(N.Y.-Ont.-Ky.); *low.*

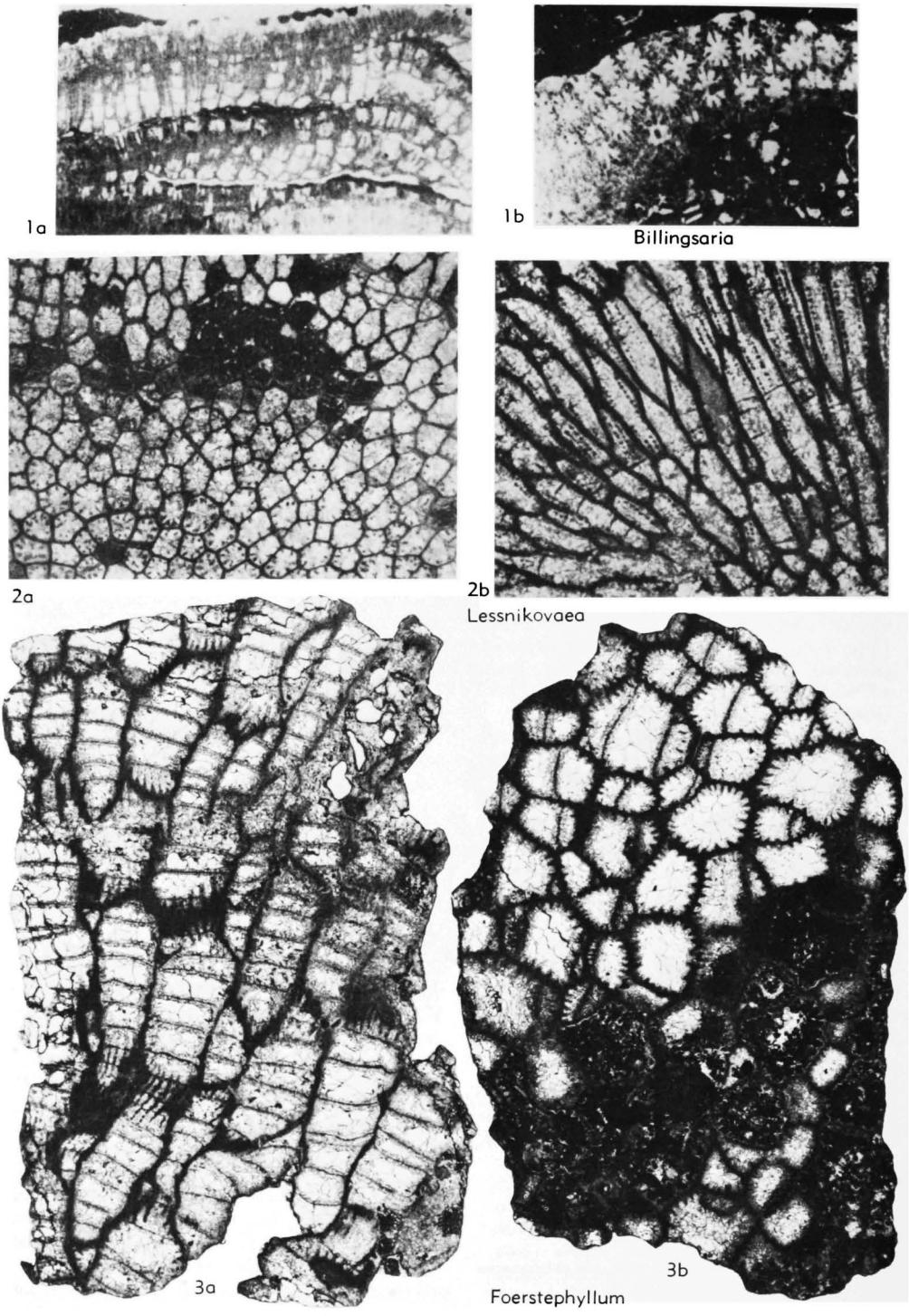


FIG. 340. Billingsariidae (p. *F523-F525*).

U.Ord., Asia(Altay).——Fig. 340,*3a,b*. **F. halli* (Nicholson), "holotype," M.Ord.(Trenton.), Can., Petersborough, Ont.; *a,b*, transv., long. secs., ×3.0 (Hill, n; photographs courtesy D. J. McLaren and A. Pedder; no. 6690, 6690a, GSC, Ottawa).

Lessnikovaea Sokolov, 1951a, p. 69 [**L. spinosa*; OD; † 45, coll. 230, VNIGRI, Leningrad] [=*Lessnikovaea* Sokolov, 1950a, p. 175, *nom. nud.*, no diagnosis, no species]. Corallum cerioid, hemispherical; corallites polygonal, with dense median plane in common wall; mural pores absent; commonly eight longitudinal rows of elongate septal spines with blunt ends; tabulae horizontal, sparse; increase intermural. *Up.M.Ord.*, Eu.(N. Urals).——Fig. 340,*2a,b*. **L. spinosa*, holotype, M.Ord. or base of up.M.Ord., N.Urals, Kozhva reg., R. Kos-yu; *a,b*, transv., long. secs., ×4.0 (Sokolov, 1951a).

Qianbeilites Ge & Yü, 1974, p. 169 [**Q. multitabulatus*; OD; †22114-5, IGP, Nanking] [?=*Foerstephyllum* Bassler, 1941, which see]. Cerioid; corallites large; wall moderately thick; septal spines short, equal, subhorizontal, in numerous longitudinal rows; [no mural pores mentioned in description]; tabulae horizontal, complete, numerous and close. *L.Sil.*, Asia(Kweichow).——Fig. 341,*1a,b*. **Q. multitabulatus*, holotype, Shiqian; *a,b*, transv., long. secs., ×2.6 (Ge & Yü, 1974).

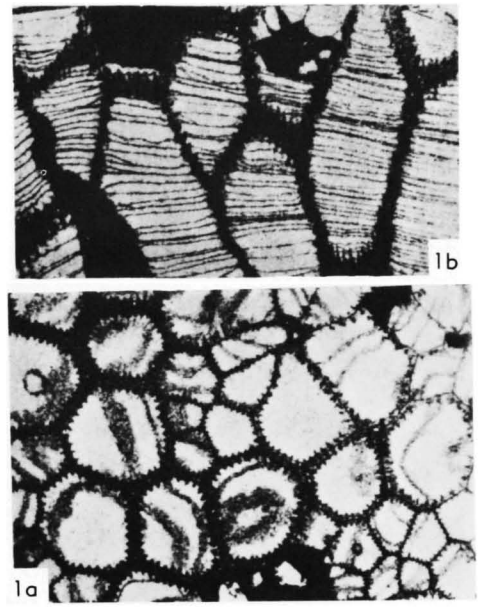


Fig. 341. Billingsariidae (p. *F*525).

Family SYRINGOPHYLLIDAE Roemer, 1883

[*nom. correct.* Koken, 1896, p. 313, *pro* Syringophylliden Roemer, 1883, p. 527] [=Sarcinulidae Sokolov, 1950a, p. 170; Columnoporidae Lecompte, 1952, p. 517; Coxiidae Preobrazhenskiy, 1974a, p. 46]

Cerioid, phaceloceroid or tollinoid; tabularia communicating by more or less rounded interseptal spaces or by connecting canals or channels, or coenenchymal platforms; septa short, stout basally, each a palisade of subhorizontal to steeply inclined conjunct or discrete monacanths; tabulae horizontal except in *Uralopora*. *?L.Ord.; M.Ord.-L.Sil.*

Subfamily LYOPORINAE Kiaer, 1930

[*nom. transl.* Hill, herein, *ex* Lyoporidae Kiaer, 1930, p. 53; Lioporidae Sokolov, 1950a, p. 173, *nom. van.*; Lioporinae Sokolov, 1955, p. 242, *nom. van.*] [=Vacuoporidae Preobrazhenskiy, 1965, p. 23; ?Eofletcheriinae Sokolov, 1955, p. 242]

Corallum cerioid, phaceloceroid or tollinoid; midwall suture commonly distinct; septa short, thick, contiguous laterally by their bases or throughout to form a peripheral stereozone; each septum a single series of contiguous ?monacanths, more or less steeply inclined upward and inward; wall pores simple, rounded spaces between neighboring septa, arranged in imperfect horizontal rows, somewhat sporadically; tabulae complete, horizontal. *?L.Ord.; M.Ord.-L.Sil.*

Lyopora Nicholson & Etheridge, 1878, p. 25 [**Palaeopora? favosa* McCoy, 1850, p. 285; M; syntypes A5526, 5527, SM, Cambridge] [=*Liopora* Lang, Smith, & Thomas, 1940, p. 77, *nom. van., non* Girty, 1915, a polyzoan]. Massive coralla with prismatic corallites each with a single peripheral ring of about 20 longitudinal rows of slightly inclined thick trabeculae, those of neighboring corallites alternating or opposed; the thick common walls so formed may be pierced in horizontal zones by a row of irregularly rounded pores each caused by a local thinning of two neighboring trabeculae; tabulae distant, slightly sagging [see Hill, 1953, p. 158; Preobrazhenskiy & Klaamann, 1975, p. 133]. *M.Ord.*, Eu.(Scot.-Nor.-Est.)-Asia (Sib. Platf.)-Australia (Tasm.)-N. Am. (Ont.-N.Y.); *U.Ord.(Ashgill.)*, Asia(Kazakh.-?Shoria Mts.)-N.Am.(?Manit.).——Fig. 342,*1a,b*. **L. favosa* (McCoy), M.Ord., Craighead Ls., Scot., Girvan, Ayrshire; *a,b*, long., transv. secs., ×4 (Hill, n; UQF27459).

Baikitolites Sokolov, 1955, p. 242 [**B. alveolitoides*; OD; † 82 (*fide* Jell, written commun.), coll. 599, VNIGRI, Leningrad]. Corallum cerioid, digitate, groups of amalgamated corallites sheathed in holotheca being separated from neighboring groups by longitudinal lacunae; increase intermural

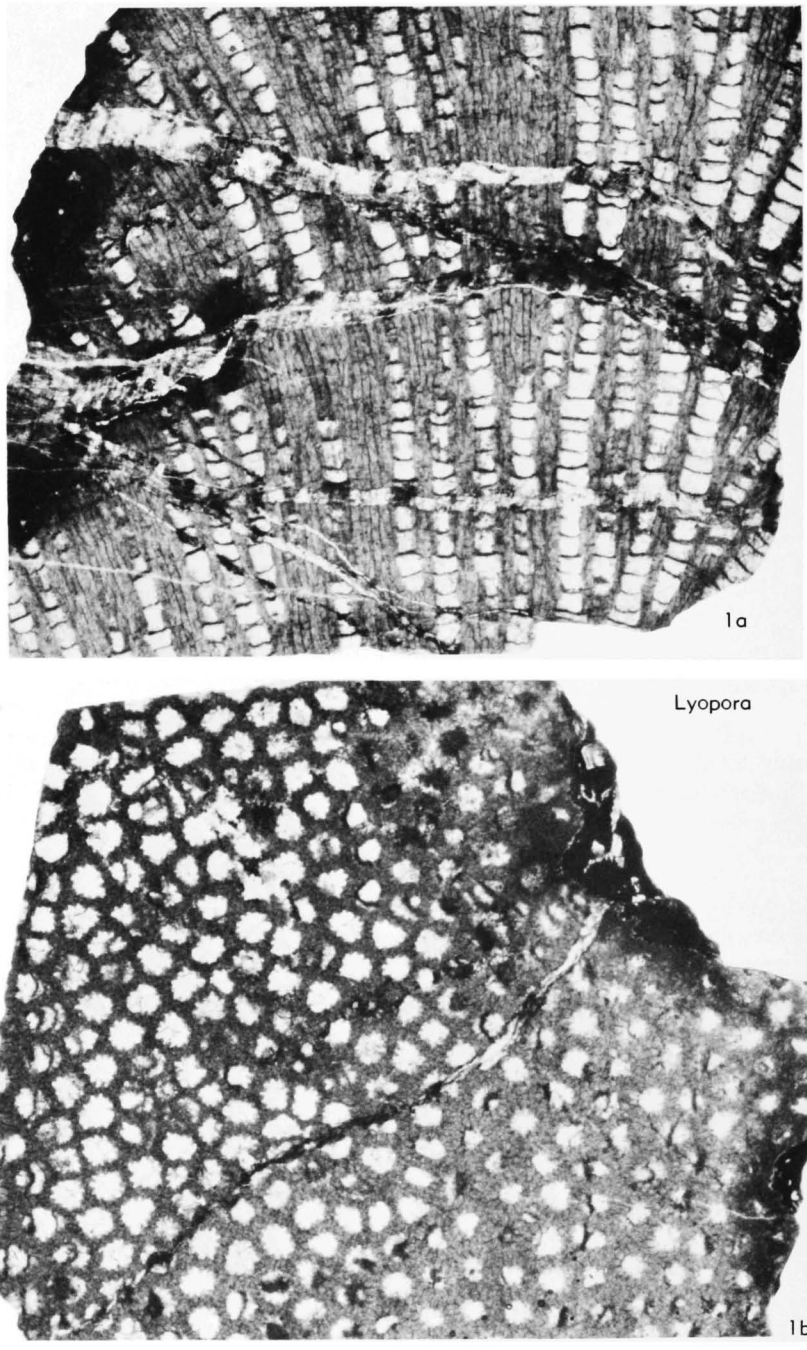


FIG. 342. Syringophyllidae (p. *F525*).

by lateral outgrowth; corallites semicircular or alveolitoid in transverse section; common walls with distinct median plane and of contiguous longitudinal rows of short subhorizontal contiguous trabeculae; mural pores ?absent; tabulae thin, horizontal. *U.Ord.(Dolbor.)*, Asia(Sib.Platf.-Altay).

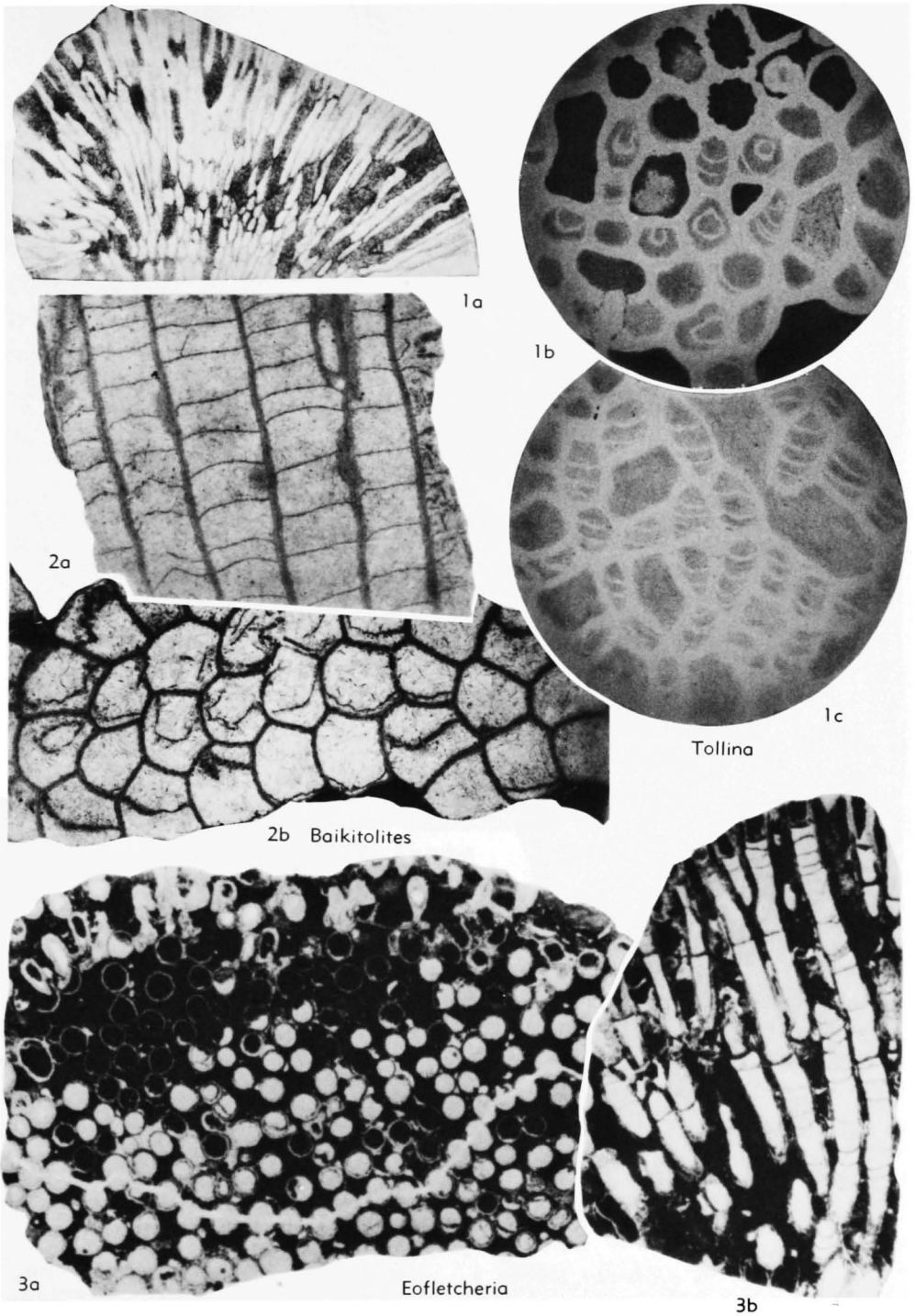


FIG. 343. Syringophyllidae (p. *F*525-*F*530).

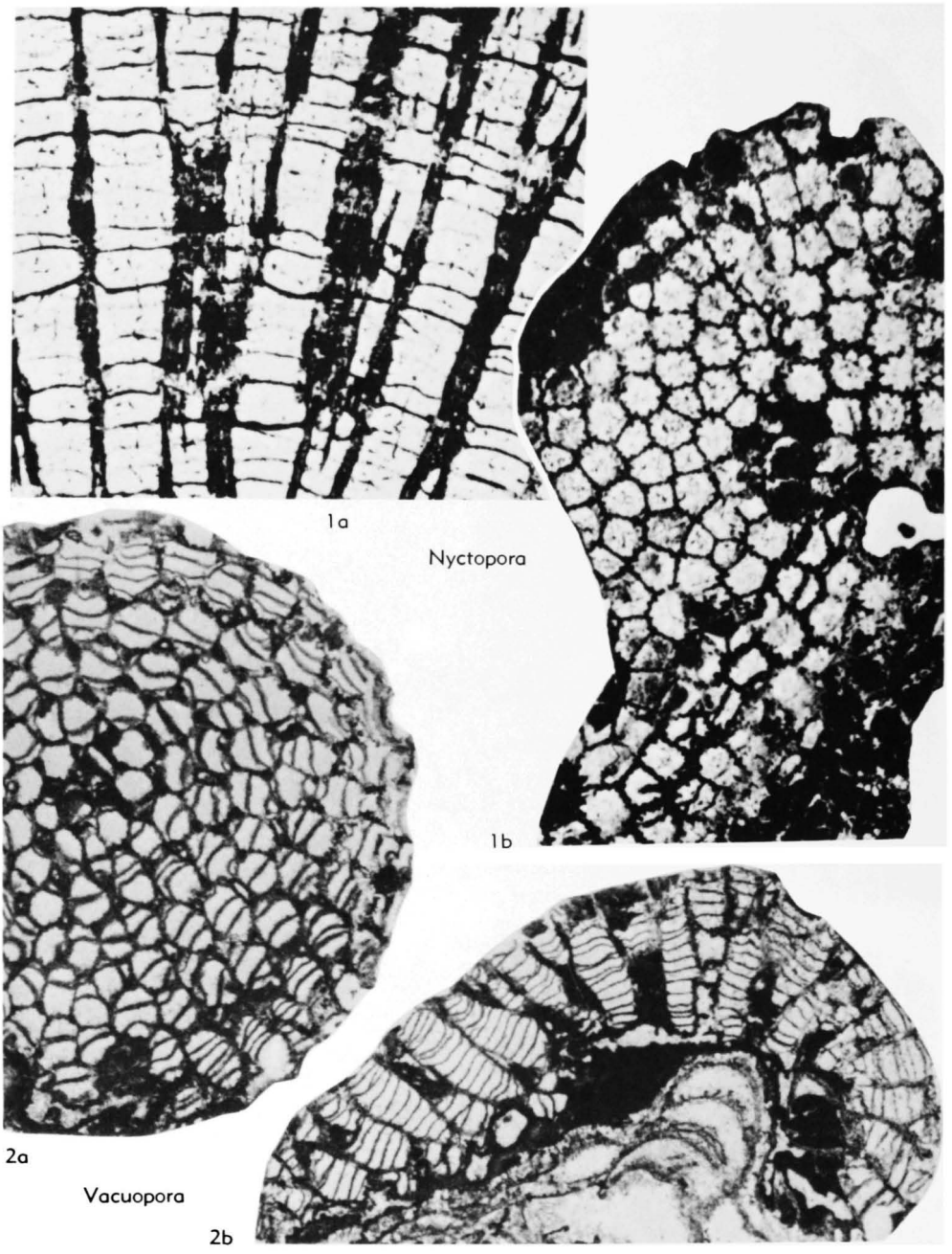


FIG. 344. Syringophyllidae (p. *F529*, *F531*).

——FIG. 343,*2a,b*. **B. alveolitoides,* holotype, R. Chunya, basin of R. Stony Tunguska; *a,b,* long., transv. secs., ×4 (Sokolov, 1955).

?**Eofletcheria** BASSLER, 1950, p. 266 [**Columnaria incerta* BILLINGS, 1859a, p. 428; OD; †1014c, Natl. Type Coll., GSC, Ottawa; lectotype by SINCLAIR, 1961, p. 14]. Corallum phaceloid, increase lateral; corallites cylindrical, slender; no known connecting processes; walls moderately thick; septa not observed in syntypes; tabulae with upturned

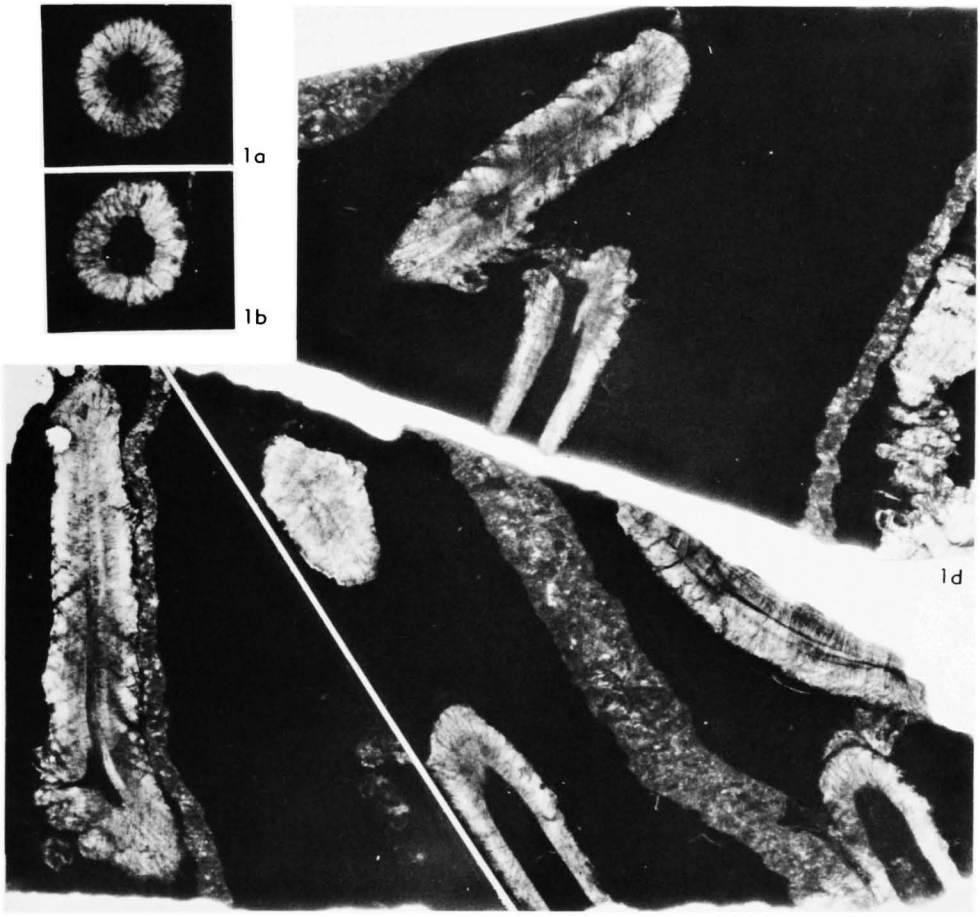


FIG. 345. Syringophyllidae (p. *F*530).

edges and commonly complete, horizontal or gently sagging, rarely slightly domed. *?L.Ord.,* N.Am. (Nev.-Utah); *M.Ord.,* N.Am.(Que.-E.USA)-Eu. (Nor.-Est.); *low.U.Ord.,* Eu.(Urals)-Asia(Altay-Shoria Mts.).——FIG. 343,*3a,b.* **E. incerta* (BILLINGS), syntype, Chazy., Que., Mingan Ls.; *a,b,* transv., long. secs., ×3 (Sinclair, 1961). [The genus is tentatively included in the Lyoporinae because, although the syntypes are described as too recrystallized to show original microstructure, the Eurasian species placed in it have radially fibrous walls with small septal trabeculae, the inner ends of which may project as spines into the lumen. It might, also reasonably, be classified in the Auloporida.]

Nyctopora NICHOLSON, 1879, p. 182 [**N. billingsii*; M; † thin sections 6689, Natl. Type Coll., GSC, Ottawa; lectotype by JULL, 1976b, p. 459, *fide* BENTON, 1979]. Corallum cerioid or ?astreoid, corallites small, with peripheral or intermural increase; common wall between corallites commonly zigzag in transverse section, each projection a very short septum; number of septa variable up to nine alternating somewhat irregularly with still shorter septa; each septum a single longitudinal series of conjunct trabeculae steeply inclined distally and adaxially; as many as three septal trabeculae occur in the thickness of the common wall between the angles of two neighboring corallites; very small mural pores, oval or round spaces, occur sporadically between neighboring trabeculae in horizontal rows; tabulae complete, horizontal or slightly arched or saucered [HILL, 1961, p. 6; see also JULL, 1976b, p. 459]. *M.Ord.(Chazy.-Trenton.),* N. Am. (Ont.)-Eu. (Baltic)-Australia (New S.Wales)-*U.Ord.,* Asia(Altay-Kazakh.-Shoria Mts.-Sib. Platf.-NE. USSR)-N. Am. (Ariz.)-Eu. (Nor.).——FIG. 344,*1a,b.* **N. billingsii,* holotype, Trenton., Ont., Peterborough; *a,* long. sec., ×11.5; *b,* transv. sec., ×4.0 (Hill, 1961).

FIG. 346. Syringophyllidae (p. F530).

Reuschia KIAER, 1930, p. 27, p. 54 [**R. aperta*; SD HILL, 1953, p. 158; †32434, PM, Oslo]. Corallum fasciculate, walls of neighboring corallites transversely wrinkled at regions of juxtaposition; increase lateral; corallites diverging, slender, cylindrical, each with wide stereozone formed of thick, contiguous septa that seldom show free spines adaxially; tabulae sparse to absent [see KLAAMANN, 1966, p. 76]. *U.Ord.(Harjuian)*, Eu.(Nor.-Swed.); *U.Ord.(Richmond.)*, N.Am.(Ariz.)-Asia (Altay-Tadzhik.-?Kazakh.); *L.Sil.(low.Llandov.)*, Eu.(Baltic).——FIG. 345,*1a-d*. **R. aperta*, lectotype, U.Ord.(Vikenes), Nor., Stord; *a,b*, transv., *c,d*, long., tang. secs., ×4 (Hill, 1953).

Septentrionites PREOBRAZHENSKIY, 1965, p. 27 [**S. stellaris*; OD; † 2, coll. 8426, TsGM, Leningrad]. Corallum small, like *Vacuopora* but in addition to narrow longitudinal lacunae at junctions of three or more corallites, smaller lacunae may occur between contiguous side walls, and larger halysitoid lacunae are left between tollinoid chains of corallites. *U.Ord.*, Asia(NE.USSR).——FIG. 346,*1a-d*. **S. stellaris*, base of Iryudi suite, NE.USSR, basin of R. Yasachna, R. Kolyma; *a*, ext. view, ×1; *b,c*, holotype, long., transv. secs., ×6; *d*, oblique sec., ×4 (Preobrazhenskiy, 1965).

?Tollina SOKOLOV, 1949, p. 94 [**Halysites keyserlingi* VON TOLL, 1889, p. 49; M; †not traced; holotype of type species not subsequently described or figured, see PREOBRAZHENSKIY, 1965, p. 25]. Corallum cateniform, corallites thick-walled, subquadrate in transverse section with lumina of oval outline and forming simple or multiple ranks enclosing irregular longitudinal lacunae; lyoporid septal structure present in some species; tabulae thin, complete, horizontal, no microcorallites. *U. Ord.*, Asia(NE. USSR-Taymyr-Sib. Platf.)-?N. Am. (Alaska).——FIG. 343,*1a-c*. **T. keyserlingi* (VON TOLL), syntype, Arctic NE. USSR, Kotelny I.; *a*, long. sec., ×1; *b,c*, transv. secs., ×4 (von Toll, 1889).

Trabeculites FLOWER, 1961, p. 61 [**T. keithae*; OD; † 674, NMBM, Socorro] [?=*Transitolites* BONDARENKO & MINZHIN, 1977, which see]. Corallum cerioid, corallites large; common wall of each corallite a palisade of commonly contiguous longitudinal and clinogonally fibrous monacanthine trabeculae that may be separated by thinner segments of wall with fibers perpendicular to median plane; mural pores not observed; tabulae thin, with edges commonly upturned slightly. *U.Ord.*, N.Am. (Texas-Akpatok I.).——FIG. 347,*1a,b*. **T. keithae*, holotype, Montoya Gr. (Second Value F.), Texas, El Paso; *a,b*, long., transv. secs., ×8.8 (Flower, 1961).

Transitolites BONDARENKO & MINZHIN, 1977, p. 27 [**T. hongorensis*; OD; †13, coll. 3634, PIN, Moscow; Central Mongolia, Bayan Khongor distr.] [?=*Trabeculites* FLOWER, 1961, which see]. Corallite walls of one or, occasionally, two series of

longitudinal contiguous trabeculae, from which septal spines may project adaxially; mural pores not observed; tabulae complete, widely separated, flat, slightly concave or convex. *U.Ord.(low. Ashgill.),* Asia(Mongolia).

Vacuopora Sokolov & Tesakov, 1963, p. 83 [**Hexismia prisca* Sokolov, 1955, p. 456; OD; †107, coll. 559, VNIGRI, Leningrad]. Corallum phacelocerioid, corallites prismatic, mostly six-sided, not rarely somewhat rounded, amalgamating so that narrow lacunae are enclosed at junctions of three or more corallites, lacunae being triangular, rounded or irregular in transverse section; wall trabeculate; septal elements and tabulae nyctoporoid [see Preobrazhenskiy, 1965, p. 25]. *U. Ord.(Dolbor.),* Asia(Kazakh.-Sib.Platf.-Sayan-Altay-Shoria Mts.-NE.USSR; *L.Sil.("Raikülla Stage"),* Eu.(Est.).——Fig. 344,*2a,b.* **V. prisca* (Sokolov), holotype, U.Ord.(Dolbor stage), R. Chunya, basin of R. Stony Tunguska; *a,b,* transv., long. secs., ×4 (Sokolov & Tesakov, 1963).

Subfamily CALAPOECIINAE Radugin, 1938

[*nom. transl.* Hill, 1951, p. 10, *ex* Calapoeciidae Radugin, 1938, p. 84] [=Columnoporidae Lecompte, 1952, p. 517; Coxiidae Preobrazhenskiy, 1974a, p. 46]

Corallum plocoid (astreoid to aphroid); tabularia rounded in transverse section; common walls do not show median suture and ordinarily are formed by contiguity of the 20 to 24 equal short septa of neighboring corallites; each septum a longitudinal row of horizontal septal trabeculae; between the septa occur regular horizontal and longitudinal rows of large pores which pierce the common wall; tabulae numerous, mostly complete and saucered; in aphroid coralla, outward extensions of septa and tabulae enclose elongate, boxlike spaces in superposed horizontal rows. *M.Ord.-U.Ord.*

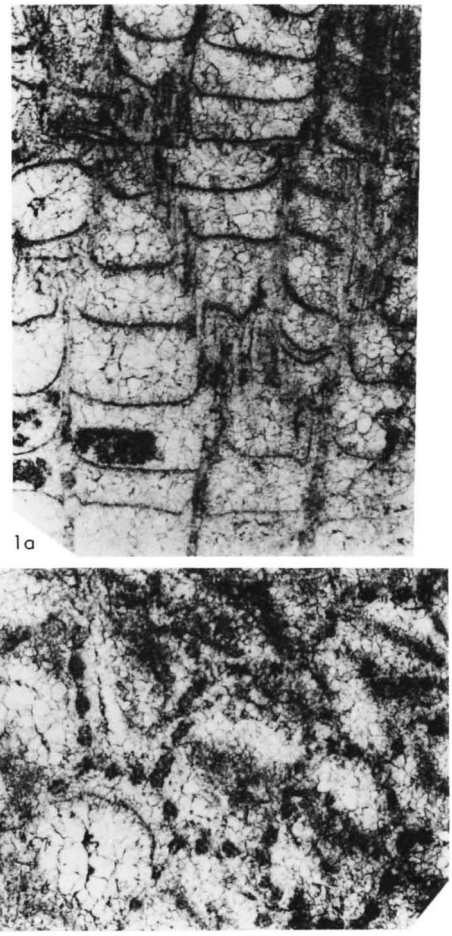


Fig. 347. Syringophyllidae (p. *F*530).

Calapoecia Billings, 1865, p. 425 [**C. anticostiensis*; SD Lindström, 1883b, p. 7; †2267a-d, Natl. Type Coll., GSC, Ottawa] [=*Calapoenia,* in F. E. Schulze *et al.,* 1926-(?)1929, *Nomenclator animalium generum et subgenerum* (Berlin, 5 v.), p. 489, *nom. null.; Columnopora* Nicholson, 1874a, p. 253 (type, *C. cribriformis,* M; †UC216, FM, Chicago, lectotype by Foerste, 1916, p. 293-295; Cincinnati Gr. near Cincinnati, Ohio; Jull, 1976b, p. 463 invalidly named as lectotype 8361, AU, Aberdeen, from Richmondian of R. Credit, Ont., see Benton, 1979); *Houghtonia* Rominger, 1876, p. 18 (type, *H. huronica,* SD Bassler, 1915, p. 154; 2 syntypes probably in UMMP, Ann Arbor, *a,* figured, Hudson R. Gr., Drummond's I., Mich., *b,* up. Cincinnati Gr., Madison, Ind.); *Haughtonia* Sokolov, 1955, p. 516, *nom. null.; Coxia* Preobrazhenskiy in Rozman *et al.,* 1970, p. 226, *nom. nud.; Coxia* Preobrazhenskiy, 1974a, p. 46 (type, *Calapoecia canadensis* Billings, 1865, p. 426, OD; †neotype, 1136b, Natl. Type Coll., GSC, Ottawa, by Cox, 1936, p. 7; M.Ord., Leray-Rockland beds, Paquette Rapids, Ottawa R.), see Cox, 1936, p. 1, and Flower, 1961, p. 66]. Corallum coenenchymate, walls of corallites trabeculate and greatly thickened with pores in regular, intersecting horizontal and vertical rows; septa commonly 20 and each commonly a longitudinal row of adaxially discrete spines; coenenchyme may be thin to absent in places and corallites polygonal, or may be wide, with rims of tabularia raised above surface of corallum and septa may be extended into it; tabulae complete or with peripheral tabellae, and horizontal or saucered [see Preobrazhenskiy & Klaamann, 1975, p. 131; Jull, 1976b, p. 461]. *M.Ord.,* N. Am.(Ont.-Que.)-Australia(Tasm.); *U.Ord.,* N.Am. (N. Mex.-Texas-Colo.-Wyo.-B.C.-Greenl.-Akpatok

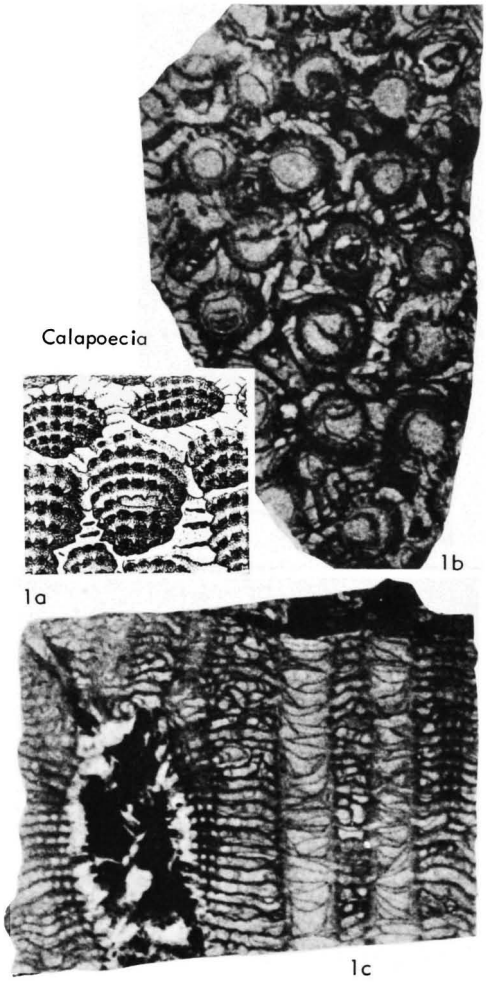


FIG. 348. Syringophyllidae (p. *F*531-*F*532).

I.-Alaska-Manit.-Que.-Ont.-Mich.-Ohio)-Eu. (Nor.-Swed.-Est.-Urals)-Asia (Sib. Platf.-Altay-NE. USSR)-Australia(New S.Wales).——FIG. 348,*1a*. *C. canadensis* BILLINGS, M.Ord. or U.Ord., Can., Manitoulin I., L. Huron, Ont.; part of weathered specimen, ext. view, enl. (Cox, 1936).——FIG. 348,*1b,c*. **C. anticostiensis*, holotype, U.Ord., Ellis Bay F., Can., W. shore Gamache Bay, Anticosti I., Que.; *b,c*, transv., long. secs., ×2 (Cox, 1936).

Columnoporella SOKOLOV & TESAKOV, 1963, p. 75 [**C. compacta*; OD; †41, coll. 260, IGG, Novosibirsk]. Corallum cerioid, hemispherical, in late stages phaceloid in part; corallites large, polygonal, subpolygonal or rounded in transverse section; wall may appear lamellate with included short septal trabeculae, in places fused at their bases; median suture between contiguous corallites distinct; mural pores sparse, passing in phaceloid parts of corallum into connecting tubular processes; tabulae irregularly sagging, may be horizontal and incomplete; septal ridges commonly spinose, may be absent. *U.Ord.(Burskian)*, Asia(Sib.Platf.).——FIG. 349, *1a,b*. **C. compacta*, holotype, R. Chunya, Sib. Platf.; *a,b*, transv., long. secs., ×4 (Sokolov & Tesakov, 1963).

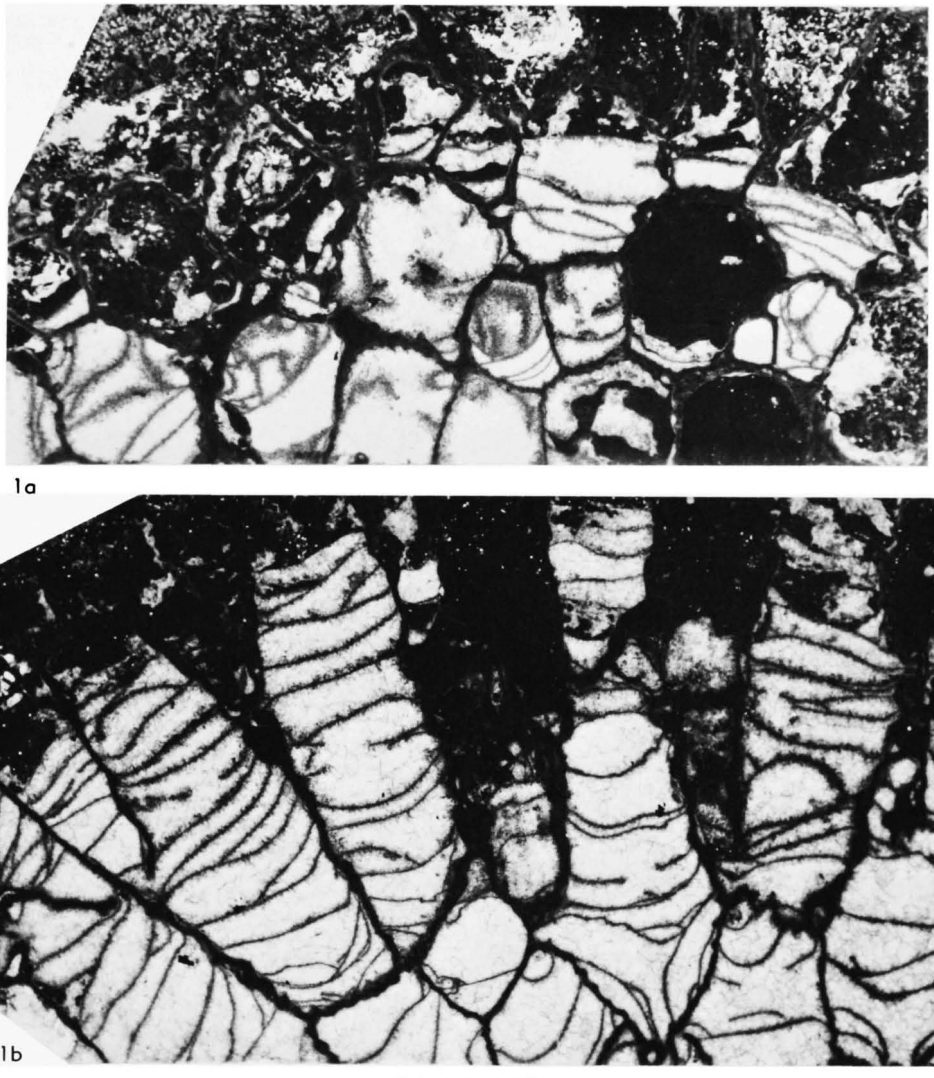
Subfamily SYRINGOPHYLLINAE Roemer, 1883

[*nom. transl.* HILL, 1955, p. 248 (*ex* Syringophyllidae, *nom. correct.* KOKEN, 1896, p. 313, *pro* Syringophylliden ROEMER, 1883, p. 527)] [=Sarcinulidae SOKOLOV, 1950a, p. 170]

Corallum hemispherical, nodular or discoid; corallites large, cylindrical with thick walls sharply distinguished from other skeletal elements and epithecate; walls with rings of pores that open into a system of radial canals surrounding corallites and fused to form connective plates arranged in successive levels throughout the corallum; septal trabeculae conjunct or slightly separated, projecting as spines in tabularia; tabulae comparatively rare, commonly on same levels as connective plates, horizontal or inclined, sometimes thickened, may be infundibuliform in some. *U.Ord.*

Sarcinula LAMARCK, 1816, p. 222 [**Madrepora organum* LINNÉ, 1758, p. 796; SD DANA, 1846a, p. 189; †not traced] [=*Syringophyllum* MILNE-EDWARDS & HAIME, 1850, p. lxxii (type, *Madrepora organum* LINNÉ, 1758, p. 796, OD; †not traced)]. Corallites cylindrical, thick-walled, with coarsely wrinkled epitheca and connected by more or less widely spaced platforms, on which pore-canals radiate, between extensions of septa, from rings of pores in corallite walls; septal trabeculae closely adpressed, commonly jutting into tabularia as 20 to 24 short ribs that may be spinose axially; tabulae thick, horizontal, here and there somewhat concave. *U.Ord.*, Eu.(Nor.-Swed.-Est.)-Asia(China)-N.Am.(Alaska).——FIG. 350,*2a,b*. S. *venusta* SOKOLOV, Pirgu stage Est., near Piirsalu; *a,b*, long., transv. secs., ×4 (Sokolov, 1962c).

Parasarcinula SOKOLOV & TESAKOV, 1963, p. 73 [**P. trabeculata*; OD; †39, coll. 260, IGG, Novosibirsk]. Corallum hemispherical and in part fasciculate; corallites large, radially arranged, of rounded section, communicating by hollow, laminar coenenchymal outgrowths which in places are imperfectly developed and transitional into connecting tubuli so that there is irregular development of the horizontal rings of mural pores in the thick walls; septa of monacanthine trabeculae distally and adaxially inclined, and contiguous or separate; tabulae irregularly sagging, in places either infundibuliform or horizontal. *?U.Ord.(?low.Ashgill.)*, Asia(Sib.Platf.).——FIG. 350,*3a,b*. **P. trabecu-*



Columnoporella

FIG. 349. Syringophyllidae (p. *F*532).

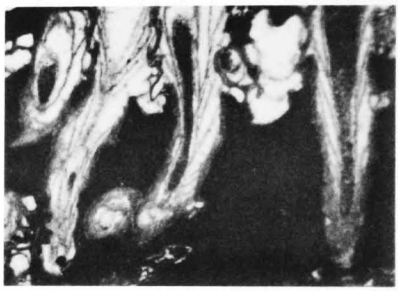
lata, holotype, Burskian horizon, Sib. Platf., R. Chunya; *a,b,* long., transv. secs., ×4 (Sokolov & Tesakov, 1963).

Uralopora SOKOLOV, 1951a, p. 47 [**U. flexibilis*; OD; †21, coll. 230, VNIGRI, Leningrad] [=*Uralopora* SOKOLOV, 1950a, p. 170, *nom. nud.*]. Cylindrical corallites connected by periodic horizontal expansions of their thick walls; oval mural pores and short canals, arranged in rings at the levels of the expansions, connect neighboring corallites; septal spines short, completely buried in thick wall in longitudinal rows; tabulae infundibuliform, a syrinx developed in places; increase lateral. *U.Ord.*(base), Eu.(Urals).——FIG. 350, *1a,b.* **U. flexibilis,* holotype, R. Koyva, W. slope of C. Urals; *a,b,* long., transv. secs., ×4 (Sokolov, 1951a).

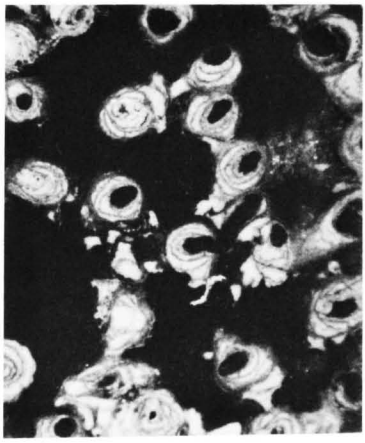
Family THECIIDAE Milne-Edwards & Haime, 1849

[*nom. correct.* KOKEN, 1896, p. 314, *pro* Thecidae MILNE-EDWARDS & HAIME, 1849b, p. 262] [=Théciens DE FROMENTEL, 1861, p. 279; Angoporidae STASINSKA, 1967, p. 61; Angoporinae, *nom. transl.* KLAAMANN, 1970a, p. 66, *ex* Angoporidae STASINSKA, 1967, p. 61; includes Laceriporinae OEKENTORP, 1970, p. 161]

Corallum cerioid or in places astreoid or thamnasterioid; formed of extensiform, su-

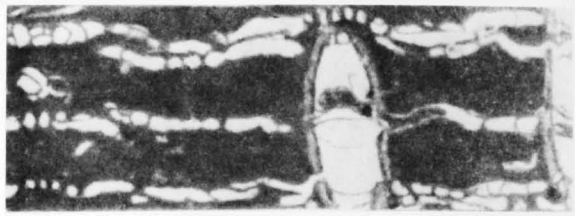


1a Uralopora

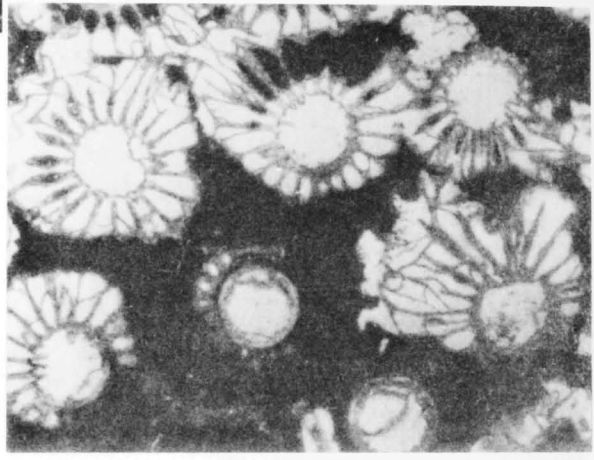


1b

3a



2a Sarcinula



2b

Parasarcinula 3b

FIG. 350. Syringophyllidae (p. *F532-F533*).

perposed layers, with or without hummocks or cylindrical lobes or branches; corallites small, prismatic, with thin or slightly thickened common walls in lower parts of layers and in axial parts of branches; near the distal surface of layers, and in peripheral parts of branches, a stereozone is commonly developed by the thickening to lateral contiguity of the peripheral parts of the septa, which commonly number 6 or 12, in some

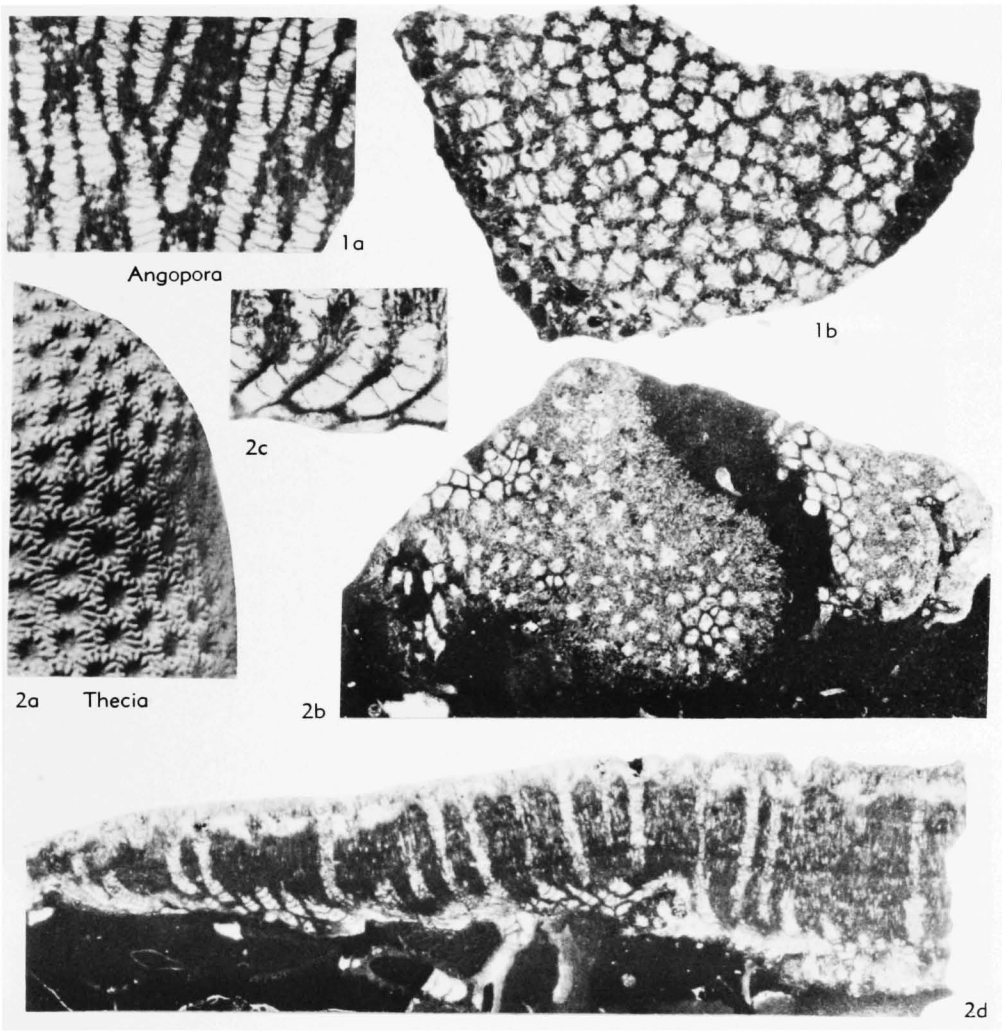


FIG. 351. Theciidae (p. *F*535-*F*538).

5 or 8 to 10. In the nominate genus, septa formed of monacanths directed upward and inward; the monacanths of each septum are contiguous peripherally to form a longitudinally continuous plate, and in these peripheral parts the monacanths are almost vertical, but curve rather sharply toward axial edge where they may project as free spines; in astreoid and thamnasterioid regions, portions of the walls may be represented by additional longitudinal monacanths. Mural pores or pore-tunnels present; tabulae thin, horizontal or curved, and commonly complete. *L.Sil.-L.Dev.; M.Dev.* (rare).

Thecia MILNE-EDWARDS & HAIME, 1849b, p. 263 [**Porites expatiatus* LONSDALE, 1839, p. 687; M; †6572 and PF4624-4626, GSM, London] [=*Romingerella* AMSDEN, 1949, p. 98 (type, *Thecia major* ROMINGER, 1876, p. 67, OD; syntypes UMMP 8527-8, Ann Arbor; Niag., Charleston Landing, Ind., and Point of Barques, L. Michigan)]. Corallum encrusting or tabular with hummocky or lobate upper surface or branching; cerioid or in places astreoid or thamnasterioid; in early stages and in axial parts of lobes and branches corallites prismatic or with one or more curved sides and moderately thin walls of fibers normal to a wide median dense plane and with but rare traces of septa; in distal parts where corallites are directed perpendicular to the calical surface, septa are commonly 12 and long and greatly thickened and

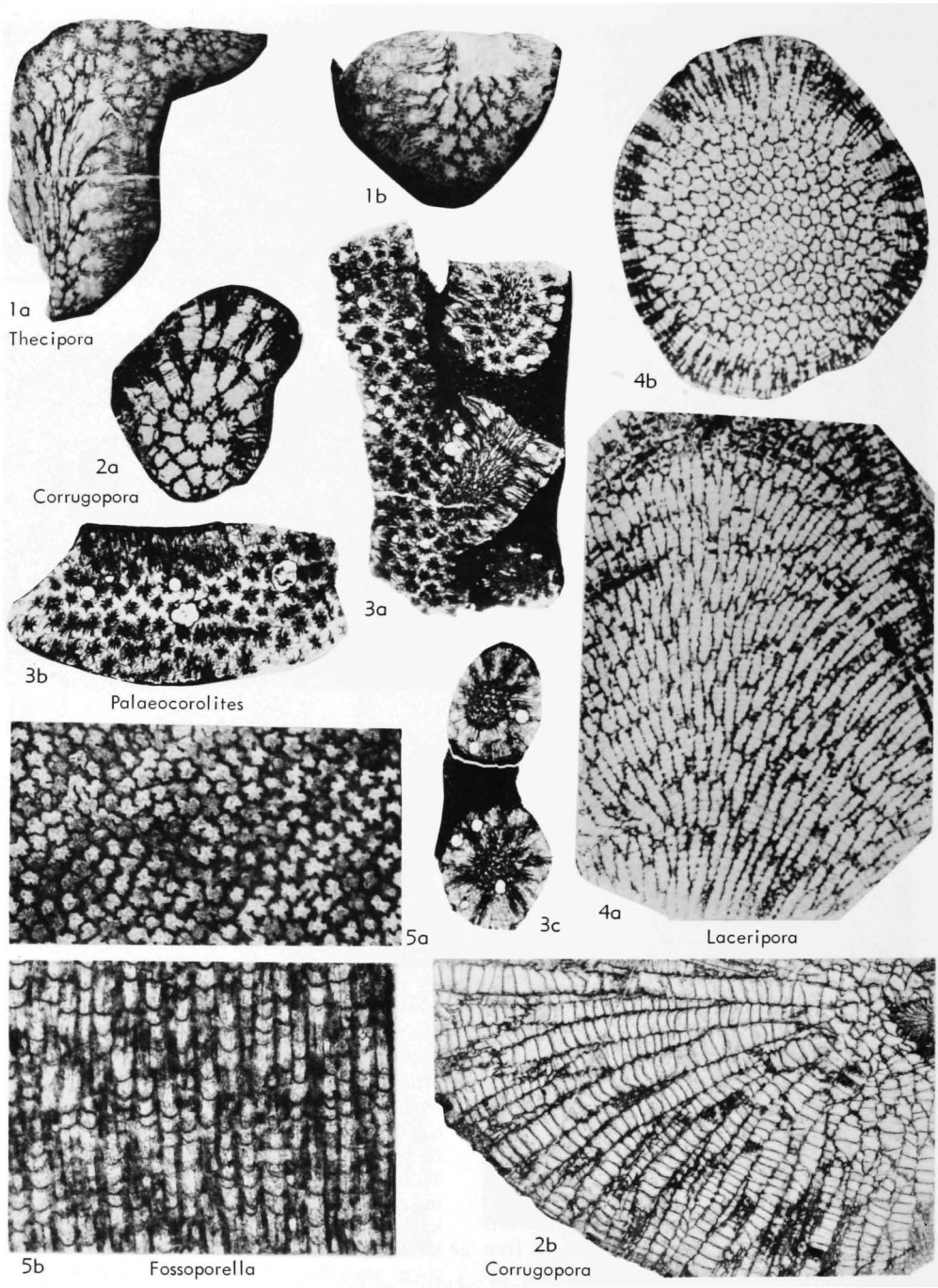
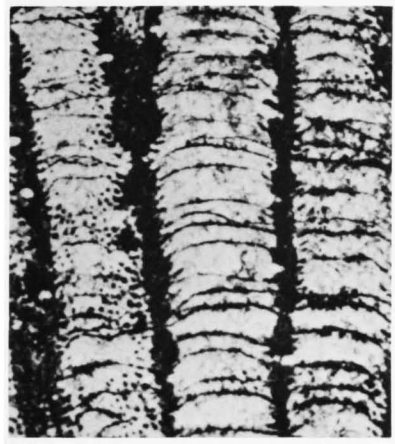
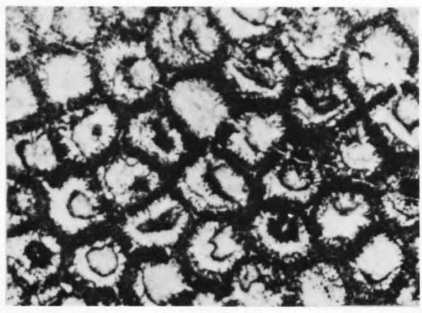


FIG. 352. Theciidae (p. *F538-F539*).

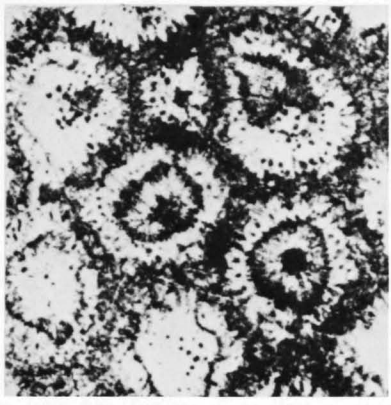
each is a plate consisting of a longitudinal row of monacanths contiguous except at axial edge; neighboring thickened septa commonly contiguous in wide peripheral stereozone in which a second order of septa may be developed; in these thickened parts the median dense plane of the common wall is indistinguishable, but a few longitudinal monacanths may be found in its place; these are not



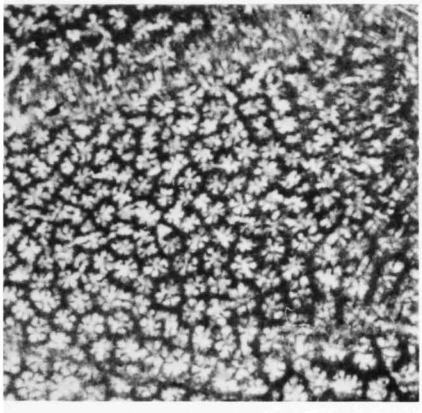
1a Kiaerites

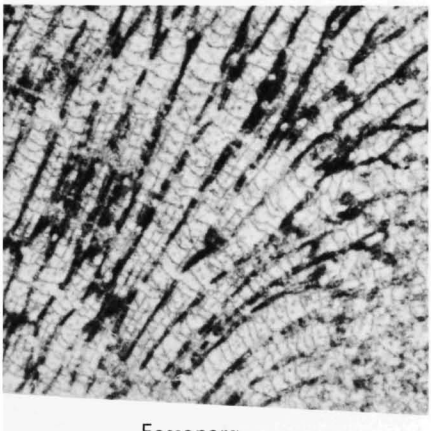


1b

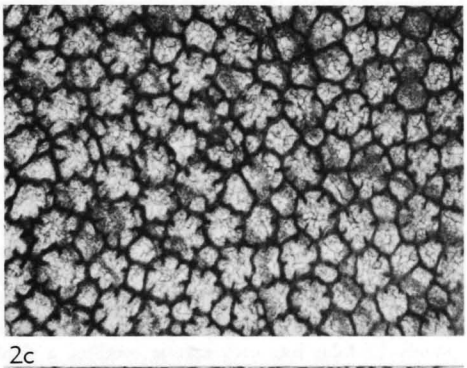


1c





Fossopora



2c

2d

FIG. 353. Theciidae (p. *F538-F539*).

so numerous as to constitute a coenenchyme; pores are present and may have diaphragms as in favositids; mural pores interseptal; in thickened parts pore-tunnels pass from one tabularium to the next; tabulae thin, complete. *L.Sil.-U.Sil.,* Eu.-Asia-N.Am.

T. (Thecia). Thin-walled, weakly septate or aseptate parts of corallum confined to reclined corallites in tabular coralla and to axial parts of branches; free axial parts of septal monacanths very short to absent; mural pores relatively sparse, more or less mid-face; tabulae subhorizontal. *L.Sil. (up.Llandov.)-U.Sil.(Ludlov.),* Eu.(Balto-Scandia-U.K.-Urals-Podolia)-Asia(Tien Shan-Malaya)-N.Am.(Tenn.-Ind.-Ky.).——Fig. 351,*2a-c.* **T. (T.) expatiata* (Lonsdale), holotype, M.Sil. (Wenlock Ls.), Eng., Lincoln Hill near Ironbridge, Shropshire; *a,* ext. view, ×6.5; *b,* transv. sec., ×4.0; *c,* long. sec., ×7.5 (Hill, n; GSM, London, no. 6572).——Fig. 351,*2d.* *T. (T.) swinderniana* (Goldfuss), Wenlock Ls., Eng., Dudley, long. sec., ×4.0 (Hill, n; BM(NH) R26375).

T. (Angopora) Jones, 1936b, p. 18, *nom. subst. pro Laminopora* Jones, 1930, p. 35, *non Laminopora* Michelin, 1842, a bryozoan [**Laminopora hisingeri* Jones, 1930, p. 35; OD; †Cn24437, RM, Stockholm]. Thin-walled weakly septate parts of corallum may occur in proximal or peripheral regions as well as in reclined and axial parts; stereozone relatively narrow; spines of axial septal edges long and slender; mural pores at angles and mid-face [see also Klaamann, 1970a, p. 66]. *L.Sil.-M.Sil.,* Eu.(U.K.-Gotl.-Nor.-Est.).——Fig. 351,*1a,b.* **T. (A.) hisingeri* (Jones), Sil., Gotl., Gustavsvik; *a,b,* long., transv. secs., ×4.0 (Hill, n; BM(NH) R26562).

Corrugopora Stearn, 1956, p. 67 [**C. rhabdota*; OD; †10406, Natl. Type Coll., GSC, Ottawa] [=*Hemithecia* Leleshus, 1965, p. 106 (type, *H. insolens,* OD; †18, coll. 9021, TsGM, Leningrad; L.Sil. (up. Llandov.), S. slope Mt. Daurich, Zeravshan Ra., C. Asia)]. Corallum cerioid; corallite walls folded longitudinally producing commonly 12 folds into each mature corallite, a short septal plate that may be spinose axially springing from each fold; mural pores numerous, on sides and at angles; tabulae complete, may coincide with transverse folds in the walls. *L.Sil.(up. Llandov.),* N.Am.(Manit.)-Asia(Kazakh.).——Fig. 352,*2a.* **C. rhabdota,* low. Clinton, East Arm Dol. of Interlake Gr., Can., mi. 5.5, Churchill Branch, Canadian Railway, S. Manit.; thin sec., ×2.7 (Stearn, 1956).——Fig. 352,*2b.* *C. insolens* (Leleshus), holotype, up. Llandov., S. slope Mt. Daurich, Zeravshan Ra.; thin sec., ×2.7 (Leleshus, 1965; photograph courtesy V. L. Leleshus).

?Erlangbapora Lin (MS) in Li *et al.,* 1975, p. 206 [**E. wangjiawanensis*; OD; †N37-27, AGS, Peking; M.Sil., Ningqiang, Shensi]. Corallum irregularly foliose, corallites moderately thin-walled in narrow median zone of folia, thick-walled elsewhere and opening perpendicular to surface; mural pores present; septa thick, commonly six, sphenoid in transverse section. [Diagnosis tentative; from illustrations.] *M.Sil.,* Asia(Shensi).

Fossopora Etheridge, 1903, p. 16 [**F. wellingtonensis*; M; †F2392 with thin sections Am 129 a, b, c, 276 in AM, Sydney] [=*Boreaster* Lambe, 1906, p. 323 (type, *B. lowi,* ?M; syntype, 7849, Natl. Type Coll., GSC, Ottawa; U.Sil., Read F., Arctic Can., Beechey I.; see Bolton, 1965, p. 29); *Fossipora* Lang, Smith, & Thomas, 1940, p. 62, *nom. van; Thecia (Neothecia)* Leleshus, 1965, p. 107 (type, *T. (N.) devonica,* OD; †6, coll. 8332, TsGM, Leningrad; M.Dev., Eifel., C. Asia, S. slope Gissar Ra.)]. Corallum lobate, partly cerioid, partly astreoid or thamnasterioid; corallites small, prismatic, turning outward from axial parts to open normal to the surface in peripheral parts where thickening of walls and septa is greatly increased; septa six plates, may have spinose axial edges, in some corallites six shorter septa alternate with the six dominant septa; septal plates thickened wedgewise so as to be laterally contiguous in peripheral parts of corallites, but leaving the unfilled lumen more or less stellate in transverse section; mural pores large, on side walls; tabulae thin, complete. *U.Sil.,* Australia(New S.Wales)-N.Am.(Can.Arctic); *L.Dev.,* Eu.(Carnic Alps-Czech.)-Australia (Vict.); *M.Dev.(Eifel.),* Asia(Gissar Ra., Kazakh.).——Fig. 353,*2a,b.* **F. wellingtonensis,* holotype, Sil.-Dev., New S.Wales, Wellington distr.; *a,b,* transv., long. secs., ×7.6 (Hill, n; AM, Sydney, no. F2392).——Fig. 353,*2c,d.* *F. devonica* (Leleshus), holotype, M.Dev.(Eifel.), S. slope Gissar Ra., upper reaches of R. Sorbukh, basin of R. Kafirnigan; *c,d,* transv., long. secs., ×7.6 (Leleshus, 1965; photographs courtesy V. L. Leleshus).

Fossoporella Leleshus, 1965, p. 108 [**F. prima*; OD; †5, coll. 8332, TsGM, Leningrad] [=*Corolites* Sokolov in Leleshus, 1961 (not seen); in Kim, 1965b, p. 77, diagnosis only, with name of type species, *C. posneri,* no descriptions or figures or collection numbers of *C. posneri* traced, but Kim (1965b, p. 77) gave descriptions and figures of one new species, *C. hamidulicus* Kim, 1965, and brief outline of its differences from *C. posneri*; see Oekentorp, 1970, p. 162; *Corolites* Kim, 1965, could presumably be validated with *C. hamidulicus* Kim, 1965, as monotype species, as suggested by Jeffords (1975, written commun.); †2/31, coll. 8490, TsGM, Leningrad]. Like *Fossopora* but corallites with 5 septal plates (in some 10, alternately longer and shorter). *L.Dev.-M.Dev.(Eifel.),* Asia(Urals-Zeravshan Ra.); *L.Dev.(Siegen.-Ems.),* Australia(Vict.).——Fig. 352,*5a,b.* **F. prima,* holotype, L.Dev., Kazakh., Shishkat Gorge, Zeravshan Ra.; *a,b,* transv., long. secs., ×6.7 (Leleshus, 1965; photographs courtesy V. L. Leleshus).

?Kiaerites Stasinska, 1967, p. 62 [**K. norvegicus*; OD; †45341, PM, Oslo, only specimen known]

[Possibly Favositida; referred to Parastriatoporinae by MIRONOVA (1974a, p. 78)]. Colony large, flattened, corallites polygonal in cross section, walls thick, formed by contiguous widened septal spines; median dark line undulate; septal spines very numerous, up to 48, long, with broad base, pointed and directed upward, and also present on tabulae; mural pores sparse, on faces and at angles of corallites; tabulae thin, commonly convex, uneven, sometimes incomplete. *L.Sil.(Llandov.)*, Eu.(Ringerike, Nor.).——FIG. 353,*1a-c*. **K. norvegicus*, holotype; *a*, long. sec., × 7.6; *b,c*, transv. secs., ×3.0, ×7.6 (Stasinska, 1967).

Laceripora EICHWALD, 1854, p. 85 [**L. cribrosa*; M; †no. not traced, ?in EICHWALD Coll., LGU, Leningrad] [=*Laceropora* LANG, SMITH, & THOMAS, 1940, p. 74, *nom. van.*]. Corallum with cylindrical branches; corallites thin-walled, prismatic with up to six septa short and thin to absent in wide axial zone of branches, long and thick in the narrow peripheral zone; mural pores numerous, on faces or at edges of faces; tabulae thin, commonly on same level in neighboring corallites, crowded and ?thickened in peripheral zone. *U.Sil.(Ludlov.)-?L.Dev.(Tiverian)*, Eu. (Swed.-Est., erratic boulders-Pol.-Bolshezemel Tundra-Polar Urals)-Asia (Salair-Kazakh.-Tien Shan-China).——FIG. 352,*4a,b*. **L. cribrosa*, U.Sil. (Ludlov., Paadla Beds, K2), Saaremaa (formerly Oesel); *a,b*, long., transv. secs., ×2.7 (Klaamann, 1962; see p. 30).

Palaeocorolites LELESHUS, 1965, p. 109 [**P. nivalis*; OD; †19, coll. 9021, TsGM, Leningrad]. Corallum slenderly branching; corallites in axial zone of branches longitudinally directed, turning sharply outward into peripheral zone and opening perpendicular to surface; corallites of axial zone very slender, with moderately thick walls in which septal elements are distinguished with difficulty; corallites of peripheral zone of markedly increased diameter, 6 to 13 (commonly 12) septa forming wide irregular stereozone; mural pores sparse; tabulae sparse. *M.Sil.(Wenlock.)*, Asia(Zeravshan Ra.-N.Urals).——FIG. 352,*3a-c*. **P. nivalis*, holotype, Mt. Daurich, Zeravshan Ra.; *a*, long., *b,c*, transv. secs., ×4.0 (Leleshus, 1965).

Thecipora LELESHUS, 1965, p. 111 [**T. ornata*; OD; †22, coll. 9021, TsGM, Leningrad]. Corallum cerioid and cylindrical or nodular; in axial parts, corallites very thin-walled and with septal elements weakly developed; in peripheral parts, corallites have up to 10 well-developed septal plates, but there is no extensive peripheral zone of thickening; pores on sides and rarely at ?angles of corallites; tabulae thin, complete. *M.Sil.(Wenlock.)*, USSR(Zeravshan Ra., Kazakh.).——FIG. 352,*1a,b*. **T. ornata*, holotype, Kazakh., upper reaches of R. Targobi-Tega, Zeravshan Ra.; *a,b*, long., transv. secs., ×2.7 (Leleshus, 1965; photographs courtesy V. L. Leleshus).

Order FAVOSITIDA Wedekind, 1937

[*nom. correct.* SOKOLOV, 1962c, p. 217, *pro* Favositacea WEDEKIND, 1937, p. 34; *nom. transl.* SOKOLOV, 1950a, p. 163, *ex* Favositacea WEDEKIND, 1937, p. 34, presumably suborder, see HILL & JELL, 1970a, p. 172] [incl. Multisolenida FRITZ, 1950, p. 115; Thamnoporina SOKOLOV, 1950a, p. 166; Alveolitida SOKOLOV, 1950a, p. 167, *nom. transl.* SOKOLOV & TESAKOV, 1968, p. 202, *ex* Alveolitina SOKOLOV, 1950a, p. 167]

Corallum cerioid or alveolitoid; corallites erect or reclined; with mural pores; septa represented by septal spines, squamulae or combs; tabulae commonly complete, horizontal; walls ?(sheathed in epitheca) constructed of growth lamellae that may be emphasized by pigment and in which radial fibers, orthogonal or rarely clinogonal to epitheca, may be apparent or in part latent or suppressed during diagenesis. *M.Ord.-U.Perm.*

Suborder FAVOSITINA Wedekind, 1937

[*nom. correct.* SOKOLOV, 1950a, p. 164, *pro* Favositacea WEDEKIND, 1937, p. 34, presumably suborder, see HILL & JELL, 1970a, p. 172] [incl. Multisolenida FRITZ, 1950, p. 115; Thamnoporina SOKOLOV, 1950a, p. 166]

Corallum cerioid; corallites polygonal in section; walls with mural pores and may be cribriform in some; septa represented by septal spines, squamulae, or ridges; tabulae commonly complete, horizontal. *M.Ord.-U.Perm.*

Superfamily FAVOSITICAE Dana, 1846

[*nom. correct.* HILL, herein (*pro* Favositoidea DANA, 1846b, p. 116, *nom. transl.* HILL & JELL, 1970a, p. 172, *ex* Favositidae DANA, 1846b, p. 116)] [incl. Multisolenida FRITZ, 1950, p. 115]

Corallum cerioid; tabular, hemispherical, nodular, rarely branching or tollinoid; corallites prismatic, calical openings perpendicular to surface; walls thin or moderately thickened, with pores, in some cribriform; septa short, equal, spinose or squamulose, variable in number; tabulae commonly complete, horizontal, rarely infundibuliform. *M.Ord.-U.Perm.*

Family FAVOSITIDAE Dana, 1846

[Favositidae DANA, 1846b, p. 116] [=Favositiniens DE FROMENTEL, 1861, p. 265]

Corallum cerioid and tabular, hemispherical, nodular, rarely branching or tollinoid;

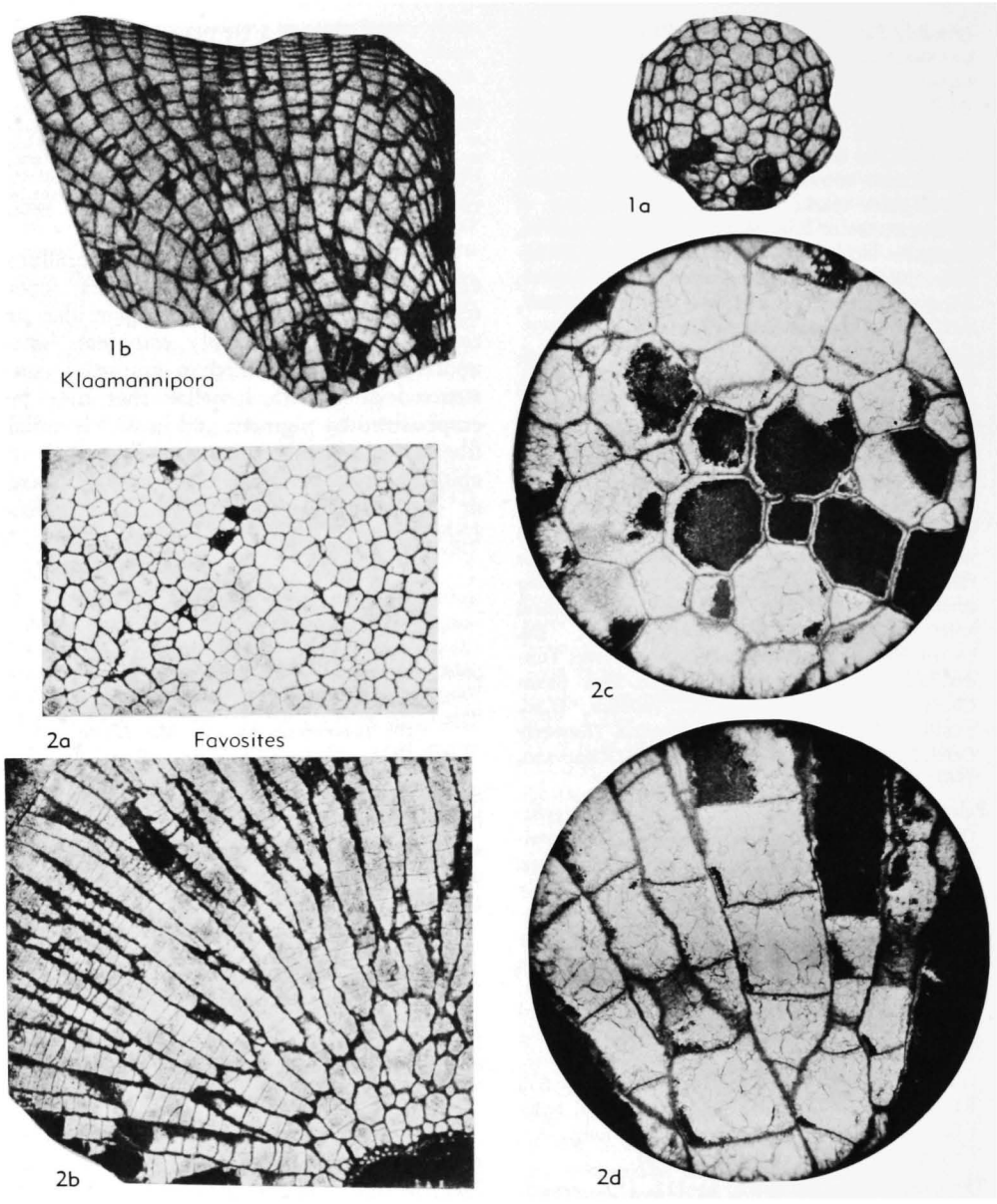


FIG. 354. Favositidae (p. *F*541, *F*544).

corallites prismatic, calical openings perpendicular to distal surface; walls with pores round to oval, in regular longitudinal rows; septa short, equal, variable in number, represented by longitudinal rows of discrete spines or by squamulae; tabulae complete, horizontal. *M.Ord.-L.Perm.*

MIRONOVA (1974a, p. 24) includes only genera with "concentrically lamellate" walls, excluding those with radially fibrous walls. In this *Treatise* it is considered that 'concentric' wall structure is diagenetically produced from normal fibrous walls with growth lamellae, and it is not accepted as a feature of taxonomic import.

Subfamily FAVOSITINAE Dana, 1846

[*nom. transl.* MILNE-EDWARDS & HAIME, 1851, p. 230, *ex* Favositidae DANA, 1846b, p. 116]

Favositidae with septa represented only or overwhelmingly by septal spines; longitudinal rows of pores commonly mid-face or evenly spaced on faces. *U.Ord.-M.Dev.*

Favosites LAMARCK, 1816, p. 204 [**F. gothlandicus*; SD MILNE-EDWARDS & HAIME, 1850, p. lx; †neotype, Cn24435, RM, Stockholm] [?=*Brignus* DE GREGORIO, 1930, p. 31; *?Sapporipora* OZAKI, 1934, which see; *Eufavosites* RUKHIN, 1937, p. 77, obj.; *?Salairia* CHERNYSHEV, 1951, which see; *?Lamellaeoporella* SMIRNOVA, 1968, which see; *Subfavosites* MIRONOVA, 1974a, p. 36 (type, *Favosites klaamanni* MIRONOVA, 1971, p. 38, OD; †62, SNIIGGIMS, Novosibirsk; Ludlov., Podolia; has radially fibrous and cryptofibrous walls)]. Corallum cerioid; tabular, hemispherical, nodular; corallites prismatic, thin-walled; septa commonly represented by longitudinal rows of spines; tabulae complete, subhorizontal; mural pores on corallite faces, in one to four longitudinal rows, and may have raised rims and diaphragms. *U.Ord.(up. Richmond.)*, N. Am. (Manit.); *L. Sil.-M. Dev. (Givet.)*, cosmop.——FIG. 354,*2a,b*. **F. klaamanni* MIRONOVA, holotype, Ludlov., Podolia, left bank R. Dnestra, ca. 2 km. below Sokol; *a,b*, long., transv. secs., ×3.2 (Mironova, 1971).——FIG. 354,*2c,d*. **F. gothlandicus*, neotype, U.Sil., (low. Ludlov.), Mulde Märgelsten, Gotl., shore N. of Fröjel fiskläge; *c,d*, transv., long. secs., ×5.8, ×6.0 (Jones, 1936b).

Astrocerium HALL, 1851, p. 399 [**A. venustum* HALL, 1852a, p. 120; SD MILLER, 1889-1897, p. 172; syntypes 1470/2, AMNH, New York]. Corallum cerioid, discoid to hemispherical; corallites prismatic, with 12 longitudinal rows of upwardly directed, long, coarse spines, sporadically developed; mural pores typically uniserial and midface [see STUMM, 1965, p. 60]. *Sil.*, N.Am. (N.Y.-Ind.-Ky.-Tenn.-Mich.); *?L.Dev.*, Asia(N. Cis-Balkhash).——FIG. 355,*1a,b*. **A. venustum*, Sil., Rochester Sh., N.Y., Lockport; *a,b*, transv., long. secs., ×6.6 (Hall, 1852a).

?Beiliupora YÜ & DENG in WANG, YÜ, & WU, 1974, p. 28 [**B. beiliuensis*; M; †23695-6, IGP, Nanking]. Ramose and reticulate; corallites very fine, diverging from axis of branches to open normal to surface; ?rounded to polygonal in section with relatively thick walls, thickness increasing distally; mural pores few, rounded to oval; septal spines sparse, some like triangular squamulae; tabulae horizontal or oblique. [Translation uncertain; compare also with *Microalveolites* LELESHUS, 1972a, a doubtful synonym of *Crassialveolites* SOKOLOV, 1955.] *Low.M.Dev.*, Asia(Kwangsi).——FIG. 356,*2a-c*. **B. beiliuensis*, holotype, Bei Liu F., Guitang Mbr., Kwangsi, Bei Liu; *a,b*, long. secs., ×2, ×6; *c*, transv. sec., ×2 (Wang, Yü, & Wu, 1974).

Crenulipora LE MAÎTRE, 1956a, p. 1340 [**C. difformis*; OD; †561,a,b, LE MAÎTRE Coll., GFC, Lille]. Corallum simple or branching, branches fingerlike and widened at summit; calices four- to six-sided, of irregular form, with crenulate distal edge; septa represented by spines thick at base, thin distally; tabulae irregular, thin, oblique, complete or incomplete, may bear septal spines on upper surfaces; mural pores present. *L.Dev.(Ems.)-M.Dev. (Eifel.)*, N.Afr. (Moroc.-Alg.)-?Asia (NE. USSR).——FIG. 355,*2a,b*. **C. difformis; a,b*, tang., long. secs., diagr. (Le Maître, 1956a).

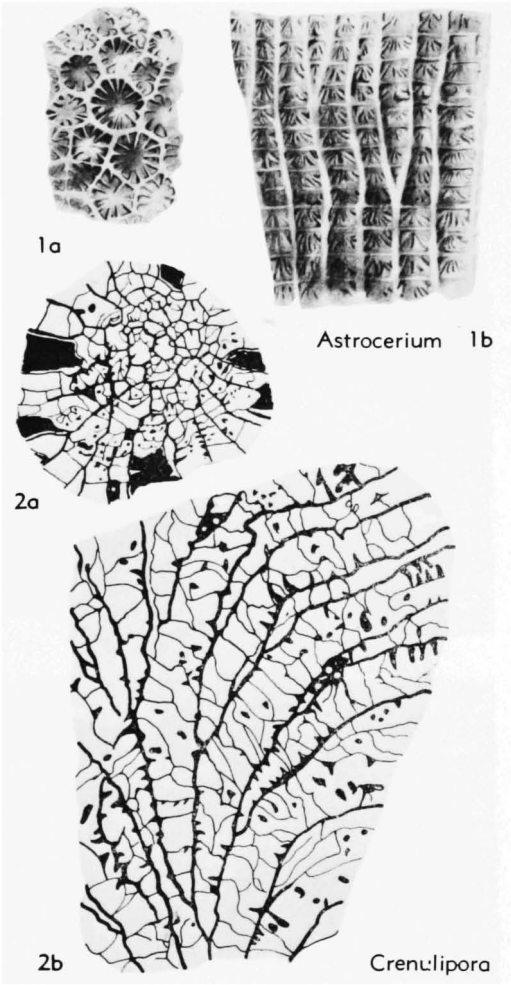


FIG. 355. Favositidae (p. F541).

Dictyofavosites CHERNYSHEV, 1951, p. 36 [**Favosites (D.) salairicus*; OD; †37, coll. 5725, TsGM, Leningrad]. Cerioid; tabulae of all corallites arranged at same levels and horizontal or slightly curved; corallites thin-walled, slender; mural pores in one or rarely two longitudinal mid-face rows; septal spines rare, in some species also small, sparse, eaveslike squamulae form upper rims of pores. *L.Dev.*, Asia(Salair-Kazakh.-NE.USSR)-

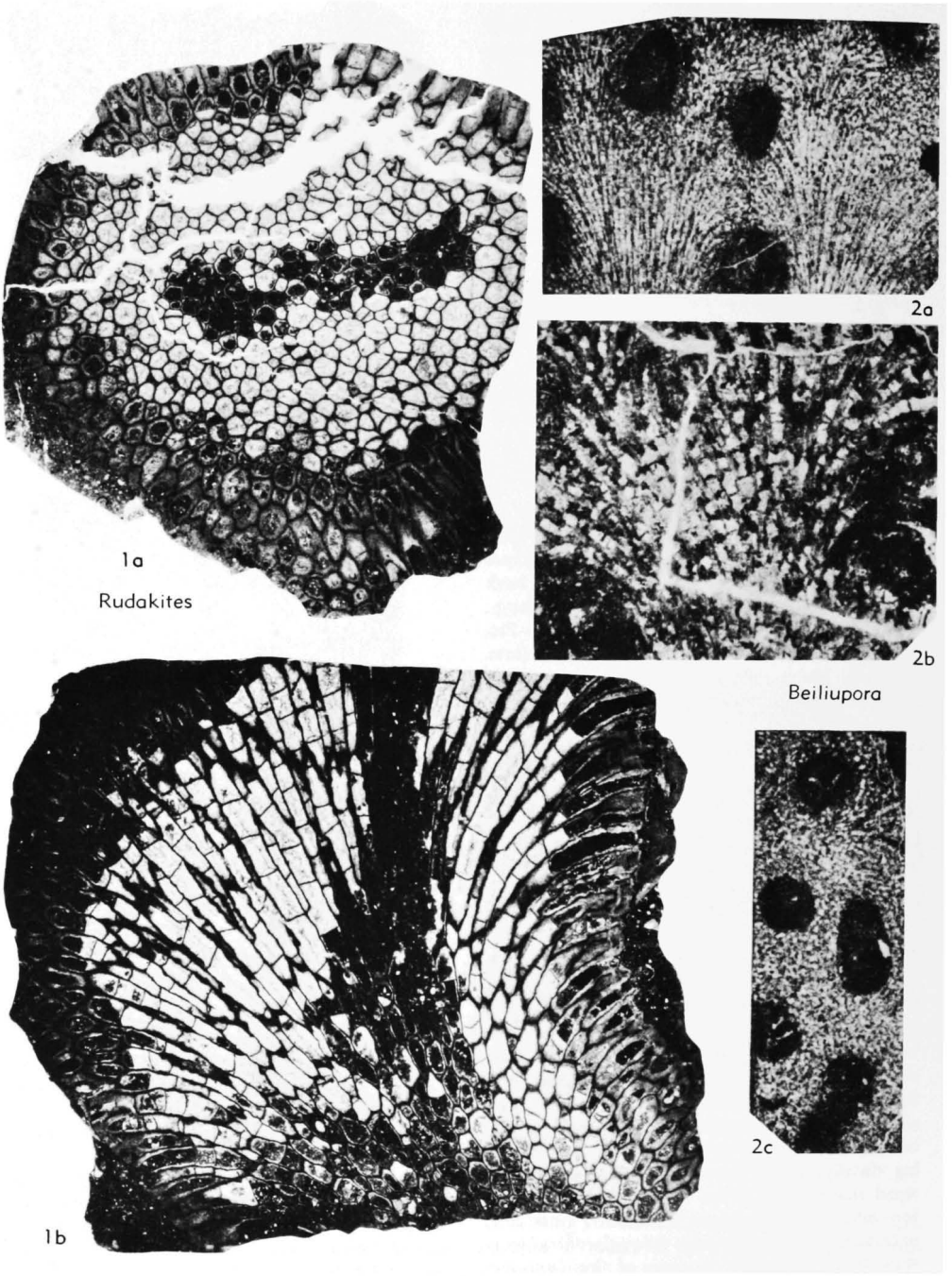


FIG. 356. Favositidae (p. *F*541, *F*546).

Australia(Vict.-New S.Wales) [see also MIRONOVA, 1974a, p. 57].——FIG. 357,*1a,b*. **D. salairicus*, holotype, L.Dev., Salair, R. Pavlova above mouth of Khvoshchevki; *a,b*, transv., long. secs., ×3.3 (Chernyshev, 1951).

