Festschrift zum 60. Geburtstag von Erik Flügel				Redaktion: Baba Senowbari-Daryan & Albert Daurer
Abh. Geol. B.-A.	ISSN 0378-0864 ISBN 3-900312-90-7	Band **50**	S. 477–507	Wien, 6. April 1994

Upper Triassic (Carnian–Lowermost Norian) Corals from the Pantokrator Limestone of Hydra (Greece)

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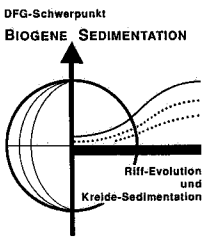
With 2 Text-Figures, 1 Table and 11 Plates



Griechenland
Hydra
Trias
Karn
Nor
Korallen
Systematik

Contents

Obertrias-Korallen (Karn–Unterstes Nor) aus dem Pantokrator-Kalk von Hydra (Griechenland)

Zusammenfassung

Aus dem Pantokrator-Kalk der Insel Hydra (Griechenland) werden 24 Korallenarten, zugehörig zu 14 Genera, beschrieben. Zwei Genera und 7 Arten sind neu: (*Palaeastraea mandrakiensis* n.sp., *Stuoresia fluegeli* n.sp., *Conophyllia hellenica* n.sp., *Hydrasmilia* n.g.: *H. rhythmica* n.sp., *H. fossulata* n.sp., *H. ornamenta* n.sp., *Craspedophyllia graeca* n.g.n.sp.). Die Korallen bestätigen das Alter der Lokalitäten als Karn bis unterstes Nor. Die Arten können meist mit südeuropäischen Lokalitäten (Italien, Slowenien, Südungarn, Rumänien, Türkei) verglichen werden und scheinen in südlichen Flachwasserbereichen der Tethys vorzuherrschen. Trotzdem, beinahe ein Drittel der neuen Arten spricht für spezielle und etwas differenzierte Lebensbedingungen in Hydra während der karnischen Periode.

Abstract

From the Pantokrator limestone of the Island Hydra, Greece, 24 species of corals belonging to 14 genera are described. Two genera and seven species are new (*Palaeastraea mandrakiensis* n.sp., *Stuoresia fluegeli* n.sp., *Conophyllia hellenica* n.sp., *Hydrasmilia* n.g.: *H. rhythmica* n.sp., *H. fossulata* n.sp., *H. ornamenta* n.sp., *Craspedophyllia graeca* n.g.n.sp.). Corals confirm Carnian to lowermost Norian age of localities. Coral species can mostly be compared with south European localities (Italy, Slovenia, south Hungary, Romania, Turkey), and seem to predominate in southern shallows of Tethys. Nevertheless, almost one third of the new species indicate special and somewhat different environments in Hydra during the Carnian period.

1. Introduction

The paleontological, palecological and microfacial investigations of the Upper Triassic limestones, the so called Pantokrator limestones in Greece were the aim of the research project "Tethyan reefs" (Fl 42/33, 38) carried out in the Paleontological institute of the University of Erlangen-Nürnberg and supported by the Deutsche Forschungsgemeinschaft over 10 years ago. During two field seasons in 1978 and 1979 almost thousand samples were collected from the Pantokrator limestones of the Didymi Mountains (southern Argolis, Pelopones) and from the Island of Hydra

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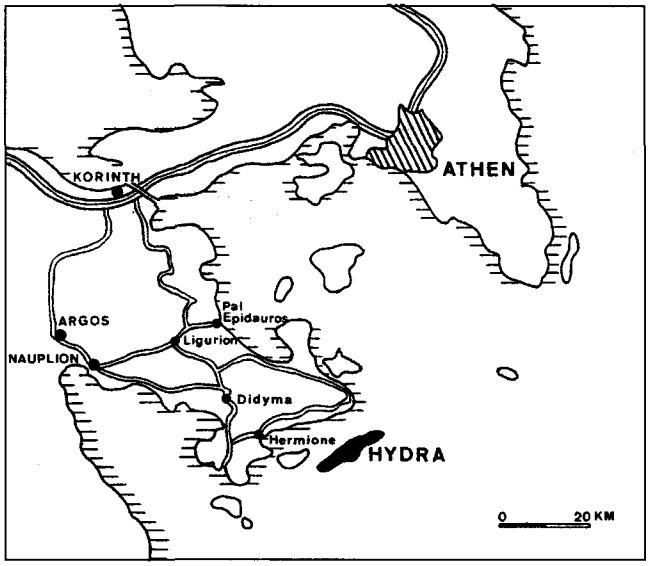


Text-Fig. 1.
Geographic position of Hydra.

(Fig. 1). Some of the paleontological, palecological and microfacies results of the investigations were published in several papers by FLÜGEL (1983), SCHÄFER & SENOWBARI-DARYAN (1982, 1983), SENOWBARI-DARYAN (1982, 1983, 1990), SENOWBARI-DARYAN & SCHÄFER (1983).

In the Didymi Mountains the Upper Triassic to Liassic sequence of Pantokrator limestones consists mainly of limestones which are developed as well bedded in the subtidal to supratidal environment. These limestones are mainly megalodont and algal limestones dominated by dasycladacean green algae. Pellets, oncolites, stromatolites and some caliche do also occur.

The occurrence of the dasycladacean green alga *Poikiloporella duplicata* (PIA) from the basal portion of a sequence exposed in the southern Argolis (BACHMANN & RISCH, 1979) and the species *Palaeodasycladus mediterraneus* (PIA) in the upper portion of the sequence described by SÜSSKOCH (1967) indicate Carnian to Liassic age of the Pantokrator limestones. Reef limestones are absent or very rare in the Didymi Mountains.

Reef facies of Pantokrator limestones, equivalent to the bedded limestones in the Didymi Mountains, are exposed in the Hydra Island (Fig. 1, 2). The complete stratigraphic sequence and a short description of different facies units of late Paleozoic to Liassic rocks are given by RÖMERMANN (1968) and SCHÄFER & SENOWBARI-DARYAN (1982). The investigation of the genesis of abundant breccia of the Pantokrator limestones was carried out by RICHTER & FÜCHTBAUER (1981).

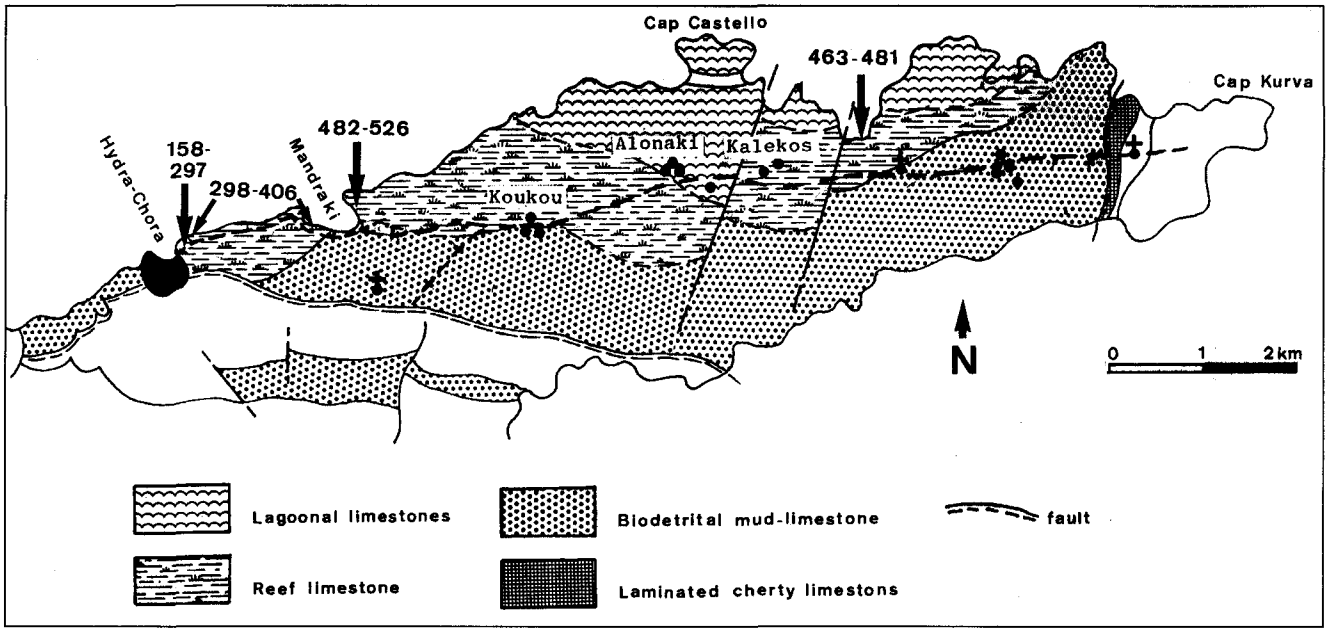
The Pantokrator reefs in Hydra are dominated by corals, sponges, various algae and the most important problematic fossil *"Tubiphytes"*. SCHÄFER & SENOWBARI-DARYAN (1982, 1983) have reported four distinct vertical facies developments as follow:

a) Coral-sponge-dominated limestone
b) Sponge-(coral-)dominated limestone
c) Coral limestone
d) Well bedded (lagoonal to tidal) limestone with megalodonts and corals.

The sponges of the Pantokrator limestones of Hydra are described by SENOWBARI-DARYAN (1982, 1990), SENOWBARI-DARYAN & SCHÄFER (1983), the algae by SCHÄFER & SENOWBARI-DARYAN (1982, 1983), and some microfossils by SENOWBARI-DARYAN (1983).

In the present paper we describe the corals collected from the Pantokrator limestones in 1978 and 1979. The samples collected in 1978 are marked with letter "G", those of 1979 with "A". The detail localities of "G" samples are given in Fig. 2. Most of "A" samples are collected on the road from Hydra Chora to Mandraki, in the eastern part of Mandraki, and in a locality near the farmer Jorgus (= Kalekos), corresponding to those of "G" samples from the same localities.

The studied material is kept in the Institute of Paleontology of the University Erlangen-Nürnberg under the same numbers as given in the text.



Text-Fig. 2.
Map of the Hydra exhibiting the distribution of the facies units of the Triassic Pantokrator Limestones with localities of G-samples.

2. Description of the Coral Fauna

In total, 150 specimens and thin sections were examined; 90 specimens were researched, while all others are completely recrystallized.

Determined were 24 species belonging to 14 genera, 8 families and 4 suborders. Two genera and seven species are new.

In systematics new revisions of the modern authors BEAUVAIS (1981), CUIF (1972, 1974, 1975, 1976, 1977), MELNIKOVA (1975, 1983, 1984), MORYCOWA (1988), RONIEWICZ (1989), RONIEWICZ & MORYCOWA (1989), XIA & LIAO (1986) and combinations with some of our aspects were taken into account. Because of the poorly preserved Hydra material no microstructure analyses were possible.

The suborders Pachythecalina and Distichophylliina are used rather uniformly by all authors. In the Hydra material the genera *Protoheterastraea* and *Volzeia* are attributed to Pachythecalina, and the genera *Coryphyllia*, *Palaeastraea*, *Margarophyllia* and *Margarosmilia* to Distichophylliina.

