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MIDDLE TRIASSIC SCLERACTINIA FROM THE CRACOW-SILESIA REGION, POLAND

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Scleractinian coral buildups from the Karchowice Beds (uppermost part of the Lower Muschelkalk) and from the *Diplopora* Dolomite (Middle Muschelkalk) of the Cracow-Silesia region were examined. Described corals comprise: three species known from literature — *Coelocenia* cf. *decipiens* (Laube), *Pamiroseris silesiaca* (Beyrich), *Eckastraea prisca* (Weissermel); four new species — *Volzeia szulci*, *Morycastraea opoliensis*, *Silesiastraea weissermeli*, *Chevalieria tenuiseptata*; and three determined as *Stylophyllopsis* sp., *Cyathocoenia* sp. and *Pamiroseris* sp. New genera, *Eckastraea* and *Silesiastraea*, are established. The most frequent component of coral communities appears *Pamiroseris silesiaca*.

Key words: Scleractinia, taxonomy, morphology, paleoecology, Middle Triassic, southern Poland.

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INTRODUCTION

Scleractinian corals from the Muschelkalk of Silesia, mainly of the region of Opole, are known in the literature for more than 130 years. The corals have been described or cited by Beyrich (1852), Eck (1865, 1879), Roemer (1870), Ahlburg (1906), Weissermel (1925), Schmidt (1928, 1938), Assmann (1937), Morycowa (1981) and Morycowa and Roniewicz (1986). The most important of these is Weissermel's paper (1925) concerning the hitherto known Muschelkalk corals from Silesia.

The examined corals occur in limestones, dolomitic limestones and dolomites belonging to the epicontinental facies of the Middle European Triassic. Corals are rare in the Górażdże Beds, frequent in the Karchowice Beds and common in the *Diplopora* Dolomite (lithostratigraphical division after Assmann 1944 and Siedlecki 1949). Some corals were also reported from the ore-bearing dolomite of the Lower and partly Middle Muschelkalk.

Coral-bearing strata are of the Anisian age (table 1), more precisely — the Pelsonian and early Illyrian (Zawidzka 1975, Trammer 1980). The Karchowice Beds constitute the upper part of the Lower Muschelkalk (Assmann 1944, Siedlecki 1949). They correspond to the late Pelsonian (conodont *Neospathodus kockeli* Zone) and the early Illyrian (conodont *Gondolella excelsa* Zone) (Zawidzka 1975).

The *Diplopora* Dolomite belongs to the Middle Muschelkalk (Assmann 1944, Siedlecki 1949) and corresponds to the early Illyrian (Zawidzka 1975, Trammer 1980).

Nine genera and ten species were identified in the here described collection (table 1). Weissermel (1925) described from the Upper Silesia nine coral species (and one subspecies) representing six genera (table 2). As the generic names of Triassic corals (see Cuif 1974, 1975) need revision, in this paper the generic assigment of Weissermel's *Thamnasteria* and *Isastraea* species have been emended.

Acknowledgements. — The coral sites in the Karchowice Beds were kindly indicated to the author by Dr. Stanisław Dżułyński and Dr. Andrzej Kubicz. Several colonies from the Karchowice Beds and *Diplopora* Dolomite were given to the author by Dr. Ewa Roniewicz, Professor Krzysztof Birkenmajer, and Dr. Joachim Szulc. The specimens of corals from borehole cores were given by Czesław Harańczyk.

The valuable information of the mentioned persons is here kindly acknowledged. I thank also Dr. Ewa Roniewicz (Institute of Paleobiology, Polish Academy of Sciences, Warsaw) as well as Dr. Galina Melnikova (Institute of Geology, Tadzhik Academy of Sciences, Dushanbe) for discussions and comparative materials. I thank Dr. Franciszka Szymakowska for part of the drawings, Mr. Władysław Wyżga for making the thin sections, and Mr. Krzysztof Fedorowicz for making most of the photographs.

After the present paper had been submitted to the editors, the author has the opportunity to examine in the Museum f. Naturkunde d. Humboldt Universität, Berlin, and in the Zentrales Geologisches Institut Aussenstelle Bernau the collections of corals (Beyrich's, Eck's, Weissermel's, Assmann's) from the Muschelkalk of the Silesia region. The present author is grateful to Dr. Hermann Jaeger from the Museum, and Dr. Harry Döring from the Institut, for providing facilities and insight into collections of the corals.

The collection examined is stored at the Museum of the Institute of Geological Sciences, Jagiellonian University in Cracow (UJ).

MATERIAL

The earlier studied Triassic coral assemblages from Silesia were poor, both, in specimens and species (table 2). A new collection of corals from the Cracow-Silesia region in the author's disposal is relatively rich (table 1). It comprises 41 specimens — 21 from the Karchowice Beds and 20 from the *Diplopora* Dolomite — representing 10 species and 9 genera.

The corals have been collected from the Karchowice Beds exposed in the quarry at Kamień Śląski (19 specimens), Tarnów Opolski (1 specimen) and Izbicko in Opole region (1 specimen), and in the *Diplopora* Dolomite —

in the quarries at Stare Gliny near Olkusz (14 specimens), Pogorzyce near Chrzanów (2 specimens) and in borehole cores from the vicinity of Zawiercie (4 specimens) (fig. 1, table 1).

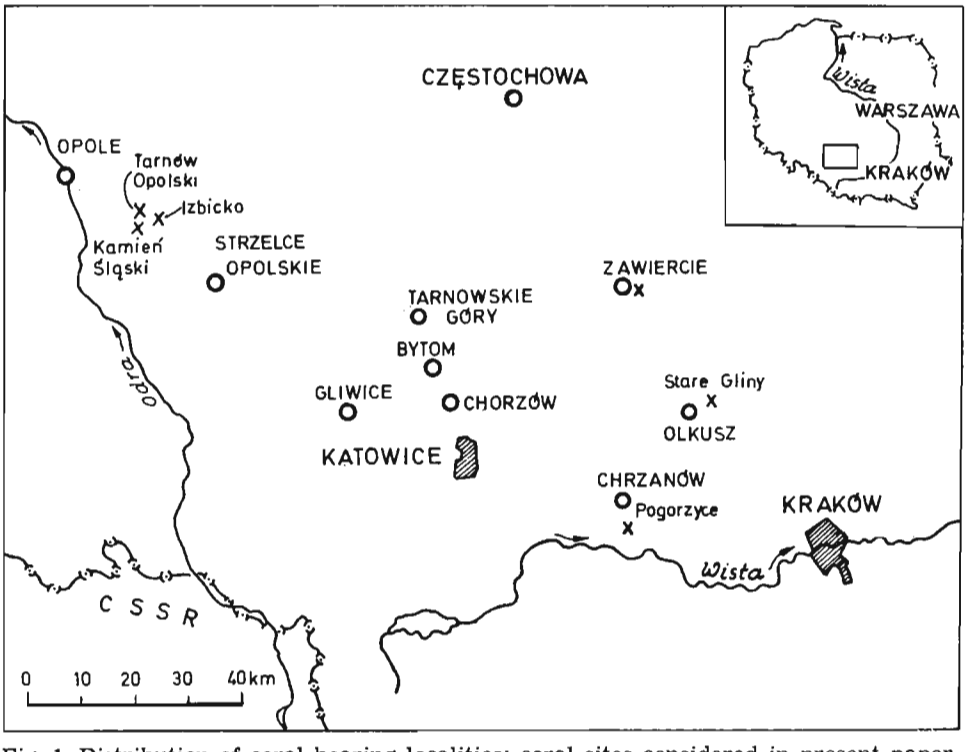


Fig. 1. Distribution of coral-bearing localities; coral sites considered in present paper. Insert shows position of the region in question

The corals from the Muschelkalk of the Cracow-Silesia region are very poorly preserved. Nevertheless, the present author has undertaken their identification because the knowledge of the Anisian corals is of great importance for the phylogeny of the Scleractinia.

The coral collection under consideration comprises complete colonies or fragments, and natural casts of calicular surfaces. The colonies are small, several centimetres in diameter. The most frequent are thin-lamellar forms, from a few millimetres to three centimetres thick, rarely massive, up to few centimetres in height. The thin-lamellar, often incrusting colonies occur usually in the form of several clusters, often superimposed one upon another (fig. 2). There occur also branching (even large phaceloid) colonies.

The coral skeletons are very poorly preserved. They are recrystallized, and sometimes partly dolomitized. The skeletal structure of the corals have been studied on the traces of trabeculae and by observation of septal ornamentation.

Table 1

Distribution of the examined species in the epicontinental Triassic

Province	Middle-European								
Geographical distribution	Cracow-Silesia region								G.D.R. F.R.G
Age	Anisian					Ladinian			Anisian
		Pelsonian		Illyrian		Fassian			
Lithostratigraphy	Muschelkalk								Muschel-kalk
	Lower				M	Upper			Lower
Species	Gogolin Beds	Górażdże Beds	*Terebratula* Beds	Karchowice Beds	*Diplopora* Dolomite	Tarnowice Beds	Wilkowice Beds	Boruszowice Beds	
Stylophyllopsis sp.				1					
Volzeia szulci sp.n.				1					
Coelocoenia cf. *decipiens* (Laube)					1				
Cyathocoenia sp.					3				
Pamiroseris silesiaca (Beyr.)		×		13 ×	10 ×				×
Pamiroseris sp.					2				
Morycastraea opoliensis sp.n.				2					
Silesiastraea weissermeli gen. et sp. n.				2	1				
Eckastraea prisca (Weiss.)				×	3				
Chevalieria tenuiseptata sp. n.				2					

1, 2 ... number of specimens under study; × occurrences known from literature. Lithostratigraphy after Assmann 1944 and Siedlecki 1949; biostratigraphy after Zawidzka 1975.

Abbreviations used in taxonomic descriptions:

c—c	distance between centres of corallites
D	diameter of corallites
d	diameter of calice
dg	density of granulae (on lateral septal surfaces, in transverse section)
S	number of radial elements per corallite
Sd	septal density measured in the wall, in transverse section
S1, S2	number of radial elements of the 1st, 2nd, ... orders of length
(...)	values encountered rarely
((...))	values encountered sporadically.

CORAL-BEARING SEDIMENTS AND THEIR FAUNAL CONTENT

Karchowice Beds. — The corals from the Karchowice Beds come from one of old, now non-existent quarries (the "northern quarry") in Kamień Śląski and from the quarries still in operation at Tarnów Opolski and Izbicko (Opole region, fig. 1). The maximum thickness of the Karchowice Beds in this area is about 15 metres (Dżułyński and Kubicz 1971). Coral-bearing strata are confined most probably within the upper part of these beds.

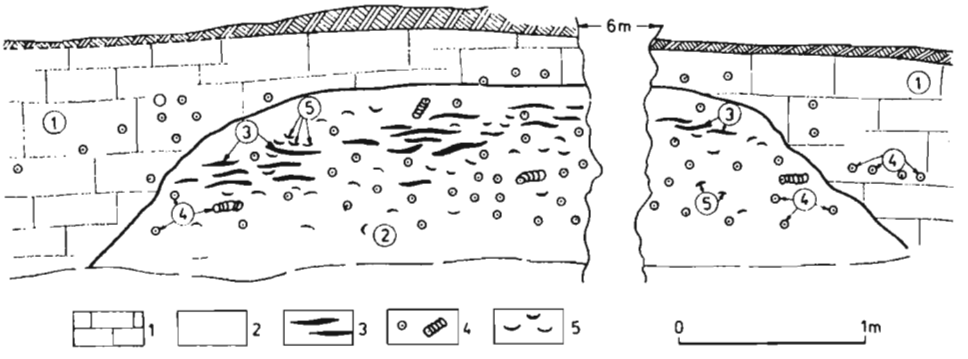


Fig. 2. Bioherm with corals of Karchowice Beds from Kamień Śląski; *1* poorly bedded limestone, *2* non-bedded limestone, *3* thin-lamellar coral colonies, *4* elements and fragments of crinoid stems, *5* pelecypod and brachiopod shells

The Karchowice Beds are represented mainly by beige, indistinctly stratified limestones and include small bioherms and biostromes of beige and beige-yellowish porous limestones (Dżułyński and Kubicz 1971, Morycowa 1974, 1981, Zawidzka 1975, Dr. J. Szulc personal communication) that are more organogenic in character than the accompanying deposits.

Some of the bioherms include accumulations of coral colonies (figs. 2, 3, 4). One bioherm (fig. 2) reveals colonies grouped in a horizon 30—40 cm thick, situated in its upper part. The most frequent are thin-lamellar

colonies at some places forming multistorey buildups. Colonies occur in life position.

The corals are accompanied by very numerous crinoid stems and fragments of stems, thin-shelled bivalves, and less numerous gastropods and brachiopods (including *Decurtella decurtata* (Girard)), as well as skeletal elements of echinoids (mainly spines).

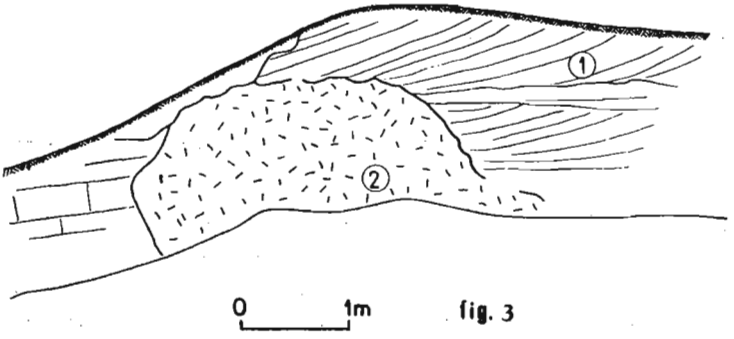


fig. 3

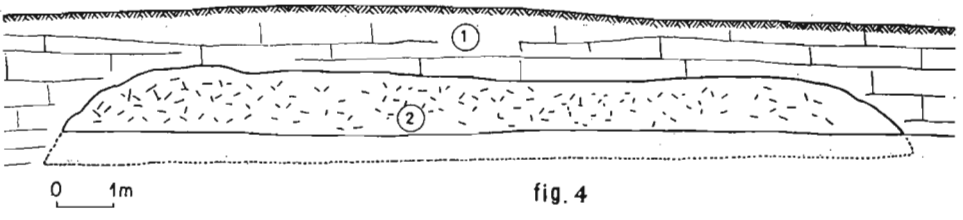


fig. 4

Figs. 3, 4. Schematic drawings of bioherms of organogenic limestones with corals, Karchowice Beds at Kamień Śląski; *1* poorly bedded limestone, *2* non-bedded organogenic limestone with corals

The organogenic limestones from the bioherms appear in thin sections as biomicrites, biomicrosparites, biosparites (pl. 1: 1—8, pl. 2: 1—3). The matrix of these limestones includes annelid tubes, very thin shells of bivalves and ostracod carapaces, rare tests of foraminifera, scarce remains of dasycladacean algae, rare biogenic sedimentary structures related to cyanophytes, and small peloids.