Hattonia JONES, 1927, p. 438 [**H. etheridgei*; M; †F7200, UQ, Brisbane]. Corallum cerioid; corallites slender, prismatic, five- or six-sided, walls thin and firmly amalgamated; tabulae occurring commonly in pairs which are regularly spaced and

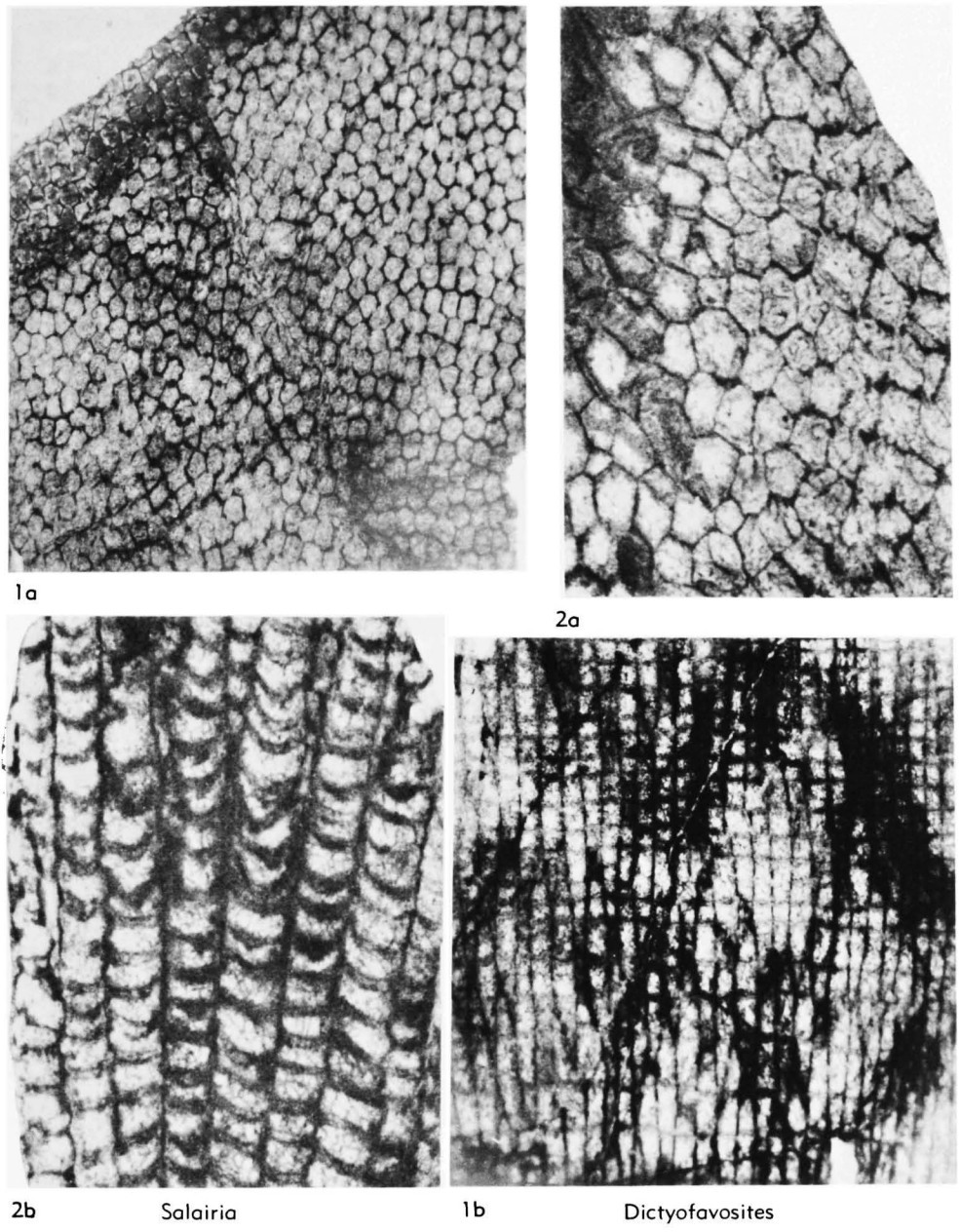


FIG. 357. Favositidae (p. *F*541-*F*542, *F*546).

on same level in contiguous corallites; mural pores small, commonly between the tabulae of a pair [see PICKETT & JELL, 1974, p. 715]. *U.Sil.(mid. Ludlov.)*, Australia (New S. Wales); *L. Dev. (Gedinn.-Ems.)*, Australia (New S.Wales-Queensl.). ——FIG. 358,*1a-c*. **H. etheridgei*, holotype, U. Sil., *Barrandella* sh., New S.Wales, Hatton's Corner, Yass; *a,c*, transv., long. secs., ×4; *b*, ext. view, ×1 (Pickett & Jell, 1974).

Issolites YANET, 1977, p. 20 [**I. fallax*; OD; †135, 136, coll. 1017, UGUp, Sverdlovsk; U.Sil. Ludlov., E. slope C. Urals, left bank R. Is. 600 m. below Obzhorki]. Corallum tumoroid, with large polygonal-rounded corallites separated by one or

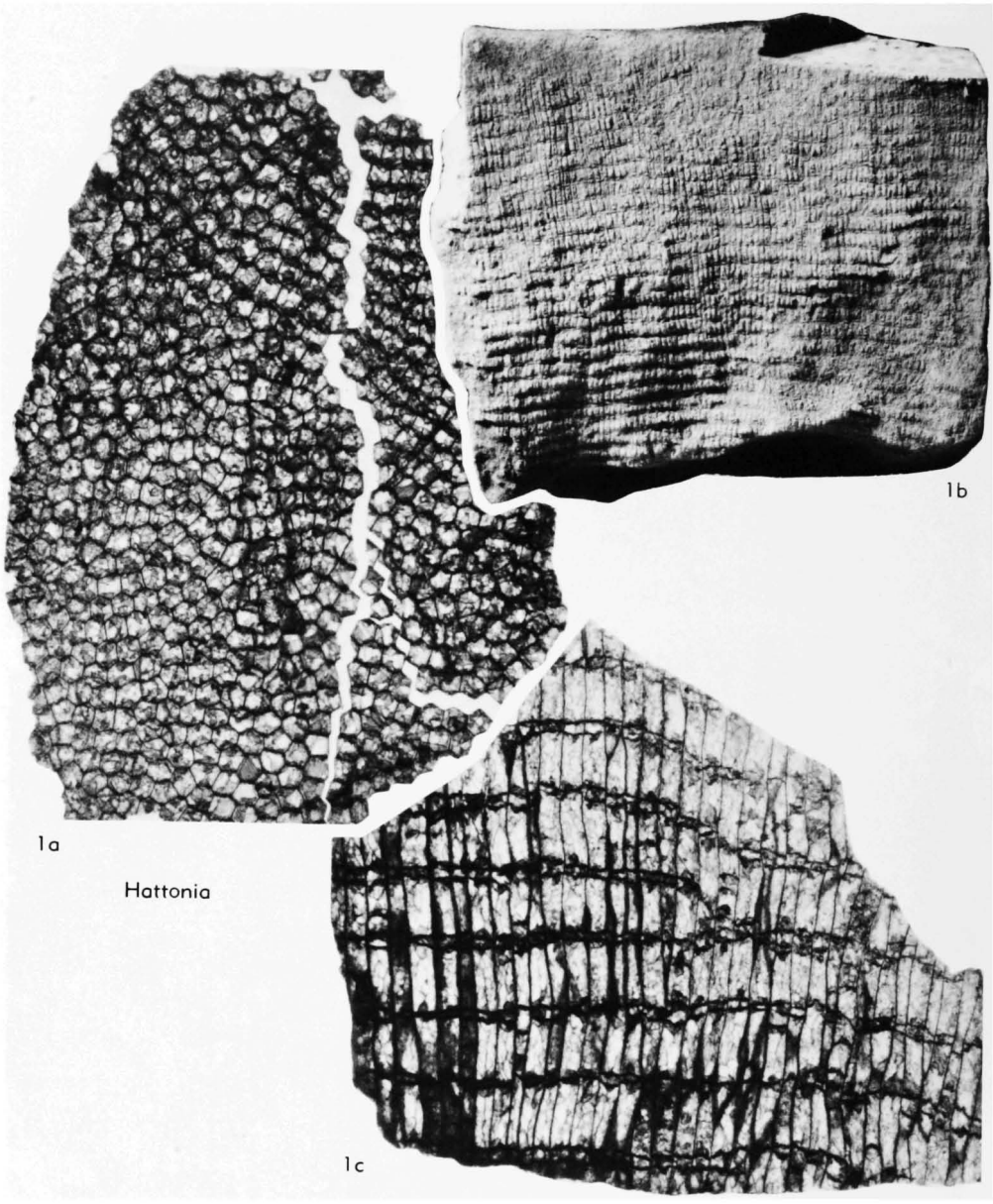


FIG. 358. Favositidae (p. *F*542-*F*543).

two rows of smaller corallites of four- to six-sided section; walls irregularly thickened, with rounded mural pores converted into canals in thickened portions; septal spines present; tabulae numerous, mainly flat. *U.Sil.(Ludlov.)*, Eu.(C.Urals).

?**Klaamannipora** MIRONOVA, 1974a, p. 78 [**Favosites coreaniformis* SOKOLOV, 1952a, p. 53; OD; †in coll. 484, VNIGRI, Leningrad]. Corallum cylindrical, coarsely branching; corallites moderately large, prismatic, diverging slowly at first from axis of branch, opening at surface at right angles; walls thin except for slight thickening in peripheral zone of branch; pores large, uniserial; septal spines present in calices; tabulae flat, commonly on same level in neighboring corallites. *U.Sil.(Ludlov.)*, Eu.(Est.); *?L.Dev.*, Asia(Salair-NE.USSR).—FIG. 354,*1a,b*. **K. coreaniformis* (SOKOLOV), holotype, Ludlov., Paadla beds, K_2, Est., Saarema (=Oesel); *a,b*, transv., long. secs., ×3.2 (Sokolov, 1952a).

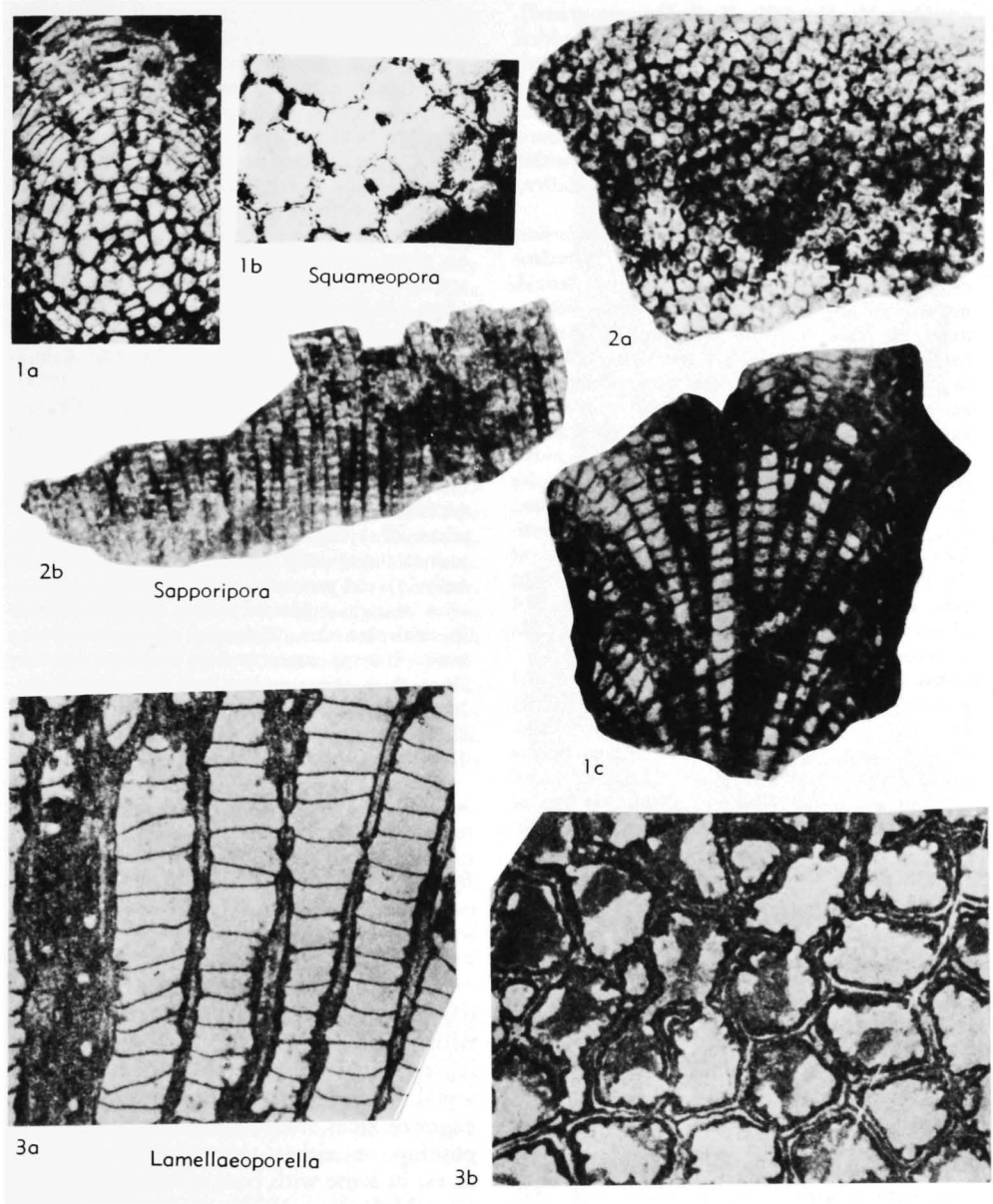


FIG. 359. Favositidae (p. *F*545-*F*546).

Lamellaeoporella SMIRNOVA in CHERKESOVA, SMIRNOVA, & KRAVTSOV, 1968, p. 157 [**L. superba*; OD; †4, coll. 9718, TsGM, Leningrad] [?=*Favosites* LAMARCK, 1816, which see; *?Pseudopachyfavosites* CHI, 1976, p. 107 (type, *P. rotundus*, OD; †4$P_{7-8}ZH_4^3$, IGMR, Shenyang; low. M. Dev., Dong Ujimqin Qi, NE. Inner Mongolia)]. Corallum cerioid, of medium size; corallites polygonal in transverse section, with rounded angles and walls showing growth lamellation; mural pores in faces and rarely in angles, without rims but with diaphragms; septa thin, short, laminae with discrete short spines on axial edges; tabulae complete [see BARSKAYA, 1975, p. 34]. *L.Dev.*(Valnevsk horizon), Eu.(N.Zemlya-NE.USSR); *low.M.Dev.*, Asia(?Inner Mongolia).——FIG. 359,*3a,b*. **L. superba*, holotype, Tsivolko, E. bank; *a,b*, long., transv. secs., ×10.0 (Cherkesova, Smirnova, & Kravtsov, 1968).

?Ozopora WEISSERMEL, 1941, p. 206 [**O. thamno-*

poroides; M; †in ZGI, E. Berlin, not traced]. Corallum branching, the branches subcylindrical and each encased in holotheca except at distal end; corallites longitudinally directed within branches and opening only at distal end of each branch; walls thick, with irregularly distributed mural pores; septal spinules in places perceptible within wall tissue; tabulae flat or slightly arched. *L.Dev.*, Eu.(Ger.).

Rudakites LELESHUS, 1964b, p. 46 [**R. multiformis*; OD; †2, coll. 8332, TsGM, Leningrad] [?=*Striatoporella* RUKHIN, 1938, which see]. Cerioid, nodular initially, later with short, thick, dichotomous branches that may in places be laterally contiguous; corallites slender, prismatic, walls thin in axial zone, may thicken slightly toward periphery of branch; corallites longitudinally directed in axis of branch, diverging to open at right angles to surface; septal spines very fine, short; mural pores small, sparse, uniserial, mid-face; tabulae thin, distant; increase calicular, peripheral. *L.Dev.*, Asia(Tadzhik.).——FIG. 356,*1a,b*. **R. multiformis*, holotype, Siegen.-low.Ems., N. slope of Zeravshan Ra., left side of Shishkat Say, right tributary of R. Kshtut; *a,b*, tang., long. secs., ×4 (Leleshus, 1964b; photographs courtesy of V. L. Leleshus).

Salairia CHERNYSHEV, 1951, p. 38 [**Favosites (S.) peetzi*; OD; †40, coll. 5725, TsGM, Leningrad] [?=*Favosites* LAMARCK, 1816, which see]. Favositoid; corallites thin-walled with concave tabulae grouped in pairs; septal spines numerous; mural pores in one to three longitudinal rows on faces of corallites. [Concave tabulae of holotype are most distinctive; doubling of tabulae possible diagenetic. Considered by MIRONOVA (1974a, p. 52) to have squamulae and referred to *Squameofavosites* CHERNYSHEV, 1941a.] *L.Dev.(Gedinn.)*, Asia (Salair).——FIG. 357,*2a,b*. **S. peetzi*, holotype, Salair, R. Pavlova above mouth of Khvoshchevki; *a,b*, transv., long. secs., ×3.3 (Chernyshev, 1951).

Sapporipora OZAKI in SHIMIZU, OZAKI, & OBATA, 1934, p. 74 [**S. favositoides*; OD; † not traced] [?=*Favosites* LAMARCK, 1816, which see]. Corallum cerioid, corallites small, prismatic, each wall face with one median longitudinal row of large pores; no septal spines recorded in holotype; new corallites commonly arise at junction of four corallites [see HAMADA, 1960, p. 169]. *?Sil.*, Asia (Korea); *?M.Sil.(Wenlock.)*, Asia(Sib.Platf.-Taymyr-Tarbagatau Ra.).——FIG. 359,*2a,b*. **S. favositoides*; syntypes, pebble in Ken-niho ls. congl., NW. Korea; *a,b*, transv., long. secs., ×4.0 (Shimizu, Ozaki, & Obata, 1934).

?Squameopora PREOBRAZHENSKIY, 1967b, p. 8 [**Favosites hidensis* KAMEI, 1955, p. 53; OD; †30119, Geol. Inst., Shinshu Univ., Matsumoto, Japan]. Corallum cerioid; pyriform, club-shaped or branching with subcylindrical to cylindrical branches; corallites prismatic, growing longitudinally and parallel in axial part of branch but turning to open at surface at acute or right angle; walls thin or moderately thick, thickening toward periphery; wall microstructure radiate-fibrous; mural pores without elevated rims, circular, fairly large, biserial, placed toward edges of prism faces; septa represented [by squamulae or] by spinules buried in sclerenchyme; tabulae complete, transverse. [HAMADA (1959b, p. 208) did not mention squamulae as being present in type species, but PREOBRAZHENSKIY included species with them in his genus. MIRONOVA (1974a, p. 49) referred type species to *Striatoporella* RUKHIN, 1938.] *L.Dev. (Ems.)-M.Dev.(Eifel.)*, Asia(Japan-E.Tien Shan)-N.Z.——FIG. 359,*1a-c*. **S. hidensis* (KAMEI), type material, L.Dev., W.Japan, Ichinotani, Fukuji; *a,b*, transv. secs., ×3.8, ×7.5 (Kamei, 1955); *c*, topotype, long. sec., ×4.0 (Hamada, 1959b).

Striatoporella RUKHIN, 1938, p. 62 [**S. multiporifera*; OD; †neotype, 109, coll. 337, IGG, Novosibirsk; SD DUBATOLOV, 1969, p. 80] [?=*Rudakites* LELESHUS, 1964b, which see]. Corallum of cylindrical, coarse branches; corallites unequal, irregularly prismatic, directed longitudinally in axial parts of branch, curving outward to open at right angles to surface of branch; walls in axial parts thin, thickening slightly on curving outward; septa represented in peripheral zone by short, thick spines or here and there by squamulae; microstructure of wall radial-concentric, favositoid; pores numerous, large; tabulae transverse [see also MIRONOVA, 1974a, p. 49]. *L.Dev.*, Asia (NE.USSR).——FIG. 360,*1a,b*. **S. multiporifera*, neotype, Nelyudim horizon, Kolyma R.; *a,b*, long., transv. secs., ×4 (Dubatolov, 1969).

Subfamily PALEOFAVOSITINAE Sokolov, herein

[*nom. correct.* SOKOLOV herein, *pro* Palaeofavositinae SOKOLOV, 1950a, p. 164, *nom. inval.*, based on *Palaeofavosites* LANG, SMITH, & THOMAS, 1940, p. 94, *nom. van.*]

Thin-walled Favositidae, dendroid and tabular or hemispherical or in part tollinoid, with uniserial or multiserial ranks; septa represented only by or overwhelmingly by septal spines; with pore rows at extreme edges of faces and commonly alternating in position on either side of angle between faces; in some with pore rows also mid-face. [See MIRONOVA, 1974a, p. 35, for different conception based on microstructural interpretations.] *M.Ord.-L.Dev.*

Paleofavosites TWENHOFEL, 1914, p. 24, Official List of Generic Names, Name No. 2028 [**Favosites asper* D'ORBIGNY, 1850, p. 49; OD; †GSb3726-3728 (3 parts of corallum), GSM, London, *fide* OEKENTORP, 1976, p. 169; =*Favosites alveolaris* "DE BLAINVILLE" LONSDALE, 1839, pl. 15 *bis*, fig. 1, *non* GOLDFUSS] [=*Calamopora* GOLDFUSS, 1829, p. 77, generic name suppressed by Op. 1059, ICZN (MELVILLE, 1976, p. 24 and Corrigenda,

p. 264) (type, *C. alveolaris* Goldfuss, 1829, SD King, 1850, p. 26; †254a, Goldfuss Coll., IP, Bonn; glacial drift, Groningen, Holland; *fide* Oekentorp, 1971, p. 158, congeneric with *F. asper* d'Orbigny); *Palaeofavosites* Lang, Smith, & Thomas, 1940, p. 94, *nom. van.*]. Corallum massive; corallites prismatic, thin-walled; mural pores at edges of faces of prisms, alternating in position on either side of the angle giving characteristic wavy appearance to longitudinal section through an angle; each pore opens into two corallites only (Oekentorp & Schouppé, 1969, p. 89); septa each represented by a longitudinal row of discrete spines directed upward and inward; tabulae thin, commonly complete and subhorizontal. *Up.M. Ord.-U.Sil.(low.Ludlov.),* Eu.(Urals); *U.Ord.-U. Sil.(low.Ludlov.),* Eu.(G.Brit.-Gotl.-Est.-Podolia-Czech.)-Asia(N. & Sev.Zemlya-Taymyr-Sib.Platf.-NE. USSR-Afghan.-Uzbek.-Kazakh.-Salair-Altay-Tuva-China)-N. Am. (Arctic-Alaska-Manit.-Ont.-Anticosti-N.Mex.-Texas)-Australia(New S.Wales-Tasm.).——Fig. 361,*1a-d.* **P. asper* (d'Orbigny), holotype, M.Sil.(Wenlock.), U.K., Leinthall Earls, near Ludlow; *a,* ext. view, ×1.0 (Lonsdale, 1839); *b,* transv. sec., ×5.0, *c,d,* long. secs., ×5.0, ×10.7, showing tangential section of wall with spines and mural pores (Oekentorp, 1976; photographs courtesy of K. Oekentorp).——Fig. 361, *1e-g. P. alveolaris* (Goldfuss), holotype, ?Sil., drift, Holland, Groningen; *e,* ext. view, ×1.0, *f,g,* transv., long. secs., ×5.0 (Goldfuss, 1829; photographs courtesy K. Oekentorp).

Manipora Sinclair, 1955, p. 97 [**M. amicarum*; OD; †12382, Natl. Type Coll., GSC, Ottawa]. Corallum cateniform, corallites thin-walled subquadrate in transverse section and forming simple or multiple ranks enclosing irregular lacunae; internal walls in the ranks corrugated, with septal spines projecting from the corrugations; mural pores sparse, commonly near angles of walls; tabulae complete, thin. *M.Ord.-U.Ord.,* N.Am.(Manit.-Texas-N.Mex.-Arctic Can.-N.Greenl.).——Fig. 362, *3a-c. M. magna* Flower, U.Ord., Second Value F., Texas, El Paso; *a,b,* transv. secs., ×12.8; *c,* long. sec., ×4.8 (Flower, 1961).——Fig. 362, *3d.* **M. amicarum,* holotype, Red River F., Selkirk Mbr., Manit., Tyndale; transv. sec., ×3.2 (Sinclair, 1955).

Mesofavosites Sokolov, 1951b, p. 59 [**M. dualis*; OD; †56, coll. 292, VNIGRI, Leningrad]. Corallum massive, cerioid; corallites thin-walled, prismatic; mural pores on faces as well as at edges of faces of prisms; septal spines present or absent; tabulae subhorizontal. *U.Ord.(Ashgill.)-U.Sil. (Ludlov.),* Eu. (Nor.-Est.-G. Brit.-Podolia-Urals)-Asia (N. Zemlya-Taymyr-Sib. Platf.-NE. Iran-Kazakh.-Tadzhik.-Uzbek.-Salair-NE. USSR)-N. Am. (Alaska)-Australia(Queensl.); *L.Dev.,* Asia(Kazakh.).——Fig. 362,*2a,b.* **M. dualis,* holotype, U.Ord.(Ashgill.), Est., Porkuni; *a,b,* transv., long. secs., ×3.2 (Sokolov, 1951b).

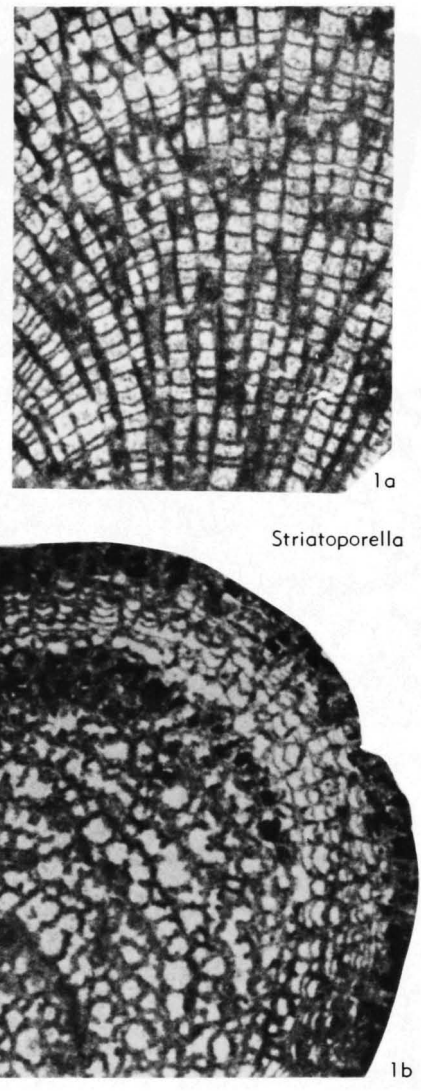


Fig. 360. Favositidae (p. *F*546).

Saffordophyllum Bassler, 1950, p. 267 [**S. deckeri*; OD; syntypes 90998, USNM, Washington]. Corallum cerioid; walls thin, radially fibrous, the fibers directed upward adaxially; walls commonly with 12 longitudinal corrugations, fibers in each projection lengthened to form short, commonly smooth, rarely axially serrated septal ridge; mural pores sparse, bordering angles of corallites; tabulae horizontal, thin [see Flower, 1961, p. 57]. *M. Ord.-U.Ord.(mid.-up.Chazy.-Richmond.),* N.Am. (Texas-Tenn.-Ohio-Ky.-Que.-Anticosti-?Akpatok-C. Calhoun); *up.M.Ord.,* ?Eu.(Est.); *U.Ord.,* Eu. (Nor.)-?Australia (Tasm.)-Asia (Altay-Sib.Platf.). ——Fig. 362,*1a-c.* **S. deckeri,* syntype, Chazy.,

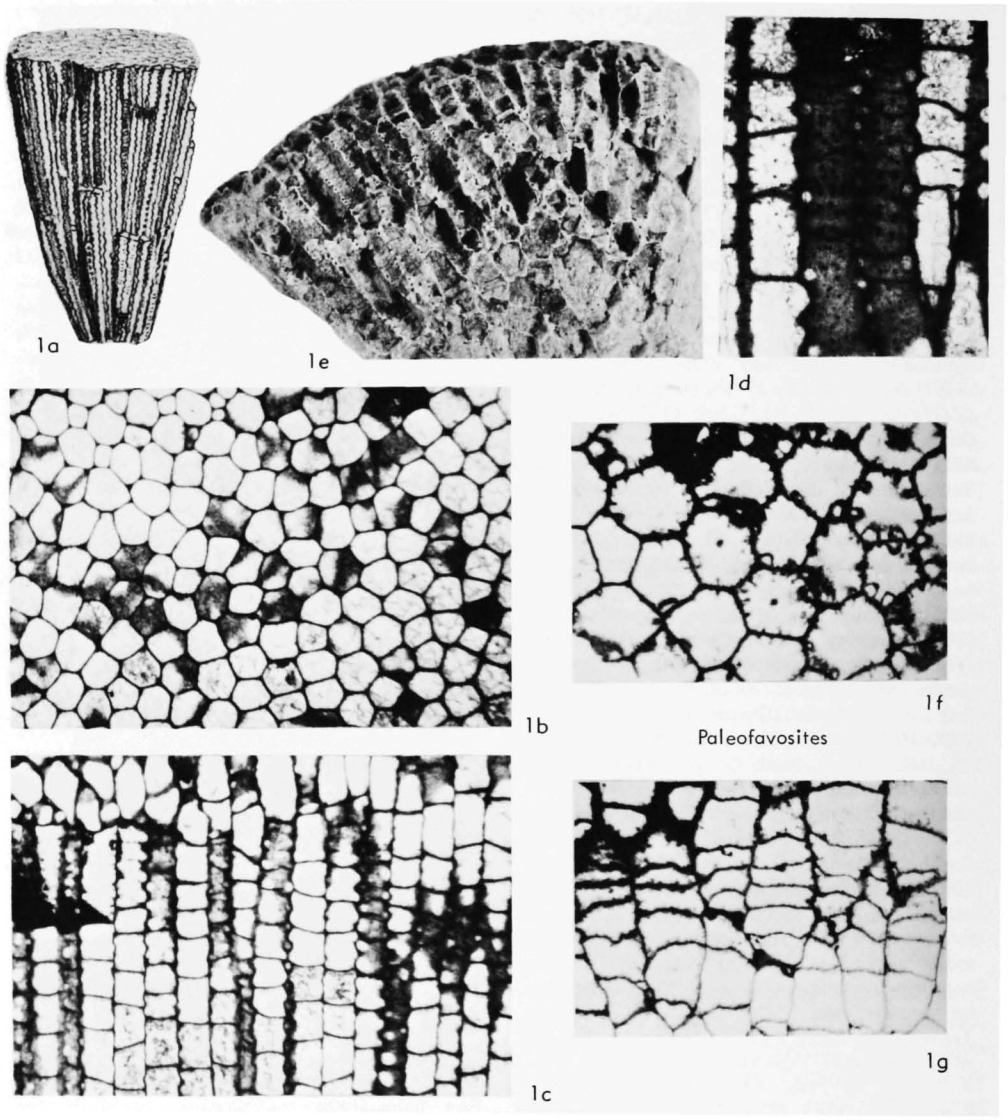


FIG. 361. Favositidae (p. F546-F547).

McLish F., Okla., NW. of Bromide; *a*, long., *b,c*, transv. secs., ×3.2 (Hill, n; USNM no. 90998).

Subfamily PACHYFAVOSITINAE Mironova, 1965

[Pachyfavositinae MIRONOVA, 1965, p. 85] [?=Favositinae DANA, 1946b, which see]

Favositidae with walls significantly thickened especially in the angles so that tabularium is cylindrical; mural pores present; septal elements spines, or squamulae; tabulae complete, transverse. *U.Sil.-U.Dev.*

Pachyfavosites SOKOLOV, 1952b, p. 43, as subgenus of *Favosites* LAMARCK, 1816 [**Calamopora polymorpha* var. *tuberosa* GOLDFUSS, 1826, p. 74; †259, GOLDFUSS Coll., IP, Bonn, figured GOLDFUSS, 1826, pl. 27, fig. 2a; lectotype by SOKOLOV, 1952b, p. 43]. Corallum of moderate size, nodular or elongate; corallites prismatic with moderately thick, dense walls; lumen rounded or rounded-polygonal in transverse section; pores large and well developed in one or two longitudinal rows to a corallite face; tabulae commonly complete; septal spines may be present. *L.Dev.-M.Dev.(Eifel.)* and rarely *U.Dev.(Frasn.)*, Eu.(Pol.-Czech.-U.K.-France-Belg.-Ger.-Podolia-USSR)-N.Afr.-Asia(China-Viet Nam-Urals-Kuzbas-Altaya-C.Asia-Kazakh.-Kolyma Basin)-Australia (New S. Wales-Queensl.)-N. Am. (?Alaska).

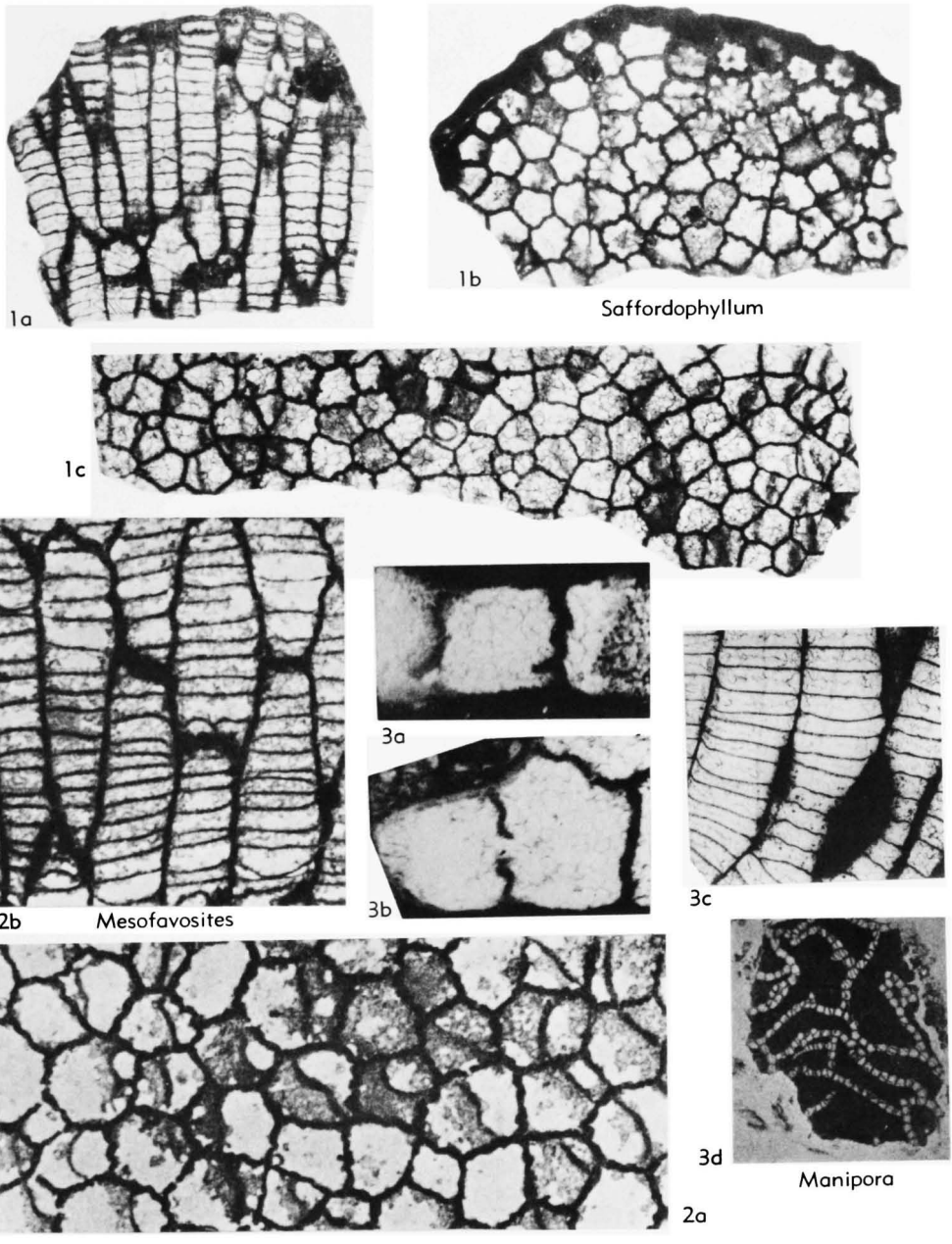


FIG. 362. Favositidae (p. *F*547).

——FIG. 363,*3a,b*. **P. polymorphus* (GOLDFUSS), lectotype, M.Dev., Eifel; *a*, transv. sec. of colony, *b*, transv. and oblique sec., ×2.6 (Lecompte, 1936). **Mesolites** MIRONOVA, 1969a, p. 86 [**Pachyfavosites squamatus* DUBATOLOV, 1959, p. 67; OD; †123-z, ?coll. 546, VNIGRI, Leningrad]. Corallum cerioid; corallites with thick walls, significantly thickened at angles to give cylindrical tabularia; mural pores uniserial; septa represented by squamulae; tabulae complete, commonly transverse. *M.Dev.*, Asia(Altay-Salair-E.Sib.); *U.Dev.*, Asia(Kuzbas).——FIG. 363,*2a-c*. **M. squamatus* (DUBATOLOV), holotype, Frasn., Yaya-Petropavlovsk beds, Kuzbas, right bank R. Kondomy near Osman railway station;

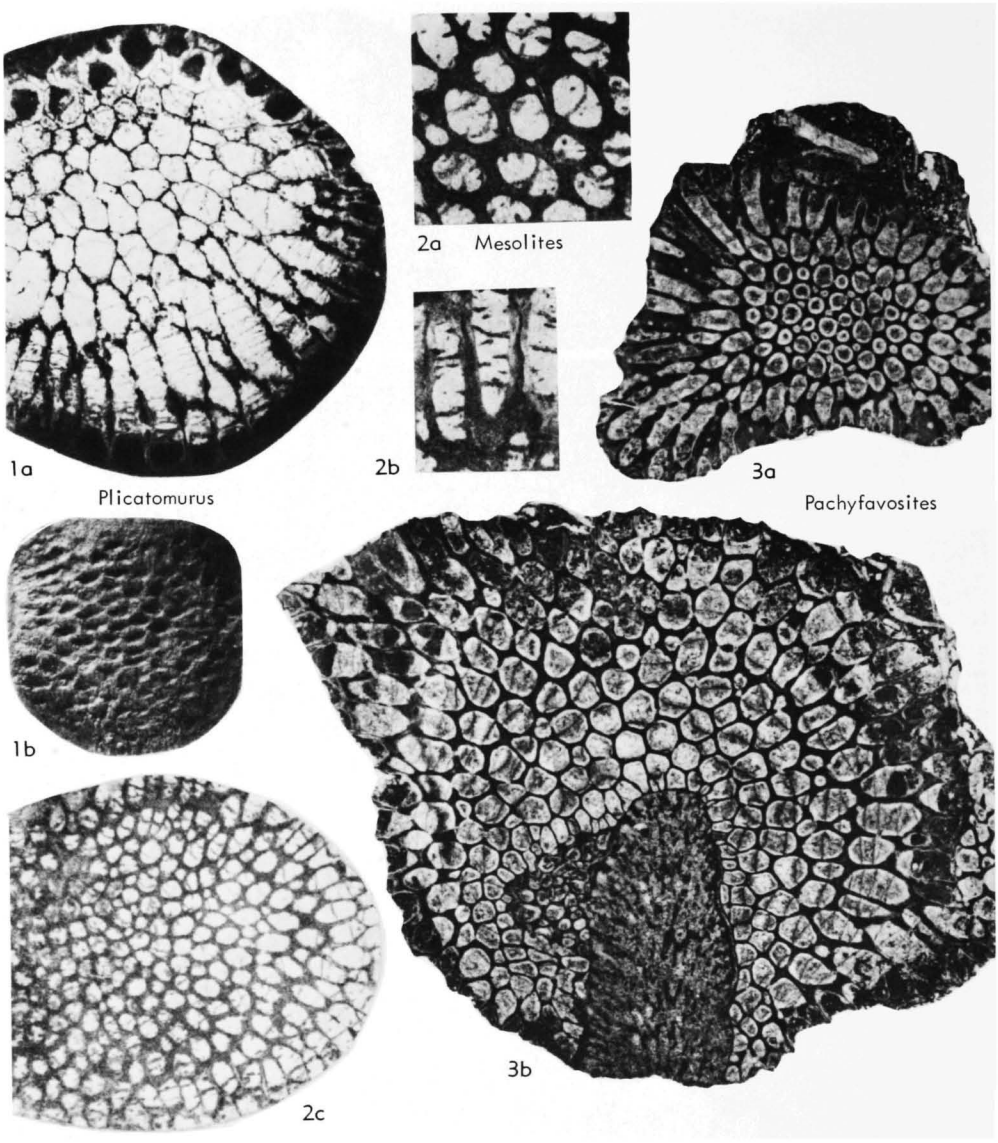


FIG. 363. Favositidae (p. F548-F550).

a,c, transv. secs., ×6.7, ×2.7; *b,* long. sec., ×6.7 (Dubatolov, 1959).

Plicatomurus CHANG, 1959, p. 27 [**P. solidus*; OD; †?in MGU, Moscow]. Corallum cerioid, of variable to spherical form; corallites rounded-polygonal or irregular in section; walls in inner parts of corallum thin, in peripheral parts gradually thickened; microstructure of wall concentric, plicate; median suture distinct; pores arranged on the walls in regular longitudinal rows; septal spines with wide bases; tabulae horizontal or curved. [Bedded appearance of wall possibly in part diagenetic.] *U.Sil.*(or *L.Dev.*), Asia(Kazakh.); *M. Dev.(Givet.),* Asia(Kuzbas).——FIG. 363,*1a,b.* **P. solidus*; holotype, U.Sil. or L.Dev., up. Isen Suite, C. Kazakh.; *a,* transv. sec corallum, *b,* ext. view, ×2.7, ×1.3 (Chang, 1959).

Subfamily EMMONSIINAE Lecompte, 1952

[Emmonsiinae LECOMPTE, 1952, p. 513]

Favositidae with septa represented mainly by squamulae, which may form scoops below or eaves above pores; pore rows commonly evenly spaced on faces. *U.Sil.-M. Dev.; L.Carb.-L.Perm.*

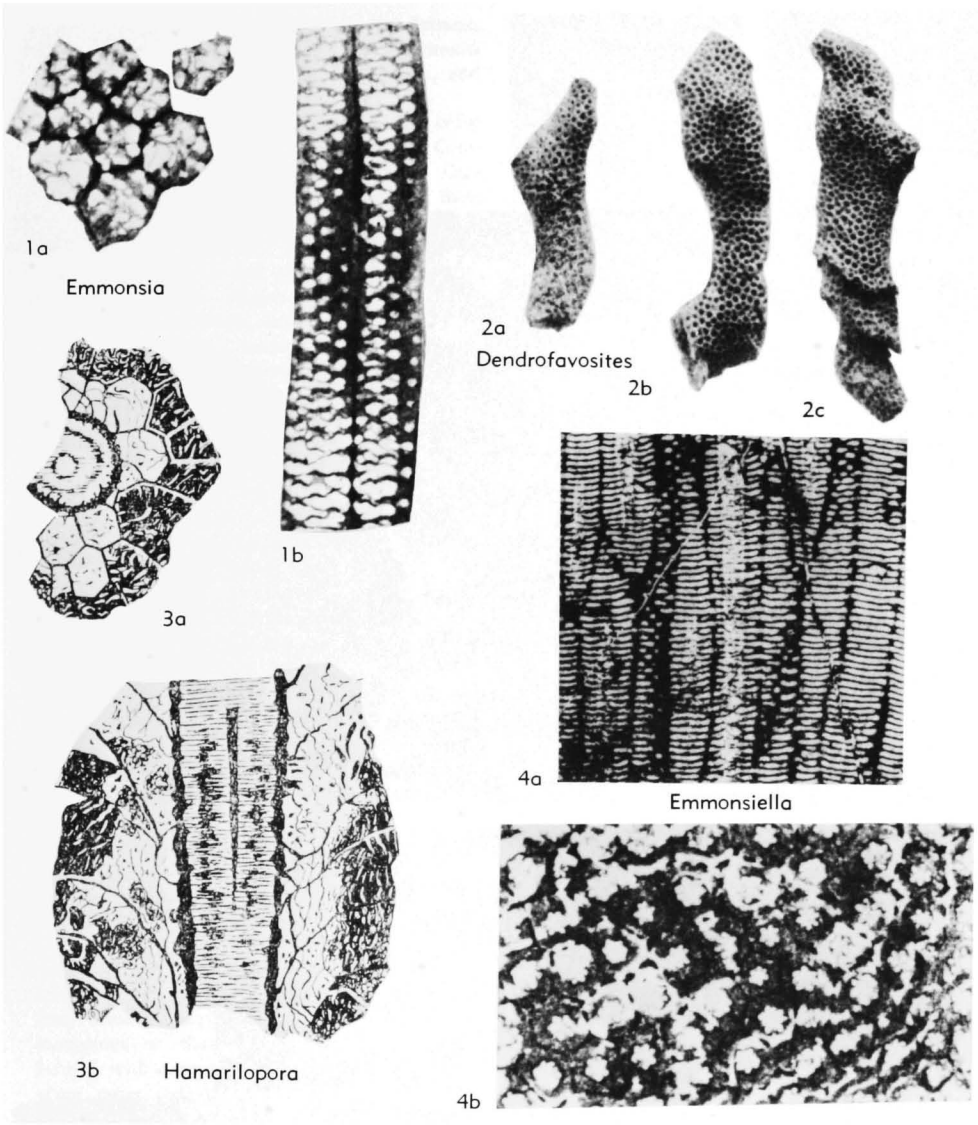


FIG. 364. Favositidae (p. *F*550-*F*553).

Emmonsia MILNE-EDWARDS & HAIME, 1851, p. 152 [**E. hemispherica* (YANDELL & SHUMARD) MILNE-EDWARDS & HAIME, 1851, p. 247; SD ROEMER, 1883, p. 423]. Corallum cerioid, hemispherical or tuberose; corallites prismatic, walls thin to moderately thick, with squamulae that project almost to axis; favositoid spines rare to ?absent; pores numerous, large, commonly triserial; tabulae thin, subordinate to and commonly suspended from inner ends of squamulae. *M.Dev.*, Asia(Urals-Viet Nam)-N. Am. (N. Y.-Ind.-Ky.-Ohio-Mich.-Ont.). ——FIG. 364,*1a,b*. **E. emmonsii* (ROMINGER), M.Dev., Ind., Ky., Falls of the Ohio; *a,b*, transv., long. secs., ×5 (Hill, n; UQF4357). [*E. hemispherica* MILNE-EDWARDS & HAIME embraces two forms, *Favosites alveolaris* (GOLDFUSS) HALL, 1843, p. 158 (renamed *Favosites emmonsii* HALL, 1876, explanation of pl. ix) and *F. hemispherica* YANDELL & SHUMARD, 1847, p. 7; *F. emmonsii* HALL also embraces two forms, *Emmonsia emmonsii* (HALL) and *Favosites halli* FENTON & FENTON, 1936, p. 27; FENTON & FENTON (1936, p. 23) designated *E. emmonsii* (HALL) restricted FENTON & FENTON (1936, p. 35) as lectotype species of *Emmonsia,* and chose 3426/8, NYSM, Albany, as its lectotype. See LANG, SMITH, & THOMAS, 1940, p. 56. STUMM, 1965, p. 66, regards *Favosites emmonsii* ROMINGER, 1876 (p. 27, pl. 7, fig. 1,

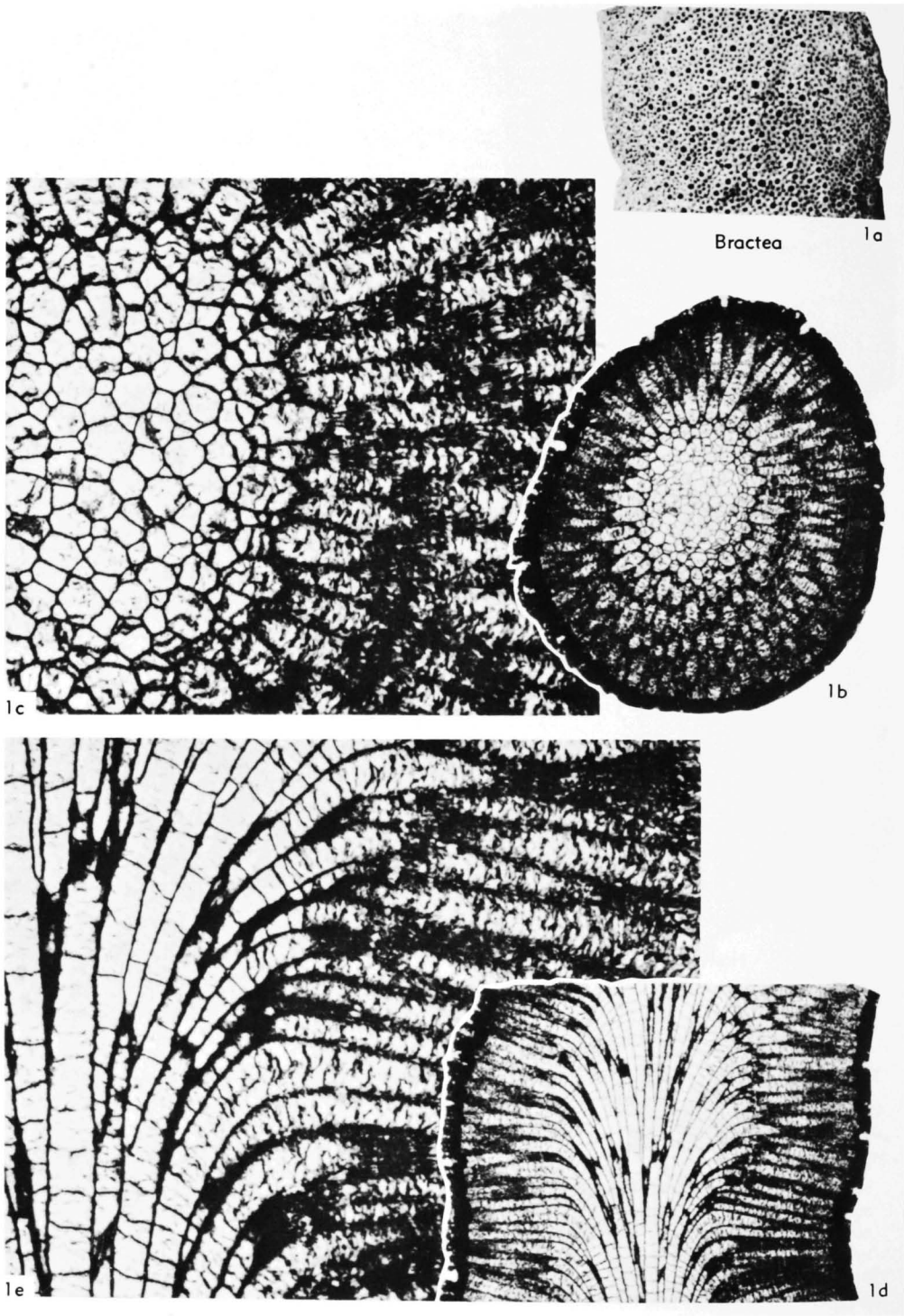


FIG. 365. Favositidae (p. *F553*).

8449, lectotype, UMMP, Ann Arbor, by STUMM, 1965, p. 66) as conspecific with *E. emmonsii* (HALL) as restricted by FENTON & FENTON, and also as having priority in publication.]

Bractea OLIVER, 1975b, p. D6 [**Favosites arbor* DAVIS, 1887, pl. 22; OD; †8496a, MCZ, Cambridge; lectotype by OLIVER, 1975b, p. D7]. Corallum branching or massive; corallites like those of *Lecfedites* OLIVER, 1975b, except that both large and small corallites have squamulae and suspended tabulae in late stages. *L.Dev.(Ems.)-M.Dev.(?low.Eifel.)*, N.Am.(Ky.).——FIG. 365, *1a-e*. **B. arbor* (DAVIS), lectotype, Ems., Falls of the Ohio, Louisville; *a*, surface, ×1.0; *b,c*, transv. secs., ×1.5, ×5.0; *d,e*, long. secs., ×1.5, ×5.0 (Oliver, 1975b).

?**Dendrofavosites** RUKHIN, 1937, p. 11, as subgenus of *Favosites* LAMARCK, 1816 [**Favosites digitatus* ROMINGER, 1876, p. 39; OD; †8484, ROMINGER Coll., UMMP, Ann Arbor; lectotype by STUMM, 1949, card Tabulata 197] [?=*Thamnopora* STEININGER, 1831, Pachyporicae, Pachyporidae, but squamulae if proved would differentiate it]. Corallum caespitose, of subparallel anastomosing fingerlike branches; corallite walls stout, outlines of calices polygonal; mural pores large; tabulae present, regular or incomplete and reinforced or replaced by horizontal 'squamulae' arranged in fewer than 12 longitudinal rows on walls. [In opinion of STUMM & TYLER, 1964, p. 26, squamulae are absent.] *M.Dev.*, N.Am.(Mich.).——FIG. 364, *2a-c*. **D. digitatus* (ROMINGER), Transverse Gr., N. fork Thunder Bay R.; *a,b*, syntypes, ext. views, ×1; *c*, lectotype, ext. view, inverted, ×1 (Rominger, 1876).

Emmonsiella KIM, 1971c, p. 141 [**E. ornata*; OD; †sample 6/1b-260, coll. 9490, TsGM, Leningrad]. Corallum favositoid, corallites thin-walled, prismatic, regularly parallel; numerous squamulae developed at successive horizontal levels in the corallites, those of each level in a corallite laterally contiguous so that an annular septal plate is formed with a rounded or stellate (thorny) axial edge; pores well-developed, on the faces of the corallites and between the annular plates, in one or more longitudinal rows; tabulae thin, intersecting, suspended from the axial edges of the annular plates. *?U.Sil.(above Ludlov.)*, Asia (Turkestan Ra.).——FIG. 364,*4a,b*. **E. ornata*, holotype, R. Isfara, Turkestan Ra.; *a,b*, long., transv. secs., ×6 (Kim, 1971c).

?**Hamarilopora** LE MAÎTRE, 1956a, p. 1339 [**H. minima*; OD; †565,a,b,c, LE MAÎTRE Coll., GFC, Lille]. Corallum mufflike, encircling crinoid stems; corallites prismatic, diverging from crinoid stem to open approximately normal to surface of colony, and of two sizes, the larger surrounded by an aureole of the smaller; walls moderately thick, of fibers normal to median suture; septa represented by spines and by squamulae?; tabulae ?sparse [mural pores not mentioned]. *L.Dev.*

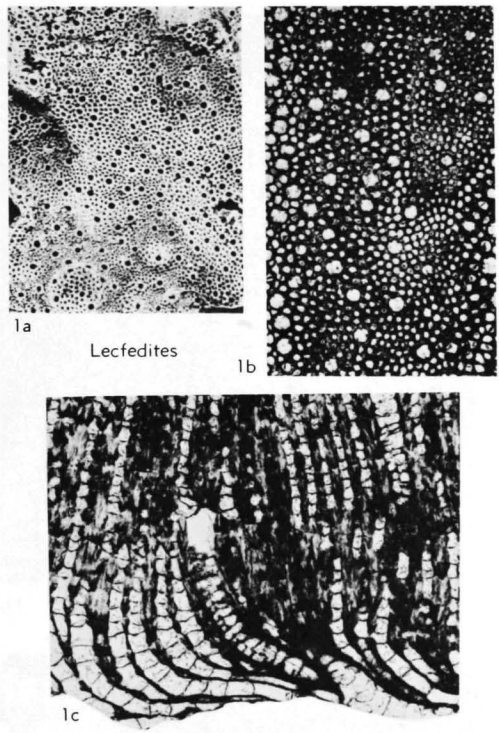
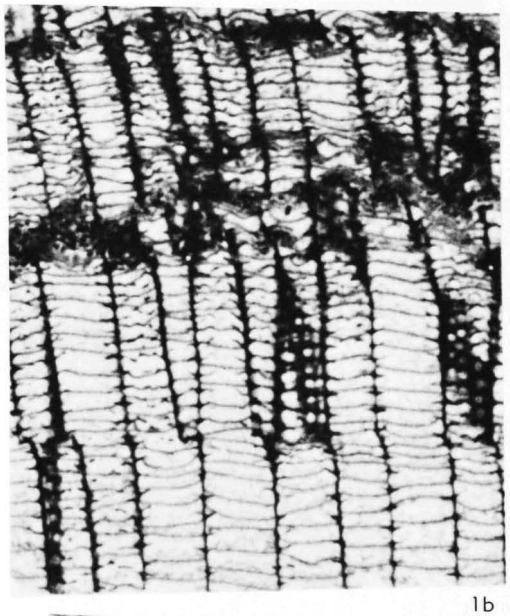


FIG. 366. Favositidae (p. *F*553).

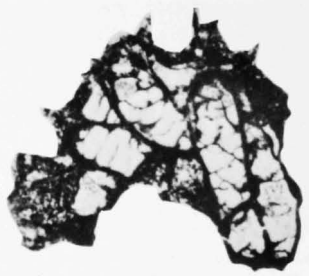
(Siegen.)-M.Dev.(low.Eifel.), N.Afr.(Moroc.-Alg.).——FIG. 364,*3a,b*. **H. minima*, low. Eifel., Moroc., Hamar Laghdad, Tafilelt; *a,b*, tang., long. secs., ×5 (Le Maître, 1956a).

Lecfedites OLIVER, 1975b, p. D5 [**Fistulipora canadensis* BILLINGS, 1858, p. 165; OD; †3387, GSC, Ottawa; lectotype by STUMM, 1949, card 236]. Corallites of two sizes; large ones with protruding calical rims and more rounded cross sections and with closely spaced squamulae with suspended tabulae, and small ones with more polygonal cross sections and with complete, widely spaced tabulae but lacking squamulae; all corallites with mural pores and lacking septal spines; early stages of all corallites are reptant with vaulted growth form and thin favositoid walls, later stages erect with thickened walls. *L.Dev.(Ems.)-M.Dev.(?low. Eifel.)*, N.Am.(N.Y.-Ont.-Ky.).——FIG. 366,*1a-c*. **L. canadensis* (BILLINGS); *a*, lectotype, Ont., near Port Colborne, surface, ×1.0; *b,c*, another specimen, N.Y., Williamsville, transv., long. secs., ×2.5, ×5.0 (Oliver, 1975b).

Mariusilites MIRONOVA, 1974a, p. 104 [**Caliapora chaetetoides* LECOMPTE, 1939, p. 138; OD; †452, Pl. Couvin, 7965, IRSN, Brussels] [?=*Squameofavosites* CHERNYSHEV, 1941a, which see]. Subhemispherical; corallites very slender, prismatic, directed perpendicular to surface; walls thin, with

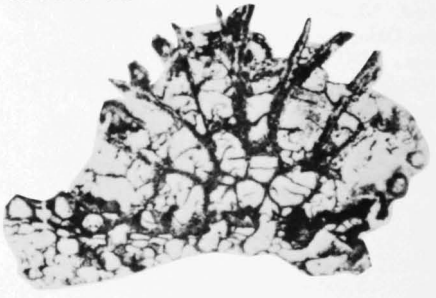


1b

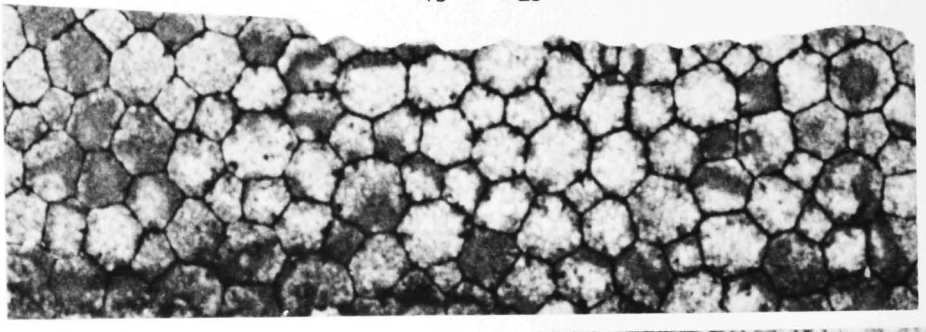


2a

Sutherlandia

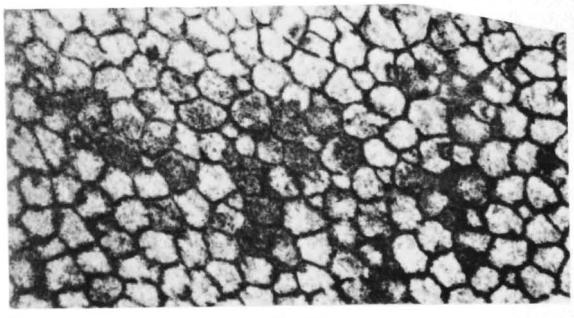


2b



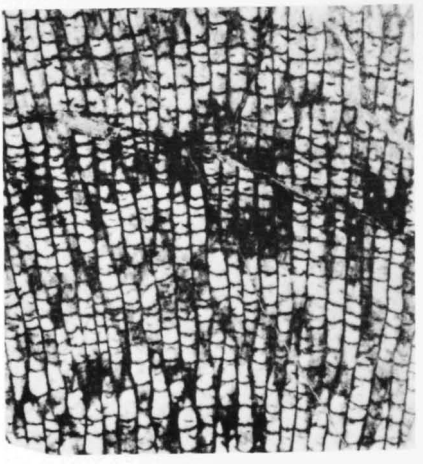
1a

Squameofavosites



3a

Mariusilites



3b

FIG. 367. Favositidae (p. *F*553-*F*557).

uniserial pores on prism faces; squamulae commonly opposite on adjacent corallites, subhorizontal, slightly concave upward, bases not or slightly thickened; spines absent; tabulae complete, flat or

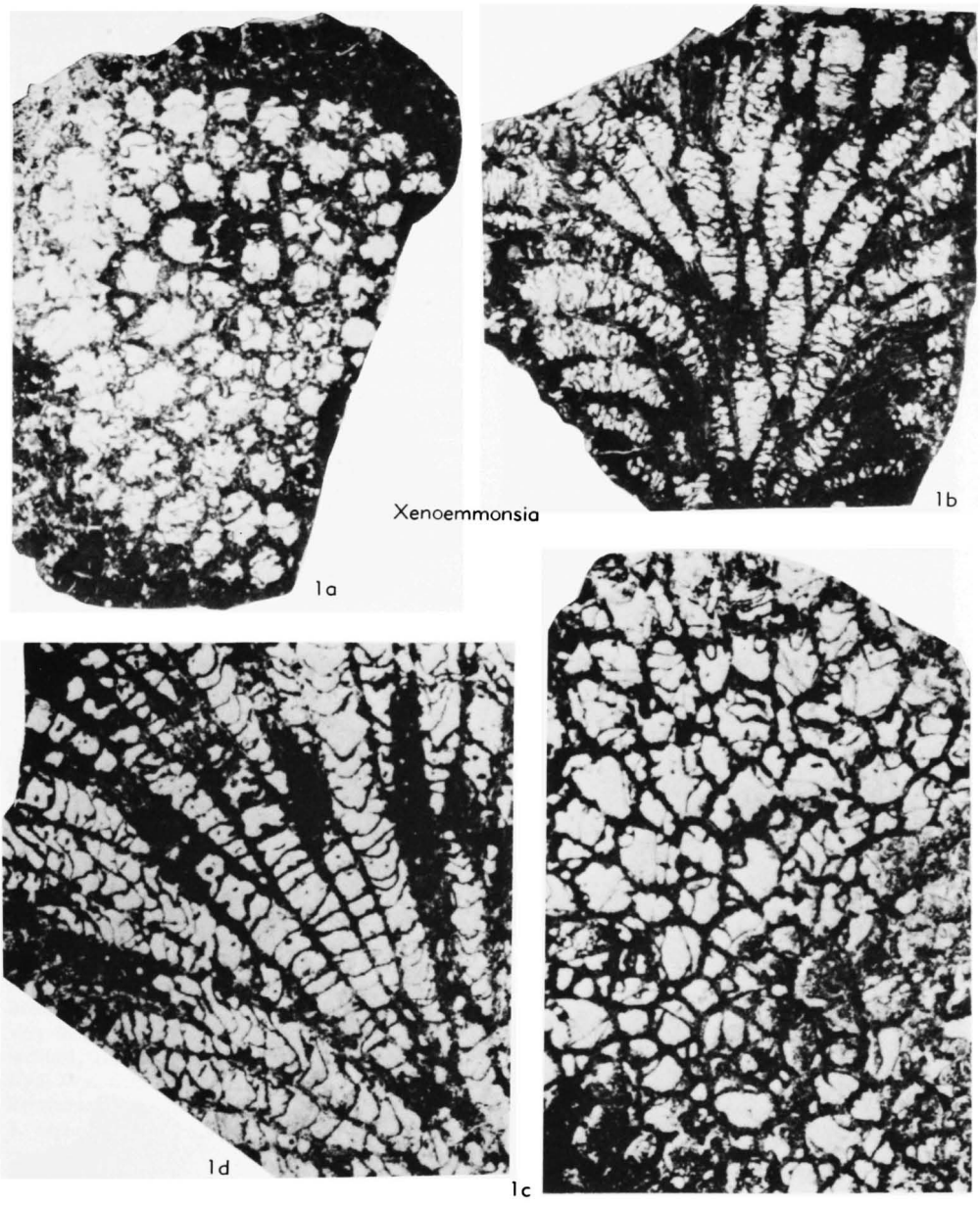


FIG. 368. Favositidae (p. *F557*).

slightly concave, not on same levels in adjacent corallites. *L.Dev.*, Asia(Mt.Altay); *M.Dev.(Couvin.)*, Eu.(Belg.).——FIG. 367,*3a,b*. **M. chaetetoides* (LECOMPTE), holotype, Couvin., Co_{2b}, Belg.; *a,b*, transv., long. secs., ×8, ×4 (Lecompte, 1939).

Squameofavosites CHERNYSHEV, 1941a, p. 24 [**Favosites hemisphericus* var. *bohemica* POČTA, 1902, renamed *Squameofavosites cechicus* GALLE, 1978, p. 47; OD; †47 (PV6,7 in POČTA Coll.), NM, Prague; lectotype by DUBATOLOV & SMIRNOVA, 1964, p. 44; *non Favosites bohemicus* POČTA, 1902, p. 241, *nec F. bohemicus* MAURER, 1896, p. 632; see GALLE, 1978, p. 49] [?=*Mesosolenia* MIRONOVA, 1960, Multisoleniidae, Multisoleniinae; ?*Mariusilites* MIRONOVA, 1974a, which see]. Corallum favositoid, walls of corallites somewhat thickened, squamulae more common than spines and

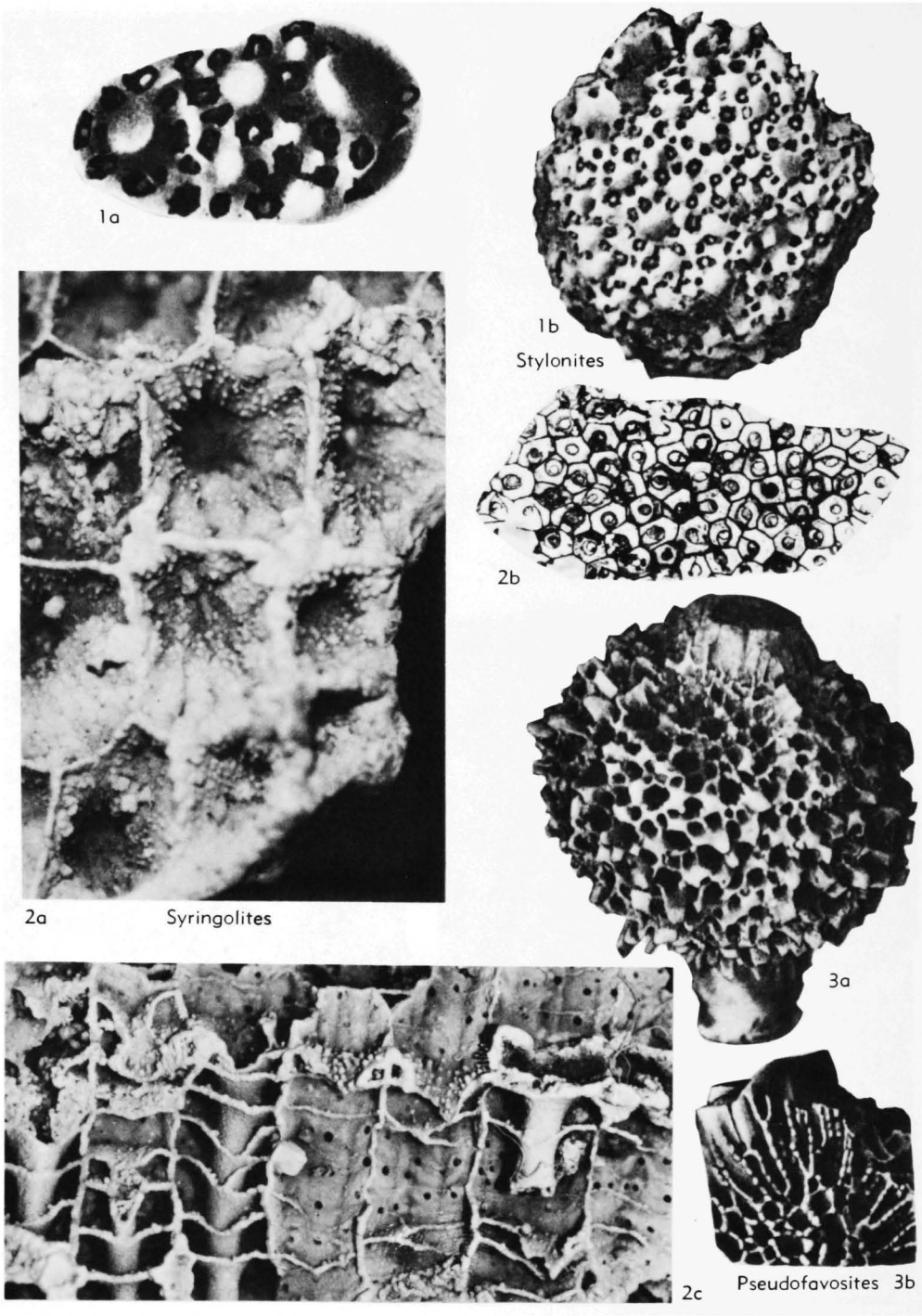


FIG. 369. Pseudofavositidae (1, 3); Syringolitidae (2) (p. *F557*).

commonly paired in neighboring corallites and developed as linguiform projections mainly from upper rims of pores and thinning toward axial ends; mural pores in one to four longitudinal rows on each wall-face, commonly large; tabulae mostly complete, but some suspended from squamulae, which they outnumber [see also KRAICZ, 1937, p. 53, and GALLE, 1978, p. 49]. *U.Sil.-low.M.Dev.*, Eu.(Czech.-Podolia-Urals)-Asia(Salair-SW.Kuzbas-Altay-NE. USSR-Taymyr-Viet Nam)-Australia (Tasm.-Vict.-New S.Wales-Queensl.)-N.Z.-N.Am.-N.Afr.(Moroc.).——FIG. 367,*1a,b*. **S. bohemicus* (POČTA), lectotype, Prag., Czech., Koněprusy; *a,b*, transv., long. secs., ×4 (Hill, n; photographs courtesy W. A. Oliver).

Sutherlandia COCKE & BOWSHER, 1968, p. 2 [**S. irregularis*; OD; †5654, OU, Norman]. Spherical coralla commonly adherent to crinoid stems; corallites thick-walled, lumina cylindrical; mural pores large; squamulae numerous, thin, convex or concave upward; faint septal ridges may be present, septal spinules ?absent; tabulae absent [see WEYER, 1972a, p. 33]. *L.Carb.(Tournais.-Visean)*, Eu.(U.K.-Eire-Ger.)-Asia(China); *Miss.*, N.Am.(Mo.); *U.Carb.*, Eu.(U.K.)-Asia(China); *Penn.*, N.Am.(Okla.-Kans.); *L.Perm.(Artinsk.)*, Eu.(Urals).——FIG. 367,*2a,b*. **S. irregularis*, holotype, Penn., Dewey F., Okla., Washington Co.; *a*, thin. sec., ×6; *b*, another specimen, same locality, encrusted on bryozoan colony, ×6 (Cocke & Bowsher, 1968).

Xenoemmonsia LELESHUS, 1971d, p. 150 [**X. crassima*; OD; †232a/46, coll. 901, UpG, Dushanbe] [*?=Squamites* LELESHUS, 1971d, p. 151 (type, *S. nodosus*, OD; †11/23, coll. 901, UpG, Dushanbe; up.L.Dev., Zeravshan Ra.)]. Corallum cerioid, irregularly spherical or nodular, small; corallites prismatic, with thick walls formed of short radial longitudinal trabeculae; mural pores commonly on the prism faces, a few placed near angles; in places where wall is very thick pores become tunnels; squamulae numerous, tonguelike, very long and thin; tabulae sparse, horizontal or inclined, attached either to wall or to squamulae. *Up.L.Dev.*, C.Asia.——FIG. 368,*1a,b*. **X. crassima*, Zeravshan Ra.; *a*, holotype, transv. sec., ×4; *b*, topotype, long. sec., ×4 (Leleshus, 1971d). ——FIG. 374,*1c,d*. *?X. nodosa* (LELESHUS), holotype, Zeravshan Ra.; *c,d*, transv., long. secs., ×4 (Leleshus, 1971d).

Family PSEUDOFAVOSITIDAE Sokolov, 1950

[*nom. transl.* MIRONOVA, 1969b, p. 149, *ex* Pseudofavositinae SOKOLOV, 1950a, p. 165]

Favositoid colonies; walls may be distally produced at angles between corallites as short, coarse aporose spines; septa 12, lamellar at base, acanthine adaxially; mural pores present; no tabulae known. *U.Perm.*

Pseudofavosites GERTH, 1921, p. 101 [**P. stylifer*; M; syntypes 33, 34, WANNER Coll., IP, Bonn and 11800, 11801, TH, Delft]. Corallum subspherical, cerioid, commonly encircling crinoid stems; walls may be distally produced at angle between corallites as short, coarse, aporose spines; septa 12 (HEHENWARTER, 1951, p. 62), short, lamellar at base, acanthine adaxially; mural pores present between septa and within septal bases between spines; no tabulae. *U.Perm.*, Asia(Timor).——FIG. 369,*3a,b*. **P. stylifer*, syntypes, Basleo; *a*, ext. view, ×1.3; *b*, colony with strongly thickened skeleton, ×1.3 (Gerth, 1921).

?Stylonites GERTH, 1921, p. 104, *non Stylonites* FRIES, 1848, a protozoan [**S. porosus*; M; figured syntype 11802, TH, Delft]. Like *Pseudofavosites* but septa number five ?(or eight), and in each corallite are connected with an axial columella; wall pores occur between septa. [Insufficiently known.] *U.Perm.*, Asia(Timor).——FIG. 369,*1a,b*. **S. porosus*, syntype, Timor, Noil Tonini; *a*, ext. view, ×4.0; *b*, ext. view, ×2.0 (Gerth, 1921).

Family SYRINGOLITIDAE Waagen & Wentzel, 1886

[*nom. transl.* SOKOLOV, 1950a, p. 165, *ex* Syringolitinae WAAGEN & WENTZEL, 1886, p. 844]

Tabular to hemispherical coralla with tightly contiguous prismatic corallites, the common walls with pores; septa represented by very short spines developed in radial rows on the upper surfaces of tabulae; tabulae infundibuliform, their downturned axial edges forming a persistent axial tube that may bear spines and be crossed by small, flat tabellae [see HILL & JELL, 1970a, p. 172]. *L.Sil.-M.Sil.; L.Dev.*

Syringolites HINDE, 1879, p. 244 [**S. huronensis*; OD; †R19949, BM(NH), London; lectotype by HILL & JELL, 1970a, p. 173]. Cerioid coralla; corallites small, thin-walled with mural pores; with spines developed in radial rows on upper surfaces of tabulae; tabulae widely spaced, infundibuliform, the axially downturned edges forming a continuous and regular axial tube that is crossed by small, flat or saucered tabellae; axial tube not diverted to open into a mural pore. *L.Sil.(Llandov.)*, N.Am.(Ont.); *L.Sil.-M.Sil.*, Eu.(Gotl.-Est.). ——FIG. 369,*2a-c*. **S. huronensis*, Llandov., Manitoulin Dol., Ont., near Manitouwaning, Manitoulin Is., L. Huron; *a*, calical view, ×10.0 (R19984); *b*, transv. sec., ×2.0; *c*, lat. view, ×7.0 (R19947) (Hill & Jell, 1970a).

?Ohnopora MINATO & MINOURA, 1977, p. 559 [**O. hayasakai*; OD; †R30190-3, UH, Sapporo]. Discoid, corallites commonly rectangular in section, growing and dichotomising radially and horizontally; tabulae on same level in neighboring corallites; each corallite has two tubes piercing its

tabulae and growing radially and longitudinally in the corallum, its tubes connected by canals in the mid-planes of the tabulae; common walls may have pores. [Systematic position problematical; horizontal canals in tabulae otherwise unknown in the Tabulata.] *L.Dev.*, Asia(Japan).

GENERIC NAMES BASED ON FAVOSITIDS WITH COMMENSALS OR WITH (?) PRIMARY OR DIAGENETIC STRUCTURES AT ANGLES OF JUNCTION OF CORALLITES

For review of commensalism in favositids see OEKENTORP, 1969, p. 165; for an interpretation of nodal structures within median suture at angles of junction of corallites, see FLÜGEL, 1973a, p. 54.

Actinopora VINASSA DA REGNY, 1918, p. 98 [Syntype species: *A. carnica,* †unknown, M.Dev., Givigliana, Carnic Alps, favositid, possibly *Favosites; Favosites asteriscus* FRECH, 1899, p. 196, †unknown, up.M.Dev., Hwalingpu, Sze-chuan, China, favositid *Squameofavosites* or possibly *Emmonsia; Favosites proasteriscus* CHARLESWORTH, 1914, p. 373, †unknown, L.Dev., Wolayer Thorl, Carnic Alps, favositid, possibly *Favosites.*] [SOKOLOV (1948, p. 108) referred the commensals of *F. asteriscus* and *F. proasteriscus* to *Asterosalpinx* SOKOLOV, 1948, p. 106 (type, *A. asiaticus*)].

Asteriophyllum V. B. PORFIRIEV, 1937, p. 30 [**A. aenigmaticum*; M; †unknown; up.L.Dev. or low. M.Dev., E. slopes Urals; favositid, possibly *Favosites*]. [SOKOLOV named nodal structures at angles of walls *Actinosalpinx uralensis* (SOKOLOV, 1962b, p. 47); similar structures in *Favosites stellaris* CHERNYSHEV (1937b, p. 80), named *Asterosalpinx asiaticus* (SOKOLOV, 1948, p. 106), are considered by FLÜGEL (1973a, p. 58) primary trabecular structures distinguishing a valid favositid genus *Asteriophyllum* V. B. PORFIRIEV, 1937.]

Gephuropora ETHERIDGE, 1920, p. 60 [**Favosites (?Columnopora) duni*; M; syntypes 4474, 4700, 4784, 4813, 4840, AM, Sydney; L.Dev., Taemas, New S.Wales; favositid, possibly *Favosites,* but see MIRONOVA (1971, p. 41) for different opinion; commensal named *Phragmosalpinx australiensis* by SOKOLOV (1948, p. 106)].

Moyerolites SOKOLOV, 1955, p. 157 [**M. sibiricus*; OD; †16, coll. 599, VNIGRI, Leningrad; M.Sil. (Wenlock.), R. Moyero, Sib. Platf., symbiosis between *Favosites* and stromatoporoid] [See SOKOLOV & TESAKOV, 1963, p. 58. Subfamily Moyerolitinae SOKOLOV, 1955, p. 157 was used to include this genus. For discussion of commensalism and commensal worms, see section on symbiosis and parasitism in the Tabulata introduction.]

Parafavosites ORLOV, 1930, p. 122; 1931, p. 502 [**P. ferganensis*; SD LANG, SMITH, & THOMAS, 1940, p. 96; †unknown; Sil., Wenlock, bank of R. Isfara, S. of Natsch, Ferghana; favositid, probably *Favosites*; commensal is *Chaetosalpinx ferganensis* SOKOLOV, 1948, p. 106] [=*Parallelo-porella* STRAND, 1934, p. 271, *non Parellelopora* BARGATSKY, 1881, a stromatoporoid, *nom. subst. pro Parallelopora* HOLTEDAHL, 1914, p. 13 (type, *P. favositiformis,* OD; †no trace in USNM, Washington; U.Sil., ?Ludlov., Ser. B, Arctic Can., valley S. of Borgen, SW. Ellesmereland), favositid, probably *Favosites,* but see MIRONOVA, 1974a, p. 41, for different opinion; commensal probably *Chaetosalpinx* SOKOLOV, 1948, p. 106].

Family MULTISOLENIIDAE Fritz, 1950

[*nom. correct.* SOKOLOV, 1955, p. 152, *pro* Multisolenidae FRITZ, 1950, p. 116] [=Multisolenida FRITZ, 1950, p. 116, order] [incl. Antherolitinae SOKOLOV, 1955, p. 148]

Corallum favositoid, pseudomeandroid; corallites thin-walled, cylindroprismatic, each with longitudinal series of rounded, more or less regularly spaced, radial protuberances, each such extension communicating through large mural pore with similar projection from another corallite; pores may be with or without pore diaphragms; midwall pores, or paleofavositoid angle-pores may occur in some; septa when present commonly in 6 or 12 longitudinal series of spines (Multisoleniinae), but in some (Antherolitinae) laminar; tabulae horizontal or oblique, commonly developed between the protrusions. *U.Ord.-?L.Dev.*

Subfamily MULTISOLENIINAE Fritz, 1950

[*nom. transl.* MIRONOVA, 1963, *fide* KIM, 1971b, p. 132; MIRONOVA, 1965, p. 85]

Multisoleniids with septa represented by more or less well-developed septal spines. *U.Ord.-U.Sil., ?L.Dev.*

Multisolenia FRITZ, 1937, p. 231 [**M. tortuosa*; OD; †1154, ROM, Toronto] [=*Polysolenia* WEISSERMEL, 1939, p. 65, *nom. van.*]. Corallum cerioid, pseudomeandroid; corallites thin-walled, cylindroprismatic, each with up to four longitudinal rows of more or less regularly spaced, rounded, radial protuberances, each meeting a similar one from another corallite in a large pore which may have a pore diaphragm; corallites thus connected normally have no prism face in common; tabulae subhorizontal, complete; septal spines sparse. [LELESHUS, 1970b, p. 65, considered 12 specific names to be subjective synonyms of 3 specific names.] *Sil.*, ?N.Afr.-Eu.(U.K.-Gotl.-Est.-Podolia-Czech.)-Asia (Urals-Arctic-Sib. Platf.-Kazakh.-Kuzbas-NE. USSR-China)Australia (New S. Wales-Queensl.)-N. Am.(Ont.-Que.-Manit.-Yukon-Alaska-Mich.).——FIG. 370,*1a,b.* **M. tortuosa,* M.Sil.(Niag.), Thornloe F., Can., Mann I. (=Burnt I.), L.Timiskaming, Ost.-Que.; *a,b,* long., transv. secs., ×10, ×4 (Bolton, 1965).

?**Mesosolenia** MIRONOVA, 1960, p. 95 [**Favosites festivus* CHERNYSHEV, 1951, p. 26; OD; †11, coll. 5725, TsGM, Leningrad] [?=*Squameofavosites* CHERNYSHEV, 1941a, Favositidae, Emmonsiinae; *?Mesosoleniella* LIN MS in LI *et al.*, 1975, p. 207 (type, *M. decorasa*, OD; †N39-1, AGS, Peking; M.Sil., Ningqiang, Shensi)]. Corallum cerioid, corallites small, of uniform size, five- or six-sided, a single longitudinal series of large pores on each side, pores occupying full width of side; in addition in places at angles of corallites radial protuberances ?(eaveslike squamulae) may occur with pores at their ends; septal spines numerous, small, triangular ?(squamulae); tabulae flat, commonly on one level in neighboring corallites. *M.Sil.*, Eu.(Arctic Urals)-Asia(Sib.Platf.); *?M.Sil.*, Asia(Shensi); *?U.Sil.*, Asia(Salair-Sib.Platf.); *?L. Dev.*, Australia(Vict.-New S.Wales).——FIG. 371, *1a,b*. **M. festiva* (CHERNYSHEV), holotype, ?U.Sil., Kuzbas, left bank of R. Chumysh, Mt. Glyaden; *a,b*, transv., long. secs., ×4 (Chernyshev, 1951).

Priscosolenia KLAAMANN, 1964, p. 40 [**Multisolenia prisca* SOKOLOV, 1951b, p. 54; M; †52, coll. 292, VNIGRI, Leningrad] [=*Priscosolenia* SOKOLOV, 1962a, p. 58, *nom. nud.*]. Corallites cylindroprismatic with thin walls with paleofavositoid angle-pores and in addition, pores at ends of radial protuberances (solenia); septal spines thick, numerous and long, reaching almost to axis, commonly in 12 longitudinal series; tabulae thin, horizontal or inclined and supplemented by oblique tabellae. *U.Ord.(Porkuni Stage)*, Eu.(Est.).——FIG. 371,*2a,b*. **P. prisca* (SOKOLOV), holotype, Est., Porkuni; *a,b*, transv., long. secs., ×4 (Sokolov, 1951b).

?**Sparsisolenia** STASINSKA, 1967, p. 74 [**S. kiaeri*; OD; †51428, PM, Oslo]. Corallum cerioid, corallites prismatic, rarely pseudomeandroid, slender, thin-walled; radial pore protuberances sparse; septal spines weakly developed; tabulae widely spaced, thin. *L.Sil.(Llandov.)*, Eu.(Nor.).——FIG. 371, *3a,b*. **S. kiaeri*, holotype, Ser. 7, Nor., Skien; *a,b*, transv., long. secs., ×4 (Stasinska, 1967).

Subfamily ANTHEROLITINAE Sokolov, 1955

[Antherolitinae SOKOLOV, 1955, p. 148]

Corallum cerioid, corallites slender with roundly stellate outline; walls thin, with large pores near or at angles between faces; pores may be at ends of radial protuberances so that corallum appears meandroid in part in transverse section; septa six, laminar basally, ?spinose axially. *M.Sil.(Wenlock.)*.

Antherolites SOKOLOV, 1955, p. 148 [**A. septosus*; OD; †30, coll. 599, VNIGRI, Leningrad] [=*Spinopora* SOKOLOV, 1950a, p. 164, *nom. nud., non Spinopora* DE BLAINVILLE, 1830, a bryozoan; *?Somphoporella* LIN MS in LI *et al.*, 1975, p. 204 (type, *S. ningqiangensis*, OD; †N33-5, AGS, Peking; M.Sil., Ningqiang, Shensi)]. Corallum small, hemispherical calices of corallites roundly stellate in transverse section; walls thin, septa six, laminar basally; mural pores large, at edges of faces of corallites, may be on radial protuberances so that corallum appears meandroid in part in transverse section. *M.Sil.(Wenlock.)*, Asia(Kazakh.); *?M.Sil.*, Asia(Shensi).——FIG. 372,*1a,b*. **A. septosus*, holotype, Wenlock, C.Asia, Balkhash area; *a,b*, transv., long. secs., ×4 (Sokolov, 1955).

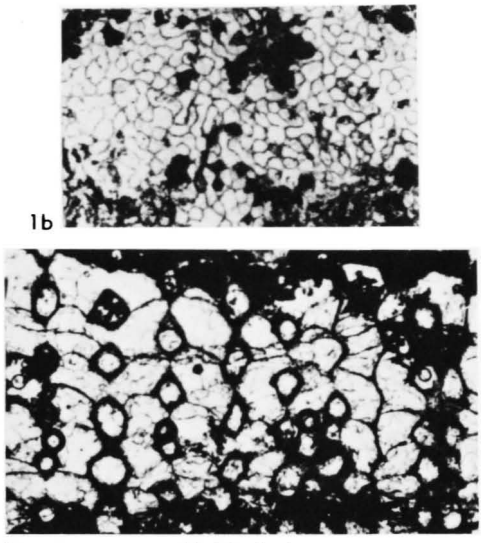


FIG. 370. Multisoleniidae (p. *F*558-*F*559).

Family AGETOLITIDAE Kim, 1962

[*nom. transl.* KIM, 1965a, p. 53, *ex Agetolitinae* KIM, 1962, p. 117]

Corallum cerioid with pores at angles between two, three, or four corallites, or also on the faces; septa continuous and laminar at their peripheral edges, may be spinose axially; near angles between side walls, septa may be represented by squamulae; tabulae complete, horizontal or concave or convex. [KIM (1971a, p. 40; 1974, p. 121) considers the agetolitids have septal insertion characteristic of the Rugosa, and that the family should be transferred thereto.] *U.Ord.-?L.Sil.-M.Sil.*

Agetolites SOKOLOV, 1955, p. 150 [**A. mirabilis*; OD; †17, coll. 599, VNIGRI, Leningrad] [=*Hemiagetolites* LELESHUS, 1963, p. 146 (type, *H. sugranicus*, OD; †1, coll. 8203, TsGM, Leningrad; U.Ord., up. R. Sugran, Tadzhik.; see KIM, 1965a, p. 51]. Corallum hemispherical, nodular, pyriform or cylindrical, cerioid; corallites pris-

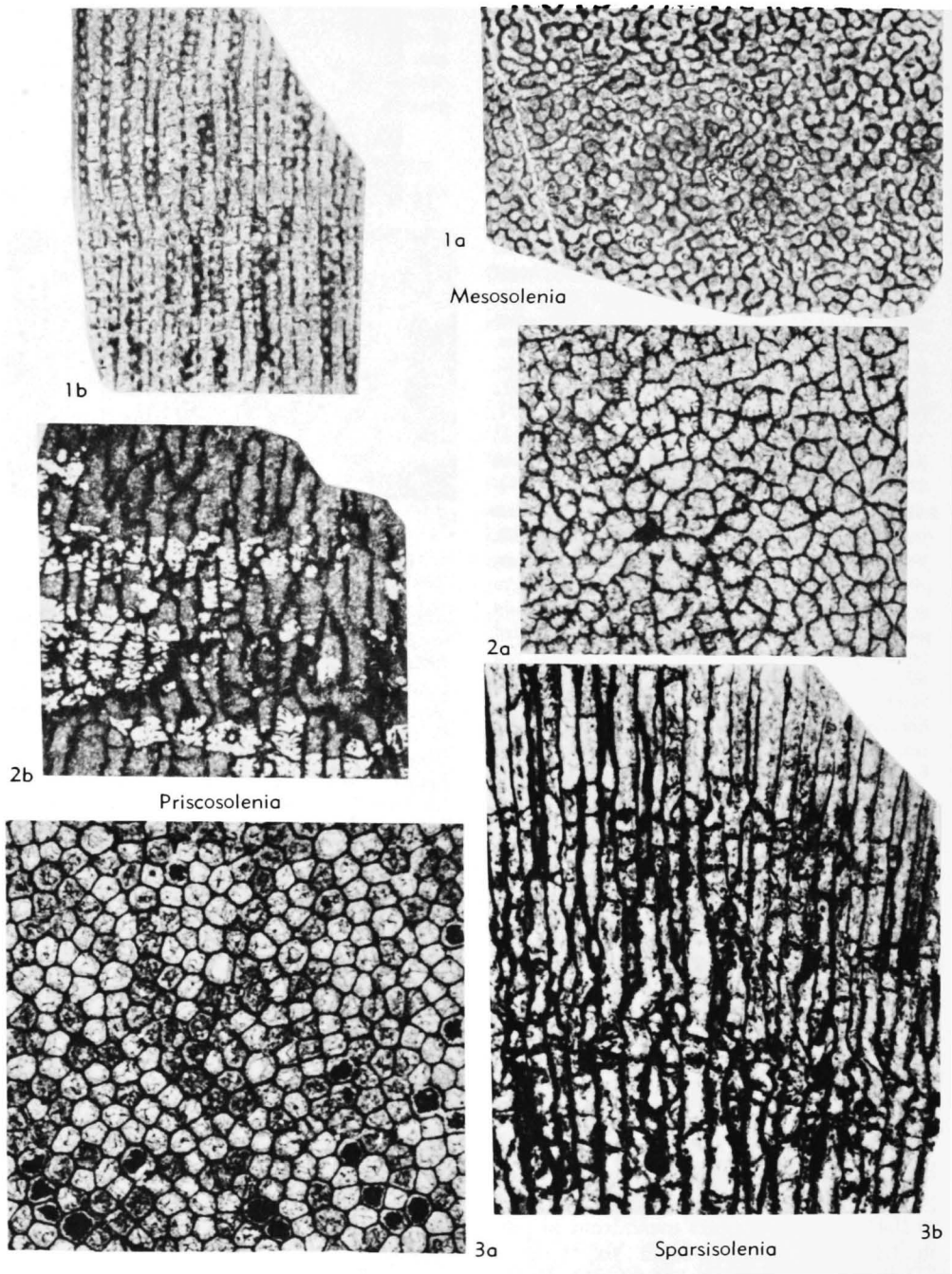


FIG. 371. Multisoleniidae (p. *F559*).

matic; common walls with sinuous median suture; septa alternately long and short thin plates with long axial parts spinose; tabulae horizontal, or convex or concave, commonly complete; pores at or near angles between corallites, rounded and numerous, commonly opening simultaneously into three adjacent corallites. *U.Ord.*, Asia(Kazakh.-Tadzhik.-Uzbek.-China)-N.Am.(Alaska); *U.Ord.*

or *?L.Sil.*, Australia(N.Queensl.).——FIG. 373, *2a,b.* **A. mirabilis*, holotype, Kazakh., SW. foothills Chingiz Ra.; *a,b*, transv., long. secs., ×3.6 (Sokolov, 1955).