The suborder Archaeocoeniina unites very different corals by various authors. These corals have smaller dimensions of corallites, compact septa of large trabeculae, and septothecal wall. To this suborder among Hydra specimens the *Stuoresia* and *Gumbelastraea* are ascribed (following BEAUVAIS [1981] and MELNIKOVA [1984]).

The genera *Myriophyllum*, *Rhopalodendron*, *Thamnotropis*, have various systematic positions in literature. These genera and the new genera *Hydrasmilia* and *Craspedosmilia* are here ascribed to the suborder Archaeofungiina, partly following BEAUVAIS (1981). Detailed explanation is given in the text.

For Hydra corals, temporarily the following systematics is proposed:

Suborder: Pachythecalina ELIAŠOVA, 1976
Family: Pachythecalidae CUIF, 1975
Genus: *Protoheterastraea* WELLS,, 1937
Family: Volzeidae CUIF, 1977
Genus: *Volzeia* CUIF, 1966
Suborder: Distichophylliina BEAUVAIS, 1981
Family: Margarophylliidae CUIF, 1977
Genus: *Margarosmilia* VOLZ, 1896
Genus: *Margarophyllia* VOLZ, 1896
Family: Coryphylliidae BEAUVAIS, 1981
Genus: *Coryphyllia* CUIF, 1974
Genus: *Palaeastraea* KÜHN, 1936
Suborder: Archaeocoeniina ALLOITEAU, 1952
Family: Gumbelastraeidae CUIF, 1977
Genus: *Gumbelastraea* CUIF, 1976
Genus: *Stuoresia* CUIF, 1976
Suborder: Archaeofungiina BEAUVAIS, 1981
Family: Procyclolitidae VAUGHAN & WELLS, 1943
Genus: *Myriophyllum* CUIF, 1975
Genus: *Hydrasmilia* nov.gen.
Family: Conophylliidae ALLOITEAU, 1952
Genus: *Conophyllia* D'ORBIGNY, 1849
Genus: *Craspedosmilia* nov.gen.
Genus: *Rhopalodendron* TURNŠEK, 1989
Family: Tropiastraeidae CUIF, 1977
Genus: *Thamnotropis* CUIF, 1975

New taxa and new systematical observations are described in detail. For the already known species the first name and the most important revisions are given, and the latest synonymy is added where neccessary. New materials in Hydra are documented. Abbreviations for dimensions are as usual:

d: diameter of corallite
cc: distance between two neighbouring centres of corallites
s: number of septa, or density of septa at some distance
s1, s2: number of septa cycles.

Suborder: Pachythecalina ELIAŠOVA, 1976
Family: Pachythecalidae CUIF, 1975
Genus: *Protoheterastraea* WELLS, 1937

Protoheterastraea leonhardi (VOLZ), 1896

(Pl. 1, Fig. 1–2)

1896 *Hexastraea Leonhardi* nov.spec. – VOLZ: 92, Taf. 11/21–25.
1937 *Protoheterastraea leonhardi* (VOLZ). – WELLS: 73–74.
1972 *Hexastraea* (= *Protoheterastraea*) *leonhardi* (VOLZ). – CUIF: 258–268, Fig. 23–26.
1991 *Protoheterastraea leonhardi* (VOLZ). – RIEDEL: 116.

The phaceloid colony has corallites with d = 4–5 mm, typical thick wall and incease by septal division which fits well with type specimen.

Material: G-504.

Protoheterastraea minor TURNŠEK, 1989

(Pl. 1, Fig. 3–4)

1989 *Protoheterastraea minor* n.sp. – TURNŠEK in: TURNŠEK & BUSER: 83–84, Pl. 1/1–5.
1991 *Protoheterastraea minor* TURNŠEK. – RIEDEL: 117.

The specimens from Hydra are identical with originals from Slovenia in the same dimensions of corallites (d = 2–3 mm) but having a somewhat thinner wall and in places more septa (20–28). Nevertheless they are still in the variation range of the species.

Material: A-55, A-293, G-211, G-299.

Family: Volzeidae CUIF, 1977
Genus: *Volzeia* CUIF, 1966

Volzeia badiotica (VOLZ), 1896

(Pl. 1, Fig. 5–6)

1896 *Thecosmilia badiotica* n.sp. – VOLZ: 26–30, Taf. 2/14–19, Text-Fig. 24–27.
1982 *Volzeia badiotica* (VOLZ). – TURNŠEK et al.: 69–70, Pl. 3/4–5. Synonymy!
1984 *Volzeia badiotica* (VOLZ). – RAMOVŠ & TURNŠEK: 178, Pl. 8/1.
1987 *Volzeia badiotica* (VOLZ). – TURNŠEK et al.: 45, Pl. 4/1–2.
1989 *Volzeia badiotica* (VOLZ). – TURNŠEK & BUSER: 84, Pl. 2/1–3.
1991 *Volzeia badiotica* (VOLZ). – RIEDEL: 118.

Very well preserved phaceloid colonies from Hydra with dimensions d = 8–15 mm are identical with previous descriptions of this species.

Material: A-31/1,2,3, A-580, A-586, A-738, G-374.

Volzeia sublaevis (MÜNSTER), 1841

(Pl. 1, Fig. 7)

1841 *Lithodendron sublaevis* – MÜNSTER: non vid.
1896 *Thecosmilia sublaevis* MÜNSTER. – VOLZ: 24–26, Taf. 2/1–5, Text-Fig. 21–22.

1982 *Volzeia sublaevis* (MÜNSTER). – TURNŠEK et al.: 70, Pl. 3/6, Synonymy!
1984 *Volzeia sublaevis* (MÜNSTER). – RAMOVŠ & TURNŠEK: 178–179, Pl. 8/2–3.
1991 *Volzeia sublaevis* (MÜNSTER). – RIEDEL: 118.

V. sublaevis is smaller (d = 5–8 mm) than *V. badiotica* and very numerous in Hydra.

Material: A-50, A-53, A-56, A-147, A-281, G-464, G-472, G-502.

Volzeia subdichotoma (MÜNSTER), 1841

(Pl. 1, Fig. 8)

1841 *Lithodendron subdichotomum.* – MÜNSTER: non. vid.
1865 *Cladophyllia subdichotoma* MÜNSTER. – LAUBE: 38, Taf. 4/2.
1896 *Thecosmilia subdichotoma* MÜNSTER. – VOLZ: 22–24, Taf. 1/17–21, Text-Fig. 7, 16, 19, 20.
1974 "*Volzeia subdichotoma*" in: groupe *subdichotoma – sublaevis – badiotica.* – CUIF: 337–354, Fig. 17, 21d.
1986 *Retiophyllia subdichotoma* (MÜNSTER). – XIA & LIAO: 41, Pl. 2/9–11.
1991 *Volzeia subdichotoma* (MÜNSTER). – RIEDEL: 118.

This species is characteristic because of its dense corallites. d = 4–8 mm.

Material: G-285, G-286, G-477.

Suborder: Distichophylliina BEAUVAIS, 1981
Family: Margarophylliidae CUIF, 1977
Genus: *Margarosmilia* VOLZ, 1896

Margarosmilia confluens (MÜNSTER), 1841

(Pl. 2, Fig. 1–3)

1841 *Cyathophyllum confluens.* – MÜNSTER: non. vid.
1896 *Margarosmilia zieteni* KLIPSTEIN. var. *confluens* MÜNSTER. – VOLZ: 35–36, Taf. 1/8–12.
1982 *Margarosmilia confluens* (MÜNSTER). – TURNŠEK et al.: 68–69, Pl. 2/5–6. Synonymy!
1986 *Margarosmilia confluens* (MÜNSTER). – XIA & LIAO: 40–41, Pl. 1/3–6.
1989 *Margarosmilia confluens* (MÜNSTER). – TURNŠEK & BUSER: 85, Pl. 3/3.
1991 *Margarosmilia confluens* (MÜNSTER). – RIEDEL: 115.

A modern description of the species was made by CUIF (1974). Phaceloid specimens from Hydra are frequent and fit in with this description; d = 5–8 mm.

Material: A-518, A-523, A-584, G-142, G-345.

Margarosmilia nova TURNŠEK, 1991

(Pl. 2, Fig. 4)

1991 *Margarosmilia nova* n.sp. – TURNŠEK in: RAMOVŠ & TURNŠEK: 184, Pl. 6/1–3.

Phaceloid coral with very large corallites (d = 15–20 × 25 mm) is rather rare. Hydra is its second locality.

Material: A-260/1, A-260/I.

Margarosmilia zieteni (KLIPSTEIN), 1843

(Pl. 2, Fig. 5)

1843 *Montlivaultia zieteni* – KLIPSTEIN: non. vid.
1896 *Margarosmilia zieteni* KLIPSTEIN. – VOLZ: 34–35, Taf. 1/1–7, Text-Fig. 18.
1982 *Margarosmilia zieteni* KLIPSTEIN. – TURNŠEK et. al.: 68, Pl. 2/1–4. Synonymy!
1987 *Margarosmilia zieteni* KLIPSTEIN. – TURNŠEK et al.: 44, Pl. 1/4.
1991 *Margarosmilia zieteni* KLIPSTEIN. – RIEDEL: 115.

Hydra specimens are numerous and well preserved, d = 11–16 mm, and fit in with other materials.

Material: A-5, A-192, A-612/5,6, G-487ab.

Margarosmilia richthofeni VOLZ, 1896

(Pl. 2, Fig. 6–7)

1896 *Margarosmilia richthofeni* nov.spec. – VOLZ: 36, Taf. 1/13–14.
1984 *Margarosmilia richthofeni* VOLZ. – RAMOVŠ & TURNŠEK: 176–177, Pl. 5/1–2.
1986 *Margarosmilia richthofeni* (MÜNSTER). – XIA & LIAO: 40, Pl. 1/1–2.
1989 *Margarosmilia richthofeni* VOLZ. – TURNŠEK & BUSER: 85, Pl. 4/3.
1991 *Margarosmilia richthofeni* VOLZ. – RIEDEL: 115.

This species differs from the other species of this genus in much more dense septa in the periphery. d = 7–15 mm.

Material: A-159.

Genus: *Margarophyllia* VOLZ, 1896

Margarophyllia crenata (MÜNSTER), 1841

(Pl. 3, Fig. 1)

1841 *Montlivaultia crenata.* – MÜNSTER: non. vid.
1896 *Margarophyllia crenata* (MÜNSTER). – VOLZ: 49–50, Taf. 3/6–11.
1982 *Margarophyllia crenata* (MÜNSTER). – TURNŠEK et al.: 68, Pl. 1/5–8. Synonymy!
1984 *Margarophyllia crenata* (MÜNSTER). – RAMOVŠ & TURNŠEK: 176, Pl. 4/2.
1987 *Margarophyllia crenata* (MÜNSTER). – TURNŠEK et al.: 44, Pl. 1/3.
1991 *Margarophyllia crenata* (MÜNSTER). – RIEDEL: 115.

Large solitary coral with d = 30–50 mm is an outstanding well preserved coral in the Hydra Pantokrator limestone.

Material: A-595, A-646, A-647.