Diplopora Dolomite. — The corals come from the exposures in the quarries at Stare Gliny and Pogorzyce, and from boreholes in the vicinity of Zawiercie (fig. 1, table 1).

The *Diplopora* Dolomite is represented by dolomites, dolomitic limestones with numerous (moulds and natural casts), and rare remains of fauna and algae (including *Diplopora annulatissima* Pia). The thickness of these strata in the investigated area is ca. 15—30 m (Assmann 1944, Siedlecki 1949).

The information on the mode of occurrence of corals in the deposits of the Middle Muschelkalk comes mainly from the exposures in the

southern wall of the quarry at Stare Gliny. There are exposed yellowish-grey dolomites and calcareous dolomites, ca. 9 m thick. Coral colonies occur mainly in the lower, up to one metre thick part of the *Diplopora* Dolomite, represented here by detritic dolomites and calcareous dolomites. Apart from the corals, they include fragments of crinoid stems, moulds of bivalves and numerous fragments of dark-grey Devonian limestones (pl. 2: 4a, b).

Corals were also found in an oncolitic horizon, ca. 1 m thick, that occurs in the highest part of the exposure. The limestone, apart of the coral skeletons and their natural casts includes poorly preserved remains of foraminifera, debris of bivalves, echinoderms and dasycladacean algae (pl. 2: 6).

The microfacies of the detritic dolomites and calcareous dolomites include mainly extra-intradolomicrosparites (deposits related to the direct transgression of the *Diplopora* beds over the Devonian basement) as well as intradolosparite and intradolomicrosparite.

The oncoid deposits appear in thin sections mainly as oncodolomicrosparites and oncodolosparites. The microdolosparite, less frequently dolosparite matrix, with patches silicified to a various degree, includes microoncoides and less frequently oncoides, often completely altered by aggradational neomorphism and dolomitization. Few peloids are also present.

The corals from the *Diplopora* Dolomites in Stare Gliny occur usually as dispersed colonies. It seems that they do not occur in life position. They are chiefly encountered as casts of outer surfaces of colonies, rarely as colonies with somewhat altered, recrystallized skeleton, and often — dolomitized.

The corals from the quarry at Pogorzyce occur in oncolitic deposits of the Middle Muschelkalk. These deposits are slightly porous, marly, cream-coloured. Microscopically they are oncodolosparites and oncosparites (pl. 2: 5a, b).

In similar oncolitic deposits occurred the casts of coral skeletons found in cores from two boreholes: Zawiercie Miasto ZMZ-14 (Glass plant), depth 42 m, and Zawiercie Miasto ("South") ZL 8-7, depth 36 m.

REMARKS ON CORAL PALEOECOLOGY AND PALEOGEOGRAPHICAL DISTRIBUTION

The environment of coral buildups formation in the Lower Muschelkalk (Karchowice Beds) was one of warm, shallow and calm waters (probably not more than 40 m deep), slightly off shore. This is indicated by development of hermatypic corals associated with dasycladacean algae. The relatively calm-water environment is indicated by sediment types

(micrite-dominated) and coral growth forms (fine, thin-lamellar or branching corals occurring in life position), as well as preservation state of co-occurring fauna (non-fragmented delicate bivalve shells and frequent fairly long crinoid stems). The settling of coral larvae was probably facilitated by crinoidal "sand" abounding on the bottom.

The life conditions of the corals of the Middle Muschelkalk (*Diplopora* Dolomite) were those of warm and shallow waters (ca. 10—20 m) as indicated by the coral-algal association (hermatypic corals, dasycladacean algae), and the presence of oncoids. The detritic and oncoidal nature of the sediments is indicative of a relatively high energy of the environment.

The corals of the *Diplopora* Dolomite probably do not occur in life position, but are undoubtedly an autochthonous component of the sediment.

From the nineteen Muschelkalk coral species of the Cracow-Silesia region, the most frequent, both in the old and the present collections, is *Pamiroseris silesiaca* (Beyrich 1852). It is known from strata of similar age in GDR and FRG (Eck 1879, Schmidt 1938), as well as from the Tethyan province: Alps (Schauroth 1859, see also Eck 1879 and Weissermel 1925) and from southern China (Deng Zhanqiu and Kong Lei 1984, Qi Wentog 1984). Three other species are common with the Tethyan province, and one even with the Pacific province. Two of these are determined by Weissermel as *Thecosmilia compressa* (Anisian of Hungary and Czechoslovakia — West Carpathians; Kolosvary 1966) and *Thecosmilia caespitosa* Reuss (Late Triassic of the Alps, Hungary and North America: Frech 1890, Kolosvary 1966, Stanley 1986). The third is from the author's collection — *Coelocoenia* cf. *decipiens* (Laube). It is very close to *C. decipiens* (Laube) described from the Carnian of the Southern Alps (Laube 1865, Frech 1890, Volz 1896, and Cuif 1972).

DESCRIPTIONS

Suborder **Stylophyllina** Beauvais, 1981
Family **Stylophyllidae** Volz, 1896, emend. Alloiteau, 1952
Genus *Stylophyllopsis* Frech, 1890, emend. Cuif, 1972
Stylophyllopsis sp.
(pl. 4: 2)

Material. — One fragment of colony (No. UJ 34P/1).

Dimensions (in mm):

D ca. 3.0×4.0

S 12 S1+nS2 and S3

Description. — Fragment of small branching colony composed of two short corallites. Calices oval. Septa belonging to 2—3 orders. About 12 thick septa reach the centre of corallite. Between them much thinner, occurring irregularly. Inner edge

Table 2

Corals from the Cracow-Silesia region, known from literature*)
(largely after Weissermel 1925; generic names not emended)

Number of specimens	Species \ Stratigraphy	Muschelkalk: Gogolin Beds	Górażdże Beds	*Terebratula* B.	Karchowice Beds	*Diplopora* Dolomite	Ore-bearing Dolomites	Occurrence (after Beyrich 1852, Eck 1865 and Weissermel 1925)
1	*Coelocoenia*(?) *assmanni* Weissermel				+*			Kamień Śląski
1	*Coelocoenia exporrecta* Weissermel				+*			Kamień Śląski
24	*Montlivaltia triasina* Dunker				+	+	+	Gliwice-Łabędy, Zabrze-Mikulczyce, Grabowiec n. Zabrze-Mikulczyce, Repty n. Tarnowskie Góry, St. Anna Mt., Kamień Śląski, Jemielnica n. Strzelce Opolskie
5	*Montlivaltia chonocalyx* Weissermel		+		+		+	Strzelce Opolskie, Kępczowice n. Tarnowskie Góry
1	*Thecosmilia compressa* Weissermel						+	Tarnowskie Góry
1	*Thecosmilia caespitosa* Reuss				+			Zabrze-Mikulczyce
1	*Isastraea prisca* Weissermel				+*			Kamień Śląski
1	*Phyllocoenia globosa* Weissermel (= *Phyllocoeniella globosa* Weissermel, 1925)				+*			Kamień Śląski
23	*Thamnastraea silesiaca* Beyrich		+	+	+	+	+	Zabrze-Mikulczyce, Bytom, Tarnowskie Góry, Granice n. Jaworzno, Osiecznica n. Bolesławiec
1	*Th. silesiaca* v. *stichophila* Weissermel						+	Tarnowskie Góry

*) Names of localities used in old literature (Beyrich 1852, Eck 1865, Weissermel 1925, Assmann 1937 and others): Annaberg — Góra Św. Anny = St. Anna Mt.; Beuthen — Bytom; Grabowietz—Mühle bei Mikultschütz — Grabowiec, about 1/2 km N of Zabrze—Mikulczyce; Granietz — Granice, about 4 km SW of Jaworzno; Gleiwitz — Gliwice; Gross Stein — Kamień Śląski; Gross Strehlitz — Strzelce Opolskie; Himmelwitz — Jemielnica near Strzelce Opolskie; Kempczowitz — Kępczowice near Tarnowskie Góry; Laband — Łabędy = Gliwice—Łabędy (Łabędy about 2—3 km NW of Gliwice); Mikultschütz — Zabrze—Mikulczyce (N part of Zabrze); Repten — Repty, about 3—4 km SW of Tarnowskie Góry; Tarnowitz — Tarnowice, W quarter of Tarnowskie Góry; Wehrau — Osiecznica near Bolesławiec (Lower Silesia).

of septa dissociating into isolated trabeculae which form a small papillar columella. Wall thick, finely longitudinally striated.

Remarks. — This species was included in the genus *Stylophyllopsis* (= *Phacelostylophyllum* Melnikova, 1972) on the basis of the development of septa.

Occurrence. — Cracow-Silesia region: Kamień Śląski — Karchowice Beds (uppermost Lower Muschelkalk).

Suborder **Pachythecalina** Eliášová, 1978
Family **Volzeiidae** Beauvais, 1981 [1)]
Genus *Volzeia* Cuif, 1966
Volzeia szulci sp. n.
(pl. 3: 1a—f; fig. 5)

Holotypus: UJ 34P/2; fig. 5; pl. 3: 1a—f.

Stratum typicum: Karchowice Beds (uppermost Lower Muschelkalk).

Locus typicus: Tarnów Opolski (Opole region).

Derivatio nominis: *szulci* — dedicated to Dr. Joachim Szulc of Jagiellonian University who found this and several Middle Triassic coral colonies in the Cracow-Silesia region.

Diagnosis. — Colony built of subparallel corallites 2—3 mm in diameter, with 18—24 septa.

Material. — Several fragments of one large colony (UJ 34P/2a—e); 2 thin sections (UJ 7/2a, b).

Dimensions:

diameter of colony	about 0.5 m
heigth of colony	about 1 m
length of corallites	about 10 mm
D	2—3 mm
S	(16)—24

Description. — Phaceloid colony consisting of numerous, fairly long corallites, circular in transverse sections. Septa are differentiated in three orders. The S1 septa are distinctly thicker than the others and they reach 2/3 of the length radius. S2 slightly shorter, S3 very short and thin. Septal faces ornamented with granulae. Wall and epitheca are thin. Endotheca composed of large dissepiments. Budding lateral, extracalicular, or less frequently — intracalicular. Columella absent. Microstructure not preserved.

Remarks. — Our species differs from all so far known species of this genus by its distinctly smaller corallites.

Occurrence. — Cracow-Silesia region: Tarnów Opolski — Karchowice Beds (uppermost Lower Muschelkalk).

[1)] In the paper, the taxonomic position of Volzeiidae is accepted after Cuif (1974) and Beauvais (1981) and not Melnikova (1984b).

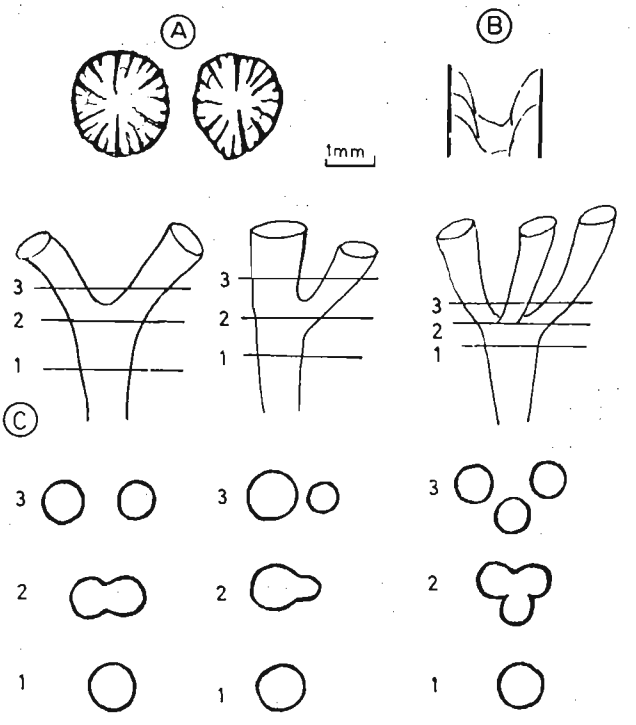


Fig. 5. *Volzeia szulci* sp. n. Specimen UJ 34P/2: *A* corallite transverse sections showing septal arrangement; *B* longitudinal section; *C* most common modes of budding

Suborder **Archaeocoeniina** Alloiteau, 1952
Family uncertain
Genus *Coelocoenia* Duncan, 1866, emend. Volz, 1896
Coelocoenia cf. *decipiens* (Laube, 1865)
(pl. 4: 4a—c)

1896. *Coelocoenia decipiens* (Laube); Volz: 84, pl. 10: 5.
1972. *Coelocoenia decipiens* (Laube); Cuif: 271, figs. 27 and 28.

Material. — One fragment of colony (UJ 34P/3).
Dimensions (in mm):

Specimen No. UJ 34P/3		*Coelocoenia assmanni* Weissermel, 1925	
d	2.0—3.0	d	2.0—3.5
D	3.0—3.5 (4.5)	D	5.0—6.0
c—c	2.5—3.5	S	44—48 in the essential wall
S	28—ca. 40		18 in the pseudotheca

Description. — Fragment of subcerioid colony of plocoid aspect. This aspect is due to double wall consisting of an internal pseudotheca (dissepimental stereozone) of circular outline, and external essential wall of polygonal outline. Radial elements compact, nonconfluent, belonging to 2—3 orders and differentiated in 8—9 systems. Columella absent. Endotheca consists of subtabular elements. Microstructure not preserved.

Remarks. — The species differs from *Coelocoenia* (?) *assmanni* Weissermel, 1925 from Kamień Śląski, by smaller dimensions of coralites and slightly smaller number of septa.