Agetolitella KIM, 1962, p. 117 [**A. prima*; OD; †1, coll. 8490, TsGM, Leningrad]. Like *Agetolites* but pores on faces as well as near or through angles between faces; septa not alternating in length; increase intermural. *U.Ord.*, Asia(China-Tadzhik.-Uzbek.).——FIG. 379,*1a,b.* **A. prima*, C.Asia, Zeravshan-Gissar Ra., Tien Shan; *a,b*, transv., long. secs., ×3.6 (Kim, 1965a).

Somphopora LINDSTRÖM, 1883a, p. 51 [**S. daedalea*; M; †in RICHTHOFEN Coll., HU, E. Berlin]. Like *Agetolites* but corallites relatively small and septa six in number; tabulae thin. *M.Sil.(Wenlock.)*, Asia(China).——FIG. 373,*3a,b.* **S. daedalea*, holotype, Chan-Tien, Szechuan; *a,b*, transv., long. secs., ×3.6 (Hill, n; photographs courtesy Humboldt University, E. Berlin).

Family MICHELINIIDAE Waagen & Wentzel, 1886

[*nom. correct.* SOKOLOV, 1950a, p. 165, *pro* Michelinidae GERTH, 1921, p. 112 (*nom. transl.* GERTH, 1921, p. 112, as Michelinidae, *nom. null., ex* Micheliniinae WAAGEN & WENTZEL, 1886, p. 843; Michelininae POČTA, 1902, p. 64)] [=Beaumontidae CHAPMAN, 1893, p. 42; Pleurodictyidae SARDESON, 1896, p. 353; incl. Holacanthoporinae LE MAÎTRE, 1957, p. 369; Granulidictyinae WEYER, 1970b, p. 1116]

Corallum cerioid, rarely astreoid or in part phaceloid; discoid to hemispherical to tall and subcylindrical; with or without holotheca; corallites large, commonly prismatic; walls bearing septal ridges or spines or both; mural pores sparse to numerous, regularly or irregularly arranged; tabulae absent to numerous, complete or incomplete. *U.Sil.-U.Perm.*

Subfamily MICHELINIINAE Waagen & Wentzel, 1886

[Micheliniinae WAAGEN & WENTZEL, 1886, p. 843] [=Beaumontidae CHAPMAN, 1893, p. 42; Pleurodictyidae SARDESON, 1896, p. 353; Holacanthoporinae LE MAÎTRE, 1957, p. 369]

Micheliniids with holotheca. *U.Sil.-U. Perm.*

Michelinia DE KONINCK, 1841, p. 29, *non Michelinia* DUJARDIN & HUPÉ, 1862, an echinoid [**Calamopora tenuiseptata* PHILLIPS, 1836, p. 201; SD MILNE-EDWARDS & HAIME, 1850, p. lx; †lectotype here chosen, R333, W. GILBERTSON Coll., BM (NH), London] [?=*Conopoterium* WINCHELL, 1865, which see; *Eumichelinia* YABE & HAYASAKA, 1915, p. 59 (type, *Michelinia tenuisepta* (PHILLIPS) DE KONINCK, 1841, p. 31, SD LANG, SMITH, & THOMAS, 1940, p. 58); *?Cystomichelinia* LIN, 1962a, p. 223 (type, *Michelinia multicystosa* YOH in YOH & HUANG, 1932, p. 23, OD; †1174, IGP, Nanking; L.Perm., Chihsia Ls., near Nanking; has impersistent series of peripheral tabellae)].

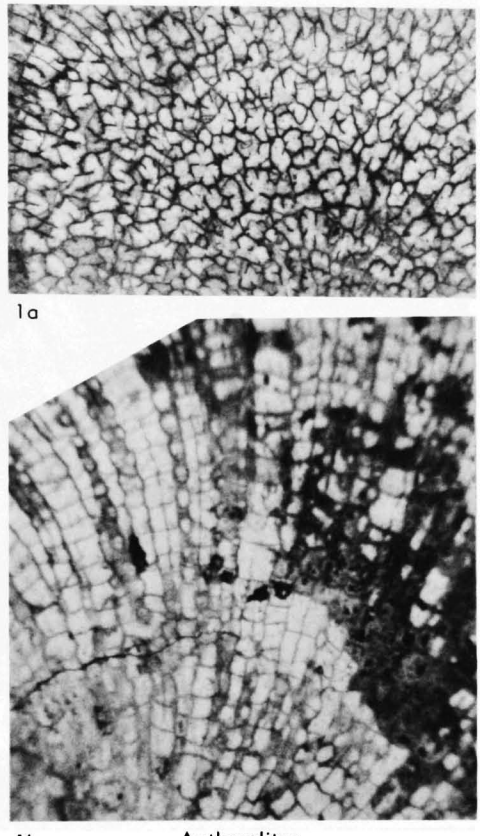


FIG. 372. Multisoleniidae (p. *F*559).

Corallum cerioid with strong holotheca; corallites large and moderately rounded in section to small and polygonal; walls thin to moderately thick with median suture and projecting short septal trabeculae (may be holacanthine); mural pores large, tunnel-like and sparse; tabulae commonly incomplete, somewhat globose, and not forming regular pattern of inclination, some thickened and some carrying septal spinules on upper surface. *L.Dev.-M.Dev.*, N.Afr.(Alg.-Moroc.)-N.Am.(Ont.-Mich.-Ind.-Ky.); *Carb.-Perm.*, cosmop. except S. Am.——FIG. 374,*2a-c.* **M. tenuiseptata* (PHILLIPS); *a*, ext. view, ×1 (Phillips, 1836); *b,c*, lectotype, Yorkshire, Bolland, transv., long. secs., ×4 (Hill, n; photographs courtesy H. D. Thomas).

Beaumontia MILNE-EDWARDS & HAIME, 1851, p. 154 [**Columnaria laxa* MCCOY, 1849, p. 122; SD LANG, SMITH, & THOMAS, 1940, p. 26; †A2389, SM, Cambridge; lectotype by D. E. WHITE, herein] [*Rhizopora* DE KONINCK, 1871, p. 323, *nom. nud.*; *Rhizopora* DE KONINCK, 1872, p. 117 (type, *R. tubaria*, M; †293, DE KONINCK Coll., IRSN, Brussels, lectotype by D. E. WHITE, herein)].

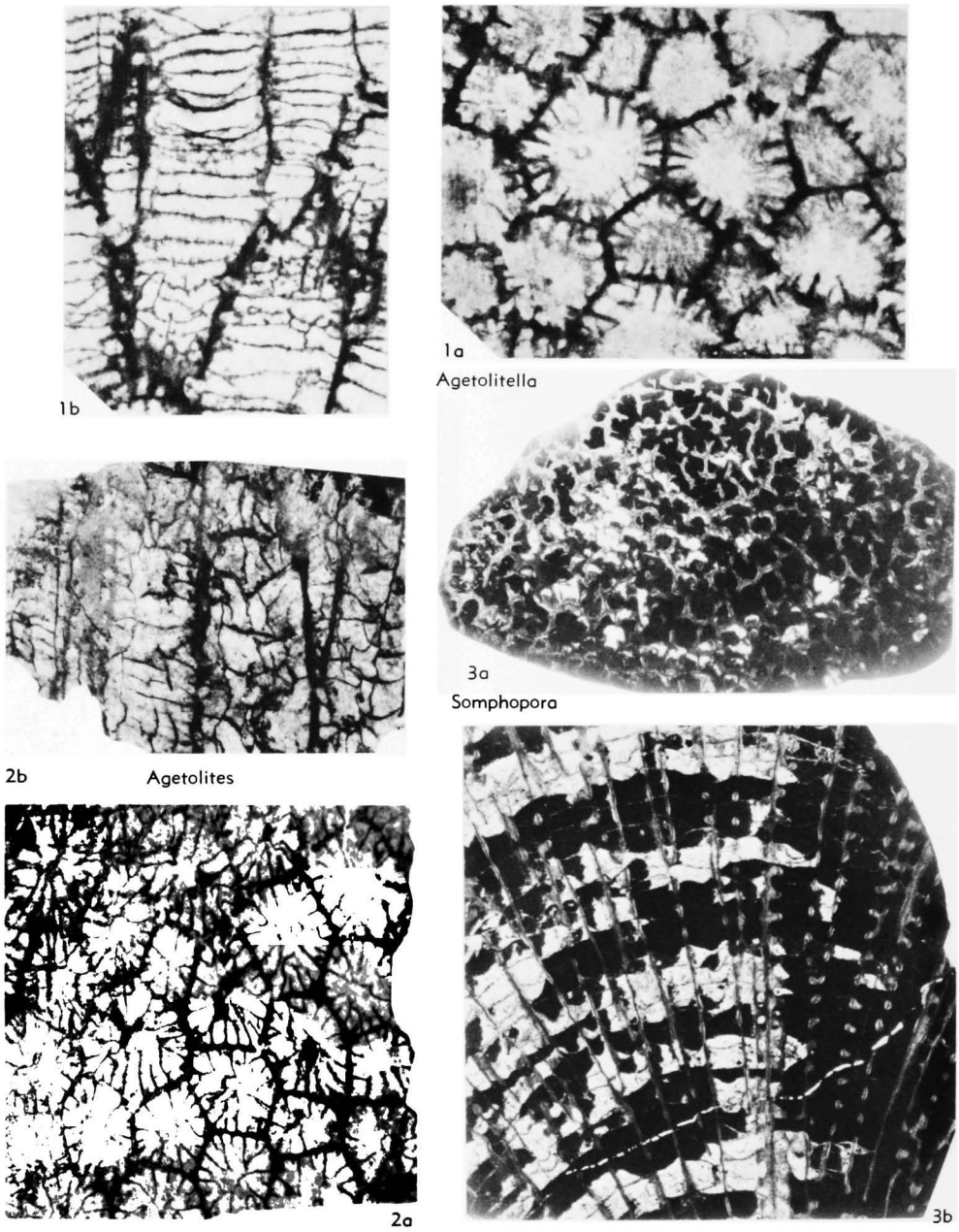


FIG. 373. Agetolitidae (p. *F559-F561*).

Corallum phaceloid in part, cerioid in part; corallites large, walls thin, with infrequent mural pores commonly near angles; tabulae complete or incomplete, tabellae large, subglobose, variably based; septal spines not observed, but epithecate surface shows septal grooves and interseptal ridges. *L. Carb.*, Eu.(Brit.I.-Belg.)-Asia(Kuzbas); *Miss.*, N. Am.(Mo.-Ill.-?Mexico).——FIG. 375,*2a-c*. ***B. laxa*** (McCOY), low. Visean, Eng., Derbyshire; *a,b*, lectotype, transv., long. secs., ×1, ×2 (Hill, n; photographs courtesy D. E. White, SM A2389, GSM, London); *c*, ext. view, ×1 (McCoy, 1851b). **Conopoterium** WINCHELL, 1865, p. 111 [**C. effusum*; M; syntypes in UMMP, Ann Arbor] [?=*Mi-*

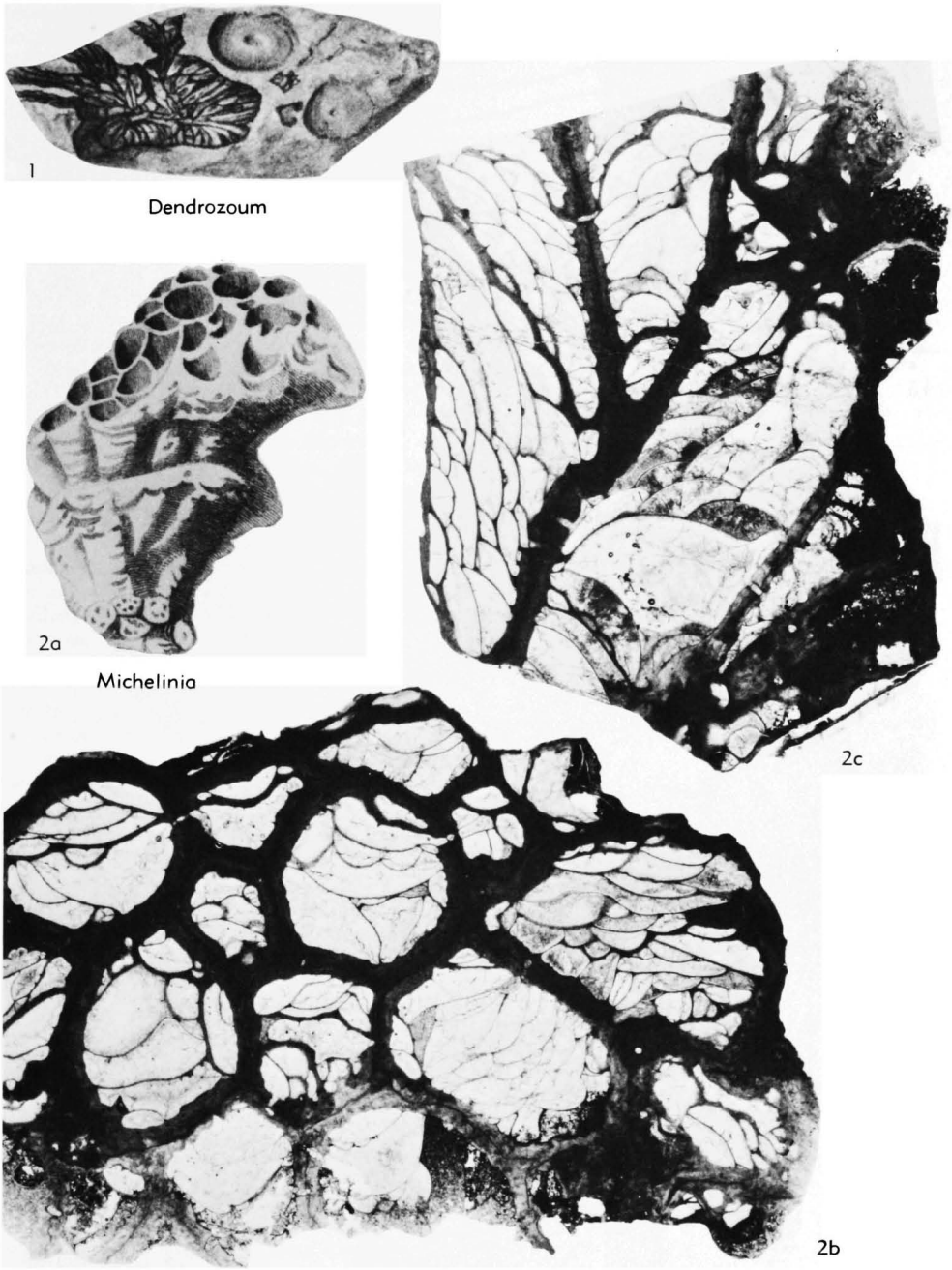


FIG. 374. Micheliniidae (p. *F*561, *F*565).

chelinia DE KONINCK, 1841, which see, see also WILLIAMS, 1943, p. 61; *Conopterium* SCUDDER, 1882, p. 84, *nom. null.*]. Corallum small, subspherical, with holotheca; corallites prismatic or subcylindrical, unequal; walls with rare mural pores; septa represented only by longitudinal striations on walls; tabulae rare; increase lateral and ?intermural. [Insufficiently known.] *U.Dev. (topmost Famenn.)* or *Miss.(basal)*, N.Am.(Mo., Louisiana Ls., Clarkville).

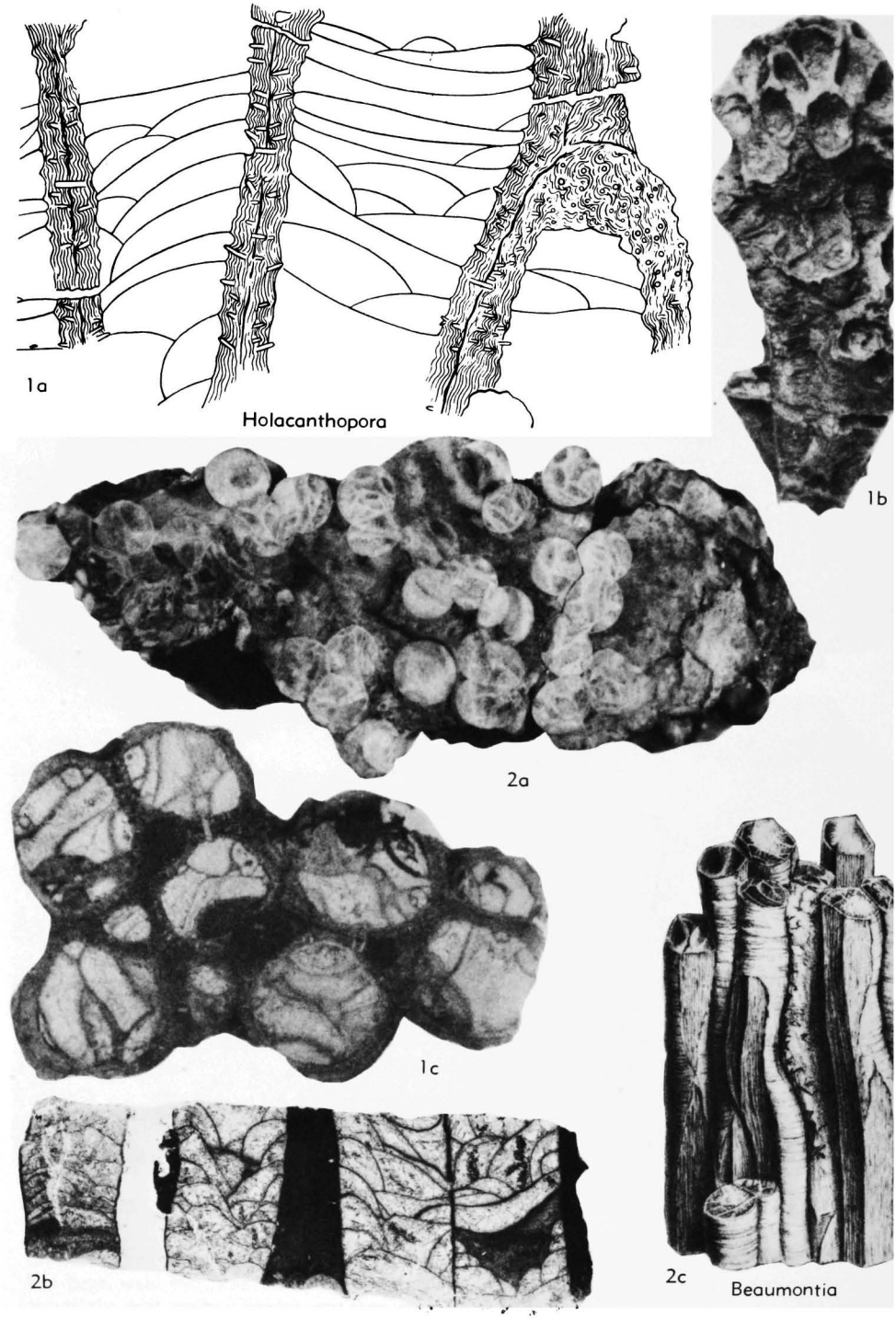


FIG. 375. Micheliniidae (p. *F561-F562*, *F565*).

Cystodendropora LIN, 1962b, p. 502 [**Michelinia sinitzini* SOKOLOV, 1955, p. 354, *nom. subst. pro Michelinia cylindrica* ILINA, 1939, p. 85, *non* ROMINGER, 1876, p. 74; OD; †Muzey Moskovskiy geologorazvedochnyy institut]. Corallum large, dichotomously branched; branches cylindrical, oriented at right angles to surface of colony; corallites diverging slightly from axis in axial zone of branch, turning sharply perpendicular to surface in peripheral zone; corallites prismatic, thin-walled in axial zone, somewhat thickened in peripheral zone; mural pores small; tabulae complete in axial zone, incomplete with a peripheral series of tabellae in peripheral zone, so that axial parts of calices are sunken. [The Chinese specimens have greatly thickened walls in peripheral zone of branches.] *L.Carb.(Visean)*, Asia(Kazakh.-?China)-?Australia(Queensl.).——FIG. 376,*1a-c*. **C. sinitzini* (SOKOLOV), Kazakh., R. Kipchak; *a*, ext. view, ×0.5; *b,c*, long., transv. secs., ×0.8 (Ilina, 1939).

?Dendrozoum FUCHS, 1915, p. 5 [**D. rhenanum*; M; †in FUCHS Coll., Museum Preuss. Geol. Landesanst., Berlin (in 1915)]. Corallum platelike or conical and attached basally, giving off relatively slender branchlike processes; corallites numerous, small, unequal, elongate, conical, in basal portion radiating from a commensal ?worm tube; mural pores not observed. [Insufficiently known.] *L.Dev.*, Eu.(Ger.).——FIG. 374,*1*. **D. rhenanum*, syntype, Hunsrückschiefer, Bornich horizon, Ger., small hill to S. of Balledillesweg near Bornich; ext. view, ×1 (Fuchs, 1915).

Holacanthopora LE MAÎTRE, 1954, p. 1668 [**Michelinia (Ethmoplax) fascialis* LE MAÎTRE, 1952, p. 80; OD; †cotypes, 123, LE MAÎTRE Coll., GFC, Lille]. Corallum tall, with subparallel corallites in clumps or branches; corallites subcylindrical, conjunct or in places separate, calices opening at different heights, not all reaching summit of colony; increase lateral; common walls thick, with median suture and commonly with pseudolamellae in which immersed septal spines are holacanthine; mural pores (tunnels) present; tabulae complete or incomplete, numerous. [Thick walls distinguish it from *Beaumontia* MILNE-EDWARDS & HAIME, 1851.] *M.Dev.(low.Eifel.)*, N.Afr.(Alg.).——FIG. 375,*1a-c*. **H. fascialis* (LE MAÎTRE), Erg Djemel; *a*, long. sec., ×6 (Le Maître, 1954); *b*, ext. view, ×1; *c*, transv. sec., ×3 (Le Maître, 1952).

Kerforneidictyum LAFUSTE & PLUSQUELLEC, 1976, p. 1699 [**Pleurodictyum kerfornei* COLLIN, 1912, p. 434; OD; †10 016, IG, Rennes; lectotype by LAFUSTE & PLUSQUELLEC, 1976, p. 1700; "Schistes à nodules calcaires à *Aucella eifeliensis*," M.Dev., Eifel., France, "la cale de Quelern, Roscanvel, Brest"] [?=*Pleurodictyum* GOLDFUSS, 1829, which see]. Like *Pleurodictyum* but corallum conical, corallites few, peripheral corallites with rounded external walls; of the septa, one to four may be prominent. *M.Dev.(Eifel.)*, Eu.(France-Spain); *M. Dev.(Givet.)*, N.Afr.(Moroc.).

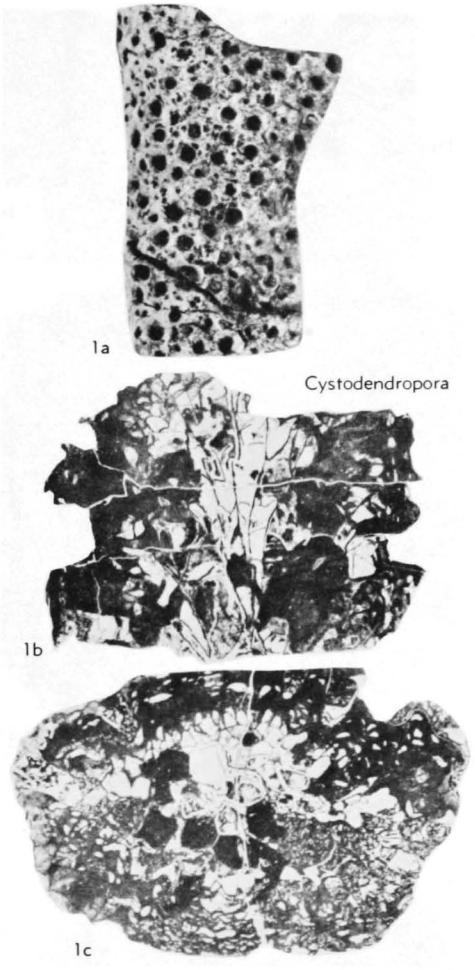


FIG. 376. Micheliniidae (p. *F565*).

Petridictyum SCHINDEWOLF, 1959, p. 310 [**Pleurodictyum petrii* MAURER, 1874, p. 456; OD; †not traced]. Like *Pleurodictyum* but with central corallite surrounded by corona of up to seven large corallites, in which septal ridges alternate in length like major and minor septa in rugose corals [see PLUSQUELLEC, 1976, p. 32]. *L.Dev.(Siegen.)-M.Dev.(Couvin.)*, Eu.(Ger.-France)-N.Afr.(Moroc.-Sahara)-Asia (Altay)-?Australia (Vict.).——FIG. 377,*3a,b*. **P. petrii* (MAURER), L.Dev., Ger., Erbsloch; *a*, specimen with 5 corallites, *b*, specimen with 7 corallites, showing septal ridges alternating in size as in rugose corals, ×3 (Schindewolf, 1959).

Pleurodictyum GOLDFUSS, 1829, p. 113 [**P. problematicum*; M; †missing from GOLDFUSS Coll., IP, Bonn] [=*Ligulodictyum* PLUSQUELLEC, 1973, p.

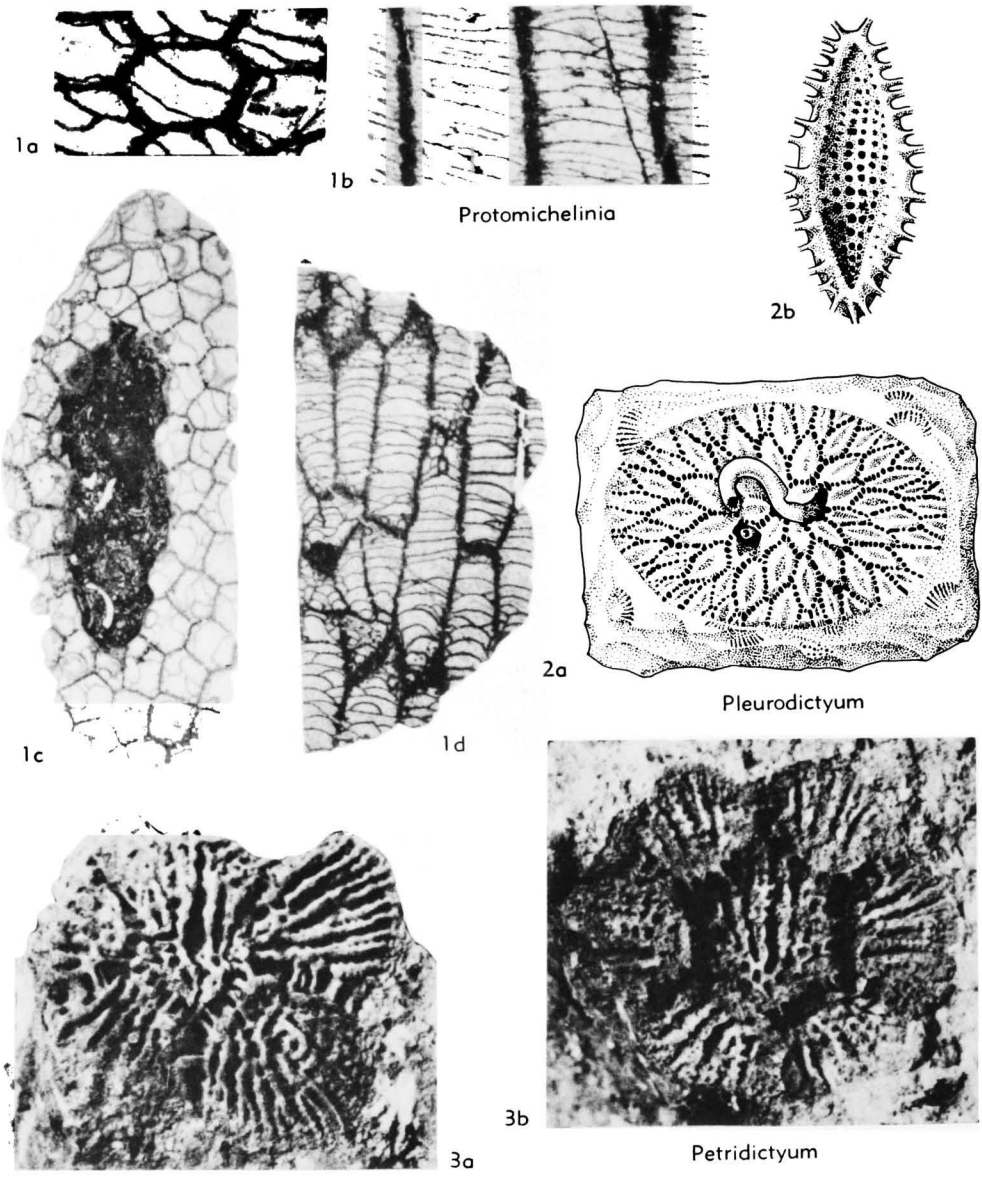


FIG. 377. Micheliniidae (p. *F565-F567*).

154 (type, *L. paraligulatum, nom. nov. pro Pleurodictyum ? constantinopolitanum* ROEMER, var. minor PLUSQUELLEC, 1965, p. 45, OD; †PL183, LP, Brest; mid. Siegen., La Fraternité Finistère France; has inconstant narrow peripheral trough on inner side of calices of offsets); *?Kerforneidictyum* LAFUSTE & PLUSQUELLEC, 1976, which see]. Corallum cerioid, discoid or a low dome, with flat or slightly concave base covered with concentrically wrinkled holotheca; frequently with tube of commensal worm *Hicetes* CLARKE, 1908; corallites large, commonly short, prismatic, with walls bearing septal ridges or rows of spines, or spinose ridges; walls thick, pierced by numerous mural tunnels; tabulae typically absent, when present complete or incomplete, horizontal, convex or concave [*see* PLUSQUELLEC, 1965, p. 9]. *U.Sil. (Ludlov.)*, N.Am.(Ky.-Tenn.)-Australia(New S. Wales); *L.Dev.-M.Dev.*, Eu.(Ger.-France-Belg.-U.K.)-Asia (Kazakh.-Tuva-Salair-R.Amur-Kolyma

Basin-NE.USSR)-Australia(New S.Wales-Vict.)-N. Am. (Ind.-Ky.-Mich.-N.Y.)-N.Afr.(Moroc.-Sahara-Alg.).——FIG. 377,*2a,b*. **P. problematicum*, syntype, L.Dev.(Eifel. or Nassauian), Ger.; *a*, ext. view of internal mold of proximal part of decalcified specimen, ×1; *b*, one corallite, enl. (Goldfuss, 1829).

Protomichelinia YABE & HAYASAKA, 1915, p. 61, as subgenus of *Michelinia* DE KONINCK [**Michelinia (P.) microstoma*; SD LANG, SMITH, & THOMAS, 1940, p. 107; †6272, TohU, Sendai] [=*Michelinia (Michelinopora)* YABE & HAYASAKA, 1915, p. 59 (type, *M. (M.) multitabulata*, M; syntype?, 8241, TohU, Sendai; Perm., *Parafusulina* ls., between Sagadachi and Maiya, Moto-yoshi-gun, Miyagi Pref., and Yatsuse near Kesen-numa, Iwate Pref., Japan; see MINATO, 1955, p. 183)]. Corallum cerioid, corallites long, prismatic or subcylindrical; walls thin, with median suture; mural pores large; septal ridges low, may have spinose axial edges; tabulae numerous, low convex, commonly complete. *L.Carb.*, Asia(Japan); *Perm.*, Asia(China-Japan-Iran-Armen.SSR)-Eu.(Spits.).——FIG. 377, *1a,b*. *P. multitabulata* (YABE & HAYASAKA), ?Perm., Japan, Yatsuse near Kesen-numa; *a,b*, transv., long. secs., ×4 (Hill, n; UQF15372).——FIG. 377,*1c,d*. **P. microstoma*, syntype, Perm., China, Mei-tse-kou, prov. Hupei; *c,d*, transv., long. secs., ×3 (Yabe & Hayasaka, 1920).

?Tabellaephyllum STUMM, 1948a, p. 41 [**T. peculiare*; OD; †127971, USNM, Washington; =*Michelinia expansa* WHITE, 1883, p. 158, †UC6687, FM, Chicago, M, Chouteau Ls., Sedalia, Mo.; OLIVER & SANDO, 1977, p. 422, conclude that only two specimens have been referred to *T. peculiare* and both are residuum specimens of the Mississippian *M. expansa* WHITE left on the surface of the Frasnian Martin Limestone of Arizona after weathering of the previously overlying Mississippian]. Cerioid; corallites moderately large, with common walls thin and rough and with porelike discontinuities as in *Protomichelinia*; septal spines not observed; tabular floors concave, tabellae large, in two series, those at periphery like rather flat-lying lonsdaleoid dissepiments. [Relationship to *Yavorskia* FOMICHEV, 1931 (Cleistoporidae) should be investigated.] *Miss.*, N.Am.(Ariz.-Mo.).——FIG. 378,*1a,b*. **T. expansum* (WHITE), holotype of *T. peculiare*, ?residuum from weathered Miss. on upper surface of Frasnian Martin Ls., Ariz.; *a,b*, transv., long. secs., ×2 (Stumm, 1948a).

Subfamily GRANULIDICTYINAE Weyer, 1970

[Granulidictyinae WEYER, 1970b, p. 1116]

Flat, discoid, hemispherical to spherical and encrusting cerioid coralla; without holotheca; corallites prismatic with simple mural pores that do not ramify and without tabulae or with tabellae; septa represented by aspinose longitudinal ridges. *L.Dev.-M.Dev.*

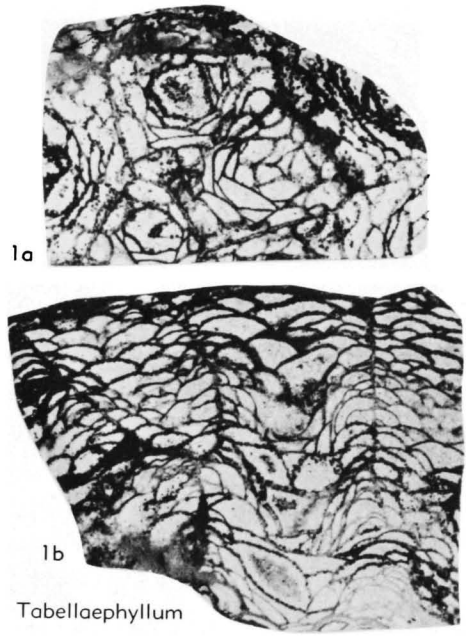


FIG. 378. Micheliniidae (p. *F*567).

Granulidictyum SCHINDEWOLF, 1959, p. 307, as subgenus of *Pleurodictyum* GOLDFUSS, 1829 [**Pleurodictyum granuliferum* SCHLÜTER, 1889, p. 103 (361); OD; syntypes 196a-e, SCHLÜTER Coll., IP, Bonn]. Corallum flat discoid to low hemispherical; without holotheca; corallites prismatic, short, without tabulae; walls with mural pores; distal part of walls thin and of polygonal outline in hemispherical forms; septal ridges aspinose, low [see PLUSQUELLEC, 1970, p. 60; WEYER, 1970b, p. 1117]. *L.Dev.(Siegen.-Ems.)-M.Dev.(Couvin.)*, Eu.(Ger.-France)-N. Am. (Ohio-Mich.-Ind.-Ky.).——FIG. 379,*3a,b*. **G. granuliferum* (SCHLÜTER), M.Dev., Gerolstein Mulde, Ger., Eifel; *a,b*, top and side views, ×1 (Schlüter, 1889).

Antholites DAVIS, 1887, explanation to pl. 78 [**A. speciosus*; M; †8746, MCZ, Cambridge]. Corallum encrusting; commonly (always?) surrounding crinoid columns or basal parts of crinoid cups; without holotheca; distal edges of calices rounded, laterally free; corallites conical, subpolygonal, without tabulae; walls with low, rounded septal ridges separated by uniserial rows of large, subrounded, or quadrangular mural pores [see STUMM & WATKINS, 1964, p. 1000]. *M.Dev.(Givet.)*, N.Am. (Ind.-Ky.-Mich.-Ont.-N.Y.).——FIG. 379,*1a-d*. **A. speciosus; a,b*, holotype, Beechwood Ls., Ky., near Louisville, ext. views, ×1 (Stumm & Watkins, 1964); *c,d*, Beechwood Ls., Ind., near Charlestown, Clark Co., side, calical views, ×2 (Stumm, 1950).

Procteria DAVIS, 1887, explanation to pl. 41 [**P. michelinoidea*; SD LANG, SMITH, & THOMAS, 1940,

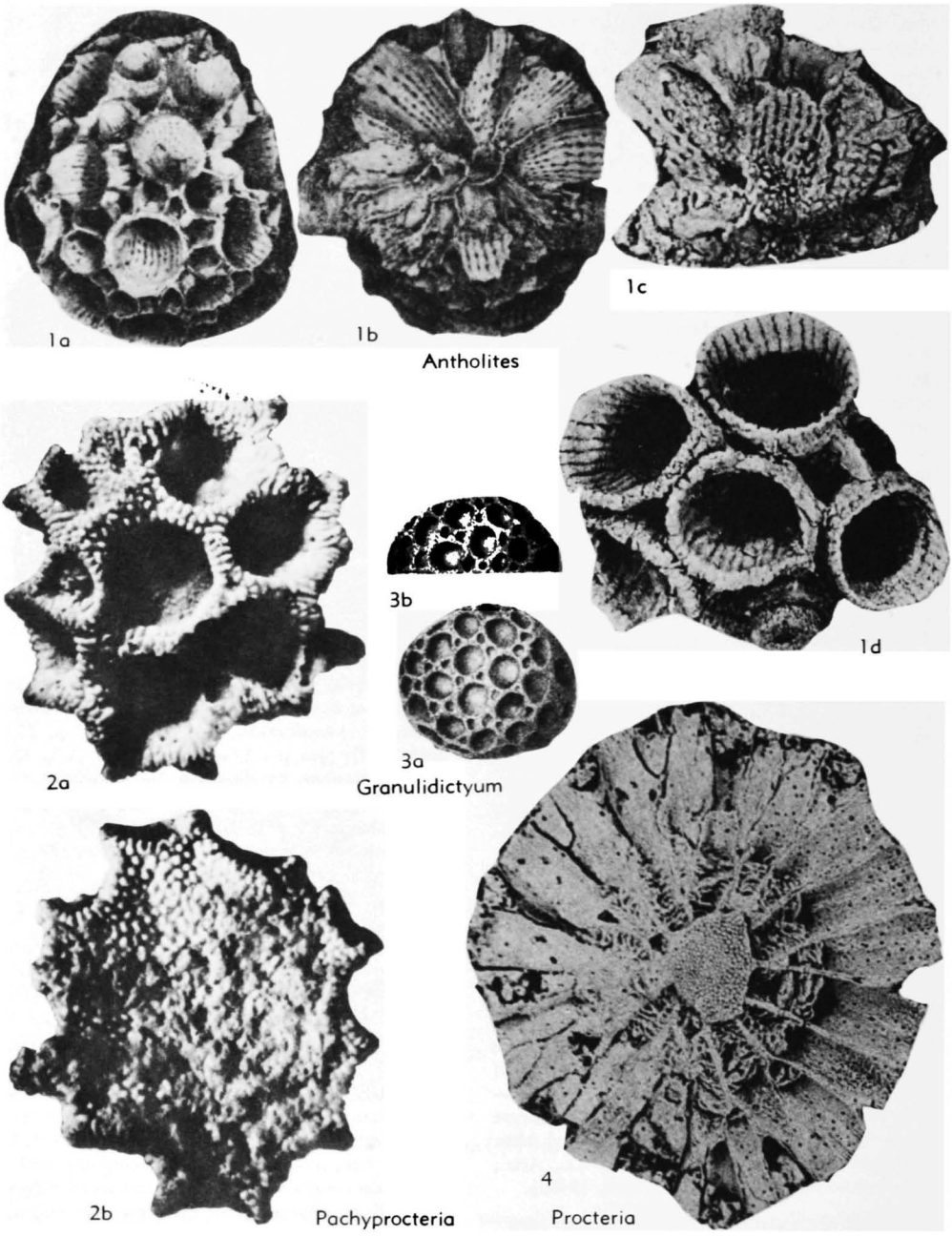


FIG. 379. Micheliniidae (p. *F567-F570*).

p. 105; syntypes, 8711-8722, MCZ, Cambridge]. Corallum small, discoid to low hemispherical, without holotheca; corallites relatively few, prismatic, radiating; calical margins polygonal, contiguous; walls smooth or with faint septal ridges, pierced by small, irregularly scattered mural pores; with tabellae [*see* PLUSQUELLEC, 1970, p. 60]. *M.Dev.*, N.Am.-Eu.

P. (Procteria). Corallites deep, tabellae well-developed, distal part of walls thin. *M.Dev.*, N.Am. (Ind.-Ky.-Ohio-Mich.).——FIG. 379,*4*. **P. (P.) michelinoidea*, Jeffersonville Ls., Ky., Falls of

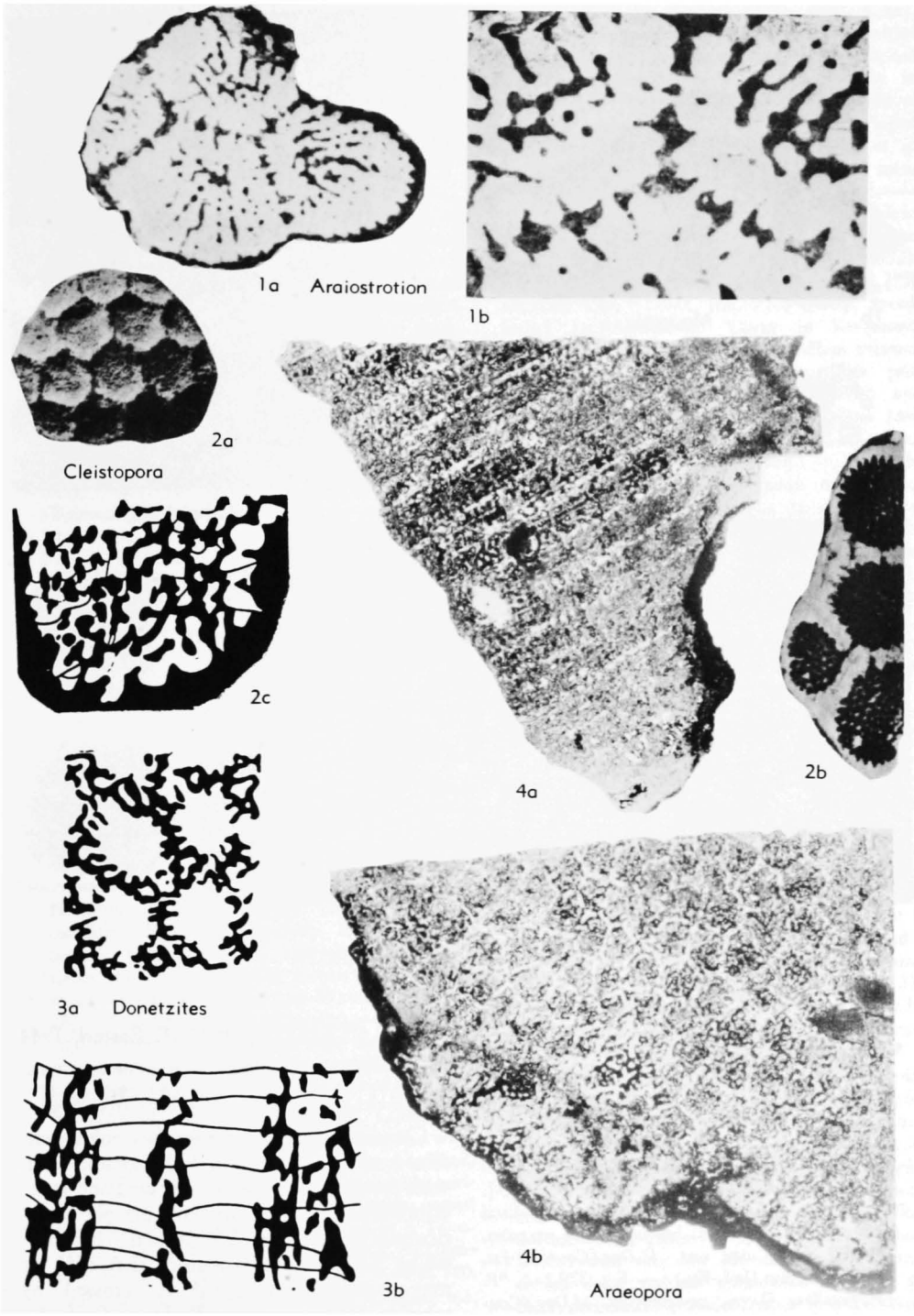


FIG. 380. Cleistoporidae (p. *F571*).

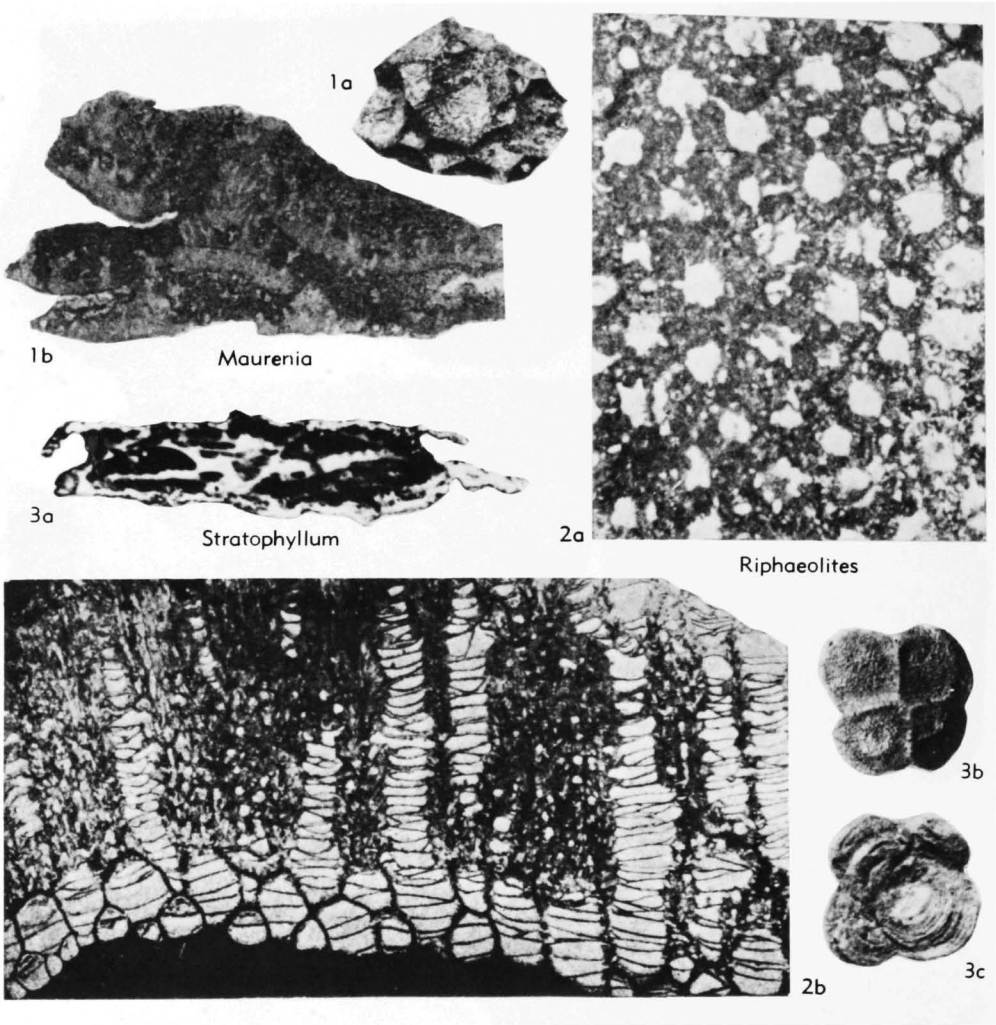


FIG. 381. Cleistoporidae (p. *F571-F572*).

Ohio R. near Louisville, ×2 (Stumm, 1950).

P. (Pachyprocteria) PLUSQUELLEC, 1970, p. 61 [**Procteria papillosa* DAVIS, 1887, explanation pl. 41; OD; †lectotype by STUMM, 1950, card 361, original of DAVIS' fig. 19, lost (*fide* PLUSQUELLEC, 1970, p. 68); neolectotype by PLUSQUELLEC, 1970, p. 68, 8725d, MCZ, Cambridge, 5 unlettered syntypes comprise no. 8725]. Corallites with tabulae absent or sparse; distal part of wall very thick, bearing strong granules, corallites all of one size. *M.Dev.(Couvin.)*-Eu.(France)-N.Am.(Ind.-Ky.).——FIG. 379,*2a,b*. **P. (P.)papillosa* DAVIS, neolectotype, M.Dev.(Couvin.), Jeffersonville Ls., Ky., Falls of the Ohio; *a,b*, calical, proximal views, ×6 (Plusquellec, 1970).

Family CLEISTOPORIDAE Easton, 1944

[Cleistoporidae EASTON, 1944b, p. 57, *nom. nov. pro* Leptoporidae MILLER, 1891, p. 6, invalid name based on junior homonym] [?=Riphaeolitinae DUBATOLOV, 1972b, p. 63]

Cerioid or rarely in part fasciculate coralla, commonly discoid; holothecate; walls with favositoid mural pores; ?wall and septa cribriform, in some forming peripheral reticulum around tabulate lumen, in others filling lumen with reticulum that may or may not be interrupted or crossed by tabellae. *U.Sil.-M.Dev.; ?U.Dev.; Carb.(M. Penn.)*.

Cleistopora NICHOLSON, 1888, p. 150 [**Michelinia*

geometrica MILNE-EDWARDS & HAIME, 1851, p. 252; OD; †now missing, MN, Paris] [?=*Leptopora* WINCHELL, 1863, p. 3 (type, *L. typa,* OD; †14253, UMMP, Ann Arbor, lectotype by EASTON, 1944b, p. 60), *non Leptopora* D'ORBIGNY, 1849, a bryozoan; *?Squameophyllum* SMYTH, 1933b, which see; *Paracleistopora* PLUSQUELLEC, 1973, p. 153 (type, *Cleistopora smythi* LE MAÎTRE, 1952, p. 85, OD; †not traced, ?GFC, Lille; low. Eifel., Erg Jemel, Alg.), wall tissue recrystallized to pseudolamellate-holacanthate condition); *Cleistodictyum* PLUSQUELLEC, 1973, p. 154 (type, *C. porosum,* OD; †2356, LP, Brest; L.Dev., La rade de Brest), reticulate tissue sparse]. Corallum small, discoid, usually attached; holothecate; corallites short, prismatic, with dense walls pierced by sparse, straight or nearly straight mural pores; lumina filled with reticulate tissue developed from the perforate septa and crossed by thin, widely separated tabulae [see SMYTH, 1933a, p. 169; PLUSQUELLEC, 1976, p. 7]. *L.Dev.-M.Dev.(Couvin.),* Eu.(France-Ger.)-N.Afr.(Alg.); *?L.Miss. (Tournais.),* N.Am.(Iowa-Ill.-Mo.).——FIG. 380, *2a-c.* **C. geometrica* (MILNE-EDWARDS & HAIME), France, Viré and Loué, Sarthe; *a,* calical view, ×2.0; *b,* transv. sec. showing straight mural pores, ×4.0; *c,* long. sec., ×12.0 (Smyth, 1933a).

Araeopora ETHERIDGE & NICHOLSON, 1879, p. 277 [**A. australis*; OD; †F25230; AM, Sydney, part of which is 90249, BM(NH), London; thin sections are 1967.66.253-254, RSM, Edinburgh and 1214(3), AU, Aberdeen, *fide* BENTON, 1979, p. 39]. Massive, with slender, tall prismatic corallites; mural pores numerous; septa cribriform, anastomosing in luminar reticulum; tabulae few, thin. *?Dev.,* Australia(N.Queensl.).——FIG. 380,*4a,b.* **A. australis,* ls. of Burdekin R., N. Queensl.; *a,b,* long., transv. secs., ×3.5 (Hill, n; UQF60556).

Araiostrotion GUO, 1965, p. 654 [**A. yohi*; OD; †RU64001, IGMR, Shenyang]. Cerioid, with few corallites; holotheca complete; common walls coarsely porous, external wall ?aporose; septal spines coarse, long, meeting at axis in loose axial structure; tabulae ?absent [*see* WEYER, 1973a, p. 28]. *U.Sil.,* Asia(Inner Mongolia).——FIG. 380, *1a,b.* **A. yohi,* Dongwu-Qi reg., holotype; *a,b,* transv. secs., ×2.0, ×6.0 (Guo, 1965).

Donetzites DAMPEL, 1940, p. 317 [**D. milleporoides*; OD; †not traced, ?TsGM, Leningrad]. Corallum encrusting; corallites prismatic, walls thick, spongy, pierced by numerous branched, irregular, connective tunnels; tabulae regular, horizontal, continuous into tunnels of walls; septal spines sporadic or absent [see DUBATOLOV & TONGDZUY, 1965, p. 44]. *U.Carb.(Moscov.),* Eu.(Donbas)-Asia(Iran-Viet Nam-Kweichow).——FIG. 380, *3a,b.* **D. milleporoides,* suite C_2^6, Donbas; *a,b,* transv., long. secs., ×11.0 (Sokolov, 1962c).

Maurenia LE MAÎTRE, 1957, p. 370 [**Squameophyllum? arborescens* LE MAÎTRE, 1952, p. 87; †cotypes, 126, LE MAÎTRE Coll., GFC, Lille]. Corallum small, discoid, thick; with wrinkled basal holotheca; corallites polygonal, calicinal tabula with granules or spines, peripherally in radial (septal) rows; basal and common walls of lamellate sclerenchyme, with holacanthine septal spines embedded; lumen with reticulum as in *Squameophyllum* SMYTH, 1933b; pores not mentioned. *M.Dev.(low.Couvin.),* N.Afr.(Alg.).——FIG. 381,*1a,b.* **M. arborescens* (LE MAÎTRE), low. Couvin., Alg., El Kseib; *a,* cotype, calical view, ×1; *b,* paratype, long. sec., ×5 (Le Maître, 1952).

?Riphaeolites YANET in SOKOLOV, 1955, p. 169 [**R. sokolovi*; OD; †184/3, coll. 270, UGUp, Sverdlovsk] [=*Rhiphaeolites* YANET in KIPARISOVA *et al.,* 1956, p. 33, *nom. null.*]. Corallum crustose, with well-developed holotheca; corallites prismatic; in early stages corallites inclined and favositoid; in adult, erect stages, corallites have a wide peripheral stereozone pierced by numerous mural pore tunnels and composed of otherwise contiguous thickened septal bases from which numerous thin septal spines may project adaxially; lumina of irregularly rounded outline; tabulae numerous, commonly irregular and incomplete. [Possibly a theciid; no septal counts available.] *U.Sil.-L.Dev.,* Asia(E.slope,N.Urals).——FIG. 381, *2a,b.* **R. sokolovi,* holotype, L.Dev.(Coblenz.), E. slope of N. Urals, near Karpinsky, right bank of R. Toty, 2,180 m. above Toty; *a,b,* transv., long. secs., ×4 (Kiparisova *et al.,* 1956).

Squameophyllum SMYTH, 1933b, p. 171 [**S. spumans*; OD; †R.4656, BM(NH), London] [?=*Cleistopora* NICHOLSON, 1888, which see]. Corallum broadly conical to stalked, holothecate with epithecal scales; corallites prismatic or in places separate and cylindrical; calices conical, floors of calice granular throughout; lumina of reticulate tissue continuous from base of corallite to floor of calice and without tabulae, its vermiculate passages connected from one corallite to the next by pores which tend to be in horizontal rows and at right angles to the plane of contact of the corallites. *L.Carb.(Tournais.),* Eu.(Belg.).——FIG. 382, *2a,b.* **S. spumans,* Tournai; *a,* holotype, calical view, ×2; *b,* paratype, long. sec., ×4 (Smyth, 1933b).

Stratophyllum SMYTH, 1933b, p. 173 [**S. tenue*; OD; †R14307, BM(NH), London] [=*Stratiphyllum* SMYTH, 1939, p. 859, *nom. van., non Stratiphyllum* SCHEFFEN, 1933, a rugosan; *Ethmoplax* SMYTH, 1939, p. 859, *nom. subst. pro Stratiphyllum* SMYTH]. Corallum small, discoid, holothecate and with epithecal scales; calices shallow, floors flat or convex, granulose; large tabellae or tabulae present with very low convexity and with more or less dense and tall granulation on upper surfaces; peripherally granules conjoin in radial anastomosing ridges; mural pores numerous. ["*Michelinia*" *antiqua* (MCCOY) is herein transferred to *Yavorskia* FOMICHEV, 1931.] *L.Carb.(Tournais.),*

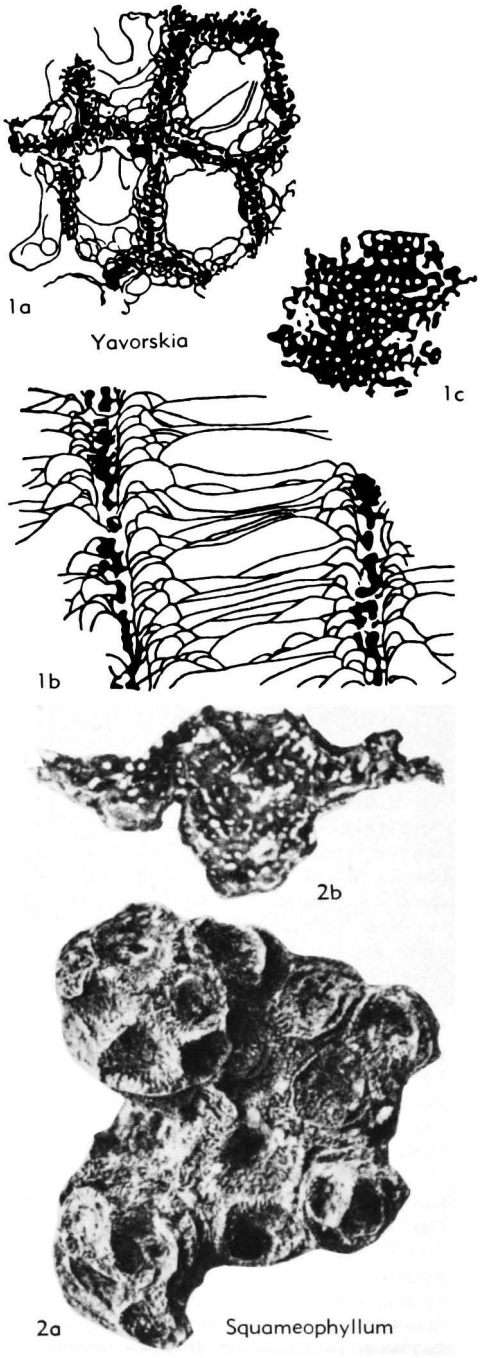


FIG. 382. Cleistoporidae (p. *F*571-*F*572).

Eu.(Belg.).——FIG. 381,*3a-c.* **S. tenue,* Belg., Tournai; *a,* paratype, long. sec., ×5; *b,c,* holotype, upper, lower surfaces, ×2 (Smyth, 1933b).

Yavorskia FOMICHEV, 1931, p. 10 [**Y. barsaensis*; M; †not traced; ?TsGM, Leningrad]. Cerioid, holothecate; calices shallow; corallites prismatic, common walls thin, pierced by numerous circular to irregularly lobate pores, and augmented by more or less thickened and granular septal bases that may anastomose to form a spongy peripheral zone; tabulae numerous, thin, irregular, incomplete, with small tabellae concentrated peripherally [see SAYUTINA, 1966, p. 208]. *L.Carb.(Tournais.),* Asia (Kuzbas-Urals-N. Zemlya)-Eu. (Eire-Wales-Belg.)-Australia(New S.Wales).——FIG. 382,*1a-c.* **Y. barsaensis,* Kuzbas, R. Taydon; *a,* transv. sec., ×2; *b,* long. sec., ×4; *c,* tang. sec. through common wall, diag. (Sokolov, 1962c).

Family VAUGHANIIDAE Lecompte, 1952

[Vaughaniidae LECOMPTE, 1952, p. 515]

Corallum cerioid, discoid or low hemispherical, holothecate and small; corallites large, prismatic, short, atabulate; basal and common walls of dense, radially fibrous tissue, a ring groove or tunnel around base of each corallite where wall joins floor; ring-tunnels of neighboring corallites connected by short radial tunnels and opening into lumen by short radial branches. *L.Carb. (up.Tournais.).*

Vaughania GARWOOD, 1913, p. 564 [**V. cleistoporoides*; M; syntypes, 63587-8, 63590, and PF2536, IGS, Leeds]. Discoid, free or attached; epithecate; atabulate; walls and floors of dense fibrous tissue in which neither septa, interseptal loculi, nor tabulae can be distinguished; each corallite with a ring canal around the base where the wall joins the floor; ring canals of neighboring corallites connected by radial canals ?(mural pores), and opening into calices by branch canals. *L.Carb.(up.Tournais.),* Eu.(Eng.).——FIG. 383, *3a-c.* **V. cleistoporoides,* near base of *Solenopora* subzone, NW. Eng.; *a,* long. sec., ×33.0; *b,* calical view, ×1.5; *c,* sec. through corallum showing ring and branching canals and mural pores, ×1.5 (Garwood, 1913).

Family PALAEACIDAE Roemer, 1883

[*nom. correct.* POČTA, 1902, p. 64, *pro* Palaeaciden ROEMER, 1883, p. 515] [=Palaeacinae HILL & STUMM, 1956b, p. *F*466]

Sphenoid or cruciform or crustose coralla with vermiculately porous coenenchyme more or less well developed between calices and corallites and with or without holotheca; calices may be lined by dense sclerenchyme, aperforate or pierced by perpendicular pores; atabulate. *L.Carb.*

Palaeacis HAIME in MILNE-EDWARDS & HAIME, 1857c, p. 9 [**P. cuneiformis*; M; ?MN, Paris]

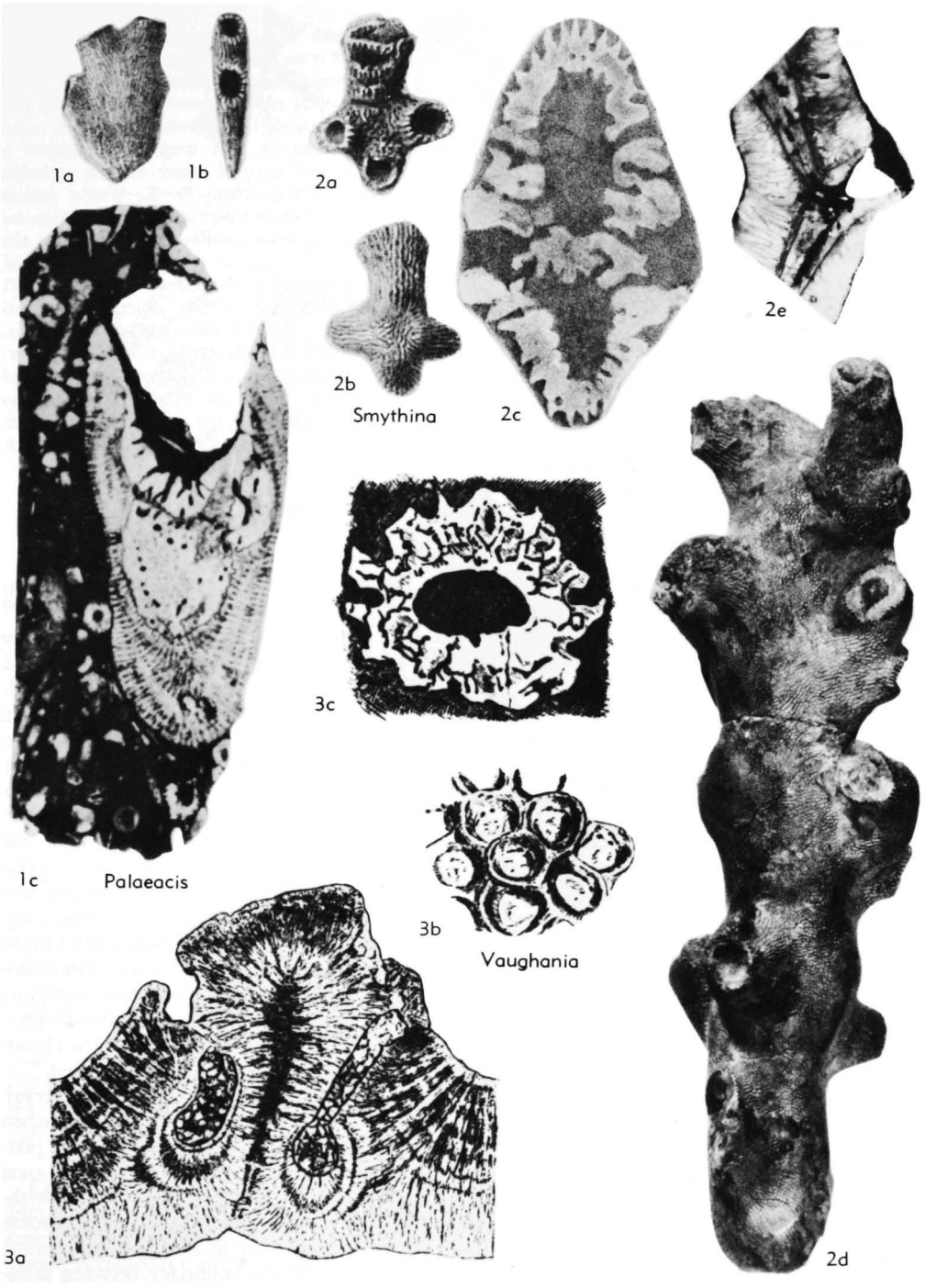


FIG. 383. Vaughaniidae (3); Palaeacidae (1, 2) (p. *F*572-*F*574).

[=*Sphenopoterium* MEEK & WORTHEN, 1860, p. 447 (type, *S. obtusum*, OD; 4 syntypes, X-36, UIl, Urbana); *?Helioalcyon* TERMIER & TERMIER, 1945, p. 70 (type, *H. segaudi*, OD; 3 figured syntypes, hd2003-M95, SGM, Rabat; up. Visean, Ain Oulad bei Abdid, Oujda reg., Moroc.); *Polypatina*

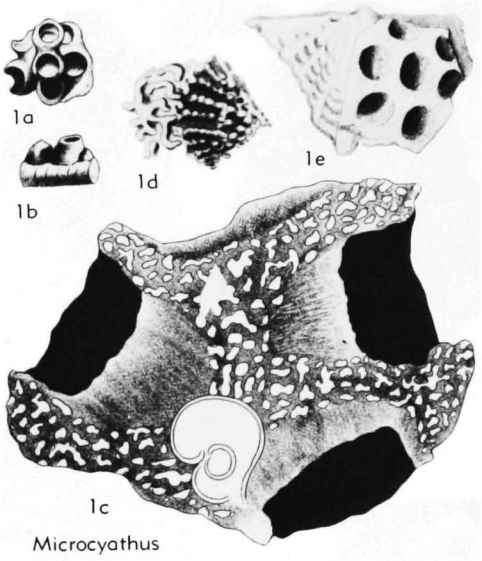


FIG. 384. Palaeacidae (p. *F*574).

ARENDT, 1959, p. 46 (type, *P. okensis,* OD; †1556/1, 1556/22, PIN, Moscow; L.Carb., Moscow Basin)]. [See WEYER, 1970b, p. 1118.] Corallum sphenoid without holotheca; adherent in young stage with round calices opening along narrow sides and broad end of wedge and set in porous coenenchyme; flat sides of irregularly septate (ridged) and canaliculate coenenchyme; calices lined with ?atrabeculate fibrous tissue pierced by perpendicular pores that may fork; septa ?cribriform; atabulate [see SMYTH, 1929, p. 125; CONKIN, BRATCHER, & CONKIN, 1976]. *L.Carb.(Tournais.-Visean),* Eu.(Brit.I.)-Australia(Queensl.); *Miss.,* N.Am.(Ky.-Ind.-Ill.).——FIG. 383,*1a,b.* **P. cuneiformis,* St. Louis Gr., Ind., Spergen Hill; *a,b,* ext. views, ×1.5 (Hinde, 1896).——FIG. 383,*1c.* *P. axinoides* SMYTH, C_1, Eire, Hook Head, Co. Wexford; oblique long. sec., ×4.0 (Smyth, 1929).

?Microcyathus HINDE, 1896, p. 447 [**Hydnopora? cyclostoma* PHILLIPS, 1836, p. 202; M; †67, YM, York]. Adherent, holothecate, discoid; coenenchyme trabeculate, ridged and irregularly canaliculate; calices lined with nontrabeculate aperforate fibrous tissue; atabulate [see WEYER, 1970b, p. 1118]. *L.Carb.,* Eu.(G.Brit.-Belg.-Silesia); *Miss.,* N.Am.(Ill.-Ind.-Mo.).——FIG. 384,*1a-e.* **M. cyclostoma* (PHILLIPS); *a,b,* Visean, G.Brit., Northumberland, ext. views, ×0.6, enl. (Phillips, 1836); *c-e,* L.Carb.Ls., Fifeshire, *c,* thin sec., ×5, *d,e,* ext. views, enl. (Etheridge & Nicholson, 1878).

Smythina WEYER, 1970b, p. 1118 [**Palaeacis humilis* HINDE, 1896, p. 440; OD; †lectotype R2731, BM(NH), London; by D. E. WHITE, herein, from syntypes R2728-2735, 22547-22549, 22221, 22222]. Corallum without holotheca, low, dish-shaped, with four thick-walled corallites arranged in form of cross, with rounded calices set in porous coenenchyme; ornament of slightly wavy longitudinal ?septal ribbing; pores predominantly simple and straight through walls in calical region and on underside, but irregularly reticulate in spongy central zone of upper surface; atabulate. [WEYER's interpretation; D. E. WHITE informs me (pers. commun.) that HINDE's description was based on immature coralla only; he suggests that mature coralla such as GSM8148 (Fig. 389,*2d*) might be referred to *Trachypsammia* GERTH, 1921, and that they may be two genera in symbiotic relationship.] *L.Carb.(mid.up.Visean),* Eu.(Eng.-Ger.).——FIG. 383,*2a-e.* **S. humilis* (HINDE), syntypes, Eng., R. Hodder near Stonyhurst College, Lancashire; *a,b,* ext. views, ×2.0; *c,* transv. sec., ×7.0 (Hinde, 1896); *d,e,* mature corallum, ext. view, transv. sec., ×2.0 (Hill, n; photographs courtesy D. E. White).

Superfamily PACHYPORICAE Gerth, 1921

[*nom. transl.* HILL, herein, *ex* Pachyporidae GERTH, 1921, p. 105] [=Thamnoporina SOKOLOV, 1950a, p. 166, suborder]

Corallum cerioid and branching, in some astreoid; corallites polygonal or rounded-polygonal in section, with marked peripheral stereozone at least in peripheral parts of branch; width of stereozone increases either gradually throughout growth or suddenly so as to demarcate peripheral from axial zone of branch; original microstructure of stereozones either radially fibrous and growth lamellate, and with either septal spinules or rarely squamulae projecting into tabularium, or consisting of contiguous septal laminae composed of clinogonally fibrous trabeculae conjunct basally and free adaxia.ly; diagenesis commonly obscures original microstructure; mural pores or tunnels present; tabulae complete, horizontal, rarely inclined or incomplete. *U.Ord.-U.Perm.*

In some pachyporicids the cerioid corallum may become astreoid peripherally, when calical, extratabularial (stereozonal) platforms and underlying growth lamellae pass from one to the neighboring corallite without change of slope or even with some depression; on some of these a raised calical ridge forms at the boundary between tabularial pit and stereozone, and the calicular platforms outside this ridge may be ornamented with granules and ridges, some radial. These calicular platform regions are not coenenchymal, and there seems no need

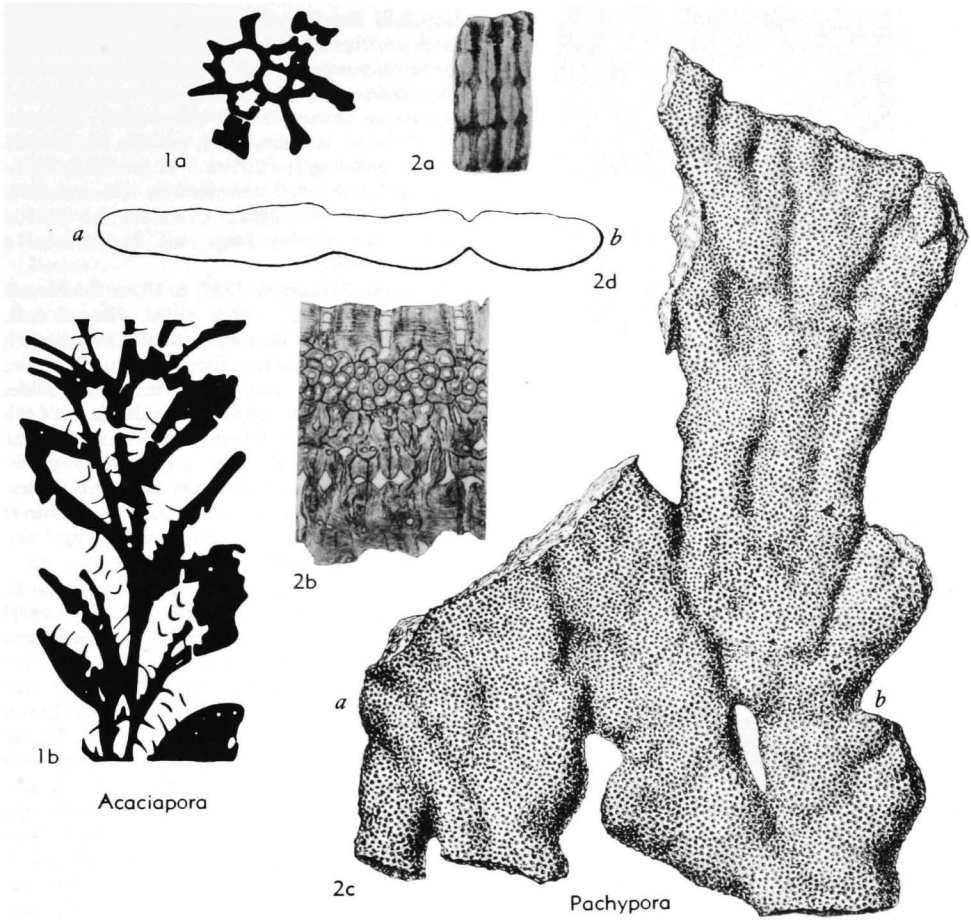


FIG. 385. Pachyporidae (p. *F575-F576*).

to have a family name "Trachyporidae" or "Dendroporidae" for such forms.

Family PACHYPORIDAE Gerth, 1921

[Pachyporidae GERTH, 1921, p. 105; Pachyporinae HILL & STUMM, 1956, p. *F464*; Thamnoporidae, Thamnoporinae SOKOLOV, 1950a, p. 166; Striatoporinae SOKOLOV, 1950a, p. 166] [?=Trachyporidae WAAGEN & WENTZEL, 1886, p. 843, *nom. transl.* SARDESON, 1896, p. 352, *ex* Trachyporinae WAAGEN & WENTZEL, 1886, p. 843; Dendroporidae DE FROMENTEL, 1861, *nom correct.* SOKOLOV, 1950a, p. 167, *pro* Dendroporiens DE FROMENTEL, 1861, p. 264]

Corallum cerioid and branching; corallites polygonal or rounded-polygonal in section and diverging from axis of branch to open commonly normal to surface of branch, but toward apex of branch at acute angle; corallite walls thin and favositoid in axial zone of branch, with peripheral stereozones more or less suddenly developed in peripheral zone of branch; original microstructure, when retained, shows stereozone consisting of radial fibers deposited in concentric growth lamellae; septal spines or rarely squamulae may project from stereozone into tabularium; mural pores and tabulae present. *L.Sil.-U.Perm.*

Latency or overtness of radial fibrosity and of growth lamellation is in my view diagenetically controlled; radial or bilateral symmetry of calice appears to be controlled by distance in time and space from apex of growth of branch.

Pachypora LINDSTRÖM, 1873a, p. 14 [**P. lamellicornis*; M; syntypes Cn580, 583-5, 587, 592, 596, 598, 600, 58592, RM, Stockholm] [?=*Thamnopora* STEININGER, 1831, which see, but is frondescent and digitate, not cylindrically branching; ?*Pachypora (Parapachypora)* YANG, KIM, & CHOW, 1978, p. 193 (type, *Thamnopora lamellosa* YÜ,

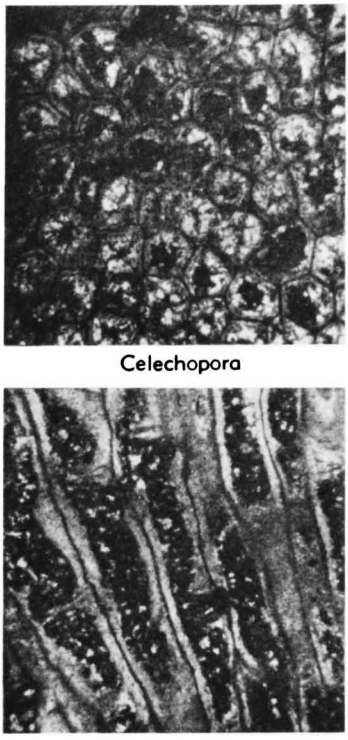


FIG. 386. Pachyporidae (p. *F576*).

1962, work not traced; †not traced; Sil., China)]. Corallum frondescent; corallites directed longitudinally in median parts of frond and with somewhat thickened walls diverging sharply to open obliquely or perpendicularly to surface of frond; calices polymorphous, alveolitoid to polyhedral; in peripheral parts of fronds walls very thick and growth lamellae ?(pseudolamellae) continuous across median sutures between neighboring corallites; septal spines present in some calices; mural pores arranged in rows parallel to surface of frond; tabulae sparse, thin [see LINDSTRÖM, 1896b, p. 23]. *M.Sil.(low.Wenlock.)*, Eu.(Gotl.); *Sil.*, Asia(?China).——FIG. 385,*2a-d*. **P. lamellicornis*, Gotl., near Visby; *a,b*, long., transv. secs., ×4; *c*, ext. view, *d*, outline of cross section, *ab*, of frond, ×1 (Lindström, 1896b).

Acaciapora MOORE & JEFFORDS, 1945, p. 181 [**Michelinia subcylindrica* MATHER, 1915, p. 97; OD; UC16159, 8 syntypes, FM, Chicago] [?=*Sinkiangopora* CHI, 1961, which see; *Acaciopora* IVANOVSKIY, 1973b, p. 267, *nom. null.*]. Corallum ramose, with dichotomous (rarely trichotomous) branching, the branches slender, cylindrical; corallites small, commonly spirally arranged; each proximally directed outward at a low angle to axis of branch, curving rapidly outward distally to open obliquely to surface; walls thin proximally, thickened distally; calices oval, elongated parallel to axis of branch, slightly projecting especially on lower side, separated by schlerenchyme, septa possibly represented by faint ridges; no tabulae, but squamulae present; mural pores fairly numerous [see THOMAS & FORD, 1963, p. 46]. *L.Carb.(Visean)*, Eu.(Eng.); *L.Penn.*, N.Am.(Okla.).——FIG. 385,*1a,b*. **A. subcylindrica* (MATHER), L. Penn., Hale F., Okla., Greenleaf L., SE. of Braggs; *a,b*, transv., long. secs., ×6 (Moore & Jeffords, 1945).

Celechopora PRADÁČOVÁ, 1938, p. 18, as *Čelechopora* [**C. ķettnerae*; OD; †not traced, ?REMEŠ Coll., Univ. Charles, Prague]. Corallum slenderly branching, corallites moderately divergent, opening obliquely; calices may have rhomboid outlines, width greater than height; squamulae present only in distal parts of corallites; septal spines ?absent; tabulae thin, mural pores scarce, walls thicken slightly distally; increase adaxial, bipartite. *M.Dev.*, Eu.(Moravia).——FIG. 386,*1a,b*. **C. ķettnerae*, Moravia, Chelochovice; *a,b*, transv., long. secs., ×20 (Pradáčová, 1938).

Cladopora HALL, 1851, p. 400 [**C. seriata*; SD MILLER, 1889-1897, p. 178; †1679:1, AMNH, New York; lectotype by OLIVER, 1963, explanation to pl. 5, fig. 1-4] [=*Vetofistula* ETHERIDGE, 1917, p. 17 (type, *V. mirabilis*, OD; †F899, AM, Sydney; M.Dev., Reid's Gap, near Townsville, N. Queensl.), see also Ross, 1961b, p. 105; *?Hillaepora* MIRONOVA, 1960, which see; *Taxopora* SOKOLOV in DZYUBO & MIRONOVA, 1961, p. 68, *nom. nud.* (type, *T. xenia*, OD, not described, diagnosed, or figured; MIRONOVA in DZYUBO & MIRONOVA, 1961, p. 68, diagnosed and figured *T. altaica* from Silurian, Chagyr Suite of the Altay and *T. salairica* from Silurian, Baskuskan Suite, Salair), see also DUBATOLOV, 1972b, p. 69; *?Sinocladopora* CHI, 1975, p. 108 (type, *S. fistula*, OD; †1121-A, ?AGS, ?Peking; M.Dev., Fengxian, Dushan Co., Kwangsi)]. Corallum ramose with slender, cylindrical branches; corallites initially parallel to axis but gradually diverging to intersect surface obliquely in lozenge-shaped calices; walls thin at axis, thickening gradually toward periphery of branch; mural pores rare, tabulae and septal ridges rare to absent [see OLIVER, 1963, p. G6]. *Sil.-Dev.*, cosmop.——FIG. 387,*1a-c*. **C. seriata*, lectotype, Sil., Lockport dol., N.Y., Lockport; *a*, ext. view, ×2; *b,c*, transv., long. secs., ×6 (Oliver, 1963).

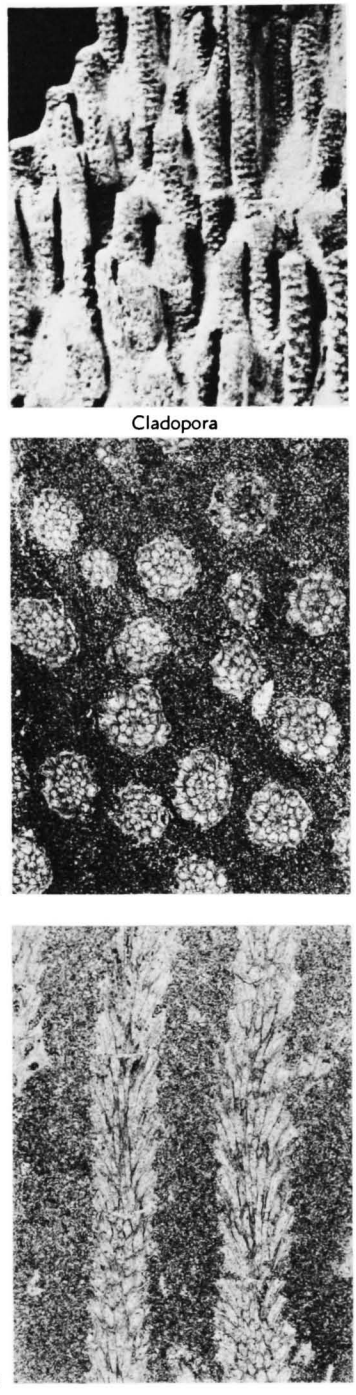
Daljanolites LELESHUS, 1964a, p. 11 [**D. reticulatus*; OD; †8, coll. 8332, TsGM, Leningrad]. Corallum reptant, of cylindrical or sublobate separate and anastomosing branches; corallites in axial parts of branch prismatic and very thick-walled, with distinct median sutures and uniserial mural pores and weakly developed septal elements; toward periphery of branch diameter of corallites and radius of their peripheral stereozones increase two to three times, mural pores are absent and

median sutures become indistinct, but 12 laterally continuous septal elements (short plates) bound the very narrow lumen and become discontinuous radially outward; tabulae not distinguishable, presumably due to thickness of stereozone; increase lateral and calicular [*see* LELESHUS, 1972b, p. 26]. *U.Sil.(Ludlov.),* Asia(Turkestan Ra.).——FIG. 388,*1a-c*. **D. reticulatus; a,b,* holotype, ext. view, ×1, long. sec., ×5; *c,* topotype, tang. sec., ×4 (Leleshus, 1972b; photographs courtesy V. L. Leleshus).

Egosiella DUBATOLOV in SOKOLOV, 1955, p. 190 [**E. safonoviensis*; OD; †390, coll. 546, VNIGRI, Leningrad] [?=*Limaria* STEININGER, 1831, p. 12 (type, *L. clathrata,* SD LANG, SMITH, & THOMAS, 1940, p. 76; †lost, *fide* LECOMPTE, 1939, p. 71; M.Dev., Eifel., Gerolstein), *non Limaria* LINK, 1807 *nec* RAFINESQUE, 1815, both bivalves; see NICHOLSON, 1879, p. 130]. Corallum of procumbent, anastomosing, slender, cylindrical branches; corallites diverge fanwise from asymmetrical axis of branch and open in small, compressed, pocket-like calices commonly arranged in alternating longitudinal rows; corallites irregularly prismatic and thin-walled in axial region, but calices crescentic or oval due to thickening of walls in peripheral regions; septal spinules weakly developed; mural pores few; tabulae transverse [see MIRONOVA, 1968, p. 50]. *M.Sil.-U.Sil.,* N.Am.(Mich.-Ky.-Tenn.-Okla.); *L.Dev.-M.Dev.,* Asia(Kuzbas-Tarbagatau Ra.)-?Eu.(Ger.-Belg.).——FIG. 389, *2a,b*. **E. safonoviensis,* holotype, M.Dev.(Givet., Safonovo beds), Kuzbas, R. Egos, Safonovo; *a,* ext. view, ×3.0; *b,* long. sec. of branch, ×4.0 (Sokolov, 1955).

Gertholites SOKOLOV, 1955, p. 181 [**Pachypora curvata* WAAGEN & WENTZEL, 1886 of GERTH, 1921, p. 107; OD; †GERTH's specimen 36, WANNER Coll., IP, Bonn] [?=*Thamnopora* STEININGER, 1831, which see; *?Thamnoporella* SOKOLOV, 1955, which see; *?Sakhapora* KOKSHARSKAYA, 1965b, p. 65 (type, *S. verkhojanica,* OD; †2170/54-15, IG, Yakutsk; corallites open at low angles to surface)]. Corallum branching; branches of radially diverging corallites increasing notably in diameter during growth and opening normal to surface of branch; edges of tabularium raised in calice, variable in size and distant; septal spines visible in calices; skeletal thickening great; mural tunnels vermiform, anastomosing; tabulae rare to absent. *Perm.,* Asia(Salt Ra.-Timor-?Yakutia)-Australia(New S. Wales-Queensl.-Tasm.-W.Australia).——FIG. 390, *1a-e*. **G. curvatus* (WAAGEN & WENTZEL), U. Perm.(Basleo.), Timor; *a,* long. sec., ×1.7, *b,* ext. view, ×1.3, *c,* tang. sec., ×2.0 (Gerth, 1921); *d,* tang. sec., ×50.0, *e,* long. sec., ×25.0 (Waagen & Wentzel, 1886).

Gracilopora CHUDINOVA, 1964, p. 31 [**G. acuta*; OD; †54, coll. 887, PIN, Moscow; =*Thamnopora yavorskyi* DUBATOLOV, 1959, p. 75, †? in DUBATOLOV Coll., VNIGRI, Leningrad, *fide* MIRONOVA, 1974a, p. 72]. Corallum of moderately slender, cylindrical branches; corallites very slender, numer-



1a

Cladopora

1b

1c

FIG. 387. Pachyporidae (p. *F576*).

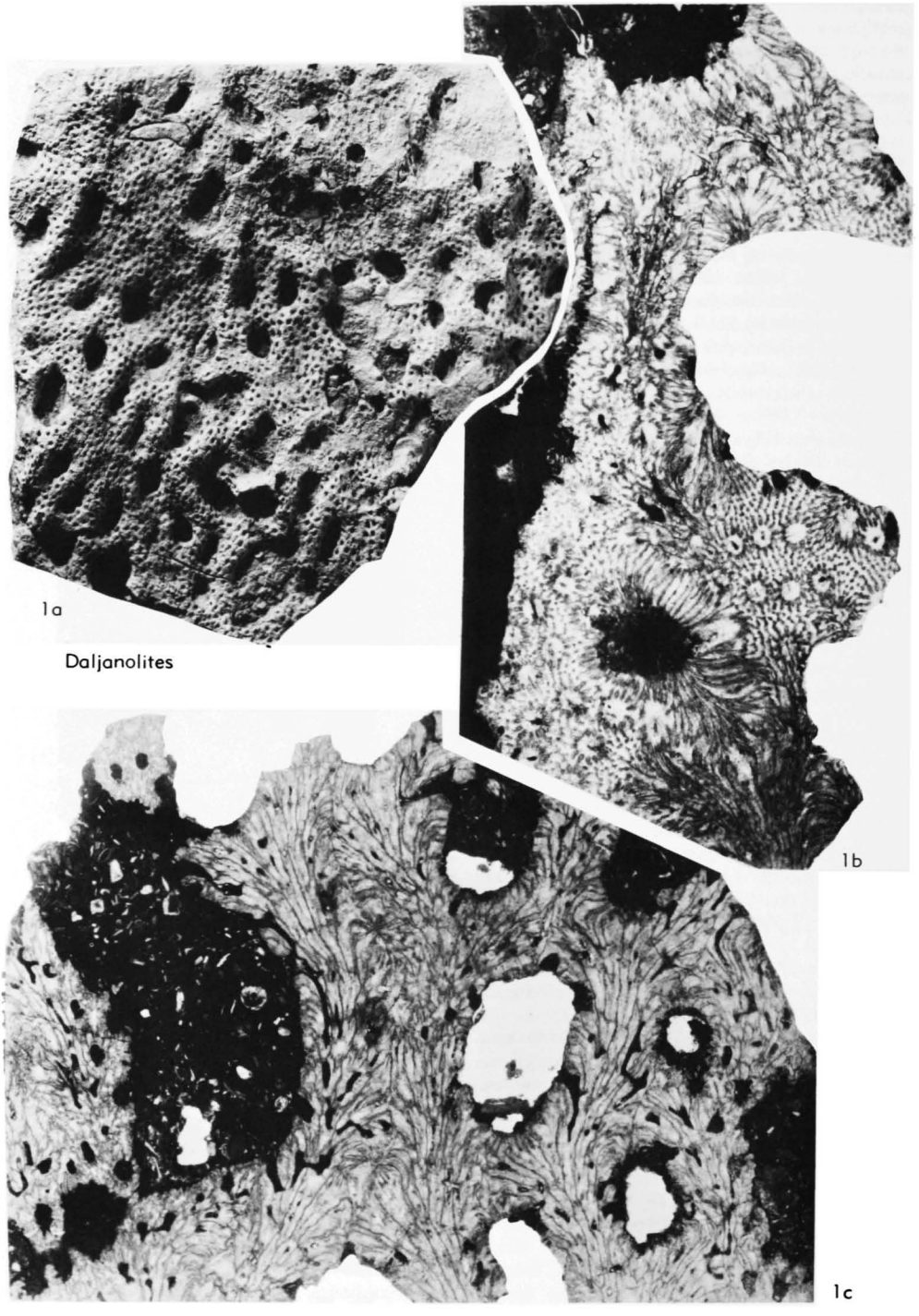


FIG. 388. Pachyporidae (p. *F576-F577*).