Margarophyllia capitata (MÜNSTER), 1841

(Pl. 3, Fig. 2–3)

1841 *Montlivaultia capitata* – MÜNSTER: non. vid.
1896 *Margarophyllia capitata* MÜNSTER. – VOLZ: 46–47, Taf. 3/1–4.
1982 *Margarophyllia capitata* (MÜNSTER). – TURNŠEK et al.: 67–68, Pl. 1/1–4.
1984 *Margarophyllia capitata* (MÜNSTER). – RAMOVŠ & TURNŠEK: 16, Pl. 4/5–6.
1987 *Margarophyllia capitata* (MÜNSTER). – TURNŠEK et al.: 43, Pl. 1/2.
1989 *Margarophyllia capitata* (MÜNSTER). – TURNŠEK & BUSER: 85, Pl. 3/2.
1991 *Margarophyllia capitata* (MÜNSTER). – RIEDEL: 115.

This solitary species with d = 15–20 mm is very frequent in Hydra and completely fits with so far known samples.

Material: A-520, G-237, G-311, G-365, G-494, G-495, G-508, G-522.

Family: Coryphylliidae BEAUVAIS, 1981
Genus: *Coryphyllia* CUIF, 1975

In addition to lonsdaleoid septa (RONIEWICZ 1989: 35) this genus has also laterally ornamented septa. So it is separated from the family Distichophylliidae CUIF 1977, and ascribed to the family Coryphylliidae, following BEAUVAIS (1981: 352).

Coryphyllia elliptica (MELNIKOVA), 1975

(Pl. 3, Fig. 4)

1975 *Cuifia elliptica* sp. nov. – MELNIKOVA: 84–85, Tab. 14/3–5.
1987 *Cuifia elliptica* MELNIKOVA. – TURNŠEK & RAMOVŠ: 34–35, Pl. 4/3–4.
1989 *Coryphyllia elliptica* (MELNIKOVA). – RONIEWICZ: 65–66, Pl. 15/1,2,7.
1991 *Coryphyllia elliptica* (MELNIKOVA). – RIEDEL: 113.

This solitary coral has very large dimensions; d = 40–50 mm.

Material: A-279, G-367.

Coryphyllia regularis CUIF, 1974

(Pl. 3, Fig. 5)

1974 *Coryphyllia regularis* n.sp. – CUIF: 380–383, Text-Fig. 37–38.
1984 *Coryphyllia regularis* CUIF. – RAMOVŠ & TURNŠEK: 175, Pl. 4/1.
1989 *Coryphyllia regularis* CUIF. – TURNŠEK & BUSER: 84, Pl. 3/1.
1989 *Coryphyllia regularis* CUIF. – RONIEWICZ: 64.
1991 *Coryphyllia regularis* CUIF. – RIEDEL: 113.

Differs from *C. elliptica* in d = 25–30 mm.

Material: A-546, A-587.

Genus: *Palaeastraea* KÜHN, 1936

Palaeastraea mandrakiensis n.sp.

(Pl. 4, Fig. 1–6)

Name: After the locality at Mandraki Bay.

Holotypus: G-284 (Pl. 4, Fig. 3).

Material: G-185, G-281, G-284 with three thin sections.

Locus typicus: At the road near Mandraki Bay.

Stratum typicum: Pantokrator limestone, Carnian – lowermost Norian.

Diagnosis: *Palaeastraea* with large dissepimental peritheca, d = 15–20, s = 16+s.

Description: Large massive colony with presumably confluent septa. Septa compact, in 3–4 cycles, S1 (and S2) being very thick, the others by degrees shorter and thinner. Lateral side rarely granulated or almost smooth. Endotheca of vesicular and long belt dissepiments.

Comparison: Our specimens are nearly identical with *P. cyathophylloides* (FRECH) revised by RONIEWICZ (1989: 66–68). She explains the phaceloid resemblance of some corallites with the secondary endolithic destruction. Also our specimens show that the connections between corallites in places are clear and well preserved. Our species differs from *P. cyathophylloides* in larger dimensions of corallites, smaller number of septa and wider peritheca.

Suborder: Archaeocoeniina ALLOITEAU, 1952
Family: Gumbelastraeidae CUIF, 1977
Genus: *Stuoresia* CUIF, 1976

The genus was established by CUIF (1976: 108) on the basis of the specis *Meandrina bronni* KLIPSTEIN. It is a meandroid-cerioid colony with typical polyfurcate budding. Septa trabecular with menian ornamentation, septothecal wall. In systematics it was ascribed to Archaeocoeniina – Tropiphyllidae by BEAUVAIS (1981: 354), and Archaeocoeniina – Gumbelastraeidae by MELNIKOVA (1984: 50–51). The explanation of the authorship of the family Gumbelastraeidae being of CUIF 1977 (and not MELNIKOVA 1984) was given by RONIEWICZ (1989: 24).

Stuoresia fluegeli n.sp.

(Pl. 5, Fig. 1–6)

Name: Due to the respect to Prof. Dr. ERIK FLÜGEL.

Holotypus: A-588 (Pl. 5, Fig. 1).

Material: A-29, A-140, A-168, A-217, A-287, A-467, A-525, A-529, A-588, A-644, G-214, ?G-216, G-220, G-221, G-310.

Locus typicus: Kalekos, Hydra.

Stratum typicum: Pantokrator Limestone, Carnian.

Diagnosis: *Stuoresia* with d = 2–3(4) mm, s = 24+c.

Description: Cerioid-meandroid colony. Corallites in cross section roundish, oval or meandroid. Budding intracalicinal, in more directions. Septa compact, in 3–4 cycles, the last one as ridges in the wall only. Lateral ?menianes poorly preserved. Wall septothecal. No columella.

Comparison: *S. bronni* (KLIPSTEIN 1841) is of the same dimensions of corallites, but much more meandriform (CUIF, 1975: 105–109, Pl. 15/1–7, Text-Fig. 16; CUIF, 1976, 103–105, Pl. 7/1–9). *S. cerioidea* (CUIF, 1976: 140) has larger corallites, and is never meandroid.

Genus: *Gumbelastraea* CUIF, 1976

Gumbelastraea pamphyliensis CUIF, 1976

(Pl. 6, Fig. 1–3)

1976 *Gumbelastraea pamphyliensis* nov.sp. – CUIF: 108, Pl. 9/2–4.

Description and comparison given by CUIF (1976: 105–109): Cerioid colony with corallites: d = ca 2–4 mm, s = ca 48. From type species *G. guembeli* CUIF (1976) it is distinguished by smaller dimensions and stronger pennulae.

Material: A-58, G-194, G-286, G-290, G-520.

Suborder: Archaeofungiina BEAUVAIS, 1981

In the present state of systematical subdivision of corals the suborder Archaeofungiina introduced by BEAUVAIS (1981) is here accepted.

Several representatives of Procyclolitidae, Conophyllidae and Tropiphyllidae as the genera *Myriophyllum*, *Thamnotropis*, *Rhopalodendron* and ? *Craspedophyllia* were attributed by various authors to various suborders, as: Archaeocoeniina, Archaeofungiina, Fungiina or even Distichophyllina (see BEAUVAIS, 1981: 354, 355; MELNIKOVA, 1984: 45, 52; RONIEWICZ, 1989: 24, 83). These genera have compact septa with small trabecular microstructure, sometimes ?pennular or menianes ornamentation, rare synapticulae, and columellar structure, but wall lacking or weakly developed epitheca.

They are distinguished from Fungiina which have typical porous septa, and from Archaeocoeniina which have septa of large trabeculae and septothecal wall. The new genera *Hydrasmilia* and *Craspedosmilia* are also put into Archaeofungiina.

Family: Procyclolitidae VAUGHAN & WELLS, 1943
Genus: *Myriophyllum* CUIF, 1975

Myriophyllum badioticum (VOLZ), 1896
(Pl. 6, Fig. 4)

1896 *Myriophyllia badiotica* LORETZ n.n. – VOLZ: 75–76, Taf. 9/9, Text-Fig. 41–42.
1982 *Myriophyllum badioticum* (VOLZ). – TURNŠEK et al.: 73–74, Pl. 7/5–6. Synonymy!
1989 *Myriophyllum badioticum* (VOLZ). – TURNŠEK & BUSER: 87, Pl. 7/4.

The specimen is a fragment with densely packed septa which fit in with structures of *Myriophyllum badioticum*.

Material: A-626.

Genus: *Hydrasmilia* nov.gen.

Name: After the Island of Hydra.

Type species: *Hydrasmilia rhythmica* n.sp.

Diagnosis: Phaceloid colony with more or less rhythmical growth of corallites, round and oval in section. Septa compact of the same thickness, with rare lateral sharp granulations. Endotheca of tabulate and vesicular dissepiments, rare synapticulae. Microstructure of ?small trabeculae. Prolongated fossula with parietal columella.

Comparison: In structure of septa this genus is similar to *Margarosmilia*, but differs in having parietal columella. In type and equal thickness of septa it resembles to *Poklukosmilia* TURNŠEK (TURNŠEK & BUSER, 1989: 85) but differs as well in collumella, and in special rhythmical growth of corallites. In density of septa it is also similar to *Gillastraea* (MELNIKOVA, 1983: 51–54), from which it differs in granular ornamentation. In structure of septa it resembles *Myriophyllum* (CUIF, 1975: 61) which is solitary. For now, the new genus is put into the family Procyclolitidae, suborder Archaeofungiina.

Hydrasmilia rhythmica n.sp.
(Pl. 7, Fig. 1–6)

Name: After the rhythmical growth of corallites.

Holotypus: A-151 (Pl. 7, Fig. 1).

Material: A-151, A-509, G-213 with eight thin sections.

Locus typicus: Mandraki Bay, Hydra.

Stratum typicum: Pantokrator Limestone, Carnian.

Diagnosis: *Hydrasmilia* with special rhythmical growth of corallites; d = 5–8 × 6–12 mm, s = ca 120.

Description: Phaceloid colony with rhythmical thickenings of corallites. In transverse section they are roundish to oval, in longitudinal section periodical growth of corallites is seen. Septa are compact, in 5–6 cycles, all of them of the same thickness along the whole length. Lateral rare granulations. Microstructure seems to be of subperpendicularly arranged small trabeculae. In axial part parietal elongated columella. Endotheca is of tabulate and vesicular dissepiments, and rare synapticulae.

Comparison: As given for genus. *H. rhythmica* is characterized with its special rhythmical growth of corallites.

Hydrasmilia fossulata n.sp.
(Pl. 8, Fig. 1–5)

Name: After a long fossulla filled with parietal columella.

Holotypus: A-57 (Pl. 8, Fig. 1).

Material: Colony with three thin sections.

Locus typicus: Mandraki Bay, Hydra.

Stratum typicum: Pantokrator Limestone, Carnian.

Diagnosis: *Hydrasmilia* of dense septa and long fossula with parietal columella. d = 9–11 × 12–20 mm, s = ca 160 (7–8/ 2 mm).

Description: Phaceloid colony, corallites in transverse section are elongated. Septa are compact, of equal thickness, dense, in 5–6 cycles. Lateral ornamentation is granular. Endotheca of numerous vesicular and tabulate dissepiments and rare synapticulae. Somewhere thin epitheca is preserved. Axial part of corallites is elongated fossula, fulfilled with parietal columella.