Occurrence. — Cracow-Silesia region: Stare Gliny near Olkusz — *Diplopora* dolomite (Middle Muschelkalk). Carnian Alps — St. Cassian Beds (Carnian).

Genus *Cyathocoenia* Duncan, 1867
Cyathocoenia sp.
(pl. 4: 3a, b)

Material. — Three fragments of colonies (UJ 34P/4—6).

Dimensions (in mm):

d	1.5—2.0
c—c	2.5—3.5 (4.0)
S	22—about 36
Sd	8—10/2

Description. — Fragments of plocoid colonies of cerioid aspect. Calices subcircular or slightly oval. Septa nonconfluent and subconfluent, arranged in 3—4 orders. At places, at the distal-inner edge, they dissociate into isolated trabeculae. Six S1 septa reach the calicular centre; S2 are slightly shorter than S1. S3 are shorter than S2 and are frequently fused with inner edge to the faces of S2. Columella small. Endotheca composed of subtabular, subhorizontal elements. The wall is parathecal. Peritheca not preserved. Budding intercalicular. Microstructure not preserved.

Remarks. — The species is very close to *Cyathocoenia schafhaeutli* (Winkler), known from the Upper Triassic deposits (Norian, Rhaetian) of the Tethyan area from which it differs in having less developed S2 septa. Our species most frequently has 6—8 S1 and 6—8 slightly shorter S2; *C. schafhaeutli* has 12—16 S1.

Occurrence. — Cracow-Silesia region: Stare Gliny near Olkusz — *Diplopora* Dolomites (Middle Muschelkalk).

Suborder **Faviina** Vaughan et Wells, 1943
Family **Pamiroseriidae** Melnikova, 1984
Genus *Pamiroseris* Melnikova, 1971

Systematic position of the genus *Pamiroseris* is still not established. This genus was ranged in the suborder Fugiina Duncan, family Thamnasteriidae Vaughan et Wells (Melnikova 1971, 1975; Beauvais 1981), in the family Astraeomorphidae Frech (Roniewicz 1974), in *familia incerta* (Morycowa, Roniewicz, 1986) and recently in the suborder Cuifastraeina Melnikova, family Pamiroseriidae Melnikova (Melnikova 1984). In this paper the family Pamiroseriidae, including the genus *Pamiroseris*, is included into the suborder Faviina Vaughan et Wells (= Astraeoina Alloiteau, 1952). This decision is based on microstructure of the pamiroseriid skeleton. Radial elements of pamiroseriids are compact, composed of one medium sized (up to ca. 150 μm) series of simple trabeculae, usually vertical or only slightly inclined towards the axis and the periphery of the corallite. The trabeculae are usually transversally flattened, sometimes lateral axes of small trabeculae may be seen to depart from the axis of the main trabecula. The microstructure of the radial elements resembles the microstructure of Faviina, e.g. Clausastraeidae (Morycowa 1964, fig. 15; pl. 16: 2c; Morycowa 1971, fig. 7a), in places of Montlivaltiidae (Morycowa 1971, fig. 7a) as well as of Isastraeidae (Roniewicz 1982, pl. 69: 1a—c).

Pamiroseris silesiaca (Beyrich, 1852)

(pl. 5: 1a—c, 2a—d, 3, 4a—b; pl. 6: 2a—b; pl. 7: 3a, b; fig. 6; tab. 3, 4)

v.1852. *Thamnastraea Silesiaca* Beyrich: 217.
?1859. *Thamnastraea Bolognae* Schauroth: 285—286, pl. 1: 1a, 1b.
1865. *Thamnastraea silesiaca* Beyrich; Eck: 86, pl. 1: 3a, 3b.
1870. *Thamnastraea silesiaca* Beyrich; Roemer: 11, fig. 7.
1879. *Thamnastraea silesiaca* Beyrich; Eck: 255—256.
?1906. *Thamnastraea silesiaca* Beyrich; Ahlburg: 82.
1925. *Thamnastraea silesiaca* Beyrich; Weissermel: 4—9, pl. 1: 1 and 3 (not fig. 2), text — fig. 1.
v.1925. *Thamnastraea silesiaca* n. var. stichophila Weissermel: 9—10, pl. 1: 4.
1928. *Thamnastraea silesiaca* Beyrich; Schmidt: 118, fig. 221.
1928. *Thamnastraea silesiaca* n. var. *stichophila* Weissermel; Schmidt: 118, fig. 222.
1937. *Thamnastraea silesiaca* Beyrich; Assmann: 15, pl. 3: 1.
1937. *Thamnastraea silesiaca* Beyrich var. *stichophila* Weissermel; Assmann: 15, pl. 3: 2.
1938. *Thamnastraea silesiaca* Beyrich; Schmidt: 16, fig. 221.
1984. *Pamiroseris* cf *silesiaca* (Beyrich); Deng Zhanqiu and Kong Lei: 490, pl. 2: 10, 11.
1986. *Pamiroseris silesiaca* (Beyrich); Morycowa, Roniewicz: 38, pl. 6: 1—4.

Material. — 23 specimens, including small fragments and natural casts of colonies (UJ 34P/7—29); 9 thin sections (UJ7/7—12).

Dimensions (in mm):

d	(1.3) 1.5—2.0 (2.5)
c—c: in series	1.5—3.0
between series	2.5—3.5 (4.0—4.5)
S	18—24 (26) ((36))
Sd	6—8 per 2
diameter of colony (UJ 34/29)	54×27 max.
height of colony (UJ 34/29)	10 max.

Description. — Colonies thamnasterioid, lamellar, often incrusting. Calices fairly deep, mainly in central parts of colonies. Corallites often ordered in short series, generally at the peripheral zones. Radial elements compact, thin, confluent, belonging to 2—3, less frequently 4 orders. From eight to fourteen S1 septa reach the centre of corallite. Their thickness in intercalicular spaces is usually similar less frequently they are slightly differentiated (more or less each second is thinner). Inner margin of radial elements has short paliform projections. Septal faces granulated (granulae

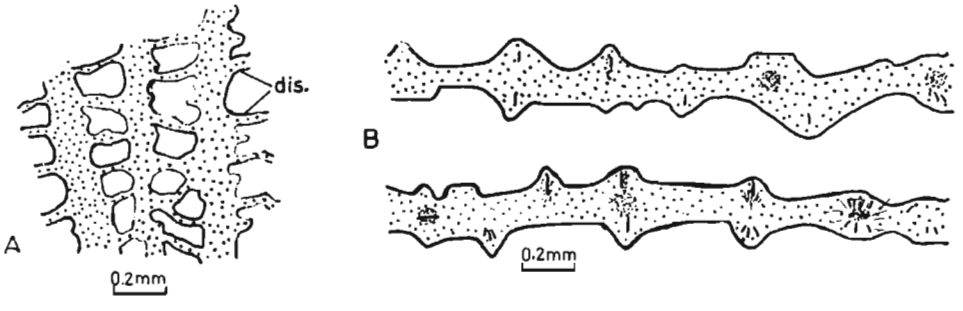
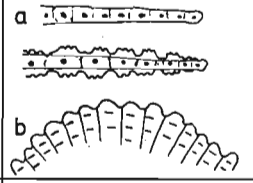
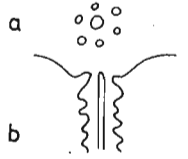
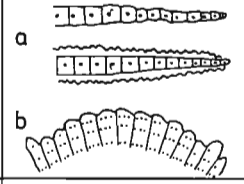
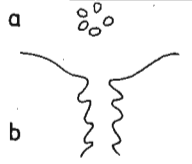
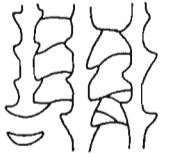
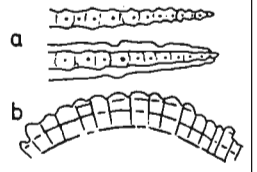
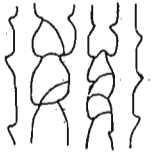
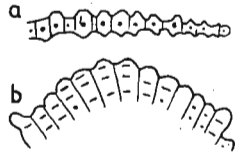
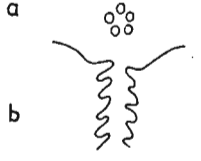
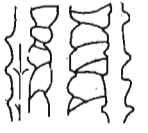


Fig. 6. *Pamiroseris silesiaca* (Beyrich). Specimen UJ 34P/7: *A* longitudinal section; *B* septal ornamentation in transverse section; *dis.* dissepiments

Table 3

Comparison of several genera of thamnasterioid corals described from Triassic deposits

FAMILY	GENUS	ORNAMENTATION OF RADIAL ELEMENTS a – transv. sec. b – lat. surf.	COLUMELLA a – transv. sec. b – longitud. sec.	RADIAL ELEMENTS longitud. sec.	TYPE SPECIES, OCCURRENCE:
THAMNASTRAEIDAE Vaughan & Wells, 1943	THAMNASTERIA Lesauvage, 1823				ASTRAEA DENDROIDEA Lamouroux, 1821 DEPART. MEUSE: SEQUANIAN
CUIFASTRAEIDAE Meln., 1983	CUIFASTRAEA Melnikova, 1983				CUIFASTRAEA GRANULATA Meln., 1983 SE PAMIR: LATE NORIAN
TROPIASTRAEIDAE Meln., 1984	CHEVALIERIA Melnikova, 1984				CHEVALIERIA GRANDIS Meln., 1984 SE PAMIR: LATE NORIAN
PAMIROSERIIDAE Meln., 1984	PAMIROSERIS Melnikova, 1971				THAMNASTRAEA MERIANI Stoppani, 1858 LOMBARDY: RHAETIAN

spiniform and pennuliform). Columella papillar, feebly developed. Endotheca abundant, vesicular. Budding intracalicular.

Microstructure of the skeleton is poorly preserved. The traces of microstructure and ornamentation of the radial elements permit to infer that they were built of individual, distinct trabeculae, arranged in one divergent system.

Remarks. — The preserved microstructure traces, the ornamentation of radial elements, the development of columella and the characteristics of endotheca indicate that the discussed species does not belong to *Thamnasteria* Lesauvage, 1823 (incorrectly — *Thamnastraea*) but it belongs to the genus *Pamiroseris* Melnikova (see Table 3).

Weissermel (1925) described *Thamnastraea silesiaca* Beyrich and *Th. silesiaca* n. var. *stichophila* from the Muschelkalk of the Upper Silesia. According to him, *Thamnastraea silesiaca silesiaca* differs from *Th. silesiaca stichophila* by the presence of calicular series within which individual calices are either distinct or more or less coalesce into a common calicular fossa.

The material studied by present author includes a natural cast of the upper surface of the colony (pl. 7: 3a, b) and a colony fragment (pl. 5: 4ab) featured by, both, clearly distinct corallites and series of subdistinct corallites. It should be noted that short series (of 2—3 calices) of feebly marked calices occur in many colonies of *P. silesiaca*, especially in their most peripheral parts.

The review of calicular surfaces of *Pamiroseris silesiaca* from my collection and illustrations in papers of other authors, reveals their differentiation with respect to the calice depth. The forms with fairly deep calices (see pl. 5: 1a—c, 3; pl. 7: 3a, b) and those with superficial calices (pl. 5: 4a, b; pl. 6: 2a, b) are observed. This feature is regarded partly as the intraspecific variability, partly as dependent on the preservation of specimens. It should be stressed that the dimensions of corallites, dis-

Table 4

Pamiroseris silesiaca (Beyrich) and similar species

Characteristics / Species	S	c — c *a* in series *b* between series
Pamiroseris silesiaca (Beyrich)	18—24 (26) ((36))	*a* 1.5—3.0 *b* 2.5—3.5 (4.0—4.5)
Pamiroseris sp.	(21) 24—32 (36)	*a* 3.0—3.5 (chaotic) *b* (1.5) 2.5—3.5
Pamiroseris rectilamellosa (Winkler)	after Frech 1890: 20—26 after Roniewicz 1974: (22) 24—35 (45) after Melnikova 1975: 18—40 after Cuif 1976 30—35	after Frech 1890, pl. 16, ca. 5.0—9.0 ca. 4.0—7.0 ca. 4.0—10 ca. 6.0—8.0
Pamiroseris rectilamellosa var. *minor* (Frech)	after Frech 1890: 18—20	after Frech 1890, pl. 17, fig. 12: ca. 2.0—3.0

tances between their centres, and to a less degree, the numbers of septa — all differ from one colony to another. Above, the extremal dimensions are presented.

The described species reveals greatest affinities with the Upper Triassic species *Pamiroseris rectilamellosa* (Winkler, 1861) from which it differs by its smaller corallites and less numerous radial elements (Table 4). In its dimensions and number of septa it resembles a Rhaetian form described by Frech (1890) as *Thamnastraea rectilamellosa minor*.

Pamiroseris silesiaca has similar corallite dimensions and only slightly smaller number of septa than *Pamiroseris* sp. The difference between both forms consists mainly in the arrangement and course of radial elements. In *P. silesiaca* these are usually parallel to one another and rectilinear, arched or S-like. In *Pamiroseris* sp. they are usually arranged radially in intercalicular spaces; radial elements of neighbouring corallites fuse at some angle (pl. 6: 1a—b) what results in polygonal outline of corallites and a subcerioid-thamnasterioid aspect of colony.

The synonymy of *Pamiroseris silesiaca* includes *Thamnastraea bolognae* Schauroth from the Anisian of the Alps, on the basis of literature data (Eck 1865, Weissermel 1925). Flügel (1961) described *Thamnasteria* sp. aff. *T. bolognae* Schauroth from the Anisian of the Alps (Stuaria Kalk). This species differs from *P. silesiaca* by its larger corallites and higher number of septa. It seems moreover, that this thamnasterioid coral (*l.c.*, fig. 2) belongs neither to the genus *Thamnasteria* nor to the genus *Pamiroseris*.

I wish to note that not all specimens of *Thamnastraea silesiaca* from the Weissermel collection belong to the genus *Pamiroseris*.

Occurrence. — Cracow-Silesia region: Kamień Śląski near Opole (12 specimens) and Izbicko near Opole (one specimen) — Karchowice Beds (uppermost Lower Muschelkalk); Stare Gliny near Olkusz (6 specimens) and Zawiercie (4 specimens) — *Diplopora* Dolomite (middle Muschelkalk).