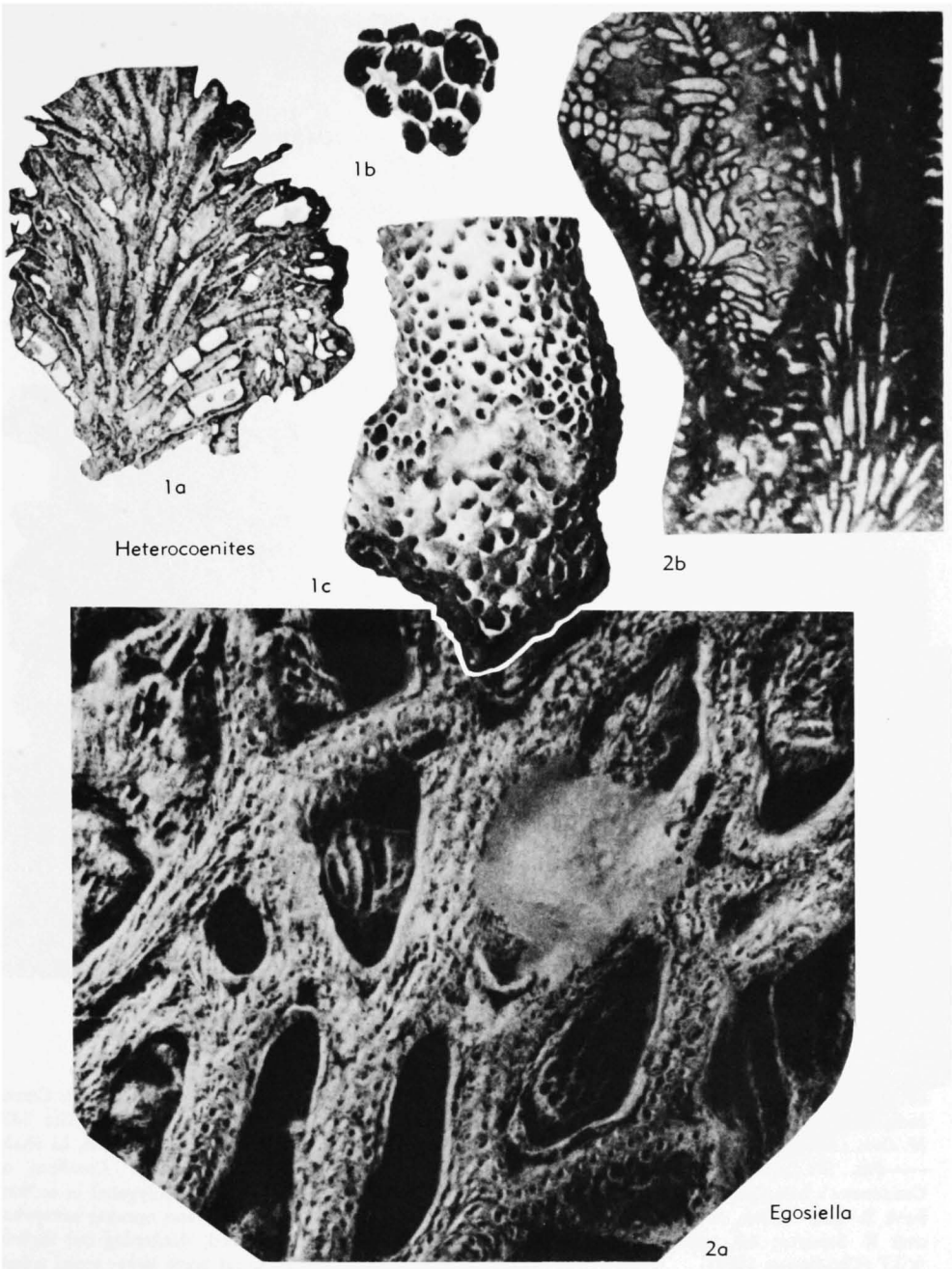


FIG. 389. Pachyporidae (p. *F*577, *F*580-*F*581).

ous, polygonal or rounded polygonal in cross section and curving slowly at first outward from axis of branch to open at surface at an acute or closer to right angle; calices with sharp lower lip and gently sloping, bluntly thickened upper lip; walls thin in axial zone, gradually thickening toward surface of branch; stereozone latently radially fibrous with faintly marked median suture between

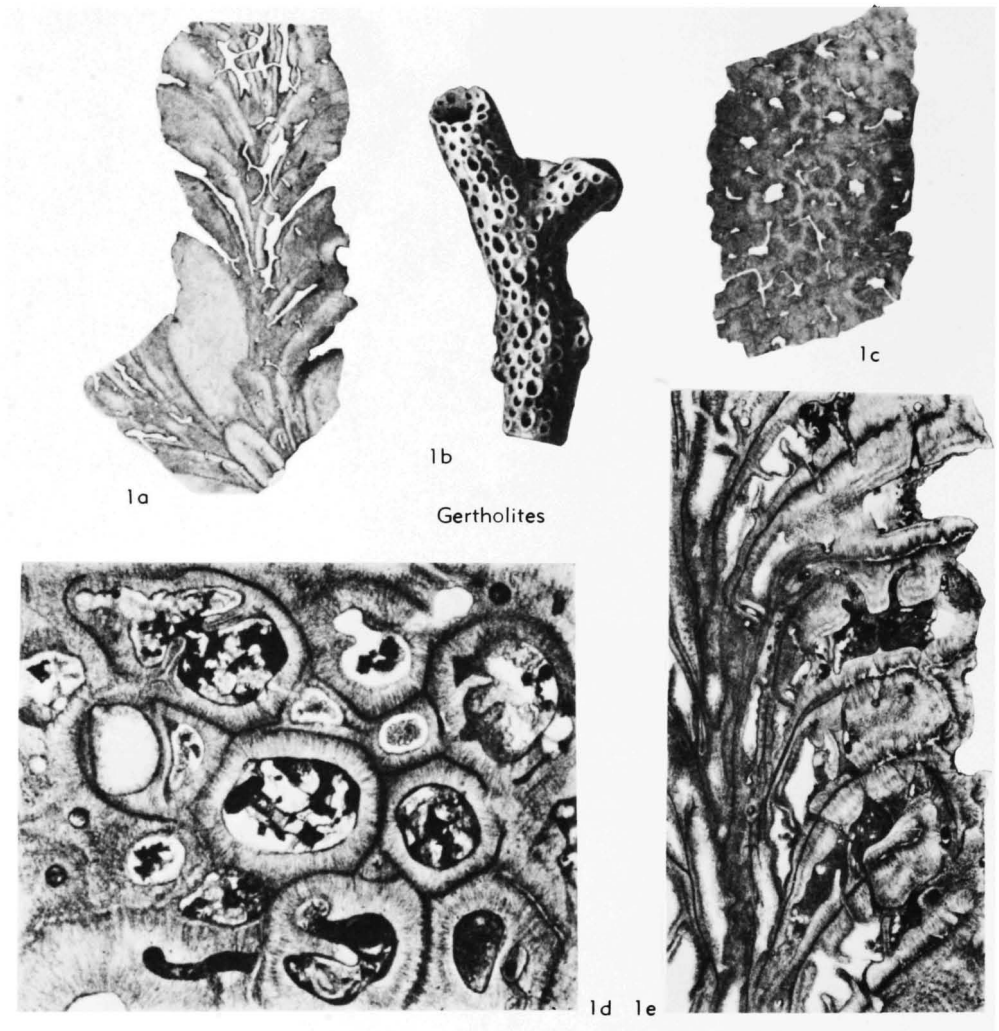


FIG. 390. Pachyporidae (p. *F577*).

corallites; pores uniserial; small septal spines may be present; tabulae complete, horizontal, or rarely inclined [see DUBATOLOV, 1969, p. 112]. *L.Dev.-M. Dev. (Eifel.),* Asia (Kuzbas-NE. USSR-Urals). ——FIG. 391,*1a,b.* **G. yavorskyi* (DUBATOLOV), CHUDINOVA's holotype, Eifel., Salairka horizon, left bank R. Maly Bachat, 500 to 600 m. E. of bridge over R. Salairka; *a,b,* transv., long. secs., ×1.3, ×2.7 (Chudinova, 1964).

Guanziyaopora KIM & YANG in YANG, KIM, & CHOW, 1978, p. 189 [**G. guanziyaoensis*; OD; †Gct 379-380, GB, Guiyang; M.Dev., Guanziyao F., Guanziyao, Puan (Panshui), Guizhou (Kweichow)]. Like *Thamnopora* but in peripheral parts of branches thickening of walls developed in successive, transverse, shelflike annuli. [Diagnosis tentative, from illustrations.] *M.Dev.,* Asia(Kweichow).

?Guizhoustriatopora CHOW in YANG, KIM, & CHOW, 1978, p. 192 [**G. dushanensis*; OD; †Gct 382, 383, GB, Guiyang; L. or M.Sil., Shuiyan, Li Shan, Dushan, Guizhou (Kweichow)]. Corallum of cylindrical branches; corallites polygonal in section, diverging slowly from axis and opening somewhat obliquely; walls thickened, thickening but slightly increasing distally; mural pores large; septal spines sparse; tabulae flat or slightly curved. [Diagnosis tentative, from illustrations.] *L.Sil.* or *M.Sil.,* Asia(Kweichow).

Heterocoenites GERTH, 1921, p. 109 [**H. variabilis*; SD LANG, SMITH, & THOMAS, 1940, p. 68; figured syntypes 39, WANNER Coll., IP, Bonn]. Corallum branching, corallites directed longitudinally in axes of branches, diverging to open at surface

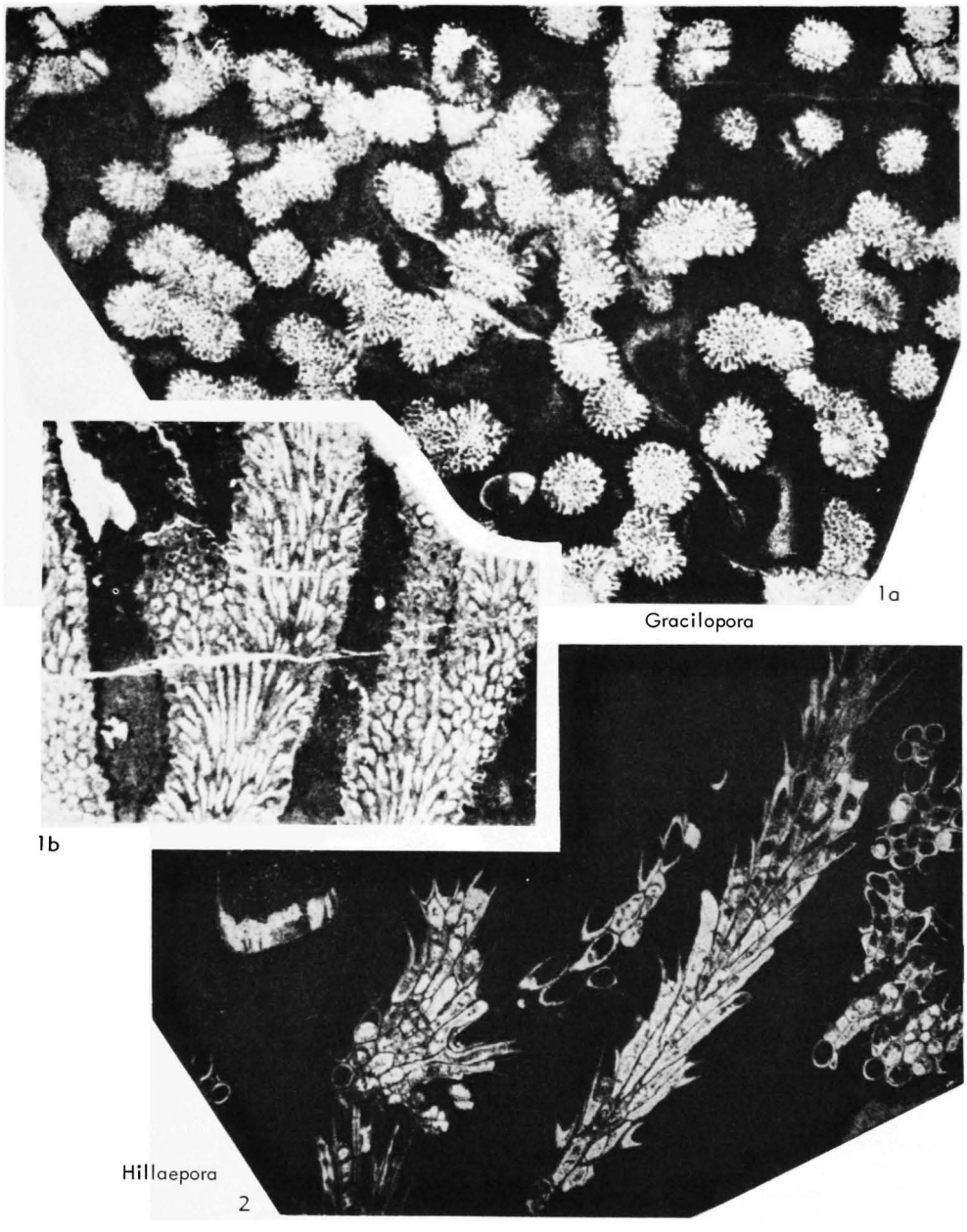


FIG. 391. Pachyporidae (p. *F*577-*F*582).

with polygonal calices in proximal parts, but obliquely and with alveolitoid calices in distal parts; skeletal thickening great, lumina filled in axial regions of branch; septa represented by ridges or rows of small spines, up to eight; one septum larger than others; mural pores sparse, somewhat irregular; tabulae rare. *U.Perm.*, Asia(Timor).

——FIG. 389,*1a-c*. **H. variabilis*, syntype, Basleo., Timor; *a*, long. sec., ×2.3; *b,c*, ext. views, ×2.7, ×1.3 (Gerth, 1921).

Hillaepora MIRONOVA, 1960, p. 97 [**H. spica*; OD; †1167-31, coll. 853, SNIIGGIMS, Novosibirsk] [?=*Cladopora* HALL, 1851, which see, but differs in having long, distally produced calical edges;

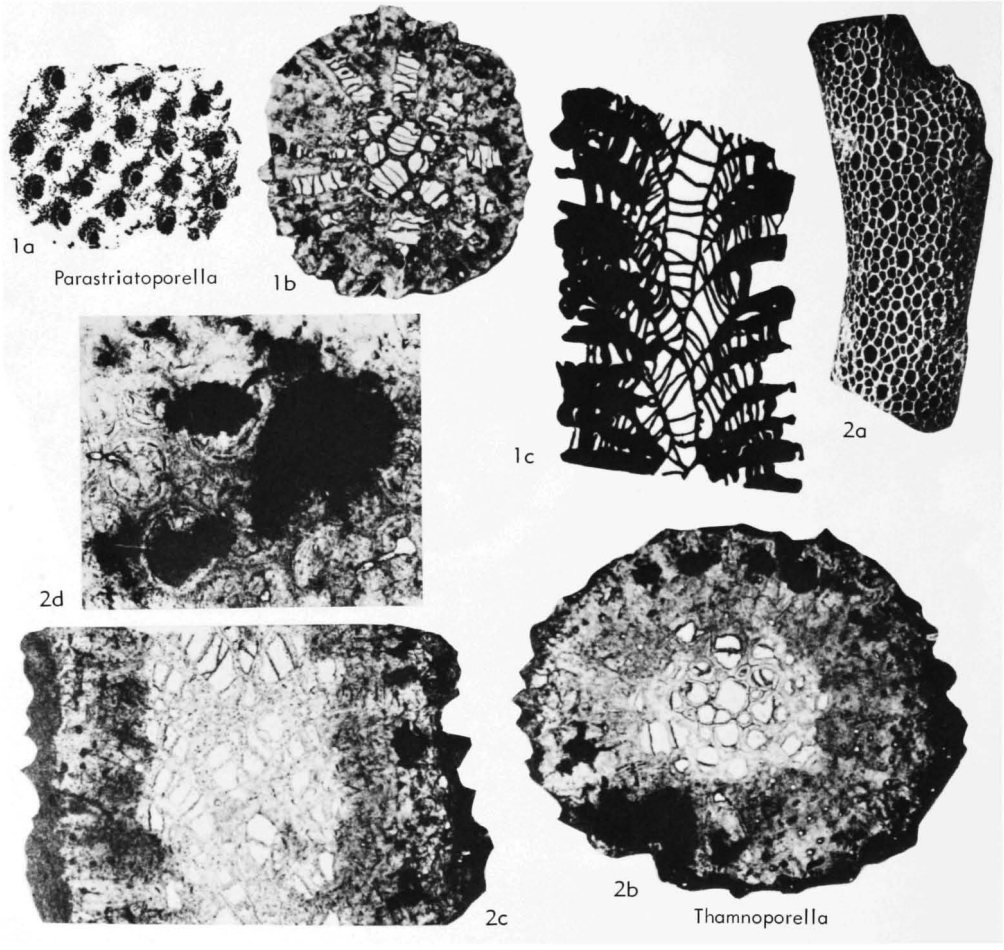


FIG. 392. Pachyporidae (p. *F*582-*F*584).

Hillaeopora FLÜGEL, 1970, p. 132, *nom. null.*]. Corallum branching, each slender branch formed of corallites directed upward and outward from axis and opening to surface at acute angle; calices deep, with thin edges that project as pipes high above rest of surface of branch; in axial zone corallites tightly contiguous and polygonal to rounded in section, at surface they separate and attain cylindrical form; walls everywhere thin or but weakly thickened; pores in one longitudinal row to each face of wall; septal spines ?absent, tabulae sparse. *L.Dev.(Gedinn.),* Asia(Salair). ——FIG. 391,2. **H. spica,* Tom-chumysh beds, "Sukhaya suite," E. Salair, Bachaty; oblique transv. and long. secs., ×2.7 (Mironova, 1960).

?Pachystriatopora LE MAÎTRE, 1956a, p. 1342 [**P. obliqua*; OD; †564,a,b, LE MAÎTRE Coll., GFC, Lille]. Corallum of fingerlike branches; calices opening very obliquely to axis and with well-developed upper lip; calicinal walls with septal ridges separated by deep furrows in which pores are disposed in several rows; pores sparse below calice; sclerenchyme of walls lamellate, septal spines ?absent; tabulae thin. [Unfigured, insufficiently known.] *L.Dev.(up.Ems.)-M.Dev.(low.Eifel.),* N. Afr.(Hamar Laghdad, Tafilelt, Moroc.).

Parastriatoporella CHUDINOVA, 1959, p. 50 [**Striatopora immota* MOORE & JEFFORDS, 1945, p. 180; OD; †P-9364, UTBEG, Austin]. Branching corallum with peripheral zone of skeletal thickening; corallites curve evenly outward and increase gradually in diameter from axis to open perpendicular to surface of branch; calices may show septal ridges; corallites polygonal in section and thin-walled in axial region, thick-walled in peripheral region; mural pores present; tabulae complete or incomplete; nature of skeletal thickening insufficiently known. *L.Penn.,* N.Am.(Texas-Okla.-Ark.).——FIG. 392,*1a-c*. **P. immota* (MOORE & JEFFORDS); holotype, Brentwood Ls., Ark., 1.5 mi.

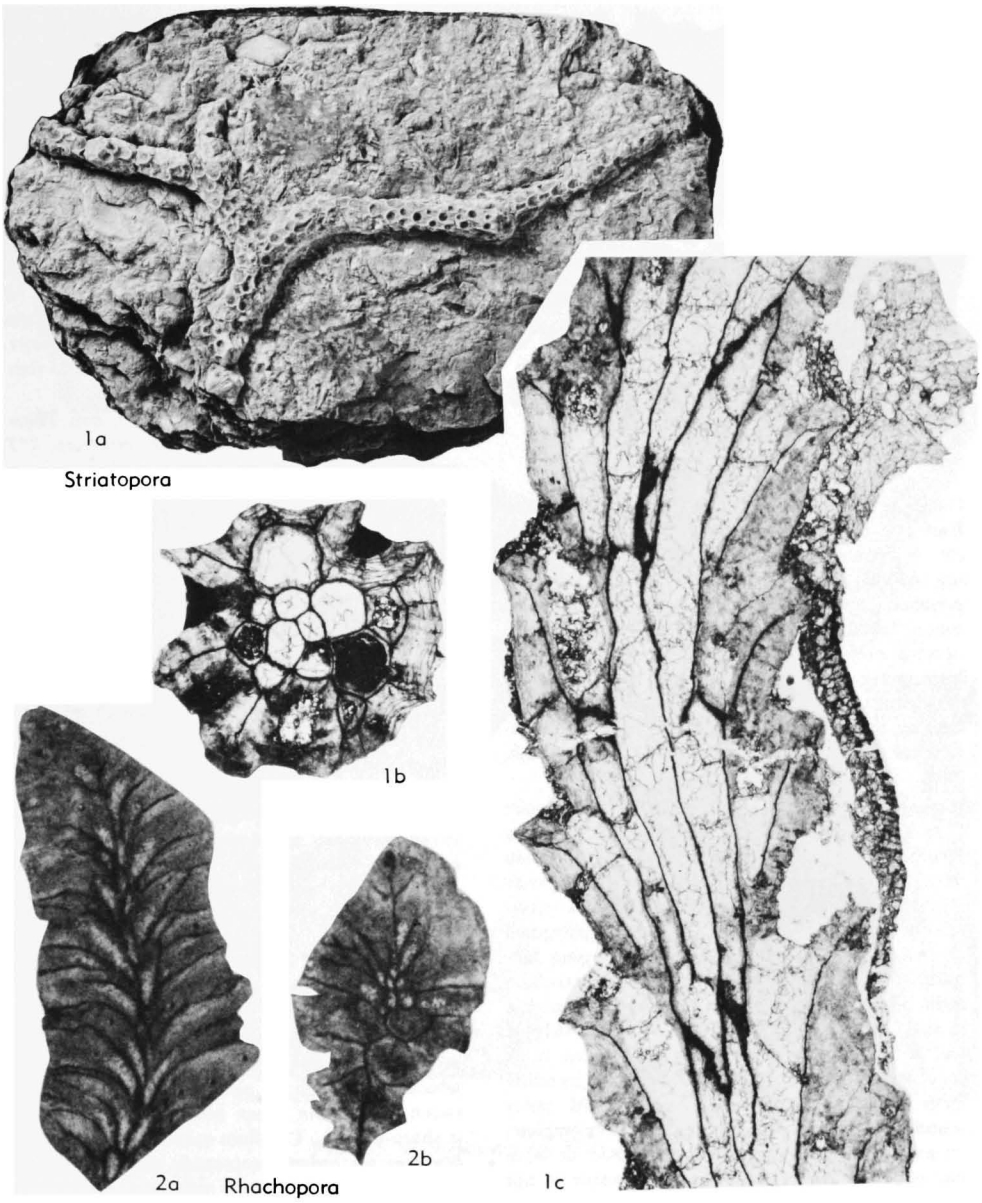


FIG. 393. Pachyporidae (p. *F*583-*F*584).

NE. of Fayetteville; *a*, calical view, ×2.7; *b,c*, transv., long. secs., ×2.7 (Moore & Jeffords, 1945).

Protrachypora CHOW in YANG, KIM, & CHOW, 1978, p. 195 [**P. yanheensis*; OD; †Gct 393-396, GB, Guiyang; L.Sil., Shiniulan F., Tudiao, Yanhe Xian (co.), Guizhou (Ḳweichow)]. Corallum ramose, with slender subcylindrical branches with corallites polygonal or subrounded in section in axial part, diverging slightly from axis to open obliquely at surface of branch, their distal parts rounded and not contiguous in section distally; walls moderately thickened, thickening slightly increasing distally; mural pores sparse; septal spines short. [Diagnosis tentative, from illustrations.] *L.Sil.*, Asia(Kweichow).

Rhachopora SOKOLOV, 1955, p. 181 [**R. modzalevskajae*; OD; †40, coll. 599, VNIGRI, Leningrad] [=*Rhacypora* SOKOLOV, 1955, p. 181, *nom. null.*; *Rachopora* SOKOLOV, 1962c, p. 230, *nom. null.*].

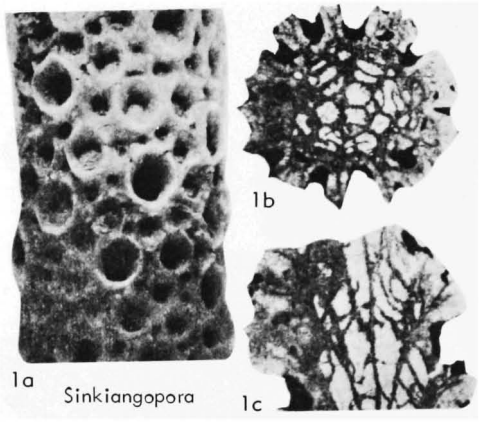


FIG. 394. Pachyporidae (p. F584).

Corallum branching; corallites diverge radially from axis of branch and increase rapidly in diameter to open normal to surface, the walls thickening quickly but progressively so that in wide peripheral zone lumina are filled or almost filled; coarse "squamulae" with sharp edges bent strongly upward project from stereozone into axial space; large pores present; tabulae sparse and irregular or absent. *M.Dev.(?Givet.),* Asia(R.Amur.-?Tarbagatau Ra.).——FIG. 393,*2a,b*. **R. modzalevskajae,* holotype, R. Aldoy, basin of R. Amur; *a,b,* long., transv. secs., ×4 (Sokolov, 1955).

Sinkiangopora CHI, 1961, p. 294 [**S. sinkiangensis*; OD; †III-226/a-1, IGP, Nanking] [?=*Acaciapora* MOORE & JEFFORDS, 1945, which see, uncertain whether *Sinkiangopora*'s ?incomplete tabulae with one edge free are squamulae]. Branches cylindrical; corallites polygonal or rounded-polygonal in transverse section in axial parts, diverging fanwise from axis to open at periphery of branch at right angles or acutely; calices rounded, variable in size; larger calices pocketlike, commonly oblique and with thinner and more sharply angled walls than smaller calices; thickening of walls increases from axis to surface of branch; mural pores rounded, arranged biserially; tabulae ?incomplete, irregularly arranged, horizontal, inclined or with one edge free ?(squamulae); septa present or not obvious. *U.Carb.,* Asia(Sinkiang).——FIG. 394, *1a-c*. **S. sinkiangensis,* holotype; *a,* ext. view, ×2.7; *b,c,* transv., long. secs., ×2.7 (Chi, 1961).

Striatopora HALL, 1851, p. 400 [**S. flexuosa*; M; †1685:1, AMNH, New York; lectotype by OLIVER, 1966, p. 454]. Corallum ramose with cylindrical or slightly compressed branches; corallites curving gently away from axial longitudinal direction and opening obliquely to surface on small branches, perpendicularly on large branches; calices may show septal ridges. Walls thin in axial region, thickening to become wide stereozones distally, with distinct growth lamellation; corallites polygonal in section but tabularium cylindrical distally because of wall thickening; mural pores common; septal spines may project into lumen; tabulae complete; new corallites originate in one of two positions, either near axis of branch or near boundary between inner thin-walled and outer thick-walled zones; the latter do not produce new corallites. [Many Paleozoic species have been referred to *Striatopora* but now require revision in light of OLIVER's precise study of type species (OLIVER, 1966, p. 448).] *M.Sil.(Niag.),* N.Am.(N.Y.); *?U.Sil.,* N.Am.(Alaska).——FIG. 393,*1a-c*. **S. flexuosa,* Rochester Sh., N.Y., Lockport; *a,* lectotype, ext. view, ×1; *b,c,* paralectotype, transv., long. secs., ×10 (Oliver, 1966; photographs courtesy of W. A. Oliver).

Thamnopora STEININGER, 1831, p. 10, *non Thamnopora* HALL, 1883, a Devonian bryozoan [**T. madreporacea*; OD; =*Alveolites cervicornis* DE BLAINVILLE, 1830, p. 370; lectotype of both species 259a, GOLDFUSS Coll., IP, Bonn; by LANG & SMITH in HILL, 1937b, p. 56; see LANG, SMITH, & THOMAS, 1940, p. 133] [?=*Pachypora* LINDSTRÖM, 1873a, which see; *?Dendrofavosites* RUKHIN, 1937, Favositicae, Favositidae, Emmonsiinae; *?Gertholites* SOKOLOV, 1955, which see]. Corallum ramose, corallites diverge from longitudinal direction in axis of branch so that except near apex of branch calices open perpendicular to surface; walls thickened, width of stereozone increasing distally, forming rounded calical pits; thickening may show growth lamellation, of fibers radiating clinogonally from median suture between corallites; septal spines sparse; mural pores numerous, tabulae thin. *Dev.,* cosmop.——FIG. 395,*1a-c*. **T. cervicornis* (DE BLAINVILLE), lectotype, M.Dev.(Givet.), Ger., Bensberg; *a,* ext. view, ×0.7; *b,* transv. sec., ×2.7; *c,* part of long. sec., ×6.0 (Lecompte, 1936).

Thamnoporella SOKOLOV, 1955, p. 176 [**Striatopora moorei* WELLS, 1944, p. 260; OD; †19500, OSU, Columbus] [=*Thamnoporella* SOKOLOV, 1950a, p. 166, *nom. nud.; ?Gertholites* SOKOLOV, 1955, which see, in which not the median suture between calices, but inner boundary of stereozone, is sharp-edged]. Corallum ramose, branches cylindrical or somewhat compressed; corallites unequal, prismoconical, opening at right angles to surface of branch and with calices sharp-edged at median sutures between neighbors; tabulae present only in axial zone where corallites have relatively thin walls; in peripheral zone lumina filled by skeletal thickening; septal spines commonly in 12 longitudinal rows; mural pores large, canal-like in peripheral zone. *M.Penn.,* N.Am.(Texas).——FIG. 392,*2a-d*. **T. moorei* (WELLS), Strawn Gr., 5 ft. above Marble Falls Ls., Texas, about 5 mi. SE. of London, Kimble Co.; *a,* holotype, ext. view, ×1.0; *b,c,* paratypes, transv., long. secs., ×2.7; *d,* paratype, tang. sec., ×4.0 (Wells, 1944).

Thamnoptychia HALL, 1876, explanation to pl. 33

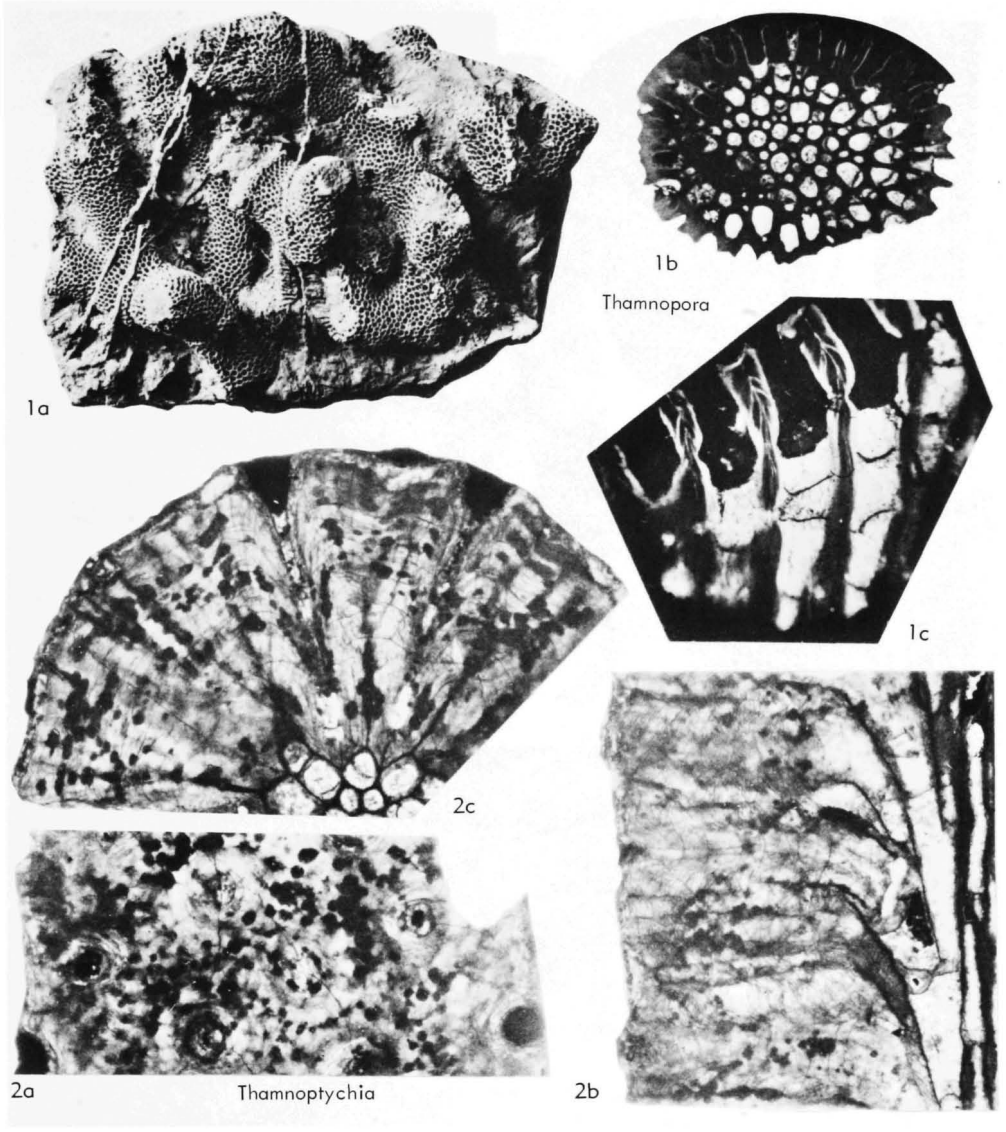


FIG. 395. Pachyporidae (p. *F*584-*F*586).

[**Striatopora (Thamnoptychia) limbata* EATON, 1832, p. 39, *non* GOLDFUSS, 1826, p. 22; M; †HALL's specimens in AMNH, New York, EATON's not traced; =*Trachypora romingeri* Ross, 1953, p. 85, †10590, NYSM, Albany, M.Dev., Kashong Sh., Hamilton Gr., Eleven Mile Cr., N.Y.; =*Milliporites vermiculosa* LESUEUR, 1821, p. 293, †not traced; see STUMM, 1965, p. 70] [?=*Trachypora* MILNE-EDWARDS & HAIME, 1851, p. 305 (type, *T. davidsoni*, M; †not traced, Dev., Ferques, France), until types can be traced or a neotype named and studied in thin section it is better not to use this name or a family name derived from it. *Trachypora* has been interpreted by LECOMPTE (1939, p. 147) as a dendroid tabulatan in symbiosis with a stromatoporoid]. Corallum digitate, branching dichotomously; corallites prismatic, directed longitudinally and with slightly thickened walls in axial part of branch, turning sharply at right angles to surface and expanding rapidly in diameter as peripheral stereozone widens almost to fill lumen; septal spines and tabulae present, and mural pores; stereozonal surfaces between openings of lumina with granular and radiating ornament for which no structural cause has yet been found in thin sections of stereozone. *L.Dev.*, N.Afr.

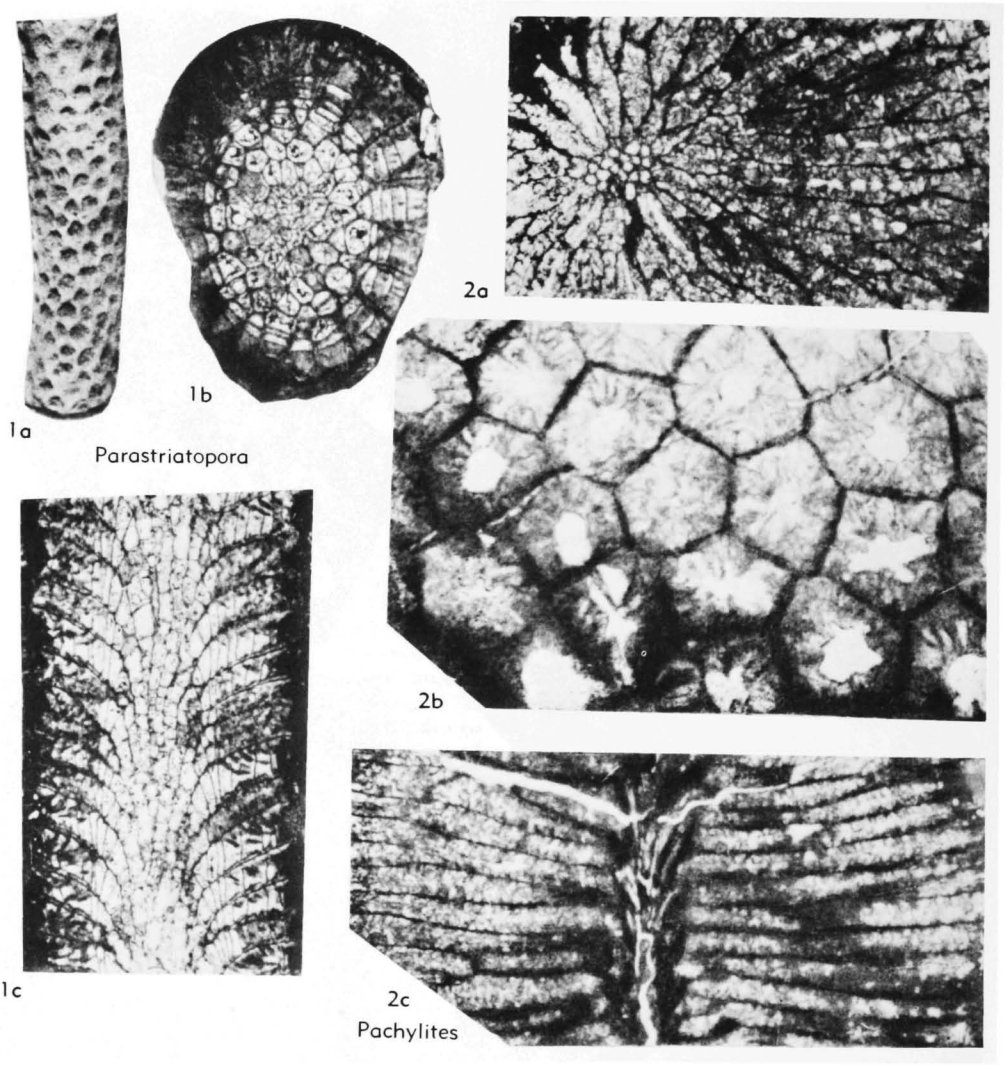


FIG. 396. Parastriatoporidae (p. *F586-F589*).

(Moroc.); *M.Dev.(Givet.)*, N.Am.(N.Y.-Ont.-Ind.-Mich.-Ky.); *?U.Dev.*, Eu.(France).——FIG. 395, *2a-c*. **T. romingeri* (Ross), M.Dev., Hamilton Gr., N.Y., Deep Run, Darien Center; *a-c*, transv., long., tang. secs., dark spots are patches of secondary alteration, ×6.7 (Hill, n; UQF11979).

Family PARASTRIATOPORIDAE Chudinova, 1959

[*nom. transl.* YANET, 1970, p. 88, *ex* Parastriatoporinae CHUDINOVA, 1959, p. 44]

Corallum cerioid, branching; corallites diverging evenly or with sharp change from longitudinal direction in axial zone of branch to open normal to surface of branch; walls favositoid and thin in axial zone, sharply augmented by thickened contiguous septa in peripheral zone; septa laminar at least basally, the lamina may be composed of conjunct trabeculae inclined adaxially upward; mural pores present; tabulae complete and transverse or inclined or incomplete; may be thickened in peripheral zone. *U.Ord.-M.Dev.*

Parastriatopora SOKOLOV, 1949, p. 86 [**P. rhizoides*; SD SOKOLOV, 1955, p. 520; †?, VNIGRI, Leningrad] [=*Favositella* MANSUY, 1912a, p. 77 (type,

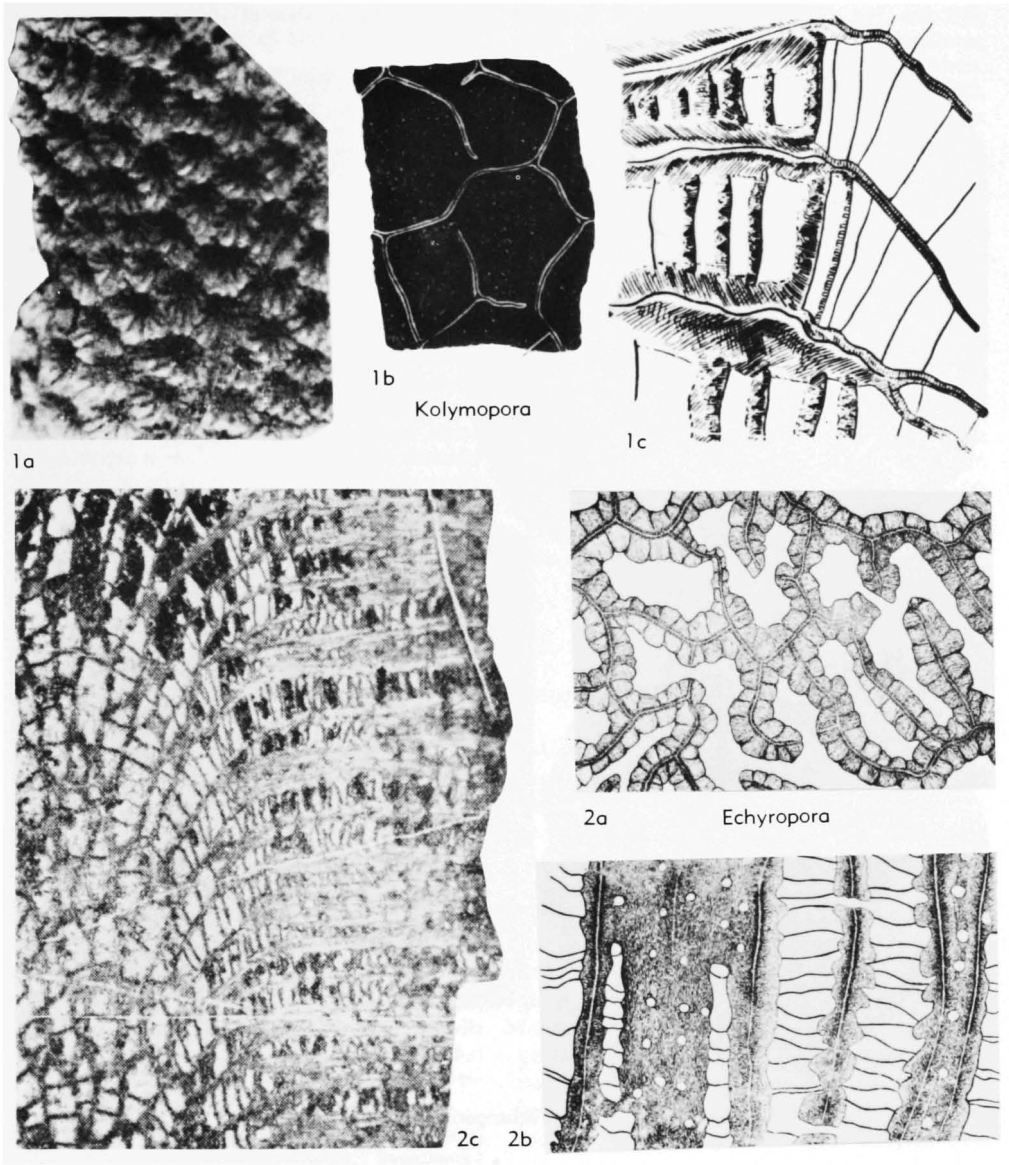


FIG. 397. Parastriatoporidae (p. *F*588-*F*589).

F. columnaris, M; †156, MG, Hanoi, lectotype by TONG-DZUY, 1966b, p. 34; ?M.Dev., Yi leang, Yunnan; *non* ETHERIDGE & FOORD, 1884, a bryozoan; see TONG-DZUY, 1966b, p. 33 and FONTAINE, 1954, p. 58)]. Corallum cylindrical, branching; corallites diverging fanwise from axis and more or less evenly curved and without sudden increase in diameter, to open perpendicularly to surface of branch; calices conical, some with radial striping; walls thin in axial parts of branch but sharply and strongly thickened in peripheral parts of branch where corallites are perpendicular to surface; where diagenesis is slight, peripheral stereozone of corallite is seen to consist of contiguous septal laminae each of upward and adaxially directed septal spines ?(rhabdacanths) whose axial edges may be free; mural pores well developed, on faces and, in some species, at angles; tabulae flat, complete, may be thickened in peripheral zone. *Sil.,* Asia(Sib.Platf.-Sev.Zemlya-N.Zemlya-Korea-Taymyr)-Eu.(Gotl.-Est.)-N.Am.(Alaska); *L.Dev.,* Australia (New S. Wales)-Asia (Kuzbas)-N. Afr.

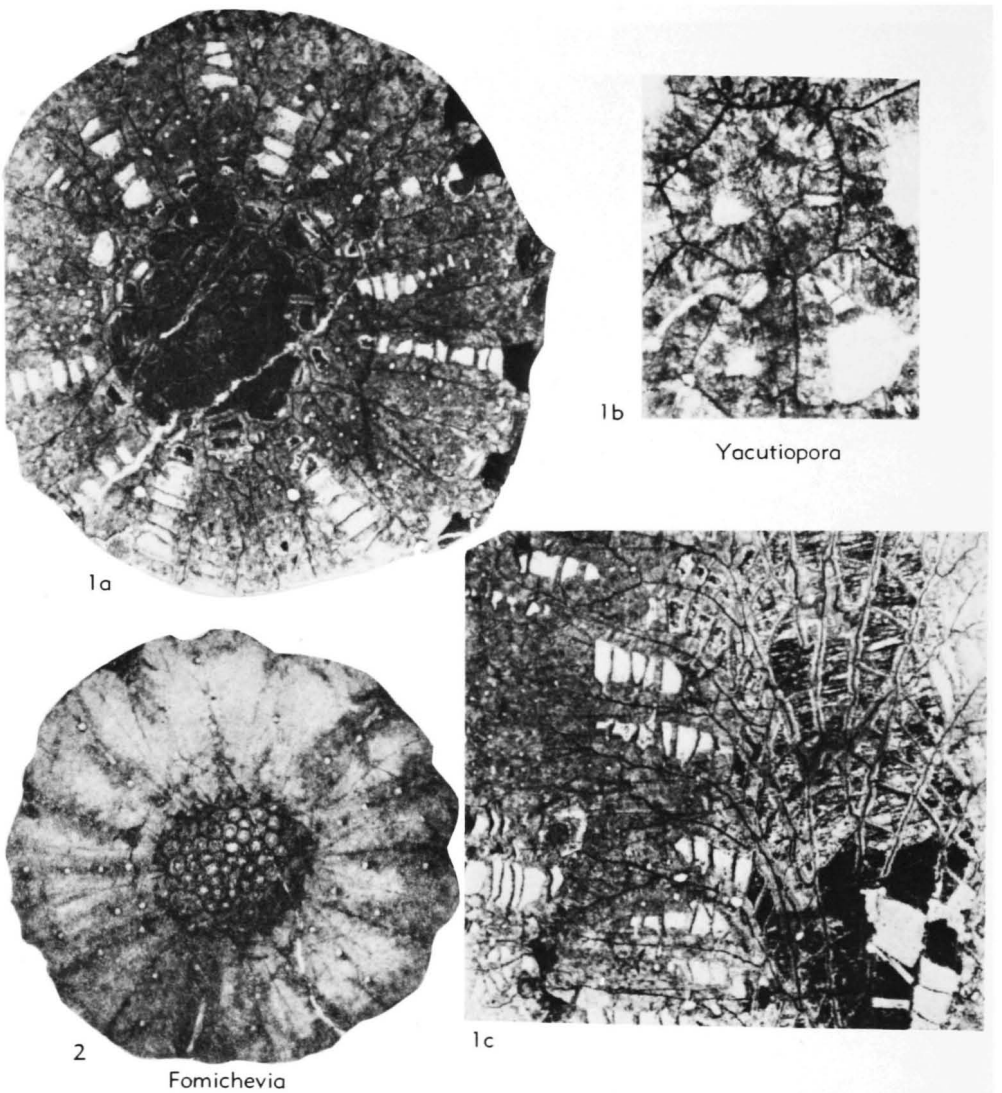


FIG. 398. Parastriatoporidae (p. *F*589).

(Alg.); *?M.Dev.*, Asia(Yunnan)-N.Am.(Alaska). ——FIG. 396,*1a-c*. **P. rhizoides*, syntype, L.Sil. or M.Sil., Sib. Platf., basin of R. Tunguska; *a*, ext. view, ×3; *b,c*, transv., long. secs., ×5 (Chudinova, 1964).

Echyropora TONG-DZUY in DUBATOLOV & SPASSKIY, 1964, p. ~~129~~ [**E. grandiporosa*; OD, fully described and figured in DUBATOLOV & TONG-DZUY, 1965, p. 49; †175/25, MG, Hanoi; see also TONG-DZUY, 1967, p. 84]. Corallum dichotomously coarsely branching; corallites curving from longitudinal direction in axial part of branch and turning sharply to lie perpendicular to surface in wide peripheral zone; in axial zone walls thin with homogeneous microstructure; in peripheral zone thick, radial, and laterally contiguous short septal laminae are composed of fibers diverging clinogonally from mid-plane of lamina and median suture of wall; internal surface of stereozone papillate; mural pores large; tabulae horizontal, inclined or weakly curved. *L.Dev.* or *M.Dev.*, Asia (Viet Nam-NE.USSR).——FIG. 397,*2a-c*. **E. grandiporosa*, Dev.(up.Ems. or low.Eifel.), Viet Nam, near village of Tu San, Ha Giang Prov.;

a,b, tang., long. secs. through peripheral zone, ×10; *c,* long. sec., part of branch, ×4 (Tongdzuy, 1966a).

Fomichevia Dubatolov, 1959, p. 119 [**F. salairica*; OD; †248, coll. 546, VNIGRI, Leningrad; briefly compared in 1958 with the diagnosed, described, and figured *F. rozkowskae* Stasinska, 1958, p. 197, †138, ?PZI, Warsaw, Couvin., Pol., Grzegorzowice, Holy Cross Mts.] [=*Fomichevia* Dubatolov in Stasinska, 1958, p. 196, *nom. nud.; Fomitchevia* Dubatolov, 1959, p. 119, *nom. van.; ?Pachylites* Yanet, 1970, which see]. Corallum small with very slender cylindrical branches; corallites in narrow axial zone prismatic, very slender, almost capillary, with walls somewhat thickened; corallites greatly increased in diameter and sharply bent at inner edge of wide peripheral zone to proceed perpendicular to surface, where calice margin is rounded-polygonal; walls markedly thickened in peripheral zone; mural pores small; tabulae transverse, sparse; septal spines weakly expressed; increase intermural in axial zone of branch. *M.Dev.(Eifel.),* Asia(Kuzbas)-Eu.(Pol.).——Fig. 398,*2*. **F. salairica,* holotype, Shanda beds, Kuzbas; transv. sec., ×8.3 (Dubatolov, 1959).

Kolymopora Preobrazhenskiy, 1964a, p. 14 [**K. irjudiensis*; OD; †1, coll. 8360, TsGM, Leningrad] [Alternative classification is within subfamily Paleofavositinae Sokolov, 1950a]. Corallum of cylindrical branches; corallites moderately large, conico-prismatic, slightly diverging and thin-walled in wide axial zone of branch, turning sharply outward and forming wide peripheral zone of thick-walled corallites normal to surface; walls of corallites in peripheral zone augmented by stereozone composed of 12 equal, contiguous, and trabeculate septal laminae; mural pores at edge of corallite face as in Paleofavositinae; tabulae complete, horizontal, may be thickened in peripheral zone of branch. *U.Ord.,* Asia(NE.USSR).——Fig. 397, *1a-c*. **K. irjudiensis,* holotype, basin of middle course of R. Kolyma; *a,* calical view, ×3; *b,c,* transv., long. secs., ×10, semidiagram. (Preobrazhenskiy, 1964a).

Pachylites Yanet, 1970, p. 89 [**P. monstratus*; OD; †191/3, coll. 270, UGUp, Sverdlovsk] [?=*Fomichevia* Dubatolov, 1959, which see]. Corallum branching; corallites in very narrow axial zone of branch, very slender, and directed longitudinally, then sharply increasing in diameter and turning into wide peripheral zone of branch to open perpendicularly to surface; walls sharply thickened in peripheral zone; septa laterally contiguous laminae, spinose along axial edges and developed only in peripheral zone. *U.Sil.(low. Ludlov.),* Asia(E.slopes Urals).——Fig. 396,*2a-c*. **P. monstratus,* holotype, left bank R. Is, N. of Bokova mine; *a,* transv. sec. branch, ×4; *b,* tang. sec., ×16; *c,* long. sec. branch, ×4 (Yanet, 1970).

Yacutiopora Dubatolov in Dubatolov & Spasskiy, 1964, p. 123 [**Y. dogdensis*; OD; †11, coll. 248, IGG, Novosibirsk] [?=*Lecomptia* Mironova, 1961, p. 177 (type, *Striatopora rosacea* Le Maître, 1952, p. 72, OD; †114, Le Maître Coll., GFC, Lille, ?co-types; Eifel., Ourarourout, Alg.; less well figured than *Yacutiopora dogdensis*); *?Lecompteia* Mironova, 1974a, p. 100, *nom. van.*]. Corallum of thick branches strongly differentiated into axial zone of polygonal, relatively thin-walled, slender, longitudinally directed corallites and a peripheral zone of larger very thick-walled corallites directed normal to surface of branch; stereozones of corallites in peripheral zone consist of approximately 12 contiguous septal laminae composed of short, blunt, stout ?monacanthine trabeculae; mural pores numerous; tabulae complete, flat, commonly thickened in peripheral parts of branch. *L.Dev.,* Asia(NE.USSR-Altay)-Australia (New S.Wales-Queensl.); *?M.Dev.(Eifel.),* N.Afr. (Alg.).——Fig. 398,*1a-c*. **Y. dogdensis,* holotype, L.Dev., left bank R. Khohochalo, left tributary R. Dogdo, Tas-Khayakhtakh; *a-c,* transv., tang., long. secs., ×3.3 (Dubatolov & Spasskiy, 1964).

Suborder ALVEOLITINA Sokolov, 1950

[Alveolitina Sokolov, 1950a, p. 167] [=Alveolitida Sokolov & Tesakov, 1968, p. 202, order]

Corallum turflike, nodular or branching; corallites slender, in cross section crescentic, triangular, rounded- or compressed-polygonal or meandroid; corallites commonly inclined, with upper wall arched and lower applied to substrate; opening to surface at acute or less commonly almost a right angle, in compressed-rounded calices; walls thin or thick, microstructure radially fibrous (orthogonal or clinogonal) with growth lamellation; alternately light and dark pigmented growth zones common; pores uniserial, on narrow sides of corallites; septa represented by spines or squamulae; tabulae horizontal, inclined or somewhat curved. *L.Sil.-U.Dev.*

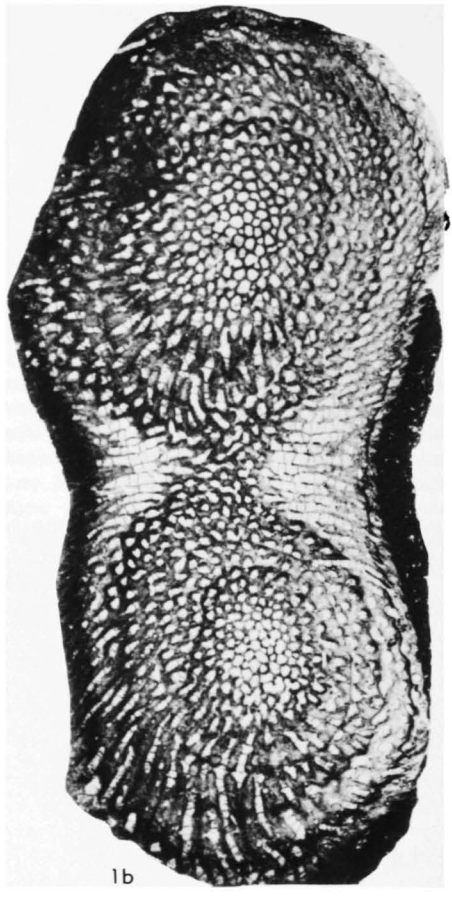
Family ALVEOLITIDAE Duncan, 1872

[Alveolitidae Duncan, 1872, p. 135]

Corallum massive, extensiform, encrusting or branching; corallites slender, long, more or less reclined, thin-walled distally, calices opening obliquely to surface and crescentic or in some compressed-polygonal; walls may be thick proximally; mural pores numerous, large, commonly in one row on narrow sides; septa represented by spines or squamulae; tabulae horizontal or inclined; increase lateral or longitudinal, asso-

1c

Alveolites



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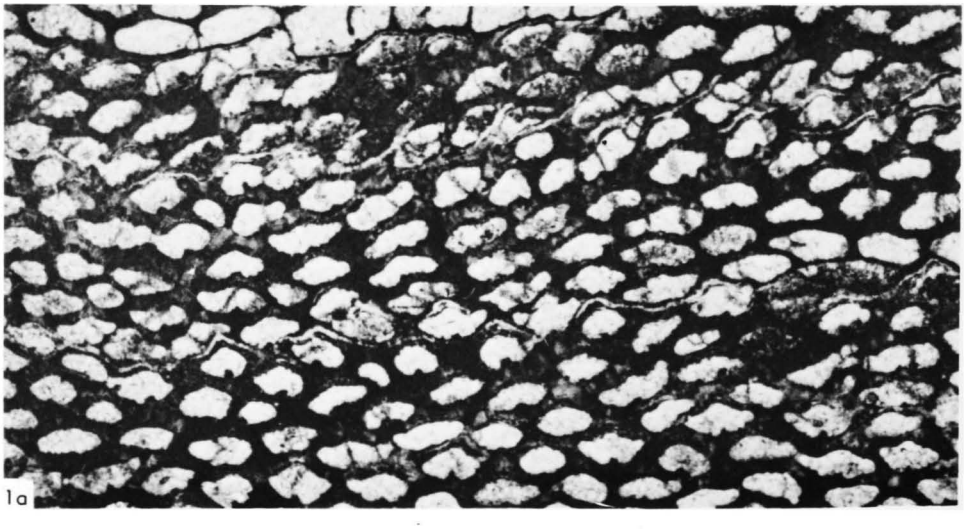

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FIG. 399. Alveolitidae (p. *F*591).

ciated with development of row of significantly larger spines [see SHARKOVA, 1971, p. 58]. *L.Sil.-U.Dev.*

Subfamily ALVEOLITINAE Duncan, 1872

[*nom. transl.* WAAGEN & WENTZEL, 1886, p. 844, *ex* Alveolitidae DUNCAN, 1872, p. 135]

Alveolitidae with corallites inclined or reclined, and without squamulae. *L.Sil.-U.Dev.*

Alveolites LAMARCK, 1801, p. 375 [**A. suborbicularis*; SD NICHOLSON & ETHERIDGE, 1877, p. 356; †neotype, 260m, GOLDFUSS Coll., IP, Bonn; by SMITH, 1933b, p. 138] [?=*Billingsia* DE KONINCK, 1876, p. 75 (type, *B. alveolaris,* M; †type material destroyed by fire, insufficiently described; Dev., New S.Wales); *Alveolitella* SOKOLOV, 1952b, p. 77, as subgenus of *Alveolites* (type, *Alveolites fecundus* LECOMPTE, 1939, p. 57, OD; †a336, IRSN, Brussels, lectotype by SOKOLOV, 1955, pl. 32, fig. 3; M.Dev., Givet., Belg.), see HILL & JELL, 1970b, p. 71]. Corallum massive, extensiform, encrusting, in some with irregular or fingerlike outgrowths; corallites reclined, long, curved; calices oblique, crescentic or irregularly angular; walls thin in basal parts of expansion and axial parts of branches, elsewhere evenly thickened, with uniserial pores; septal spines small, thin, commonly one row of larger spines related to longitudinal increase; tabulae thin, complete; increase lateral or longitudinal. *U.Sil.(Ludlov.),* Eu.(Urals)-?N. Am.-Asia(Kazakh.); *L.Dev.-U.Dev.,* cosmop.——FIG. 399,*1a.* **A. suborbicularis,* neotype, up.M. Dev. or U.Dev., Ger., Bensberg; transv. secs., ×10 (Lecompte, 1936).——FIG. 399,*1b,c. A. fecundus* (LECOMPTE), lectotype, Givet., Belg., Durbuy; *b,c,* transv., long. secs., ×3 (Lecompte, 1939).

Crassialveolites SOKOLOV, 1955, p. 185 [**Alveolites crassiformis* SOKOLOV, 1952b, p. 92; OD; †81, coll. 483, VNIGRI, Leningrad] [?=*Crassialveolitella* CHI, 1966, p. 122 (type, *C. multipora,* OD; †6, museum not traced; M.Dev., Givet., E. Yunnan; *?Microalveolites* LELESHUS, 1972a, p. 539 (type, *M. minimus,* OD; †232a-100, coll. 1165, UpG, Dushanbe; L.Dev., left bank Say Shishkat, Zeravshan Ra); *?Crassialveolitella* HLADIL, 1974, p. 219, in combination *Crassialveolitella orbicularis gen. et sp. nov.,* not diagnosed, species not diagnosed or described, Givet., Czech., borehole E. of Brno]. Corallum massive, subglobular; corallites very small and walls greatly thickened, leaving very narrow oval calices; corallites subpolygonal in section, commonly opening nearly perpendicular to surface; mural pores numerous; septal spines of one size only, weakly developed or absent; tabulae thin. *L.Dev.-U.Dev.(Frasn.),* Eu.(Belg.-Russ. Platf.-Urals)-Asia (Transcauc.-Kuzbas-Kazakh.-C.Asia-NE.USSR-China-Viet Nam).——FIG. 400,*2a,b.* **C. crassiformis* (SOKOLOV), holotype, M.Dev., *Stringocephalus* beds, USSR, Kursk reg., Staryy Oskol; *a,b,* transv., long. secs., ×4 (Sokolov, 1952b).——FIG. 400,*2c,d. ?C. minimus* (LELESHUS), holotype, L.Dev.(Siegen.-low.Ems.), N. slopes Zeravshan Ra.; *c,d,* long., transv. secs., ×10 (Leleshus, 1972a; photographs courtesy V. L. Leleshus).

Grandalveolites MIRONOVA, 1970, p. 127 [**Alveolites straeleni* LECOMPTE, 1939, p. 48; OD; †a337, IRSN, Brussels]. Corallum discoid or irregularly hemispherical; corallites large, inclined at acute angle to surface, where they are arranged in chessboard order; in section they are subtriangular or subtrapezohedral, twice as wide as long; walls moderately thickened; commonly a row of strong spines on either upper or lower wall or both; other spines commonly absent; pores numerous, on narrow sides near angles; tabulae transverse or commonly inclined and incomplete. *L.Dev. (up.Ems.),* Asia(Urals); *M.Dev.(Couvin.),* Eu. (Belg.)-Asia(Urals-Salair); *M.Dev.(Givet.),* C. Asia-N.Am.——FIG. 401,*1a,b.* **G. straeleni* (LECOMPTE), holotype, Couvin., Belg., Dinant Basin; *a,* long. sec. in shortest diameter of corallites; *b,* transv. sec., ×3 (Lecompte, 1939).

Kitakamiia SUGIYAMA, 1940, p. 112 [**K. mirabilis*; OD; †63070, TohU, Sendai] [?=*Roseoporella* SPRIESTERSBACH, 1934, p. 485 (type, *R. rhenana,* M; †in ZGI, E. Berlin; low.M.Dev., Mühlenberg beds, Oberhabbach, Ger.), see also UNSALANER, 1958, p. 83; *?Tetralites* MIRONOVA, 1970, p. 126 (type, *Alveolites tenuissimus* LECOMPTE, 1933, p. 42, OD; †a314, IRSN, Brussels, lectotype by MIRONOVA, 1970, p. 126; U.Dev., Frasn., Belg., Han-sur-Lesse); *Tuvaelites* CHEKOVICH, 1971, p. 162 (type, *Alveolites hemisphericus* CHERNYSHEV, 1937a, p. 14, OD; †neotype, 8, coll. 11174, TsGM, Leningrad, by CHEKHOVICH, 1971, p. 163; U.Sil., C. Tuva; corallites of neotype commonly chevron-shaped in cross section with septal comb on base wall)]. Corallum thick-laminar, encrusting; corallites reclined in sheets, in places concentrically arranged around axes of low, distally projecting domes; corallites of successive layers commonly superposed in vertical series, rounded oblong or crescentic in section; pores numerous, small, in side walls at ?crenulate edge with base wall; tabulae thin, transverse; walls moderately thick; septal spines sparse to absent; increase longitudinal, a septal comb or lamina growing upward from base wall. *U.Sil.(Ludlov.),* Asia(Japan-Tuva-Tarbagatau Ra.-?Asia M.)-Australia(New S.Wales); *?M.Dev.(Eifel.),* Eu.(Ger.-Belg.); *U.Dev.(Frasn.),* Eu.(Belg.).——FIG. 402,*1a-d.* **K. mirabilis,* holotype, U.Sil., *Halysites* Ls., Japan, Kitakami Mt.; *a,b,* long. secs, ×4, ×6; *c,d,* tang. secs., ×4, ×6 (Sugiyama, 1940).——FIG. 402,*1e-h. K. hemispherica* (CHERNYSHEV), neotype, Ludlov., up. Chergak suite, C. Tuva; *e,f,* transv. secs., ×4, ×10; *g,h,* long. secs., ×4, ×10 (Chekhovich, 1971).

Planalveolites LANG & SMITH, 1939, p. 154 [**Alveo-*

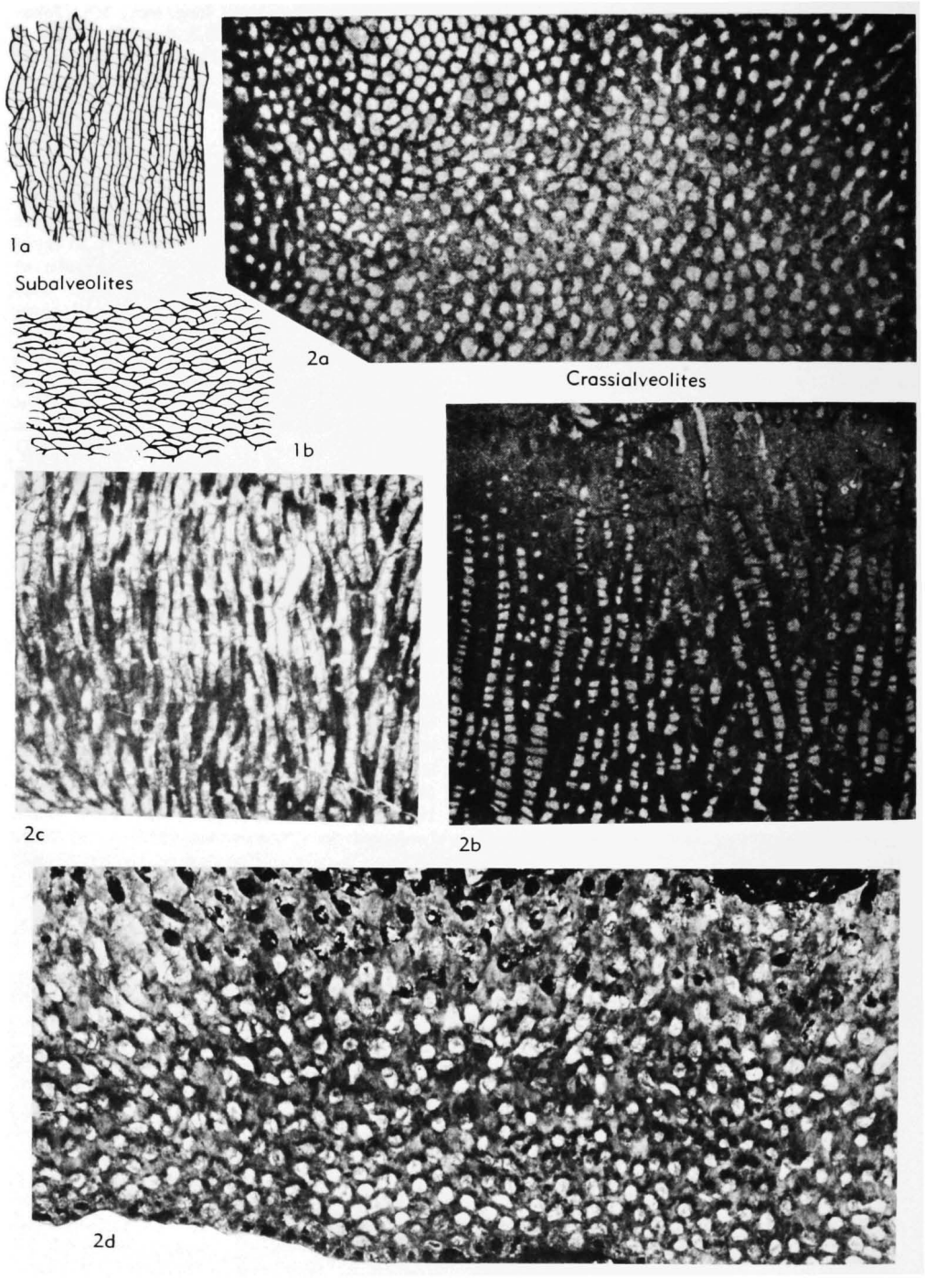


FIG. 400. Alveolitidae (p. *F*591, *F*595).

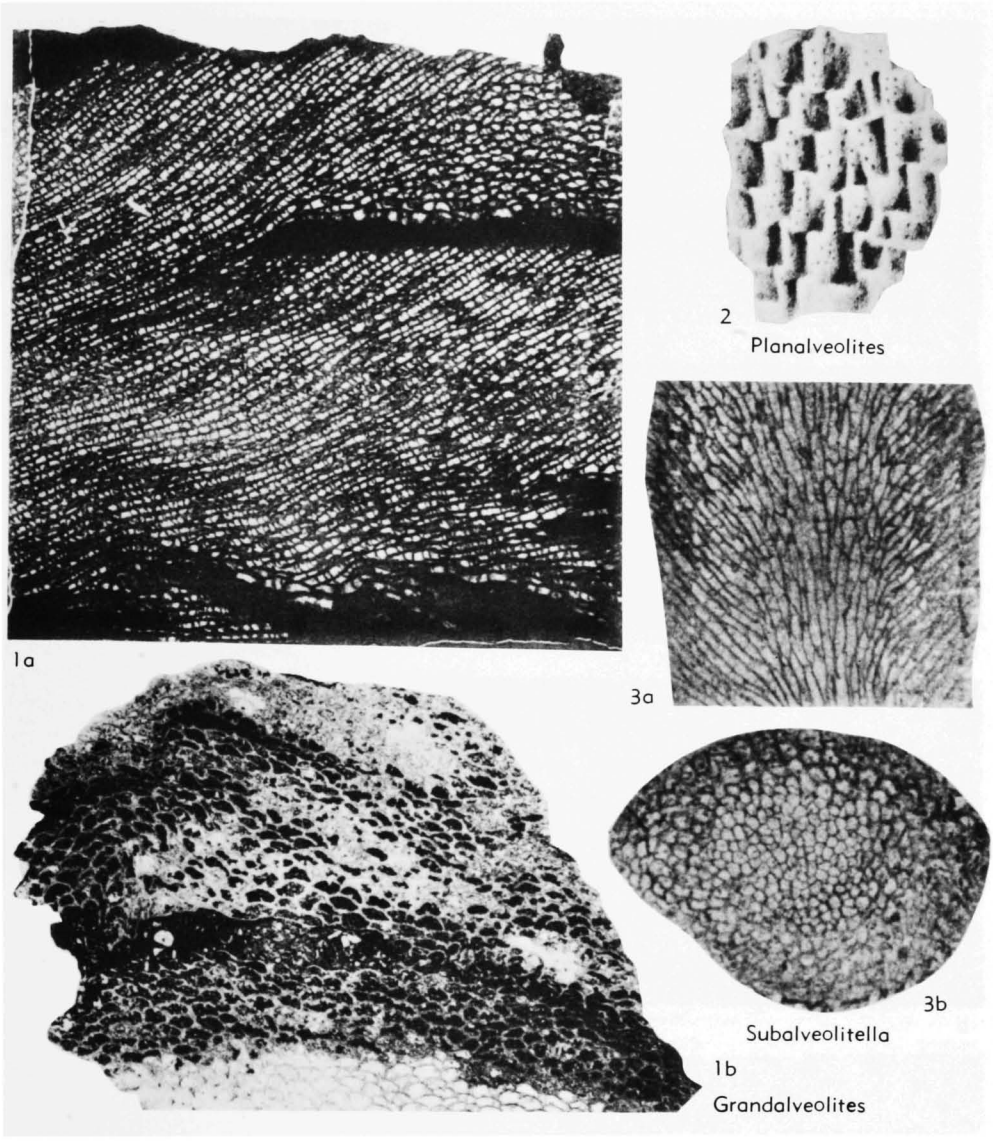


FIG. 401. Alveolitidae (p. *F*591-*F*595).

lites fougti MILNE-EDWARDS & HAIME, 1851, p. 257; OD; †now missing, EM, Paris]. Corallum thin, flat, or one to three layers of large, recumbent corallites, thin-walled and with very oblique calices, the lower wall of which is typically produced considerably beyond the upper; septal spines commonly well developed, numerous, very short; mural pores large and far apart; tabulae thin and flat. *M.Sil.(Wenlock.)*, Eu.(Gotl.).——FIG. 401,*2*. **P. fougti* (MILNE-EDWARDS & HAIME), ?holotype; ext. view, ×1 (Milne-Edwards & Haime, 1851).

?Scharkovaelites MIRONOVA, 1974a, p. 81 [**Scoliopora septosa* SHARKOVA in BARSKAYA & SHARKOVA, 1963, p. 156; OD; †? in coll. MGU, Moscow]. Corallum extensiform, corallites inclined, comparatively large, calices triangular, rounded-quadrangular or crescentic; walls moderately thick, pores on faces and at angles; large septal comb on lower side of corallite, and smaller septal spines mainly on lower side also; tabulae sparse. *U.Sil.*, Asia(Kazakh.).——FIG. 403,*1a,b*. **S. septosus* (SHARKOVA), holotype, Ludlov., Tarbagatau Ra., left bank of R. Ayaguz, mid. sec.; *a,b*, transv., long. secs., ×5 (Barskaya & Sharkova, 1963).

Subalveolitella SOKOLOV, 1955, p. 186 [**S. repentina*; OD; †54, coll. 599, VNIGRI, Leningrad].

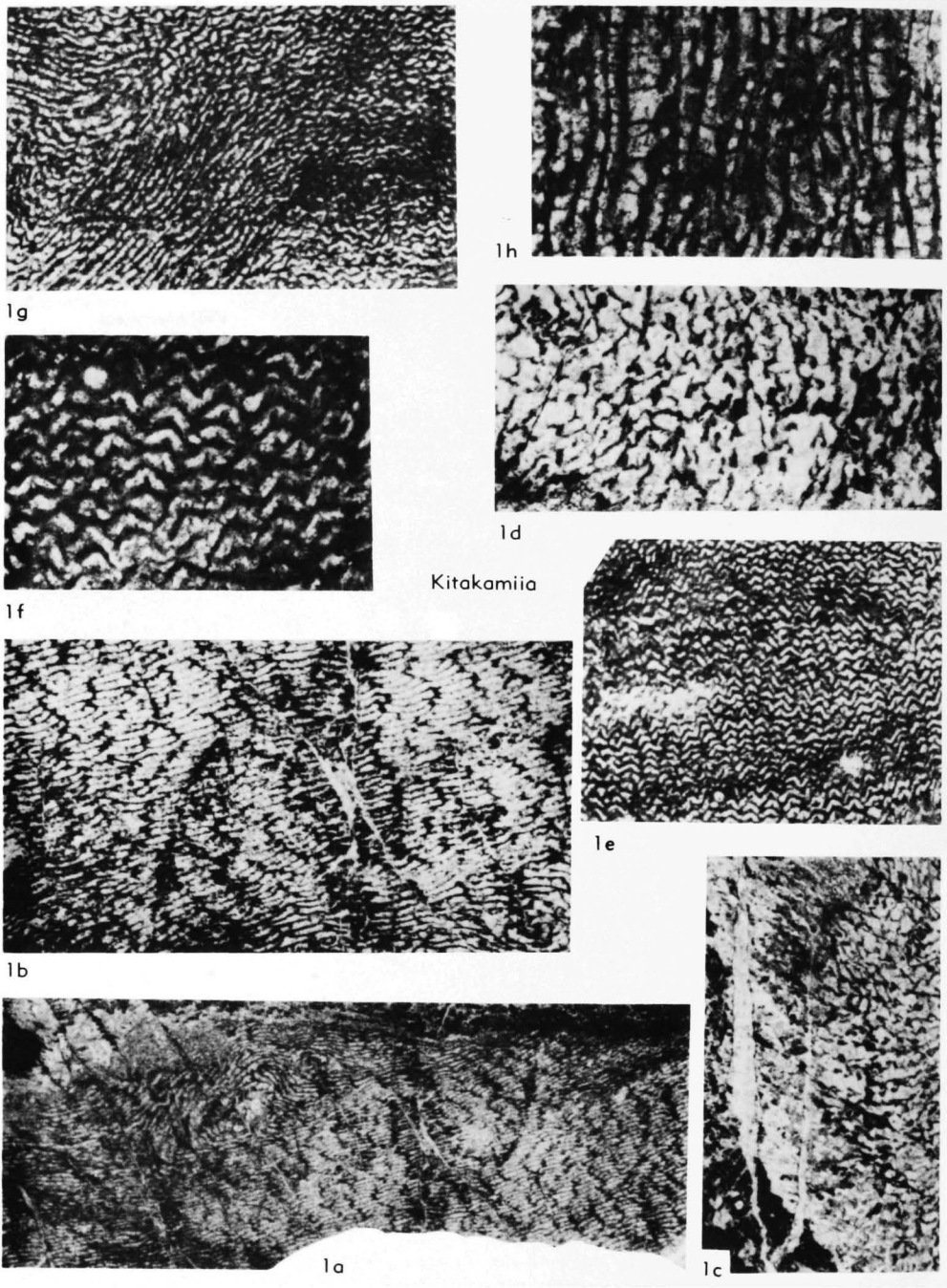


FIG. 402. Alveolitidae (p. F591).

Corallum elongate finger-shaped or branching or nodulose; corallites slender, in axial zone thin-walled, prismatic and longitudinally directed, in peripheral zone diverging and having markedly thickened walls and opening at surface obliquely in angular-crescentic calices; one row of septal spines, well expressed only in peripheral zone; pores small; tabulae thin. *L.Sil.(Adavere)-M.Sil.*

(Wenlock.), Eu.(Est.-Gotl.)-Asia(Sib.Platf.).——Fig. 401,*3a,b.* **S. repentina,* holotype, L.Sil.(Llandov.), Sib. Platf., R. Moyero; *a,b,* long., transv. secs., ×4 (Sokolov, 1962c).

Subalveolites Sokolov, 1955, p. 186 [**S. panderi*; OD; †49, coll. 599, VNIGRI, Leningrad] [?=*Shanxipora* Lin MS in Li *et al.,* 1975, p. 215 (type, *S. luojiabaensis,* OD; †G-N79-12, AGS, Peking; M.Sil., Ningqiang, Shensi)]. Corallum nodular, bun-shaped or encrusting; corallites slender, curved, commonly strongly reclined, opening obliquely at surface; in transverse section they are strongly compressed, more or less curved elliptical or crescentic; walls thin throughout; septal spines well developed only on recumbent wall, short median row commonly larger; pores at angles of corallites; tabulae thin, horizontal. *L.Sil.(Llandov.)-U.Sil.(Ludlov.),* Eu. (U.K.-Baltic-Podolia-Pol.)-Asia(Sib.Platf.-Tarbagatau Ra.); *?M.Sil.,* Asia(Shensi).——Fig. 400,*1a,b.* **S. panderi,* M. Sil.(Wenlock.), Est., Saaremaa; *a,b,* long., transv. secs., ×4 (Sokolov, 1955).

Subfamily CALIAPORINAE Mironova, 1974

[*nom. transl.* Hill, herein, *ex* Caliaporidae Mironova, 1974a, p. 102]

Alveolitidae with corallites almost normal to surface or in some inclined, and with squamulae more or less dominant over septal spines. *L.Sil.; U.Sil.-M.Dev.*

Caliapora Schlüter, 1889, p. 353 [**Alveolites battersbyi* Milne-Edwards & Haime, 1851, p. 257; M; †not traced] [=*Taouzia* Termier & Termier, 1948a, p. 136 (type, *T. chouberti,* M; †not traced; M.Dev., Tafilalet, Moroc.), see Le Maître, 1952, p. 69]. Corallum nodulose or with thick branches; corallites prismatic, opening almost perpendicular to surface in compressed-polygonal to semilunar, rather deep calices; walls moderately thick, thickening toward periphery of corallum; septal spines absent, but squamulae numerous, commonly back-to-back in neighboring corallites, thick proximally but attenuating distally; mural pores numerous, large; tabulae very thin, sparse, some dependent from squamulae. *L.Dev.,* Australia(Vict.)-Asia (NE.USSR); *M.Dev.(Givet.),* Eu.(U.K.-Belg.-Ger.)-N.Afr. (Moroc.)-Asia (Urals-Kuzbas-C.Asia-N.Viet Nam-Gt.Khingan Ra.).——Fig. 404,*1a,b.* **C. battersbyi* (Milne-Edwards & Haime), Givet., Belg., Pl. Seloignes; *a,b,* transv., long. secs., ×2.6 (Lecompte, 1939).

?Archypora Chekhovich, 1975, p. 119 [**A. tuvella*; OD; †1, coll. 10585, ?TsGM, Leningrad]. Corallum hemispherical; increase peripheral or adaxial bipartite; corallites slender, straight or curving, opening normal or slightly oblique to surface and commonly tri- or quadrangular or rounded-polygonal in transverse section, with thick walls; pores numerous, grouped at angles of walls so that two to three or three to five corallites open into one another; septal elements not large, squamulae and spines; tabulae thin, horizontal or slightly concave. [Possibly better referred to Paleofavositinae.] *L.Sil.(Llandov.),* Asia(Tuva).——Fig. 405,*1a,b.* **A. tuvella,* holotype, Llandov., low. part up. Chergak subhorizon, W. Tuva, Khondelen; *a,* transv. sec., ×10; *b,* long. sec., ×4 (Chekhovich, 1975).

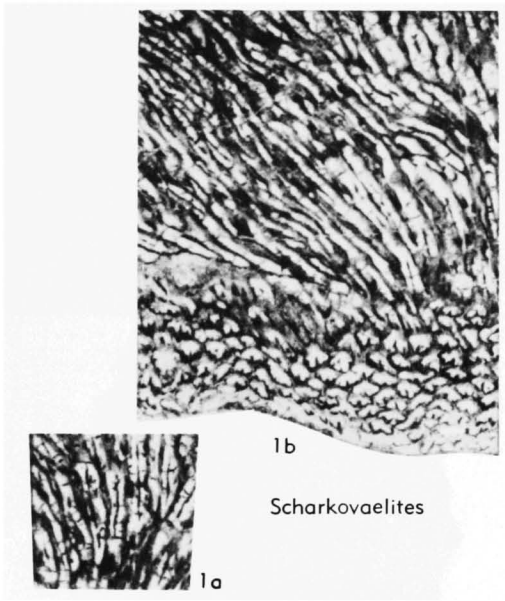


Fig. 403. Alveolitidae (p. *F*593).

?Axuolites Sharkova, 1963, p. 117 [**A. notabilis*; OD; †8/iv, MGU, Moscow] [?=*Borisilites* Mironova, 1970, p. 128 (type, *Pachyfavosites polymorphus* Sokolov, 1952b, p. 44, pl. 9, fig. 1-4, OD; syntypes 24, 25, 27, coll. 483, VNIGRI, Leningrad; M.Dev., Biya and *Calceola* beds, N. Urals; *non Calamopora polymorpha* Goldfuss, 1826, p. 79)]. Corallum encrusting to tabular; corallites reptant initially, then growing abruptly upward as compressed, thin-walled four- or three-sided prisms with rounded angles; walls may be zonally thickened, with growth lamellation parallel to surface of corallum; mural pores mid-face or at angles; minute septal spines present in longitudinal rows; tabulae thin, transverse to wavy. *U.Sil.,* Asia (Kazakh.); *L.Dev.,* Asia(Kazakh.-Urals)-Australia (Vict.); *M.Dev.,* Eu.(Urals).——Fig. 406,*2a,b.* **A. notabilis,* holotype, U.Sil., Dzhungarian Alatau, basin of R. Aksu; *a,b,* transv., oblique secs., ×6, ×4 (Sharkova, 1963).

?Oculipora Sokolov, 1952b, p. 50 [**O. tschotschiai*; OD; †34, coll. 483, VNIGRI, Leningrad] [?=*Oculiporella* Jia in Jia *et al.,* 1977, p. 246 (type, *O. elegans,* OD; †IV35033, HPRIGS, Yichang; L.Dev., Xipai F., Xiangzhou Xian [co.], Guangxi [Kwangsi]; branches thick and cylindrical, mural pores uniserial or biserial)]. Corallum cerioid;

corallites directed perpendicularly or almost so to surface; large cylindroprismatic corallites evenly scattered among small polygonal corallites of variable outline; walls slightly thickened, median suture indistinct; mural pores large, uniserial, numerous; squamulae few; septal spines coarse, sparse, with upturned ends, may be absent; tabulae

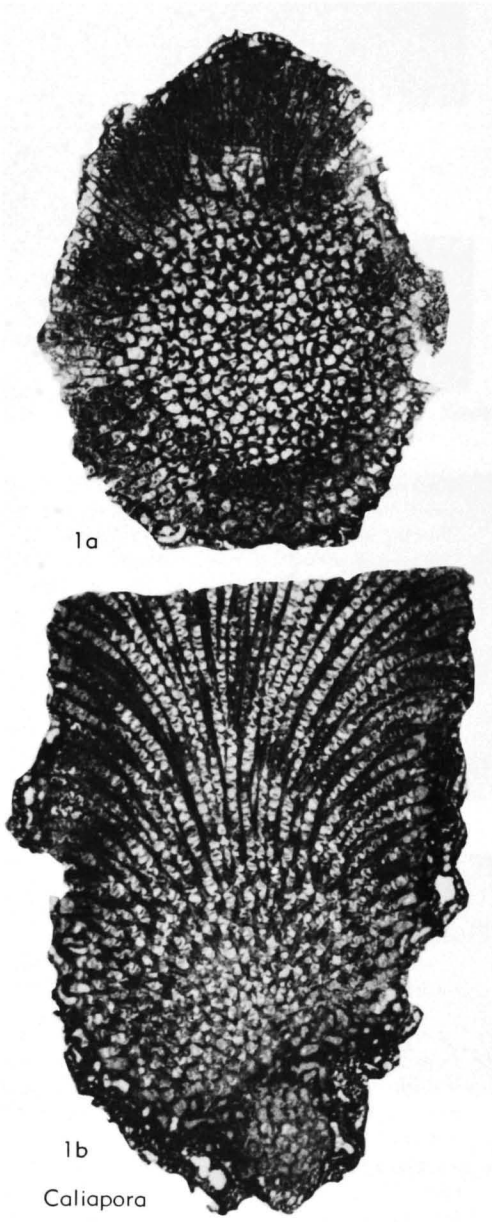


FIG. 404. Alveolitidae (p. *F*595).

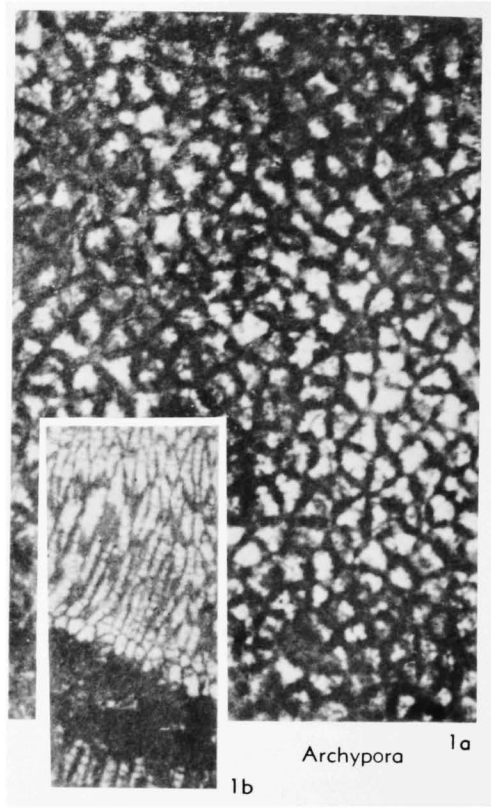


FIG. 405. Alveolitidae (p. *F*595).

complete, transverse or slightly concave, rarely incomplete and suspended from squamulae [see KIM, 1965b, p. 69; YANET in DUBATOLOV, CHEKHOVICH, & YANET, 1968, p. 102]. *?L.Dev.*, Asia(Urals-Kwangsi); *L. Dev.*(*Favosites regularissimus* Z.), Asia(Zeravshan Ra.); *M.Dev.(Eifel.)*, Eu.(Urals).——FIG. 407,*2a,b*. **O. tschotschiai*, holotype, M.Dev., Biya beds, W. slopes S. Urals, mouth of R. Arsha, basin of R. Ay; *a,b*, transv., long. secs., ×4 (Sokolov, 1952b).

Squameoalveolites MIRONOVA, 1969a, p. 86 [**Alveolites fornicatus* SCHLÜTER, 1889, p. 383, *sensu* LE MAÎTRE, 1947, p. 76; OD; LE MAÎTRE's specimen not traced, holotype of SCHLÜTER's species †200, SCHLÜTER Coll., IP, Bonn]. Corallum extensiform; corallites inclined; calices oblique and crescentic; walls somewhat thickened; septa represented by spinules and by squamulae that form eaves over large mural pores on recumbent walls of corallites; tabulae transverse or inclined. *L.Dev.*, Asia(NE.USSR-Altay)-*M.Dev.(Eifel.)*, Eu.(Belg.-Ger.)-N.Afr.(Moroc.).——FIG. 407,*1a,b*. **S. fornicatus* (SCHLÜTER), M.Dev.(Couvin.), Moroc., Ouihalane; *a,b*, long., transv. secs., ×4 (Le Maître, 1947).