Comparison: From type species *H. rhythmica* it differs in larger dimensions of more equal corallites and more elongated fossula.

Hydrasmilia ornamenta n.sp.
(Pl. 9, Fig. 1–4)

Name: It has a rich lateral ornamentation on septa.

Holotypus: A-289 (Pl. 9, Fig. 1).

Material: A-289, G-266, G-274 with five thin sections.

Locus typicus: Mandraki Bay, Hydra.

Stratum typicum: Pantokrator Limestone, Carnian.

Diagnosis: *Hydrasmilia* with numerous lateral granulations, and dimensions: d = (6–10) × (12–20) mm, s = ca 180, density of septa at wall 11–12/2 mm.

Description: Phaceloid colony with round to oval corallites. Septa compact, of almost equal thickness, with abundant lateral ornamentation which looks like spines or sometimes like pennulae. Axially septa continue into elongated fossula and form parietal columella. Endotheca of numerous vesicular dissepiments. Microstructure not well preserved, looks like composed of small centred trabeculae.

Comparison: In dimensions of corallites it is similar to *H. fossulata*, but differs in more abundant lateral septal ornamentation. From type species it differs also in larger corallites.

Family: Conophylliidae ALLOITEAU, 1952
Genus: *Conophyllia* D'ORBIGNY, 1849

The genus *Conophyllia* D'ORBIGNY 1850 was ascribed by VOLZ (1896) to the genus *Omphalophyllia* LAUBE 1865, but later the genus *Conophyllia* was recognized by ALLOITEAU (1952), WELLS (1956), RIEDEL (1991), and others.

A revision was made by CUIF (1975: 52–55; 1977: 27) and MELNIKOVA (1975: 111–112). CUIF found out the difference with the similar *Omphalophyllia* in radial growth of free septa and in polycentric columella.

The similar genus *Neoconophyllia* DENG & KONG (1984) "differs in form of columella, dissepiments and synapticulae and in arrangements of trabeculae".

Conophyllia hellenica n.sp.

(Pl. 10, Fig. 1–4)

Name: After Greece (= Hellas, adj. hellenicum) where it was found.

Holotypus: G-539 (Pl. 10, Fig. 1).

Material: G-539, A-20 with two thin sections.

Locus typicus: Mandraki Bay, Hydra.

Stratum typicum: Pantokrator Limestone, Carnian.

Diagnosis: *Conophyllia* with radial, laterally granulated septa, vesicular dissepiments, parietal (polycentric) columella, dimensions of d = 25 × 30, s = ca 150 (5/2 mm).

Description: Solitary coral, roundish in cross section. *Septa radial, compact, laterally irregularly granulated.* Endotheca of thin numerous dissepiments and rare synapticulae. In axial part columella consists of more thick prolongations of septal trabeculae which form parietal axial mass. In rare places thin epitheca. Microstructure of septa is poorly preserved, seems to be trabecular. Dimensions: d = 25–30 mm, s = ca 150.

Comparison: This new species differs from the type species in larger dimensions of corallum. It is also larger than the species *C. omphale* KOLOSVÁRY and *C. clepsidrae*, KOLOSVÁRY (see KOLOSVÁRY, 1966a: 130–131). RIEDEL (1991: 113) ascribed to this genus also species *C. laubei* VOLZ and *C. radiciformis* (KLIPSTEIN) which are as well smaller (d = 9–12 mm).

Genus: *Craspedosmilia* nov.gen.

Name: In septal and columellar structure similar to *Craspedophyllia* but phaceloid colony.

Type species: *Craspedosmilia graeca* n.sp.

Diagnosis: Phaceloid colony with round corallites. Septa compact with rough lateral ornamentation looking like horizontal thorns. Endotheca of vesicular dissepiments and ?rare synapticulae. Strong solid columella.

Comparison: In septal structure it resembles *Margarophyllia* VOLZ 1896, in columella it looks like *Craspedophyllia* VOLZ 1896. Because of its close relationship to *Craspedophyllia*, we placed it to the family Conophylliidae (see also RONIEWICZ, 1989: 83–84).

Craspedosmilia graeca n.sp.

(Pl. 11, Fig. 1–6)

Name: Species found in Greece (lat. adj. graeca).

Holotypus: A-628 (Pl. 11, Fig. 1).

Material: A-628, G-511 with five thin sections.

Locus typicus: Kalekos, Hydra.

Stratum typicum: Pantokrator Limestone, Carnian.

Diagnosis: *Craspedosmilia* with d = 7–9 mm, s = ca 80.

Description: Phaceloid colony with rare corallites roundish in cross section. Septa compact in 4–5 cycles. S1, S2 and S3 reach to the centre, the others thinner and shorter. Lateral ornamentations are granular perpendicular to the septal line. In the centre there is a large massive columella. Endotheca is of tabulate and vesicular dissepiments, and rare ?synapticulae.

Comparison: As given for the genus.

Genus: *Rhopalodendron* TURNŠEK, 1989

Rhopalodendron juliensis TURNŠEK, 1989

(Pl. 6, Fig. 5–6)

1989 *Rhopalodendron juliensis* n.sp. – TURNŠEK in: TURNŠEK & BUSER: 87–88, Pl. 8/1–6.
1991 *Rhopalodendron juliensis* TURNŠEK. – RAMOVŠ & TURNŠEK: 186, Pl. 8/1–3.

The species is frequent in Hydra and fits with materials from Slovenia. Hydra is the second so far known locality.

Material: A-25, A-288, A-517, A-670, G-364, G-489, G-508.

Family: Tropiastraeidae CUIF, 1977
Genus: *Thamnotropis* CUIF, 1975

Thamnotropis settsassi (VOLZ), 1896

(Pl. 6, Fig. 7–8)

1896 *Thamnasteria Sett Sassi* nov.spec. – VOLZ, 60, Taf. 6/11, 11a-b.
1991 *Thamnotropis settsassi* (VOLZ). – RIEDEL, 118.

Irregularly encrusting lamellate colony with concentrically arranged thamnasterioid corallites. Septa confluent, in series parallel, with pennulae-like ornamentation. Only the first cycle septa reach into the centre of the corallites, where some of them touch rather strong columella. cc = 2–3 mm, s = 30–36. Specimens from Hydra fit in with original description, differing in more irregular growth only.

Material: A-284, A-600, A-602; G-306.

3. Stratigraphic and Paleoecologic Comparison of Hydra Corals

The species of corals found in Hydra are known in many localities limited mostly to southern Europe (Dolomites/Italy (VOLZ 1896), Slovenia (RAMOVŠ & TURNŠEK, 1987, 1991; TURNŠEK, 1989; TURNŠEK & BUSER, 1989; TURNŠEK et al., 1982, 1984, 1987; TURNŠEK & RAMOVŠ, 1987), Hungary (KOLOSVARY, 1966a), Czech Republic (KOLOSVÁRY, 1966b), Romania (KÜHN, 1935), Turkey (CUIF, 1974, 1976). Some are known also in Pamir (MELNIKOVA, 1975, 1983, 1984), and in China (XIA & LIAO, 1986). (See Table 1).

Stratigraphically they are in some localities limited to Cordevolian and Julian age, some also reach into the Tuvalian, and some are mentioned in lowermost Norian beds. Typical Carnian corals are species of the genera *Protoheterastraea*, *Volzeia*, *Margarophyllia*, *Stuoresia*, *Myriophyllum* and *Thamnotropis*. The species of *Margarosmilia* are known in the whole Carnian and also in Norian localities. *Rhopalodendron*, *Coryphyllia* and *Gumbelastraea* are known in the Tuvalian and also in the Norian. The only Hydra genus *Palaeastraea* has so far been known only from Norian–Rhaetian beds (RIEDEL, 1991; RONIEWICZ, 1989; TURNŠEK & BUSER, 1991 and others).

Thus the coral localities in Hydra can mainly be compared with Carnian age (Cordevolian, Julian, Tuvalian). Only in the uppermost sections of the coral bearing Pantokrator limestone they can also belong to the lowermost Norian age.

Table 1.
Geographical and stratigraphical distribution of Hydra corals.

Coral species in Pantokrator Limestone in Hydra (Carnian - Lowermost Norian)	Regional world distribution	Stratigraph. world distrib.
Protoheterastraea leonhardi	I	C J
Volzeia sublaevis	I,Sl	C J
Volzeia subdichotoma	I, H,C	C J
Margarosmilia confluens	I Sl,H,Cz,C	C J
Margarosmilia richthofeni	I,Sl, C	C J
Myriophyllum badioticum	I,Sl	C J
Thamnotropis settsassi	I	C J
Protoheterastraea minor	Sl	C J T
Volzeia badiotica	I Sl,H,Cz,Pa	C J T
Margarosmilia zieteni	I,Sl	C J T
Margarophyllia crenata	I,Sl, R	C J T
Margarophyllia capitata	I,Sl	C J T
Coryphyllia regularis	Sl, Tur,	J T
Rhopalodendron juliensis	Sl	T N
Margarosmilia nova	Sl	T N
Gumbelastraea pamphyliensis	Tur	T N
Coryphyllia elliptica	Sl, Pa,	T N R
Stuoresia fluegeli n.sp.	Hydra	.....
Conophyllia hellenica n.sp.	Hydra	.....
Craspedosmilia graeca n.g.n.sp.	Hadry	
Hydrasmilia rhythmica n.g.n.sp.	Hydra	
Hydrasmilia fossulata n.g.n.sp.	Hydra	
Hydrasmilia ornamenta n.g.n.sp.	Hydra	
Palaeastraea mandrakiensis n.sp.	Hydra	.....

Geographical distribution: I = Italy, H = Hungary, Cz = Czech. R., Sl = Slovenia, R = Romania, Tur = Turkey, Pa = Pamir, C = China.
Stratigraphical distribution: C = Cordevolian, J = Julian, T = Tuvalian, N = Norian, R = Rhaetian, ... stratigraphical distribution of genus.

Carnian reef limestones are known also in central Europe (Leckkogel beds in the Northern Calcareous Alps, Tisovec limestone in Carpathians and others: (DULLO & LEIN, 1982; FLÜGEL, 1982), and in North America (STANLEY, 1979). Nevertheless, the coral fauna from these localities is sparse. It seems that in the Carnian corals predominated in the southern regions of Tethyan shoals.

New species involve one third of the total coral fauna in Hydra. They indicate somewhat different conditions from those in other known localities. Carnian coral reefs are mainly smaller or larger patch reefs in which the content of fossil assemblages changed from place to place, either because of horizontal (regional) or vertical (stratigraphical) changes of the environment. The complete identification of localities is therefore not possible even at small distances (TURNŠEK et al., 1984).

Acknowledgements

The study was carried out within the Priority Program "Global and Regional Controls on Biogenic Sedimentation" of the Forschungsgemeinschaft (DFG).

The authors thank Dr. EWA RONIEWICZ for her kind advice at some coral structures and determinations, her and Dr. JEAN-PIERRE CUIF for reviewing the text, Dr. SIMON PIRC and Dr. GEORGE D. STANLEY for English corrections, IZTOK SAJKO for the arrangement of plates, and CARMEN NAROBE for photographs.