Occurrences known from literature: Upper Silesia (17 specimens collected from outcrops and shafts): Zabrze-Mikulczyce, Bytom, Tarnowskie Góry, area of Jaworzno — Górażdże Beds, Karchowice Beds, *Diplopora* Dolomite and Ore-bearing Dolomite (Lower and Middle Muschelkalk): Lower Silesia (7 specimens): Osiecznica near Bolesławiec — *Terebratula* Beds (Lower Muschelkalk); GDR and FRG: Rüdersdorf, Würzburg, Feudenstadt am Schwarzwald — Lower Muschelkalk; S Alps (Recoaro) and S China in Guizhou province — Anisian (see also Qi Wentog 1984).

Pamiroseris sp.

(pl. 6: 1a—b; fig. 7)

Material. — One colony preserved as natural cast (UJ 34P/30), one colony fragment (UJ 34P/31).

Dimensions (in mm):

diameter of colony	90×45
d	1,5—2,0
c—c calices occurring chaotically	3,0—3,5
c—c calices in series	2,5—3,5
S	(21) 24—32 (36)
Sd	7—8/2

Description. — Thamnasterioid colony, subcerioid-thamnasterioid in aspect. Calices deep. Corallites chaotically arranged or in short series of 2—4 calices. Radial elements thin, confluent, less frequently subconfluent, between neighbouring individuals fused at some angle. The fusing results in formation of more or less distinctly pronounced

boundary between corallites, and in subcerioidal aspect of the colonies. In the intercalicular spaces, S3 may be slightly thinner than the other septa. In the calice, the S1 approach the centre, the S2 are slightly shorter or only slightly thinner, the S3 reach half the length of S1. Well preserved natural casts suggest that lateral surfaces of septa were finely granulated. The inner margin of S1 has fine trabecular offsets. Columella papilar, very poorly developed. Endotheca vesicular. Budding intra- rarely intercalicular.

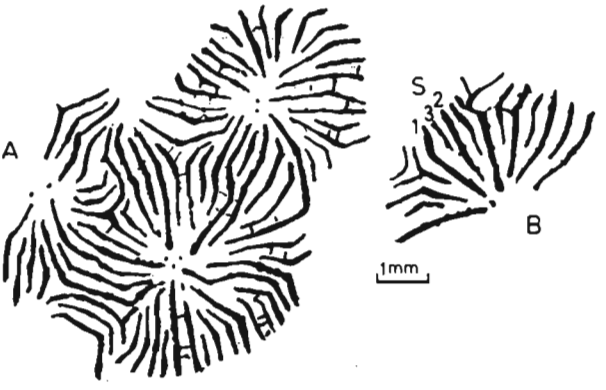


Fig. 7. *Pamiroseris* sp. Specimen UJ 34P/30: corallite morphology shown on the natural cast of the calicular surface section; *S*: *1*, *2*, *3* order of radial elements

Remarks. — *Pamiroseris* sp. differs from *P. silesiaca* Beyrich by its slightly higher number of radial elements, and by their usually radial, not parallel arrangement in intercalicular spaces. Slightly different is also the aspect of the colony upper surface. In *Pamiroseris* sp. it is subcerioid-thamnasterioid, whilst in *P. silesiaca* — thamnasterioid or at places thamnasterioid-meandroid.

Occurrence. — Cracow-Silesia region: Pogorzyce near Chrzanów — *Diplopora* Dolomite (Middle Muschelkalk).

Genus *Morycastraea* Melnikova, 1984

Morycastraea opoliensis sp. n.

(pl. 7: 1a—c; 2a, b; fig. 8)

Syntypi: The specimens UJ 34P/32—33; pl. 7: 1a—c; 2a, b.

Stratum typicum: Karchowice Beds — uppermost Lower Muschelkalk.

Locus typicus: Kamień Śląski near Opole.

Derivatio nominis: opoliensis — after Opole, the town in Silesia.

Diagnosis. — A *Morycastraea* with phaceloid corallites about 2.0 mm in diameter, 40—50 radial elements and thamnasterioid corallites with about 21—24 radial elements. Columella small, complex.

Material. — One small colony (UJ 34P/32), one fragment of colony (UJ 34P/33), one thin section (UJ 7/33).

Dimensions (in mm):

diameter of the colony	about 6.5×6.5
height of the colony	6.0
d	2.0—2.2

S in phaceloid corallites	40—50
S in thamnasterioid corallites	(18) 21—24
Sd	4—5/1

Description. — Phacelo-thamnasterioid small colony. Calices shallow, both of phaceloid and thamnasterioid forms. Radial elements compact. In phaceloid corallites they belong to 3—4 orders. The radial elements are equally thick in peripheral parts of corallites. 10—12 S1 reach the corallite centre. Distal edge of septa regularly denticulate (teeth subcircular or transversally oval), inner edge with short paliform offsets; lateral faces granulated. Columella composed of one trabecular nodule and a crown of short paliform offsets of S_1. Endotheca vesicular, well developed. It forms a fairly regular wall "ring" in the peripheral part of corallite. Budding intracalicular.

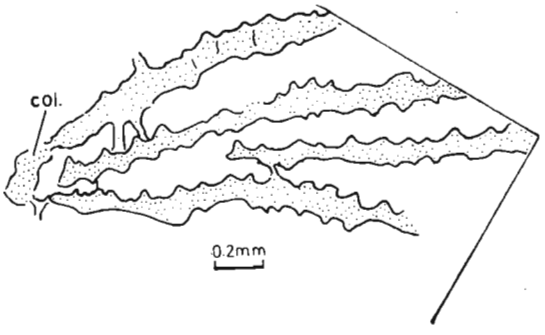


Fig. 8. *Morycastraea opoliensis* sp. n. Specimen UJ 34P/33: septal ornamentation in transverse section; *col.* columella

Remarks. — *Morycastrea opoliensis* sp. n. differs from *M. eximia* Melnikova (Melnikova 1984*a*; Norian of the SE Pamirs) by its much smaller corallite diameters, smaller number of radial elements, and less developed axial structure.

Occurrence. — Cracow-Silesia region: Kamień Śląski near Opole — Karchowice Beds (uppermost Lower Muschelkalk).

Family **Cuifastraeidae** Melnikova, 1983
Genus *Silesiastraea* nov.

Species typica: *Silesiastraea weissermeli* gen. et sp. n.

Derivatio nominis: *Silesiastraea* — after Silesia — region from which is derived the majority of the studied corals.

Diagnosis. — Meandroid-thamnasterioid colonies. Short series with distinct or subdistinct corallites. Radial elements compact, nonconfluent, subconfluent, less frequently confluent. They are composed of fairly large trabecules (diam. about 100—160 μm) arranged in one divergent system. Costae usually less distinctly developed, at places almost not developed. Distal septal ridge covered with large rounded denticles; internal edge with trabecular projections. Lateral septal faces granulated and ornamented with pennules and menianes, granulated at the edge (fig. 9). Wall feeble, often lacking. Columella trabecular. Endotheca vesicular. Intracalicular budding with indirect linkages.

The genus is monotypic.

Remarks. — The new genus *Silesiastrea* is included in the family Cuifastraeidae

Melnikova on the basis of the type of its microstructure and the ornamentation of radial elements.

Stratigraphic and geographic range. — Lower and Middle Muschelkalk (Anisian) of the Cracow-Silesia region.

Silesiastraea weissermeli sp. n.

(pl. 8: 1a—f; 2a, b; pl. 9: 3a, b; fig. 9)

Syntypes: UJ 34P/34—36, pl. 8: 1a—f; 2a, b; pl. 9: 3ab; fig. 9.

Locus typicus: Kamień Śląski near Opole.

Stratum typicum: Karchowice Beds (lowermost Muschelkalk).

Derivatio nominis: *weissermeli* — in memory of Waldemar Weissermel who studied Muschelkalk coral fauna of Silesia.

Diagnosis. — Colonies meandroid. Series of two or several coralites with calices distinct and subdistinct. Width of series 3—5 mm. Number of radial elements in adult corallites 22—30. Wall septothecal, locally absent. Columella papillar. Endotheca vesicular, feebly developed.

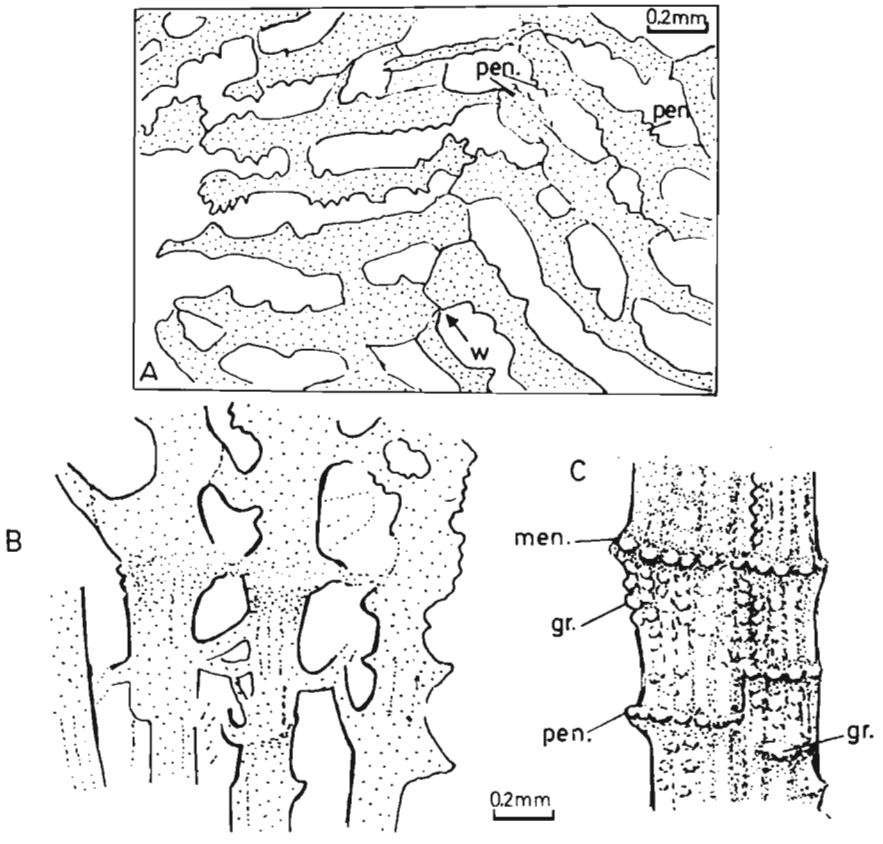


Fig. 9. *Silesiastraea weissermeli* gen. et sp. n. Specimen UJ 34P/34: *A* transverse section of two neighbouring corallites showing peripheral parts of radial elements and dividing wall; *B* longitudinal section perpendicular to septal blades; *C* reconstruction of the fragment of septal face with ornamentation; *gr.* granule, *pen* pennule, *men.* meniane, *w* wall

Material. — Three fragments of colonies (UJ 34P/34—36), 4 thin sections with longitudinal and transverse sections (UJ 7/34—36).

Dimensions (in mm):

Width of series	3.0—5.0
c—c in series	1.0—2.5
S	11—24 (—30)
Sd	7—8/2
teeth density (distal edge of septa)	3—5/0.5

Description. — The characteristics given in the diagnosis of the genus and species should be supplemented with the following: radial elements belong to two or three orders, irregularly distributed. S3 are often slightly thinner than S1 and S2. Few septa S1 have strong rhopaloid thickenings on the inner edge. Near the distal edge the granules on lateral septal surfaces are arranged in more or less vertical rows. In lower parts their pattern is more chaotic. Columella in young specimens is poorly developed, composed of one to three granulae. Adult specimens have columella better developed, composed of axial trabecula and a ring of trabeculae of septal origin. Endotheca composed of wide dissepiments subhorizontal or slightly rised in peripheral area.

Remarks. — This species resembles morphologically the Upper Muschelkalk species, *Latimeandra vogelgesangi* Eck (generic name changed to *Substuoresia* in Deng Zhanqui and Kong Lei 1984). Our species is however meandroid-thamnosterioid, with calices shallow and a wall unmarked on calicular surface. Moreover, it has a smaller number of radial elements, and less developed columella. More detailed comparison of these species is impossible without direct comparative studies.

Occurrence. — Cracow-Silesia region: Kamień Śląski near Opole (two specimens) — Karchowice Beds, and Stare Gliny near Olkusz (one specimen) — *Diplopora* Dolomite.

Family **Tropiastraeidae** Melnikova, 1984

Genus *Chevalieria* Melnikova, 1984

?*Chevalieria tenuiseptata* sp. n.

(pl. 9: 1a, b; 2a—c; fig. 10)

Holotypus: UJ 34P/37, pl. 9: 2a—c; fig. 10.

Locus typicus: Kamień Śląski near Opole.

Stratum typicum: Karchowice Beds (Lower Muschelkalk).

Derivatio nominis: *tenuiseptata* (*Lat.*) — from thin radial elements.

Diagnosis. — Thamnasterioid colonies. Corallites locally arranged in short series. Distances between centres of corallites in series are 2—3 mm, between series — 3—4 mm. Up to 24 radial elements (6 S1 and S2 in 2 mm). They are uniformly thin in peripheral parts of corallites. Columella week, papillar.

Material. — One fragment of a colony and one natural cast of colony surface (UJ 34P/37—38), two thin sections (UJ 7/37—38).

Dimensions (in mm):

c—c in series	2—3
c—c between series	3—4
S (adult specimens)	21—24 (S_1+S_2)
Sd	6/2
thickness of S_1	about 0.1
dg	3—5/0.5

Description. — Thamnasterioid colonies with corallites arranged locally in short series. Radial elements compact, thin and confluent. They belong to two orders. S1 septa (8—12) reach the centre of corallite, S2 septa are developed more or less regularly and they attain in calice ca. 1/2—3/4 of the S1 length. Distal septal edge with denticles, internal edge with fine denticles. Lateral surfaces ornamented with menianes of mostly even or slightly wavy margins. Fine ornamentation in form of granulae is, however, locally present on the margins. Columella feebly developed, papillar. Endotheca dissepimental, vesicular, poorly developed. Budding mainly intracalicular, less frequently intercalicular.