Subcaliapora CHEKHOVICH, 1971, p. 159 [**S. mag-*

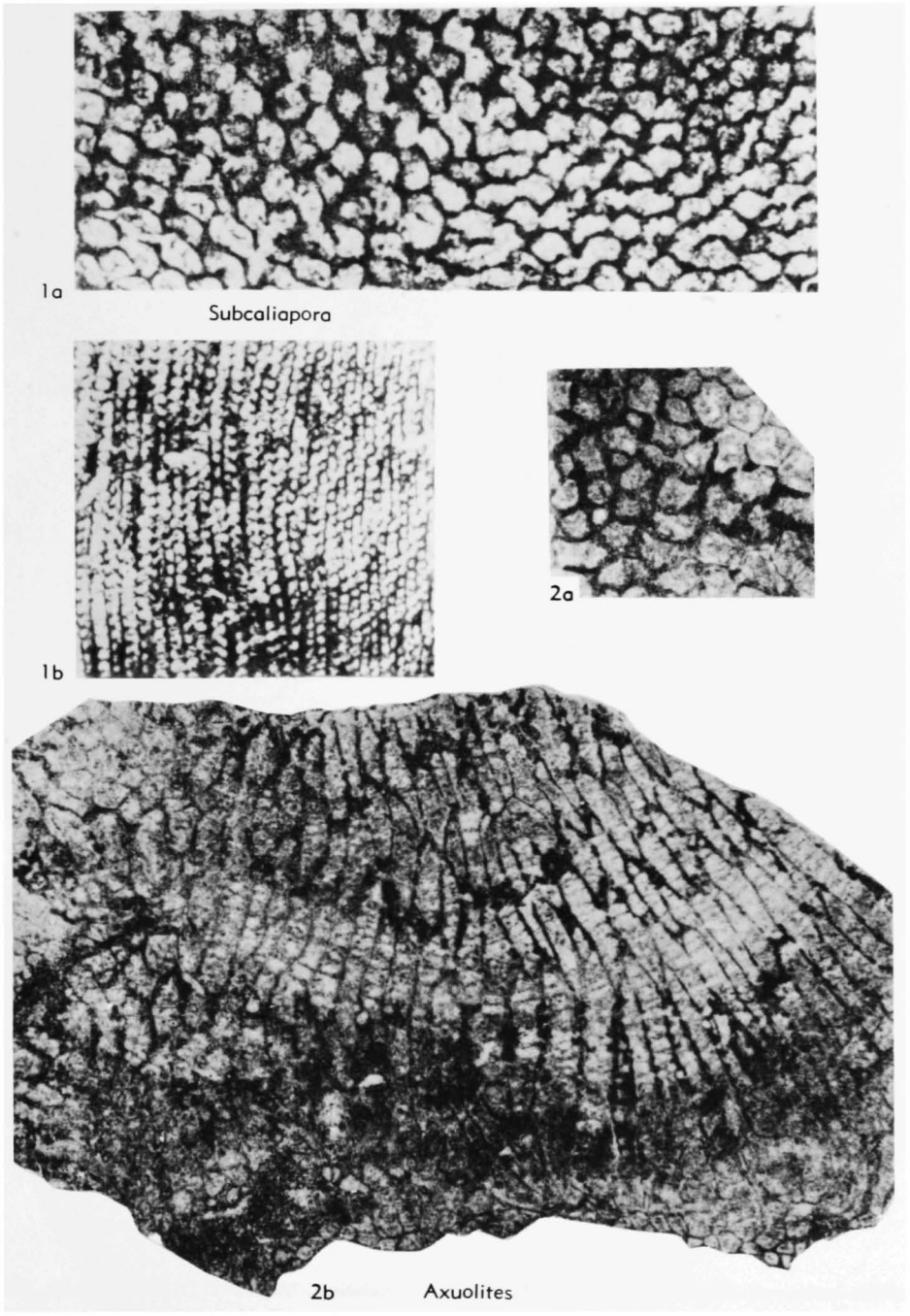


FIG. 406. Alveolitidae (p. *F595-F598*).

nifica; OD; †4, coll. 9957, TsGM, Leningrad]. Corallum massive, of medium to large size, near-spherical or hemispherical; corallites not large, rounded-polygonal or semilunar, opening at the surface almost at right angles; walls thin or moderately thick, pores large, numerous, uniserial;

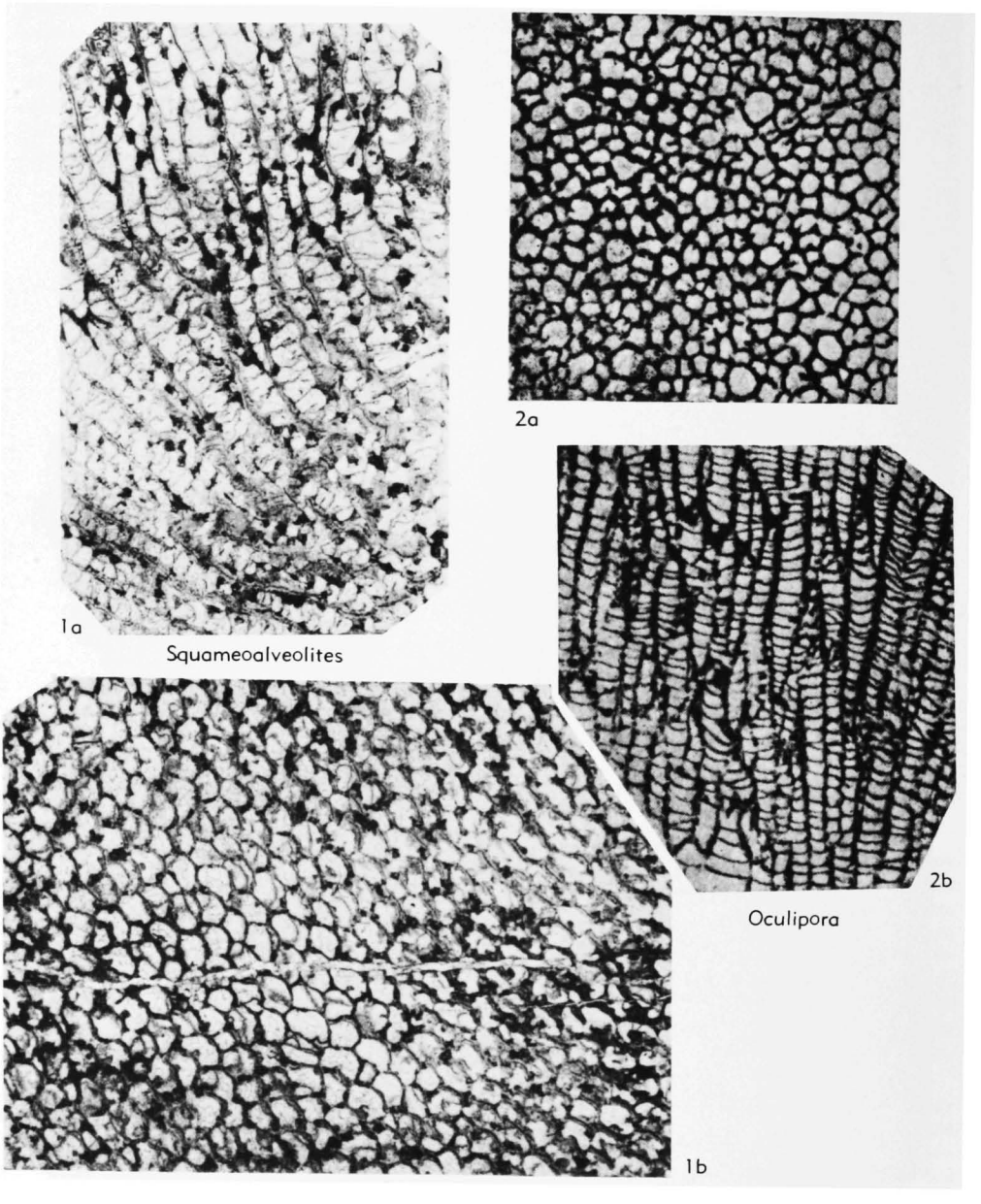


FIG. 407. Alveolitidae (p. F595-F596).

tabulae horizontal, oblique and rarely weakly concave, sometimes suspended from squamulae; squamulae uniserial, may be attended by spines. *U.Sil.(Ludlov.)*, USSR(Tuva); *L.Dev.*, USSR(R. Kolyma).——FIG. 406,*1a,b*. **S. magnifica*, holotype, U.Sil.(Ludlov.), USSR, R. Elegest, Tuva; *a*, transv. sec., ×10; *b*, long. sec., ×4 (Chekhovich, 1971).

Subfamily NATALOPHYLLINAE Sokolov, 1950

[Natalophyllinae SOKOLOV, 1950a, p. 168] [=Scolioporinae LECOMPTE, 1952, p. 513]

Corallum branched or extensiform; corallites conjunct, slender, long, prismatic, opening to surface at or nearly at a right angle; calices of irregular, commonly rectangular

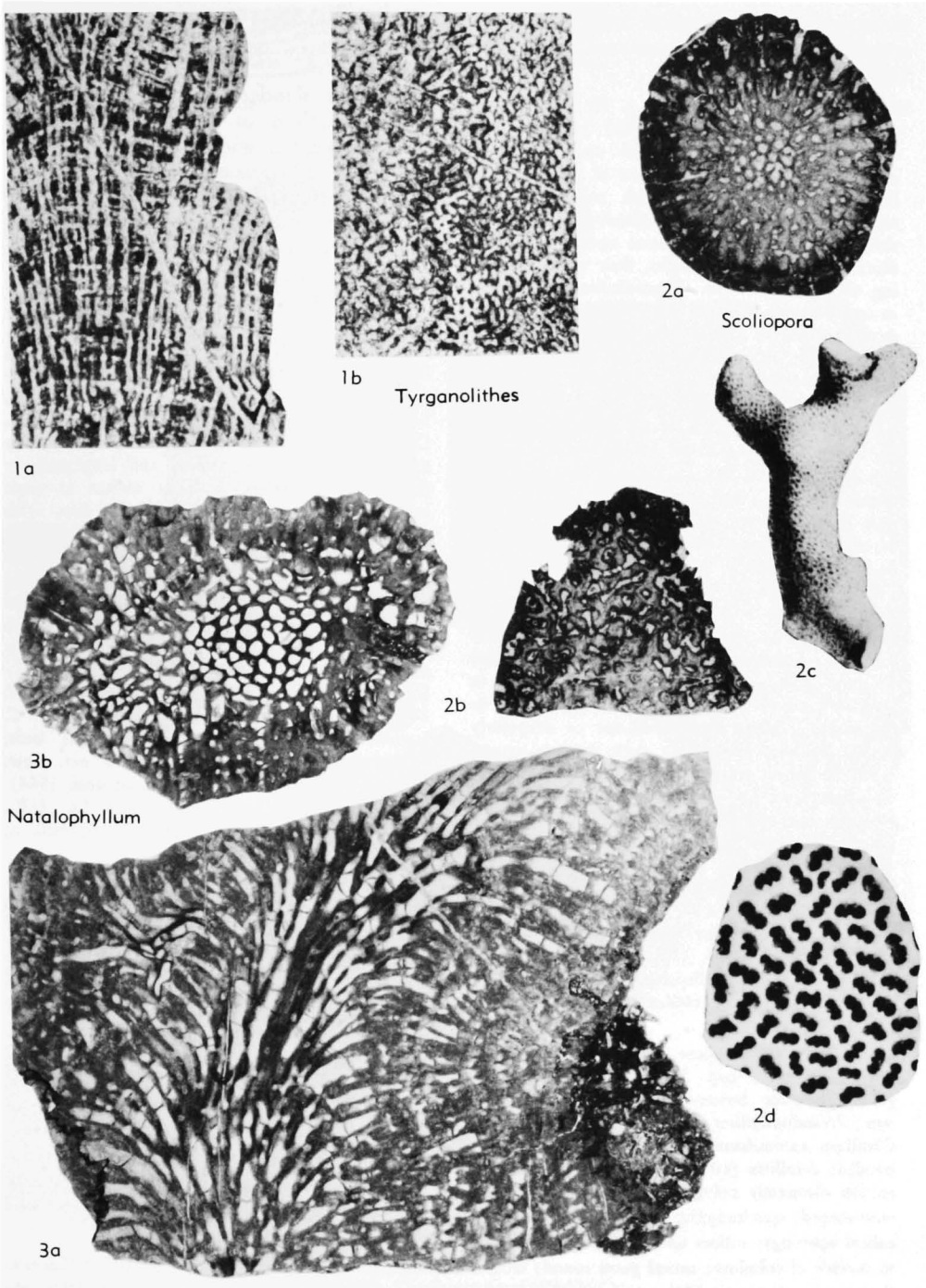


FIG. 408. Alveolitidae (p. *F600*).

outline, lips not extended; wall thickening considerable but gradual, color banding pronounced, median suture evident proximally; septal spines commonly absent but longi-

tudinal laminae may effect longitudinal increase; tabulae thin, transverse. *L.Dev.-M. Dev.*

Natalophyllum RADUGIN, 1938, p. 79 [**N. giveticum*; OD; †243, TGU, Tomsk] [?=*Tyrganolithes* CHERNYSHEV, 1951, which see]. Corallum coarsely branching; in axial zone of branch corallites rather thick-walled, with median suture, regularly prismatic and longitudinally directed; corallites enter wide peripheral zone by curving sharply almost at right angles, their walls thickening abruptly, and open perpendicularly to surface in compressed and thick-walled calices with weakly developed septal spines; pores small, numerous; tabulae thin. *L.Dev.-M.Dev.*, Asia(Kuzbas-Altay-Sayan-C.Asia-SW.China).——FIG. 408,*3a,b*. **N. giveticum*, M.Dev.(Givet.), Kuzbas, R. Mozalovski Kitat; *a,b*, long., transv. secs., ×4 (Chudinova, 1964; photographs courtesy I. Chudinova).

Scoliopora LANG, SMITH, & THOMAS, 1940, p. 118, *nom. subst. pro Plagiopora* GÜRICH, 1896, p. 143, *non Plagiopora* MACGILLIVRAY, 1895, a Tertiary bryozoan [**Alveolites denticulatus* MILNE-EDWARDS & HAIME, 1851, p. 258; SD LANG, SMITH, & THOMAS, 1940, p. 101; †5 fragments, EM, Paris, *fide* LECOMPTE, 1939, p. 142, but now missing]. Corallum small, branched, corallites irregularly angulate in cross section and relatively thin-walled in axial zone, compressed and thick-walled at periphery where they lie nearly perpendicular to the surface; calices oval, semilunar or irregularly curved, without jutting lip, with ?one to several septal ?laminae; pores large, numerous, commonly on same level in neighboring corallites; tabulae complete, horizontal; increase longitudinal by conjunction of ?laminae with opposite wall or axially with second lamina [SHARKOVA, 1971, p. 58]. *M. Dev.*, Eu. (Ger.-Belg.)-Asia (Urals-Kuzbas-China).——FIG. 408,*2a-d*. **S. denticulata* (MILNE-EDWARDS & HAIME); *a,b*, Givet., Belg., Pl. Sautour, transv., long. secs., ×4 (Lecompte, 1939); *c,d*, another specimen, Ger., Bensberg, *c*, ext. view, ×1, *d*, calical view, enl. (Milne-Edwards & Haime, 1851).

Tyrganolithes CHERNYSHEV, 1951, p. 65 [**T. eugeni*; OD; †131, coll. 5725, TsGM, Leningrad] [=*Tyrganolites* SOKOLOV, 1955, p. 189, *nom. van.*; *?Natalophyllum* RADUGIN, 1938, which see]. Corallum extensiform, thick, growth- and color-banded; corallites prismatic, thick-walled, in cross section elongately polygonal, compressed elliptical, bow-shaped, quadrangular or six-sided, with oval calical openings; calices open nearly perpendicular to surface of corallum; mural pores round; tabulae flat; no septal spines. *M.Dev.(Givet.)*, Asia(Urals-Kuzbas-Cis Balkhash).——FIG. 408,*1a,b*. **T. eugeni*, holotype, Tyrgan, Kuzbas, Mt. Kutoba, near Sergeevoy; *a,b*, long., transv. secs., ×4 (Chernyshev, 1951).

Family COENITIDAE Sardeson, 1896

[Coenitidae SARDESON, 1896, p. 352; Coenitinae SOKOLOV, 1950a, p. 168]

Corallum slenderly branching or frondescent, turflike or nodular; not large; calices crescentic, widely spaced, lips may be extended; commonly one to three rows of septal laminae or combs; mural pores sparse, in early stages mainly; tabulae transverse or inclined, sparse. *Up.L.Sil.-M.Dev.*

Coenites EICHWALD, 1829, p. 179 [**C. juniperinus*; SD MILLER, 1897, p. 727; †neotype CO 1777, coll. 92, EGM, Tallinn, by KLAAMANN, 1964, p. 92] [?=*Platyaxum* DAVIS, 1887, which see; *?Coenitoporites* RUKHIN, 1938, p. 72 (type, *Coenites (Coenitiporites) kolimaensis*, OD; †?in LGU, Leningrad; L.Dev. or M.Dev., Kolyma R.)]. Corallum of very slender branches; corallites in axial parts of branch prismatic and longitudinally directed, diverging to open at surface at acute angle; walls in axial parts relatively thin, with median suture; as corallites grow, walls quickly and evenly thicken; calices waved transverse slits constricted by thickening of walls, waviness being due to two lateral folds ?(septal ridges) on lower lip and one, median, on upper lip; mural pores sparse, small, round; tabulae thin, complete, horizontal or inclined. *M.Sil.*, Eu.(U.K.-Est.); *M.Sil.-U.Sil.*, N.Am.(Wis.-Tenn.-Ind.-Ky.); *L.Dev.-M. Dev.*, Asia(Kolyma R.).——FIG. 409,*1a,b*. **C. juniperinus*, neotype, up.M.Sil.(Pangamäe beds, Jaargarahu stage), Est., Saaremaa; *a*, ext. view, ×6.0; *b*, long. view, ×10.0 (Klaamann, 1964). ——FIG. 409,*1c,d*. *C.* sp., Wenlock Ls., U.K., Dudley; *c,d*, long., transv. secs., ×10.0 (Hill, n; UQF41939).

[I am unconvinced by the arguments of BROOD, 1970, p. 473, that *Coenites* is a bryozoan; his "central granulated wall" appears to me to be due to diagenesis of the median suture, a very fine mosaic being formed, as for instance in the septa of the rugosans *Pycnactis* and *Phaulactis* from the Gotlandian; his "zooecial lining of laminated tissue" appears to me to be the diagenetic accentuation of growth lamination of radially fibrous walls such as is found in many Pachyporidae. BROOD's "lunarium" resembles the thickened proximal calical lip of many branching Alveolitidae. BROOD gives no figures of the type species, and his photos of *C. repens* are not prepared from the type specimens.]

Planocoenites SOKOLOV, 1952b, p. 107 [**Coenites orientalis* EICHWALD, 1861, p. 101; OD; †in EICHWALD Coll., LGU, Leningrad; lectotype by SOKOLOV, 1955, p. 400] [=*Planocoenites* SOKOLOV, 1950, p. 168, *nom. nud.*; *Placocoenites* SOKOLOV, 1955, p. 190, *nom. van.*]. Corallum laminated,

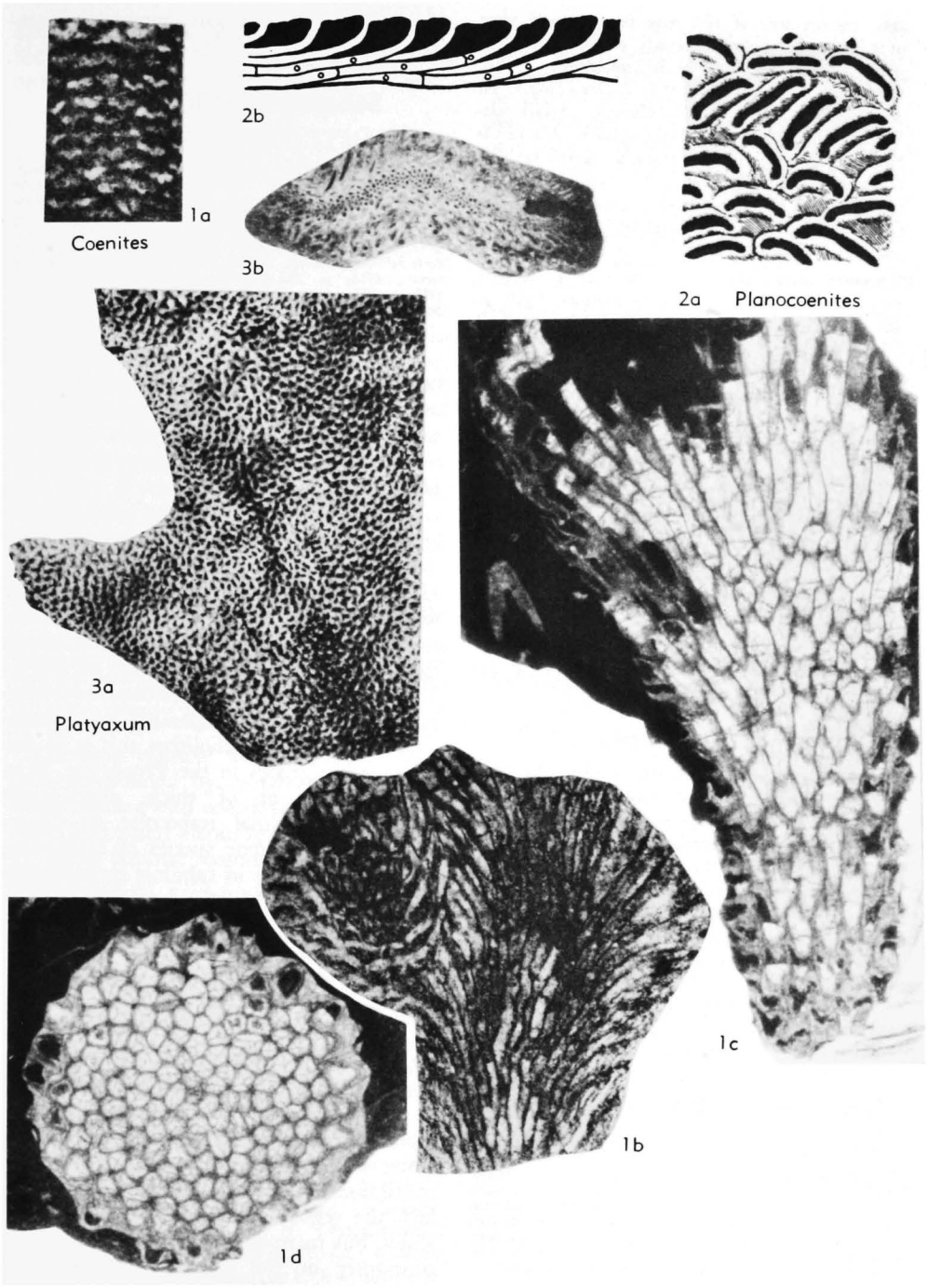


FIG. 409. Coenitidae (p. *F*600-*F*602).

forming thin crusts or films, corallites initially thin-walled and recumbent on substrate, then turning with sharply thickened walls to open in narrow, crescentic calices each bordered by smooth, raised

rim; convex side of rim may form curved visor over aperture; septa commonly poorly developed; pores and tabulae few. *L.Sil.(up.Llandov.)*, Eu.(Est.); *M.Sil.*, Asia(Sib.Platf.); *L.Dev.(Ems.)*, N.Am.(Ont.); *L.Dev.-M.Dev.(Givet.)*, Asia(Urals-Rudny Altay-Tarbagatau-Dzhungarian Alatau-Cis Balkhash-Gt.Khingan Ra.-Indoch.)-Australia(New S.Wales).——FIG. 409,*2a,b*. *P. selwynii* (NICHOLSON), Ems., Corniferous Ls., Can., Hagersville, Ont.; *a*, ext. view upper surface, ×6.0; *b*, long. sec., ×6.0 (Lambe, 1899).

Platyaxum DAVIS, 1887, explanation to pl. lx [**P. turgidum*; SD LANG, SMITH, & THOMAS, 1940, p. 102; syntypes 8476, 8478, MCZ, Cambridge] [?=*Coenites* EICHWALD, 1829, which see]. Habit of corallum erect, flattened palmate; corallites thin-walled, subcylindrical in larger median plane of fronds, developing thick walls as they proceed obliquely to open at surface in lunate to subrectangular calices with longer diameter commonly transverse to corallum; presence of spines, mural pores and tabulae not definitely established in type material. *L.Dev.(Ems.)* or *M.Dev.(Couvin.)*, N.Am.(Ind.-Ky.-Ont.); *?U.Sil.(Ludlov.)*, N.Am.(Tenn.).——FIG. 409,*3a*. **P. turgidum*, syntype, M.Dev., coral zone, Jeffersonville Ls., Ind., Falls of the Ohio; ext. view, ×1.0 (Stumm, 1965).——FIG. 409,*3b*. *P. undosum* DAVIS, considered conspecific with *P. turgidum* by STUMM, 1965, p. 77; thin sec. of frond, ×1.5 (Stumm, 1965).

Family Uncertain

Hyostragulum MAREK & GALLE, 1976, p. 54 [**H. mobile*; M; † LM130, GI, Prague]. Cerioid, encrusting dorsal side of hyolithid shells; corallites very short on dorsum, longer on sides, perpendicular to surface of conch; walls thick, mural pores doubtful; tabulae absent in short corallites on dorsum, few and oblique or horizontal in corallites on sides; median ridge ?(septum) parallel to longitudinal axis of conch projects from inner surface of encrusting base of each corallite but is not developed on upper surfaces of tabulae. [Tentatively referred by its authors to Tabulata Alveolitina.] *L.Dev.-M.Dev.*, Eu.(Czech.).

Order HELIOLITIDA Frech, 1897

[Incl. Heliolitida FRECH, 1897, p. 214, *nom. correct*. ABEL, 1920, p. 87, as group, *pro* Heliolithoidea FRECH, 1897, p. 214, suborder; Protaraeina LEITH, 1952, p. 791, order; Heliolitoidea BONDARENKO, 1958, p. 202, subclass; Protaraeida BONDARENKO, 1958, p. 202, order; Heliolitida BONDARENKO, 1958, p. 203, order; Proporida BONDARENKO, 1958, p. 204, order; Halysitacea (as *Helysitacea lapsus calami*) SOKOLOV, 1947c, p. 19, order; Halysitida BONDARENKO, 1958, p. 223, order; Cyrtophyllida BONDARENKO, 1978a, p. 33, order]

Corallum compound, massive or cateniform; increase coenenchymal and in some lateral; tabularia separated by dissepimental or tubulose coenenchyme except in some Halysitina; 12 pectinate septa or 12 rows of septal spines; tabulae commonly complete, horizontal. *M.Ord.-M.Dev.(Givet.)*.

Suborder HELIOLITINA Frech, 1897

[*nom. correct*. ABEL, 1920, p. 87, as group, *pro* Heliolithoidea FRECH, 1897, p. 214, suborder] [=Heliolithoidae WENTZEL, 1895, p. 503, group; Heliolitina OKULITCH, 1936b, p. 378, order; Heliolitacea WEDEKIND, 1937, p. 31, presumably as suborder; Heliolitida JONES & HILL, 1940, p. 197, section; Heliolitida SOKOLOV, 1950a, p. 138, group; Protaraeina LEITH, 1952, p. 791, order; Heliolitoidea BONDARENKO, 1958, p. 202, subclass; Protaraeida BONDARENKO, 1958, p. 202, order; Heliolitida BONDARENKO, 1958, p. 203, order; Proporida BONDARENKO, 1958, p. 204, order; ?Cyrtophyllida BONDARENKO, 1978a, p. 33, order]

Corallum massive, variable in form; with tabularia surrounded by coenenchyme that may be tabular, dissepimental or monacanthate; tabularia with 12 septa and commonly with complete tabulae. *M.Ord.-M.Dev.(Givet.)*.

Heliolitina previously have been considered by many as Anthozoa Zoantharia separated from the Tabulata (e.g., JONES & HILL, 1940, p. 197) chiefly because their septa constantly number 12. This is a feature shared only with the Halysitina, which have been consistently classified of late as Tabulata. Like most Halysitina, the Heliolitina have tabularia separated by a coenosclerenchyme. In Heliolitina this is of dissepimentlike plates in the Proporicae, as in *Cystihalysites*, or of thick, clinogonally fibrous longitudinal trabeculae in Coccoseridicae, as in some species of Halysitina, or more commonly of tubulose coenosclerenchyme as in the Heliolitidae; tubulose coenosclerenchyme is probably not present in the Halysitina, though simulated in *Solenihalysites*.

In common with the other Tabulata, the Heliolitina are compound, their corallites are slender, their tabulae are commonly dominant over their septa, their septa are of one order and are commonly short. The septa are tabulatan in their construction, being each a longitudinal row of spines contiguous if at all only at their bases. They lack the regular mural pores of the Favositida, but in some Coccoseridicae irregular contiguity of the longitudinal trabeculae leaves perforations like those of some Sarcinulida.

This *Treatise* sees these common features as grounds for placing the Heliolitina plus the Halysitina in the Subclass Tabulata,

and for accepting the fixity of septal number and presence of coenosclerenchyme as ordinal characters.

Superfamily HELIOLITICAE Lindström, 1876

[*nom. correct.* Hill, herein, *pro* Heliolitacea Sokolov, 1955, p. 79, *nom. transl. ex* Heliolitidae Lindström, 1876, p. 13] [=Heliolithidae Lindström, 1873a, p. 15, which has never been generally used, invalid because based on invalid name *Heliolithes*]

Corallum massive with cylindrical tabularia surrounded by coenenchyme of prismatic tubules with complete or, in some, incomplete diaphragms; tabularia with 12 septal laminae commonly with spinose axial edges, or with 12 longitudinal radial rows of discrete spines, or aseptate; an axial structure may develop by conjunction of septa; tabulae complete, commonly horizontal, but in *Saaremolites,* strongly convex to conical. *M.Ord.-M.Dev.(Givet.).*

Family HELIOLITIDAE Lindström, 1876

[Heliolitidae Lindström, 1876, p. 13, *nom. correct. pro* Heliolithidae Lindström, 1873a, p. 15, name which has never been generally used; see under Helioliticae] [=Palaeoporidae McCoy, 1851b, p. 13; Heliolitiens Dollfuss, 1875, p. 682, invalid vernacular name proposed for "group"; Heliolithinae Wentzel, 1895, p. 503]

Corallum massive with cylindrical tabularia surrounded by coenenchyme of prismatic tubules with complete walls and complete, horizontal diaphragms; tabularia with 12 septal laminae, commonly with spinose axial edges, or with 12 radial, longitudinal rows of discrete spines that may be carinate, or aseptate; tabulae complete, commonly horizontal, but in *Saaremolites* strongly convex or conical. *M.Ord.-M.Dev.(Givet.).*

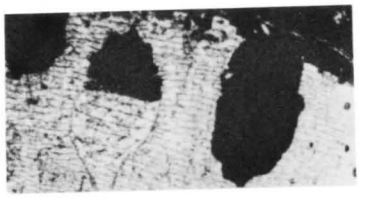
Heliolites Dana, 1846b, p. 541 [**Astraea porosa* Goldfuss, 1826, p. 64; OD; †214d, Goldfuss Coll., IP, Bonn; lectotype by Flügel, 1956a, p. 72] [=*Palaeopora* McCoy, 1849, p. 129 (type, *Astraea porosa* Goldfuss, 1826, p. 64; SD Lang, Smith, & Thomas, 1940, p. 94); *Geoporites* d'Orbigny, 1850, p. 49 (type, *Astraea porosa* Goldfuss, 1826, p. 64; SD Lang, Smith, & Thomas, 1940, p. 63); *Heliolithes* Lindström, 1873a, p. 15, *nom. van.; H. (Paraheliolites)* Tong-dzuy, 1966a, p. 27 (type, *H. (P.) minutus,* OD; †311/25, MG, Hanoi; up.L.Dev. or low.M. Dev., 0.5 km. N. of YenLac, N. Viet Nam); *?Lonsdalia* d'Orbigny, 1849, p. 12 (type, *Porites inordinatus* Lonsdale, 1839, p. 687; M; †6921, Geol. Soc. Coll., GSM, London; M.Ord., Llandeil., G.Brit., Robeston Wathen, Pembrokshire, requires study, *non Lonsdaleia* McCoy, 1849, a Carboniferous rugosan; *?Pachycanalicula* Wentzel, 1895, which see]. Corallum of variable form, massive; tabularia cylindrical, rounded or oval with folds or smooth in transverse section; septa absent to well-developed, 12, laminar basally, spinose axially; tabulae horizontal, coenenchyme of prismatic tubules with transverse diaphragms. *M.Ord.,* Australia(New S.Wales); *U.Ord.,* Eu.(Est.)-Asia(Altay Mts.-Kazakh.); *L.Sil.-M.Dev.(Givet.),* cosmop. except *M.Dev.,* E.N.Am.——Fig. 410,*2a,b.* **H. porosus* (Goldfuss), M.Dev.(Eifel.), Ger.; *a,b,* long., transv. secs., ×10 (Lindström, 1899).

Dnestrites Bondarenko, 1978c, p. 28 [**D. transitus*; OD; †15, coll. 11625, TsGM, Leningrad; U.Sil., Pridol., quarry between Dzvenigorod and Dnestrovo, Podolia]. Tabularial walls varying from weakly and irregularly wavy in early stages of astogeny to regularly folded in late stages; septal laminae developed by confluence of septal spines and in late stages may join axially, forming laminar columella and individual semiclosed tubuli; tabulae complete and horizontal to incomplete and dissepimentlike, the latter in zones of thickening of longitudinal skeletal elements; coenenchymal tubules uniform or a little variable in section, diaphragms horizontal or in zones of thickening incomplete. *?M.Sil.,* Eu.(Gotl.); *U.Sil.(Pridol.),* Eu.(Podolia).

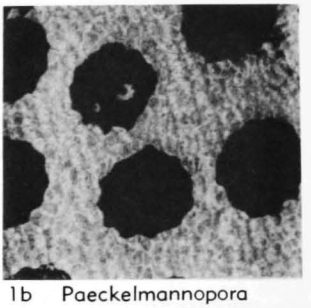
Helioplasma Kettnerová, 1933, p. 181 [**H. kolihai*; OD; †K15, Kettnerová Coll., NM, Prague]. Corallum heliolitoid; tabularial walls slightly thickened, weakly stellate in transverse section with septal laminae that may pass adaxially into separate long septal spines; tabulae complete, not evenly horizontal; coenenchymal tubules either normal prismatic with horizontal diaphragms, or elongate in transverse section with incomplete, overlapping convex diaphragms as well as horizontal, complete diaphragms; thin radial longitudinal plates may develop in elongate tubules, suggesting incipient chaetetoid division [see Galle, 1969, p. 167]. *U.Sil.(Akkan.),* Asia(Kazakh.); *L.Dev.,* Eu. (Czech.)-Asia(Karaganda Basin-Kuzbas).——Fig. 411,*3a-c.* **H. kolihai,* holotype, Prag., Czech., near Koněprusy; *a,* transv. sec., ×12; *b,c,* long. sec., ×12, ×25 (Galle, 1969).

Helioplasmolites Chekhovich, 1955, p. 11 [**H. nalivkini*; OD; †sample 503, coll. 18, MGU, Tashkent]. Corallum hemispherical or elongately nodular; tabularia with moderately folded walls, tabulae horizontal; septal elements weakly developed, rarely as long spines; coenenchyme of prismatic tubules with discontinuous walls, or in places of dissepiments forming cystose tissue; aureola absent. *U.Sil.(Ludlov.),* Asia(Tien Shan, S.Ferghana)-Eu.(Czech.).——Fig. 410,*3a,b.* **H. nalivkini,* low. Ludlov., S. Ferghana, Tien Shan, Nuratau Ra.; *a,b,* long., transv. secs., ×4 (Sokolov, 1955).

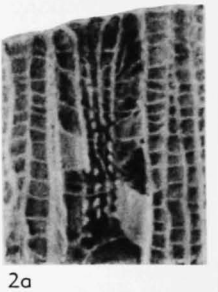
Ningqiangolites H. F. Chu MS in Li *et al.,* 1975,



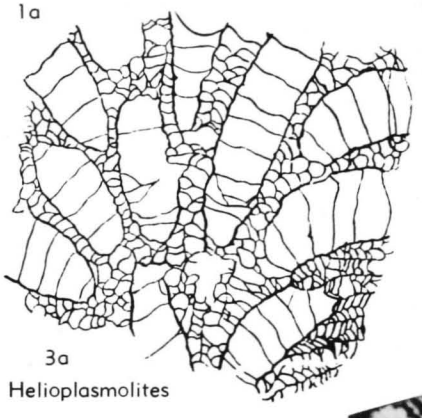
1a



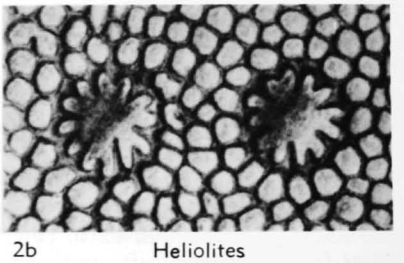
1b Paeckelmannopora



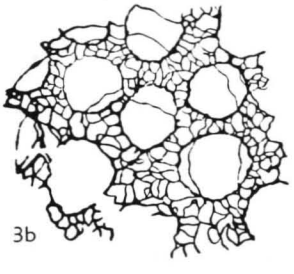
2a



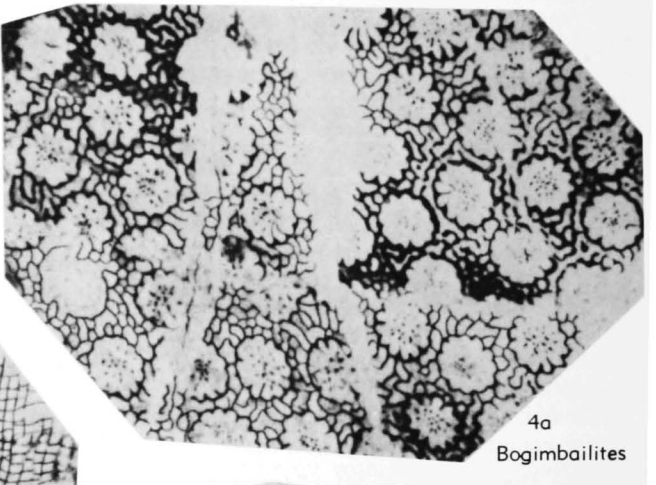
3a
Helioplasmolites



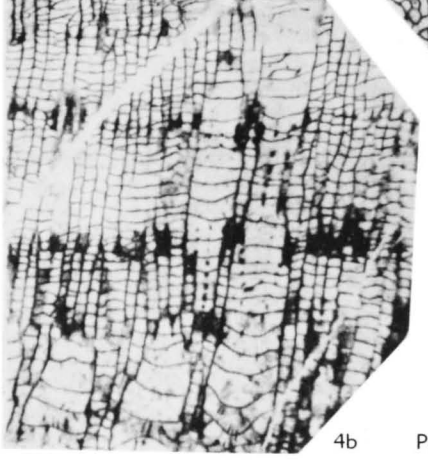
2b Heliolites



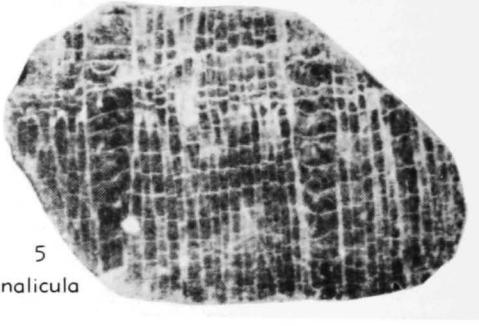
3b



4a
Bogimbailites



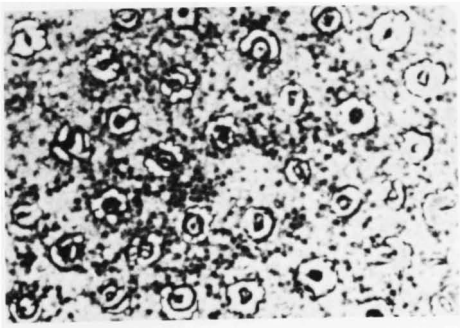
4b



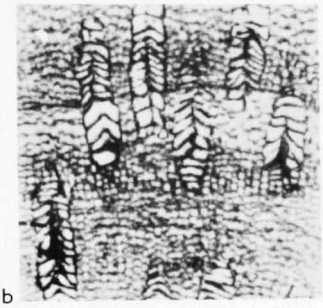
5
Pachycanalicula

FIG. 410. Heliolitidae (1-3, 5); Taeniolitidae (4) (p. *F603-F606*).

p. 196 [**N. densitabulatus*; OD; †not designated, paratype figured, AGS, Peking; M.Sil., Ningqiang, Shensi]. In Chinese. [Figures are too small to serve as source for diagnosis.] *M.Sil.*, Asia(Shensi).

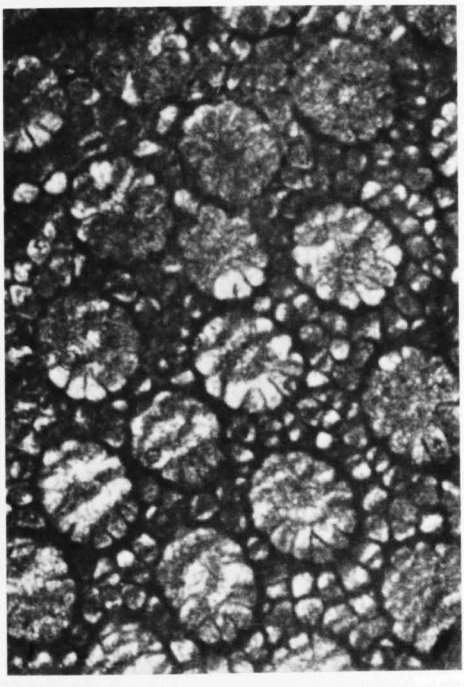


1a

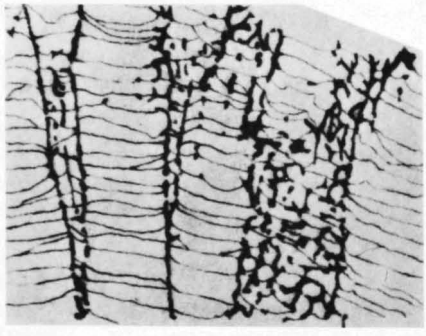


1b

Saaremolites

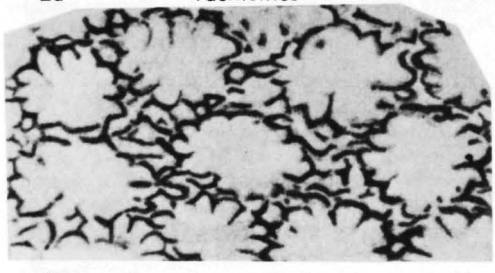


3a

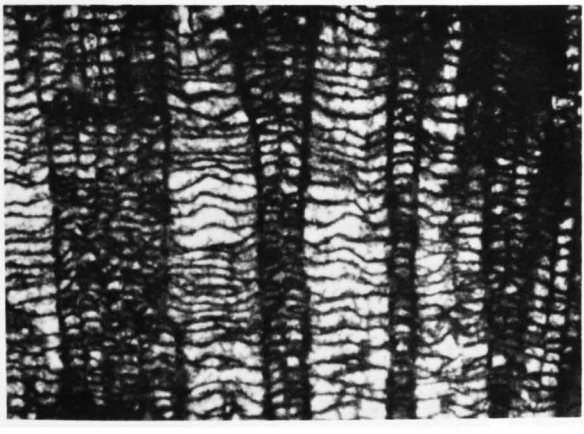


2a

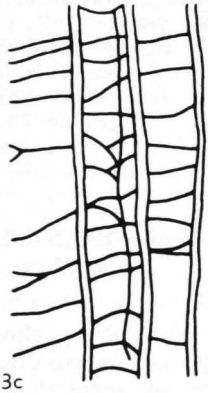
Taeniolites



2b



3b



3c

Helioplasma

FIG. 411. Heliolitidae (1, 3); Taeniolitidae (2) (p. *F603-F606*).

Okopites Bondarenko, 1978c, p. 26 [**O. okopiensis*; OD; †1, coll. 11635, TsGM, Leningrad; U. Sil., up. Ludlov. or low. Pridol., Rashkovsk beds, left bank R. Dniester, at Okopy, Podolia]. Tabularial walls varying from faintly and irregularly wavy in all stages of astogeny to regularly folded in late stages; septal spines only rarely forming rudimentary septal laminae; tabulae complete, horizontal or arched; coenenchymal tubules variable in section from drawn-out and vermiculate to polygonal, shape not altered in zones of thickening of longitudinal skeletal elements; diaphragms complete, rarely incomplete, horizontal or weakly curved. *U.Sil.,* Eu.(Podolia-?Gotl.)-Australia(New S.Wales); *L.Dev.(Gedinn., Aynasu horizon),* Asia (C.Kazakh.).

Pachycanalicula Wentzel, 1895, p. 503 [**Heliolites barrandei* Hoernes in Penecke, 1887, p. 271; OD; †no. P577, UG, Graz; lectotype by Flügel, 1956a, p. 76] [?=*Heliolites* Dana, 1946b, which see, Flügel, 1956a, p. 75, considered type species to be subspecies of *Heliolites (Heliolites) porosus* (Goldfuss)]. Corallum rounded; corallites cylindrical, relatively thick-walled, well-developed septal spines present or absent; tabulae thin, horizontal; tubules polygonal, relatively thick-walled. *L. Dev.-M. Dev.,* Eu. (E. Alps-Graz-Carnic Alps-France-Urals)-Australia(Queensl.-New S.Wales)-Asia(Kuzbas-Salair-Kazakh.-C.Asia-Kolyma Basin)-?N.Am.(*fide* Sokolov, 1962c, p. 279).——Fig. 410,*5*. **P. barrandei* (Hoernes in Penecke), lectotype, M.Dev.(?Givet.), Aus., St. Gotthart, Graz; long. sec., ×4 (Flügel, 1956a).

?Paeckelmannopora Weissermel, 1939, p. 94 [**P. macrophthalma*; OD; †not traced, Endriss Coll., Stuttgart Museum]. Tabularial walls thin, in 12 longitudinal waves, without septal spines; coenenchymal tubules small, thin-walled, irregular and unequal. [Insufficiently known.] *U.Sil.* or *L.Dev. (Gedinn.),* Asia M.(Bosporus).——Fig. 410,*1a,b*. **P. macrophthalma,* monotype, Kartal; *a,b,* long., transv. secs., ×4 (Weissermel, 1939).

Saaremolites Sokolov, 1955, p. 81 [**S. inversus*; OD; †127, coll. 599, VNIGRI, Leningrad]. Like *Heliolites* but tabulae conical, sharply elevated axially to form distinct acrocolumella. *M.Sil. (Wenlock.),* Eu.(Est.-Swed.).——Fig. 411,*1a,b*. **S. inversus,* holotype, up.Wenlock., Est., Tagamyyza, Saaremaa; *a,b,* transv., long. secs., ×4 (Sokolov, 1962c).

Family TAENIOLITIDAE Lin & Chow, 1977

[Taeniolitidae Lin & Chow, 1977, p. 162]

Walls of tabularia cylindrical or substellate, in places thin and discontinuous; septal spines in not more than 12 longitudinal rows; tabulae complete or incomplete; coenenchyme with thin and discontinuous or meandroid tubes, may appear spongy; diaphragms of neighboring tubules may be continuous through gaps in walls. [Placed in Protaraeida by Lin & Chow, 1977, p. 162.] *M.Ord.-U.Ord.; L.Dev.*

Taeniolites Bondarenko, 1961, p. 127 [**T. kelleri*; OD; †36/170, MGU, Moscow]. Corallum cylindrical; walls of tabularia and coenenchymal tubules thin and discontinuous, appearing as if constructed of dissociated, curving, ribbonlike segments imparting a spongy aspect; septal spines in not more than 12 longitudinal rows; tabulae complete or incomplete, curved or horizontal; diaphragms of neighboring tubules may be continuous through gaps in walls. *U.Ord.,* Asia(Kazakh.).——Fig. 411,*2a,b*. **T. kelleri,* holotype, Akchaul suite, SE. Kazakh., left bank of R. Karakol, Tarbagatau Ra.; *a,b,* long., transv. secs., ×4 (Bondarenko, 1961).

?Bogimbailites Bondarenko, 1966a, p. 189 [**B. sytovae*; OD; †"1655/3a-z in coll. 8732, TsGM" (not verified), Leningrad]. Corallum nodular; walls of tabularia longitudinally folded; septal spines long, broadened at their bases; tabulae complete or incomplete, horizontal or curved; walls of coenenchymal tubules discontinuous so that in transverse section tubules appear meandroid and coenenchyme spongy; zones of horizontal diaphragms alternating with zones of incomplete, horizontal or curved diaphragms. *L.Dev.(Nadaynasu.),* Asia(Kazakh.).——Fig. 410,*4a,b*. **B. sytovae,* holotype, L.Dev.(Nadaynasu horizon), Kazakh., 5 km. NE. of ruins of Bogimba, C; *a,b,* transv., long. secs., ×4 (Bondarenko, 1966a).

Wormsipora Sokolov, 1955, p. 80 [**Heliolites hirsutus* Lindström, 1899, p. 64; OD; figured syntypes Cn38085, 58603, RM, Stockholm; by Sokolov, 1955, p. 476; =*Nicholsonia megastoma* (McCoy) Kiaer, 1899, p. 37, *partim,* not necessarily *Porites megastoma* McCoy, 1846, p. 62)] [=*Nicholsonia* Kiaer, 1899, p. 37 (type, *N. megastoma* McCoy of Kiaer, 1899, *partim*; M), *non Nicholsonia* Schlüter, 1885c, p. 53, a Devonian rugosan, *nec al.*]. Corallum nodular, massive; tabularial walls continuous, substellate in transverse section; walls of coenenchymal tubules discontinuous, imparting characteristic shattered appearance; septal spines numerous, strongly curved upward, carinate and not rarely split adaxially; tabulae horizontal or drawn upward axially or weakly sagging; diaphragms of neighboring tubules commonly on same levels. *M.Ord.* or *U.Ord.,* Australia(Tasm.); *U.Ord.(Vormsi Stage),* Eu.(Ire.-Swed.-Est.)-Asia(Altay Mts.).——Fig. 412,*1a-d*. **W. hirsuta* (Lindström), U.Ord., Swed., Öland; *a,* lectotype, side view of weathered corallum, ×12; *b,d,* transv., long. secs., ×6; *c,* long. sec., ×12 (Lindström, 1899).

Family STELLIPORELLIDAE Bondarenko, 1971

[Stelliporellidae Bondarenko, 1971b, p. 167; Stelliporinae Lin in Lin & Chow, 1977, p. 165]

Corallum of variable form; walls of tabularia longitudinally plicate, rarely almost smooth; septal elements 12, radial longitudinal plates that unite at the axis in pairs or knit, forming either an axial bulkhead, or axial polygonal tubules, or an axial canal; coenenchymal tubules regularly polygonal or meandroid in cross section, with complete, horizontal diaphragms; tabulae complete or incomplete, horizontal, convex, or concave; in a ring around the tabularia are 14 to 25 coenenchymal tubules. *U.Ord.-M.Dev.*

Stelliporella WENTZEL, 1895, p. 503 [**S. lamellata*; OD; †not traced]. Walls of tabularia longitudinally plicate; septal laminae knit to form a polygonally tubular axial structure; tabulae horizontal, convex or concave; in a ring around the tabularia are 16 to 22 coenenchymal tubules; coenenchymal tubules polygonal, or meandroid in regions of intensive increase, and with horizontal diaphragms [see BONDARENKO, 1971b, p. 168]. *?U.Ord.*, Eu. (Nor.-Swed.); *U.Ord.* or *L.Sil.*, Asia(Kolyma Basin-Altay-Shoria Mts.); *Sil.*, Eu.(Czech.-Eng.-Nor.-N. Zemlya-Gotl.-Podolia)-Asia (NE.USSR-Tuva)-N. Am. (Tenn.-Alaska).——FIG. 413,*1a-c*. **S. lamellata*, U.Sil.(low.Ludlov., e_2 basal Kopanina Beds), Czech., Kozel; *a,c*, transv. secs., ×7, ×35; *b*, long. sec., ×7 (Wentzel, 1895).

?Cosmiolithus LINDSTRÖM, 1899, p. 68 [**C. ornatus*; SD LANG, SMITH, & THOMAS, 1940, p. 41; †figured syntypes Cn17459, 17460, 17464, 56908, RM, Stockholm]. Like *Stelliporella* but corallum encrusting, thin sheet, and longitudinal skeletal elements thickened; septal laminae composed of contiguous monacanths (or elongated ?tufts) directed upward adaxially; coenenchymal tubules of very small diameter. [BONDARENKO (1971b, p. 167) and SOKOLOV (1962c, p. 277) consider this genus to be protaraeican.] *L.Sil.(up.Llandov.)-M.Sil.(Wenlock.)*, Eu.(Swed.).——FIG. 413,*3a-c*. **C. ornatus*, syntype, L.Sil., *Arachnophyllum* sh., Gotl., Visby; *a*, calical view, ×1; *b,c*, transv., long. secs., ×12 (Lindström, 1899).

Derivatolites BONDARENKO, 1971b, p. 172 [**Heliolites parvistella* ROEMER, 1861, p. 25; OD; †?in Geol. Museum, Wrocław, Breslau]. Corallum round loaf-shaped; walls of tabularia longitudinally plicate; two opposed septal laminae may join axially to form axial bulkhead; tabulae convex; coenenchymal tubules polygonal in section with horizontal or convex diaphragms and may be meandroid in "light" zones and regions of active increase; in ring round tabularium, 18 to 22 tubules. *?U.Ord.*, Eu.(Gotl.); *?Sil.(glacial boulder)*, Eu.(Pol.); *M.Sil.(Wenlock.)*, Eu.(Podolia).——FIG. 413,*4a,b*. **D. parvistella* (ROEMER), holotype, glacial erratic from Pol., Sadewitz; *a*, ext. view, ×12; *b*, long. sec., ×12 (Lindström, 1899).

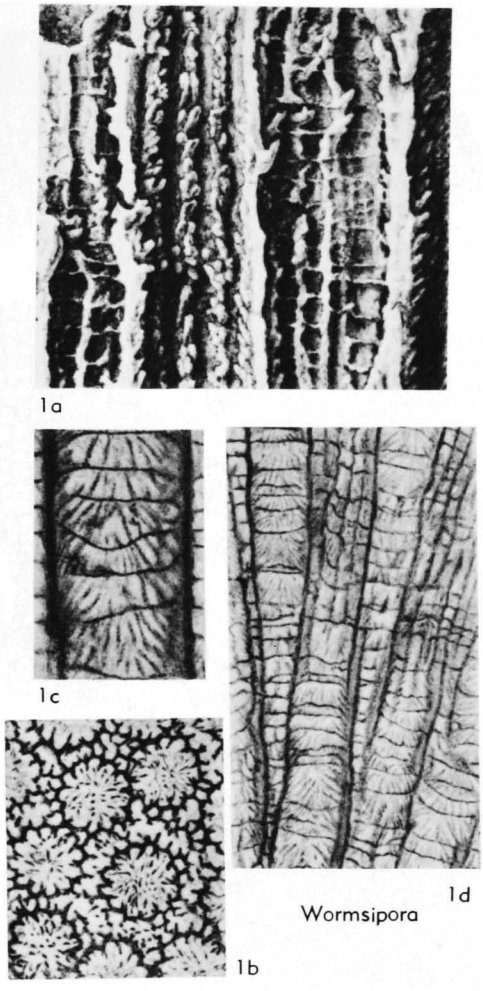


FIG. 412. Taeniolitidae (p. *F606*).

Pachystelliporella LIN MS in JIA *et al.*, 1977, p. 269 [no type species named, hence *nom. nud.*, in YANG, KIM, & CHOW, 1978, p. 247, **P. kwangsiensis* LIN, MS was nominated as type, but not diagnosed, described, or figured. JIA in JIA *et al.*, 1977, p. 269, described one new species and referred a previously described species to the genus, and KIM in YANG, KIM, & CHOW, 1978, p. 248, described and figured one new species]. *M.Sil.-M.Dev.*, Asia(Kwangsi-Kweichow).

Parastelliporella LIN & CHOW, 1977, p. 169 [**P. columella*; OD; †J-13-34, AGS, ?Peking]. Like *Stelliporella* but tabularia substellate in section and in places septal elements may be long and interdigitate at axis; at such places tabulae are updrawn axially as low cones. [Diagnosis tentative, translation unsure.] *U.Ord.(Ashgill.)*, Asia (Kwangsi).

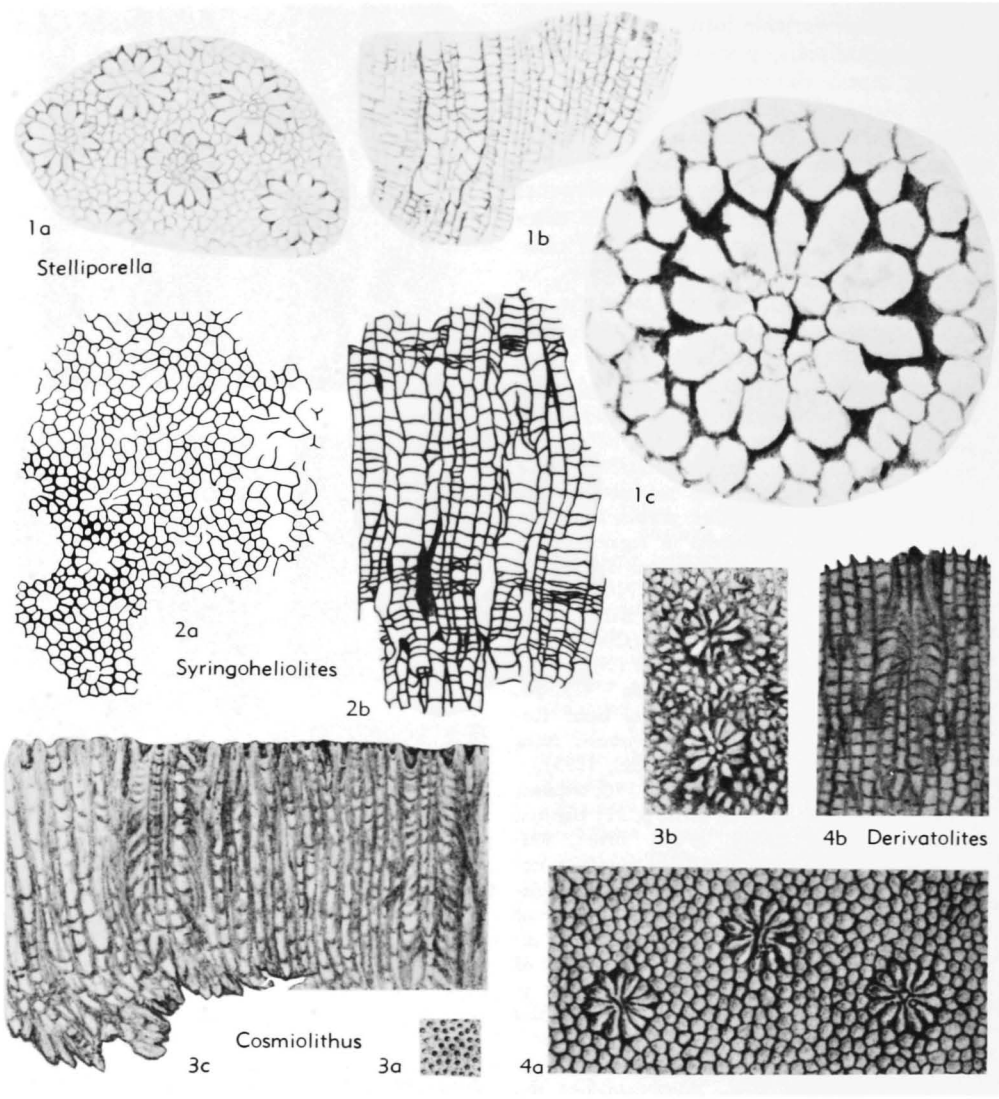


FIG. 413. Stelliporellidae (p. F607-F608).

Podollites BONDARENKO, 1971b, p. 173 [**P. diseptatus*; OD; †113/1-34, MGU, Moscow] [=*Podolites* IVANOVSKIY, 1973b, p. 281, *nom null.*]. Corallum nodular, tabularia with smooth walls, almost without trace of plication; neighboring septal laminae run together axially in twos, threes, or fours, at the same time forming axial bulkheads; tabulae horizontal; coenenchymal tubules polygonal in section, with horizontal diaphragms; in ring around tabularium, 14 to 16 coenenchymal tubules. *?L.Sil.*, Asia(Kuzbas); *L.Sil.*, Asia(Kolyma Basin); *M.Sil.(Wenlock)*, Eu.(Podolia)-Asia (China); *M.Dev.(Eifel.)*, Asia(Kazakh.).——FIG. 414,*1a-h*. **P. diseptatus*, monotype, M.Sil.(Wenlock.), Podolia; *a-f*, serial transv. secs. through alternating light and dark zones; *g-h*, transv., long. secs., all ×8 (Bondarenko, 1971b).

Syringoheliolites BONDARENKO, 1971b, p. 175 [**S. contrarius*; OD; †144/1-278, MGU, Moscow]. Corallum nodular or hemispherical; tabularia with longitudinally plicate walls; neighboring septal laminae join one another to form an axial tube commonly open into one interseptal loculus; between tube and wall are inclined tabellae, within tube, horizontal tabellae; coenenchymal tubules in "light" zones (of rapid growth) meandroid and vermiform in section, with greatly reduced walls; in "dark" zones (of slow growth), polygonal;

diaphragms horizontal; a platelike columella may develop, most clearly in the dark zones. *U.Sil. (Ludlov.),* Eu.(Podolia).——Fig. 413,*2a,b.* **S. contrarius,* holotype, Malinovets horizon, Podolia, Isakovtsy; *a,b,* transv., long. secs., ×9 (Bondarenko, 1971b).

Tarbagatailites Bondarenko, 1975a, p. 60 [**T. columellus*; OD; †19, coll. 10294, TsGM, Leningrad; L.Dev., (Gedinn. or Siegen., ?Kokbaytal or ?Pribalkhash horizon), Mt. Karadzhal, Tarbagatau R.]. Corallum tumoroid; tabularia with longitudinally plicate walls; septal laminae may inosculate in pairs or threes; tabulae complete; coenenchymal tubules polygonal, diaphragms complete and horizontal, but here and there in dark zones may be oblique. *?U.Sil.,* Australia(New S. Wales-Queensl.)-*L. Dev.,* Asia (Kazakh.)-Eu. (Czech.).

Family PSEUDOPLASMOPORIDAE Bondarenko, 1963

[*nom. transl.* herein, *ex* subfamily Pseudoplasmoporinae Bondarenko, 1963, p. 46]

Corallum of varied form; walls of tabularia smooth (with no trace of facets) or longitudinally folded; septa either laminae or longitudinal rows of spines, or absent; tabulae complete, horizontal; an aureola of 12 tubules around each tabularium, of varied radius; rest of coenenchyme also of tubules with complete and horizontal diaphragms or rarely with oblique and incomplete diaphragms. *U.Ord.-L.Sil.; U.Sil.-?M. Dev.*

Pseudoplasmopora Bondarenko, 1963, p. 47 [**P. conspecta*; OD; †1, coll. 8775, TsGM, Moscow]. Pseudoplasmoporidae in which septa consist of septal spines or are absent, walls of tabularia and tubules are unthickened and diaphragms of tubules are but rarely oblique and incomplete. *U.Sil.,* Asia (C.Kazakh.)-Eu.(Gotl.)-Australia(New S.Wales-Queensl.)-N.Am.(Tenn.); *L.Dev.,* Asia(C.Kazakh.)-Australia (Vict.-New S. Wales-Queensl.). ——Fig. 415,*3a,b.* **P. conspecta,* holotype, L. Dev., Isen Suite, Aynasu horizon, C. Kazakh., 200 km. S. of Karaganda; *a,b,* transv., long. secs., ×6, ×4 (Bondarenko, 1966a).

Amphilites Bondarenko, 1975a, p. 57 [**A. tarbagataicus*; OD; †11, coll. 10294, TsGM, Leningrad; Gedinn., Kokbaytal horizon, Mt. Karadzhal]. Corallum tumoroid; tabularia with smooth walls, septa represented by longitudinal rows of scalelike spines, and complete, horizontal tabulae; coenenchymal tubules differently developed in alternating light and dark zones; in light zones, they are straight-walled and regularly polygonal, relatively large, and 12 in aureole; in dark zones they are irregularly polygonal with curved walls, are narrower and have more intensive adaxial bipartite increase, and range from 13 to 16 in aureole; diaphragms commonly complete, but include a few that are incomplete and irregularly arranged or oblique. *L.Dev.(Gedinn.),* Asia(Kazakh.).

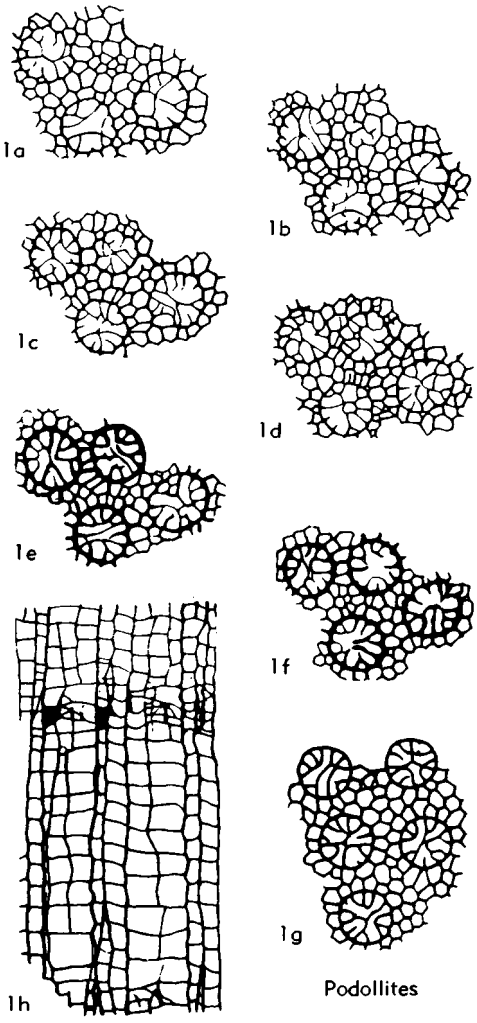


Fig. 414. Stelliporellidae (p. *F*608).

Pachyhelioplasma Kim, 1966, p. 57 [**P. kettnerovae*; OD; †435/1, coll. 9490, TsGM, Leningrad]. Corallum of variable form; tabularia cylindrical, with aureole of 12 tubules rounded-polygonal in section and reticulum of somewhat smaller tubules; walls all thickened, not discontinuous; septal spines reduced or absent; tabulae flat, concave or incomplete and oblique; diaphragms of tubules commonly incomplete and oblique. *L.Dev.-?M.Dev.,* Asia(Tien Shan-Kazakh.).——Fig. 415,*2a,b.* **P. kettnerovae,* ?M.Dev.(Eifel.), Zeravshan-Gissar Ra., basin R. Kashkadari, Khodza-Kurgan Gully; *a,b,*

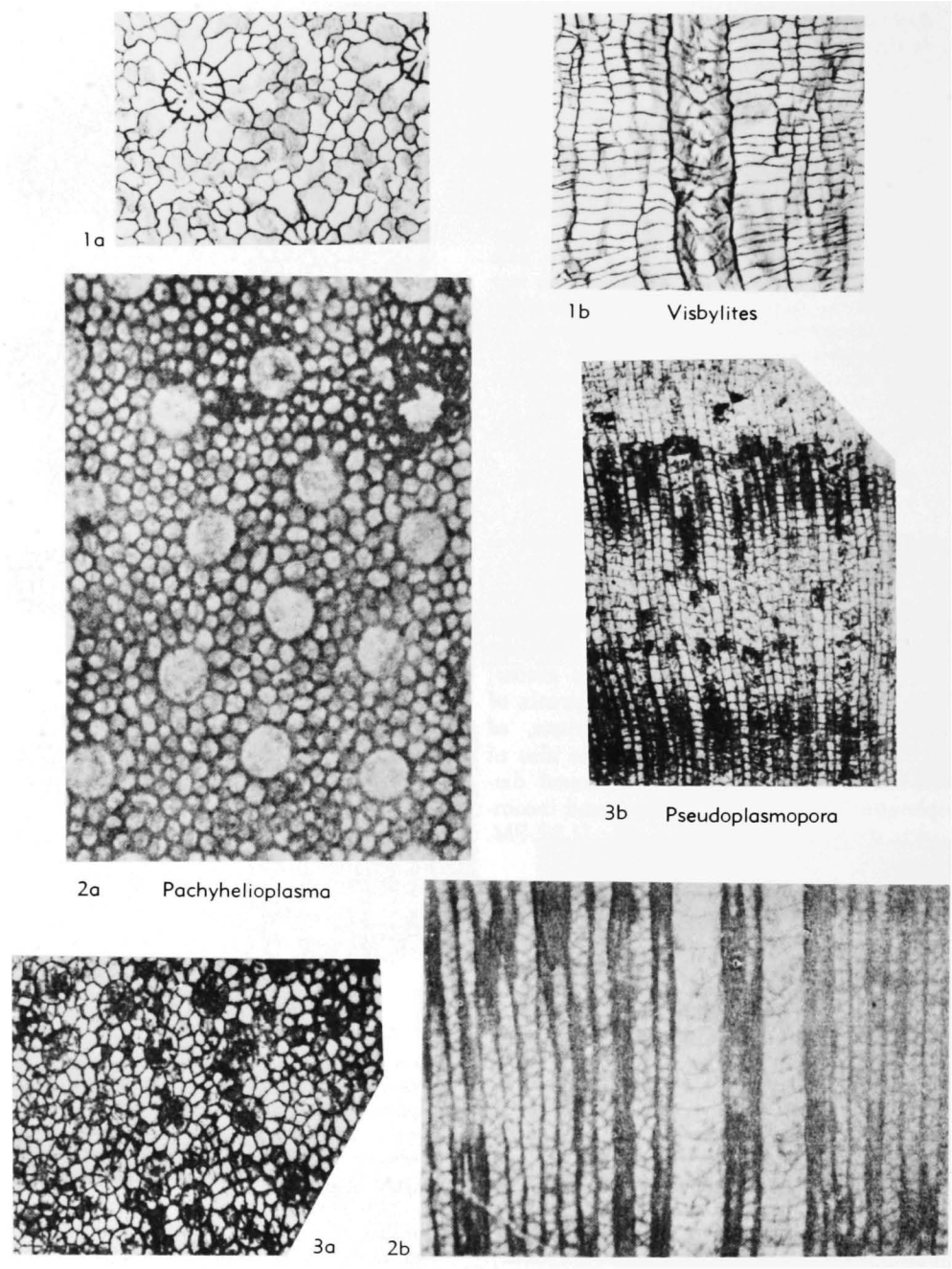


FIG. 415. Pseudoplasmoporidae (p. *F609-F610*).

transv., long. secs., ×10 (Kim, 1966).

Visbylites BONDARENKO, 1963, p. 47 [**Plasmopora stella* LINDSTRÖM, 1899, p. 83; OD; †figured syntypes Cn38124, 56555, 56565, RM, Stockholm]. Septa developed as radial longitudinal plates. *U. Ord.(Dulankar)*, Asia(Tarbagatau Ra., Kazakh.); *L.Sil.(up.Llandov.)*, Eu.(Gotl., Swed.)-N.Am.(Newf.).——FIG. 415,*1a,b*. **V. stella* (LINDSTRÖM), Visby marls, Gotl., Visby; *a,b*, transv., long. secs., ×6 (Lindström, 1899).

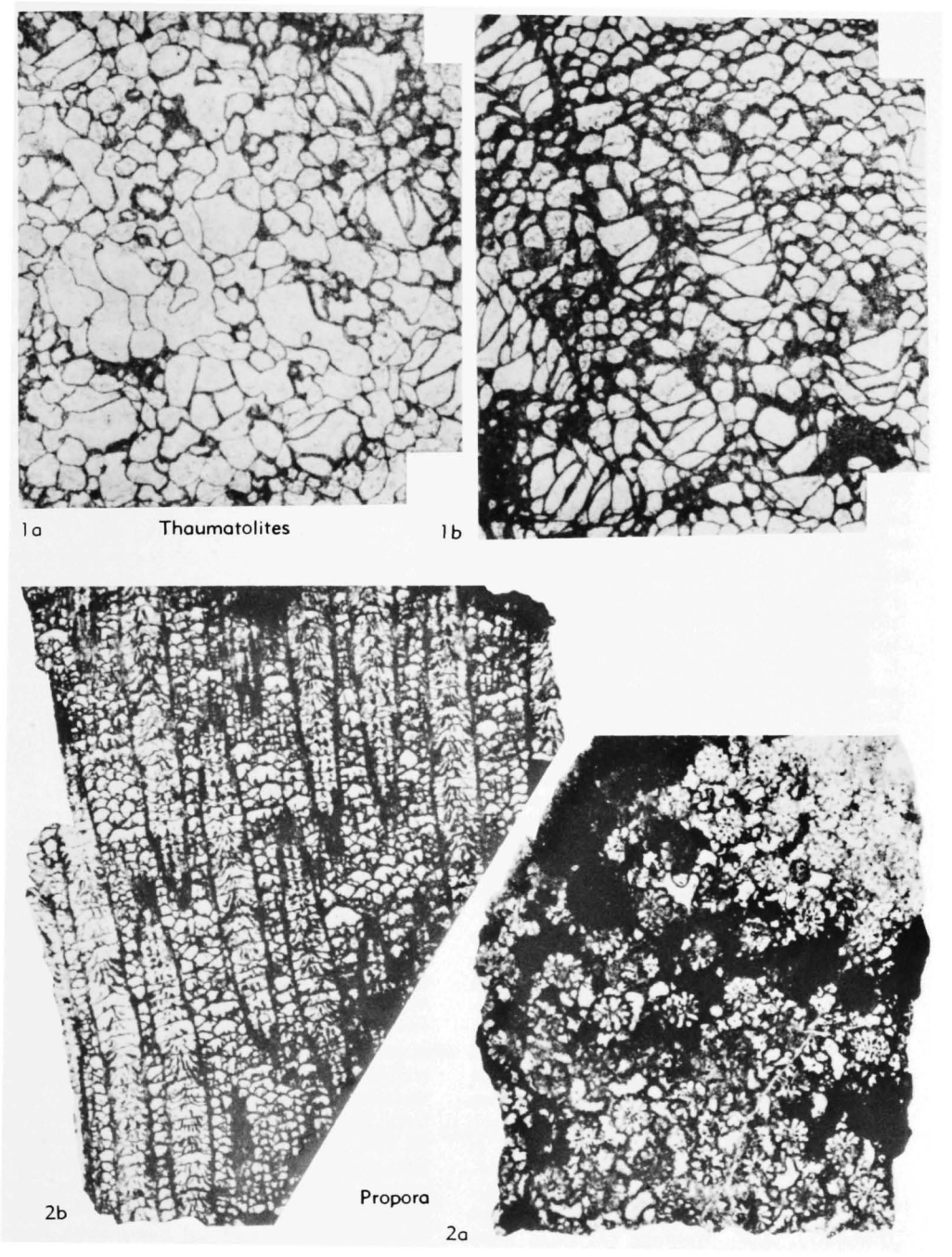


FIG. 416. Proporidae (p. *F612*, *F614*).

Superfamily PROPORICAE Sokolov, 1949

[*nom. transl.* HILL, herein, *ex* Proporidae SOKOLOV, 1949, p. 97] [=Proporida BONDARENKO, 1958, p. 204, order]

Corallum of variable form; tabularia with walls including 12 septal bases connected either by downturned edges of coenenchymal dissepiments or by independent wall

tissue that may be longitudinally plicate; septal laminae or spines may project into the tabularium from the septal bases, and short laminae may project into the coenenchyme from the septal bases or from the plicae between them; in some, an aureole of 12 tubules with discontinuous walls surrounds each tabularium; tabulae horizontal or convex and commonly complete; coenenchyme of dissepiments pierced by short monacanths or by short discontinuous laminae that but rarely associate to form tubules. *M.Ord.-?L.Dev.*

Family PROPORIDAE Sokolov, 1949

[Proporidae Sokolov, 1949, p. 97] [=Proporinae Hill, 1951, p. 12]

Tabularia without aureola of 12 coenenchymal tubules and separated by dissepimented coenenchyme with variable development of discrete monacanths. *M.Ord.-U.Sil.*

Propora Milne-Edwards & Haime, 1849b, p. 262 [**Porites tubulatus* Lonsdale, 1839, p. 687; M; †6555, Geol. Soc. Coll., GSM, London] [=*Lyellia* Milne-Edwards & Haime, 1851, p. 226 (type, *L. americana,* SD Miller, 1889-1897, p. 195; probable syntype Z226a, MN, Paris; Sil., Manistique dol., Drummond I., L. Huron, N.Am.); *?Pinacopora* Nicholson & Etheridge, 1878a, p. 52 (type, *P. grayi,* M; figured syntypes R26857, 26870-26876, *fide* Benton, 1979, BM(NH), London; L.Sil., Mulloch Hill, near Girvan, Ayrshire); *?Stylidium* Eichwald, 1855b, p. 3 (type, *S. spongiosum,* M; †not traced; Ord., Kaluga, Medynsk, USSR); *?Cavella* Stechow, 1922, p. 152, *nom. subst. pro Calvinia* Savage, 1913, p. 65 (type, *C. edgewoodensis,* OD; †not traced; Sil., Edgewood F., ¼ mi. SE. of Gale, Ill.), *non Calvinia* Nutting, 1900, a hydrozoan; *?Koreanopora* Ozaki, 1934, which see]. Corallum with tabularia separated by dissepimented coenenchyme with variable development of discrete trabeculae and without aureola; each tabularium with 12 longitudinal rows of septal spines; walls of tabularia continuous and circular or crenulate in transverse section; tabulae horizontal or slightly sagging or domed. [For intraspecific variation see Dixon, 1974, p. 568.] *M.Ord.,* Australia(New S.Wales); *U.Ord.,* Eu.(Nor.)-Asia(Kazakh.-Altay), N.Am.(Anticosti); *Sil.*(cosmop.).——Fig. 416,*2a,b*. **P. tubulata* (Lonsdale), M.Sil., Woolhope Ls., 30 ft. above *Petalocrinus* band, U.K., Woolhope; *a,b,* transv., long. secs., ×4 (Hill, n; GSM54451).

Baitalites Chekhovich, 1977, p. 23 [**B. tuvensis*; OD; †7, coll. 10943, TsGM, Leningrad; U.Sil., W. Tuva, R. Pichishuy]. Tabularia each with 12 closely spaced spinose septal laminae forming a discontinuous wall; tabulae weakly concave or flat; coenenchyme of small angulate dissepiments and numerous coarse long trabeculae arranged in rows within which they may be in contact. *U.Sil.,* Asia(Tuva).

Diploepora Quenstedt, 1879, p. 148 [**Heliolites grayi* Milne-Edwards & Haime, 1851, p. 217, 1854, p. 252; M; †?56003, ?R2740, Gray Coll., BM(NH), London; Sil., Walsall, U.K.]. Corallum branching; axial part of branch proporoid with slender trabeculae; in coenenchyme; peripheral part with all spaces between tabularia filled by thickening of the trabeculae. [Diagnosis *sensu* Lindström, 1899, p. 102.] *U.Ord.,* Eu.(Nor.); *M.Sil.-U.Sil.,* Eu.(U.K.)-Australia(New S.Wales-Queensl.).——Fig. 417,*1*. **D. grayi* (Milne-Edwards & Haime), Sil., Eu.; part of long. sec. of branch, ×4 (Hill & Stumm, 1956).

Ducdonia Leleshus, 1974b, p. 230 [**D. interrupta*; OD; †3845/73, coll. 1057, UpG, Dushanbe]. Corallum small, spherical, hemispherical or irregular; tabularia irregularly cylindrical, walls plicate, partly discontinuous, formed of 12 more or less clearly developed outer and inner longitudinal ribs; 12 septal elements represented by interrupted longitudinal ridges, commonly with spines projecting adaxially; tabulae horizontal, oblique, anastomosing or convex; coenenchyme of imperfect tubules with walls interrupted or of thin isolated segments, crossed by horizontal, oblique, or less commonly convex diaphragms. *M. Sil.(low.Wenlock.),* Asia(Tadzhik.).——Fig. 418, *1a,b*. **D. interrupta,* Zeravshan-Gissar Ra., right bank of R. Dukdon; *a,* paratype, transv. and oblique sec., ×16; *b,* holotype, transv. sec., ×3 (Leleshus, 1974b).

Helenolites Chekhovich, 1977, p. 21 [**H. clarus*; OD; †3, coll. 10943, TsGM, Leningrad; U.Sil., W. Tuva, R. Pichishuy]. Tabularia stelliform in section, immersed in coenenchyme with distinctively inosculating angulate dissepiments and coarse, discontinuous longitudinal trabeculae; septa deeply split, isolated long spines may interdigitate at axis; tabulae weakly concave or flat. *U.Sil.,* Asia(Tuva); *Sil.,* Eu.(Czech.).

Innapora Leleshus, 1974c, p. 99 [**Propora? incredula* Chernova in Kovalevskiy, Chernova, & Chekhovich, 1960, p. 219; OD; †7, coll. 274, UpG, Frunze] [=*Innapora* Leleshus, 1970a, p. 62, *nom. nud.*]. Irregularly hemispherical or nodulose; tabularia irregularly cylindrical, walls interrupted, commonly 12 separated segments bow-shaped or horseshoe shaped in transverse section spaced around the wall and discontinuous longitudinally also; in places segments may coalesce laterally and wall then appears longitudinally folded as in *Rotalites*; septal spines small, weakly developed; tabular floors sagging, of numerous tabellae; coenenchyme of dissepiments. *U.Sil. (Ludlov.),* Asia(S.Tien Shan).——Fig. 419,*2a,b*. **I. incredula* (Chernova), Dalyan horizon, N.

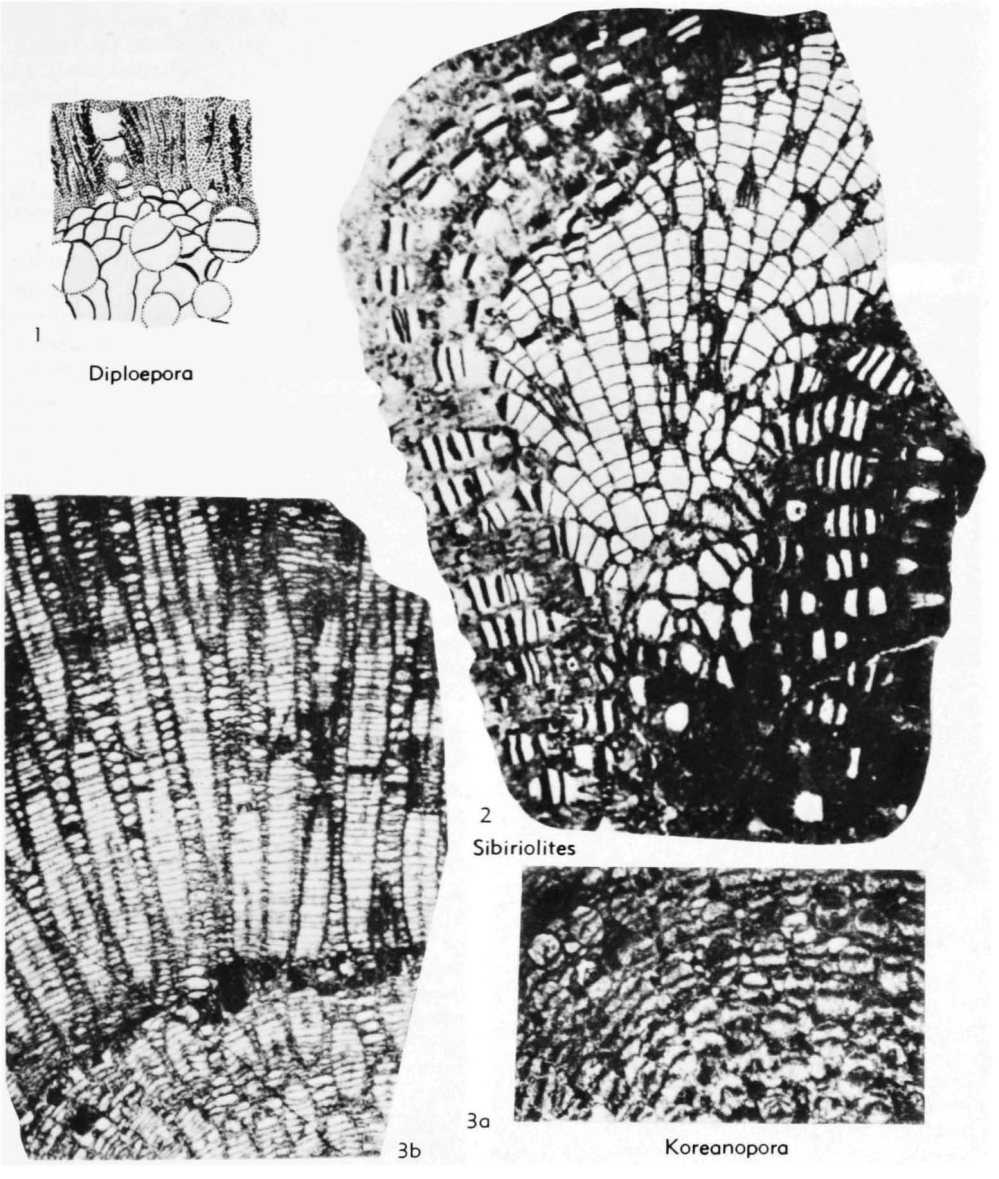


FIG. 417. Proporidae (1, 3); Sibiriolitidae (2) (p. *F*612-*F*614).

slopes Turkestan Ra., left side R. Isfara; *a,b,* transv., long. secs., ×4.5 (Hill, n; photographs courtesy V. L. Leleshus, sample 222-29, Leleshus Coll., IG, Dushanbe).

Koreanopora OZAKI in SHIMIZU, OZAKI, & OBATA, 1934, p. 68 [**K. proporoides,* OD; †not known] [?=*Propora* MILNE-EDWARDS & HAIME, 1849b, which see; see also HAMADA, 1960, p. 170]. Like *Propora* but tabularia with crenulate walls and without septal spines; tabulae subhorizontal but with slight median elevation forming slender, discontinuous columella. *?Sil.*(pebble in ls. congl.), Asia(NW.Korea, Ken-niho).——FIG. 417,*3a,b.* **K. proporoides,* syntype?; *a,b,* transv., long. secs., ×3 (Shimizu, Ozaki, & Obata, 1934).

Rotalites LELESHUS, 1974c, p. 97 [**Propora nuratensis* CHEKHOVICH in KOVALEVSKIY, CHERNOVA, & CHEKHOVICH, 1960, p. 217; OD; †508/18, MGU, Tashkent] [=*Rotalites* LELESHUS, 1970a, p. 61, *nom. nud.*]. Corallum small, hemispherical or

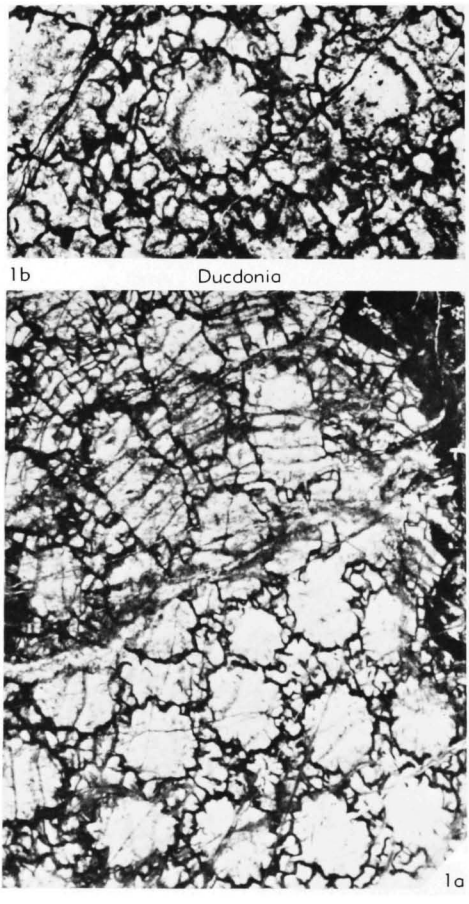


FIG. 418. Proporidae (p. F612).

nodulose; sections of tabularia like gear wheel with 12 cogs; walls of tabularia somewhat thickened, uneven, with longitudinal folds and commonly continuous; septal spines sparse to ?absent; tabulae complete, horizontal or slightly concave, in places incomplete, with tabellae; coenenchyme of dissepiments. *U.Sil.(Ludlow.)*, Asia(Tadzhik.-Kuzbas).——FIG. 419,*1a,b*. **R. nuratensis*, Merishkor beds, S. Tian Shan, Mt. Merishkor, Nuratin Ra.; *a,b*, transv., long. secs., ×4.5 (Hill, n; photographs courtesy V. L. Leleshus, sample 215-216, Leleshus Coll., IG, Dushanbe).

Thaumatolites YANET in SOKOLOV, 1955, p. 85 [**T. proporoides*; OD; †127/2, coll. 302, UGUp, Sverdlovsk; =*T. uralicus* YANET in KIPARISOVA, MARKOVSKIY, & RADCHENKO, 1956, p. 30, *nom. van.*]. Corallum pyriform or hemispherical; tabularia without independent walls or septa; tabulae horizontal or sagging, some incomplete; coenenchyme of rather angulate globose dissepiments, some bearing spines; all skeletal elements of uniform thickness. *M.Sil.(Wenlock.)*, Asia(E. slope Urals).——FIG. 416,*1a,b*. **T. proporoides*, holotype, C. Urals, vicinity of Pavdinsk, left bank R. Elva and 300 m. E. of Elva-Kyshva road; *a,b*, transv., long. secs., ×4 (Kiparisova, Markovskiy, & Radchenko, 1956).

Family SIBIRIOLITIDAE Lin, 1977

[Sibiriolitidae LIN in LIN & CHOW, 1977, p. 193; Sibiriolitacea LIN in LIN & CHOW, 1977, p. 193, as superfamily; Sibiriolitinae BONDARENKO, 1977, p. 43]

Tabularia closely spaced and rounded, or rounded-angulate in section, separated by coenenchyme of very small dissepiments placed vertically one above another; dissepimented coenenchyme may be substituted by sclerenchyme composed of stout longitudinal trabeculae that correspond to the longitudinal piles of dissepiments; 12 granulated septal riblets present or absent around tabularia; tabulae horizontal or slightly concave or convex. *U.Ord.; ?M.Sil.*

Sibiriolites SOKOLOV, 1955, p. 87 [**S. sibericus*; OD; †139, coll. 599, VNIGRI, Leningrad]. Sibiriolitidae with coenenchyme between tabularia predominantly in single series and with zonal or peripheral thickening by development of thick, close longitudinal trabeculae. [Placed by SOKOLOV, 1955, p. 87, in Proheliolitidae; see also NORFORD, 1971, p. 5; BONDARENKO, 1977, p. 44.] *U.Ord.*, Asia (W.Sib.Platf.-Altay-Taymyr-NE.USSR-China)-N.Am.(Ellesmere I.).——FIG. 417,*2*. **S. sibericus*, holotype, Dolbor., USSR, R. Stony Tunguska; sec., ×4 (Sokolov, 1962c).

?Mongoliolites BONDARENKO & MINZHIN, 1977, p. 21 [**M. paradoxides*; OD; †1, coll. 3634, PIN, Moscow; low. Ashgill., S. foot of Khangay Ra., C. Mongolia]. Tabularia polygonal, rounded or stelliform in section; walls each composed of 12 longitudinal trabeculae connected by thin wall segments; many trabeculae common to neighboring tabularia; in places tabularia may be separated by narrow zone of coenenchyme which rarely, in late stages, may form pipes around tabularia; tabulae horizontal or concave, dissepiments of coenenchyme closer, flat or concave; new corallites may arise by expansion in diameter of coenenchyme. [See also BONDARENKO, 1977, p. 45. Possibly a proheliolitid.] *U.Ord.(low.Ashgill.)*, Asia(Mongolia).

Sibiriolitella BONDARENKO, 1977, p. 44 [**Sibiriolites reticulatus* SOKOLOV, 1955, p. 486; OD; †141, coll. 599, VNIGRI, Leningrad; U.Ord., R. Stony Tunguska, Sib. Platf.] [?=*Neosibiriolites* H. F. CHU MS in LI *et al.*, 1975, p. 201 (type, *N. ningqiangensis*, OD; †N56-41, AGS, Peking; ?M. Sil., Ningqiang, Shensi]. Sibiriolitidae with coenenchyme with few thick trabeculae, mainly isolated and in peripheral region; more than one series of very small dissepiments may be found; walls of tabularia dissepimental. *U.Ord.*, Asia (Sib.Platf.); *?M.Sil.*, Asia(China).