Plate 1

Figs. 1–2: ***Protoheterastraea leonhardi* (VOLZ), 1896.**
Fig. 1: Transverse section of colony. G-504, × 4.
Fig. 2: Transverse section of part of corallites from the same colony. × 20.

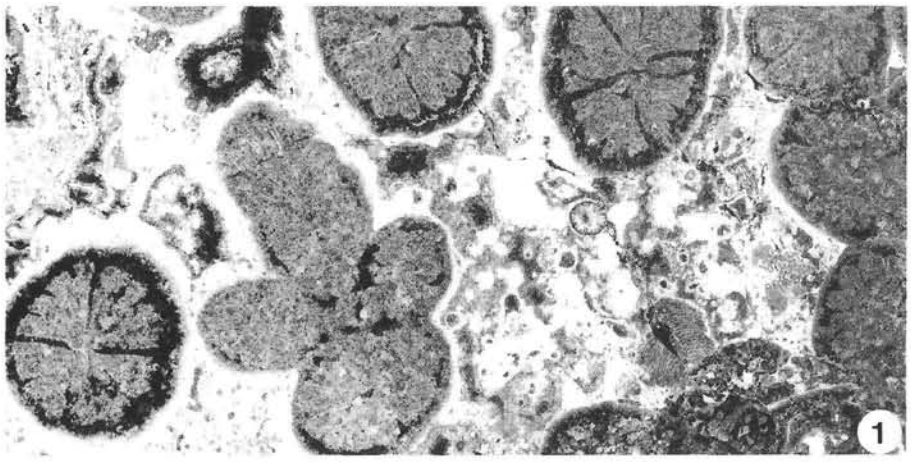
Figs. 3–4: ***Protoheterastraea minor* TURNŠEK, 1989.**
Fig. 3: Transverse section of colony. A-55a, × 4.
Fig. 4: Longitudinal section of the same colony. × 4.

Figs. 5–6: ***Volzeia badiotica* (VOLZ), 1896.**
Fig. 5: Transverse section of two corallites. A-31/2, × 4.
Fig. 6: Detail from Fig. 1. Microstructure of wall and part of septa. × 20.

Fig. 7: ***Volzeia sublaevis* (MÜNSTER), 1841.**
Transverse section of colony. G-464, × 4.

Fig. 8: ***Volzeia subdichotoma* (MÜNSTER), 1841.**
Transverse section of dense corallites. G-477, × 4.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.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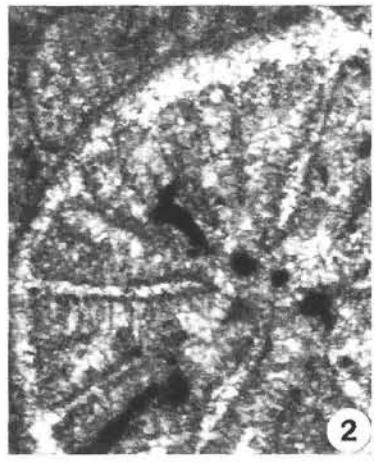
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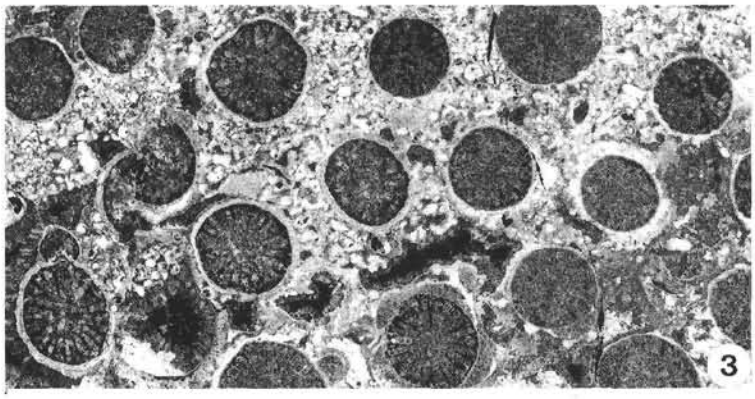
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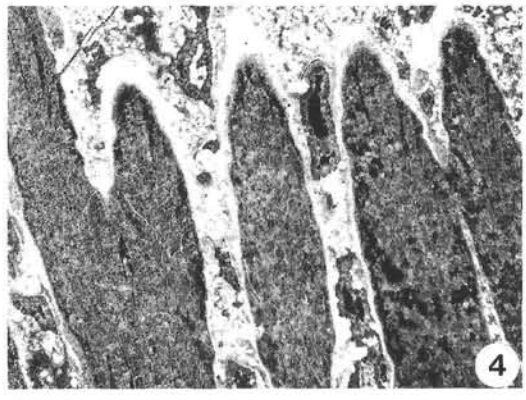
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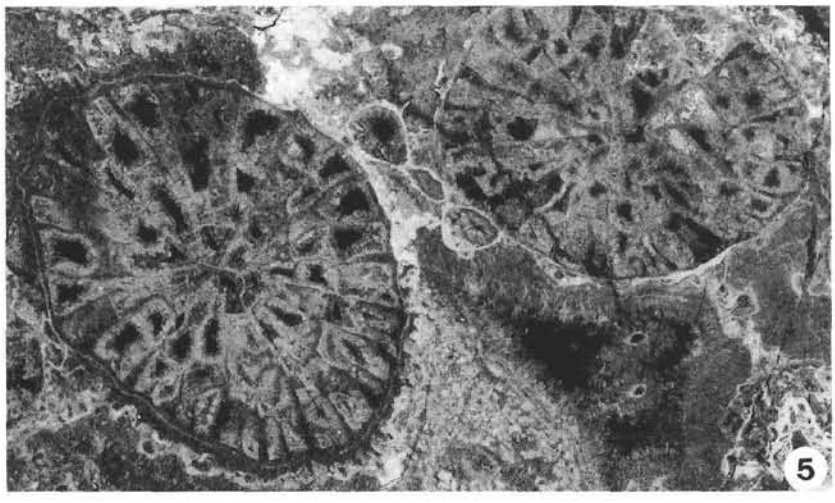
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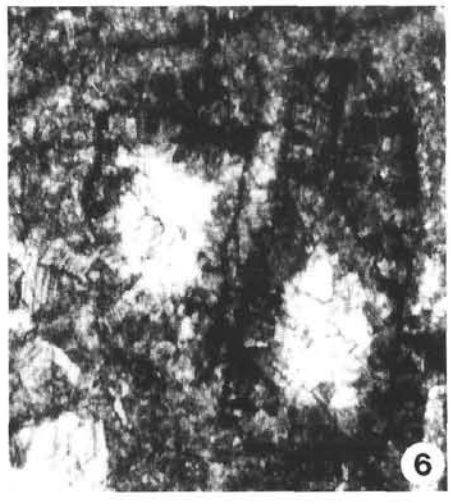
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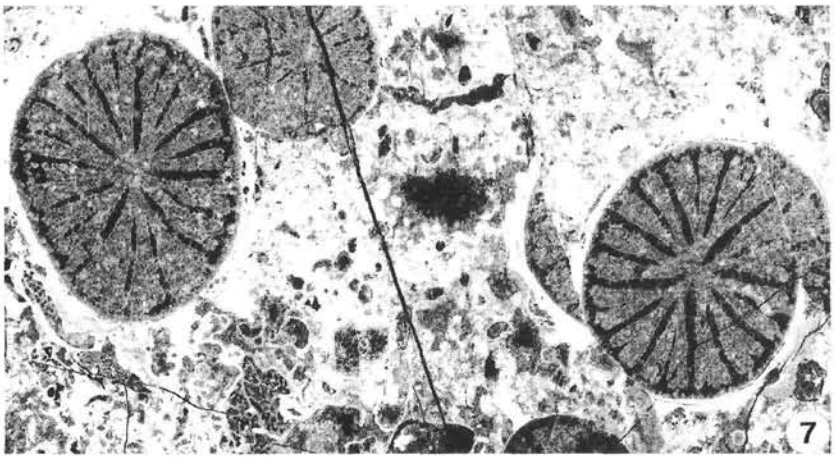
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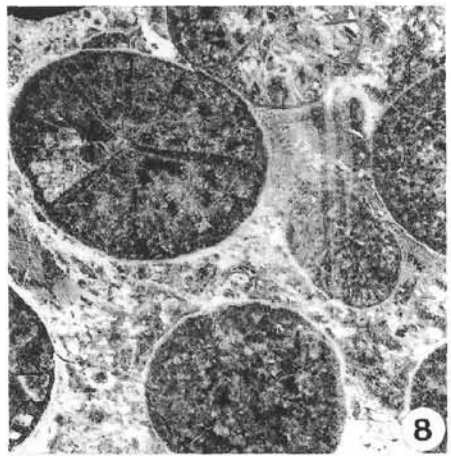
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Plate 2

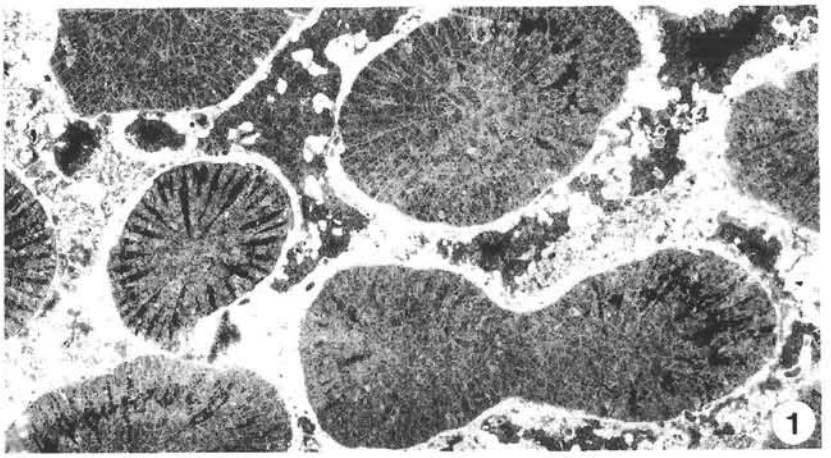
Figs. 1–3: ***Margarosmilia confluens* (MÜNSTER), 1841.**
Fig. 1: Transverse section of colony.
A-523, × 4.
Fig. 2: Longitudinal section of two corallites.
A-584b, × 4.
Fig. 3: Longitudinal tangential section of one corallite.
A-584b, × 4.

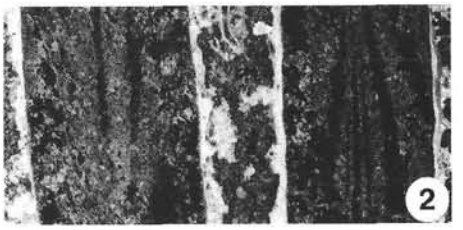
Fig. 4: ***Margarosmilia nova* TURNŠEK, 1991.**
Transverse section of corallites.
A-260/1, × 4.

Fig. 5: ***Margarosmilia zieteni* (KLIPSTEIN), 1843.**
Transverse section of corallites.
G-612/6, × 4.