Microstructure. — The preserved fragments of trabecular outlines suggest that radial elements were composed of rather small trabeculae. There was about five of them on 0.5 mm length. Also noticeable are traces of short axes of lateral trabeculae branching from the axis of the main trabecula. Columella composed of several trabeculae originating from the inner margin of septa.

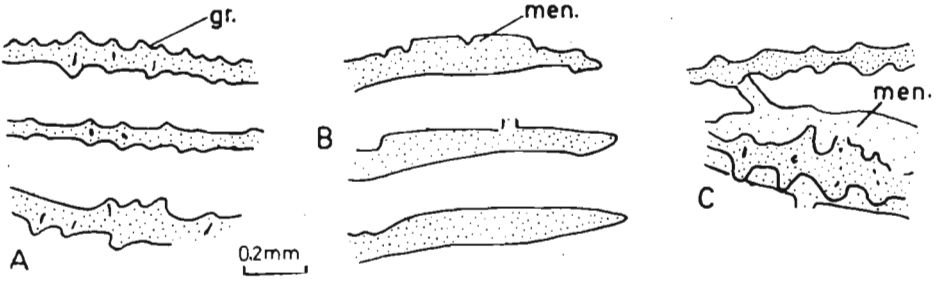


Fig. 10. *A*, *B*, *Chevalieria tenuiseptata* sp. n. Specimen UJ 34P/37: ornamentation of radial elements in transverse section; *A* section through septal surface between pennules; *B* section along the menianes; *C* *Chevalieria grandis* Melnikova: ornamentation drawn after thin section No. 2406 (Pamir: Late Norian); *gr.* granule, *men.* meniane

Remarks. — The described species is closely related, both in the calice dimensions and in the number of septa, to *Pamiroseris silesiaca* (Beyrich). It differs, however, in its type of ornamentation: in *P. silesiaca* this is granular and in *Ch. tenuiseptata* — in the form of menianes. Moreover, the endotheca in *P. silesiaca* is very rich, and in *Ch. tenuiseptata* it is very poor.

The author hesitates in assigning this species to the genus *Chevalieria* because of fine ornamentation observed at some places on margins of menianes (transverse section), similar to that in *Cuifastraea* Melnikova. Perhaps with better preserved material, it will be possible to decide whether this species belongs to the genus *Chevalieria* or another genus with finely ornamented menianes, as e.g. *Cuifastraea*.

Occurrence. — Cracow-Silesia region: Kamień Śląski near Opole — Karchowice Beds (Lower Muschelkalk).

Suborder and family uncertain

Genus *Eckastraea* nov.

Species typica: *Isastraea prisca* Weissermel, 1925.

Derivatio nominis: *Eckastraea* — in memory of Heinrich Eck, who gave (1865) the first complete stratigraphical scheme of the Triassic of Silesia, providing thus the basis for all further studies.

Table 5

Eckastraea gen. n. and similar genera

Family	Features / Genera	Radial elements: Trabeculae arranged in series	Radial elements: Ornamentation of lateral surface	Columella	Wall	Endotheca	Budding
Familia incerta	*Eckastraea* gen. n.	Trabeculae small / about 70-80 μm/	granulae small, sharp, rounded or elongated, subperpendicular to the distal margin	—	 Septotheca		
Isastraeidae Koby	*Isastraea* M.Edw. et H.,1851	Trabeculae variable in diameter /up to 300-450 μm after Roniewicz 1982/	granulation fuses vertically to form carinae	—	 Septotheca		
Andrazelliidae Meln.	*Gablonzeria* Cuif, 1976	Trabeculae small /about 70-150 μm after Cuif 1976: fig.21,22/	granulae spiniform arranged irregularly	—	 Essential wall		
Distichophylliidae Beauv.	*Distichomeandra* Cuif, 1976	Midline	granulae sharp arranged in vertical series	—	 Septotheca		

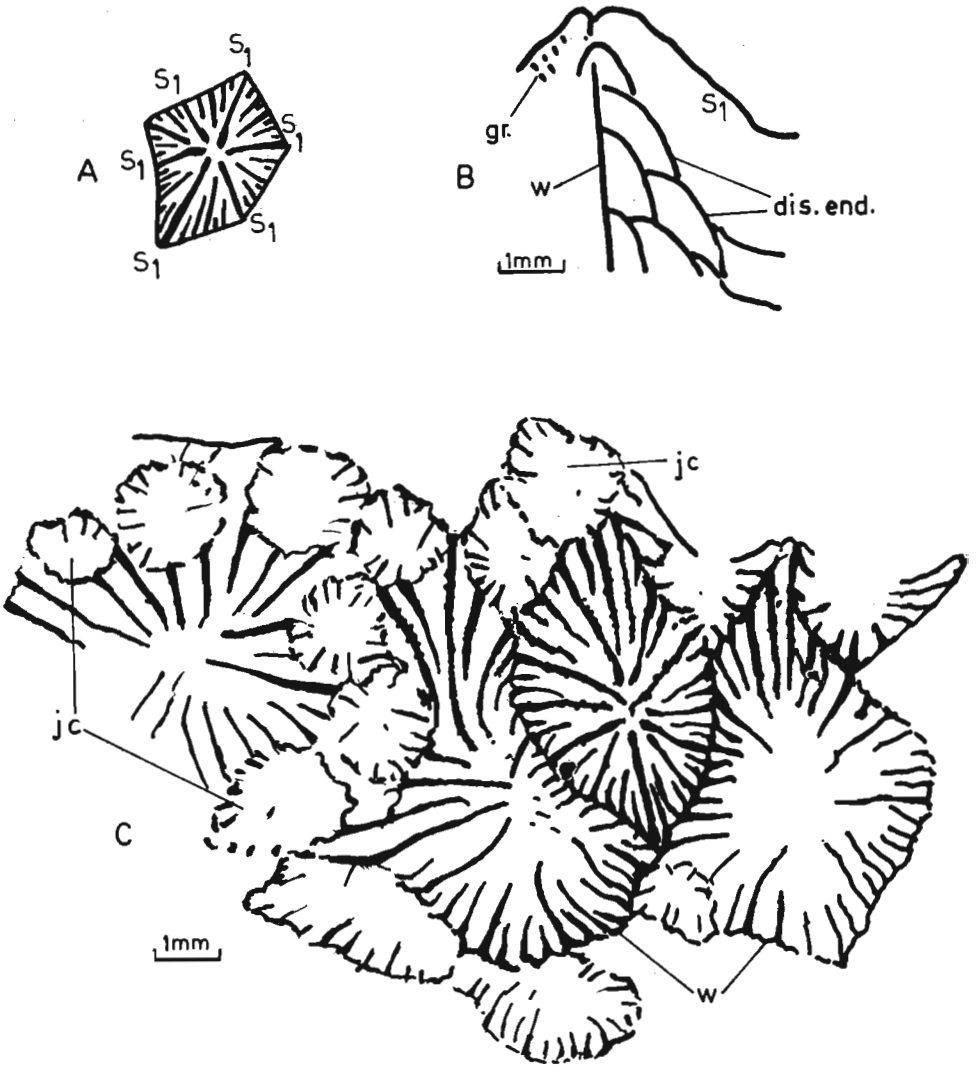


Fig. 11. *Eckastraea prisca* (Weissermel). Specimen UJ 34P/40: *A* schematic drawing of a corallite in transverse section showing septal arrangement; *B* longitudinal section of corallite; *C* calicular surface showing a mode of budding; *jc* juvenile corallites, *w* wall, *S1* radial elements of the 1st order; *gr.* granules, *dis. end.* endothecal dissepiments

Diagnosis. — Cerioid colonies. Radial elements are compact, free, nonconfluent or subconfluent. They are composed of simple, fairly small trabeculae (about 70—80 μm) arranged in series. Ornamentation of the distal margins of septa in form of fine, numerous, rounded or transversally oval teeth. Axial margin is very slightly rhopaloid, smooth or very minutely dentate. Lateral surfaces of septa are ornamented with numerous small, rounded or slightly elongated granules, arranged in subvertical series. Wall feeble, septothecal of zigzag course and originated from peripheral margins of septa. Endotheca composed of fairly large vesicular dissepiments running obliquely in the peripheral area of corallite and subhorizontally at its centre. Colum-

ella lacking. Budding intracalicular, marginal. One, or simultaneously several buds arranged circularly, formed in a calice.

Stratigraphic and geographic range. — Lower and Middle Muschelkalk (= Anisian) of the Silesian region.

Remarks. — The genera of closest morphological ressemblance are: *Isastrea* M. Edw. et H., *Gablonzeria* Cuif and *Distichomeandra* Cuif. *Eckastraea* differs from them, apart of other features, in the mode of budding (see table 5).

In the Weissermel collection there are two poorly preserved specimens of *Isastraea prisca* from the Karchowice Beds exposed at Kamień Śląski (one in the Humboldt Universität Museum f. Naturkunde, Berlin, and the other in the Zentrales Geologisches Institut Aussenstelle Bernau). The only specimen illustrated by Weissermel (1925: pl. 1: 9), thus, constituting the holotype of the type species of *Eckastraea*, appears to show among other features a budding similar to that in the specimens described below.

Eckastraea prisca (Weissermel, 1925)

(pl. 10: 1a, b; 2a, b; fig. 11; tab. 5)

v.1925. *Isastraea prisca* Weissermel: 18—19, pl. 1: 9
1938. *Isastraea prisca* Weissermel; Schmidt: 15, fig. 218a.
1937. *Isastraea prisca* Weissermel; Assmann: 16, pl. 3: 9.

Material. — Three natural casts of upper and lateral surfaces of colonies (UJ 34P/39—41).

Dimensions (in mm):

d (maximum)	4.0—4.5 (6.0)
S	(32) 36—46 (48); 6S1+6S2+12S3+nS4 or 12S1+12S
thickness of septa	about 0.8—1.30
density of teeth (distal edge)	10—13/1

Description. — Corallites polygonal, separated by distinct, thin, zigzag, septothecal wall. Calices deep. Septa very thin, arranged in radial symmetry. They belong to three or four orders. S1 and S2 are equal or subequal in length; they reach the corallite centre. S3 are about half the length of S1. S4 are developed only in adult corallites. Endotheca dissepimental. The features of the septal ornamentation, structure of endotheca and type of budding are given in the diagnosis of the genus.

Occurrence. — Cracow-Silesia region. Stare Gliny near Olkusz — *Diplopora* Dolomite (Middle Muschelkalk). The specimens studied by Weissermel (1925) and then quoted by Assman (1937) and Schmidt (1938) come from Kamień Śląski near Opole — Karchowice Beds.

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ELŻBIETA MORYCOWA

ŚRODKOWOTRIASOWE SCLERACTINIA Z REGIONU ŚLĄSKO-KRAKOWSKIEGO

Streszczenie

Występowanie koralowców w utworach wapienia muszlowego na obszarze Śląska znane jest już od ponad 130 lat. Były one opisywane lub tylko cytowane w pracach: Beyricha (1852), Ecka (1865, 1879), Roemera (1870), Ahlburga (1906), Weissermela (1925), Schmidta (1928, 1938), Assmanna (1937) i Morycowej (1974, 1981; Morycowa, Roniewicz 1986). Największe znaczenie w tym względzie ma praca Weissermela (*l.c.*), w której autor opisał wszystkie gatunki znane dotychczas z wapienia muszlowego Śląska. Koralowce opisane przez wymienionych autorów pochodzą z wapieni, wapieni dolomitycznych i dolomitów należących do facji epikontynentalnej, środkowoeuropejskiej. Zostały one znalezione w warstwach góraždžańskich (rzadkie wystąpienia), karchowickich (częste) i w dolomicie diploporowym (częste). Podawane są też z dolomitów kruszconośnych dolnego i częściowo środkowego wapienia muszlowego (tabl. 1 i 2). Wiek osadów z koralowcami, w nawiązaniu do podziału biostratygraficznego (Zawidzka 1975, Trammer 1980), odpowiada anizykowi, ściślej pelsonowi — wczesnemu illyrowi (tabl. 1).

Opracowany przez Weissermela zespół koralowców triasowych Śląska jest ubogi zarówno pod względem okazów jak i gatunków (tabl. 2). Autorka dysponuje nowym zbiorem koralowców z regionu śląsko-krakowskiego (tabl. 1, 2). Zostały one zebrane z warstw karchowickich, które odsłaniały się w starym kamieniołomie w Kamieniu Śląskim koło Opola oraz z odsłonięć w Tarnowie Opolskim i Izbicku w rejonie Opola. Okazy koralowców z dolomitu diploporowego pochodzą z kamieniołomów w Starych Glinach koło Klucz (rejon Olkusza) i Pogorzyc k. Chrzanowa oraz z rdzeni wiertniczych otworów Zawiercie — Huta Szkła i Zawiercie-Południe (fig. 1).

Stan zachowania koralowców z wapienia muszlowego obszaru śląsko-krakowskiego jest bardzo zły. Autorka podjęła się jednak ich opracowania gdyż fauna koralowców anizyku jest niezmiernie ważna z punktu widzenia filogenezy tej grupy organizmów. Najstarsze bowiem Scleractinia znane są właśnie z utworów anizyku. W świecie, jak dotychczas, znaleziono zaledwie kilka miejsc występowania koralowców tego wieku (Flügel 1982).

Opracowany zbiór składa się z 41 okazów (tabl. 1), w tym kolonii, ułamków kolonii i odcisków ich powierzchni kielichowych. Kolonie są najczęściej cienkopłytowe, rzadziej faceloidalne i dendroidalne. Szkielety koralowców są przekrystalizowane, często również częściowo zdolomityzowane. W zbiorze tym wyróżniono 10 gatunków, w tym trzy znane z literatury (*Coelocoenia* cf. *decipiens* (Laube), *Pamiroseris silesiaca* (Beyrich) i *Eckastraea prisca* (Weissermel)), cztery gatunki nowe (*Volzeia szulci*, *Morycastraea opoliensis*, *Silesiastraea weissermeli* i *Chevalieria tenuiseptata*) oraz trzy pozostawione w nomenklaturze otwartej *Stylophyllopsis* sp., *Cyathocoenia* sp. i *Pamiroseris* sp.). Wprowadzono też dwa nowe rodzaje (*Eckastraea* i *Silesiastraea*).