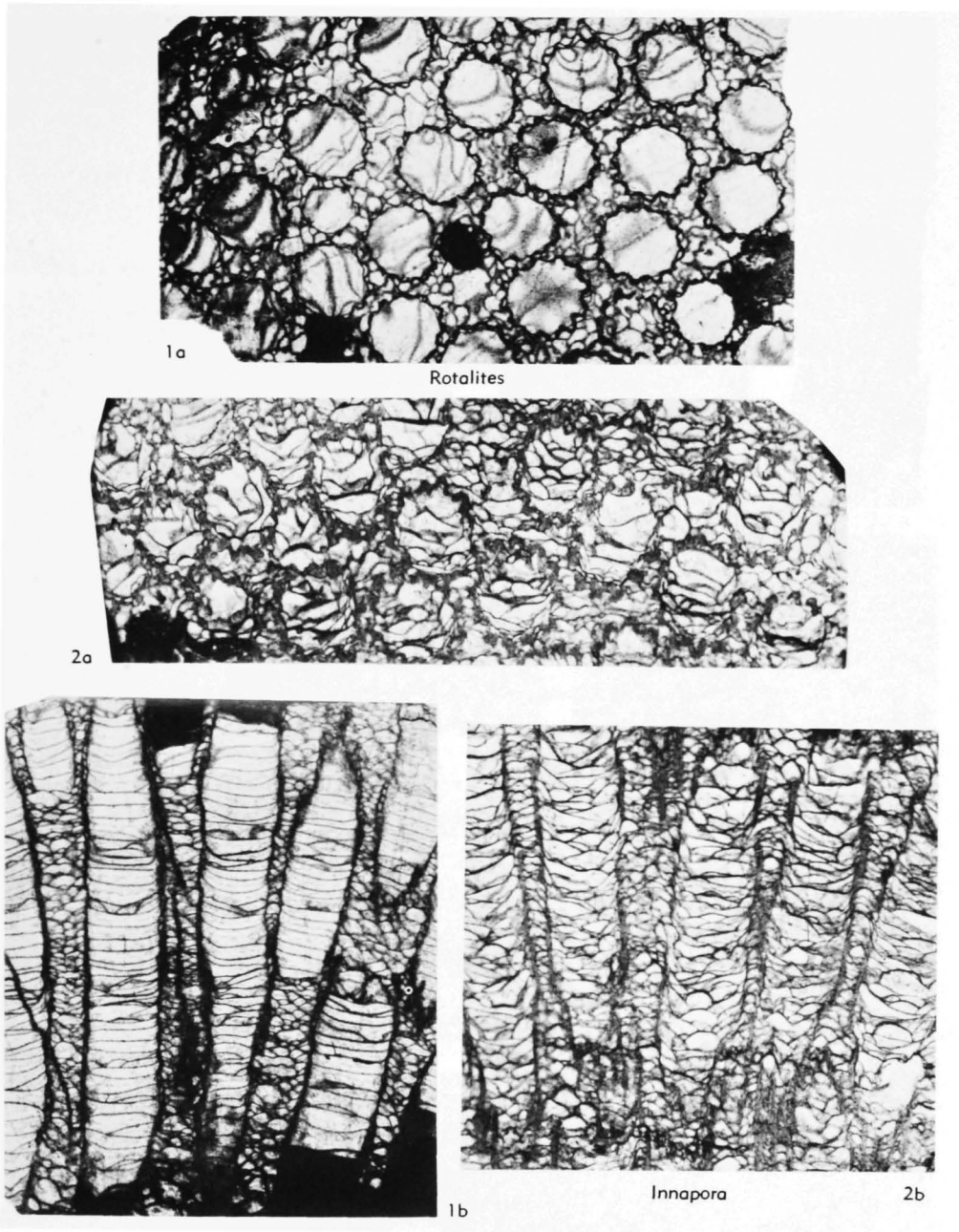


FIG. 419. Proporidae (p. *F*612-*F*614).

Family PLASMOPORIDAE Sardeson, 1896

[Plasmoporidae SARDESON, 1896, p. 353]

Corallum of varied form; walls of tabularia cylindrical or longitudinally plicate; septa 12, either laminae, or longitudinal rows of spines or of squamulae; aureole of 12 radially elongate coenenchymal tubules with discontinuous walls surrounds tabularium, and smaller tubuli with more discontinuous walls may develop between aure-

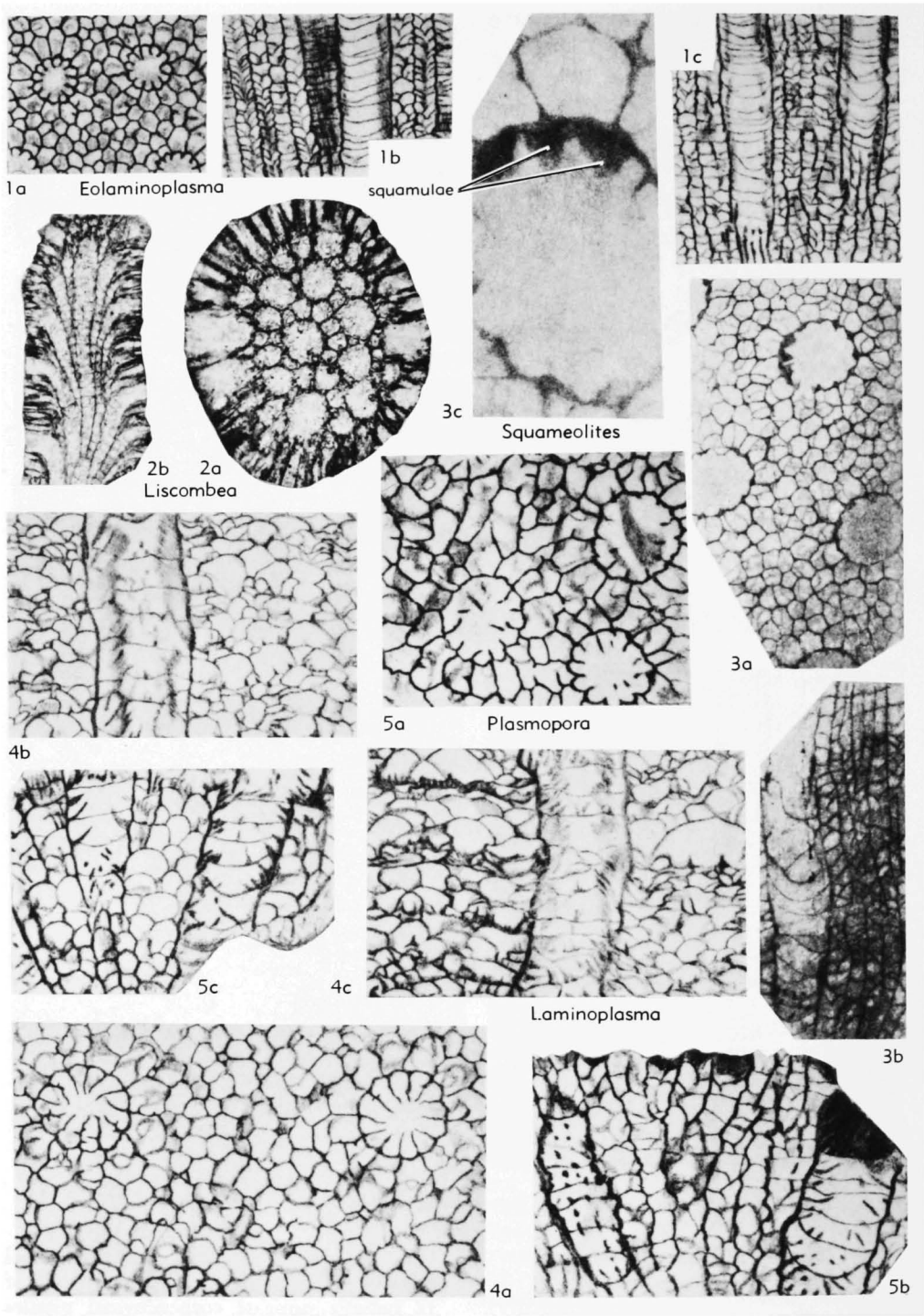


FIG. 420. Plasmoporidae (p. *F617-F618*).

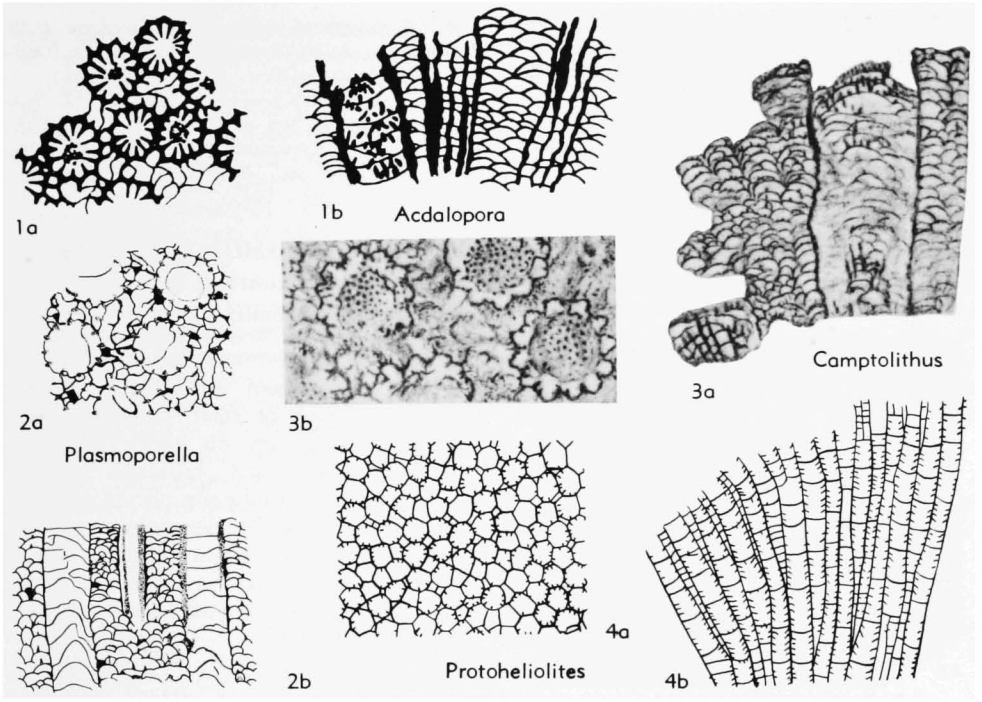


FIG. 421. Plasmoporellidae (1-3); Prohelioitidae (4) (p. *F*618-*F*619).

oles; in all tubules, horizontal diaphragms commonly replaced by dissepiments. *?M. Ord.; L.Sil.-L.Dev.*

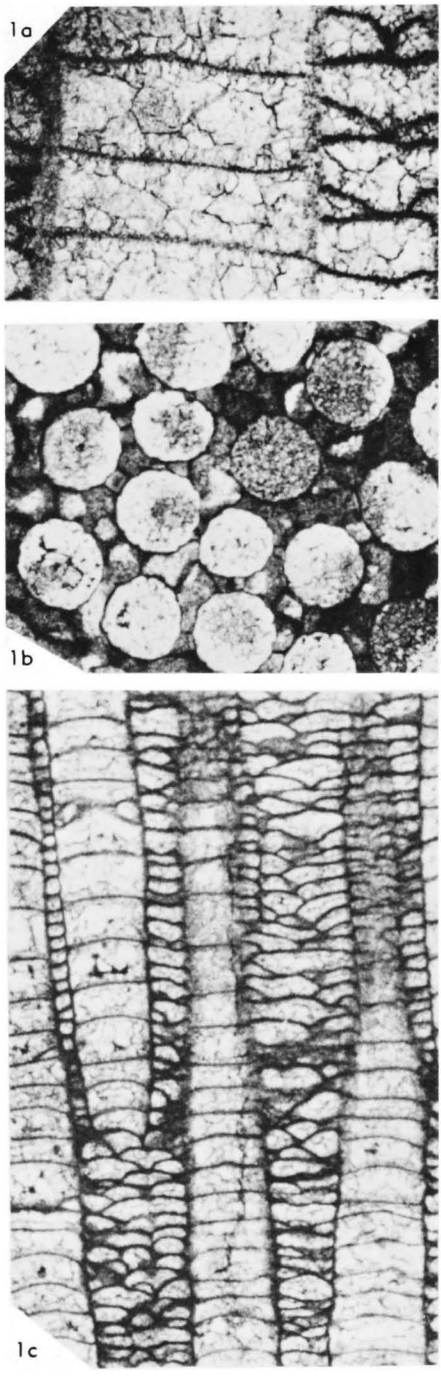
Plasmopora MILNE-EDWARDS & HAIME, 1849b, p. 262 [**Porites petalliformis* LONSDALE, 1839, p. 687; M; †6558, Geol. Soc. Coll., GSM, London]. Plasmoporids with septa consisting of spines, or absent; dissepiments dominant in coenenchyme, penetrated by spinules or rodlets or by longitudinal plates outlining imperfect tubules. *?M.Ord.*, Australia(New S.Wales); *Sil.(up.Llandov.-Ludlov.)*, Eu.(U.K.-Nor.-Swed.-Est.-Podolia-Czech.)-N.Am.(Ind.-Ky.).——FIG. 420,*5ac*. **P. petalliformis* (LONSDALE), M.Sil., Eng., Dudley; *a*, transv., *b,c*, long. secs., ×6 (Lindström, 1899).

Eolaminoplasma BONDARENKO, 1963, p. 50 [**Plasmopora rosa* LINDSTRÖM, 1899, p. 84; OD; †Cn17569, RM, Stockholm]. Walls of tabularia slightly convex outward between the radial walls of the aureolar tubules, which have complete, horizontal or curved tabulae; septa 12, radial longitudinal plates; coenenchyme mixed dissepimental-tubular, the outer edges of dissepiments intersecting in the axial region of the discontinuously walled tubules. *U.Sil.(Ludlov.)*, Eu.(Swed.).——FIG. 420,*1a-c*. **E. rosa* (LINDSTRÖM), Gotl., Lindeklint; *a*, transv., *b,c*, long. secs., ×6 (Lindström, 1899).

Laminoplasma BONDARENKO, 1963, p. 49 [**Plasmopora calyculata* LINDSTRÖM, 1899, p. 79; OD; †figured syntypes Cn17488, 56523, 58602, RM, Stockholm; =*?P. calyculata* LINDSTRÖM, 1883a, p. 59]. Septa are plates, spinose axially; coenenchyme dissepimental, with spinules and small rods within it. *L.Sil.(up.Llandov.)-M.Sil.(Wenlock.)*, Eu.(Gotl.).——FIG. 420,*4a-c*. **L. calyculatum* (LINDSTRÖM), ?holotype, L. Sil. (up. Llandov.), Gotl., Visby Marls, Visby; *a*, transv., *b,c*, long. secs., ×6 (Lindström, 1899).

?Liscombea Ross, 1961, p. 1017 [**L. insolens*; OD; †12408, SU, Sydney]. Corallum of slender, cylindrical branches; in axial parts of branches corallites prismatic and in contact without coenenchyme, mural pores ?absent; in peripheral parts wide intertabularial areas with thick trabeculae normal to surface that form walls to coenenchymal tubules of which 12 may form an aureole; tabulae flat. *L.Sil.(up.Llandov.)*, Australia(New S.Wales).——FIG. 420,*2a,b*. **L. insolens*, holotype, up. Llandov., New S.Wales, Liscombe Pools Cr., 18 mi. S. 38° W. from Cowra; *a,b*, transv., long. secs., ×13, ×6 (Ross, 1961a).

Squameolites BONDARENKO, 1963, p. 50 [**S. squamiger*; OD; †lost, was no. 46/3A-G, MGU, Moscow]. Septa represented by squamulae or by lenticular thickenings of the walls of tabularia; coenenchyme mixed dissepimental-tubular; tabulae horizontal, complete; in tubules, dissepimental edges intersect in axial regions of tubules, giving



Mcleodea

FIG. 422. Plasmoporellidae (p. *F619*).

plaited appearance in longitudinal sections. *U.Sil. (Ludlov.)*, Asia(C.Kazakh.-Tien Shan)-Eu.(Gotl.-Podolia)-Australia(New S.Wales-?Queensl.); *L. Dev.*, Asia(Kazakh.).——FIG. 420,*3a-c.* **S. squamiger*, holotype, top of Isen suite, C. Kazakh., 200 km. S. of Karaganda; *a,b*, transv., long. secs., ×7; *c*, transv. sec., dark areas are squamulae, ×22 (Bondarenko, 1963).

Family PLASMOPORELLIDAE Kovalevskiy, 1964

[Plasmoporellidae KOVALEVSKIY, 1964, p. 36] [=Proplasmoporinae KIAER, 1904, p 48, *nom. inval.*, no generic name *Proplasmopora* exists]

Tabularia without aureoles, surrounded by coenenchyme of small globose or subglobose dissepiments on which short spinules may be based; tabularia may be bounded by longitudinally plicate and continuous walls, or by discontinuous walls, or by downturned edges of dissepiments; 12 short septal laminae in tabularia; tabulae convex, complete or incomplete. *M.Ord.-U.Ord., L.Sil.-M.Sil.*

Plasmoporella KIAER, 1899, p. 34 [**P. convexotabulata* form *typica*; M; †13487, PM, Oslo] [=*Plasmoporella* KIAER, 1897, p. 10, *nom. nud.*; *?Mcleodea* FLOWER & DUNCAN, 1975, which see]. Tabularia without aureoles, separated by fine-textured dissepimental coenenchyme; tabularial walls may be replaced by a ring of superposed small dissepiments, or by thin sheets, interrupted by 12 septal laminae whose bases project into the coenenchyme; in some a palisadelike wall may be formed in places by additional trabeculae between the septa; tabulae complete or incomplete, convex; dissepiments small, commonly globose or subglobose and superposed in piles; a columella may be present, formed of interrupted series of spinelike trabeculae. *M.Ord.*, Australia(New S.Wales), *U. Ord.*, Eu.(Nor.-Urals)-Asia(Kazakh.-Uzbek.-Altay-NE.USSR)-Australia(Tasm.).——FIG. 421,*2a,b.* **P. convexotabulata*, U.Ord. *(5a-b)*, Nor.; *a,b*, transv., long. secs., ×4 (Hill & Stumm, 1956).

Acdalopora BONDARENKO, 1958, p. 215 [**A. sokolovi*; OD; †31, coll. 1, MGU, Moscow] [=*Aedalopora* FLÜGEL, 1970, p. 8, *nom. null., A. elegantis* KOVALEVSKIY, 1964, p. 46, erroneously cited as type species]. Corallum nodulose; tabularia with longitudinally plicate walls that are contiguous or separated by dissepimented coenenchyme; 12 septa, of contiguous or discrete trabeculae directed upward and adaxially from inwardly projecting plicae, alternate with 12 short plates directed outward from outwardly projecting plicae; tabulae subhorizontal or sagging; dissepiments small, numerous, subhorizontally based. *U.Ord.*, Asia (Kazakh.).——FIG. 421,*1a,b.* **A. sokolovi*, holo-

type, Chingiz Ra., Akdala-say, Chu-Iliysk Mts.; *a,b,* transv., long. secs., ×7 (Bondarenko, 1958).

Camptolithus Lindström, 1899, p. 99 [**Lyellia papillata* Rominger, 1876, p. 16; M; †8247, UMMP, Ann Arbor]. Tabularia with longitudinally plicate thin walls, the folds rounded; septa 12, short, based on adaxially projecting folds; tabulae domed, incomplete, with short spinules based on upper surfaces of tabellae; coenenchyme of horizontally based subglobose dissepiments, some bearing short spinules. [Diagnosis based on Lindström's figures. Stumm, 1965, p. 58, stated that Rominger's holotype is silicified; it has apparently not been sectioned; Lindström's specimens, given by Rominger from the type locality, have domed, incomplete tabulae, but Stumm described the species as a *Propora* having concave tabulae; the holotype requires further investigation.] *L.Sil.(up.Llandov.),* or possibly *M.Sil. (Wenlock.),* N.Am.(Mich.).——Fig. 421,*3a,b.* **C. papillatus* (Rominger), topotype, Mich., Pt. Detour; *a,b,* long., transv. secs., ×6 (Lindström, 1899).

Granulina Leleshus, 1975, p. 7 [**Plasmoporella granulosa* Bondarenko, 1958, p. 208; OD; †slide 12, coll. 1, MGU, Moscow]. Like *Plasmoporella* Kiaer, 1899, but septal trabeculae interrupted so that each is a longitudinal series of granules that in places may be transitional to short interrupted pillars. *U.Ord.,* Asia(Kazakh.-Tadzhik.).

?Mcleodea Flower & Duncan, 1975, p. 186 [**M. loisae*; OD; †1608, NMBM, Socorro] [?=*Plasmoporella* Kiaer, 1899, which see]. Tabularial wall thin and continuous; tabulae complete, horizontal or weakly convex; septal spines short (number of septa not established); narrow coenenchyme of dissepiments and ?tubuli with ?discontinuous walls, commonly one tubulus between adjacent tabularia. *U.Ord.,* N.Am.(Texas).——Fig. 422,*1a-c.* **M. loisae,* holotype, coral zone of Aleman F., El Paso; *a,* long. sec., ×22.5; *b,* transv. sec., ×7.0; *c,* long. sec., ×7.0 (Flower & Duncan, 1975).

Neowormsipora Lin & Chow, 1977, p. 172 [**N. jiangxiensis*; OD; †027 (I-7), AGS, Peking]. Like *Acdalopora* but with spines on dissepiments in places longitudinally continuous and forming some imperfect coenenchymal tubuli. *U.Ord.(Ashgill.),* Asia(Kiangsi).

?Proporella Leleshus, 1975, p. 12 [**P. rubanovi*; OD; †sample 416-27, coll. 1217, UpG, Dushanbe]. Walls of tabularia very uneven, with longitudinal corrugations, in some places continuous (as in *Propora* Milne-Edwards & Haime, 1849b), in others interrupted and replaced by longitudinal septal trabeculae placed at some distance from one another (as in *Plasmoporella* Kiaer, 1899); tabulae horizontal and complete, or rarely incomplete and oblique; coenenchyme dissepimented. *U.Ord.,* Asia(Tadzhik.-Kazakh.).

Family PROHELIOLITIDAE Kiaer, 1899

[*nom. transl.* Hill, herein, *ex* Proheliolitinae Kiaer, 1899, p. 21]

Corallum with tabularia in contact and prismatic or separated in parts of their circumference, commonly by one, two, or three small prismatic tubules crossed by flat diaphragms; each such tubule may widen to form a normal tabularium; in some, tabularia may be separated in late stages by partial rings of coenenchyme in which ?heliolitoid longitudinal laminae may develop; tabularia with flat tabulae and with 12 septa, each composed of a single series of downwardly directed or subhorizontal spines. *U.Ord.; U.Sil.*

Proheliolites Kiaer, 1897, p. 10; 1899, p. 21 [**Heliolites dubia* Schmidt, 1858, p. 226; M; †not traced in EGM, Tallinn; U.Ord., Lyckholm, Est.; species name considered *nomen dubium* by Bondarenko, 1977, p. 41]. Genus commonly interpreted on Kiaer's Norwegian material (1899, pl. 3, fig. 5, 6), which has been renamed *Protoheliolites norvegicus* Bondarenko, 1977, p. 39. See *Protoheliolites,* below.

?Avicenia Leleshus, 1974c, p. 94 [**A. aseptata*; OD; †sample 96-25, coll. 1057, UpG, Dushanbe]. Irregularly hemispherical to nodular; tabularia cylindrical or prismocylindrical, with complete walls, very closely spaced, some contiguous, others separated by narrow zone of coenenchyme from which new tabularia may arise; septa ?(absent or represented by very small, sparse spines); tabulae complete, horizontal; coenenchyme of prismatic tubuli of irregular section, crossed by diaphragms and with bipartite increase by growth, from one side, of a dividing wall. Potential number of septa not established; ?possibly bryozoan. *U.Sil. (Ludlov.),* Asia(S.Tien Shan).——Fig. 423,*1a,b.* **A. aseptata,* holotype, lower part of Dalyan horizon; *a,b,* transv., long. secs., ×5 (Leleshus, 1974c; photographs courtesy V. L. Leleshus).

Kiaerolites Bondarenko, 1977, p. 43 [**K. kalstadensis*; OD; †73069-73071, PM, Oslo; =*Propora* cf. *goldfussi* Billings of Kiaer, 1932, pl. 14, fig. 1-3, *non* Billings]. Like *Schmidtilites* but late stages with longitudinal laminae in coenenchyme ?(forming heliolitoid tubuli). *U.Ord.(up.Caradoc.-up.Ashgill.),* Eu.(Nor.).

Protoheliolites Bondarenko, 1977, p. 39 [**P. norvegicus*; OD; †74195, 13456-7, PM, Oslo; =*Proheliolites dubius* of Kiaer, 1899, p. 21, *non Heliolites dubia* Schmidt, 1858, p. 226]. Tabularia in contact and prismatic or separated in parts of their circumference by one, two, or three small prismatic tubules crossed by flat diaphragms; each such tubule may widen to form a normal tabu-

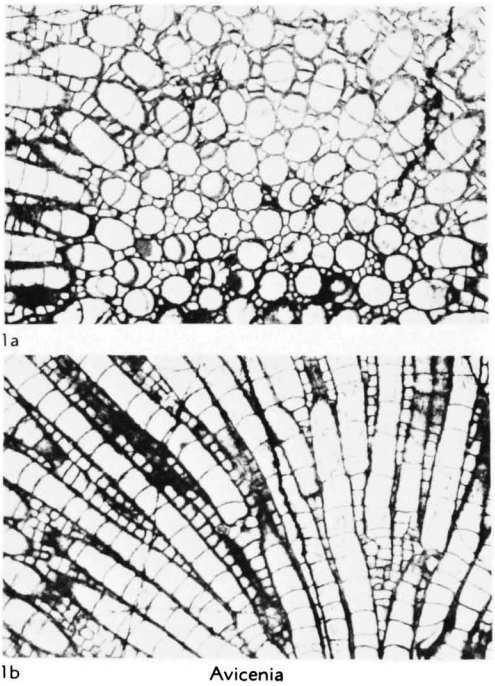


FIG. 423. Prohelioitidae (p. *F*619).

larium; in late stages tubules may widen to form partial ring of coenenchyme around tabularia; tabularia with flat tabulae and with 12 septa each composed of a single series of dominantly downwardly or subhorizontally directed spines. *U.Ord. (up.Caradoc.-Ashgill.)*, Eu.(Nor.-Swed.-Est.)-Asia (Kazakh.-Tuva-China)-N. Am. (Que.-Ont.-Ohio-Ind.-Ky.-Mich.).——FIG. 421,*4a,b*. **P. norvegicus*, holotype, U.Ord. (5a), Nor., Stavnaestangen, Ringerike; *a,b*, transv., long. secs., ×4 (Hill & Stumm, 1956).

Schmidtilites BONDARENKO, 1978b, p. 121, *nom. subst. pro Schmidtella* BONDARENKO, 1977, p. 42, *non Schmidtella* ULRICH, 1892, an ostracode [**Schmidtella schmidti*; OD; †in RM, Stockholm, figured LINDSTRÖM, 1899, pl. 11, fig. 10-13, as *Proheliolites dubius* SCHMIDT, p. 70; U.Ord., ?M. Ashgill., Worms, Est.]. Like *Protoheliolites* but tabularia polygonal to stelliform in section; septal spines springing from 12 laminar septal bases; coenenchyme from isolated patches to complete rings around tabularia. *U.Ord.(Ashgill.)*, Eu.(Est.-?Nor.-?Swed.-Ger.)-Asia (Kazakh.-China)-N. Am. (Greenl.).

?Family CYRTOPHYLLIDAE Sokolov, 1950

[Cyrtophyllidae SOKOLOV, 1950a, p. 141; Cyrtophyllida BONDARENKO, 1978a, p. 33]

Corallum massive, of cylindrical tabularia set in dissepimented coenenchyme in which typically there are extratabularial prolongations of the septa in the form of laminae that are discontinuous longitudinally or radially, or of discrete, short monacanths; in some, traces of dividing walls between the dissepiments proper to neighboring coallites may be found; walls to tabularia ?(and dividing walls) formed by downturned edges of dissepiments and tangential extensions from septa; dissepiments horizontally based; septa within tabularia more than 12 and commonly alternate in length, of conjunct or discrete monacanths directed adaxially upward; tabulae convex, horizontal or rarely concave, may bear short spines. *?M.Ord.-U.Ord.*

The systematic position of this family is uncertain. In the name genus, the longitudinal piles of horizontally based, fine dissepiments and the convexity of the tabulae resemble the condition of the Plasmoporellidae; but it differs sharply from all other Heliolitina in having more than 12 septa (see also FOMIN, 1971, p. 126). *Karagemia* DZYUBO, 1960a, and *Rhaphidophyllum* LINDSTRÖM, 1882b, are at least homomorphic with Rugosa in alternation of septal length and in their plocoid and cerioid coralla.

Cyrtophyllum LINDSTRÖM, 1882b, p. 17 [**C. densum*; M; †figured syntype(?s) Cn55160, 55161, RM, Stockholm]. Tabularia separated by dissepimented coenenchyme in which discontinuous laminar prolongations of the more than 12 septa form an aureole of more than 12 radially elongate interseptal loculi; septa composed of spines in longitudinal rows, numerous (up to 40), very short in tabularium and spines there directed upward adaxially; tabulae slightly convex, complete; dissepiments of coenenchyme horizontally based [see FOMIN, 1971, p. 116]. *?M.Ord.*, Eu.(Urals); *U. Ord.*, Asia (W. Sib. Platf.-Taymyr-Altay-Shoria Mts.)-N.Am.(Arctic Can.-Greenl.).——FIG. 424, *3a,b*. **C. densum*, syntype, Sib., R. Middle Tunguska; *a,b*, transv., long. secs., ×2.0, ×2.5 (Lindström, 1882b).

?Karagemia DZYUBO, 1960a, p. 86 [**K. altaica*; OD; †916/3, coll. ?901, SNIIGGIMS, Novosibirsk (holotype of *K. altaica* subsp. *karagemica*); lectotype by DZYUBO, 1960b, p. 452]. Corallum thamnasteroid or partly astreoid or aphroid; boundary of tabularium strongly marked; septa long, 26 to 32, alternating in size, their tabularial parts composed of discrete or contiguous trabeculae that are directed steeply upward and adaxially; in dissepimentarium septa are laminae, continuous or discontinuous; tabulae subhorizontal, convex or con-

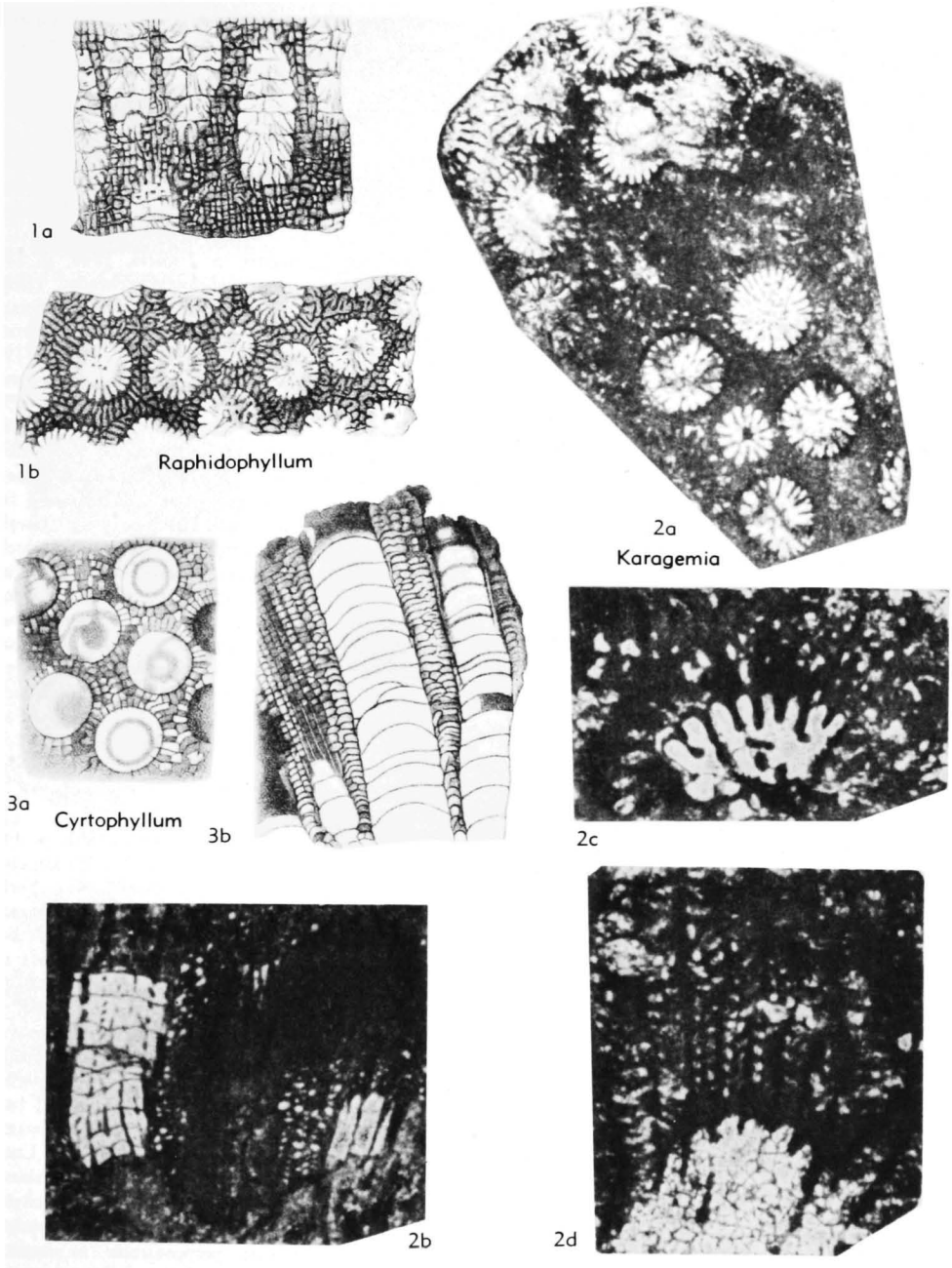


FIG. 424. Cyrtophyllidae (p. *F620-F622*).

cave; dissepiments small, may be of two inosculating longitudinal rows in an interseptal loculus. *U.Ord.*, Asia(Altay Mts.).——FIG. 424,*2a-d*. **K. altaica*, lectotype, Altay Mts., right side of R. Karagem; *a,c*, transv. secs., ×3.0, ×10.0; *b,d*, long. secs., ×4.0, ×10.0 (Dzyubo, 1960).

?**Rhaphidophyllum** LINDSTRÖM, 1882b, p. 14 [**R. constellatum*; M; †Cn55162, 55163, RM, Stockholm]. Corallum cerioid; septa more than 12, each a plate within the narrow marginarium of small regular dissepiments, but within wide tabularium each is represented by long, separated

spines directed adaxially upward; tabulae flat, complete [see PREOBRAZHENSKIY, 1964b, p. 68]. *U. Ord.*, Asia (W. Sib. Platf.-Kolyma Basin)-N. Am. (Alaska).——FIG. 426,*1a,b*. **R. constellatum*, syntype, R. Middle Tunguska, above last rapids before R. Chuna; *a,b*, transv., long. sec., ×? (Lindström, 1882b).

Superfamily COCCOSERIDICAE Kiaer, 1899

[*nom. transl.* HILL, herein, *ex* Coccoseridinae, *nom. correct.* HILL, 1955, p. 249, *pro* Coccoserinae KIAER, 1899, p. 4] [=Coccoseridae LINDSTRÖM, 1899, p. 106; Coccoserididae SOKOLOV, 1962c, p. 276; Protareina LEITH, 1952, p. 791, order; Protaraeida BONDARENKO, 1967, p. 40, order; Protaraeacea BONDARENKO, 1958, p. 202, superfamily]

Corallum encrusting, laminar or subglobular, longitudinal skeletal elements commonly greatly thickened and porous or aporose; horizontal skeletal elements thin and sparse to absent; tabularia with 12 contiguous septa composed of monacanths ?(or rhabdacanths) directed upward adaxially and in some so long and thick as to fill the lumina; in some, septa may be short and flat tabulae present; coenenchyme of longitudinal trabeculae commonly so thick that no tubular lumina occur; in others they outline tubules that may be crossed by subhorizontal diaphragms. *M.Ord.-M.Sil.*

Family COCCOSERIDIDAE Kiaer, 1899

[*nom. transl.* SOKOLOV, 1962c, p. 276, *ex* Coccoseridinae, *nom. correct.* HILL, 1955, p. 249, *pro* Coccoserinae KIAER, 1899, p. 4] [=Coccoseridae LINDSTRÖM, 1899, p. 106; Protaraeidae KIAER, 1904, *nom. transl.* SOKOLOV, 1950a, p. 140, *ex* Protaraeinae KIAER, 1904, p. 49; incl. Acidolitinae SOKOLOV, 1950a, p. 140]

Corallum encrusting, laminar or subglobular; longitudinal skeletal elements greatly thickened and aporose; horizontal skeletal elements thin and sparse to absent; tabularia with longitudinally plicate walls and with 12 contiguous septa composed of monacanthine ?(or rhabdacanthine) trabeculae directed upward adaxially and so thick and long as to fill the lumen with few exceptions; coenenchyme of coenenchymal monacanths commonly so thick that no tubular lumina occur. *M.Ord.-U.Ord.*

Coccoseris EICHWALD, 1855b, p. 2 [**C. ungerni*; SD LANG, SMITH, & THOMAS, 1940, p. 39; †in ?EICHWALD Coll., LGU, Leningrad; =*Lophoseris ungerni* EICHWALD, 1855a, p. 466]. Corallum discoid, or extensiform with tumulose surface; calice with 12 contiguous triangular septa, each a single series of contiguous inclined trabeculae, surrounding papillae in axial region; tabulae absent; coenenchyme composed of large contiguous monacanths. [SOKOLOV (1955, p. 466) considers this genus may be junior synonym of *Protaraea* MILNE-EDWARDS & HAIME, 1851.] *M.Ord.*, Australia (New S.Wales-?Tasm.); *M.Ord.-U.Ord.*, Eu.(Nor.-Est.); *U.Ord.*, N.Am.(Texas).——FIG. 425,*1a-d*. **C. ungerni* (EICHWALD), holotype, U.Ord. (Vorms.), Est., near Hapsalu; *a,b*, calical views, ×1, ×4; *c,d*, another specimen, transv., long. secs., ×4 (Sokolov, 1962c).

Acidolites LANG, SMITH, & THOMAS, 1940, p. 13, *nom. subst. pro Acantholithus* LINDSTRÖM, 1899, p. 112, *non* STIMPSON, 1858, a crustacean [**Acantholithus lateseptatus*; SD LANG, SMITH, & THOMAS, 1940, p. 13, figured syntypes Cn56719, 56722, RM, Stockholm] [=*Esthonia* SOKOLOV, 1950, p. 140, *nom. nud.; Esthonia* SOKOLOV, 1955, p. 77 (type, *E. schmidti*, OD; †122, coll. 599, VNIGRI, Leningrad; U.Ord., Vorms., Est.), differs only in having coenenchymal tubuli closed by thickening of coenenchymal trabeculae and by absence of horizontal skeletal elements]. Corallum forming successive thin plates; tabularia stellate in section; septa of contiguous thick trabeculae, upturned adaxially and almost filling the tabularium so that tabulae are rare; coenenchymal tubuli with monacanthate walls so thickened that only very narrow axial spaces are left to be crossed by diaphragms. *U.Ord.(Vorms.)*, Eu.(Est.-Nor.-Ire); *M.Ord.* or *U.Ord.*, Australia(Tasm.).——FIG. 425,*4a-c*. **A. lateseptatus* (LINDSTRÖM), pebble in Pleistocene moraine, Gotl., near Kopparsvik, Visby; *a*, calical view, *b,c*, transv., long. secs., ×12 (Lindström, 1899).

Protaraea MILNE-EDWARDS & HAIME, 1851, p. 146 [**Porites vetustus* HALL, 1847, p. 71; SD MILLER, 1889-1897, p. 201; †?642/1, AMNH, New York; FOERSTE (1924, p. 73) considered MILNE-EDWARDS & HAIME's figured specimen to be congeneric but not conspecific with *Porites? vetustus* HALL] [=*Diplastraea* EICHWALD, 1854, p. 83 (type, *D. diffluens*; SD LANG, SMITH, & THOMAS, 1940, p. 52; †not traced; U.Ord., Est., Rakvere); *Protarea* LAMBE, 1899, p. 89, *nom. van.; Tumularia* ROBINSON, 1916, p. 163, *nom. subst. pro Stylaraea* SEEBACH, 1866, p. 306 (type, *S. roemeri*, M; †not traced; Ord., Est., Rakvere), *non* MILNE-EDWARDS & HAIME, 1851, a recent hexacoral), see LINDSTRÖM, 1899, p. 109]. Corallum of thin sheets, commonly encrusting; corallites close, coenenchyme narrow to absent, when present of closely contiguous thick trabeculae perpendicular to surface; septa 12, of contiguous trabeculae directed steeply upward and filling the lumen; tabulae absent. [HALL's and MILNE-EDWARDS & HAIME's specimens require restudy; FOERSTE (1909b, p. 211), stated that in holotype, slender tubuli may occur between monacanths of coenenchyme.] *M.Ord. (Trenton.)-U. Ord. (Richmond.)*, N. Am. (N. Y.-Manit.-Ind.-Ohio); *U.Ord.*, Eu.(Est.).——FIG. 425, *3a,b*. **P. vetustus* (HALL), M.Ord., Trenton Ls.,

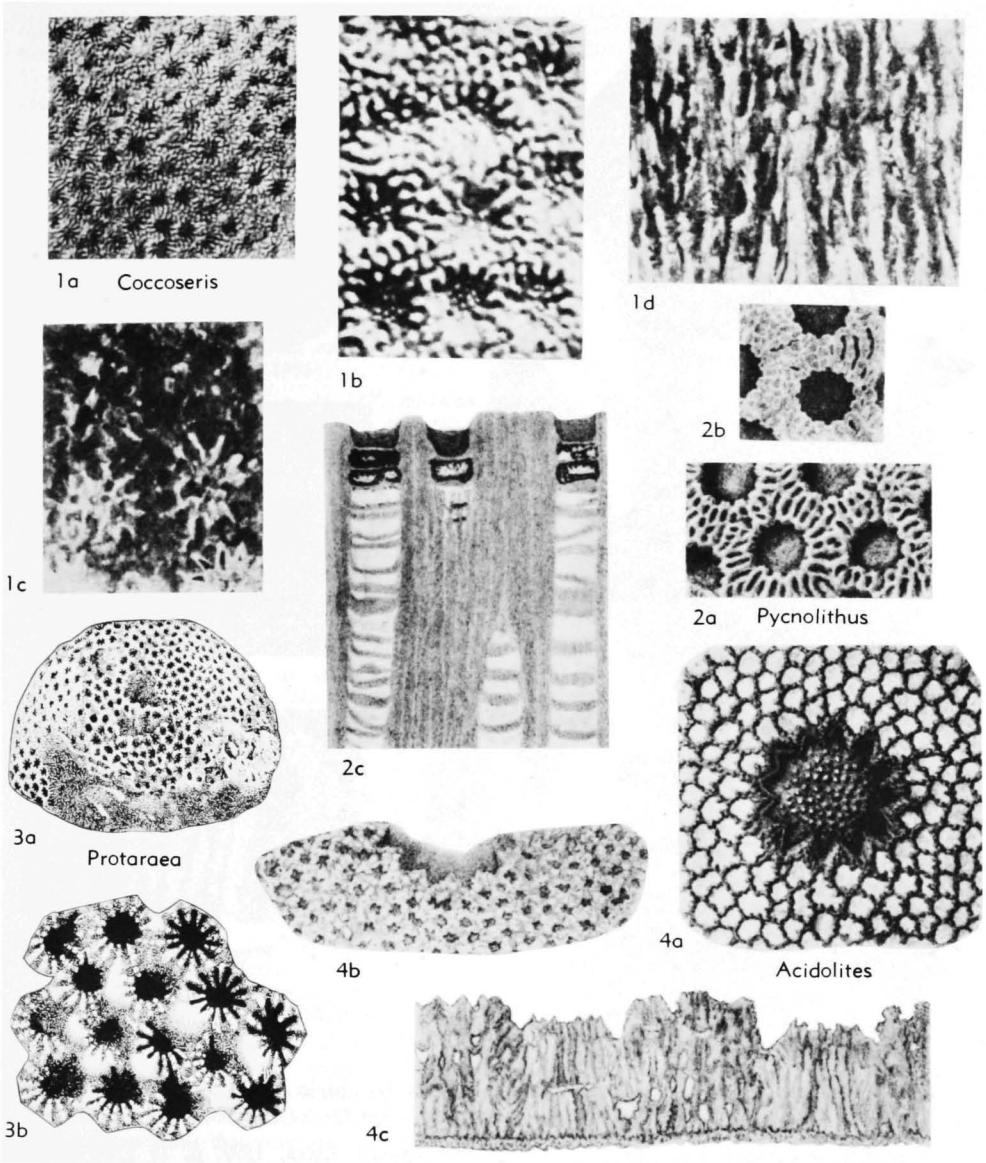


FIG. 425. Coccoseridiidae (1, 3, 4); Pycnolithidae (2) (p. *F622-F624*).

N.Y.; *a*, side view, ×1, *b*, calices, ×10 (Hill & Stumm, 1956).

Family PYCNOLITHIDAE Lindström, 1899

[*nom. transl.* SOKOLOV, 1950a, p. 140, *ex* Pycnolithinae LINDSTRÖM, 1899, p. 105, tribe]

Corallum with longitudinal skeletal elements greatly thickened; tabularia with very short septa and crossed by subhorizontal tabulae; coenenchyme of longitudinal monacanths arranged in somewhat irregular rows radiating from the tabularia and commonly so thick as to fill all spaces between the rows. *L.Sil.* or *M.Sil.*

Pycnolithus LINDSTRÖM, 1899, p. 105 [**P. bifidus*; OD; †Cn17841, RM, Stockholm]. Characters as for family. *L.Sil.(up.Llandov.)* or *M.Sil.(low. Wenlock.)*, Eu.(Swed.).——FIG. 425,*2a-c*. **P. bifidus*, monotype, shore at Visby, not ***in situ;***

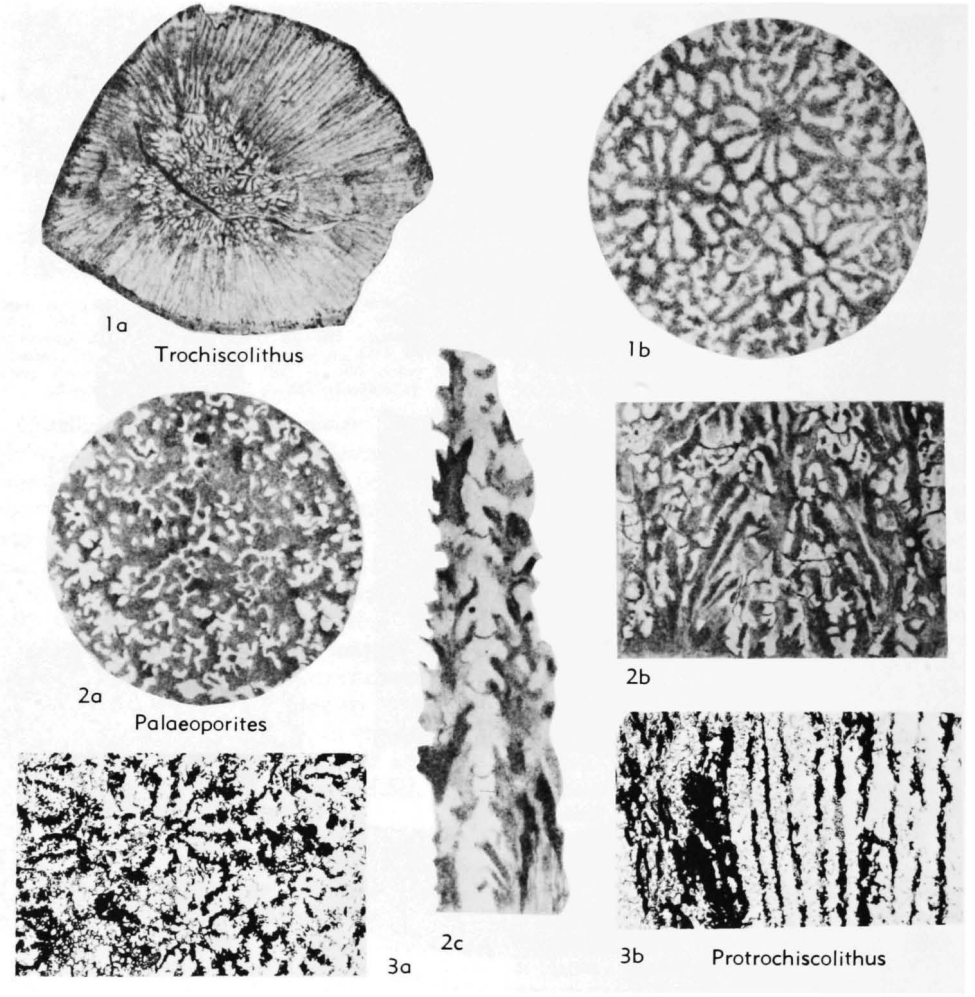


FIG. 426. Palaeoporitidae (p. *F624-F625*).

a, calical view, *b*, transv. sec. just below calices, *c*, long. sec., all ×8 (Lindström, 1899).

Family PALAEOPORITIDAE Kiaer, 1899

[*nom. transl.* SOKOLOV, 1962c, p. 278, *ex* Palaeoporitinae KIAER, 1899, p. 18] [=Trochiscolithidae SOKOLOV, 1950a, p. 139]

Corallum of variable form; longitudinal skeletal elements of monacanths ?(or rhabdacanths) commonly incompletely contiguous so that walls of tabularia and of tubuli and septa are perforate; septal trabeculae directed upward adaxially, their axial ends forming axial structure in some; tabulae sparse; coenenchymal tubules may be almost closed by thickening of trabeculae of their walls. *?M.Ord.-U.Ord.*

Palaeoporites KIAER, 1899, p. 18 [**P. estonicus*; M; figured syntypes A8451, A8452, KIAER Coll., PM, Oslo]. Nodular; coenenchyme wide, tubulate; septa and walls of coenenchymal tubules of moderately thick trabeculae, imperfectly contiguous so that walls and septa are perforate; second order trabeculae curve outward from median plane of septum; tabulae sparse, thin. *?M.Ord.*, Australia (New S.Wales); *U.Ord.(Porkuni, F₂)*, Eu.(Est.). ——FIG. 426,*2a-c*. **P. estonicus*, F_2, Est., Röa; *a,b*, transv., long. secs., ×10; *c*, oblique sec., through 2 septa, ×20 (Kiaer, 1904).

Protrochiscolithus TROEDSSON, 1928, p. 116 [**P. kiaeri*; M; †H3012, H3043, H3093 (=144 in L. KOCH Coll.), MM, Copenhagen] [=*Protro-*

chiscolithus KIAER, 1904, p. 49, invalid name based on hypothetical genus; LANG, SMITH, & THOMAS (1940, p. 107) invalidly recognized *Heliolites? parasitica* NICHOLSON & ETHERIDGE, 1880, p. 259, as type by OD]. Corallum encrusting, thick; coenenchyme narrow; septa, walls of tabularia, and walls of coenenchymal tubules partially perforate and rather thin, formed of slender trabeculae that are incompletely contiguous within a skeletal element; tabulae and diaphragms present [see FLOWER, 1961, p. 53]. *U.Ord.*, N.Am. (Greenl.-Manit.-N. Mex.-Texas)-Asia (Altay).——FIG. 426,*3a,b*. **P. kiaeri*, holotype, C. Calhoun beds, N. Greenl., C. Calhoun; *a,b*, transv., long. secs., ×10 (Hill & Stumm, 1956).

Trochiscolithus KIAER, 1904, p. 13 [**T. micraster* LINDSTRÖM of KIAER, 1904, p. 14; M; †Cn56613, RM, Stockholm; ?=*Coccoseris micraster* LINDSTRÖM, 1899, p. 109]. Corallum spheroidal to branching; coenenchyme tabular; tabularia with 12 longitudinal rows of upwardly and adaxially directed spines, forming more or less perforate septa; walls of coenenchymal tubules of longitudinal trabeculae and more or less perforate; in proximal or axial parts of corallum, skeletal tissue relatively thin as in *Protrochisolithus*; in peripheral parts trabeculae so thick as almost to fill all spaces. *U.Ord.*(F_1-F_2), Eu.(Nor.-Dalecarlia-Est.)-?Asia(Altay).——FIG. 426,*1a,b*. **T. micraster* (LINDSTRÖM) KIAER, U.Ord. *(5a)*, Nor., Stavnestangen, Ringerike; *a*, transv. sec. of branch showing strongly thickened peripheral part, ×4; *b*, axial part of *a*, ×20, showing only slight thickening (Kiaer, 1904).

Family Uncertain

Pragnellia LEITH, 1952, p. 794 [**P. arborescens*; M; †429P, Manitoba Museum, Winnipeg]. [For discussion of systematic position see BONDARENKO, 1969, p. 105. LIN in LIN & CHOW, 1977, p. 193, included *Pragnellia* together with a new family Sibiriolitidae LIN in a new order of Tabulata, Pragnellida LIN.] Polyparium branching by dichotomy; branches of internodes of calcareous skeletal elements and nodes that were not calcareous, possibly proteinous; internodes phalangoid, with 'corallites' lacking distinct walls surrounded by common tissue of loosely packed, prickly rods perpendicular to surface; neither septa nor tabulae noted, but barlike connections are found between rods of common tissue; 'corallites' almost completely filled with sclerenchyme. [Alternation within the branches of calcareous internodes with ?horny nodes recalls that in members of octocorallian Isididae also (see BAYER, 1956b, p. F222), the microstructure of the calcareous parts of the branches is very similar to that of octocorallian Helioporidae. Perhaps *Pragnellia* is an alcyonarian.] *U. Ord. (Richmond.)*, N. Am. (Manit.-?Texas)-Eu.(W. slope of Urals-?Ire.).——FIG. 427,*1a-c*. **P. arborescens*, holotype, Manit., Stony Mountain; *a*, transv. sec. internode, ×3.8, *b,c*, ext. views, ×4.7, ×0.3 (Leith, 1952).

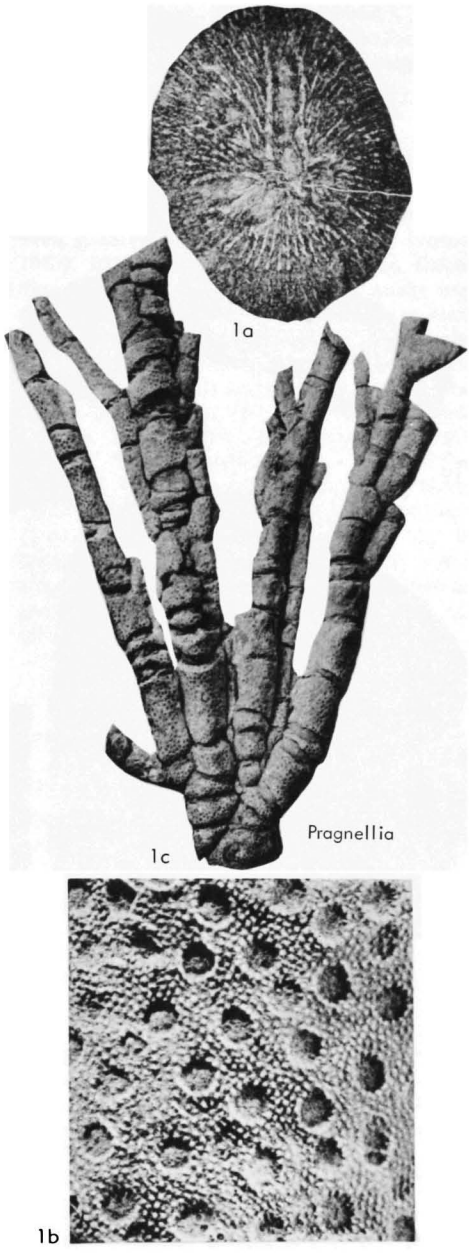


FIG. 427. Family Uncertain (p. *F625*).

Urceopora EICHWALD, 1855b, p. 3 [**U. furcata*; SD LANG, SMITH, & THOMAS, 1940, p. 137; †not traced; Ord., Calcaire à Orthocératites, Nyby,

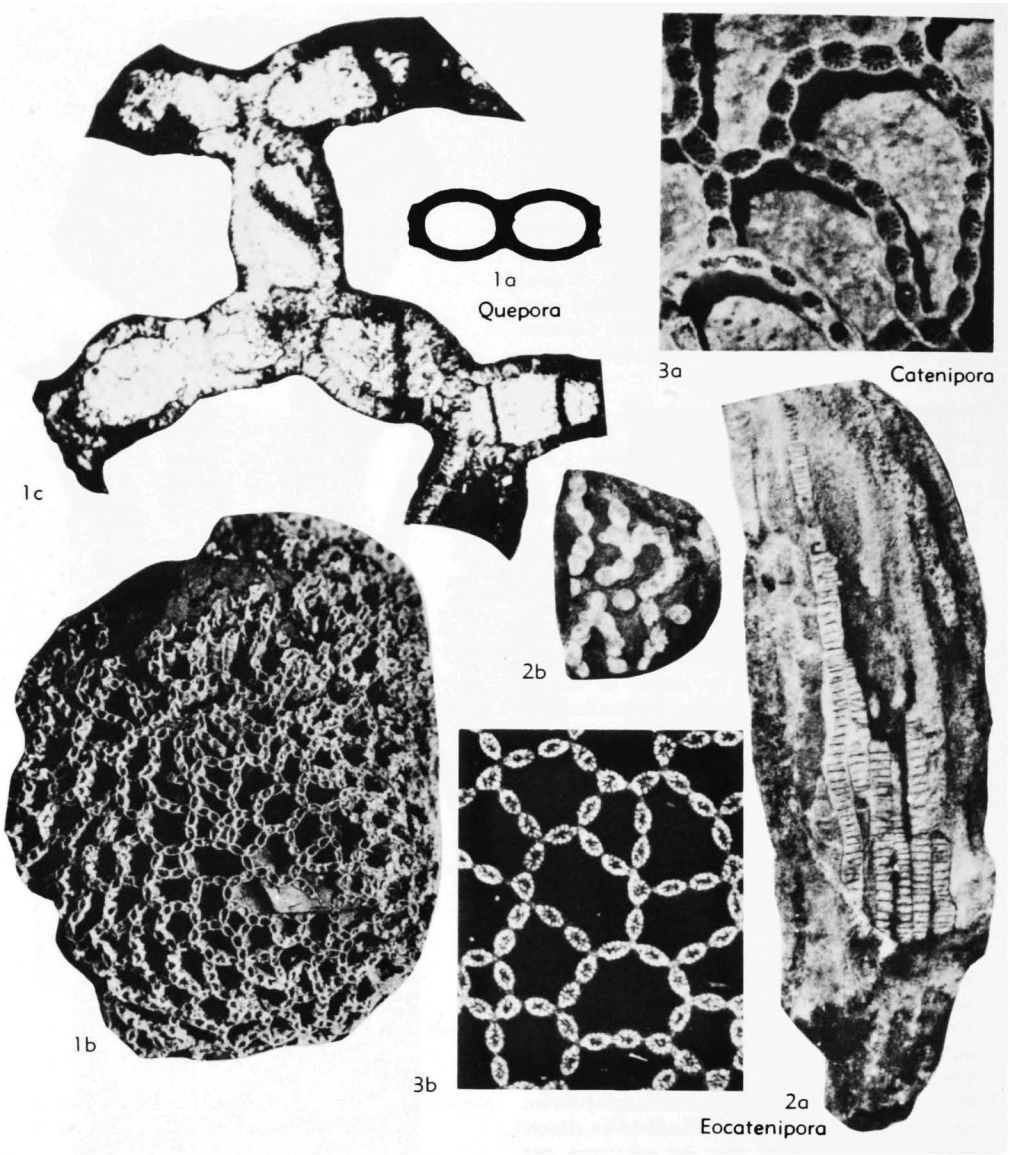


FIG. 428. Halysitidae (p. *F627*).

Estonia]. SOKOLOV (1962c, p. 281) considered that *Urceopora* was possibly referable to the Protaraeida (herein Coccoseridicae), but that in the absence of the original material this problem cannot be resolved.

Suborder HALYSITINA Sokolov, 1947

[*nom. transl.* HILL, herein (*ex* Halysitida SOKOLOV, 1947c, p. 19, *nom. correct.* BONDARENKO, 1958, p. 223, *pro* Halysitacea SOKOLOV, 1950a, p. 173, *nom. correct. pro* Helysitacea SOKOLOV, 1947c, p. 19, misprint)]

Colonial; corallites thick-walled, arranged uniserially (in ranks that connect with one another to enclose longitudinal lacunae); increase lateral or intermural or from coenenchyme; 12 longitudinal rows of septal spines present or absent; corallites may or may not be separated within ranks, and rank junctions may or may not contain narrow coenenchymal tubular spaces with horizontal or convex diaphragms and commonly without spines on bounding walls. *M.Ord.-U.Sil.*

Family HALYSITIDAE Milne-Edwards & Haime, 1849

[*nom. transl.* DUNCAN, 1872, p. 135, *ex* Halysitinae MILNE-EDWARDS & HAIME, 1849b, p. 261, tribe] [=Halysitiniens DE FROMENTEL, 1861, p. 259; Halisitinae DE KONINCK, 1872, p. 117; Hexismiidae SOKOLOV, 1950a, p. 174]

Characters of superfamily. *M.Ord.-U.Sil.* As with other Tabulata, generic subdivision for this family is difficult because the structures are so simple and degrees of difference are perforce used. Among the characters used have been degrees of difference in the development of coenenchyme and of septal spines, and though their application so far has led to some inconsistencies, their use is continued herein. Members of the family are not without stratigraphic and provincial value.

Subfamily CATENIPORINAE Hamada, 1957

[Cateniporinae HAMADA, 1957b, p. 396]

Halysitidae without coenenchyme between corallites or at junctions of ranks. *M.Ord.-U.Sil.*

Catenipora LAMARCK, 1816, p. 206 [**C. escharoides*; SD LANG, SMITH, & THOMAS, 1940, p. 33; †neotype, 4, BROMELL Coll., PM, Uppsala, by THOMAS & SMITH, 1954, p. 768] [=*Palaeohalysites* CHERNYSHEV, 1941a, p. 36 (type, *Halysites gotlandicus* YABE, 1915, p. 34, OD; †4547, TohU, Sendai]. Corallum halysitoid; corallites of each rank elongate and elliptical or angulate-elliptical in section, without intervening coenenchymal tubules; offsets may arise from either edge of corallite; septal spines in 12 longitudinal rows, commonly well developed; tabulae mostly horizontal. [See THOMAS & SMITH, 1954, p. 768; KLAAMANN, 1966, p. 29; WEBBY & SEMENIUK, 1969, p. 357. LENZ, 1964, p. 373, illustrates short cylindrical canals connecting lacunae through lines of junction of three ranks.] *U.Ord.*, N.Am.(Can.-Arctic-Texas)-Eu. (Ire.-Est.)-Asia (Taymyr-R. Kolyma-Altay Mts.)-Australia(New S.Wales); *L.Sil.-M.Sil.*, Eu. (Eng.-Nor.-Gotl.-Est.)-Asia (Afghan.-Uzbek.-Kazakh.-N.Sib.-Taymyr)-Australia(New S.Wales)-N.Am.; *U.Sil.(9a)*, Eu.(Nor.).——FIG. 428,*3a,b*. **C. escharoides; a,* neotype, Sil., Gotl., ext. view, ×4; *b,* another specimen, up. Llandov., L. Visby marls, Gotl., beach N. of Visby, transv. sec., ×4 (Thomas & Smith, 1954).

Eocatenipora HAMADA, 1957b, p. 398 [**Halysites cylindricus* WILSON, 1926, p. 15; OD; †6736, GSC, Ottawa]. Corallum halysitoid; ranks of corallites that are rounded, elliptical, or rounded polygonal in section, may or may not connect to enclose lacunae; some corallites cylindrical and distally without contact with others of a rank; septal spines ?absent; no coenenchyme known; walls thick, tabulae rather distant. *U.Ord.(Richmond.)*, N.Am.(B.C.); *U.Ord.(Ashgill.)*, Eu.(Nor.-Est.).——FIG. 434,*2a,b*. **E. cylindrica* (WILSON), holotype, U. Ord., Beaverfoot F., Can., B.C.; *a,b,* long., transv. secs., ×4 (Wilson, 1926).

Quepora SINCLAIR, 1955, p. 96 [**Halysites catenularia* var. *quebecensis* LAMBE, 1899, p. 69; OD; †11305, GSC, Ottawa; lectotype by BUEHLER, 1955, p. 47] [=*Catenipora (Holocatenipora)* YÜ, 1960, p. 83 (type, *C. (H.) orientela*, OD; †10408-10409, IGP, Nanking; U.Ord., Sinkiang, Dalyan distr., Mon-yuan Prov.)]. Halysitoid coralla with thick-walled corallites in short moniliform ranks enclosing small longitudinal lacunae; within ranks, offsets develop between adjacent corallites; septal spines absent to poorly developed; no coenenchyme; tabulae complete, flat [see WEBBY & SEMENIUK, 1969, p. 348]. *M.Ord.*, N.Am.(Que.-N.Greenl.); *M.Ord., ?U.Ord.(low.Bolindian)*, Australia(New S.Wales); *U.Ord.*, Asia(Kazakh.); *?Sil.*, N.Am.(Ky.).——FIG. 428,*1a-c*. **Q. quebecensis* (LAMBE), M.Ord.(Blackriver.), Quebec, L. St. John; *a,* syntype, 2 mi. S. of Pte. Bleue, transv. sec., diagram., ×5 (Lambe, 1899); *b,c,* another specimen, ext. view, ×1, transv. sec., ×12 (Buehler, 1955).

Subfamily HALYSITINAE Milne-Edwards & Haime, 1849

[Halysitinae MILNE-EDWARDS & HAIME, 1849b, p. 261, tribe] [=Schedohalysitinae HAMADA, 1957b, p. 401]

Halysitidae with interstitial coenenchymal tubuli between corallites or at junctions of ranks. *M.Ord.-?U.Ord.-U.Sil.*

Halysites FISCHER VON WALDHEIM, 1828, p. 15 [**Tubipora catenularia* LINNÉ, 1767a, p. 1270; OD; †neotype, 1, BROMELL Coll., PM, Uppsala; by THOMAS & SMITH, 1954, p. 797] [=*Alyssites* FISCHER VON WALDHEIM, 1813, p. 387, *nom. oblit.*]. Corallum with corallites rounded to elliptical in section, arranged uniserially in ranks that connect with one another to enclose longitudinal lacunae; corallites with thick walls and complete tabulae; septal ridges or septal spines weakly developed to absent; corallites within ranks separated by a single prismatic coenenchymal tubule, which is quadrangular and either square or oblong in section; at connections between ranks is a larger interstitial tubule of less regular section; within ranks, new corallites arise by expansion in diameter of coenenchymal tubule and subsequently a new coenenchymal tubule develops on each side of the offset; other new corallites may arise peripherally from the corallite at the end of a rank, a dividing tubule being subsequently developed; diaphragms in tubules horizontal, complete. *M.Ord.(up. Easton.)*, Australia (New S. Wales)-New Guinea (W.Irian); *L.Sil.-U.Sil.*, cosmop.——FIG. 429,*3a-e*. **H. catenularius* (LINNÉ), Sil., Gotl.; *a-c,* neotype, *a,* ext. view, ×1, *b,c,* long., transv. secs., ×4

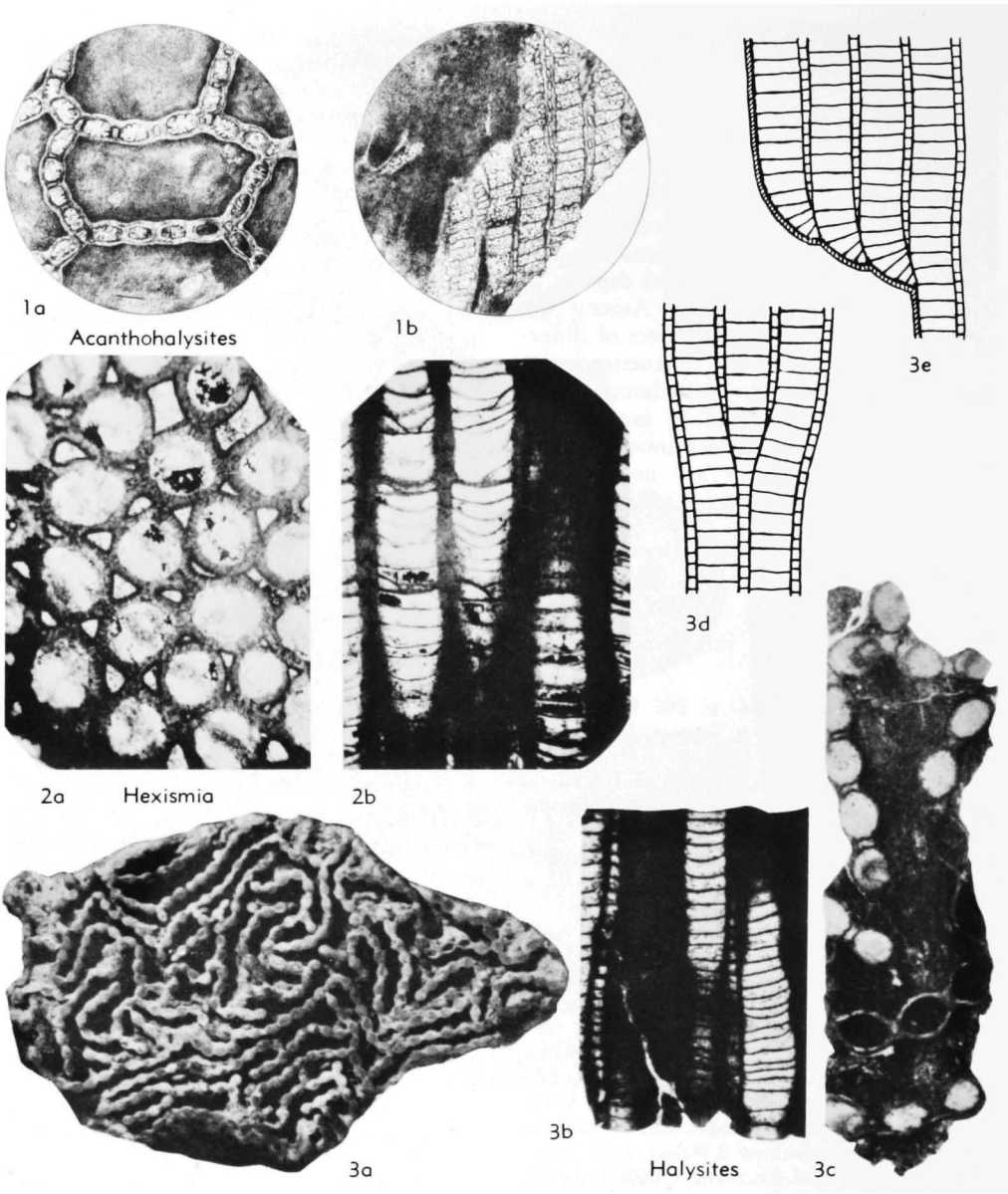


FIG. 429. Halysitidae (p. *F628-F629*).

(Thomas & Smith, 1954); *d,e,* diagr., interstitial and peripheral increase (Webby & Semeniuk, 1969).

Acanthohalysites HAMADA, 1957b, p. 404 [**Halysites australis* ETHERIDGE, 1898, p. 80; OD; syntypes F4727 (AM690), F3181 (AM691) missing, AM, Sydney] [KLAAMANN, 1966, p. 59, regards this genus as synonym of *Halysites* FISCHER VON WALDHEIM, 1828, from which it differs in having strongly developed septal spinules; it entered later (L.Sil.) than *Halysites* (M.Ord.)]. Corallum halysitoid; corallites elliptical to prismatic in section, with thick walls, commonly with 12 longitudinal rows of septal spinules and with horizontal or slightly curved tabulae; coenenchymal tubules within ranks quadrangular in section, with closely spaced horizontal diaphragms and lacking spines; tubules at junctions of three to four ranks triangular, triradiate, or quadrilateral in section. *L.Sil.-U.Sil.,* Australia(New S.Wales-Queensl.)-Eu.(Gotl.)-Asia (Sev. Zemlya-Japan-China)-N. Am.(Que.-Iowa-Wis.); *U.Sil.,* S.Am.(Venez.).——FIG.

429,*1a,b*. **A. australis* (ETHERIDGE), syntype, Sil., New S. Wales, 4 to 5 mi. N. of Molong, at the Bell R.; *a,b,* transv., long. secs., ×4 (Etheridge, 1904).

Cystihalysites CHERNYSHEV, 1941b, p. 70 [**C. mirabilis*; OD; †7, coll. 5957, TsGM, Leningrad]. Corallum halysitoid; corallites without or with sparse septal spinules; tabulae horizontal or concave; coenenchymal tubules with globose to subglobose diaphragms; new corallites in ranks develop within coenenchyme which continues to develop on each side of the offset [see WEBBY, 1975, p. 33]. *L.Sil.,* Asia(Yakutia)-N.Am.(B.C.); *Sil.,* N.Am.(Utah-Can.); *M.Sil.,* Eu.(Eng.-Gotl.); *U.Sil.,* Eu. (Podolia-Nor.)-N. Am. (Tenn.)-S. Am. (Venez.).——FIG. 430,*1a-d*. **C. mirabilis,* holotype, L.Sil., USSR, R. Khandyga, E. Verkhoyanya; *a,* transv. sec., *b-d,* long. secs., enl. (Chernyshev, 1941b).

Falsicatenipora HAMADA, 1958, p. 98 [**Halysites japonicus* SUGIYAMA, 1940, p. 131; OD; †39524, TohU, Sendai]. Corallum halysitoid, may be branching, with two to five corallites without interstitial tubules in a rank; ranks connected to enclose small longitudinal lacunae, a triangular tubule at most of junctions of ranks; septal elements absent or weakly developed; tabulae horizontal. *?U.Ord.,* N.Am.(Arctic Can.), Australia (Tasm.); *M.Sil.-U.Sil.,* Asia(Japan)-Australia(New S.Wales-Queensl.).——FIG. 431,*2a,b*. **F. japonica* (SUGIYAMA), U.Sil.(low.Ludlov.), Japan, Higutizawa in Kawauti, Kitakami Mts.; *a,b,* long., transv. secs., ×2.7 (Sugiyama, 1940).

Hexismia SOKOLOV, 1955, p. 517 [**Halysites compactus* ROMINGER, 1876, p. 79; OD; †8543, UMMP, Ann Arbor, lectotype by BUEHLER, 1955, p. 42] [=*Hexismia* SOKOLOV, 1949, p. 94, *nom. nud.; Densoporites* HAMADA, 1957b, p. 404 (type, *Halysites compactus* ROMINGER, 1876; OD)]. Corallum halysitoid, but with single corallite ranks, each corallite either in contact with several neighboring corallites or connected to them by coenenchymal tubules that may contain subglobose diaphragms or more commonly are almost filled by sclerenchyme (*fide* BUEHLER, 1955, p. 42); lacunae between ranks smaller than corallites; septa or septal spinules not observed; tabulae may be supplemented by peripheral tabellae. *Sil.,* N.Am.(Mich.); *L.Sil.-M.Sil.,* Asia(Kazakh.).——FIG. 429,*2a,b*. **H. compactus* (ROMINGER), lectotype, Sil., loose specimen, Mich., Epoufette Pt., Mackinac Co.; *a,b,* transv., long. secs., ×6 (Buehler, 1955).

Schedohalysites HAMADA, 1957b, p. 401 [**Halysites orthopteroides* ETHERIDGE, 1904, p. 25; †F45929 (AM4004-4005), AM, Sydney] [Possibly junior subjective synonym of *Halysites* FISCHER VON WALDHEIM, 1828; method of insertion of new corallites requires investigation; see WEBBY & SEMENIUK, 1969, p. 355.]. Like *Halysites* but

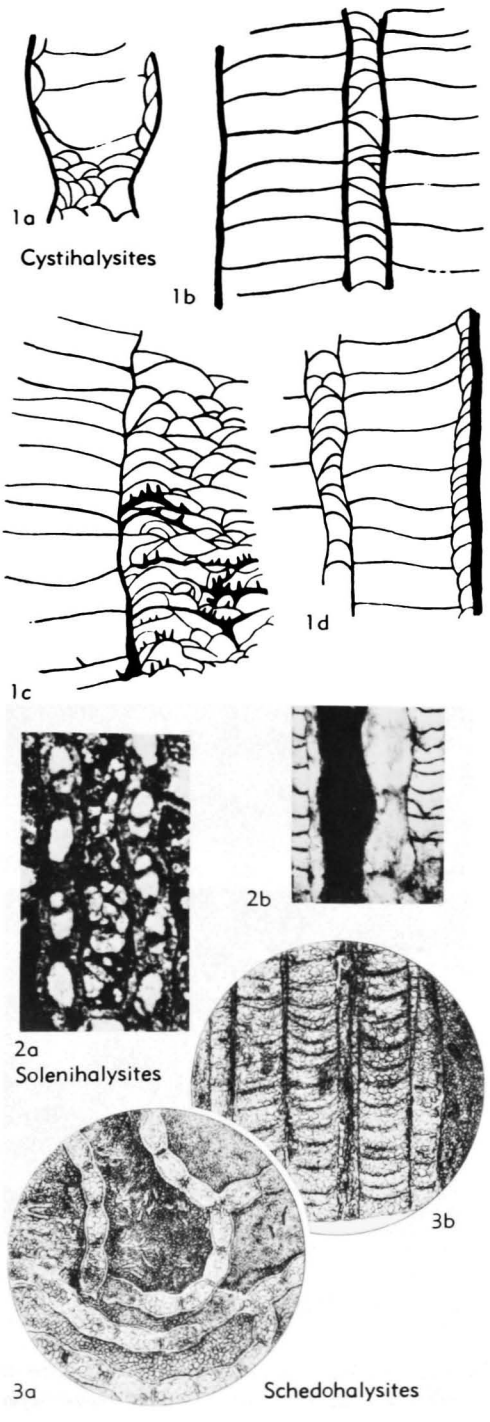


FIG. 430. Halysitidae (p. *F629-F630*).

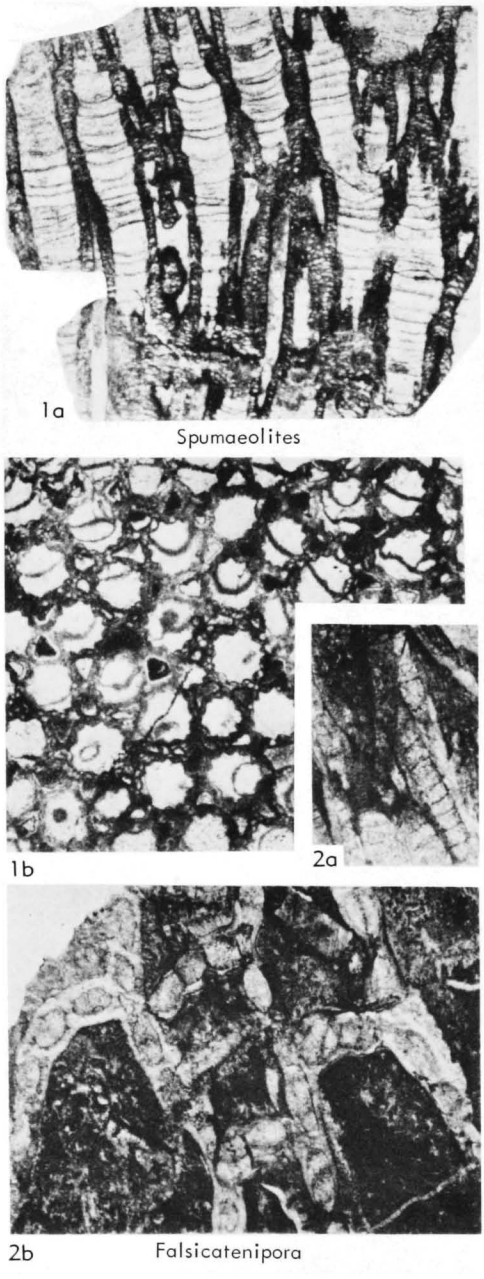


FIG. 431. Halysitidae (p. *F629-F630*).

with interstitial tubules absent in some parts of ranks and in some connections of ranks; septal spinules or ridges weakly developed to absent. *L.Sil.-M.Sil.*, Australia(New S.Wales)-Asia(Arctic-Vaygach I.-Japan-China-India); *?U.Sil.*, Australia (Queensl.).——FIG. 430,*3a,b*. **S. orthopteroides* (ETHERIDGE); holotype, L. Sil. (up. Llandov.), Quarry Cr. Ls.), New S. Wales, "Mirrabooka" nr. Orange; *a,b*, transv., long. secs., ×4 (Etheridge, 1904).

Solenihalysites STASINSKA, 1967, p. 59 [**S. norvegicus*; OD; †49378, PM, Oslo]. Corallum halysitoid; corallites oval in section with septal spines commonly weakly developed and horizontal tabulae; radially fibrous wall tissue common to neighboring corallites with very narrow, irregular longitudinal spaces imparting a spongy texture and crossed by very sparse, horizontal diaphragms. *M. Sil. (Wenlock.)-U. Sil. (Ludlov.)*, Eu. (Nor.-Swed.).——FIG. 430,*2a,b*. **S. norvegicus*, holotype, M.Sil., Nor., Holmestrand, Langøy; *a,b*, transv., long. secs., ×6 (Stasinska, 1967).

?Spumaeolites ZHIZHINA, 1967, p. 118 [**S. sokolovi*; OD; †1, coll. 8742, TsGM, Leningrad]. Tabularia of neighboring corallites separated by coenenchyme of very small globose to subglobose plates as in *Cystihalysites* and throughout the corallum in some *Plasmoporella*, except that up to seven narrow irregular longitudinal lacunae may be left around any tabularium; epitheca? covers dissepimental tissue in lacunae; there are commonly 12 dissepimentate projections into each tabularium; septal elements lacking; tabulae horizontal or slightly saucered. [Only one specimen, placed by ZHIZHINA (1967, p. 118) in Hexismiidae SOKOLOV, 1950a, p. 174. Nature of lacunae described by ZHIZHINA (1967, fig. b) suggests origin by boring or commensal; if so, specimen probably a proporican.] *L.Sil.(Llandov.)*, Asia(Taymyr).——FIG. 431,*1a,b*. **S. sokolovi*, holotype, between Tolmachev (Brody) R. and Bunga R., right side of valley of R. Lower Taymyr; *a,b*, long., transv. secs., ×2.8 (Zhizhina, 1967).

Order AULOPORIDA Sokolov, 1947

[*nom. correct.* SOKOLOV, 1962c, p. 241, *ex* Auloporacea SOKOLOV, 1947c, p. 19, order, as Auleporacea, misprint] [incl. Zoantharia Tubulosa MILNE-EDWARDS & HAIME, 1851, p. 159, section; Syringoporacea SOKOLOV, 1947c, p. 19, order; Syringoporida SOKOLOV, 1962c, p. 234, order; Thecostegitina LIN, 1963b, p. 27]

Corallum fruticose with proximal corallites commonly prostrate or adherent; from them erect corallites or branches may arise; corallites tubular, cornute or cylindrical or in places contiguous and prismatic, when mural pores may or may not develop; connecting tubuli present in Syringoporicae; septa represented by longitudinal rows of commonly fine spines; tabulae very sparse or even absent to numerous, complete or incomplete, with syrinx in most Syringoporicae; increase lateral and commonly basal. *L.Ord.-U.Perm.*

Superfamily AULOPORICAE Milne-Edwards & Haime, 1851

[*nom. transl.* Hill, herein, *ex* Auloporidae Milne-Edwards & Haime, 1851, p. 310] [=Zoantharia Tubulosa Milne-Edwards & Haime, 1851, p. 159, section; Auloporacea Sokolov, 1947c, p. 19, order; Auloporina Sokolov, 1950a, p. 171, suborder; Auloporida Sokolov, 1962c, p. 241, order]

Corallum commonly small, highly variable in form; increase basal, lateral, rarely calicular, peripheral; after increase parent commonly grows but slightly; corallum proximally prostrate; in some only the calices rise above substrate; in others cylindrical corallites rise free of substrate, give rise to no or few further offsets and are not connected by tubuli; in others, free branches arise from the prostrate parts and continue to show lateral increase; commonly the lumen of an offset is continuous with the lumen of the parent at the point of origin; sparse mural pores may be found where adult corallites are contiguous; septa more or less well developed as longitudinal rows of fine spinules; tabulae very sparse or ?absent to profuse, and complete or incomplete, a syrinx may develop in Aulocystidae. *L. Ord.-U.Perm.*

Family AULOPORIDAE Milne-Edwards & Haime, 1851

[Auloporidae Milne-Edwards & Haime, 1851, p. 310] [=Auloporiens de Fromentel, 1861, p. 318]

Colonies small, reptant or encrusting with the entire lower surface adherent to substrate; corallites reptant in chains, or anastomosing, more or less closely adpressed and united in a common basal sheet; calices slightly raised and trumpet- or barrel-shaped, with smooth margins; septal spinules present or absent, tabulae absent or sparse and oblique and slightly concave; mural pores present in some; offsets connected laterally with base of calice, in some arising initially from calical surface of thick wall (Stasinska, 1974, p. 266); parent corallites cease to grow after development of offset. *L.Ord.-U.Perm.*

Aulopora Goldfuss, 1829, p. 82 [**A. serpens* Goldfuss, 1829; SD Milne-Edwards & Haime, 1850, p. lxxvi; †original of Goldfuss, 1829, pl. 29, fig. 1b, which is 202, Goldfuss Coll., IP, Bonn, missing *fide* Lecompte, 1936, p. 83; lectotype by Lang, Smith, & Thomas, 1940, p. 24; M.Dev., Bensberg or the Eifel; =*Aulopora repens* Milne-Edwards & Haime, 1851, p. 312; see Lang, Smith, & Thomas, 1940, p. 24, for discussion of homonymy]. Corallum reptant, low, commonly adherent; corallites cornute, joined in linear chains or anastomosing; calices slightly raised above substrate, conical or barrel-shaped; walls moderately thick; septal spinules present or absent; tabulae commonly absent, or sparse and oblique; increase basal-lateral; offsets originate on calical surface of wall. [Type species insufficiently known.] *Ord.*, Eu.(Baltic)-Asia(Irkutsk); *Sil.-Perm.*, cosmop.——Fig. 432,*1a.* **A. serpens*, lectotype (=*A. repens* Milne-Edwards & Haime), M.Dev., Bensberg of the Eifel, Ger.; ext. view, ×1.0 (Goldfuss, 1829).——Fig. 432,*1b-e. A. serpens minor* Goldfuss, M.Dev.(Couvin.), Pol., Holy Cross Mts.; *b*, fragment of a colony, ×5.0 *c*, cross section showing radial structure of wall, ×30.0, *d,e*, thin secs. showing formation of young corallites, ×30.0 (Stasinska, 1974).

Aulocaulis Fenton & Fenton, 1937b, p. 119 [**Aulopora expansa* Fenton & Fenton, 1924, p. 67; OD; †UC26021, FM, Chicago]. Corallum prostrate, linear or reticulate, adherent; bifurcations of chains not numerous; corallites thin-walled, long and narrowly tubular from base to calice, then expanding abruptly to form circular, vertically directed calices with diameter much larger than that of tubular portions; tabulae few or absent; septal ridges in calice; increase lateral and through base of calice. *U.Dev.(Frasn.)*, N.Am.(Iowa-N.Y.)-?Australia(W.Australia).——Fig. 432,*3.* **A. expansus* (Fenton & Fenton), holotype, Hackberry Stage; ext. view, ×0.9 (Hill & Stumm, 1956).

?Auloporella Grubbs, 1939, p. 549 [**A. typa*; OD; †UC46022, FM, Chicago]. Reptant network of trumpet-shaped corallites with vertically directed calices; tabellae dissepimentlike, producing in places a double wall; offsets retain communication with parent; complete tabulae and septal spinules ?lacking. [Possibly an aulocystid.] *Up. L.Sil.-low.M.Sil.*, N.Am.(Ill.-B.C.).——Fig. 432, *2a,b.* **A. typa*, syntypes, ?Racine F, Ill., Chicago; *a*, long. sec., *b*, side view, both ×2.5 (Grubbs, 1939).

Aulozoa Grubbs, 1939, p. 549 [**A. constricta*; OD; †UC46024, FM, Chicago]. Corallum attached by limited portions of lower surface; composed of tortuous, tubular corallites of nearly uniform diameter; one to six new corallites may be added within a short distance at any position about the parent, diverging somewhat but growing forward and bending slightly upward near calical end; offsets communicating with parents through small circular orifice at point of origin; calices circular; tabulae ?lacking; septal spinules few, short. *Sil.*, N.Am.(Ill.).——Fig. 432,*5.* **A. constricta*, holotype, Niag. dol., Ill., Chicago; side view, ×4.5 (Grubbs, 1939).

Diorychopora Davis, 1887, explanation to pl. 74,

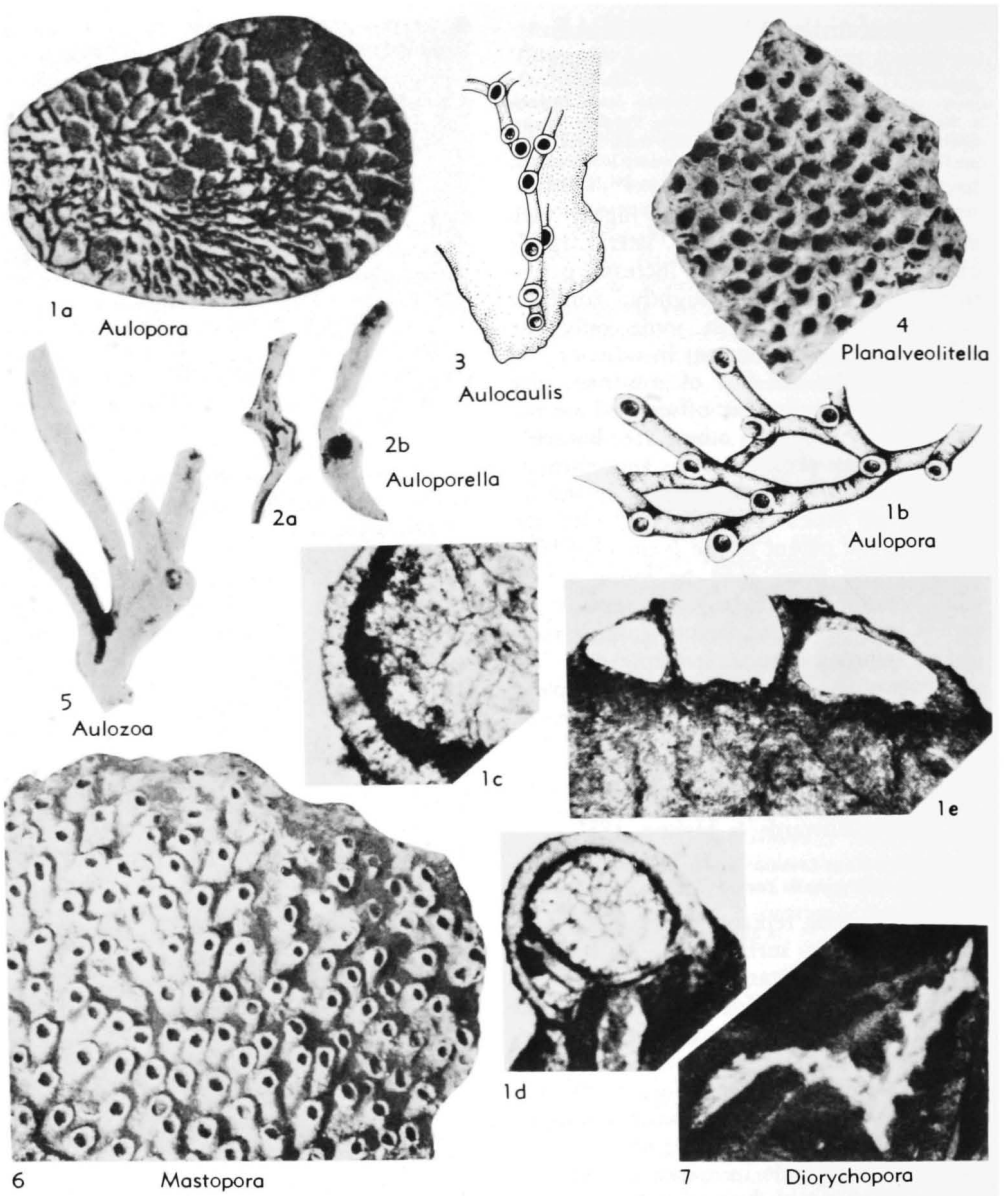


FIG. 432. Auloporidae (p. *F631-F633*).

fig. 6 [**D. tenuis*; M; †8864, MCZ, Cambridge]. Corallum of delicate, bifurcating, frondlike stems, each composed of reptant, adherent, biserially arranged, very small corallites attached along one side and very slightly expanding with circular calices directed obliquely to surface of stem; tabulae ?absent [see STUMM, 1965, p. 81]. *Sil.*, N.Am. (Ind.-Ky.).——FIG. 432,7. **D. tenuis*, monotype, Louisville Ls., third quarry on Beargrass Cr., Ky., Louisville; ext. view, ×2.0 (Davis, 1887).