Figs. 6–7: ***Margarosmilia richthofeni* VOLZ, 1896.**
Fig. 6: Transverse section of corallites. Note numerous septa at the wall area.
A-159a, × 4.
Fig. 7: Longitudinal section of corallite.
A-159b, × 4.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.





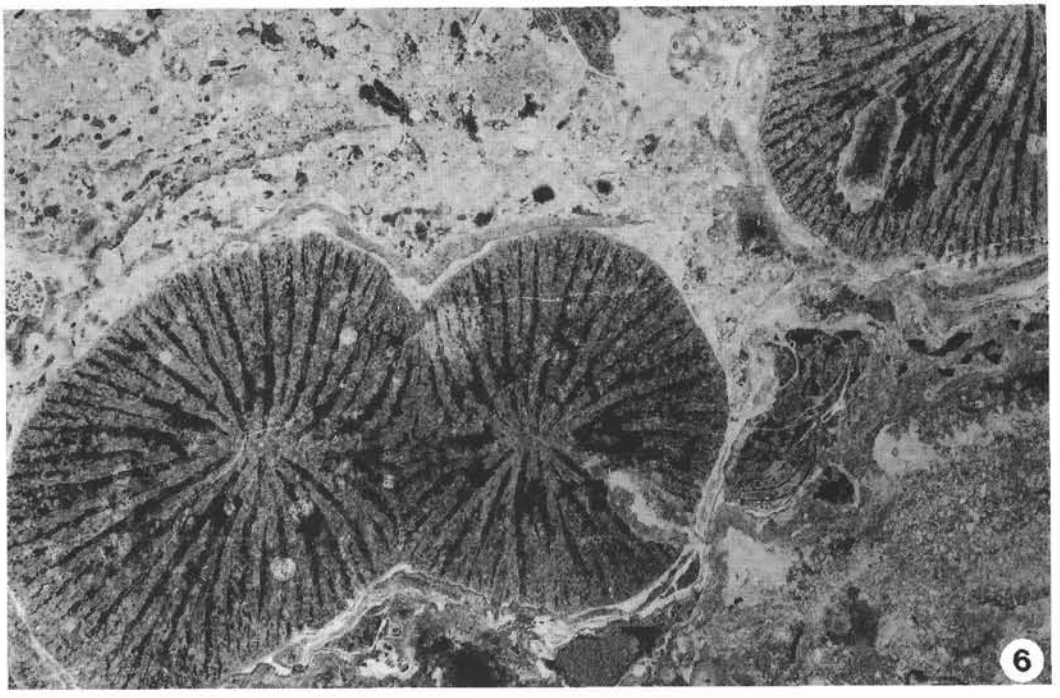


Plate 3

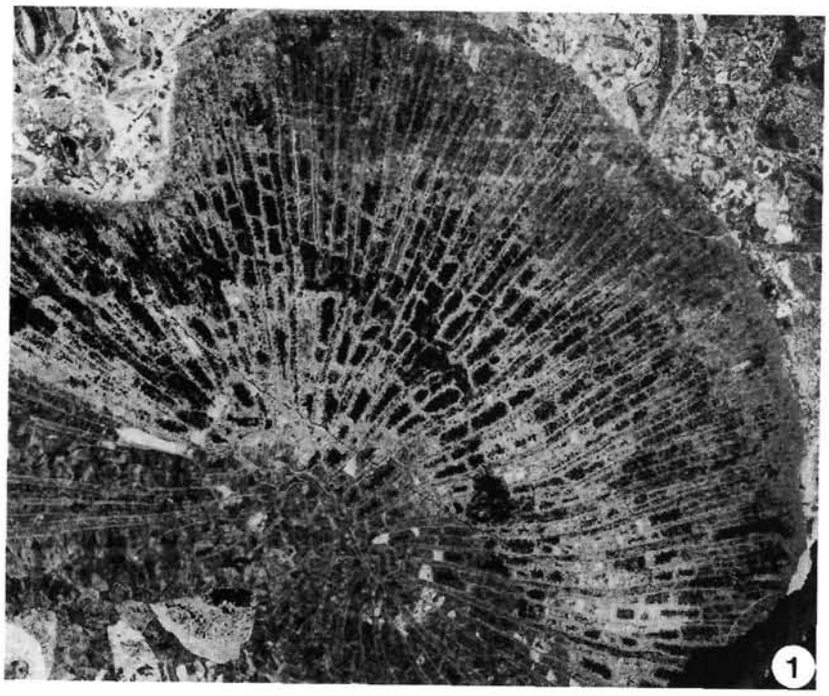
Fig. 1: ***Margarophyllia crenata* (MÜNSTER), 1841.**
Transverse section of part of corallum.
A-595, × 4.

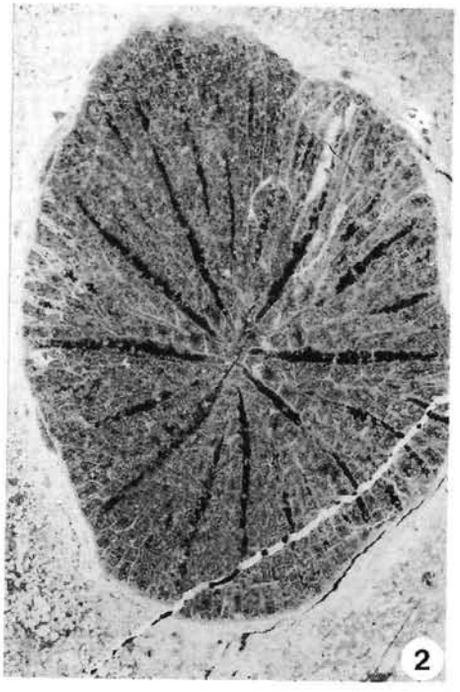
Figs. 2–3: ***Margarophyllia capitata* (MÜNSTER), 1841.**
Fig. 2: Transverse section of corallum.
G-522, × 4.
Fig. 3: Detail from Fig. 2.
× 20.

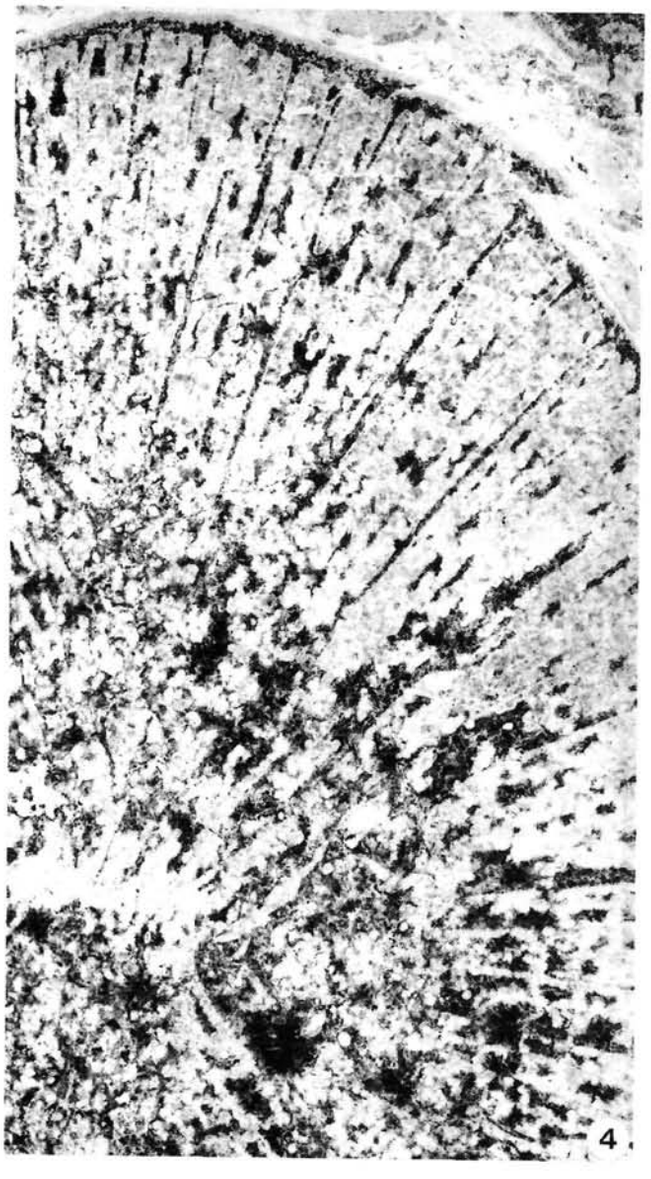
Fig. 4: ***Coryphyllia elliptica* (MELNIKOVA), 1975.**
Transverse section of part of corallum.
G-367, × 4.

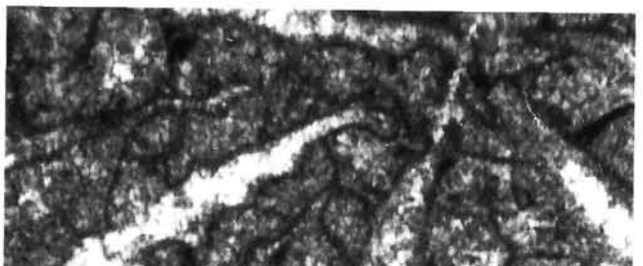
Fig. 5: ***Coryphyllia regularis* CUIF, 1974.**
Transverse section of corallum. Note smooth septa and pelicular wall.
A-546, × 4.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.









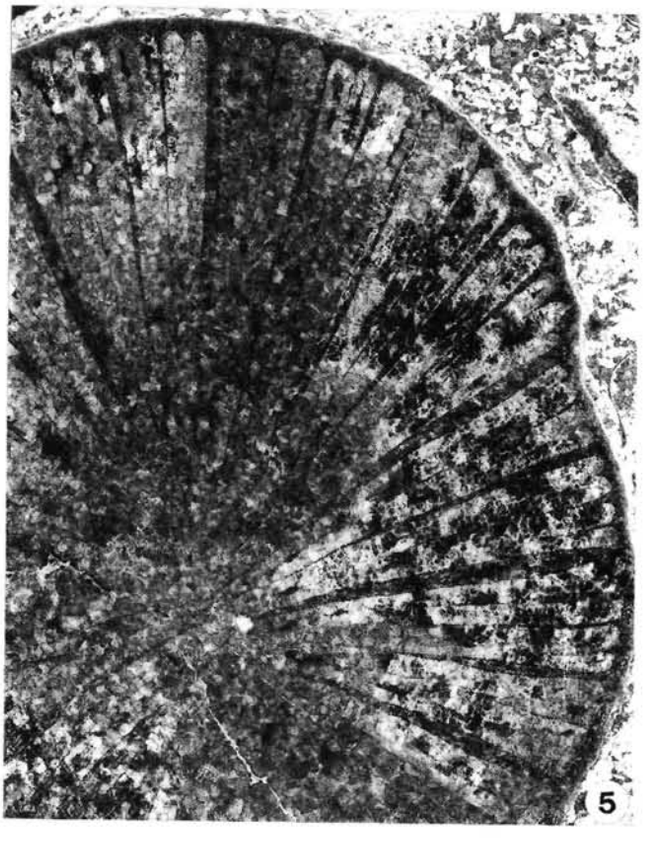


Plate 4

Figs. 1–6: ***Palaeastraea mandrakiensis* n.sp.**

Fig. 1: Transverse section of colony.
G-185/3, × 2.