Z utworów wapienia muszlowego regionu śląsko-krakowskiego znamy 19 gatun-

ków koralowców (łącznie z oznaczonymi przez dawnych autorów). Najczęściej, zarówno w starych jak i nowych zbiorach, reprezentowany jest *Pamiroseris silesiaca*. Gatunek ten znany jest z podobnych wiekowo utworów Dolnego Śląska, NRD i RFN (Eck 1879, Schmidt 1938) oraz osadów anizyku Alp (Schauroth 1859, Eck 1879, Weissermel 1925) i z Chin (Ghizhou and Yunnan: Qi Wentog 1984, Deng Zhanqiu and Kong Lei 1984).

Jeden z gatunków przedstawionych w tej pracy (*Coelocoenia* cf. *decipiens*) zbliżony jest do gatunku znanego z karniku Alp (Volz 1896, Cuif 1972). Dwa inne gatunki ze zbioru Weissermela (*"Thecosmilia" compressa* Weiss. i *"Th." caespitosa* Reuss) znane są z utworów środkowo- bądź późnotriasowych prowincji tetydzkiej (m.in. Frech 1890, Kolosvary 1966) a jeden z nich (*Retiophyllia caespitosa*, oznaczenie rodzajowe poprawione) też z prowincji pacyficznej (Stanley 1986). Jeśli jednak idzie o ten ostatni, można mieć poważne wątpliwości czy Weissermel dokonał właściwego oznaczenia gatunkowego, zważywszy, że *Retiophyllia caespitosa* (Reuss) jest gatunkiem charakterystycznym dla późnego noryku.

Opracowany zespół koralowców górnej części dolnego wapienia muszlowego (warstwy karchowickie) reprezentuje prawdopodobnie typ ekologiczny hermatypowy. Koralowce te rozwijały się w basenie sedymentacyjnym w mało sprzyjających warunkach życia. Świadczą o tym niewielkie wymiary kolonii i częsty ich pokrój cienkopłytowy. Środowisko życia tych koralowców było ciepło- i płytkowodne (najprawdopodobniej o głębokości nie przekraczającej 40 m), nieco oddalone od brzegu, o względnie małej energii wody. Za ciepło- i płytkowodnym środowiskiem przemawia zespół koralowców oraz obecność glonów Dasycladaceae. O względnie spokojnym środowisku świadczy typ osadu, w którym koralowce te występują oraz delikatne cienkopłytowe, rzadziej drobnogałązkowe formy kolonii w pozycji życiowej, a także niepokruszone, delikatne skorupki małżów i w wielu przypadkach zachowane dość długie łodyżki liliowców. Osiedlanie się koralowców w basenie sedymentacyjnym warstw karchowickich ułatwiał zapewne obfity detrytus krynoidowy.

W odniesieniu do warunków życia koralowców występujących w utworach środkowego wapienia muszlowego (dolomit diploporowy) można stwierdzić, że asocjacja koralowcowo-glonowa (koralowce prawdopodobnie hermatypowe i glony Dasycladaceae) przemawia również za ciepło- i płytkowodnym środowiskiem ich życia (głębokość do kilkunastu metrów?). Charakter osadów (detrytyczny i onkolitowy) świadczy ponadto o dość znacznej energii ich środowiska. Koralowce w dolomicie diploporowym nie są znajdowane w pozycji życia, są jednak niewątpliwie autochtonicznym składnikiem osadu.

EXPLANATION OF PLATES 1—10

Plate 1

Karchowice Beds

Biomicrites and biomicrosparites (thin sections UJ 7/7—8) from the bioherm (see fig. 2) at Kamień Śląski

1. Annelid tubes. 2, 3. Strongly sparitized gastropod shells. 4. Brachipod shell. 5. Echinoid spine, ostracod and bivalve shells. 6. Fragment of echinoderm skeleton. 7, 8. Crinoid segments.

Plate 2

Karchowice Beds

Biosparite (thin section UJ 7/42) from the bioherm (see fig. 4) at Kamień Śląski
1, 2. Foraminifera (1 ?*Andothyranella*, 2 *Agathammina*). 3. Dasycladacean alga.

Diplopora Dolomite

4. *a* Extra-intradolomicrosparite (thin section UJ 7/41), Stare Gliny; *b* a detail. D — fragments of Devonian sparitic rock.
5. *a* Oncomicrodolosparite with high porosity (UJ 7/51), Pogorzyce near Chrzanów; b a detail.
6. Dolosparite with fragment of dasycladacean alga (transverse section, UJ 7/47), Stare Gliny.

Plate 3

Volzeia szulci sp. n.

1. Holotype, UJ 34P/2. Tarnów Opolski — Karchowice Beds: *a*, *c*, *d*, transverse sections of colony fragments showing the way of budding (*c*) and traces of endothecal elements (*d*); *b*, *f* longitudinal sections of colony fragment; *e* transverse section of corallite.

Plate 4

1. *Pamiroseris silesiaca* (Beyr.), specimen UJ 34P/7: *a* transverse section (thin section UJ 7/7a) of colony part; *b* a detail with septal ornamentation visible; *c* same specimen (thin section UJ 7/7a) showing longitudinal section of septa. Kamień Śląski — Karchowice Beds.
2. *Stylophyllopsis* sp., specimen UJ 34P/1: Kamień Śląski — Karchowice Beds.
3. *Cyathocoenia* sp., specimen UJ 34P/4: *a* calicular surface; *b* a detail. Stare Gliny — *Diplopora* Dolomite.

4. *Coelocoenia* cf. *decipiens* (Laube), specimen UJ 34P/3: *a*, *b* colony upper surface; *c* a detail. Stare Gliny — *Diplopora* Dolomite.

Plate 5

Pamiroseris silesiaca (Beyrich)

1. Specimen UJ 34P/20: *a* natural cast of colony upper surface; *b*, *c* details showing traces of septal ornamentation and papillar columella. Zawiercie — *Diplopora* Dolomite.
2. Specimen UJ 34P/8: *a*, *b* longitudinal sections showing thin-walled vesicular dissepiments (thin section UJ 7/8b); *c* corallites in transverse section (UJ 7/8a); *d* a detail showing septal granulation. Kamień Śląski — Karchowice Beds.
3. Specimen UJ 34P/26: natural cast of calicular surface. Stare Gliny *Diplopora* Dolomite.
4. Specimen UJ 34P/10: *a* calicular surface; *b* a detail showing shallow calices, Kamień Śląski — Karchowice Beds.

Plate 6

1. *Pamiroseris* sp., specimen UJ 34P/30: *a* natural cast of calicular surface; *b* same specimen showing thin septa S1—S2, and fusing of radial elements of neighbouring corallites. Pogorzyce near Chrzanów — *Diplopora* Dolomite.
2. *Pamiroseris silesiaca* (Beyr.), specimen UJ 34P/26: *a* calicular surface; *b* a detail showing shallow calices. Stare Gliny — *Diplopora* Dolomite.

Plate 7

1. *Morycastraea opoliensis* sp. n., syntype UJ 34P/33: *a* cross section of a part of a phaceloid corallite at an early stage of budding with thamnasterioid connections between descendant corallites; *b*, *c* same thin section exposing strongly granulated septa (*b*) and trabecular columella (*c*; arrow). Kamień Śląski — Karchowice Beds.
2. *Morycastraea opoliensis* sp. n., syntype UJ 34P/32: *a* two phaceloid corallites; *b* same specimen in lateral view. Kamień Śląski — Karchowice Beds.
3. *Pamiroseris silesiaca* (Beyr.), specimen UJ 34P/29: *a* natural cast of calicular surface; *b* a fragment with subdistinct calicular series visible. Stare Gliny — *Diplopora* Dolomite.

Plate 8

Silesiastraea weissermeli gen. et sp. n., Kamień Śląski — Karchowice Beds

1. Syntype UJ 34P/34: *a*, *b* transverse section of colony part (thin section UJ 7/34a) showing arrangement of corallites and radial elements; *c* same thin section to show peripheral portion of the corallites and a wall (*arrow*); *d* same thin section with central part of corallite showing small trabecular columella; *e* radial elements in longitudinal section with diverging trabeculae visible (*arrow*); *f* longitudinal section perpendicular to septal blades.

2. Same species, UJ 34P/35: *a* lateral surface of septum with menianes (*arrows*); *b* fragment of lateral part of radial element in longitudinal broken section, internal edge (*arrow*) and divergent trabeculae (*double arrow*) are seen.

Plate 9

1. *Chevalieria tenuiseptata* sp. n., syntype UJ 34P/38: *a* natural cast of calicular surface; *b* a detail showing parallel radial elements. Stare Gliny — *Diplopora* Dolomite.
2. *Chevalieria tenuiseptata* sp. n., syntype UJ 34P/37: *a* transverse section of colony part (thin section UJ 7/37); *b* same thin section showing septal granulation (intermeniane space); *c* same thin section showing radial elements cut in plane of menianes. Kamień Śląski — Karchowice Beds.
3. *Silesiastraea weissermeli* gen. et sp. n., syntype UJ 34P/36: *a* colony upper surface; *b* a detail. Stare Gliny — *Diplopora* Dolomite.

Plate 10

Eckastraea prisca (Weissermel), Stare Gliny — *Diplopora* Dolomite

1. Syntype UJ 34P/39: *a* natural cast of calicular surface; *b* same specimen, juvenile corallites are visible (*arrow*).
2. Syntype UJ 34P/40: *a* natural cast of calicular surface; *b* a detail showing an adult corallite (*arrow*) with several juveniles arranged at its circumference.


1
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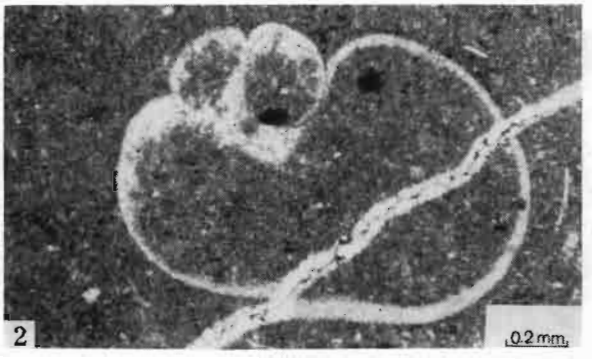
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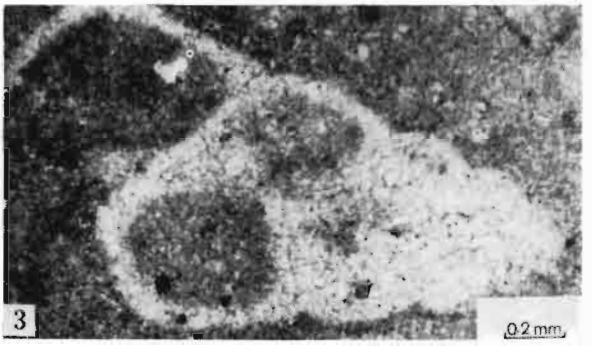
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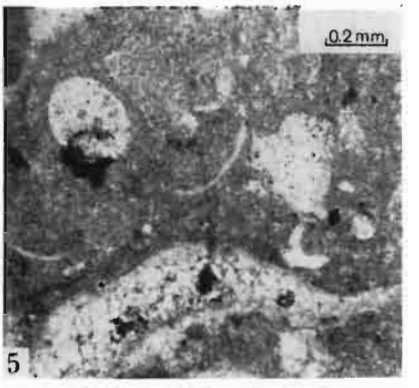
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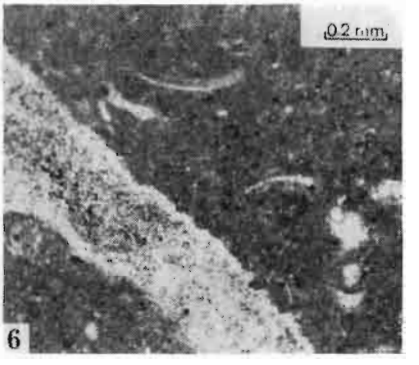
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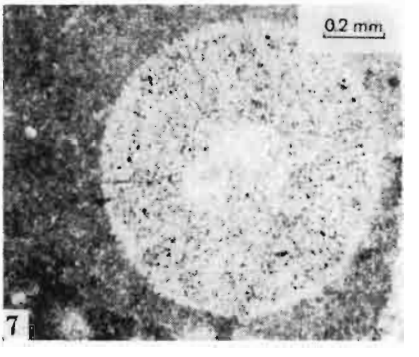
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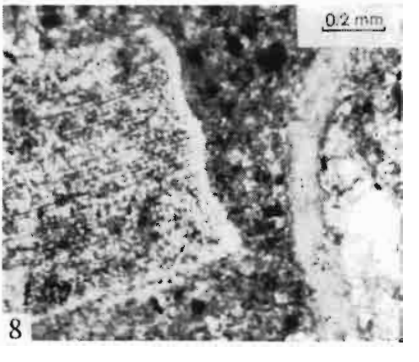
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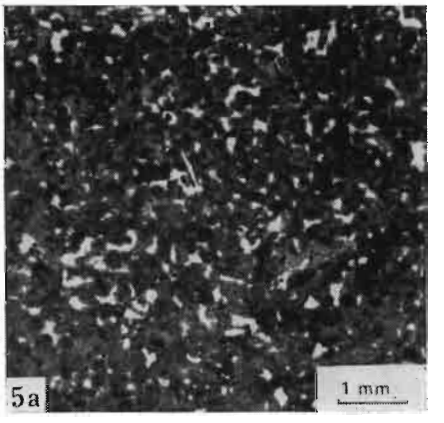
1
0.2 mm