Mastopora SOKOLOV, 1952b, p. 155 [**Aulopora compacta* CHERNYSHEV, 1941c, p. 122; OD; †11, coll. 121, PIN, Moscow]. Corallum of densely adpressed reptant corallites which fuse into continuous encrusting sheets; successive sheets may form globular masses; increase lateral; offsets originate on calical surface of wall, calices slightly raised, mammilliform, with small aperture; walls thick, mural pores present in some; septal spines may be well developed; tabulae complete, in places

may be almost infundibuliform [see STASINSKA, 1974, p. 267]. *M.Sil.(Wenlock.)*, Eu.(Est.); *M. Dev.-U. Dev. (Frasn.)*, Eu. (Pol.-Ger.-Russ. Platf.-Urals)-Asia(Kuzbas)-N.Am.(Iowa).——FIG. 432, *6. *M. compacta* (CHERNYSHEV), holotype, U.Dev., Svinord beds, Russ. Platf., loc. not precisely established; ext. view, ×2.0 (Chernyshev, 1941c).

?**Planalveolitella** STUMM, 1967, p. 69 [**P. parasitica*; OD; †no. 53043, UMMP, Ann Arbor]. Corallum encrusting, thin, flat, of one layer of oblique corallites with large lunate or oval calices; corallites may be more crowded and less oblique in some species; tabulae and mural pores lacking. [Type species encrusts nautiloids.] *M.Dev.(Hamilton)*, N.Am.(Ohio-Mich.-Wis.).——FIG. 432,*4. *P. parasitica*, holotype, Silica Sh., Unit 9, Ohio, quarry of the Medusa Portland Cement Co. at Silica, 1.5 mi. SW. of Sylvania, Lucas Co.; distal view, ×2.0 (Stumm, 1967).

Family BAJGOLIIDAE Hill, new family

Corallum dichotomously branching; corallites prismatic or cylindroprismatic, diverging fanwise from axis of branch to open obliquely to surface; walls thickening evenly and very slightly from axis to periphery of branch; septal spines ?absent; tabulae absent or ?sparse; mural pores absent. *M.Ord.-U.Ord.*

Only tentatively included in Auloporicae; except for the absence of mural pores and tabulae it might be considered ancestral to the Pachyporicae and referred to the Favositina.

Bajgolia DZYUBO, 1962, p. 154 [**B. altaica*; OD; †44 (2), coll. 901, SNIIGGIMS, Novosibirsk]. Corallum dichotomously branching; increase ?adaxial, ?bipartite; corallites diverging fanwise from axis of branch to open obliquely to surface and polygonal or polygonal-rounded in section; calices goblet-shaped or inversely conical with thin edges; walls thickening evenly and very slightly from axis to periphery of branch; median suture of wall distinct; septal spines not observed; tabulae absent to ?sparse; mural pores absent. *M.Ord.-U.Ord.*, Australia(Tasm.-New S.Wales); *U.Ord.*, Asia (Altay).——FIG. 433,*2a,b. **B. altaica*, holotype, U.Ord., USSR, Baygol Cr., 1 km. above junction with R. Kayna, Altay; *a,b*, tang., long. secs., ×4.0 (Dzyubo, 1962).

Family KOZLOWSKIOCYSTIIDAE Stasinska, 1969

[*nom. correct.* HILL, herein, *ex* Kozlowskiocystidae STASINSKA, 1969, p. 554, *nom. subst. pro* Kozlowskiidae STASINSKA, 1958, p. 221, founded on invalid generic name]

Corallum encrusting, adherent by entire lower surface; increase intracalicular, peripheral; corallites conical, prostrate, united in dichotomizing chains that do not anastomose; calices raised slightly above substrate; walls thick, distally the stereozone is disrupted by peripheral tabellae, notably on the underside of the corallite; septal spinules sparse to absent; mural pores absent. *M.Dev.*

Kozlowskiocystia STASINSKA, 1969, p. 554, *nom. subst. pro Kozlowskia* STASINSKA, 1958, p. 222, *non Kozlowskia* FREDERIKS, 1933, a brachiopod [**Kozlowskia polonica* STASINSKA, 1958, p. 222; OD; †501, PZI, Warsaw]. Corallum reptant, adherent by entire lower surface; increase calicular, peripheral; corallites conical, prostrate, united in the form of dichotomizing chains that do not anastomose; calices raised a little above substrate and wide, with smooth edges; walls thick; stereozone distally disrupted by peripheral tabellae, notably on under side; septal spinules ?absent; tabulae few, irregular, in proximal parts of corallite only. *M.Dev.(Couvin.)*, Eu.(Pol.).——FIG. 433,*1a-i. **K. polonica; a*, holotype, Grzegorzowice, ext. view, ×2.0; *b,c*, ?other specimens, oblique long., transv. secs., ×8.0, ×12.5 (Stasinska, 1958); *d-i*, serial transv. secs. through corallite showing origin of two new offsets by peripheral increase, ×30 (Stasinska, 1969).

Family FLETCHERIELLIDAE Sokolov, 1965

[Fletcheriellidae SOKOLOV, 1965, p. 7]

Corallum fasciculate; increase lateral; corallites large, cylindrical; wall moderately thin, concentrically laminated; connecting tubuli absent; septal spines short, immersed in sclerenchyme of wall; tabulae numerous, horizontal, in places incomplete, in some, absent. [Description of wall structure suggests Auloporicae rather than the sarcinulinan Lyoporinae.] *U.Ord.-M.Sil.; M.Dev.*

Fletcheriella SOKOLOV, 1955, p. 227 [**F. evenkiana*; OD; †87, coll. 599, VNIGRI, Leningrad] [?=*Quasifletcheriella* YANG, KIM, & CHOW, 1978, p. 223 (type, *Q. longispinosa* YANG in YANG, KIM, & CHOW, 1978, p. 223, OD; †Gct 642-644, GB, Guiyang; L.Sil., Shiniulan F., Xishui Xian (county), Guizhou (Kweichow)]. Characters as for family. *U.Ord.*, Asia(USSR); *L.Sil.*, Asia (Kweichow).——FIG. 434,*1a,b. **F. evenkiana*, holotype, Dolbor., basin of R. Stony Tunguska; *a,b*, long., transv. secs., ×2.3 (Sokolov, 1962c).

Eofletcheriella LIN & CHOW, 1977, p. 154 [**E. primitiva*; OD; †J-21-66, AGS, Peking]. Corallum partly fasciculate, partly cerioid; epitheca possibly wrinkled transversely; corallites large; walls mod-

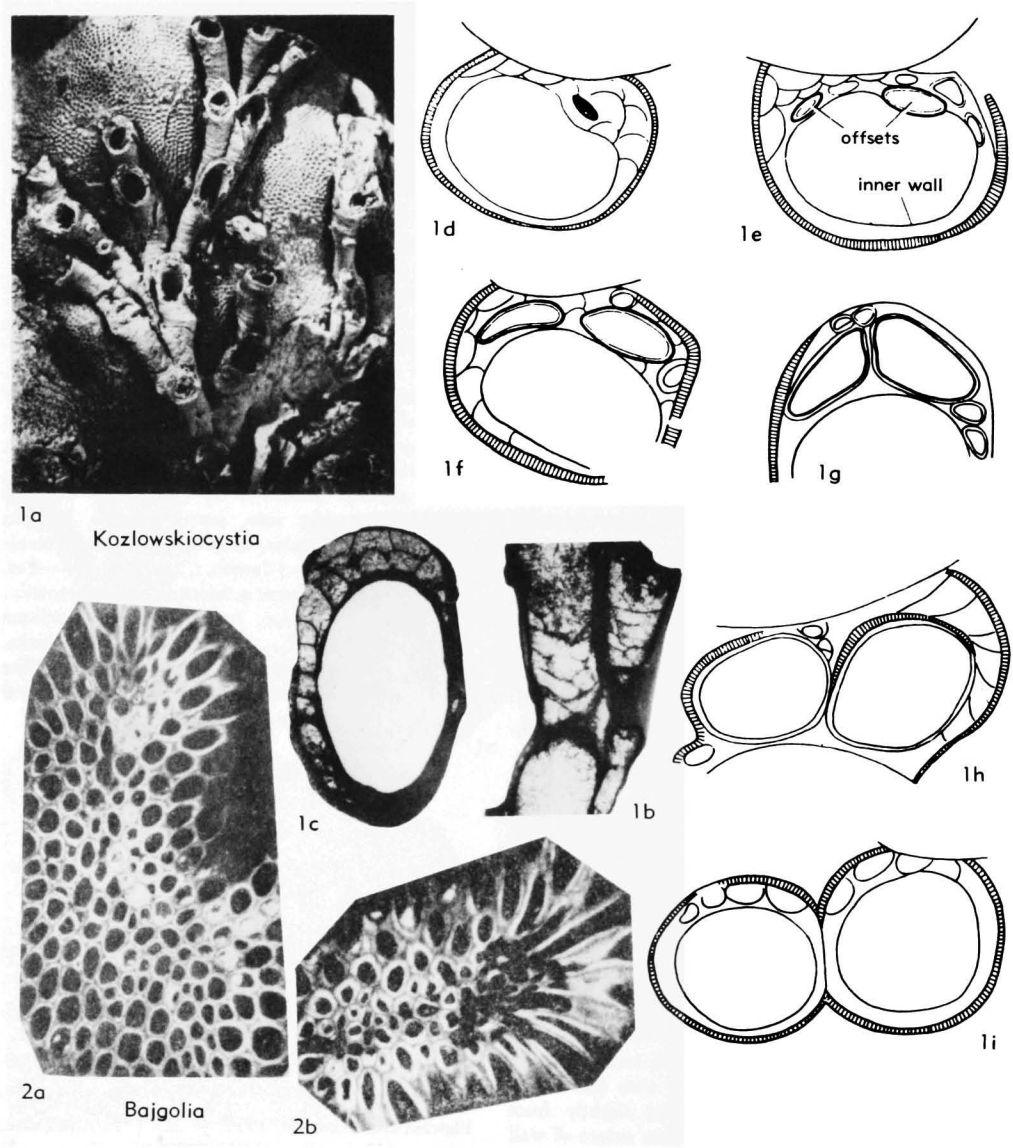


FIG. 433. Bajgoliidae (2); Kozlowskiocystiidae (1) (p. *F633*).

erately thick, mural pores not observed; acanthine septa numerous, the axial ends of spines projecting slightly from wall; tabulae absent. [Diagnosis tentative, translation unsure.] *U.Ord.(Ashgill.)*, Asia(Kiangsi).

Neofletcheriella LIN (MS) in LI *et al.*, 1975, p. 219 [**N. cystosa*; OD; †G-N79-24, AGS, Peking; M. Sil., Ningqiang, Shensi]. Bushy, corallites large, with thick wall and short septa ?(spines); tabular floors flat or concave; tabulae mostly complete, a single imperfect series of peripheral dissepiment-like plates in larger corallites. [Diagnosis tentative, from illustrations.] *M.Sil.*, Asia(Shensi).

Pseudofletcheria CHI, 1976, p. 122 [**P. fundibula*; OD; †9H1137$_1^a$, ?IGMR, Shenyang; low.M.Dev., Dong Ujimqin Qi, NE. Inner Mongolia]. Fasciculate, ?(without connecting tubuli or mural pores); corallites cylindrical and large, wall thick; septal spines moderately long; tabulae complete, horizontal or oblique or rarely infundibuliform; increase lateral. [Diagnosis tentative; from illustrations.] *M.Dev.*, Asia(Inner Mongolia).

Family PYRGIIDAE de Fromentel, 1861

[*nom. correct.* Hill, herein, *pro* Pyrgiens de Fromentel, 1861, p. 318] [=Moniloporidae Grabau, 1899, p. 409; Cladochonidae Hill, 1942d, p. 68; Moniliporidae Sokolov, 1950a, p. 171, *nom. van.*]

Colonies branchlike, small, proximally reptant or slightly raised above substrate; erect branches may arise from basal ring; corallites broadly conical, short, cornute; calices large, funnel-shaped, elevated, with sharp edges; offsets diverge consecutively in opposite directions; total dichotomy sometimes present; wall an epithecate peripheral stereozone with characteristic ?secondary lamellae or reticulate microstructure; septal spinules and tabulae commonly lacking in narrow lumen, but septal ridges may appear in calice; mural pores present in some. *U.Sil.; M.Dev.-U.Perm.*

Cladochonus McCoy, 1847, p. 227 [**C. tenuicollis*; SD Milne-Edwards & Haime, 1850, p. lxxvi; †A8003, W. B. Clarke Coll., SM, Cambridge; lectotype by Hill & Smyth, 1938, p. 128] [=*Pyrgia* Milne-Edwards & Haime, 1851, p. 310 (type, *P. michelini,* SD Hill & Smyth, 1938, p. 126; syntypes, 43 fragments, Z168a,b, MN, Paris; L.Carb., Tournai, Belg.); *Monilopora* Nicholson & Etheridge, 1879, p. 293 (type, *Jania crassa* McCoy, 1844, p. 197, M; †81A,B, 1925, Griffith Coll., NM, Dublin; lectotype chosen and figured Hill & Smyth, 1938, pl. 22, fig. 1; L.Carb., St. John's Pt., Co. Donegal, Eire); *Monilipora* Lang, Smith, & Thomas, 1940, p. 86, *nom. van.*]. Proximal parts of corallum prostrate, annular when attached to crinoid stem; distal parts of corallum erect branches that may fork; corallites commonly opening through wall near base of calice of parent; wall moderately thick, in some states of preservation including holacanthine spinules; in other states ?growth lamellae of sclerenchyme of wall may be slightly separate and connected by granules; tabulae absent or sparse [see Roberts, 1963, p. 7; Hamada, 1973, p. 33]. *M.Dev.-U. Dev.,* Eu.(Ger.)-N.Am.(N.Y.); *Carb.-Perm.,* cosmop.——Fig. 435,*2a-e.* **C. tenuicollis,* lectotype, Carb., New S. Wales, Dunvegan, Paterson R.; *a,* ext. view, ×2.0; *b-e,* syntypes, thin secs., ×4.0 (Hill & Smyth, 1938).——Fig. 435,*2f. C. crassus* (McCoy), lectotype, ext. view, ×2.0 (Hill & Smyth, 1938).

?Amniopora Sokolov, 1955, p. 217 [**A. lata*; OD; †77, coll. 599, VNIGRI, Leningrad] [=*Amnipora* Flügel, 1970, p. 12, *nom. null.*]. Solitary, very small, broadly conical; base narrow, curved, with one side attached to substrate; calice rising free from substrate, funnel-shaped with sharp edges; wall thick; no tabulae or septal spinules. *U.Carb.(Moscov.),* Eu.(Moscow Basin).——Fig. 435,*5.* **A. lata,* holotype, up. part Myachkovo horizon, lower reaches of R. Moskva, R. Medvedka; ext. view, ×1.5 (Sokolov, 1955).

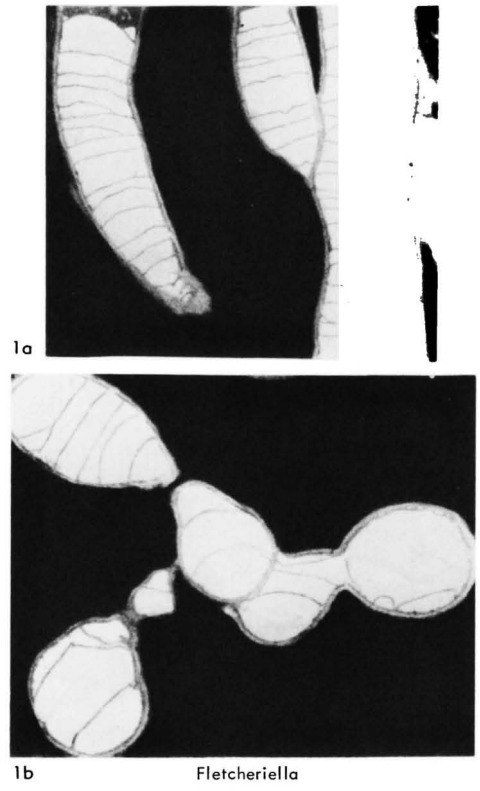


Fig. 434. Fletcheriellidae (p. *F633*).

Bainbridgia Ball, 1933, p. 239 [**B. typicalis*; OD; †UC37782, FM, Chicago]. Corallum of flattened cylindrical ?branches; corallites short, cornute, uniformly spaced, opening on opposite sides in regular alternation; walls thick, faint radial ?septal ridges in calices of some; tabulae ?absent. *U.Sil.(low.Ludlov.),* N.Am.(Mo.).——Fig. 435, *3a,b.* **B. typicalis,* ?holotype; *a,b,* side view, long. sec., ×5.0 (Hill & Stumm, 1956).

Bibucia Roberts, 1963, p. 6 [**B. tubiformis*; OD; †F5366, UNE, Armidale]. Corallum branching with slender stems, each stem biserial with two contiguous, opposite, alternating rows of thick-walled, small, trumpet-shaped corallites, the rows connected by mural pores; a new corallite arises from immediately below calice, on upper side of parent; branches arise at irregular intervals and from below calice on under side of parent. [Differs from *Bainbridgia* Ball, 1933, by presence of mural pores.] *L.Carb.(Tournais.),* Australia(New S. Wales).——Fig. 435,*4a,b.* **B. tubiformis,* holotype, Lewinsbrook, New S. Wales; *a,b,* ext. view, diagram. long. sec. of stem and branch, ×4.0 (Roberts, 1963).

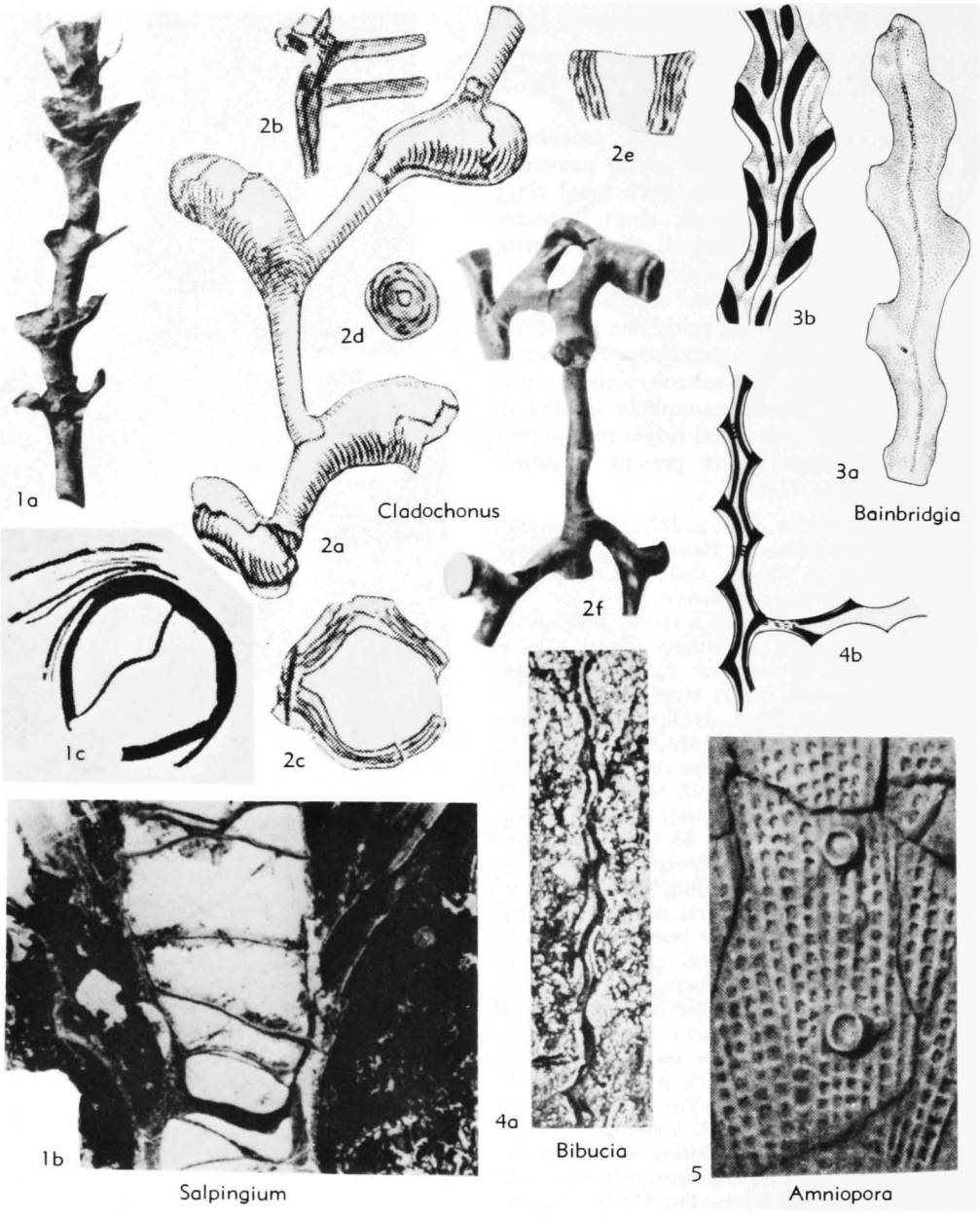


FIG. 435. Pyrgiidae (p. *F635-F636*).

?Salpingium SMYTH, 1928, p. 39 [**S. palinorsum*; OD; †T153/1007, TC, Dublin]. Corallum tubular, with periodic platformlike ?(calical edge) expansions; wall a slender stereozone enclosing ?septal spinules; upper surfaces of ?calicular platforms with radial ?septal ridges; tabulae complete, subhorizontal. *L.Carb.(up.Tournais.)*, Eu.(Eire). ——FIG. 435,*1a-c*. **S. palinorsum*, holotype, Eire, 250 yds. N. of lighthouse, Hook Hd., Co. Wexford; *a*, ext. view, ×0.8; *b*, long. sec., ×4.0; *c*, transv. sec., ×4.0 (Smyth, 1928).

?Family TRACHYPSAMMIIDAE Gerth, 1921

[*nom. correct*. LECOMPTE, 1952, p. 517, *pro* Trachypsammidae GERTH, 1921, p. 113] [=Trachypsammiacea MONTANARO-GALLITELLI, 1955, as order of Anthozoa Octocorallia, *nom. correct*. MONTANARO-GALLITELLI, 1956, p. *F190*, *pro* Trachypsammacea MONTANARO-GALLITELLI, 1955, p. 224]

Corallum branching; an axial *Cladochonus*-like part is surrounded by ?coenenchyme resembling hydrozoan or stromatoporoid. *Perm.*

Trachypsammia GERTH, 1921, p. 113 [**T. dendroides*; M; syntypes, 43, WANNER Coll., IP, Bonn, and 11804, TH, Delft; HEHENWARTER, 1951, p. 68, invalidly named as holotype 2 specimens from different localities]. Corallum small, branched; corallites not numerous, with elevated calices arranged in two rows on opposite sides of branch; remaining surfaces of branch a characteristic sclerenchyme with surface granules and ridges continued in depth; septal elements (ridges) continued some distance into intercalical sclerenchyme; no tabulae; coenenchyme pierced by canals opening into pores scattered within and outside calices. [Possibly a *Cladochonus* in symbiosis with a stromatoporoid or hydrozoan.] *U.Perm.*, Asia (Timor)-Eu.(Sicily).——FIG. 436,*1a-d*. *T. dendroides*, Basleo., Timor; *a*, ext. view, ×1.3; *b*, calice, ×2.7; *c*, transv. sec. of branch, ×2.7; *d*, from Bitauni, Timor, tang. sec. of branch, ×1.3 (Gerth, 1921).

?"Dictyopora" GERTH, 1921, p. 123, *non Dictyopora* STEININGER, 1849, p. 10, a bryozoan, *nec Dictyopora* MACGILLIVRAY, 1869, a recent bryozoan [**D. incrustans*; M; †52, WANNER Coll., IP, Bonn]. Encrusting; ?corallite openings rimmed by numerous fine ?septal ridges, and separated by skeletal tissue with scattered mural pores; tabulae absent. *Perm.*, Asia(Hatu Dame, Timor).

Oculinella YAKOVLEV, 1939, p. 631 [**O. gerthi*; M; †? in coll. 6111, TsGM, Leningrad]. Differs from *Trachypsammia* in having calices more or less evenly spaced over whole surface of branch; calical edges sharp, slightly raised; septal elements not evident; ?coenenchyme with granulated and striated surface. *L.Perm.(up.Artinsk.)*, Eu.(Donbas-Krasnoufimsk).

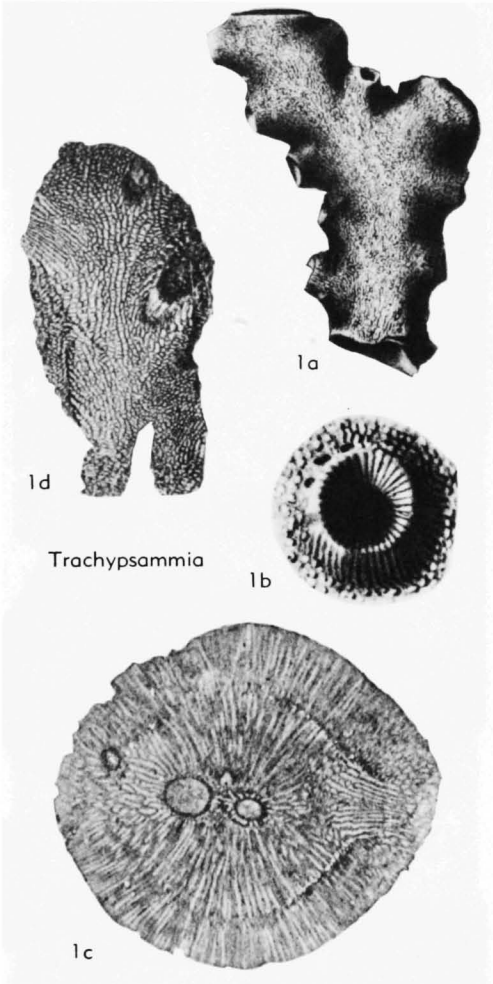


FIG. 436. Trachypsammiidae (p. *F637*).

Family AULOHELIIDAE Sokolov, 1950

[Auloheliidae SOKOLOV, 1950a, p. 172]

Small coralla proximally encircling crinoid stems or encrusting other skeletons, distally with branches rising suberect from the ring; calices circular, margins may rise high above surface of corallum, each surrounded by its own tumid mass of sclerenchyme beyond edge of calice; increase basal. [See HEHENWARTER, 1951, p. 80. Further investigation of type material needed to consider possibility of commensalism.] *U.Perm.*

Aulohelia GERTH, 1921, p. 119 [**A. irregularis*; SD LANG, SMITH, & THOMAS, 1940, p. 24; †11809, TH, Delft; ?lectotype by HEHENWARTER, 1951, p. 80]. Characters as for family. *U.Perm.*, Asia (Timor).——FIG. 437,*4a,b*. **A. irregularis*, Basleo; *a*, ext. view, ×1; *b*, another specimen, long. sec., ×4 (Gerth, 1921).

Family ROMINGERIIDAE Sokolov, 1950

[Romingeriidae SOKOLOV, 1950a, p. 172]

Corallum small, raised above substrate and variously fasciculate; corallites long, cylindrical, adult diameter uniform; offsets arise in regular verticils of up to 12, or as less symmetrical bundles, and may continue growing in close contact with parent and one another, or may diverge, simultaneously or consecutively; protocorallites vermiform, adherent; isolated mural pores may appear at points of initial contact between corallites and rarely between adult corallites; septal

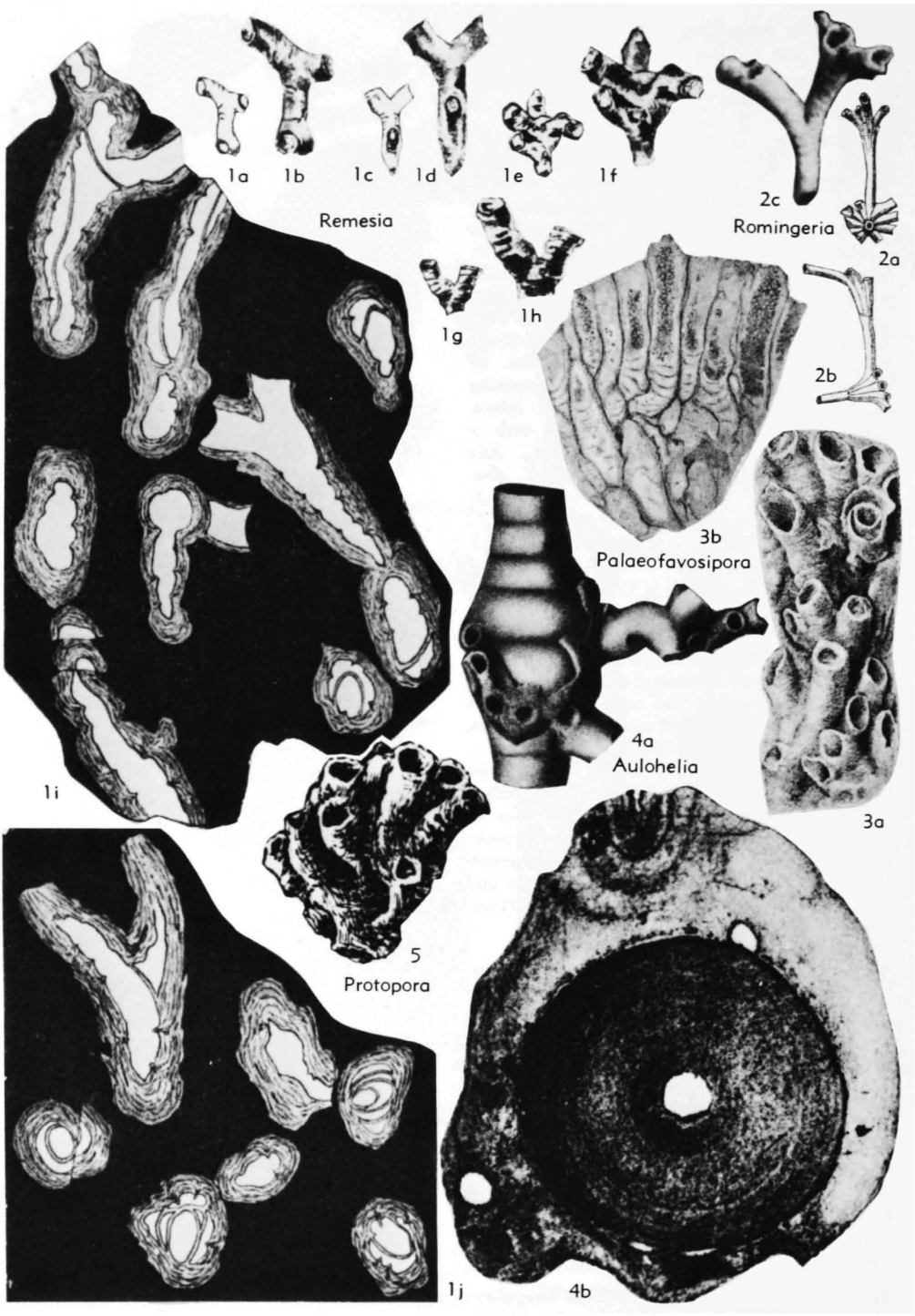


FIG. 437. Auloheliidae (4); Romingeriidae (1, 2, 5); Palaeofavosiporidae (3) (p. *F637-F641*).

spinules present; tabulae ?absent or sparse and horizontal or oblique; increase lateral. *?L.Sil.-U.Sil.; M.Dev.; ?L.Miss.-U.Miss.*

Romingeria NICHOLSON, 1879, p. 114, *nom. subst. pro Quenstedtia* ROMINGER, 1876, p. 71, *non Quenstedtia* MORRIS & LYCETT, 1854, a Jurassic bivalve [**Aulopora umbellifera* BILLINGS, 1859b, p. 119; OD; syntypes 3402a-d, GSC, Ottawa]. Corallum shrublike, attached basally; increase lateral, offsets arising from parent in verticils of from 5 to 12, commonly 12; corallites long, cylindrical; mural pores may be present where corallites are contiguous; tabulae complete; septal spinules of variable development, up to 12 longitudinal rows [see BEECHER, 1903, p. 3]. *?L.Sil.(up.Llandov.),* Eu.(Est.); *M.Sil.,* N.Am.(B.C.-Ind.-Ky.); *M.Dev. (Onondag.),* N.Am.(Ont.-Ohio-Mich.-N.Y.-Ky.)-?Australia(Queensl.).——FIG. 437,*2a-c.* **R. umbellifera* (BILLINGS), syntype, "Corniferous Ls.," Ont., Port Colborne; *a,b,* ext. views, ×1 (Billings, 1859b); *c,* another specimen, "Corniferous" drift, ext. view, ×2 (Rominger, 1876).

Ainia LELESHUS, 1974a, p. 593 [**A. varians*; OD; †69/25, coll. 1057, UpG, Dushanbe]. Corallum bushy; corallites commonly separated and cylindrical, in places in contact forming either chain or small cerioid segment; walls epithecate, moderately thick; mural pores developed between contiguous corallites; septal elements very weakly developed, fine spines; tabulae thin, complete or rarely incomplete, horizontal or oblique or concave or convex; increase lateral. *U.Sil.(Ludlov.),* Asia(Tadzhik.).——FIG. 438,*1a,b.* **A. varians,* holotype, Dalyan horizon, N. slope Turkestan-Gissar Ra., right bank R. Lyaylyak; *a,b,* transv., long. secs., ×2.7 (Leleshus, 1974a).

Protopora GREENE, 1904, p. 169 [**Romingeria cystoides* GRABAU in GREENE, 1901, p. 52; OD; syntypes 23634, 23635, AMNH, New York]. Corallum small, bushy; corallites elongate-conical; increase nonparricidal by verticils of three or more offsets that grow upward closely adherent to parent corallite for most of their length, connected by mural pores; septal spinules ?absent; tabulae unequal. *U.Miss.,* N.Am.(Ind.).——FIG. 437,*5.* **P. cystoides* (GRABAU), syntype, St. Louis gr. (Warsaw div.), Ind.; ext. view, ×? (Greene, 1901).

?Remesia KETTNER, 1934, p. 11, as *Remešia,* Eng. transl. KETTNER, 1937, p. 16 [**R. tubulosa*; OD; †in REMEŠ Coll., Charles Univ., Prague]. Corallum ?recumbent, composed of sparse, slender cylindrical corallites, straight or irregularly bent and laterally giving off offsets of somewhat smaller diameter that quickly attain equal diameter; calices slightly raised; walls thick, of lamellate sclerenchyme with septal spinules, tabulae concave, ?may be incomplete. *M.Dev.(Givet.),* Eu.(Czech.); *?L. Carb.,* Asia(Szechuan).——FIG. 437,*1a-j.* **R. tubulosa,* Givet., Celechovice; *a-h,* fragments, ×1 and enl.; *i,j,* oblique transv., long. secs., ×4 (Kettner, 1937).

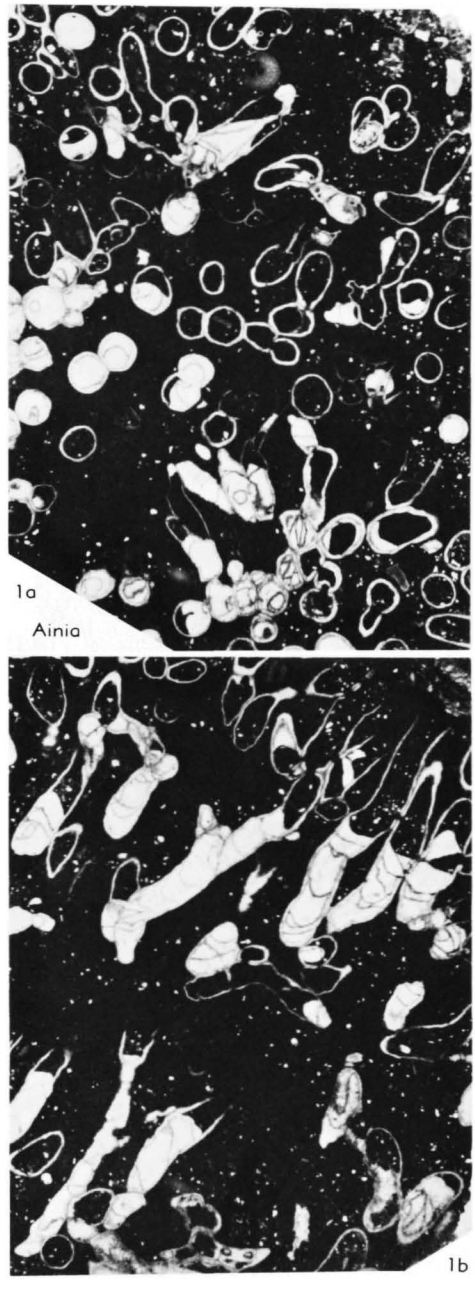


FIG. 438. Romingeriidae (p. *F639*).

?Family PALAEOFAVOSIPORIDAE Stasinska, 1976

[Palaeofavosiporidae STASINSKA, 1976, p. 365]

Corallites cylindrical, thick-walled and

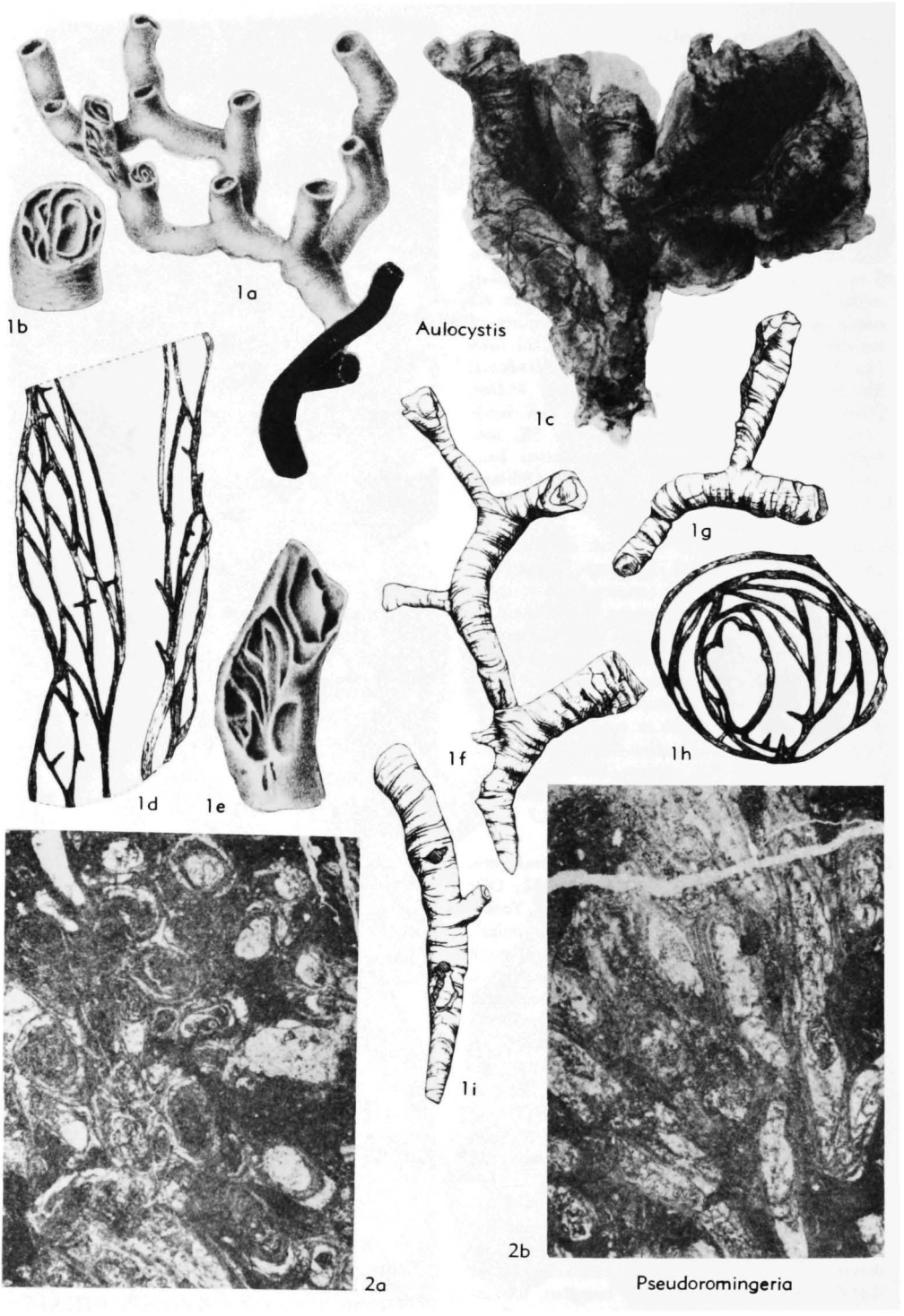


FIG. 439. Aulocystidae (p. *F641-F643*).

closely spaced, or thinner walled, contiguous and prismatic with mural pores adjacent to edges of prisms; protocorallite auloporoid; septal spinules short, tabulae not regular, convex, concave, complete or incomplete; offsets arise from wall of parent. [Possibly favositidan.] *M.Sil.*

Palaeofavosipora STASINSKA, 1976, p. 366, *nom. subst. pro Favosipora* STASINSKA, 1967, p. 100, *non Favosipora* MACGILLIVRAY, 1885, a bryozoan [**Fletcheria clausa* LINDSTRÖM, 1866, p. 292; †original of figured specimen not identified; material figured LINDSTRÖM, 1896b, fig. 10-17b, Cn10863-10866, 22046, 55141-55143, RM, Stockholm]. Small; as seen in calice, tabulae show concentric structure with small convexity in center. *M.Sil.(Wenlock.),* Eu.(Gotl.-Swed.).——FIG. 437, *3a,b.* **P. clausa* (LINDSTRÖM); *a,b,* ext. view, long. sec. showing mural pores and septal spinules, ×4 (Lindstrom, 1896b).

Family AULOCYSTIDAE Sokolov, 1950

[Aulocystidae SOKOLOV, 1950a, p. 172]

Corallum commonly small, proximally prostrate, distally with branches rising free above substrate; increase lateral, without regularity; corallites of branches cylindrical or subcylindrical, commonly moderately short; without connecting tubuli; calices with infundibuliform or strongly concave floors; tabulae infundibuliform, peripheral tabellae form an axial syrinx that may be crossed by axial tabellae; septal spinulae may be present in wall and on tabellae. *L.Sil.; L.Dev.-U.Penn.; U.Perm.*

Aulocystis SCHLÜTER, 1885b, p. 148 [**A. cornigera*; M; syntypes, 215a, SCHLÜTER Coll., IP, Bonn] [=*Ceratopora* GRABAU, 1899, p. 414 (type, *C. jacksoni,* OD; †16840CU, *fide* STUMM, 1965, p. 82, ?New York; M.Dev., Hamilton Sh., Eighteen Mile Ck., Erie Co., N.Y.); *?Drymopora* DAVIS, 1887, explanation to pl. 70, fig. 1-4 (type, *D. fasciculatis,* SD BASSLER, 1915, p. 1252; †8899, MCZ, Cambridge, lectotype by STUMM, 1965, p. 83; Dev., near Louisville, Ky.); *Grabaulites* SOKOLOV, 1962c, p. 246, *nom. subst. pro Ceratopora* GRABAU, 1899, p. 414, *non Ceratopora* HAGENOW, 1851, a bryozoan, *nec* HICKSON, 1911, a coelenterate; see LAUB, 1972, p. 364]. Corallum proximally prostrate, distally of free branches, each a series of commonly short, cylindrical or subcylindrical corallites each formed as a lateral offset through the wall near base of calice of the one below, commonly without regularity; tabulae infundibuliform, with a syrinx; wall moderately thick; septal spinules in wall and on tabulae; no connecting tubuli. *L.Dev.,* Asia(NE.USSR); *M. Dev.,* Eu.(Ger.)-Asia(Kuzbas)-N.Am.(Ohio-Ont.-

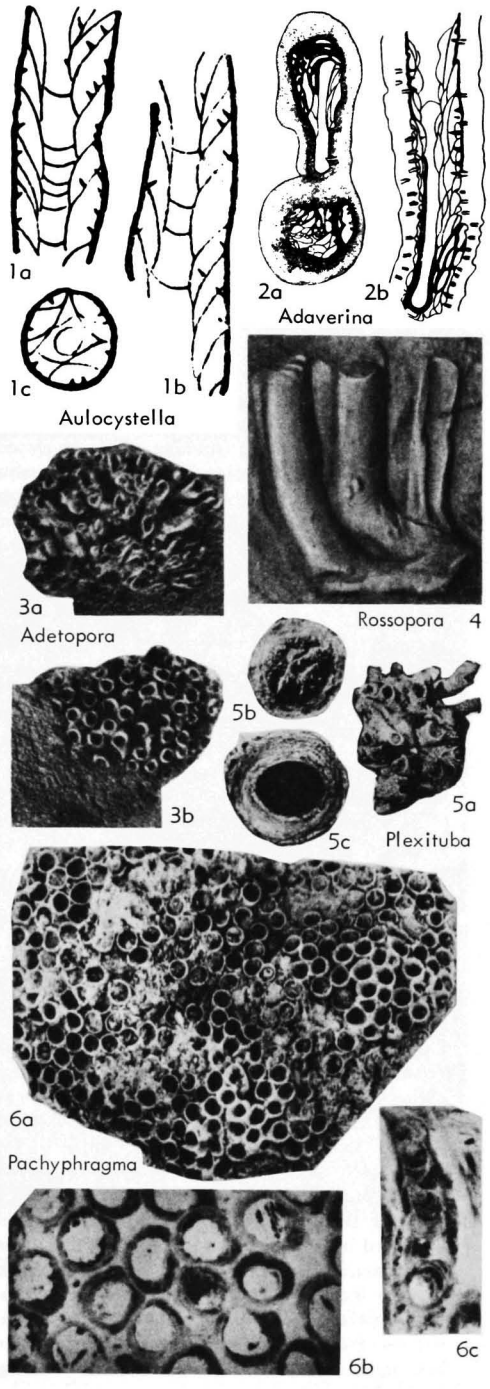


FIG. 440. Aulocystidae (1); Sinoporidae (2) (p. *F642, F644*).

Mich.-N.Y.).——Fig. 439,*1a,b,e*. **A. cornigera*, syntype, up.M.Dev., Ger., Büchel, Bergisch Gladbach; *a*, ext. view, ×1.0; *b,e*, transv., long. fractured surfaces, ×3.0 (Schlüter, 1889).——Fig. 439,*1c,d,f-i*. *A. jacksoni* (Grabau); *c*, holotype, M. Dev., Hamilton Sh., N.Y., Eighteen Mile Cr., N.Y., ext. view, ×1.0; *d,f-i*, paratype, M.Dev., Marcellus Ls., N.Y., Lancaster; *d,h*, long., transv. secs., ×5.0; *f,g,i*, ext. views, ×1.0 (Grabau, 1899).

Adaverina Klaamann, 1969, p. 88, *nom. subst. pro Syringocystis* Klaamann, 1966, p. 72, *non Syringocystis* Deng, 1966, p. 44 [**Syringocystis adaverensis* Klaamann, 1966, p. 72; OD; †Co1795, coll. 94, EGM, Tallinn]. Corallum rising above substrate as irregular spreading bush; increase lateral, corallites joined only at points of origin of offsets, large, cylindrical, with deep, chalice-, cup-, or barrel-shaped calices; wall a thick peripheral stereozone; septal spinules well developed, mainly in peripheral stereozone, but also on tabulae; tabulae funnel-shaped, or tabellae may form a discontinuous axial syrinx, crossed by sparse, convex tabellae. *L.Sil.(up.Llandov.)*, Eu.(Est.).——Fig. 440,*2a,b*. **A. adaverensis* (Klaamann), holotype, W. Est., Pyari; *a,b*, transv., long. secs., ×3.4 (Klaamann, 1966).

Adetopora Sokolov, 1955, p. 223 [**A. humilis*; OD; †78, coll. 599, VNIGRI, Leningrad] [?=*Aulocystella* Kuzina in Sokolov, 1955, which see]. Corallum small, low, compact fruticose; corallites cylindrical, thin-walled, without connecting tubuli; calices deep; tabulae infundibuliform, septal spinules poorly developed to absent; increase lateral, offsets issuing with nearly the full diameter of the parent, which then has limited growth. *?M.Dev.(Givet.)*, Asia(Kuzbas); *U.Carb.*, Eu.(Urals)-?Asia (C.Asia-Sib.).——Fig. 440,*3a,b*. **A. humilis*, holotype, U.Carb., basin of R. Chusovoy, W. Urals; *a,b*, side and calical views, ×1.0 (Sokolov, 1955).

Aulocystella Kuzina in Sokolov, 1955, p. 222 [**A. syringoporoides*; OD; †not traced] [=*Aulocystella* Kuzina in Sokolov, 1950a, p. 172, *nom. nud.*; *?Adetopora* Sokolov, 1955, which see]. Corallum a small cluster of moderately long, radiating and rather widely separated cylindrical corallites with slightly thickened walls; increase lateral; offsets, of same diameter as parent, project widely at first then rapidly become radial to corallum; no connecting tubuli; tabulae of two series, a peripheral series of tabellae forming wide syrinx with their conjoined inner parts and an axial series of narrow, subhorizontal tabellae crossing the syrinx; septal spinules inconstant, present on walls and tabellae. *L.Carb.(Visean)*, Eu.(Donbas-S.Urals)-Asia(China).——Fig. 440,*1a-c*. **A. syringoporoides*, Donbas, right bank of R. Sklevata, below Veselogo farm, Beshevskiy reg.; *a,b*, long., *c*, transv. secs., ×4.0 (Sokolov, 1955).

?Aulostegites Lejeune & Pel, 1973, p. 452 [**A. hillae*; OD; †H-H 189/2, J. Pel Coll., PAU, Liège]. Corallum initially encrusting, of prostrate contiguous moderately thin-walled corallites with upwardly directed calices; some corallites grow much taller than others, and at a higher level give rise by lateral increase to a new expansion of prostrate and contiguous corallites; several such periodic expansions and upgrowth may occur; mural pores sparse; tabulae thin, numerous, deeply concave to infundibular, in places incomplete; septal spinules absent to poorly developed. *M.Dev.(Givet.)*, Eu.(Belg.-Czech.).——Fig. 441,*1a,b*. **A. hillae*, mid. Givet., Belg., prov. Luxembourg; *a,b*, transv., long. secs., ×2.7, ×3.7 (Lejeune & Pel, 1973).

Cystitrypanopora Jia in Jia *et al.*, 1977, p. 267 [**C. zhongguoensis*; OD; †IV35067, HPRIGS, Yichang; L.Dev., Yujiang F., Sicun, Xiangzhou Xian (county), Guangxi (Kwangsi)] [?=*Trypanopora* Sokolov & Obut in Sokolov, 1955, which see in order, superfamily and family uncertain, p. *F665*]. Fasciculate, corallites cylindrical and of spiral growth form; tabulae concave, supplemented peripherally by oblique tabellae; increase lateral. [Diagnosis tentative; from illustrations.] *L.Dev.*, Asia(Kwangsi)-Australia(New S.Wales).

Pachyphragma Watkins, 1959b, p. 801 [**Aulopora erecta* Rominger, 1876, p. 88; OD; †8560, UMMP, Ann Arbor]. Corallum proximally reptant and adherent, distally phaceloid, corallites relatively large, cylindrical and closely spaced to contiguous; mural pores and connecting tubuli absent; offsets develop by lateral increase mainly in proximal region; walls thick; tabulae few or numerous, complete or incomplete, arched or depressed; septal spinules variably developed. *M.Dev.(Givet.)*, N.Am.(Mich.).——Fig. 440,*6a-c*. **P. erectum* (Rominger), holotype, Potter Farm F., Mich., Stony Pt., on shore of L. Huron, just S. of Alpena; *a*, calical view, ×1.0, *b,c*, transv., long. secs., ×4.0 (Watkins, 1959b).

Plexituba Stainbrook, 1946, p. 424 [**P. contexta*; OD; †SUI20942A (missing), UI, Iowa City]. Corallum reptant and proximally adherent; increase lateral through base of calice; corallites crowded in irregular plexus or in chains that do ?not anastomose; calices rising somewhat above substrate and not contracting; walls moderately thick, of concentric growth lamellae rarely enclosing septal spinules; dissepimentlike tabellae commonly line wall; no connecting tubuli or mural pores [see Laub, 1972, p. 366]. *M.Dev.(up.Givet.)*, N.Am.(Manit.); *U.Dev.(Frasn.)*, N.Am.(Iowa).——Fig. 440,*5a-c*. **P. contexta*, lectotype, U.Dev., Independence Sh., Iowa, Brandon; *a*, ext. view, ×1.0, *b*, transv. sec. showing edges of tabellae, ×5.0, *c*, transv. sec. showing wall, ×6.0 (Stainbrook, 1946).

Pseudoromingeria Yabe & Sugiyama, 1941, p. 379 [**Romingeria? kotoi* Yabe & Hayasaka, 1915, p. 85(23); OD; †8232, TohU, Sendai]. Corallum subramose, a lax mass of slender thick-walled corallites in clusters; ?prostrate in early stages;

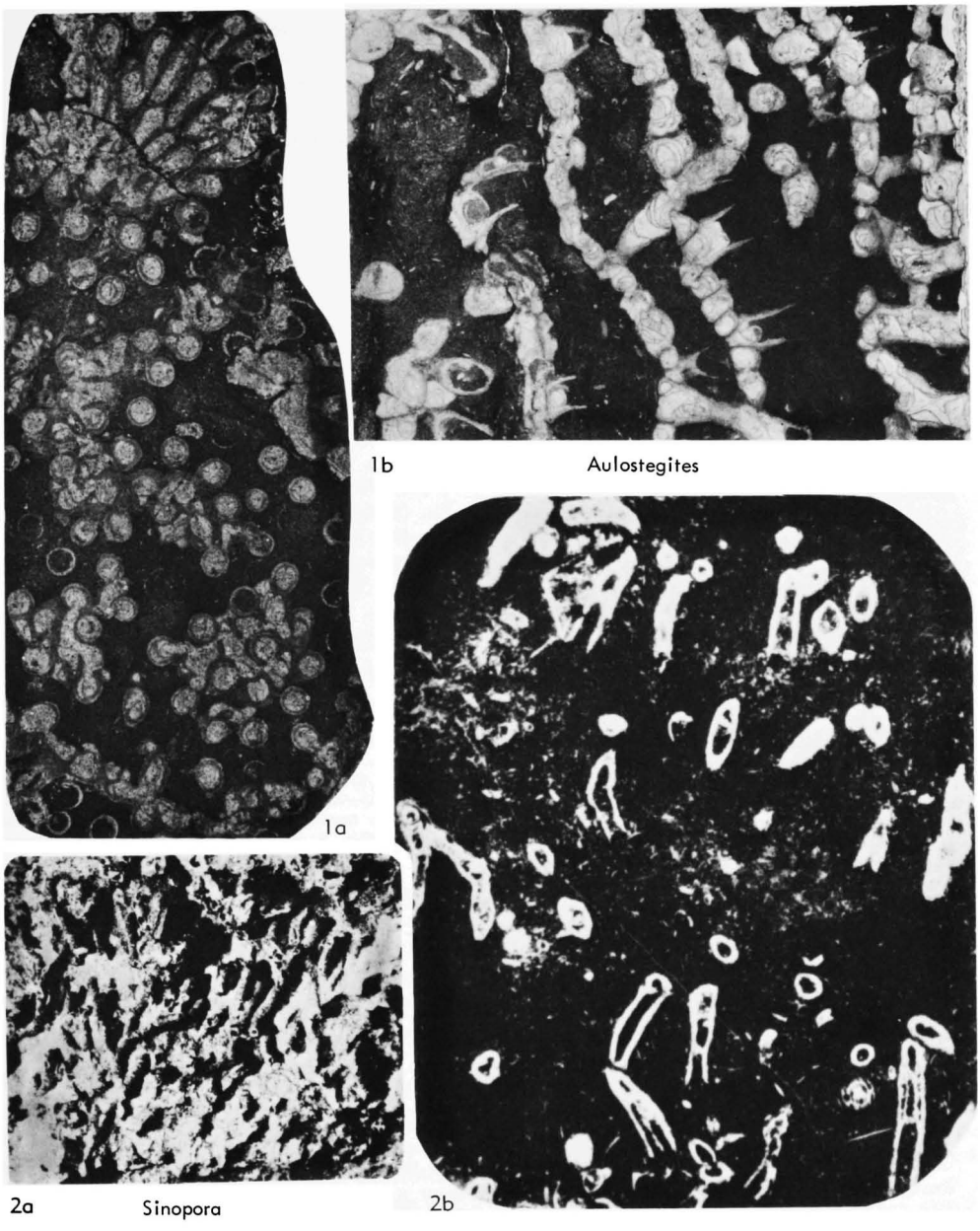


FIG. 441. Aulocystidae (1-3, 5, 6); Sinoporidae (4) (p. *F642*, *F644*).

increase lateral; without connecting tubuli; with septal spinules more or less in longitudinal rows; tabulae very thin, commonly infundibuliform or concave but also including irregularly disposed dissepimentlike plates; mural pores ?absent. *U.Perm. (Yabeina Z.)*, Asia(Japan).——FIG. 439,*2a,b*. **P. kotoi* (YABE & HAYASAKA), Kinsyozan, Gifu Pref., Fuwa-gun; *a,b*, transv., long. secs., ×4 (Yabe & Sugiyama, 1941).

?Family SINOPORIDAE Sokolov, 1955

[Sinoporidae SOKOLOV, 1955, p. 225]

Corallum small, shrublike, with lateral increase moderately common throughout corallum; corallites cylindrical, with thick, peripheral, lamellate stereozone sheathed with transversely wrinkled epitheca; con-

necting tubuli absent; calices deep, infundibuliform, with sharp edges; septa sometimes apparent as slightly spinose ridges on sides of calice; tabulae sparse and oblique to absent. *L.Sil.; M.Carb.-Perm.*

Sinopora Sokolov, 1955, p. 226 [**Monilopora dendroidea* Yoh in Yoh & Huang, 1932, p. 10; †3928, 3947, IGP, Nanking] [?=*Multithecopora* Yoh, 1927, p. 292 (type, *M. penchiensis,* OD; †not traced; *see* Oekentorp & Kaever, 1970, p. 292)]. Corallum small, fruticose; corallites cylindrical, slender, elongate and curved; calices small with sharp edges; increase lateral, moderately common throughout corallum; offsets diverging in different directions, diameter of offset at origin almost equal to that of parent; no connecting tubuli; wall an epithecate, lamellate stereozone; tabulae sparse to absent; septal spines absent or weakly developed. [Proximal parts not known.] *?L.Sil. (Llandov.),* Eu.(Est.); *U.Carb.,* Eu.(Urals-Russ. Platf.); *L.Perm. (Wolfcamp.-Leonard.),* N.Am. (Alaska); *Perm.,* Eu.(W.Serbia)-Asia(China-Japan-Malaya-Iran).——Fig. 441,*2a,b.* **S. dendroidea* (Yoh); *a,* holotype, L.Perm., Chihsia Ls., China, Chi-lung-shan, near Ho-chou, SE. Anhui; ext. view, ×1.0; *b,* paratype, Chihsia Ls., China, Chuanshan, Chu-yung-hsien, Kiangsu, thin sec., ×2.7 (Yoh & Huang, 1932).

Rossopora Sokolov, 1955, p. 225 [**R. alta*; OD; syntype 83, coll. 599, VNIGRI, Leningrad; =*Cladochonus altus* Ivanov, in coll., *nom. inval.*]. Corallum small, shrublike, of several corallites, or solitary; offsets arise by basal lateral increase, spread briefly along substrate, then turn sharply upward as parallel, erect cylinders; no connecting tubuli; walls very thick; calices deep, funnel-shaped, with sharp edges; tabulae absent; septal elements not observed. *U.Carb.(Moscov.),* Eu. (Moscow Basin).——Fig. 440,*4.* **R. alta* Sokolov, syntype, Podolsk horizon, Obrastovo, N. of Kashira; ext. view showing very deep calice, right, ×2.0 (Sokolov, 1955).

Sinoporella Kim & Yang in Yang, Kim, & Chow, 1978, p. 220 [**S. fenggangensis*; OD; †Gct 501, 502, GB, Guiyang; L.Sil., Shiniulan F., Fenggang, Guizhou (Kweichow)]. Fasciculate; corallites very slender, increase lateral, offsets diverging at an angle of from 30° to 40°; walls relatively thick; tabulae sparse, septal spines absent or weakly developed. [Diagnosis tentative; from illustrations.] *L.Sil.,* Asia(Kweichow).

?Family KHMERIIDAE Montanaro-Gallitelli, 1954

[*nom. correct.* Sokolov, 1962c, p. 257, *ex* Khmeridae Montanaro-Gallitelli, 1954, p. 52]

Solitary or weakly compound; corallites turbinate or scolecoid; calice with operculum of one to three convex plates; a lateral offset may be developed; wall moderately thick, no trace of septa; tabulae few, distant, complete or incomplete. *?Carb.(L.Penn.), Perm.*

Khmeria Mansuy, 1914, p. 53 [**K. problematica*; M; syntypes 835-843, MSG, Saigon, *fide* Fontaine, 1961, p. 218] [=*Osium* de Gregorio, 1930, p. 45 (type, *O. importans,* ?M; †not traced; Perm., Sicily); *Seleucites* Porfiriev, 1937, p. 51 (type, *Vermetus tschernyschewi* Shtukenberg, 1898, p. 248; OD; †not traced; Artinsk., C. Urals); *Monotubella* Yakovlev, 1939, p. 629 (type, *M. permiensis*; †1, coll. 6111, TsGM, Leningrad; L. Perm., Donbas); *Sosiophyllum* Montanaro-Gallitelli, 1954, p. 59 (type, *Osium importans* de Gregorio, 1930, p. 45, OD); see Fontaine, 1961, p. 216; Chudinova, 1970, p. 107]. Characters as for family. *?Carb.(L.Penn.),* S.Am. (Peru); *Perm.,* Asia(Cambodia-Japan-Armen.SSR)-Eu. (Sicily-Kazan-Donbas-Urals)-N. Afr. (Tunis). ——Fig. 442,*1a-c.* **K. problematica,* Perm., W. Cambodia; *a,* ext. view showing opercula and offset, ×2; *b,c,* transv., long. secs., ×4 (Fontaine, 1961).

Superfamily SYRINGOPORICAE de Fromentel, 1861

[*nom. correct.* Hill, herein (*pro* Syringoporoidea, *nom. transl.* Hill & Jell, 1970a, p. 175, *ex* Syringoporidae de Fromentel, 1861, *nom. correct.* Nicholson, 1879, p. 203, *pro* Syringoporiens de Fromentel, 1861, p. 257)] [=Syringoporacea Sokolov, 1947c, p. 19, order; Syringoporina Sokolov, 1950a, p. 169, suborder; Syringoporida Sokolov, 1962c, p. 234, order]

Corallum compound, of radially arranged or parallel cylindrical corallites or partly of contiguous and prismatic corallites, connected by tubuli arranged irregularly or in longitudinal rows, or by horizontal laminar processes with which the tubuli may merge; walls thin to greatly thickened; tabulae infundibuliform, with or without axial syrinx, or concave or horizontal and complete or incomplete; septal spines more or less well developed; increase lateral; offsets may arise also from connecting tubuli. *M. Ord.-Perm.*

For most of the genera in this superfamily, we lack descriptions of the proximal parts of the corallum. Indications are that the families Syringoporidae, Tetraporellidae, and Multithecoporidae may be distinguished by a proximal layer of prostrate corallites from which upright, cylindrical corallites arise. Members of the families Roemeriidae and Thecostegitidae, on the other hand, appear to be proximally cerioid. The prox-

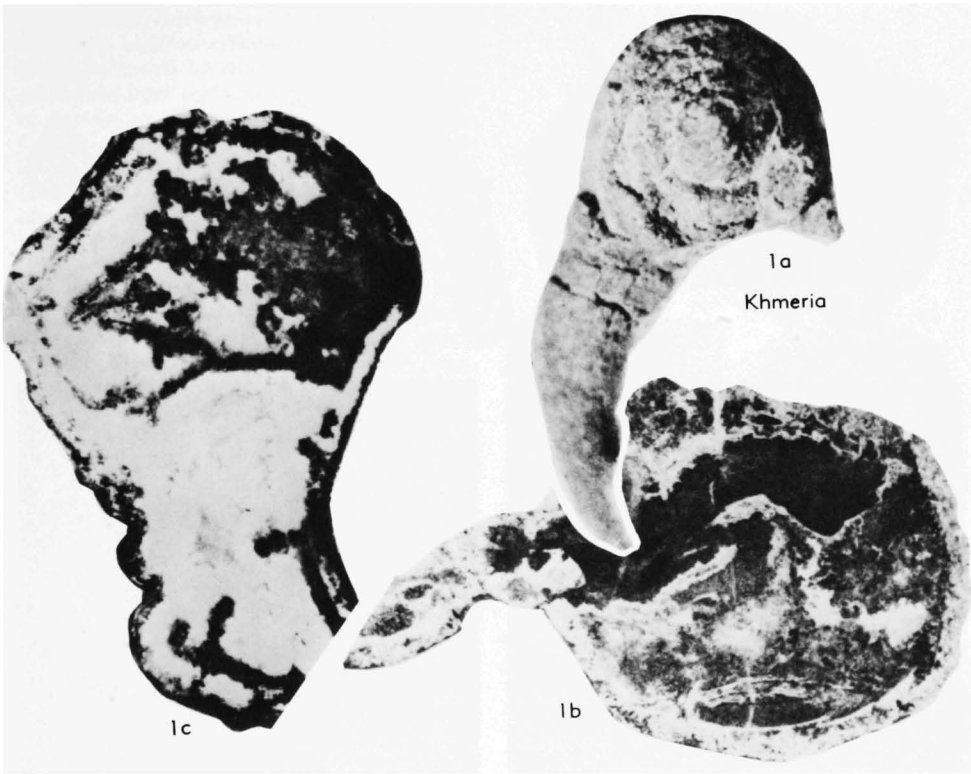


FIG. 442. Khmeriidae (p. *F*644).

imal parts of the Gorskyitidae and Chonostegitidae are not known.

The microstructure of the corallite wall appears to be the same in all the genera herein placed in this superfamily; it may be studied with least difficulty in the thick-walled genera. Inside the epitheca, which is transversely rugose in many, the wall consists primarily of fibers of $CaCO_3$ perpendicular or almost so to the epitheca, and includes septal spinules in longitudinal and radial rows; spinules may project into the tabularium and may also be developed on tabulae; in diagenesis the fibrous nature may be obscured, and additionally, secondary lamellae may result, in which the septal spinules appear as holacanths.

Family SYRINGOPORIDAE de Fromentel, 1861

[*nom. correct.* NICHOLSON, 1879, p. 203, *pro* Syringoporiens DE FROMENTEL, 1861, p. 257] [?=Syringoalcyonidae TERMIER & TERMIER, 1950, p. 57]

Corallum fasciculate, of cylindrical moderately thick-walled corallites connected by horizontal tubuli or platforms; tabulae commonly infundibuliform or forming axial tube (syrinx) or ?columella; may be supplemented by peripheral tabellae; septa represented by longitudinal rows of spinules, or may be sparse to absent. *U.Ord.-L.Perm.*

Syringopora GOLDFUSS, 1826, p. 75 [**S. ramulosa*; SD MILNE-EDWARDS & HAIME, 1850, p. lxii; 251, GOLDFUSS Coll., IP, Bonn] [=*Harmodites* FISCHER VON WALDHEIM, 1828, p. 19 (type, *H. distans* EICHWALD in FISCHER VON WALDHEIM, *fide* LANG, SMITH, & THOMAS, 1940, p. 65; †?in EICHWALD Coll., ?LGU, Leningrad; L.Carb., Archangelskiy on R. Moskva); *Caunopora* PHILLIPS, 1841, p. 18 (type, *C. placenta,* M, for a commensal relationship between a species of *Syringopora* and a species of *Stromatopora,* LANG, SMITH, & THOMAS, 1940, p. 33, selected the species of *Syringopora* as type; †not traced; M.Dev., Torquay and Plymouth, U.K.); *?Syringoalcyon* TERMIER & TERMIER, 1945, which see; *?Praesyringopora* IVANOV in IVANOV & MYAGKOVA, 1950, p. 16 (type, *P. prima,* OD; †28, coll. M-2, SGI, Sverdlovsk; Mme. YANET in letter 26 July 1974 advises that holotype is very badly preserved and may be *Syringopora,* and that it comes from post-Ludlovian deposits, R. Boltun,

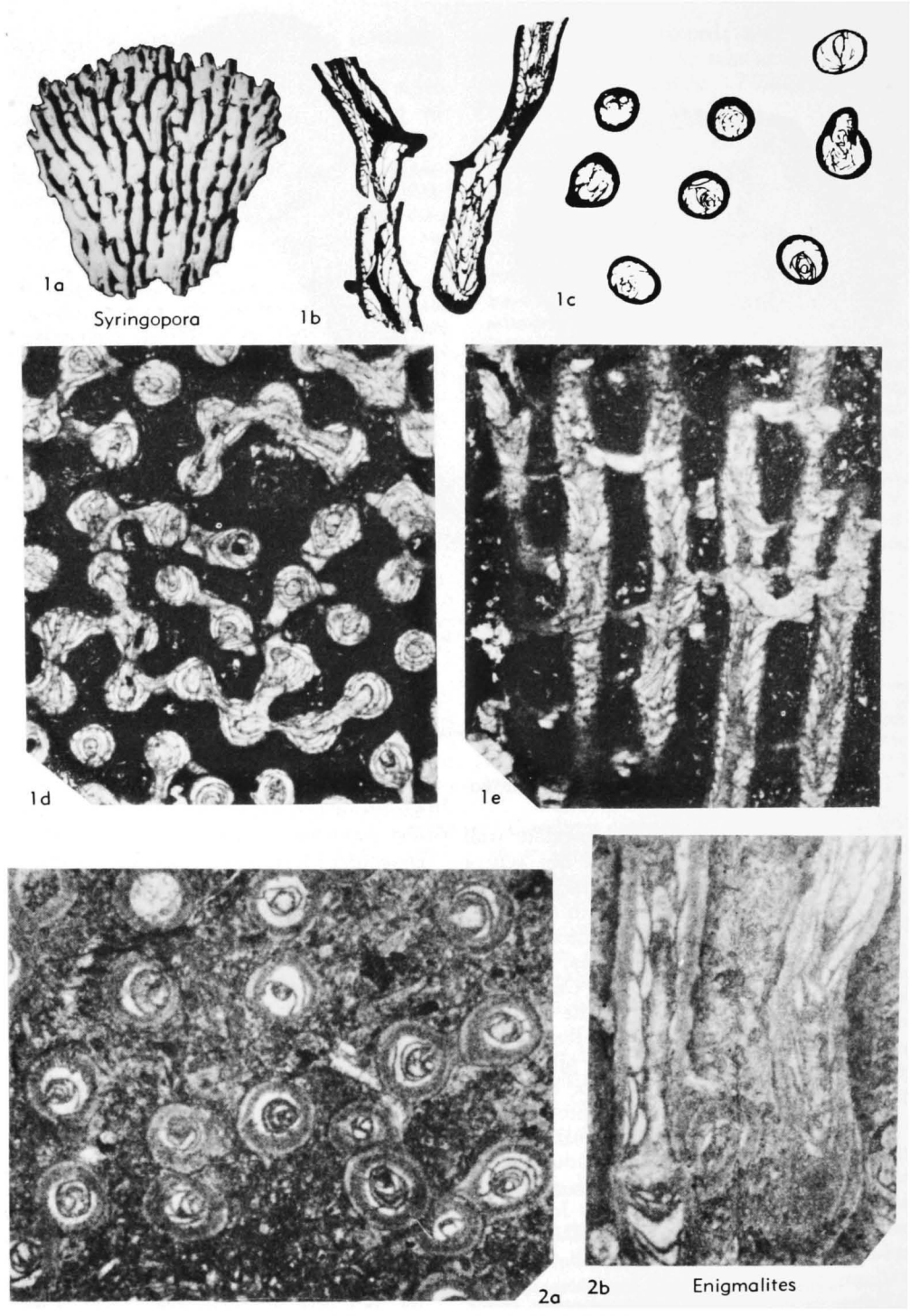


FIG. 443. Syringoporidae (p. *F645-F647*).

tributary of R. Serebryanay, C. Urals)]. Corallum fasciculate; corallites cylindrical, moderately thick-walled, connected by tubuli without regularity of orientation; septa represented by longitudinal rows of spinules or ?absent; tabulae infundibuliform, forming axial syrinx in many corallites; increase lateral or from connecting tubuli. *U.Ord.*, Eu. (Urals); *L.Sil.-?U.Carb.*, cosmop.; *?L.Perm.(Wolfcamp.)*, N.Am.(Yukon).——Fig. 443,*1a-c*. **S. ramulosa; a*, syntype, L.Carb., Ger., Olne, ext. view, ×1 (Goldfuss, 1826); *b,c*, another specimen, L.Carb., Moscow Basin, long., transv. secs., ×4 (Sokolov, 1955).——Fig. 443,*1d,e*. *S. blanda* Klaamann, Skal., left bank R. Dnestra, quarry between Dzvingorod and Volkovtsy; *d,e*, long., transv. secs., ×4 (Chudinova, 1971b).

?Cannapora Hall, 1852a, p. 43 [**C. junciformis*; M; 1473 (3 syntypes), AMNH, New York] [=*Cannipora* Lang, Smith, & Thomas, 1940, p. 31, *nom. van.*]. Fasciculate, with slender, closely set cylindrical corallites connected at intervals by annulate, sharp-edged ridges on the same levels throughout the corallum, forming platforms; septa spiniform, in up to 12 longitudinal rows; tabulae horizontal; the upright corallites spring from an encrusting basal expansion of prostrate corallites as in *Syringopora*. [From photographs of syntypes supplied by Dr. W. A. Oliver, the horizontal ridges may enclose connecting canals and offsets may arise from them; genus may be better placed in Tetraporellidae. *See* Lambe, 1899-1901, p. 63.] *L.Sil.*, N.Am.(Ont.-N.Y.).——Fig. 444,*1*. **C. junciformis*, syntype, Clinton Gr., Ont. or N.Y., ext. view, ×0.6? (Hill, n; photographs courtesy W. A. Oliver, AMNH1473).

Chia Lin, 1958, p. 483 [**Syringopora tuvaensis* Chernyshev, 1937, p. 16; ?OD; †10, coll. 11174, TsGM, Leningrad] [=*Syringocystis* Deng, 1966, p. 44 (53) (type, *S. tabulata*, OD; †18056-18057, IGP, Nanking; M.Dev., Heitai, China), *non Syringocystis* Klaamann, 1966, p. 72, an auloporid; *Syringella* Nowinski, 1970, p. 540 (type, *S. polonica*, OD; †Z.Pal.T/V/1, PZI, Warsaw; Dev., ?Frasn., Pol.)]. Corallum fasciculate; corallites sparsely and irregularly connected by tubuli; walls moderately thick; a series of small, dissepimentlike plates applied to inner side of wall; tabulae in axial parts of corallites infundibuliform and with distinct axial syrinx with or without transverse tabellae; septal spines may be present; increase lateral. *U.Sil.*, Asia(Tuva); *M.Dev.*, Asia(China); *U.Dev.(?Frasn.)*, Eu.(Pol.); *L.Carb.*, Eu.(Donbas)-Asia(China).——Fig. 445,*2a,b*. **C. tuvaensis* (Chernyshev), holotype, U.Sil., Tuva, Elegest R.; *a,b*, transv., long. secs., ×4 (Chernyshev, 1937).

Enigmalites Chudinova, 1975a, p. 17 [**E. lectus*; OD; †3494/3, PIN, Moscow]. Fasciculate; corallites cylindrical, at base of colony radially arranged, later growth parallel; corallites when separated connected by tubules, when in contact, by mural pores; walls thick; tabulae thin, coarsely cystose,

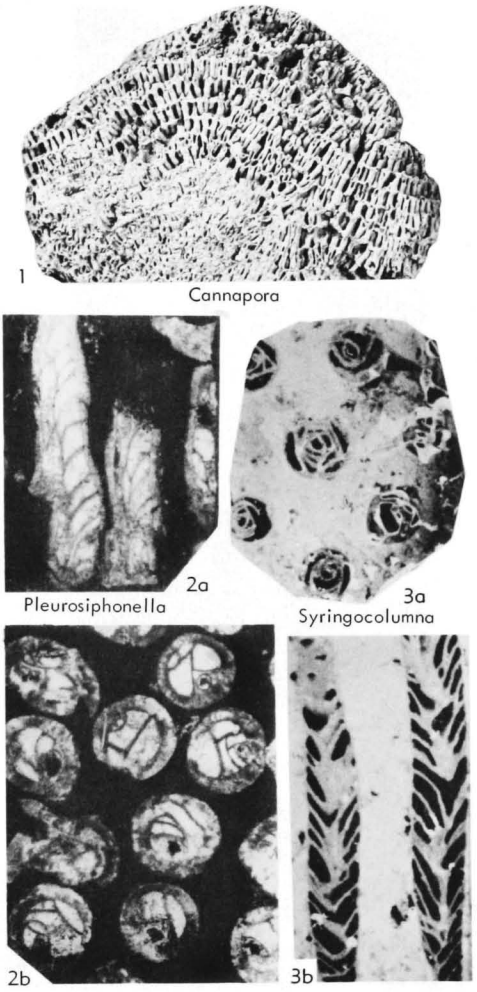
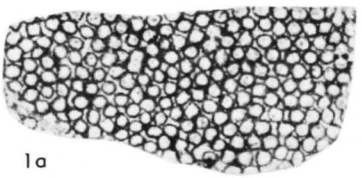


Fig. 444. Syringoporidae (p. *F647*, *F649*).

approaching a funnel shape, their proximal edges resting on the one below; with wide, free axial canal in places crossed by horizontal tabellae; septal spines well developed; increase lateral, rarely interstitial from connecting tubuli. *U.Carb.-L.Perm. (Sakmar.)*, Eu.(C.Urals).——Fig. 443,*2a,b*. **E. lectus*, holotype, L.Perm., Up. Tastuba subhorizon, C. Urals, right bank of R. Kosva, W. slopes; *a,b*, transv., long. secs., ×5 (Chudinova, 1975a).

Kueichowpora Chi, 1933, p. 22 [**K. tushanensis*; OD; †3138-3140, IGP, Nanking]. Corallum fasciculate, slender; cylindrical corallites commonly bifurcating due to lateral ?(or peripheral) increase; with very rare connecting tubuli; tabellae arranged in a peripheral ring, surrounding an axial tubular space ?(empty or with sparse tabulae); traces of septal ridges or spines absent from type. *L.Carb.*, Asia (China-Transcauc.-?Japan-?Taymyr-?Anato-



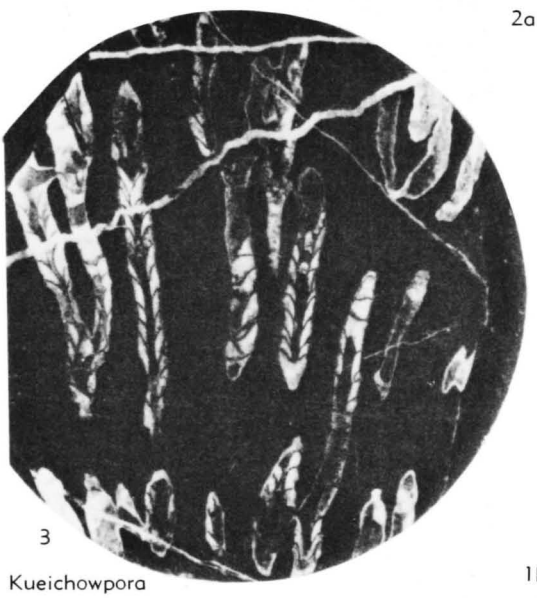
1a

Syringoporiella

2b

Chia

2a



3

Kueichowpora

1b

FIG. 445. Syringoporidae (p. *F647-F649*).

lia).——Fig. 445,*3*. **K. tushanensis*, holotype, Fengnin., Kueichou, Lanchai, Tushanhsien; long. sec., ×3 (Chi, 1933).

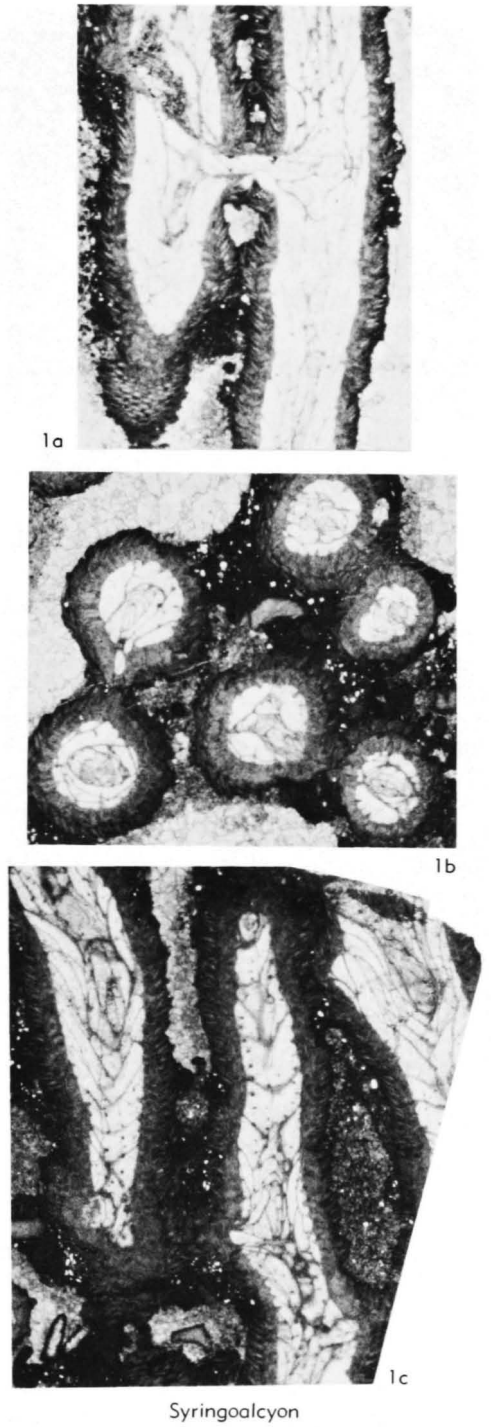
Oharaia Nelson, 1977, p. 558 [**Syringopora magnussoni* Nelson, 1962, p. 458; OD; †470, UA, Edmonton; Mt. Head F., Can., Mt. Rae, Alberta]. Like *Pleurosiphonella* but walls proportionally thinner and syrinx subaxial. *L.Carb.-U.Carb. (Visean-Namur.)*, N.Am.(Alberta).

Pleurosiphonella Chudinova, 1970, p. 105 [**P. crustosa*; OD; †369, coll. 2182, PIN, Moscow]. Corallum fasciculate; corallites cylindrical, weakly curving, commonly rather closely spaced; connecting tubuli rare and without orderly arrangement; walls thick, covered with concentrically wrinkled epitheca; tabulae deeply infundibuliform, with laterally placed syrinx crossed by rare diaphragms; septal spines seldom seen, increase lateral [see also Nelson, 1977, p. 557]. *L.Carb. (Tournais.)*, Asia M.(Transcauc.)-Australia(New S. Wales)-N. Am. (Alberta-Ida.-Va.-Yukon).——Fig. 444,*2a,b*. **P. crustosa*, Armashkiy horizon; *a*, M. Sari-Pap, long. sec., ×6.3; *b*, holotype, W. part of Urts Ra., transv. sec., ×6.3 (Chudinova, 1970).

Syringoalcyon Termier & Termier, 1945, p. 71 [**S. maroccana*; M; †in Termier Coll., Paris] [?=*Syringopora* Goldfuss, 1826, which see]. Like *Syringopora* but with ?epithecal scales [see also Termier & Termier, 1975, p. 85]. *L.Carb. (Visean)*, N.Afr.(Moroc.).——Fig. 446,*1a-c*. **S. maroccana*, syntype, Dchar Ait Abdallah; *a*, long. sec. to show ?epithecal scales, ×6; *b*, transv. sec., ×6; *c*, long. sec. showing wall, septal spines, and tabulae, ×6 (Hill, n; UQF69382).

?Syringocolumna Stumm, 1969, p. 244 [**Syringopora infundibula* Whitfield, 1878, p. 79; OD; †34350, MPUC, Berkeley]. Corallum fasciculate with lateral increase; no connecting tubuli known; walls thin; tabulae infundibuliform, "coalescent in groups to form intermittent columella"; septal spinules not observed; one specimen. *M.Sil.*, N. Am.(Wis.).——Fig. 444,*3a,b*. **S. infundibula* (Whitfield), monotype, Niag., Racine dol., Wis., Howley's Quarry, Milwaukee; *a,b*, transv., long. secs., ×1.9 (Stumm, 1969).

Syringoporiella Rukhin, 1937, p. 71 [**Syringopora (S.) ferganica*; OD; †in ?LGU, Leningrad]. Corallum fasciculate; slender cylindrical corallites closely and regularly arranged, connected by closely spaced tubules arranged in four mutually perpendicular longitudinal rows in each corallite, and commonly at the same levels in neighboring corallites; tabellae numerous, syrinx seldom noted. [Possibly tetraporellid.] *U.Sil.*, Asia(Turkestan Ra.).——Fig. 445,*1a,b*. **S. ferganica*; R. Sarkent, near depression Ak-su; *a,b*, transv., long. secs., ×2, ×7 (Rukhin, 1937).



Syringoalcyon

Fig. 446. Syringoporidae (p. *F649*).

1 Periphaceloporа

FIG. 447. Periphaceloporidae (p. F650).

Family PERIPHACELOPORIDAE Hill, new family

Corallum with cerioid base from which rise blades of varying thickness, each composed of cerioid axial parts surrounded by fasciculate peripheral parts; corallites thick-walled and without septa; mural pores rare, in cerioid parts; connecting tubuli rare, short, in fasciculate parts; tabulae unequally distributed, straight, oblique, or concave or convex. *M.Dev.*

Periphacelopora DETHIER & PEL, 1971, p. 302 [**P. exornata*; OD; †H-H 11 23A, Coll. J. PEL, PAU, Liège]. Characters as for family. *M.Dev.(low. Givet.)*, Eu.(Belg.).——FIG. 447,*1*. **P. exornata*, Belg., Hampteau; sec. of blade, ×3.3 (Dethier & Pel, 1971; photograph courtesy Mme. Carpentier-Lejeune).

Family TETRAPORELLIDAE Sokolov, 1950

[Tetraporellidae SOKOLOV, 1950a, p. 169]

Corallum of syringoporoid type but formed of prismatic or rounded prismatic corallites, commonly four or six-sided, or subcylindrical; walls thin, or in younger genera slightly thickened; connecting tubuli arranged in longitudinal rows, or in one genus randomly; in prismatic corallites commonly projecting from edges of prism faces; tabulae horizontal, or incomplete, oblique and curved; in younger genera there may be a cylinder of dissepimentlike tabellae around the periphery; infundibuliform tabulae rarely observed; septal spines present or absent. *M.Ord.-M.Dev.; L.Carb.; L. Perm.-U.Perm.*

Labyrinthites LAMBE, 1906, p. 327 [**L. chidlensis*; M; †7933, GSC, Ottawa, lectotype by BOLTON, 1965, p. 19] [=*Tetraporella* SOKOLOV, 1947a, p. 470 (type, *Labyrinthites? monticuliporoides* TROEDSSON, 1928, p. 135, OD; †2 specimens designated holotype by TROEDSSON, 1928, p. 137 and explanation to pl. 44, H3038 ?(and H3094), H3040 = 153 and 693 in KOCH Coll., respectively, MM, Copenhagen; Cape Calhoun Beds, C. Calhoun, N. Greenland; see BOLTON, 1965, p. 20); *Labyrinthites (Arcturia)* WILSON, 1931, p. 294 (type, *L. (A.) complexa*, SD HILL & STUMM, 1956, p. F469; †6505, GSC, Ottawa; glacial drift; differs from *L. chidlensis* in having larger corallites with indented sides, see BOLTON, 1965, p. 19)]. Corallum fasciculate, corallites prismatic or rounded-prismatic, commonly four-sided, closely spaced, moderately thick-walled, ?aseptate, with horizontal, complete tabulae and connected in short ranks by very short tubuli closely spaced in longitudinal rows developed at the angles of the corallites. *M. Ord.-U.Ord.*, N.Am.(Que.-Ellesmere I.-Devon I.-Newf.-Greenl.-Baffin I.-Alaska)-Asia (Tuva-Kazakh.); *L.Sil.*, Asia(W.Sayan-E.Ferghana); *M.Sil.* or *U.Sil.*, N.Am.(Me.); *M.Dev.(Eifel.)*, Eu.(Volgo-Urals).——FIG. 448,*1a-c,f*. **L. chidlensis; a,b*, lectotype, Ord. drift, Newf., C. Chidley, Hudson Str., transv., long. secs., ×4 (Bolton, 1965); *c,f*, M.Ord., Quebec, shore W. central L. Manicouagan, long. secs., ×4, ×7 (Bolton, 1965). ——FIG. 448,*1d,e*. *L. complexus* (WILSON), syntype, Ord. or Sil. (in drift), southern Baffin I., Fossil I., L. Nettelling; *d,e*, transv., long. sec., ×4 (Bolton, 1965).

Hayasakaia LANG, SMITH, & THOMAS, 1940, p. 65, *nom. subst. pro Tetrapora* YABE & HAYASAKA, 1915, p. 87, *non Tetrapora* QUENSTEDT, 1857, a bryozoan [**Tetrapora elegantula* YABE & HAYASAKA; OD; figured syntype 6254, TohU, Sendai (missing)]. Corallum fasciculate with slender corallites of rounded-polygonal section, connected by horizontal tubuli arranged more or less regularly in four longitudinal rows, diagonally placed; septal spines poorly developed to absent; tabulae in two series, axial tabellae subhorizontal and complete or incomplete, and peripheral tabellae in single and in places discontinuous series of small dissepimentlike plates. *L.Perm.*, Asia(China)-Eu. (Spits.); *U.Perm.*, Asia(N.Viet Nam).——FIG. 448,*3a,b*. **H. elegantula* (YABE & HAYASAKA), L. Perm., Chihsia Ls., Kweichow, Synan; *a,b*, transv., long. secs., ×4 (Lin, 1962a).