Fig. 2: Longitudinal section of one corallum.
G-281/1, × 2.

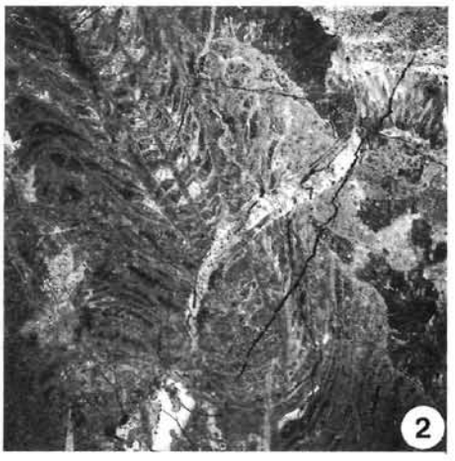
Fig. 3: Transverse section of corallites.
Left below perithecal skeleton.
G-284, holotype.
× 4.

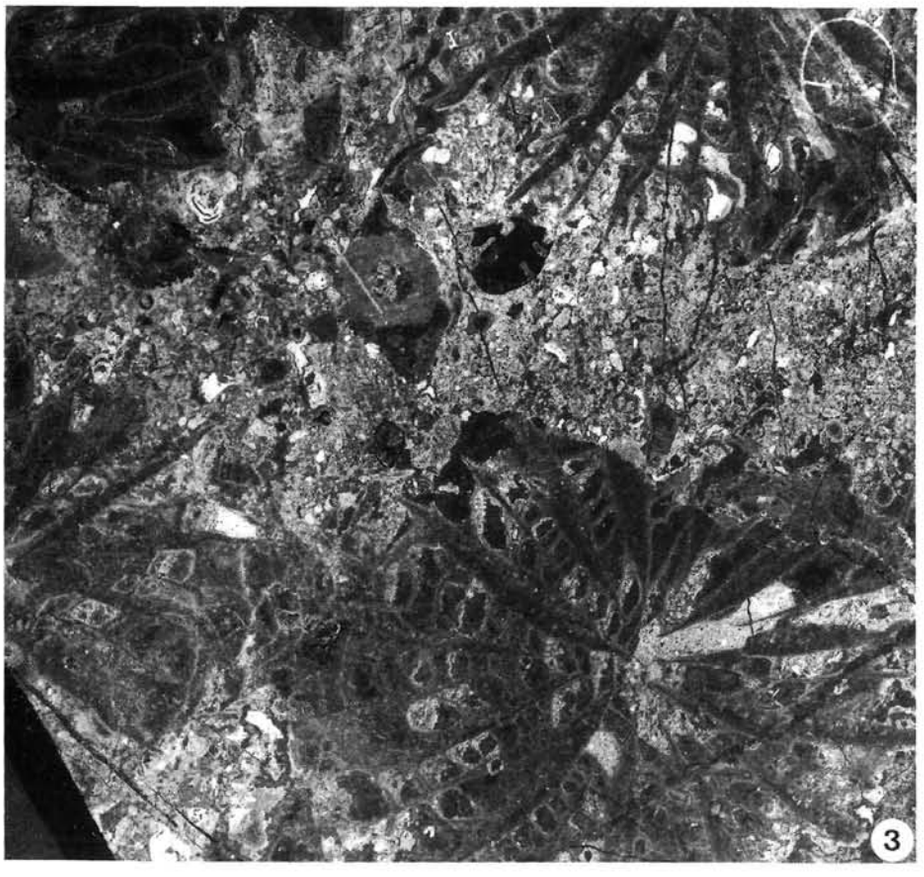
Fig. 4: Detail from Fig. 1.
× 4.

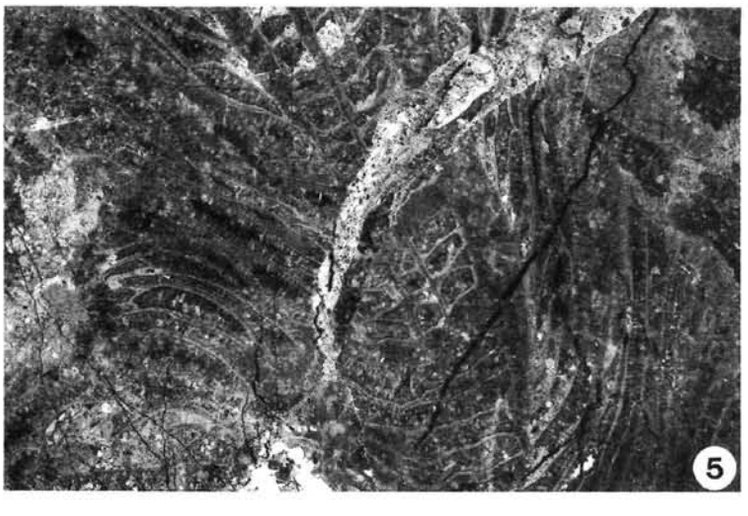
Fig. 5: Detail from Fig. 2.
× 4.

Fig. 6: Microstructure in transverse section.
G-284, × 50.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.







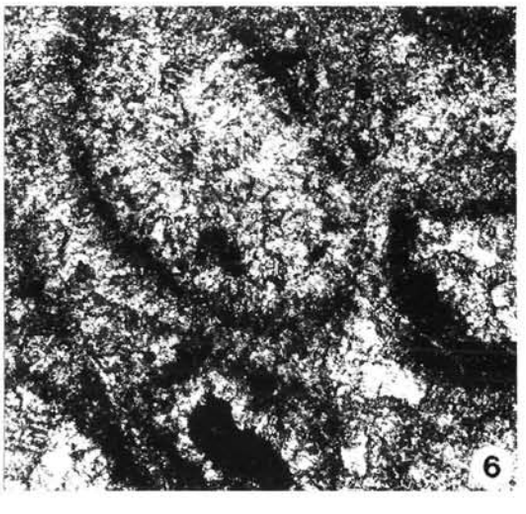


Plate 5

Figs. 1–6: ***Stuoresia fluegeli* n.sp.**

Fig. 1: Transverse section of colony with roundish, polygonal and meandroid corallites.
A-588/2, holotype, × 4.

Fig. 2: Longitudinal section of colony.
A-588/1, × 4.

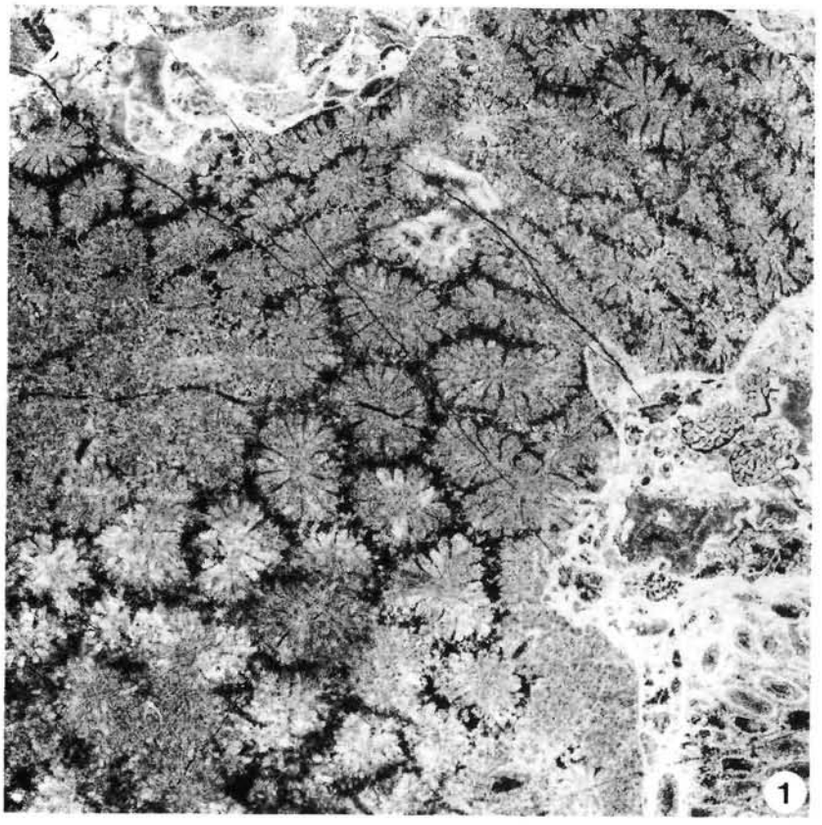
Fig. 3: Transverse section of another colony.
A-525, × 4.

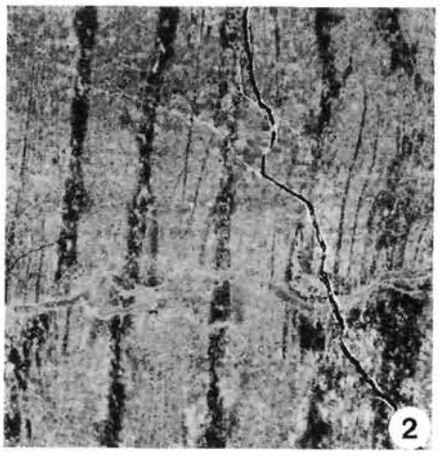
Fig. 4: Detail from Fig. 1.
× 8.

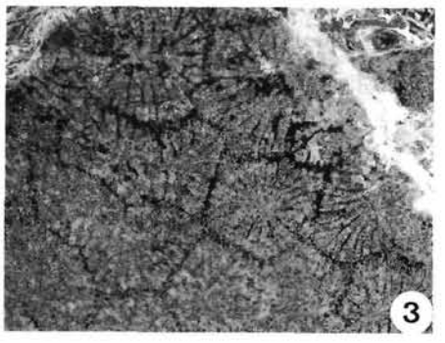
Fig. 5: Detail from Fig. 2.
× 8.

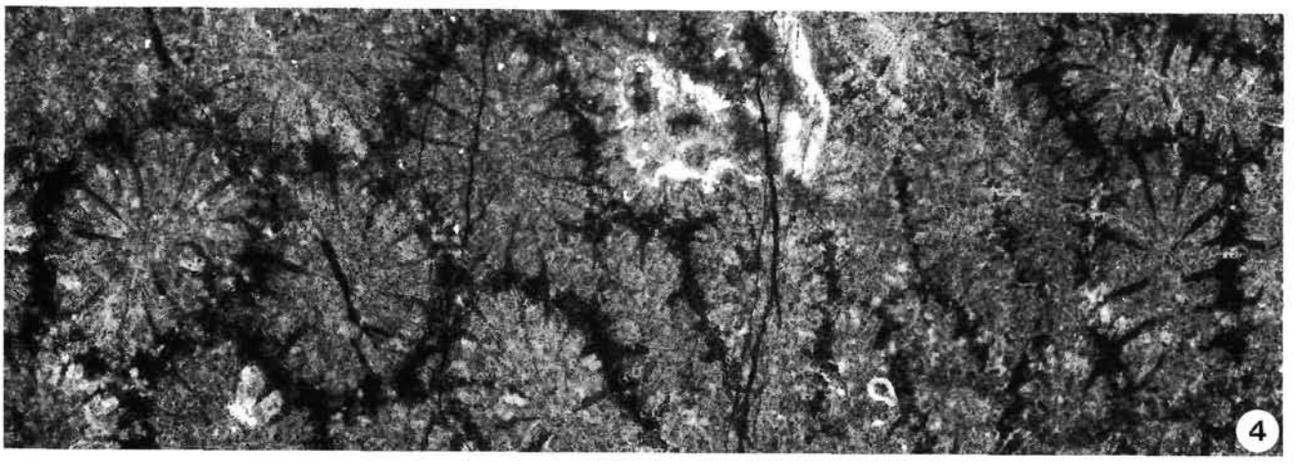
Fig. 6: Microstructure in transverse section.
A-588/2, × 20.