2
0.2 mm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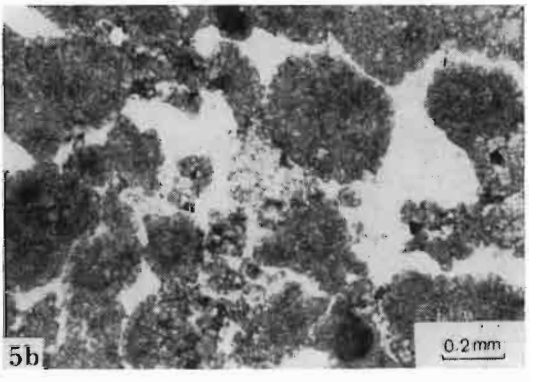
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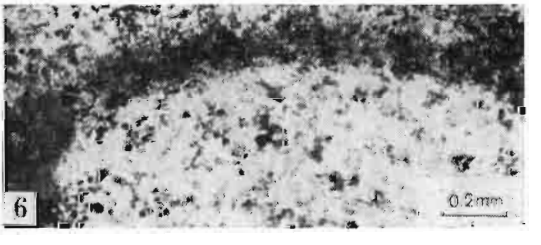
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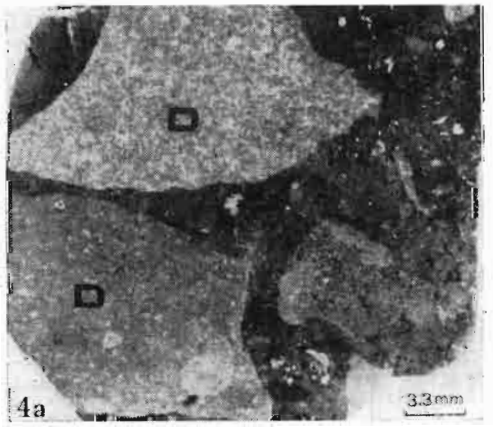
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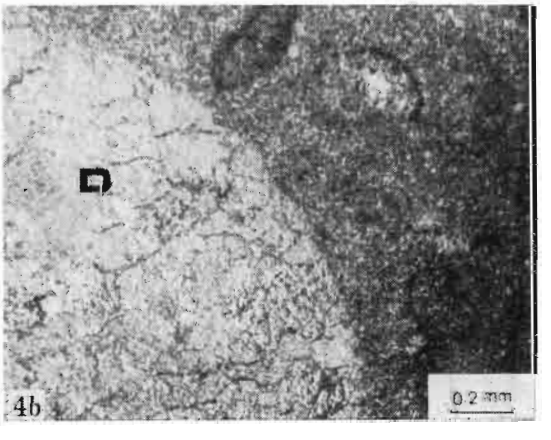
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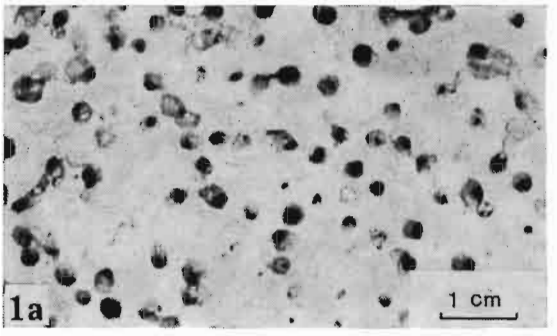
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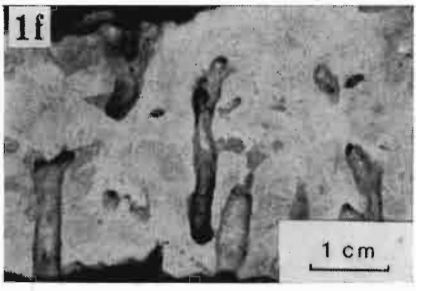
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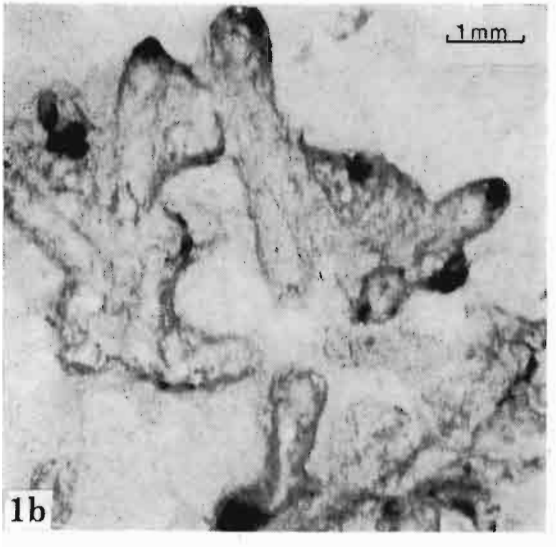
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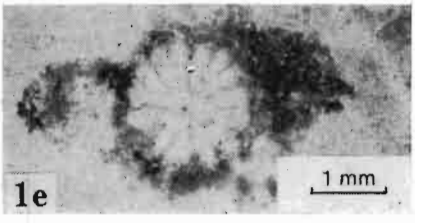
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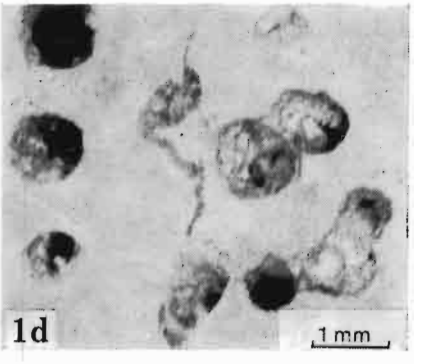
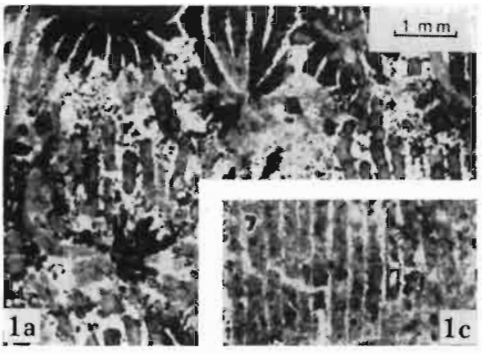

1d
1 mm


1 mm
1c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1a
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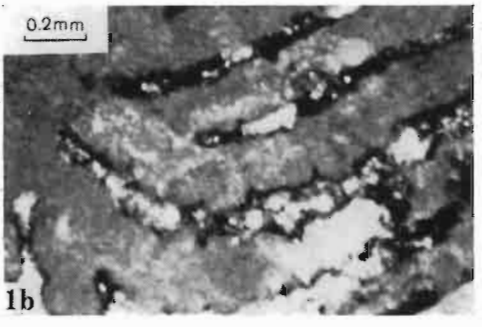
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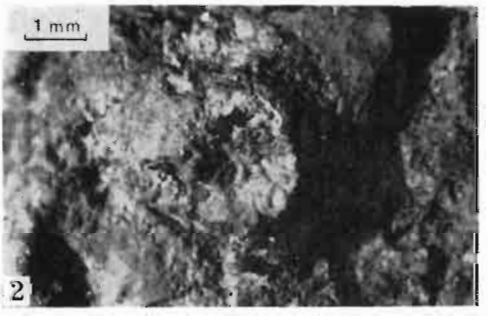
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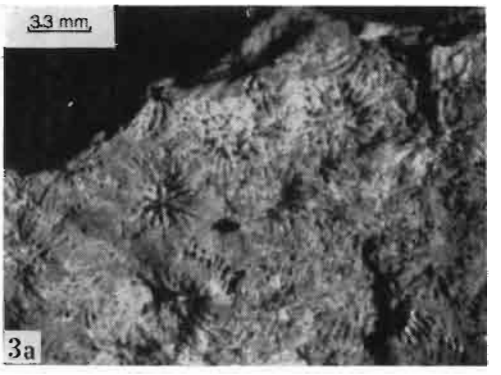
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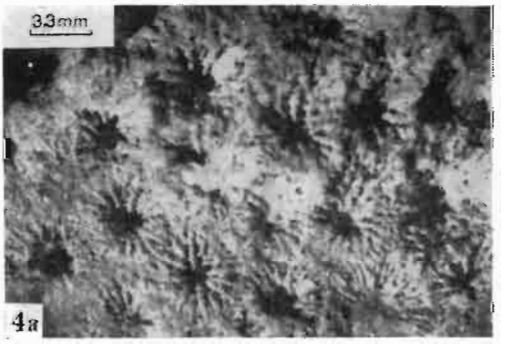
3a


1 mm
3b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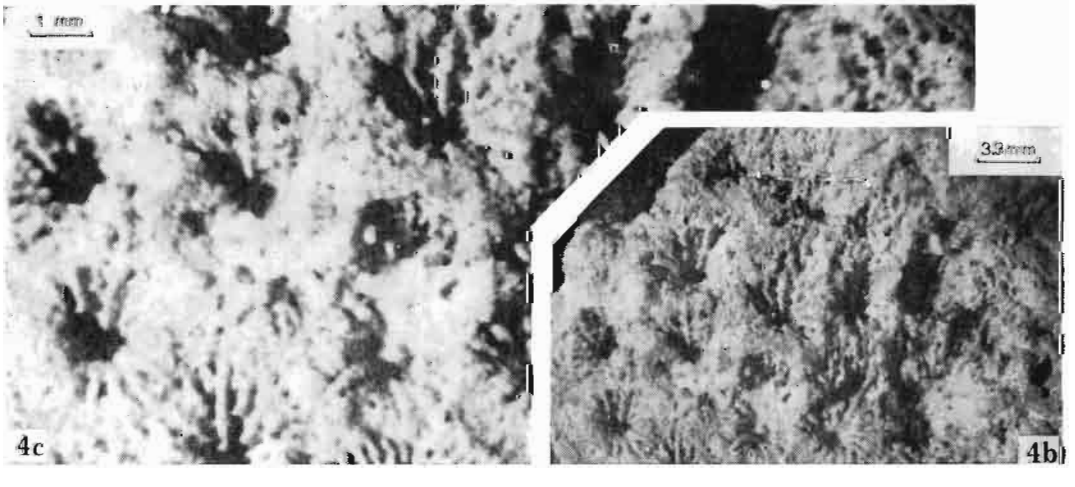
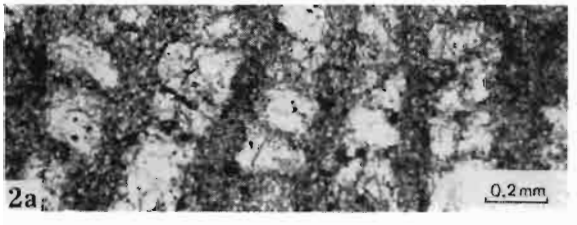

1 mm
3.3mm
4c
4b


1a


1b
1 mm


1c
1 mm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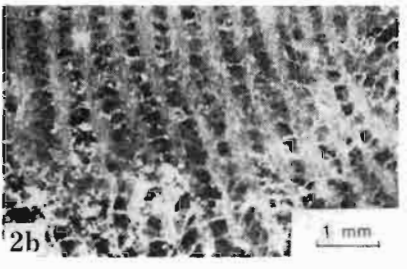
2b
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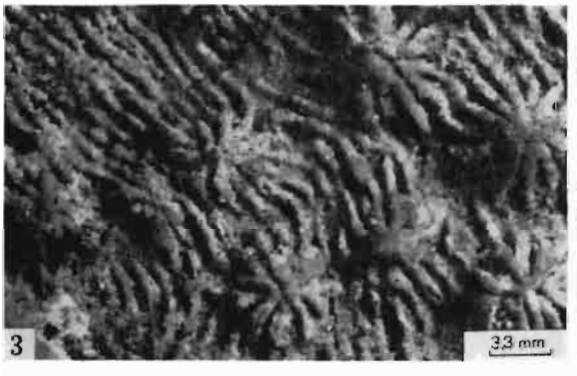
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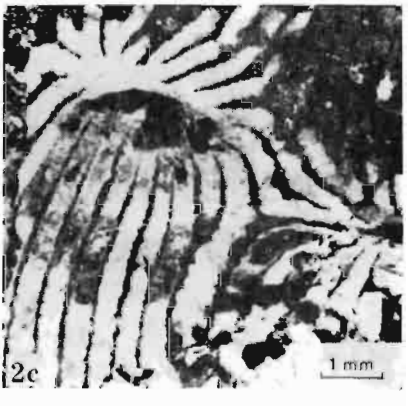
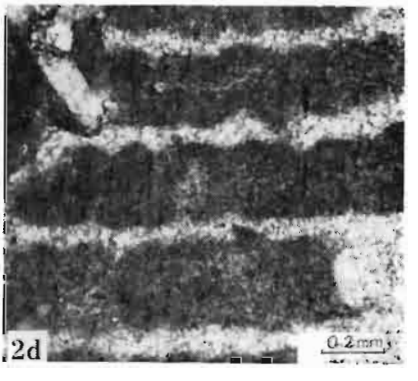

2c
1 mm


4a
1 cm
4b
1 mm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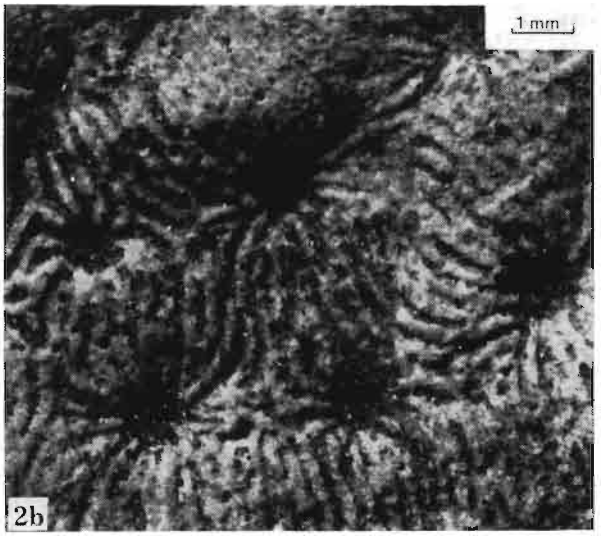
0,2 mm