Pseudoroemeria CHEKHOVICH, 1960, p. 43 [**P. atbashiensis*; OD; †82, coll. 9207, TsGM, Leningrad]. Corallum in places fasciculate, of slender corallites with tabularia in communication through connecting tubuli, in places cerioid, with numerous fine mural pores, walls thin; septa represented

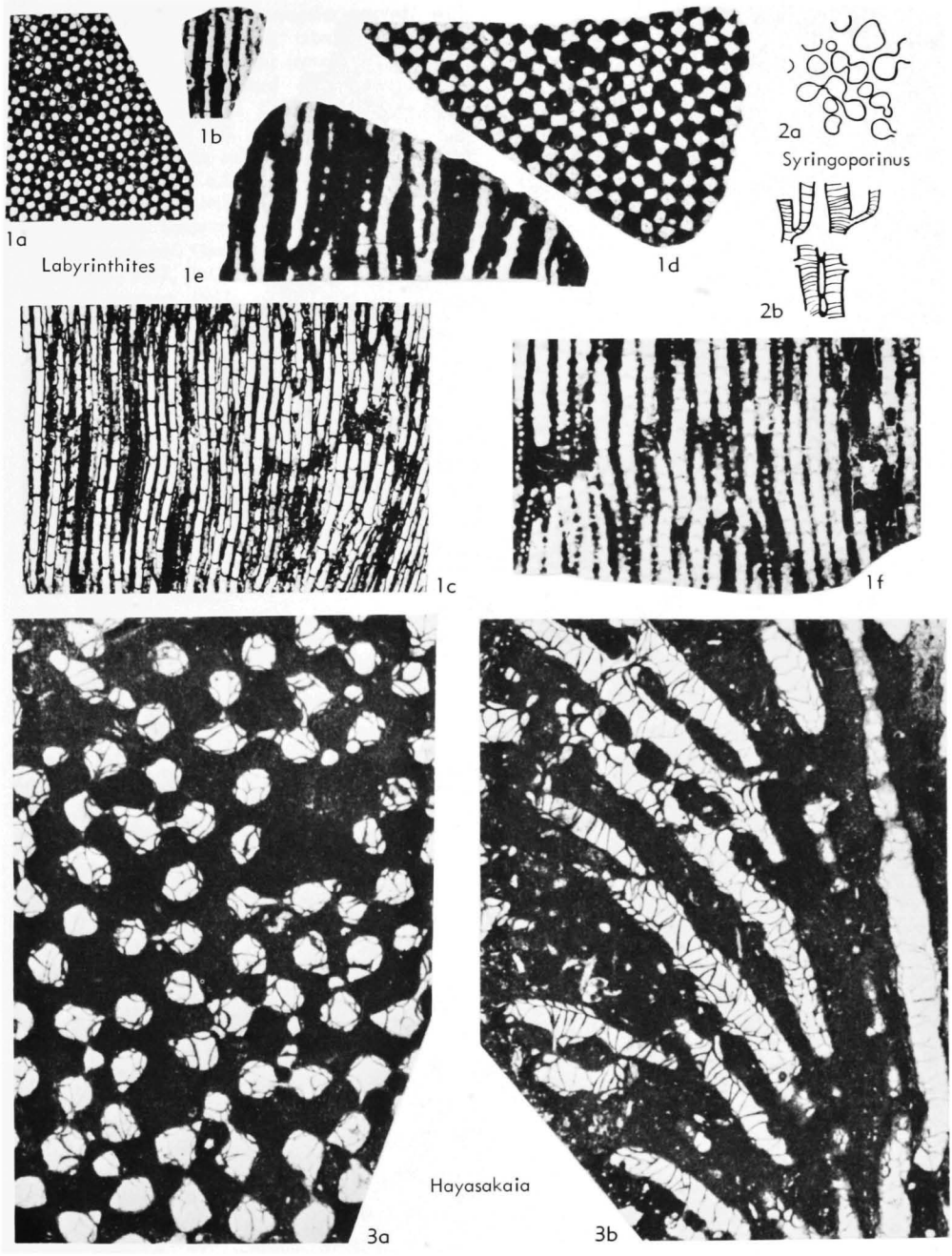


FIG. 448. Tetraporellidae (p. *F650*, *F653*).

by spinules; tabulae thin, horizontal, oblique or rarely weakly concave, never with axial tube [see HILL & JELL, 1970a, p. 184]. *L.Dev.(Gedinn.)*, Asia(Tien Shan).——FIG. 449,*1a,b*. ***P. atbashiensis,*** holotype, ?Gedinn., Tien Shan, R. Sherikty, Atbashinskiy Ra.; *a,b,* transv., long. secs., ×4 (Chekhovich, 1960).

Spiroclados DUBATOLOV in AVROV & DUBATOLOV, 1969, p. 25 [**S. avrovi*; OD; †20, coll. 359, IGG, Novosibirsk]. Corallum fasciculate; corallites slen-

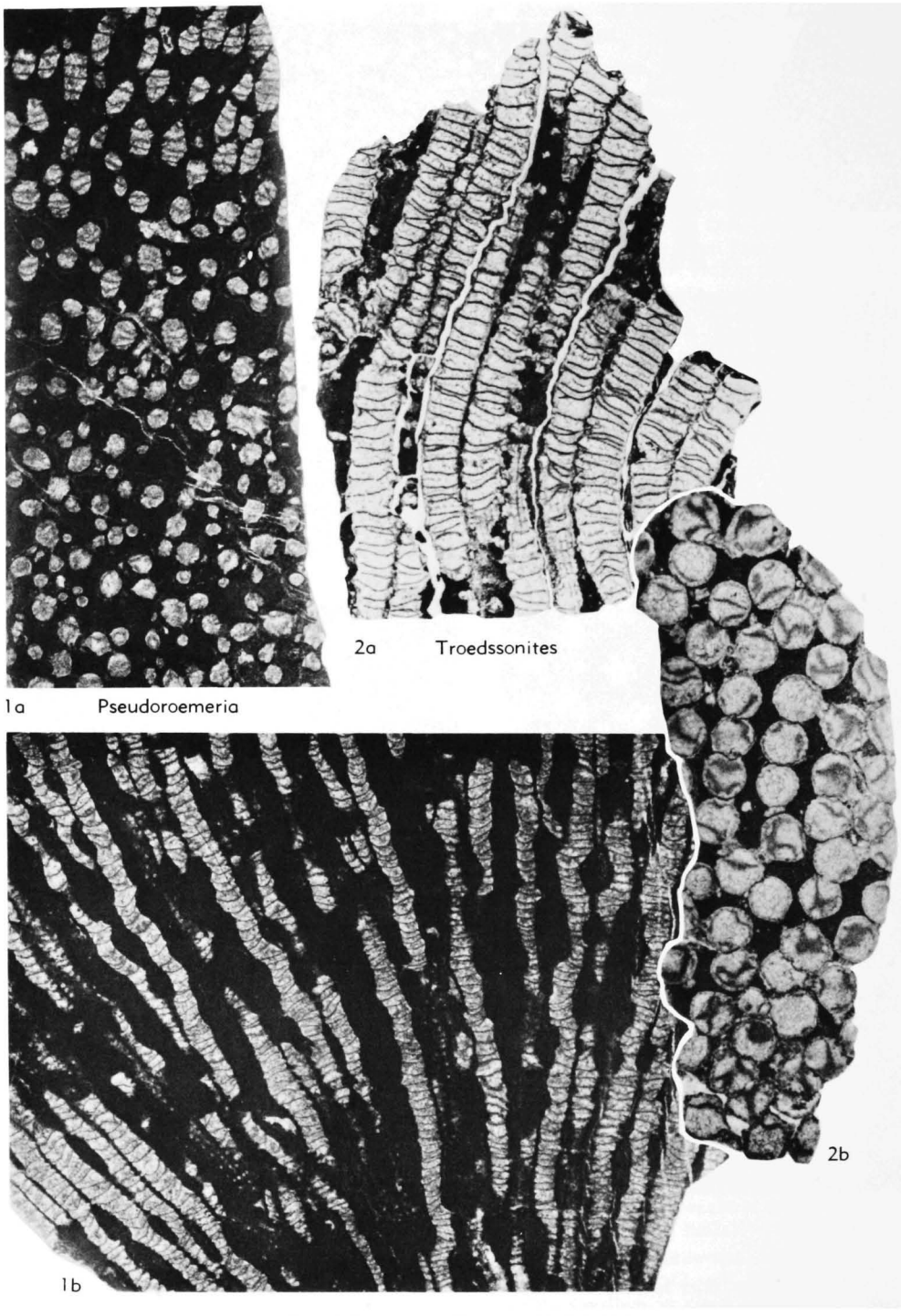


FIG. 449. Tetraporellidae (p. *F650-F653*).

der, tubular, spirally or irregular curved, with transverse tubuli connecting tabularia of neighboring corallites; walls thin; septal spines present; tabulae horizontal, inclined or slightly curved. *L.Dev.* or *M.Dev.*(basal *Couvin*), Asia(S.Altay).——Fig. 450,*2a,b*. **S. avrovi,* holotype, middle part of Sarymsaktin suite, 450 m. above mouth of R. Okoleekha; *a,b,* transv., long. secs., ×4 (Dubatolov in Ivanovskiy, 1969).

Syringoporinus Sokolov, 1955, p. 524 [**Syringoporella irregularis* Chernyshev, 1941a, p. 34; OD; †46, coll. 5958, TsGM, Leningrad] [=*Syringoporinus* Sokolov, 1947c, p. 20 and 1950a, p. 169, *nom. nud.*; 1952, p. 131, *nom. inval.,* no type species named, but *Syringoporella irregularis* referred "most probably" to it]. Corallum fasciculate, corallites cylindrical, close, relatively thin-walled with randomly arranged connecting tubuli; offsets numerous by lateral increase, diverging widely before becoming parallel; tabulae thin, horizontal, complete. *L.Sil.,* Asia(Sev.Zemlya-Sib. Platf.-Kazakh.); *M.Sil.(low.Wenlock.),* Asia(Tadzhik.).——Fig. 448,*2a,b*. **S. irregularis* (Chernyshev), holotype, Llandov., Severnaya Zemlya, Domashini I.; *a,b,* transv., long. secs., ×4 (Sokolov, 1955, after Chernyshev, 1941a).

Tetraporinus Sokolov, 1947c, p. 24 [**T. singularis*; †131b, Coll. A. I. Guseva, location not traced]. Corallum with radiating to parallel subcylindrical to prismatic corallites, slender and four-sided, connected by four mutually perpendicular rows of tubuli; tabulae numerous, commonly incomplete and obliquely inclined to the axis or, rarely, infundibuliform; septal spines weakly developed to absent. *U.Sil.,* Eu.(N.Urals-Vaygach I.)-Asia(Tien Shan); *L.Carb.,* Asia(Taymyr-N.Zemlya-N.Viet Nam-Laos-China)-Eu.(Donbas); *L.Perm.(Chihs.),* Asia(China-Anatolia).——Fig. 450,*1a,b*. **T. singularis,* L.Carb., Taymyr, R. Kharulakh-bigay; *a,b,* transv., long. secs., ×4 (Sokolov, 1955).

Troedssonites Sokolov, 1947a, p. 469 [**"Syringopora" conspirata* Troedsson, 1928, p. 134; †H3036 ?(and H3037), =441, 442 in Koch Coll., MM, Copenhagen]. Corallum hemispherical; corallites moderately thick-walled, cylindrical and closely spaced or connected by one to three or, in places, four longitudinal rows of short connecting tubuli, or contiguous in short ranks; tabulae horizontal, commonly complete; septal ridges and spines weakly developed or absent [see Bolton, 1965, p. 24]. *U.Ord.,* N.Am.(Greenl.-Ellesmere I.)-Asia (NE.Sib.-SW.China); *?Sil.,* Asia(SW.China).——Fig. 449,*2a,b*. **T. conspiratus* (Troedsson), U. Ord., Cape Calhoun F., N. Greenl.; *a,b,* long., transv. secs., ×4 (Troedsson, 1928).

Family MULTITHECOPORIDAE Sokolov, 1950

[Multithecoporidae Sokolov, 1950a, p. 169]

Corallum fasciculate; increase lateral, off-

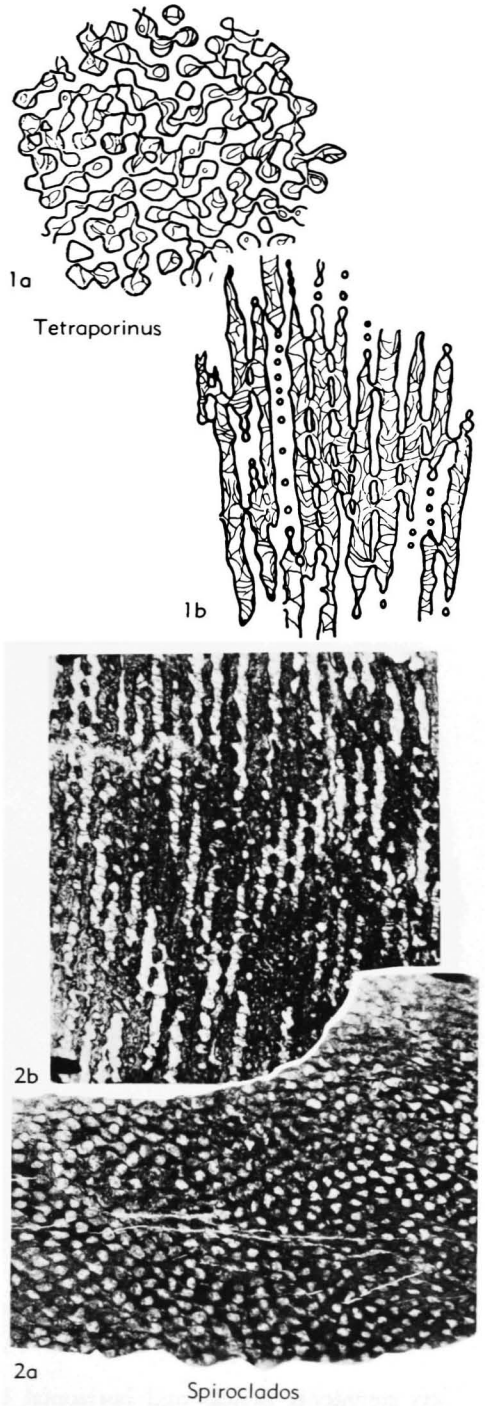


Fig. 450. Tetraporellidae (p. *F651-F653*).

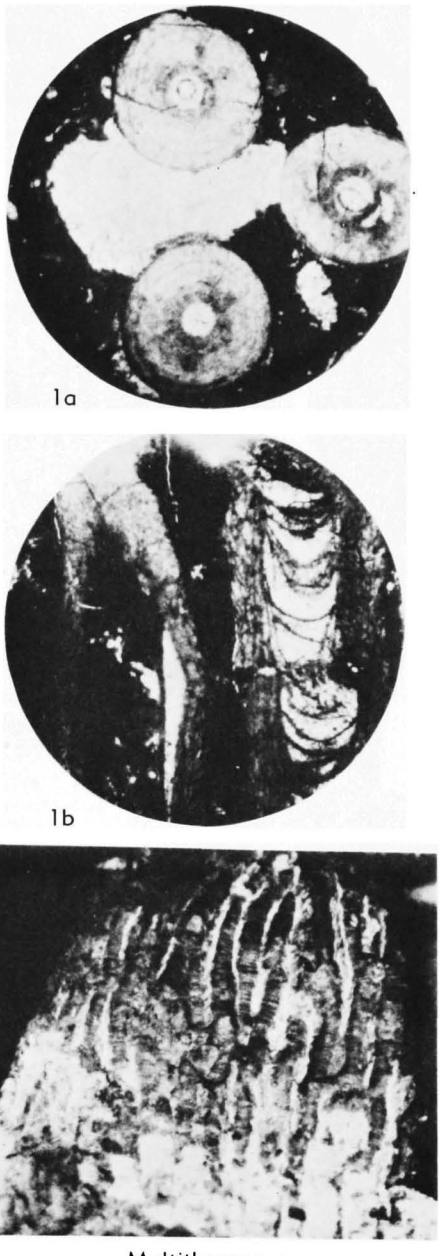


FIG. 451. Multithecoporidae (p. *F654*).

sets commonly slender and horizontal initially; corallites cylindrical, connecting tubuli commonly sparse; walls very thick; septal spines weakly developed, in some in multiples of six; tabulae thin, horizontal or curved, complete. *L.Sil.-M.Sil.; L.Dev.-?U. Dev.-U.Perm.*

Multithecopora YOH, 1927, p. 291 [**M. penchiensis*; OD; †not traced] [?=*Sinopora* SOKOLOV, 1955, p. 225 (type, *Monilopora dendroides* YOH in YOH & HUANG, 1932, p. 10, OD; †3928, 3947, IGP, Nanking; L.Perm., Chihsia Ls., Chi-lung-shan, near Ho-chou, Anhui; *see* OEKENTORP & KAEVER, 1970, p. 284)]. Corallum phaceloid to bushy; increase lateral; corallites cylindrical; walls very thick, so that lumen may be only one-third to one-fifth diameter of corallite; connecting tubuli rare; septal spines weakly developed; tabulae thin, horizontal or curved. *L.Sil.(Llandov.),* Eu.(Nor.); *L.Carb.,* Australia(Queensl.-New S.Wales); *U. Carb.(L.Penn.),* N.Am.(Yukon-Texas-Nev.); *?U. Carb.,* Asia(Viet Nam); *L.Carb.-U.Carb.,* Eu. (Donbas-Moscow Basin-Urals-Timan)-Asia(China-C.Asia-Taymyr); *?U.Carb.* or *L.Perm.,* Eu.(Spits.); *Perm.,* Asia(China-Japan-Iran-Afghan.)-Eu.(Yugo.-Urals)-N.Am.(Yukon).——FIG. 451,*1a-c.* **M. penchiensis,* holotype, M.Carb., Penchi Ls., China, Feng-tien Prov.; *a,b,* transv., long. secs., ×12.5; *c,* ext. view, ×1.7 (Yoh, 1927).

Cylindrostylus SOKOLOV, 1955, p. 225, *nom. subst. pro Edwardsiella* RUKHIN, 1937, p. 64, *non Edwardsiella* ANDRES, 1883, a coelenterate [**E. turkmensaica* RUKHIN, OD; †?, LGU, Leningrad]. Fasciculate; slenderly cylindrical corallites, closely spaced and commonly contiguous, without connecting tubuli or mural pores; walls very thick, sclerenchyme layered, pierced by longitudinal rows of septal spinules; tabulae complete, sparse, characteristically oblique. *M.Sil.(?Wenlock.),* Asia (Turkestan Ra.-Zeravshan-Gissar Ra.).——FIG. 452,*3a,b.* **C. turkmensaicus* (RUKHIN), Turkestan Ra., valley of R. Turkmen-Saya; *a,b,* transv., long. secs., ×2 (Rukhin, 1937).

?Neomultithecopora LIN, 1963a, p. 593 [**N. syringoporoides*; OD; †sample N zhuan-58-gu-162, location not traced]. Corallum branching, not large; increase lateral; corallites regularly cylindrical, with rare connecting tubuli; epitheca transversely wrinkled; walls thick; tabulae complete, concave or in places infundibuliform, with or without axial syrinx; septal spines in multiples of six in longitudinal rows. [Possibly would be better placed in Roemeriidae, but is not known to be cerioid proximally. See KACHANOV, 1967, p. 25.] *L.Carb.(Visean),* Asia(S.China); *Carb.(Visean-Namur.),* Eu.(N.Zemlya-Urals).——FIG. 452,*2a,b.* **N. syringoporoides,* holotype, China, Duan distr., Guangxi Prov.; *a,b,* long., transv. secs., ×4 (Lin, 1963a).

Syringoporella KETTNER, 1934, p. 1 [**Syringopora moravica* ROEMER, 1883, p. 495; OD; †not traced, ?in ROEMER Coll., Univ. Wrocław (formerly Breslau); KETTNER's other figured specimens in REMEŠ Coll., Charles Univ., Prague]. Corallum small; corallites cylindrical, slender, close, thick-

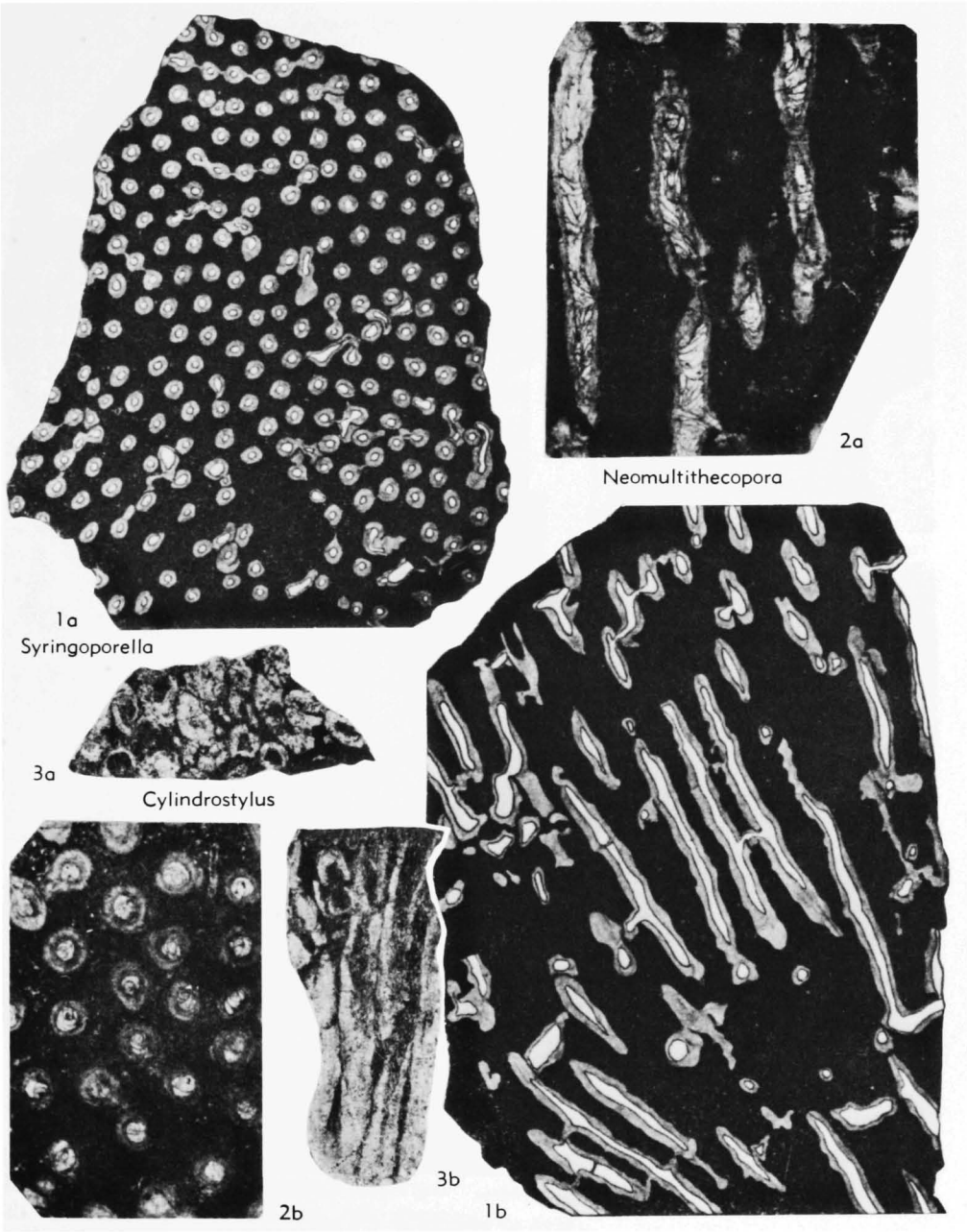


FIG. 452. Multithecoporidae (p. *F654-F655*).

walled, with connecting tubuli; calices narrow, deep, with flat base and commonly with obtuse edges; septal spines absent or poorly developed; tabulae sparse, horizontal; offsets arise by ?basal lateral increase. *L.Dev.*, Asia(R.Kolyma); *M.Dev. (Givet.)*, Eu.(Czech.-E.Russ.Platf.)-Asia(?Kuzbas); *?U.Dev.(Frasn.)*, N.Am.(Alberta); *?Miss.*, N.Am. (Ind.).——FIG. 452,*1a,b*. **S. moravica* (ROEMER), holotype, Givet., Moravia, Slatinky; *a,b*, transv., long. secs., ×4 (Kettner, 1937).

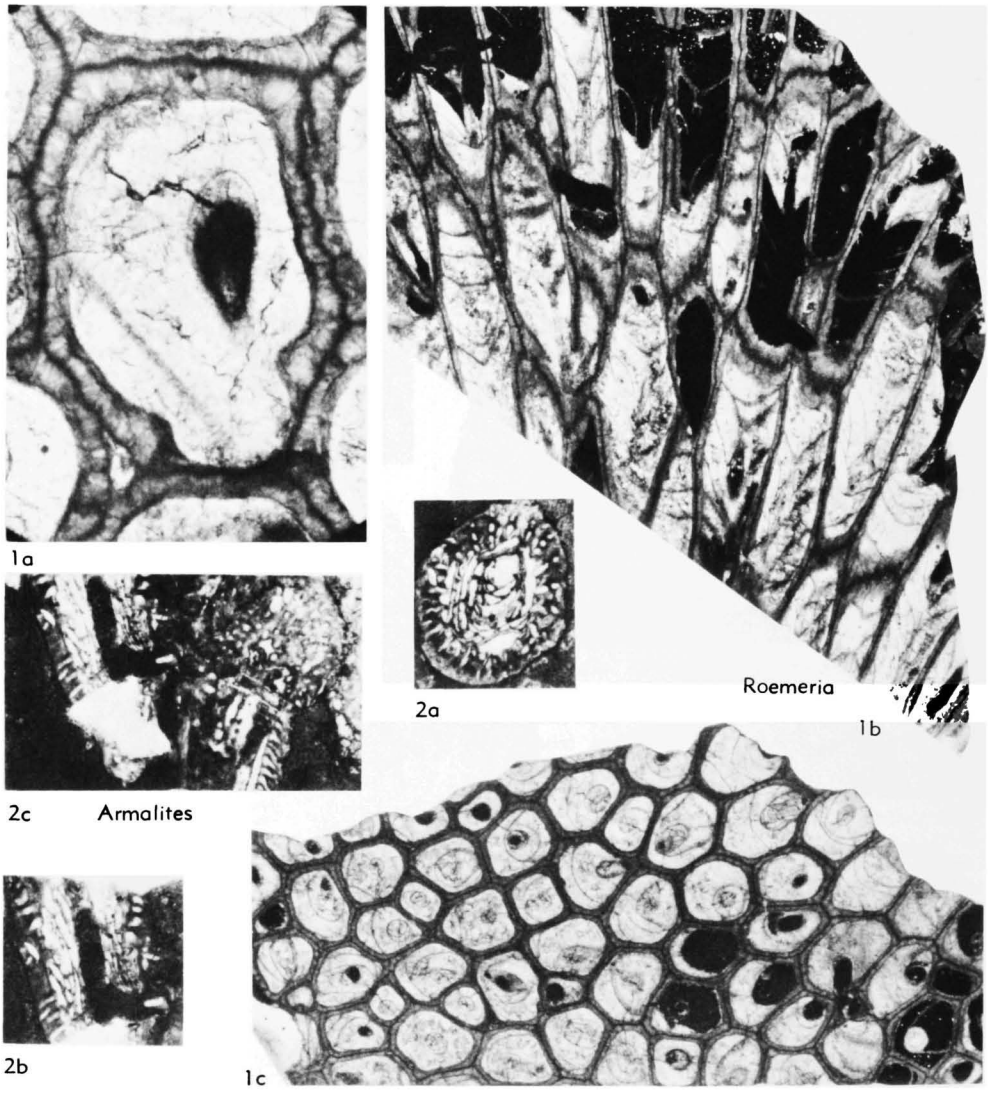


FIG. 453. Romeriidae (p. *F657-F658*).

Family ROEMERIIDAE Počta, 1904

[*nom. correct.* SOKOLOV, 1955, p. 160, *pro* Roemeridae POČTA, 1904, p. 77]

Encrusting, discoid or branching; corallites adpressed and prismatic with mural pores or canals, but more or less divergent peripherally, where external transverse wrinklings in the thickened walls outline tunnel-like spaces into which wall pores open, so that communication between neighboring corallites is retained; wall microstructure syringoporoid—primarily of 'fibers' of $CaCO_3$ normal to the epitheca, and including septal spinules in longitudinal and radial rows; the spinules may project into the tabularium and may also be developed on tabulae; in diagenesis the fibrous nature may be obscured, and, additionally, secondary lamellation may result, in which the septal spinules appear as holacanths; tabulae thin, horizontal or concave or infundibuliform, with the notches in places elongated proximally to form a syrinx, which may divert from the axis to a mural pore so

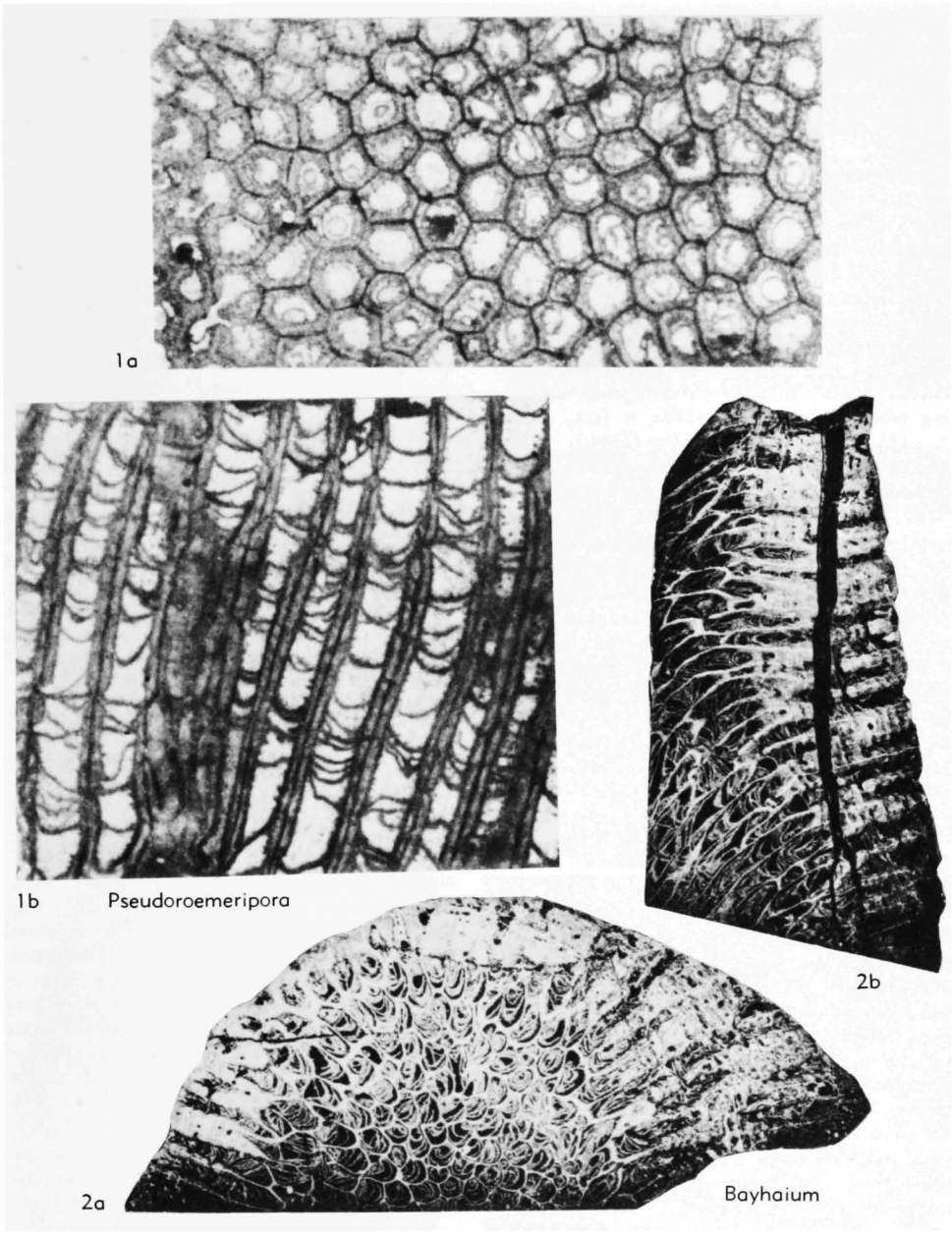


FIG. 454. Romeriidae (p. *F658*).

that communication is obtained between the tubes of some neighboring corallites. *?L.Sil.; L.Dev.-M.Dev.; L.Carb.; L.Perm.*

Roemeria MILNE-EDWARDS & HAIME, 1851, p. 152, 253 [**Calamopora infundibulifera* GOLDFUSS, 1829, p. 78; †258b, GOLDFUSS Coll., IP, Bonn; lectotype by CHERNYSHEV, 1951, p. 69]. Cerioid coralla with small, prismatic corallites of which some may cease to join tightly at the angles so that the corners are rounded and small spaces are developed; walls somewhat thickened, with sporadic mural pores; septal spines very sparse and slender; tabulae simple, infundibuliform, a slender axial or eccentric syrinx being formed by the proximally produced parts of the funnels [see JELL & HILL, 1970c, p.

159]. *M.Dev.*, Eu.(Ger.)-?Asia(Altay-Sayan).——Fig. 453,*1a-c*. **R. infundibulifera* (Goldfuss), lectotype, Eifel., Ger.; *a,c*, transv. secs., ×20, ×4; *b*, long. sec., ×4 (Jell & Hill, 1970c).

Armalites Chudinova, 1964, p. 63 [**A. novellus*; OD; †2586, coll. 1396, PIN, Moscow] [=*Armalites* Chudinova in Dubatolov, 1963, p. 62, *nom. nud.*, type species named but not described, figured, or diagnosed]. Dendroid to subcerioid, corallites with peripheral stereozone transversely wrinkled externally; septal spinules long, holacanthine, immersed in lamellar sclerenchyme of stereozone in numerous radial longitudinal series and on the tabulae; tabulae thin, infundibuliform with discontinuous syrinx; pore-canals developed when corallites are contiguous, connecting tubules otherwise [see Hill & Jell, 1970a, p. 183]. *L.Dev.(Ems.)-M.Dev.(Eifel.)*, USSR (Kuzbas).——Fig. 453,*2a-c*. **A. novellus*, holotype, up. Eifel., Kuzbas, R. Ur; *a-c*, transv., long. secs., ×4 (Chudinova, 1964).

Bayhaium Langenheim & McCutcheon, 1959, p. 99 [**B. merriamorum*; OD; †37683, MPUC, Berkeley]. Corallum massively branching; in axial parts of branch, corallites prismatic and thin-walled; in peripheral parts walls thicken and in places corallites may diverge slightly and become cylindrical; wall wrinkled transversely exteriorly to form tunnel-like intercorallite connections into which mural pores open; axial edges of septa project from wall as low ridges; tabulae thin, infundibuliform, somewhat irregular, seldom produced proximally into short axial tubes, grouped in relation to mural pores. *L.Perm.(Wolfcamp.)*, N.Am.(Cal.-Nev.).——Fig. 454,*2a,b*. **B. merriamorum*, holotype, McCloud Ls., Cal., Shasta Co.; *a,b*, transv., long. secs., ×1.8 (Langenheim & McCutcheon, 1959).

Pseudoroemeripora Koksharskaya, 1965a, p. 88 [**P. lenaica*; OD; †07V, coll. 205/17, IG, Yakutsk]. Corallum small, turflike; corallites thick-walled, contiguous and prismatic or somewhat divergent and rounded; mural (and corner) pores (in prismatic corallites) rounded, connecting tubules (between divergent corallites) short; tabulae favositoid (subhorizontal) or syringoporoid (infundibuliform), in places grouped in relation to the pores; septa laminar peripherally, giving off spinules axially; increase intermural and peripheral [Hill & Jell, 1970a, p. 183]. *L.Carb.*, Asia(NE. USSR).——Fig. 454,*1a,b*. **P. lenaica*, holotype, C. Krestyakh, northern Kharaulakh, mouth of R. Lena; *a,b*, transv., long. secs., ×4.0 (Koksharskaya, 1965a).

Roemeripora Kraicz, 1934, p. 45 [**Roemeria bohemica* Barrande in Počta, 1902, p. 262; OD; †21, with thin sec. PV2 in Počta Coll., NM, Prague; lectotype by Galle, 1974 MS] [?=*Vaughanites* Paul, 1937, p. 110 (type, *Syringopora favositoides* Vaughan, 1915, p. 34, OD; †E11401, SM, Cambridge; L.Carb., base of δ (*sublaevis* level), Avesnes area, France), *non Vaughanites* Woodring, 1928, a Miocene gastropod; *?Roemerolites* Dubatolov, 1963, which see]. Corallum cerioid; corallites prismatic or, when slightly divergent, cylindrical; peripheral stereozone transversely wrinkled externally where corallites are not tightly adpressed; septal spines holacanthine, arranged in lamellar sclerenchyme of stereozone in numerous radial longitudinal rows and on tabulae; tabulae thin, complete, or more commonly incomplete, horizontal, concave or infundibuliform, and grouped in relation to pore-canals (or to connecting tubules that lie on the external wrinklings of the wall); offsets arise from openings of pore-canals [Hill & Jell, 1970a, p. 176]. *L.Dev.*, Eu.(Czech.)-Asia(Kuzbas)-Australia(Vict.-New S.Wales)-N.Z.; *M.Dev.(?low.Couvin.)*, Australia(Queensl.); *M.Dev.(Givet.)*, Asia (Kuzbas); *?L.Carb.*, Eu.(Urals-N.Zemlya-Donbas)-Asia(Kuzbas).——Fig. 455,*1a,b*. **R. bohemica*, Prag., up. Koneprus Ls., Czech., Koněprusy; *a*, syntype, long. sec., *b*, lectotype, transv. sec., both ×2 (Hill, n; photographs courtesy W. A. Oliver, from slides figured by Počta, 1902).——Fig. 456, *1. ?R. favositoides* (Vaughan), holotype, L.Carb., base of δ, Avesnes area, France, oblique sec., ×3.8 (Hill & Jell, 1970a).

Roemerolites Dubatolov, 1963, p. 58 [**R. batschatensis*; OD; †54, coll. 72, IGG, Novosibirsk] [?=*Roemeripora* Kraicz, 1934, which see, see Hill & Jell, 1970a, p. 183; *?Eoroemerolites* Yang in Yang, Kim, & Chow, 1978, p. 181 (type, *E. syringoporoides*, OD; †Gct 333, 334, GB, Guiyang; L.Sil., Shiniulan F., Fenggang, Guizhou [Kweichow])]. Corallum dendroid, but slender corallites contiguous and partly prismatic in early stage and in patches later; corallites with peripheral stereozone in which septal spinules are developed; tabulae very thin, irregularly infundibuliform or concave; axial tubes of neighboring corallites may be continuous through pore-canals or connecting rounded tubules; offsets arise through openings of the pore-canals. *?L.Sil.*, Asia(Kweichow); *M.Dev. (?Eifel.)*, Asia(Kuzbas).——Fig. 455,*2a-c*. **R. batschatensis*, holotype, ?Eifel. or ?Ems., Salairka Beds, Kuzbas, left bank of R. Chernevoy Bachat., near Gurievska; *a-c*, thin secs., ×4, ×4, ×10 (Dubatolov, 1963).

Family THECOSTEGITIDAE de Fromentel, 1861

[*nom. correct.* Sokolov, 1950a, p. 170, *pro* Thecosteginiens de Fromentel, 1861, p. 277] [=Neoroemeriidae Radugin, 1938, p. 84]

Encrusting, subhemispherical or ramose; corallites slender, in early parts of colony or axial parts of branch may be adpressed and prismatic, communicating by mural

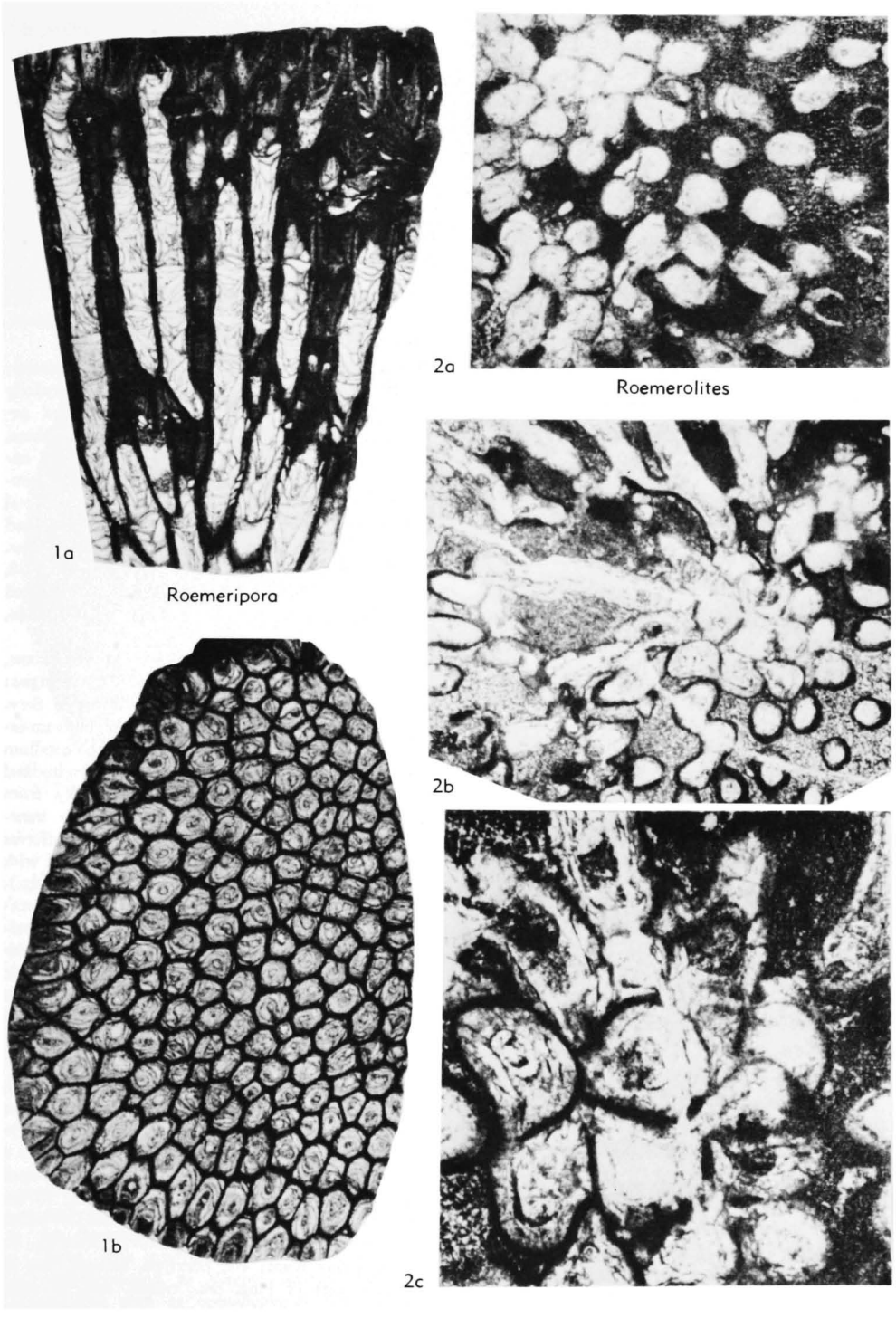


FIG. 455. Romeriidae (p. *F658*).

1 Roemeripora

FIG. 456. Romeriidae (p. *F658*).

pores; in later parts the corallites diverge but remain subparallel, and are united by irregular tubular or platformlike tabulate expansions through perforations in the wall; these expansions may be contiguous vertically one with another or separated by spaces in which the corallites are not united. Wall microstructure of fibers normal to the epitheca; septal spinules variably developed; tabulae thin, complete or incomplete, horizontal, concave or in places infundibuliform with the median notch drawn down into a short syrinx, which may be continuous with a similar but horizontal tube in the intercorallite expansions; the axial tubes may be crossed by small tabellae; tabellae may be grouped in relation to mural pores. *U.Sil.-U.Carb.*

Thecostegites MILNE-EDWARDS & HAIME, 1849b, p. 261 [**Harmodites bouchardi* MICHELIN, 1846, p. 185; M; †Z153 bis b, MN, Paris; lectotype by LECOMPTE, 1939, p. 171]. Corallum massive and encrusting; corallites slender, cylindrical, thick-walled, united by successive irregular platformlike expansions of tabulate tissue, each expansion in communication with the tabularia through perforations arranged in verticils in the walls of the corallites; the expansions may be epithecate above and below; septal spinules irregular in development; tabulae in lateral expansions as well as in the cylindrical corallites, irregular, horizontal, oblique, concave, or with short axial tubes, which may be extended into the lateral expansions where they lie horizontally, and may be crossed by small tabellae. *U.Sil.(?Pridol.)* or *L.Dev.(Gedinn.)*, Eu.(Polar Urals); *L. Dev. (Gedinn.-up. Isfarian)*, Asia (Tien Shan)-Australia(Tasm.); *M.Dev.* or *U.Dev.*, N. Am.(Alaska); *M.Dev.-U.Dev.*, Eu.-Asia; *L.Carb. (Tournais.)*, Asia(Kuzbas).——FIG. 457,*2*. **T. bouchardi* (MICHELIN), Frasn., Belg., Couvin, thin sec., ×5 (Lecompte, 1939).

Duncanopora SANDO, 1975, p. C25 [**D. duncanae*; OD; †165184, USNM, Washington]. Alternately phaceloid and cerioid; cylindrical corallites periodically expand to contiguity with neighbors, or are periodically connected by tubuli or by encircling sclerenchyme perforated by tunnels connecting adjacent lumina; increase lateral; septal spines rare, tabulae sparse, commonly complete and horizontal or slightly sagging. *U.Carb.(?low. Namur.)*, N.Am.(Wyo.-Idaho-Utah).——FIG. 458, *1a,b*. **D. duncanae*, holotype, Wyo., Moffat Trail Ls. Mbr.; *a,b*, transv., long. secs., ×1.9 (Sando, 1975).

Groessensia TERMIER & TERMIER in GROESSENS, TERMIER, & TERMIER, 1975, p. 6 [**G. ambigua*; OD; 2 syntypes, cat. nos. not stated, one in Serv. Geol. Belg., other in Lab. Paleont. Louvain-la-Neuve]. Cylindrical tabularia of the corallum with horizontal tabulae and radial longitudinal rows of septal spines projecting adaxially from their porous walls; tabularia connected by transverse platforms and tubuli; connecting platforms may bear spines in radial rows continuous with rows in tabularia. *L.Carb.(Tournais.)*, Eu.(Belg.).

Neoroemeria RADUGIN, 1938, p. 83 [**N. westsibirica*; OD; †73, ?Tomsk Industrial Univ.]. Corallum massively branching, rarely platelike or encrusting; in axial zone of branch corallites prismatic and adpressed, communicating by mural pores; in peripheral parts of branch corallites diverge and become cylindrical, but neighboring tabularia are in communication through irregular expansions of tubules extending from perforations in the wall, the expansions containing tabulae; septal spinules present, tabulae concave, convex, irregularly curving and becoming incomplete, forming in places a very short axial tube; the tabulae may be grouped in relation to the pores [see HILL & JELL, 1970a, p. 185]. *M.Dev.(Givet.)*, Asia(Kuzbas).——FIG. 457,*1a-d*. *N. gibbosa* CHUDINOVA, Kuzbas, R. Mozalovskiy Kitat; *a-c*, paratype, oblique, sec. of branch, part of long. sec., transv. sec., all ×1; *d*, holotype, part of long. sec., ×4 (*a-c*, Hill, n, photographs courtesy M. Chudinova, Akad. Nauk SSSR 1396/280; *d*, Chudinova, 1964).

Ortholites CHUDINOVA, 1975b, p. 34 [**O. nexus*;

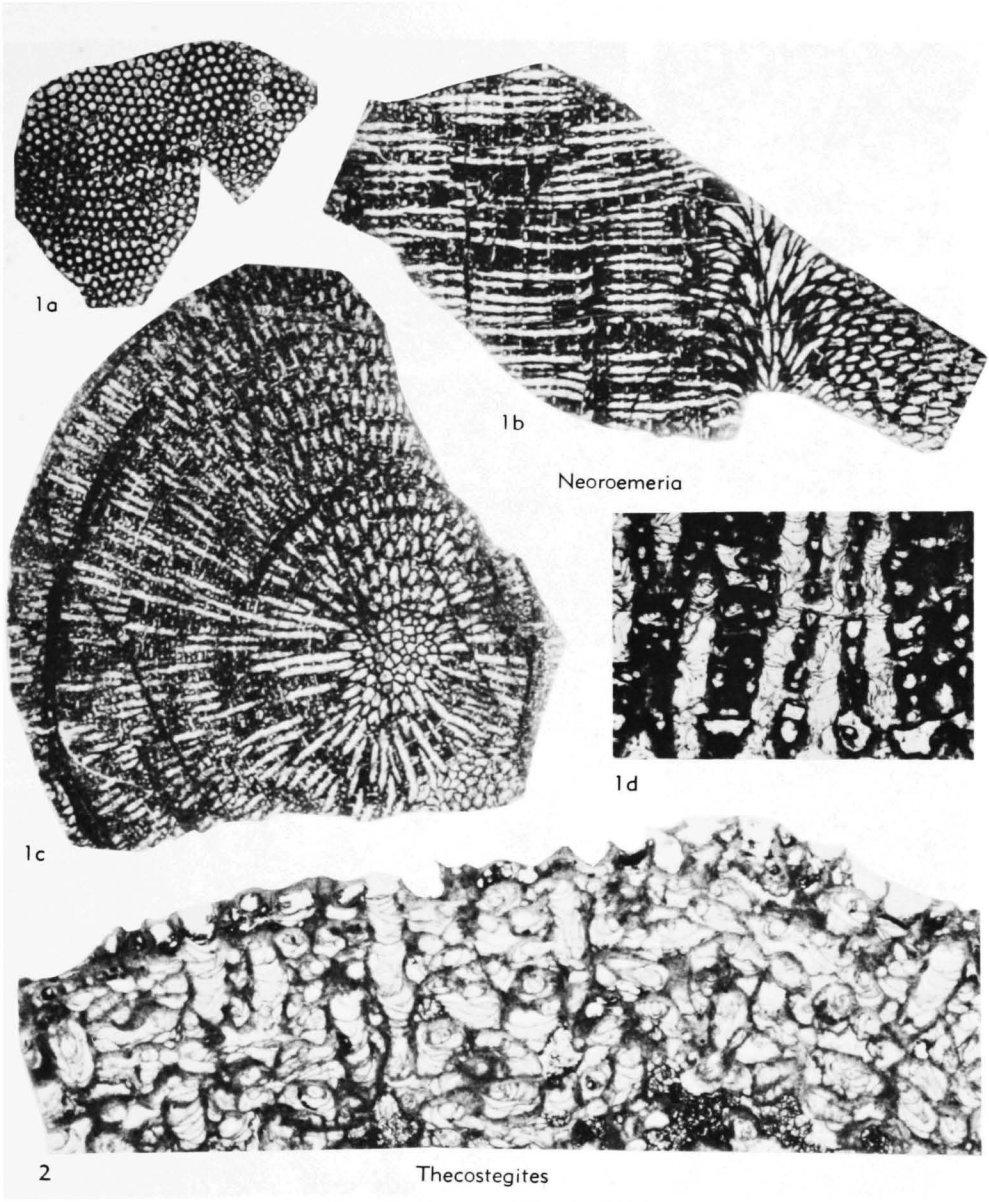


FIG. 457. Thecostegitidae (p. *F660*).

OD; †3460/1, PIN, Moscow]. Cylindrical or rounded prismatic corallites connected by short, very closely spaced platforms and here and there by connecting tubuli; tabulae thin, infundibuliform, with interrupted axial canals; septal spines well-developed to absent; increase lateral from corallite wall or coenenchymal from connecting platform or tubule. *L.Carb.(Tournais.)*, Asia (Kazakh.).——FIG. 458,*3a,b*. **O. nexus*, holotype, Tournais., Simorinsky horizon, C. Kazakh., R. Karasu; *a,b*, transv., long. secs., ×3.8 (Chudinova, 1975b).

?**Verolites** CHUDINOVA, 1975b, p. 35 [**V. rarus*; OD; †3460/2, PIN, Moscow]. Corallites cylindrical, cylindroprismatic, thin-walled, connected by numerous short tubules, by sparse connecting platforms, and where corallites are in contact, here and there by mural pores; tabulae thin, infundibuliform, incomplete, or closely spaced, numerous dissepimental plates; septal spines well-developed to absent; increase lateral from corallite walls or coenenchymal from connecting elements.

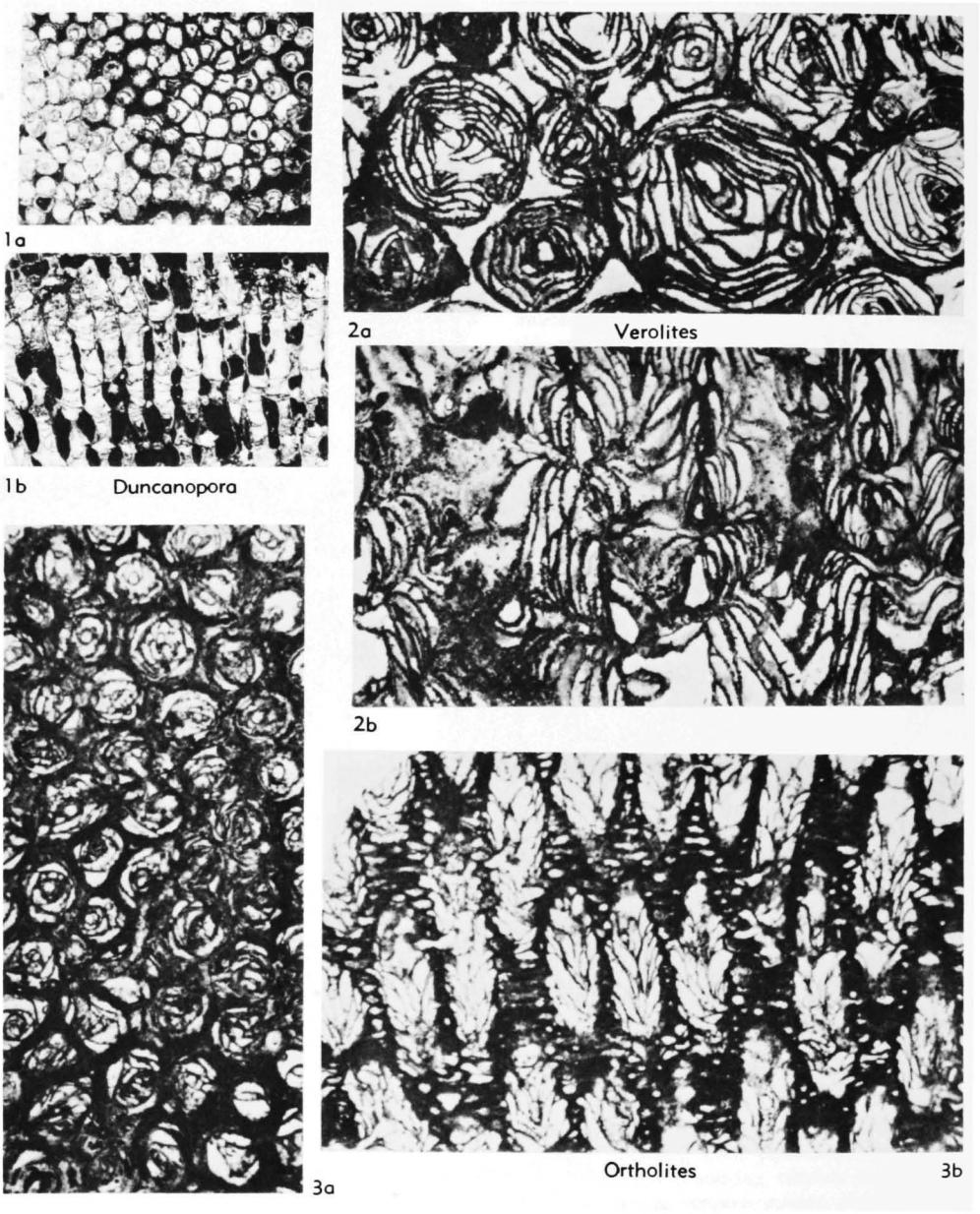


FIG. 458. Thecostegitidae (p. *F660-F662*).

L.Carb.(Tournais.), Asia(Kazakh.).——FIG. 458, *2a,b*. **V. rarus*; holotype, Tournais., Simorinsky horizon, C. Kazakh., R. Karasu; *a,b*, transv., long. secs., ×3.8 (Chudinova, 1975b).

Family CHONOSTEGITIDAE Lecompte, 1952

[Chonostegitidae LECOMPTE, 1952, p. 521]

Corallum phaceloid and cerioid in fairly regularly repeated alternation, with large pores through thin common walls of cerioid parts; septa represented peripherally by short spines and by other spines on tabulae; tabulae thin, horizontal or low to tall domes, reinforced peripherally and in cerioid parts by large, dissepimentlike plates; in places

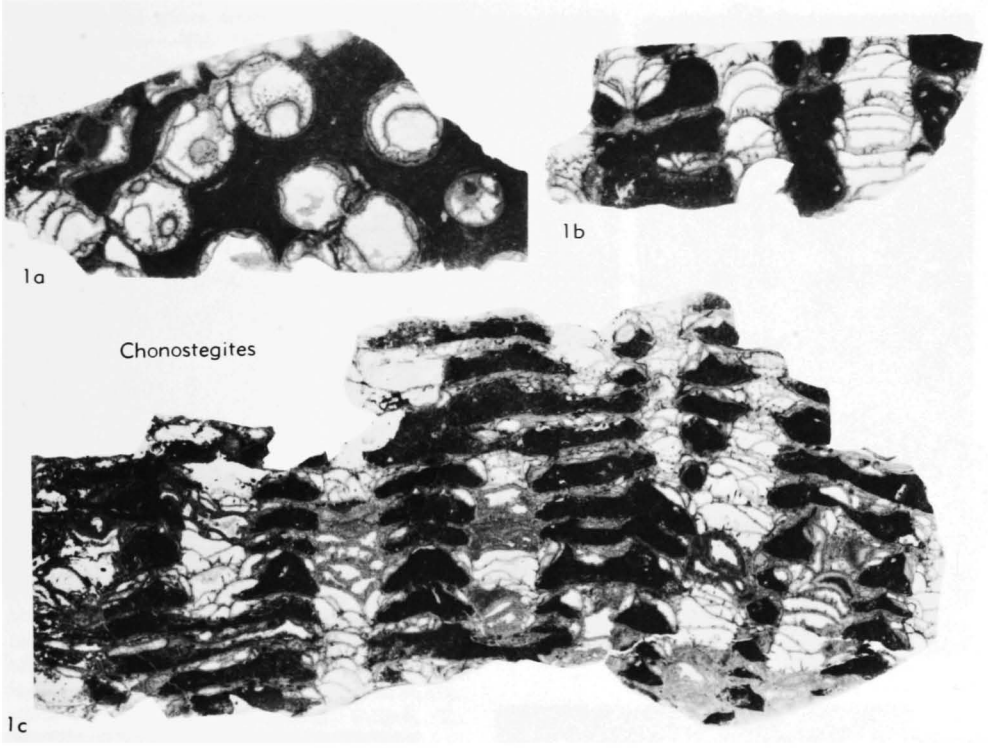


FIG. 459. Chonostegitidae (p. *F663*).

tabulae may have an axial notch that may be extended as a short axial tube. *L.Dev.-M.Dev.*

Chonostegites MILNE-EDWARDS & HAIME, 1851, p. 156 [**C. clappi*; M; †e-145, EM, Paris, see HILL & JELL, 1970a, p. 187] [=*Haimeophyllum* BILLINGS, 1859b, p. 139 (type, *H. ordinatum*, M; syntype, 3444a, GSC, Ottawa, see HILL & JELL, 1970a, p. 186]. Characters as for family. *L.Dev.(Ems.)-M.Dev.(Eifel.)*, E.N.Am.——FIG. 459,*1a,b*. *C. ordinatus* (BILLINGS), syntype, Dev., Can., Pt. Colborne, Ont.; *a,b*, transv., long. secs., ×2 (Hill & Jell, 1970a).——FIG. 459,*1c*. **C. clappi*, holotype, drift *ex* Dev., USA, Dayton, Ohio, long. sec., ×2 (Hill & Jell, 1970a).

Family GORSKYITIDAE Lin, 1963

[Gorskyitidae LIN, 1963a, p. 586] [?=Gorskyitidae LIN, 1959, publication not verified]

Corallum fasciculate; corallites thin-walled and closely spaced, rounded to rounded-polygonal in section and connected by tubuli that may be in haloes and somewhat flattened in horizontal plane; tabulae numerous and commonly incomplete, of tabellae that may form concave or infundibuliform floors and in places an axial syrinx; septal spinules present or absent. *L.Sil.; L.Carb.-L.Perm.*

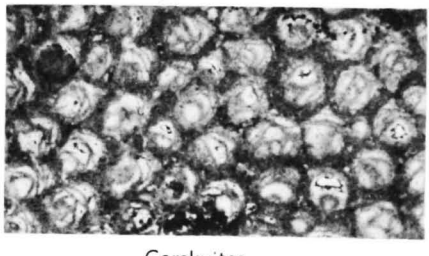
Gorskyites SOKOLOV, 1955, p. 194 [**G. elegans*; OD; †20, coll. 599, VNIGRI, Leningrad]. Corallum fasciculate, corallites cylindrical and closely spaced; walls thin; corallites connected by scattered thin tubuli of irregular circular or elliptical cross section, tubuli commonly in groups each forming an open halo about a corallite; septal spines rare to absent; tabulae numerous, more or less concave, commonly incomplete and declined adaxially. *L.Carb.(Tournais.)*, Asia(S.China)-Eu.(N.USSR).——FIG. 460,*3a,b*. **G. elegans*, holotype, USSR, Bolshezemel Tundra; *a,b*, transv., long. secs., ×4 (Sokolov, 1955).

Fuchungopora LIN, 1963a, p. 587 [**F. multispinosa*; OD; †not traced] [=*Füchungpora* LIN, 1963a, p. 587, *nom. null.*; *Füchungopora* JIA *et al.*, 1977, p. 265, *nom null.*] [It appears that this genus was founded in 1963 in some untraced publication; in the Chinese text of LIN, 1963a, p. 594, the generic name is followed by "1963" and not by the Chinese characters for "new genus." *F. multispinosa* was presumably described in the untraced paper. *F. multitabulata* is described and figured in LIN, 1963a. A specimen from the Lower Carboniferous of Kwangtung was described and figured as *F. multispinosa* LIN by JIA *et al.*,

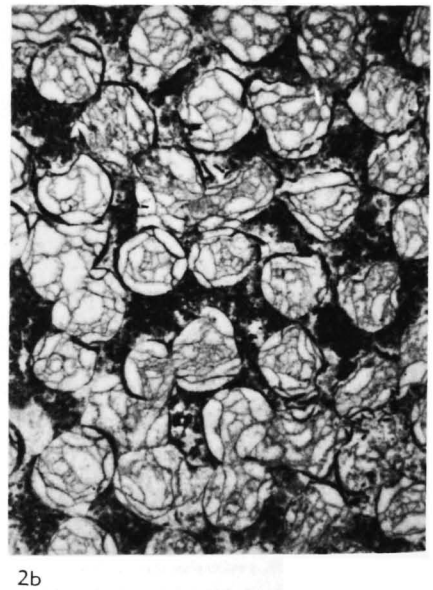
1a Fuchungopora

1b

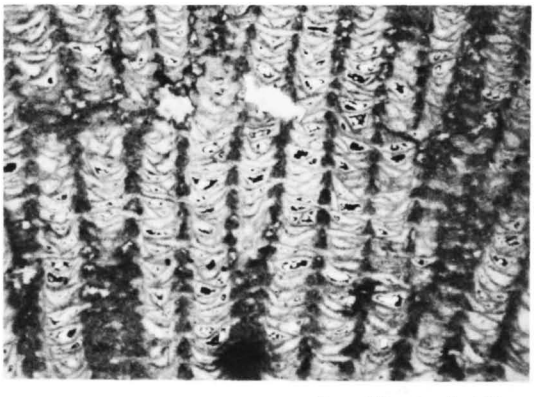
2a Neosyringopora



3a Gorskyites



2b



3b

FIG. 460. Gorskyitidae (p. *F663-F665*).

1977, p. 265.]. Corallum fasciculate; corallites numerous, closely spaced and of irregularly rounded-polygonal, rarely rounded, cross section; connecting processes common, tubular or laminar; walls thin; tabulae numerous, infundibuliform, with narrow axial syrinx and auxiliary peripheral

tabellae; septal spines present or absent. *L.Carb.*, Asia(S.China).——Fig. 460,*1a,b*. *F. multitabulata* Lin, Kwangsi, Duan distr.; *a,b*, long., transv. secs., ×4 (Lin, 1963a).

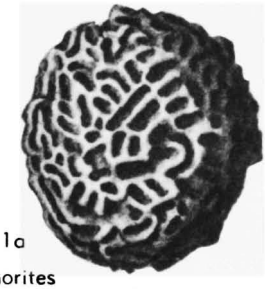
?**Meitanopora** Yang, 1973, work not traced, quoted in Yang, Kim, & Chow, 1978, p. 216 [**M. convexocystosa*; OD; †Gct 488-490, GB, Guiyang; L. Sil., Shiniulan F., Meitan, Guizhou (Kweichow)]. Fasciculate; corallites large and cylindrical, connected by ?tubular or ?platformlike processes that contain tabellae and may develop on successive levels simultaneously in neighboring corallites; walls moderately thick, septal spines not observed; tabulae like broad dissepiments, thin, closely spaced. [Diagnosis tentative, from illustrations; possibly chonostegitid or thecostegitid.] *L.Sil.*, Asia(Kweichow-Szechuan).

Neosyringopora Sokolov, 1955, p. 196 [**N. bulloides*; OD; †59, coll. 599, VNIGRI, Leningrad] [=*Cornwallatia* Hoare, 1966, p. 148, *nom. subst. pro Cornwallia* Hoare, 1964, p. 501 (type, *Cornwallia tabularia*, OD; †141494, USNM, Washington; Wolfcamp., USA, N. Nev., *non Cornwallia* Wilson, 1932, a brachiopod]. Corallum fasciculate; corallites thin-walled and closely spaced, commonly joined by very sparse and short connecting tubuli; tabulae incomplete, of dissepimentlike tabellae based on the walls and oblique to corallite axis; septal spinules weakly developed. *U.Carb.*, Eu. (W.slope S.Urals); *L.Perm.*, Eu.(Spits.-Urals)-N. Am.(Devon I.-Nev.).——Fig. 460,*2a,b*. **N. bulloides*, holotype, Ural Mts., basin of R. Berezova, lower section, Kolvo-Vishera region, W. slopes; *a,b*, long., transv. secs., ×4 (Sokolov, 1955).

Order, Superfamily, and Family Uncertain

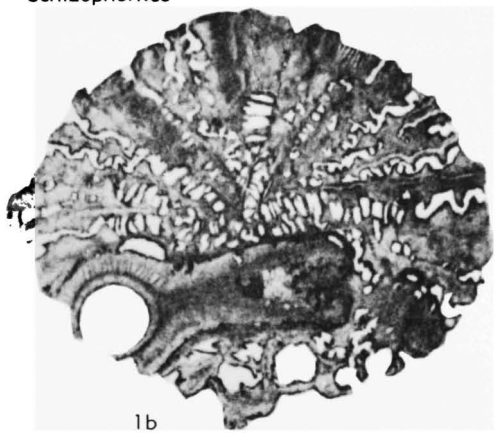
Schizophorites Gerth, 1921, p. 122 [**S. dubiosus*; M; figured syntypes 51, Wanner Coll., IP, Bonn]. Small spherical colonies, commonly adherent; calical openings round initially, rectangular or slitlike when more mature, opening normal to surface; proximal parts of corallites with superposed tabulae, distal parts with squamulalike projections from walls, not conjoined to one another; neither septal ridges nor spinules nor mural pores identified. [Insufficiently known.] *U.Perm.*, Asia (Timor).——Fig. 461,*1a,b*. **S. dubiosus*, syntypes, Basleo; *a*, ext. view, ×1.5; *b*, long. sec., ×4.0 (Gerth, 1921).

Trypanopora Sokolov & Obut in Sokolov, 1955, p. 221, *nom. subst. pro Spirocystis* Sokolov & Obut in Sokolov, 1950a, p. 172, *nom. nud., non Spirocystis* Leger & Duboscq, 1911, a protozoan [**T. terebra*; OD; †80, coll. 599, VNIGRI, Leningrad] [?=*Cystitrypanopora* Jia, 1977, Auloporida, Auloporicae, Aulocystidae]. Associations of gimletlike, spirally growing ?corallites (possibly solitary) of gradually increasing diameter; walls thin with



1a

Schizophorites



1b

2 Trypanopora

Fig. 461. Order, Superfamily, and Family Uncertain (p. *F665-F666*).

distinct external sheath; tabulae numerous, like vesicles, oblique to infundibuliform; septal spines not observed. [See PEL & LEJEUNE, 1971, p. 295. May possibly be worms rather than coelenterates.] *M.Dev.*, Asia(S.Ferghana); *M.Dev.(up.Givet.)*, Eu.(France-?Carnic Alps)-?Australia(New S.Wales). ——FIG. 461,2. *T. gabeliensis* PEL & LEJEUNE, up.Givet., France, Mont d'Haurs, thin sec., ×4.0 (Pel & Lejeune, 1971; photograph courtesy Mme. Carpentier-Lejeune).

UNRECOGNIZABLE GENERA

?Chaetetopsis NEUMAYR, 1890, p. 28 [**C. crinita*; OD; †no longer in the NEUMAYR Coll. in Vienna, *fide* PETERHANS, 1929c, p. 81; U.Jur.(Tithon.), Iwaso Konpira and Torinosuyama, Japan; PETERHANS, 1929c, based his chaetetid interpretation of the genus on the type specimen of *Monotrypa limitata* DENINGER, 1906, p. 64, in the Museum Univ. Freiburg, Ger., U.Jur.(Tithon.), Capri, Italy]. A neotype in MN, Paris, named by FISCHER, 1970, p. 197, is unsatisfactory in that it comes from a locality not named by NEUMAYR (Musaki, Japan) and has been greatly altered by diagenesis. From the two thin sections figured by FISCHER, its "tubuli" are of the right diameter for chaetetids, but some of the Mesozoic solenoporaceans also have wide cells.

Chonemblema SAY, 1824, p. 253 [**C. intricata*; M; †not traced; ?Sil. or ?Dev., N.Am.]. Insufficiently described, *nom. oblit.*, see HILL & JELL, 1970a, p. 177. Might possibly be referable to either *Syringolites, Roemeria, Roemeripora,* or *Syringopora.*

Cispusella DE GREGORIO, 1930, p. 45 [**C. grata*; M; †not traced; U.Perm., Sicily] [=*Cispuesella* FLÜGEL, 1970, p. 57, *nom. null.*]. Insufficiently described and figured.

Cladoporium DE GREGORIO, 1930, p. 46 [**C. porrectum*; M; †not traced; U.Perm., Sicily]. Insufficiently described and figured.

Cylicopora STEININGER, 1849, p. 17 [**C. fasciculata*; M; †not traced; M.Dev., Ger., Gerolstein, Eifel]. MILNE-EDWARDS & HAIME (1851, p. 427) considered this genus to be Silurian and a synonym of the rugosan *Strombodes* SCHWEIGGER (1819, table 6). SOKOLOV (1955, p. 258) listed it in his work on Tabulata but considered its position obscure.

Cylindripora EICHWALD, 1829, p. 190 [**C. serpuloides*; M; †not traced; from Sil. drift near Vilnius, Lith.] [=*Cylindropora* LANG, SMITH, & THOMAS, 1940, p. 46, *nom. van.*]. LANG, SMITH, & THOMAS (1940, p. 46) and SOKOLOV (1955, p. 258) considered that it may be a bryozoan.

Dendropora MICHELIN, 1846, p. 187 [**D. explicita*; M; †not traced; Ferques, Marquise, France, horizon uncertain, assumed by DE FROMENTEL (1861, p. 265) to be Dev.]. Insufficiently known. LANG, SMITH, & THOMAS (1940, p. 49) stated that *Dendropora* may be a bryozoan; SOKOLOV (1962c, p. 230) interpreted it as Trachyporidae; MICHELIN's illustration shows very slender branches with smooth surface except for distant, somewhat raised ?calical openings. Dendroporidae DE FROMENTEL, 1861, *nom. correct.* SOKOLOV, 1950a, p. 167, *pro* Dendroporiens DE FROMENTEL, 1861, p. 264, is thus insecurely founded.

Dictyostroma NICHOLSON, 1875d, p. 254 [**D. undulatum*; OD; ?syntype 10113, NICHOLSON Coll., AU, Aberdeen; Sil., Niagara Gr., Louisville, Ky.]. Originally described as a stromatoporoid; but NICHOLSON (1892, p. 232) stated that it "is certainly not referable to the stromatoporoids," although "its precise affinities are not absolutely clear." ROMINGER (1886, p. 55) considered *Dictyostroma* to be a synonym of *Alveolites.* BASSLER (1915, p. 428) stated "it is not a stromatoporoid but is a coral closely allied if not identical with *Coenites.*" SOKOLOV (1955, p. 189) doubtfully included it in Coenitinae. *?M.Sil.*, N. Am.(Ky.).——FIG. 462,*1a,b*. **D. undulatum*; ?syntype, Niag., Louisville; *a,b*, long., transv. secs., ×2.0 (Hill, n; AU10113).

Latepora RAFINESQUE, 1819, p. 429 [**L. alba*; M; †not traced; Ohio R., USA] [=*Lateropora* SOKOLOV, 1955, p. 517, *nom. van.*]. LANG, SMITH, & THOMAS (1940, p. 75) opined that *L. alba* is probably conspecific with *Michelinia convexa* D'ORBIGNY (1850, p. 107) from the Onondaga Limestone (low.M.Dev.) of Preston Co., Virginia, USA. Until the original material can be reexamined, the genus must remain indeterminate.

Linipora TROOST, 1840, p. 64 [**L. rotunda*; M; †not traced; Sil., USA, Brown's Port, Perry Co., Tenn.] [=*Linopora* LANG, SMITH, & THOMAS, 1940, p. 77, *nom. van.*]. BASSLER (1915, p. 472) stated that *L. rotunda* TROOST is not recognizable.

Milleria DAVIS, 1887, explanation to pl. 46, *non Milleria* HARTMANN, 1830, a fossil crinoid [**M. laminata*; M; †8357, MCZ, Cambridge, original of DAVIS, pl. 46, fig. 9; Sil.(up.Niag.), ferruginous clay near Louisville, Ky.]. BASSLER (1915, p. 428) considered it a synonym of *Dictyostroma* NICHOLSON, 1875d, which (see above) is also *incertae sedis.*

Mortieria DE KONINCK, 1841, p. 12 [**M. vertebralis*; M; †not traced; L.Carb.(Tournais.), Eu., Belg.] [=*Mortiera* HINDE, 1883, p. 156, *nom. null.*]. Possibly a sponge; see C. F. ROEMER, 1883, p. 321 and HINDE, 1883, p. 156.

Oncopora POČTA, 1894, p. 226 [**O. paradoxa*; M; †no number, BARRANDE Coll., NM, Prague; Dev., g_1, Karlštejn, Czech.]. Referred to Auloporidae by POČTA and by SOKOLOV (1955, p. 215); possibly an association of two organisms, very small solitary corals and a polyzoan.

Osculius DE GREGORIO, 1930, p. 46]**Favosites (Osculius) decipiens*; M; †not traced; U.Perm., Sicily]. Possibly pachyporid.

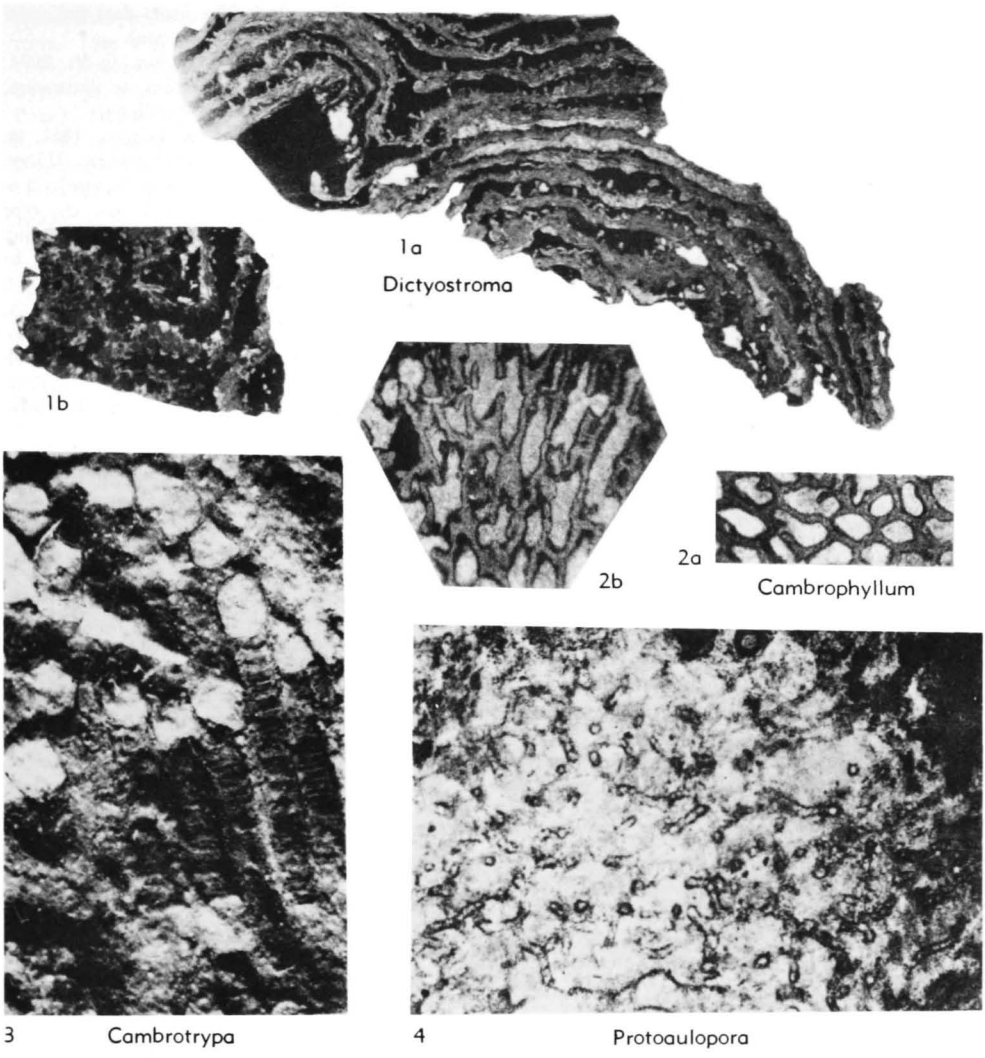


FIG. 462. Miscellaneous (p. *F666-F669*).

Plasmadictyon WILSON, 1926, p. 19 [**P. irregulare*; M; †6743, GSC, Ottawa; U.Ord.(Richmond.), N. Am., B.C.] [=*Plasmodictyon* SOKOLOV, 1955, p. 520, *nom. null.*]. Corallum a thin expansion; corallites of irregular size and section, with large mural pores. SOKOLOV (1955, p. 187) considered it alveolitid.

Pyritonema MCCOY, 1850, p. 273 [**P. fasciculus*; M; †A6946, SM, Cambridge; Ord., U.K., Tre Gil]. LINDSTRÖM, 1883b, p. 13, considered the genus synonymous with *Heliolites* DANA, 1846b, but HINDE, 1888, p. 111, described it as junior subjective synonym of *Hyalostelia* ZITTEL, 1879 (Porifera).

Rhabdopora MILNE-EDWARDS & HAIME, 1849a, p. 62, 1850, p. lxiii [**Dendropora megastoma* MCCOY, 1849, p. 129; OD; †E5392, SM, Cambridge; L.Carb., Derbyshire]. Possibly a bryozoan.

NOMINA NUDA

Cyathopora OWEN, 1844, p. 69, *err. pro Cyathophora* MICHELIN, 1843, p. 104. LANG, SMITH, & THOMAS, 1940, p. 44 state: "Although it might be argued that *Cyathopora* Owens is not a mistake for *Cyathophora* but was erected as a new genus by him, nevertheless, in view of the absence of any definite evidence to that effect, and as Owen was not in the habit of creating new genera, we prefer to regard Owen's term as an error for *Cyathophora* (a Jurassic hexacoral genus). Lind-

ström . . . [1883b, p. 8] holds this view, and he also states that Meek & Worthen considered the name to have been used by inadvertence. R. S. Bassler *(in litt.)* also accepts this as the correct interpretation. If, however, it be held that *Cyathopora* Owen is a new genus, then its genoholotype (by monotypy) is *C. iowensis* Owen, 1844, p. 69, pl. xi, from the 'Carboniferous Limestone' [Devonian, Hamilton Group], Iowa, U.S.A., and the name replaces *Striatopora* Hall." This *Treatise* regards *Cyathopora* Owen as an incorrect subsequent spelling and therefore not an available name.

Fuchungoporella Lin MS in Jia *et al.*, 1977, p. 266, as *Füchungoporella*. [No type species named, but *F. multitabulata* (Lin) was described and figured from the Lower Carboniferous of Guangdong (Kwangtung); this species is presumably the species mentioned in comment on *Fuchungopora* Lin, 1963a, which see. Jia described two other new species from the Middle Devonian of Hunan in the same work.]

Heliolitella Lin MS in Yang, Kim, & Chow, 1978, p. 241 [**H. lankaoensis*; OD; not diagnosed, described, or figured; but three other new species, two by Yang and one by Chow, are described and figured from L.Sil., Shiniulan F., Guizhou (Kweichow), China]. *L.Sil.-M.Sil.*, Asia(Kweichow-Shensi).

Heliolitella (Lankaolites) Lin MS in Li *et al.*, 1975, p. 199 [**H. (L.) sokolovi*, not described or figured]. Only species described is *H. (L.) erlangbaensis* H. F. Chu MS in Li *et al.*, 1975, p. 199, M.Sil., Ningqiang, Shensi; no type species is named or described for *Heliolitella (Heliolitella)*. In Chinese. [Figures are too small to serve as source for diagnosis.] *M.Sil.*, Asia (Shensi).

Jiangshanolites Lin & Chow (no date). In combination *J. multitabulatus* Lin & Chow in Yi, 1974, p. 6; no diagnosis, description, or illustration, no type species named. *M.Ord.*, China.

?Laceriporella Smirnova, 1970, p. 61, no description or diagnosis, no nomination of type species. Figures of *L. beluschja* are given without explanation or description, and specimen 145, coll. 10336 in collections of TsGM, Leningrad, is catalogued as holotype. *U.Sil.(Grebeni horizon)*, USSR (Belush, Vaygach I.).

Marginofistula Lin MS in Li *et al.*, 1975, p. 217 [**M. eccentrica* Lin MS; L.Carb., Hunan; not described or figured; only species described and figured is *M. dabashanensis* Lin & Yeh in Li *et al.*, 1975, p. 217, M.Sil., Ningqiang, Shensi]. Like *Syringopora* but tabular syrinx commonly eccentric. [Diagnosis tentative; translation not available.] *M.Sil.*, Asia(Shensi); *L.Carb.*, Asia(Yunnan).

Michelinella Yü & Shu, 1929, p. 50, 106, *nom. nud., fide* Lang, Smith, & Thomas, 1940, p. 84.

Quadrifavosites Rukhin, 1939, *nom. nud., fide* Sokolov, 1955, p. 258. The name does not occur in Roman letters in the work cited.

Subagetolites Li, no date. Gen. nov. in Yi, 1974, p. 12, no diagnosis, no description, no illustration, no type species named. *U.Ord.*, China.

Trachypora Milne-Edwards & Haime, 1851, p. 158, 305 [**T. davidsoni*; M; †missing; U.Dev. (Frasn.), Ferques, near Boulogne, France]. Lecompte (1939, p. 147), deduced that the type specimen was an association between an encrusting stromatoporoid and a branching tabulate coral; he compared it with a specimen he figured (1939, pl. 19, fig. 8, 9) as *Trachypora circulipora* Kayser, which is such an association between a stromatoporoid and *Thamnopora* or possibly an auloporoid. The family Trachyporidae Waagen & Wentzel, 1886 (p. 843, as Trachyporinae) is thus insecurely founded.

TAXA PROBABLY NEITHER RUGOSA NOR TABULATA

Aseptaliidae Vologdin in Vologdin & Strygin, 1969, p. 447, family. Minute, slenderly conical, with double-layered wall and no sign of septa. *L.Proterozoic.*

Aseptalia Vologdin in Vologdin & Strygin, 1969, p. 447 [**A. ukrainika*; OD; †1802, IG, Kiev]. Minute slender cones with double-layered wall, outer layer thicker; holotype of type species aseptate. *L.Proterozoic*, USSR (drill-hole, Krivoi-Rog, Ukraine).

Bija Vologdin, 1932, p. 17 [**B. sibirica*; M; †not traced; L.Cam., USSR, R. Ledbed, Altay]. Numerous, very small, prismatic tubes closely adpressed and radiating fanwise, with thin walls and without trace of septa or tabulae. [Doubtfully referred by Vologdin to Alcyonaria. Sokolov (1962c, p. 208) suggested that it showed affinities with Tabulata.]

Bolboporites Pander, 1830, p. 106 [**B. mitralis*; SD Bassler, 1915, p. 128; †not traced]. *Ord.*, USSR(near Leningrad). [See Lang, Smith, & Thomas, 1940, p. 27.]

Cambrophyllum Fritz & Howell, 1955, p. 181 [**C. problematicum*; OD; †76262, PU, Princeton]. Skeleton compound, hemispherical; increase by adaxial growth of longitudinal laminae; individual skeletons polygonal to rounded in cross section; walls thick, with gaps ?(mural pores); septa and tabulae absent. [Sokolov, 1962c, p. 208, considered that *Cambrophyllum* may be regarded as probable predecessor of Tabulata.] *U.Cam.(low. Dresbach.)*, USA(Mont.).——Fig. 462,*2a,b*. **C. problematicum*, Horseshoe Hills; *a,b*, holotype, transv., long. secs., ×4.0 (Fritz & Howell, 1955).

Cambrotrypa Fritz & Howell, 1959, p. 89 [**C. montanensis*; OD; †84516, PU, Princeton]. Skeleton compound, of small slender cylindrical to subprismatic tubuli contiguous or closely spaced with walls finely wrinkled transversely and with sparse

connections between tubules; no internal structures. [See also BOLTON & COPELAND, 1963, p. 1069. SOKOLOV, 1962, p. 208, described *Cambrotrypa* as "tabulate-like."] *M.Cam.(Albertella Zone),* N.Am.(Mont.-Alberta-B.C.).——FIG. 462, *3.* **C. montanensis,* Silver Hill F., Mont., near Drummond Post Office; syntype, long. view, ×11.4 (Fritz & Howell, 1959).

Coelenteratella KORDE, 1959, p. 627 [**C. antiqua*; OD; †323, KORDE coll., PIN, Moscow]. Solitary, slenderly conical skeletons attached to substrate by flat sole; with marked distant rejuvenescence; calice ?deep. Insufficiently known. *Low.M.Cam. (Amgian),* Asia(SE.Sib.Platf.).

Cothoniidae JELL & JELL, 1976, p. 181, family. Small, solitary or more rarely colonial (dendroid), operculate, calcareous skeletons; individuals conical with smooth to peripherally and biradially corrugated to septate calices; conical aporose wall with a pair of symmetrically placed longitudinal folds at which calical rim may project; circumference increased during growth by insertion of additional fibrous ?trabeculate material in the four positions adjacent to the two folds; lumen without tabulae or dissepiments, but filled with fibrous and possibly trabeculate sclerenchyme; increase peripheral and parricidal; operculum highly variable, its outer surface with concentric growth rings and its inner surface septate with prominent fossula, septa being arranged in two or three orders symmetrically about fossula; may or may not close calice. *Low. M.Cam.*

Cothonion JELL & JELL, 1976, p. 181 [**C. sympomatum*; OD; †29237, ANU, Canberra]. Characters as for family Cothoniidae. *Low.M.Cam.,* Australia(New S.Wales).

Decaphyllum FRECH, 1885, p. 69 [**D. koeneni*; M; †slides in HU, E. Berlin]. See SCHINDEWOLF (1942, p. 285), who considers monotype to be a Mesozoic scleractinian, erroneously labeled as from Upper Devonian of Grund, Harz, Ger.

Disconia WESTPHAL, 1974a, p. 79 [**D. pentamerus*; M; †1561/3, UW, Madison]. Removed from the corals and identified as an echinoderm by WESTPHAL, 1974b, p. 1096. *M.Ord.,* N.Am.(Wis.).

Gakarusia HAUGHTON, 1964, p. 258 [**G. addisoni*; OD; †4350, MMM, Kimberley]. *Proterozoic,* S. Afr. [See HÄNTZSCHEL, 1975, p. *W*147.]

Ingordium DE GREGORIO, 1930, p. 44 [**R. nodosum*; M; †not traced]. Insufficiently described and figured. *U.Perm.,* Sicily.

Lamellopora OWEN, 1844, p. 70 [**L. infundibularia*; M; †not traced] [=*Lamellipora* LANG, SMITH, & THOMAS, 1940, p. 74, *nom. van.*]. Possibly a stromatoporoid. *Sil.(Niag.),* N.Am.(Iowa-Wis.).

Lipopora JELL & JELL, 1976, p. 193 [**L. lissa*; OD; †29521, ANU, Canberra]. Characters as for family Lipoporidae. *Low.M.Cam.,* Australia(New S.Wales).

Lipoporidae JELL & JELL, 1976, p. 193, family. Small, loosely fasciculate calcareous skeletons; individuals scolecoid, with rejuvenescense rims; calice with narrow rim that may be extended laterally, and is weakly to prominently septate, 8 to 16 continuous ridges extending subradially halfway to axis; wall aporose; lumen without tabulae or dissepiments; increase lateral. *Low.M.Cam.*

Patinula EICHWALD, 1829, p. 186 [**P. lithuana*; M; †not traced]. Drift, Eu.(Lith.).

Protoaulopora SOKOLOV, 1952b, p. 145 [**Syringopora ramosa* VOLOGDIN, 1931, p. 134; OD; †not traced] [=*Protoaulopora* SOKOLOV, 1950a, p. 171, *nom. nud.*]. Corallum small, in large clusters; corallites minute, slightly conical, prostrate, with slightly raised calices; walls thin; three offsets may arise from a single site; no septa, no tabulae. [See SOKOLOV, 1962c, p. 243; systematic position and age doubtful.] *?U.Cam.,* Asia(Kazakh.).——FIG. 462,*4.* **P. ramosa* (VOLOGDIN), syntype, Chingiz Ra., Kazakh.; random thin sec., ×10.0 (Vologdin, 1931).

Ruscum DE GREGORIO, 1930, p. 44 [**R. pluriechinatum*; M; †not traced]. Insufficiently described and figured. *Perm.,* Eu.(Sicily).

Spongarium LONSDALE, 1839, p. 696 [**S. edwardsi*; M; †not traced]. *U.Sil.,* Eu.(Eng.).

Tabulaconus HANDFIELD, 1969, p. 784 [**T. kordeae*; OD; †24709, GSC, Ottawa]. Aseptate cones with tabulae flat and complete or, in places, of large tabellae. *?L.Cam.,* N.Am.(Alaska); *L.Cam.,* N.Am.(B.C.).