3.3 mm
1a


1 mm
1b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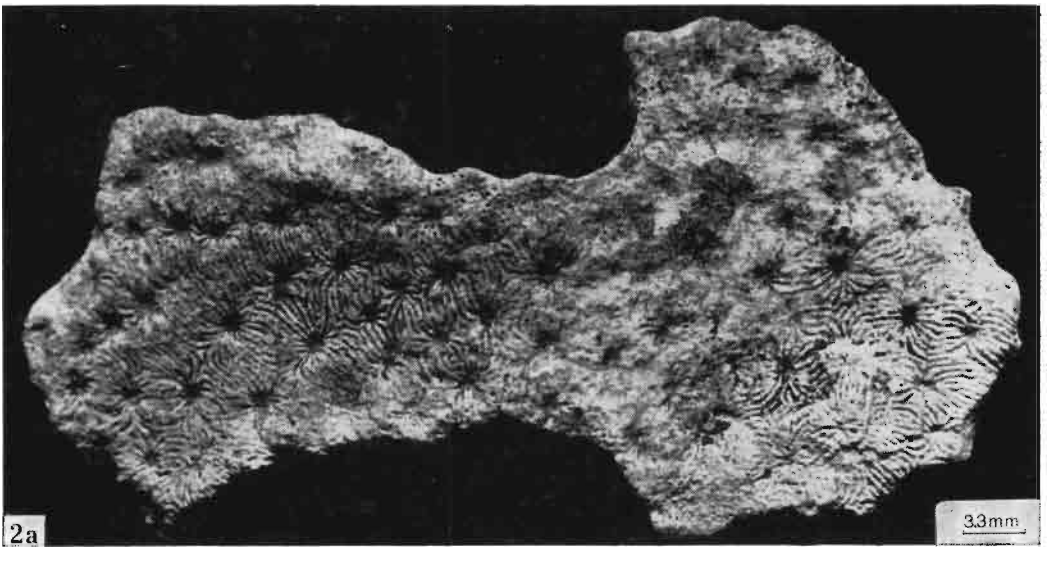
2b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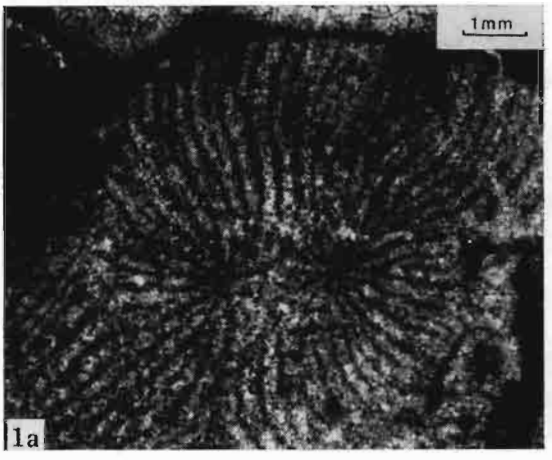
3.3mm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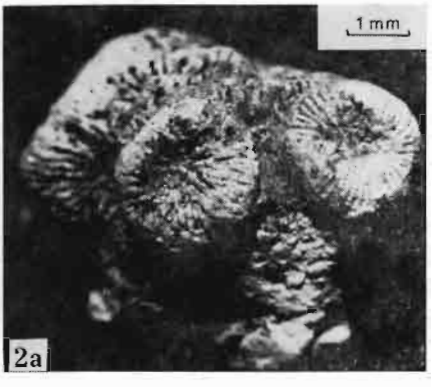
1a


1 mm
2b


0.2 mm
1b


0.2 mm
1c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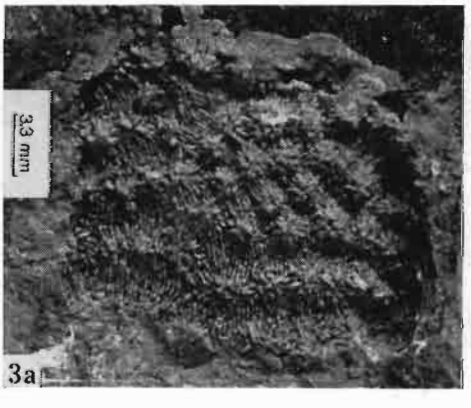
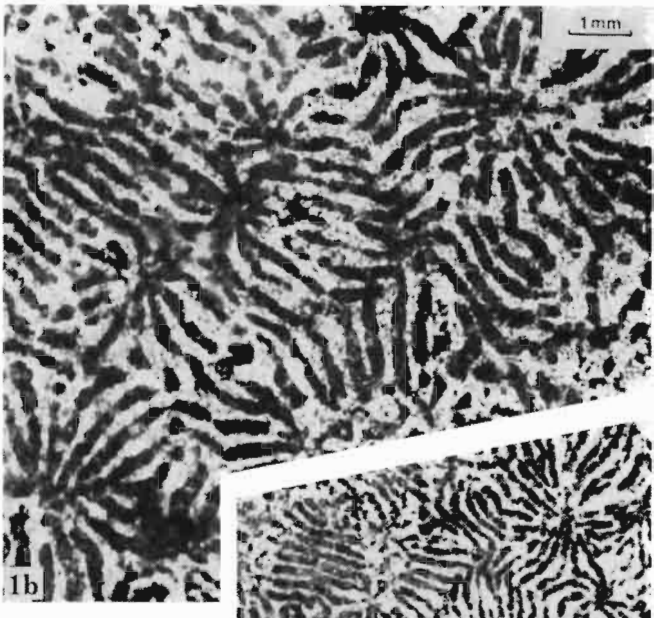

3.3 mm
3a

1 mm
3b


0.2 mm
1c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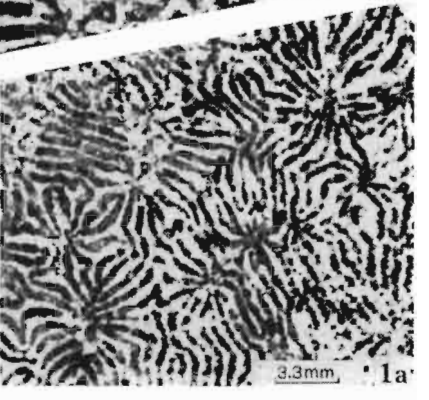
1b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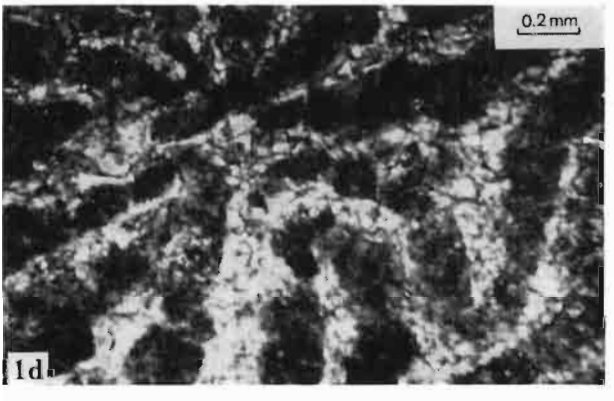
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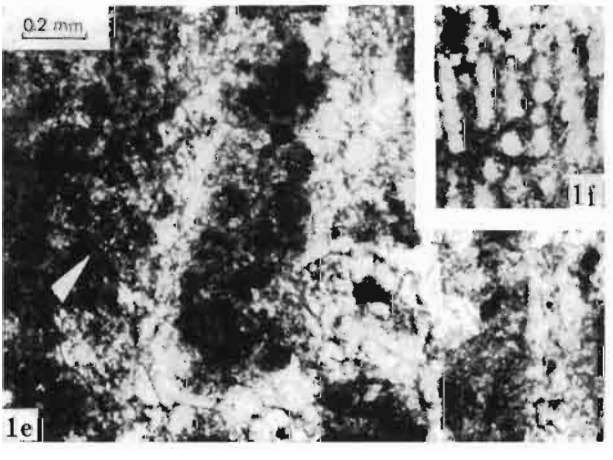
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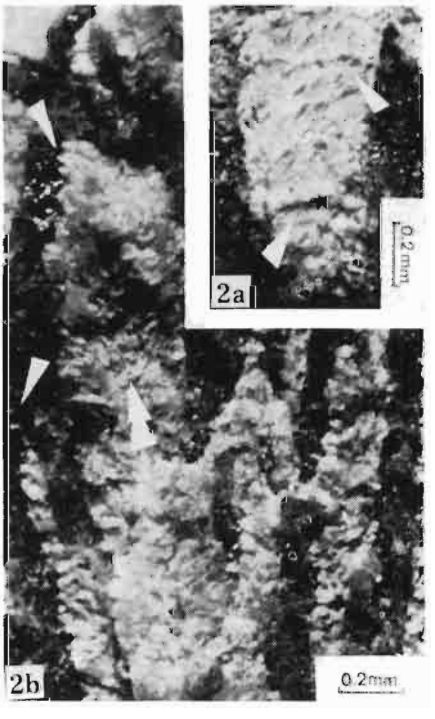
1f


2a
0.2 mm
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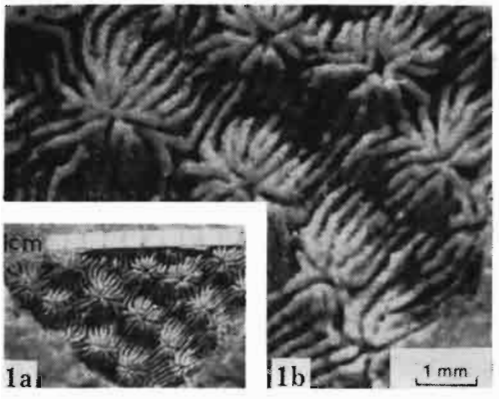
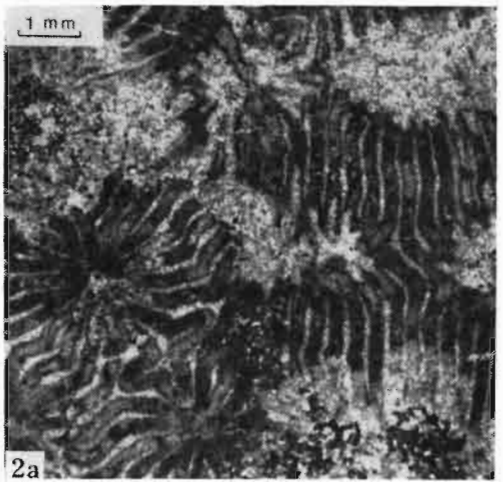
0.2 mm


1a
1b
1 mm


3a
3.3 mm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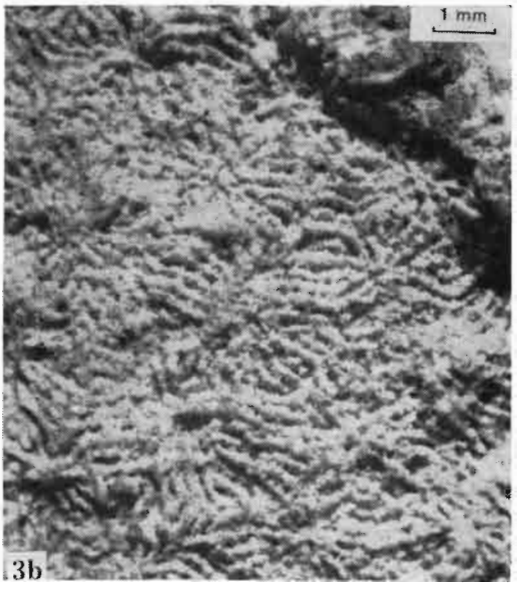
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3b


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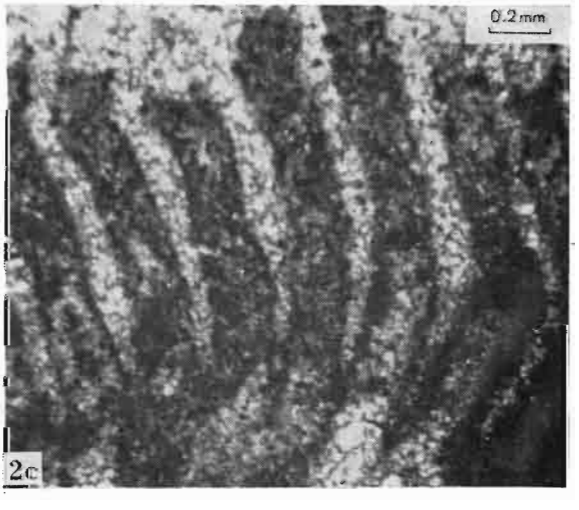
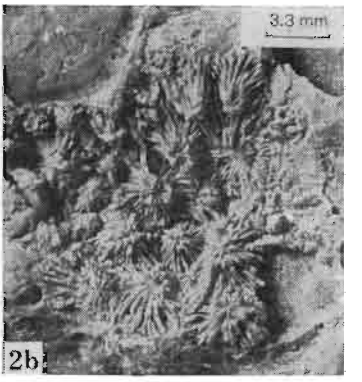

0.2 mm
2c


3.3 mm
1a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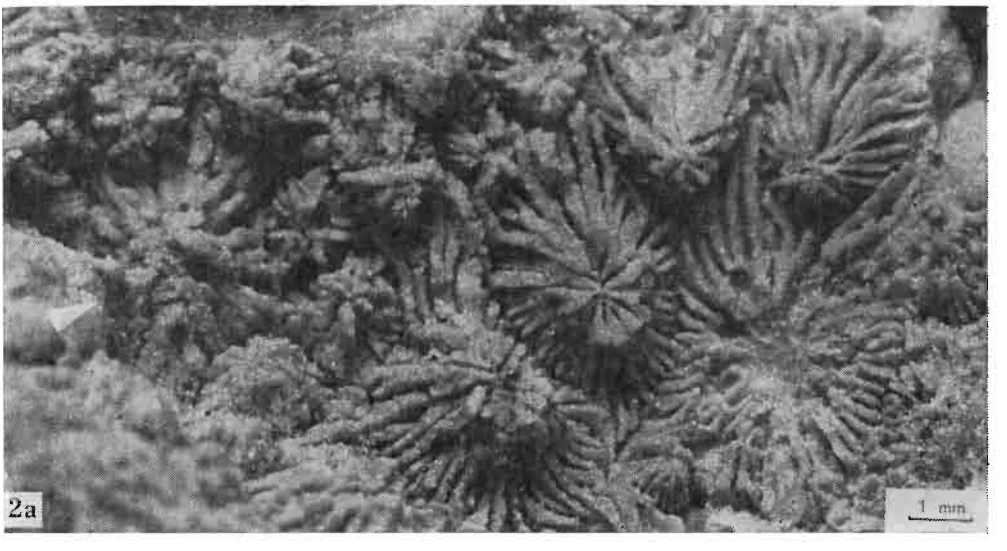
2b


1b
1 mm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1 mm