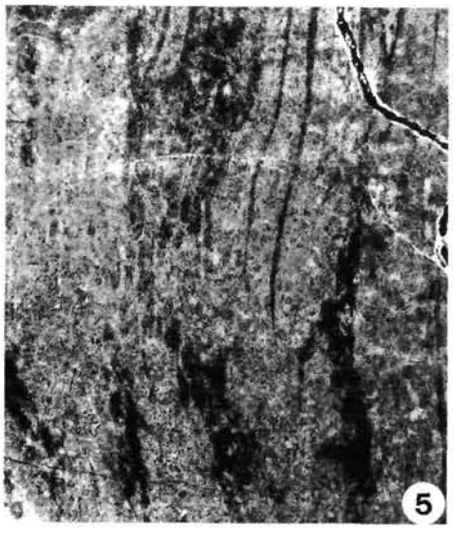
All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.











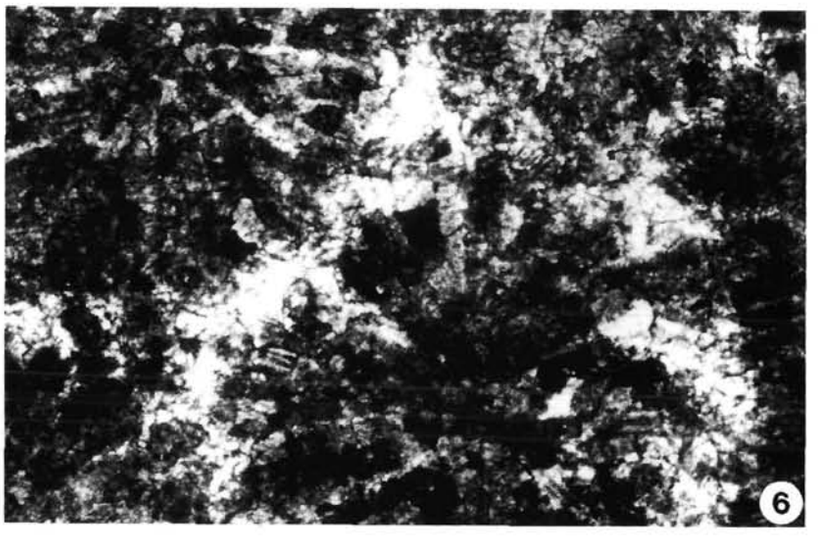


Plate 6

Figs. 1–3: ***Gumbelastraea pamphylliensis*, CUIF 1976.**
Fig. 1: Transverse section of cerioid colony.
A-58, × 4.
Fig. 2: Detail from Fig. 1, × 8.
Fig. 3: Longitudinal-oblique section of colony.
G-520, × 8.

Fig. 4: ***Myriophyllum badioticum* (VOLZ), 1896.**
Transverse section of part of corallum.
A-626, × 4.

Figs. 5–6: ***Rhopalodendron juliensis* TURNSEK, 1989.**
Fig. 5: Transverse section of colony.
G-508, × 4.
Fig. 6: Detail from Fig. 5, × 8.

Figs. 7–8: ***Thramnotropis settsassi* (VOLZ), 1896.**
Fig. 7: Transverse oblique section of colony.
A-600, × 4.
Fig. 8: Transverse section of another part of colony showing two confluent corallites with columella.
A-600, × 20.

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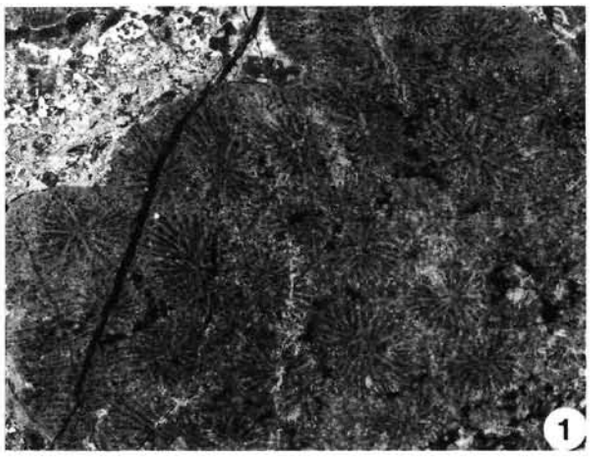

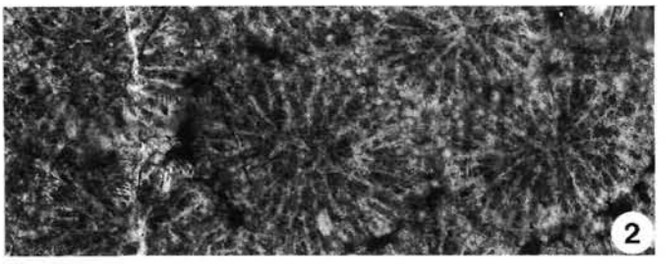

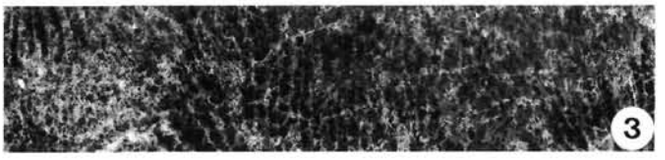

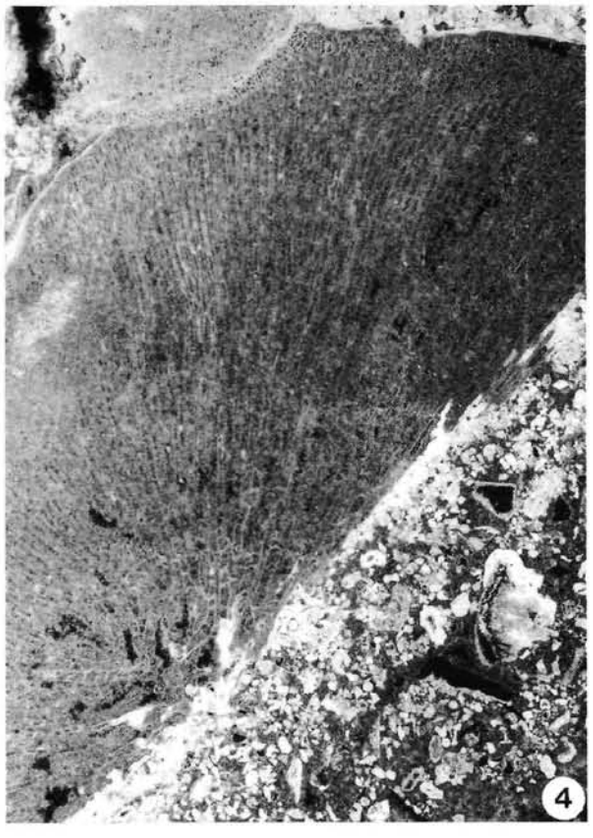

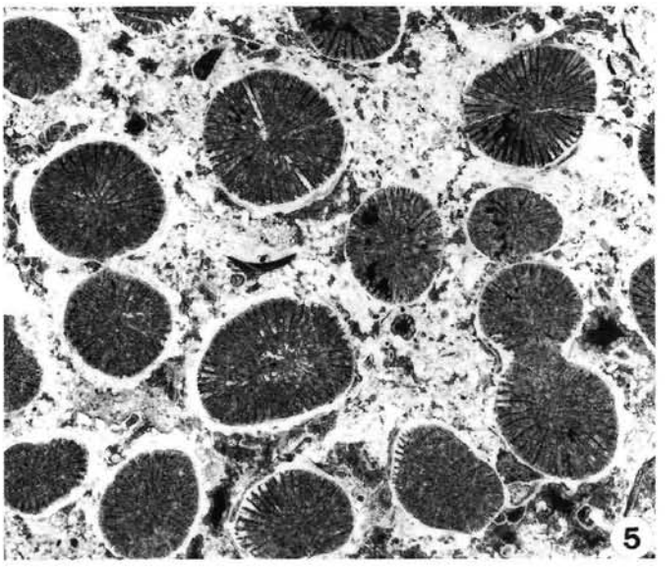

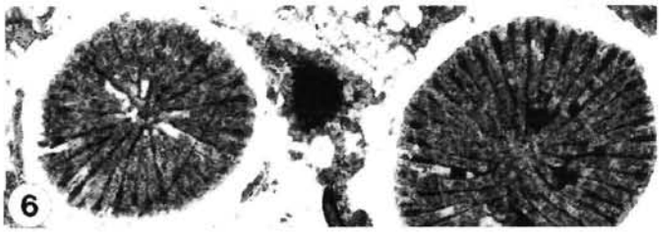

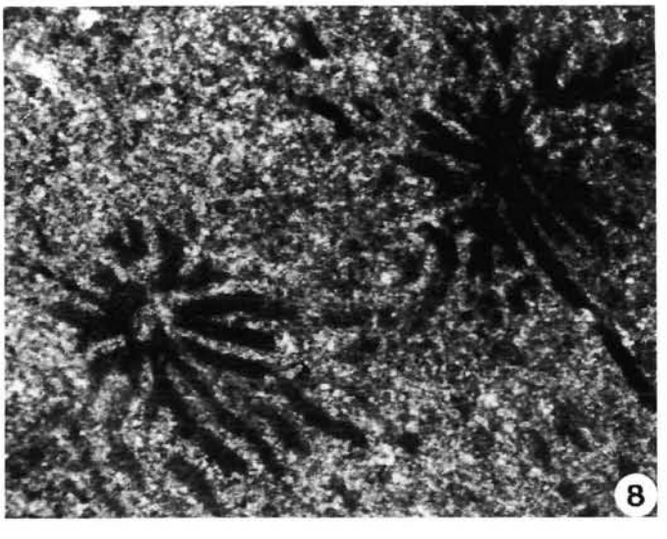

Plate 7

Figs. 1–6: ***Hydrasmilia rhythmica* n.g. n.sp.**

Fig. 1: Transverse section of corallites.
A-151d, holotype, × 4.

Fig. 2: Longitudinal section of two corallites. Note rhythmical thickenings.
A-151a, × 4.

Fig. 3: Transverse section of two corallites.
A-151c, × 8.

Fig. 4: Detail from Fig. 2 with axial and tangential longitudinal sections.
× 8.

Fig. 5: Microstructure in transverse section.
A-151c, × 50.

Fig. 6: Microstructure in longitudinal section.
A-151a, × 50.

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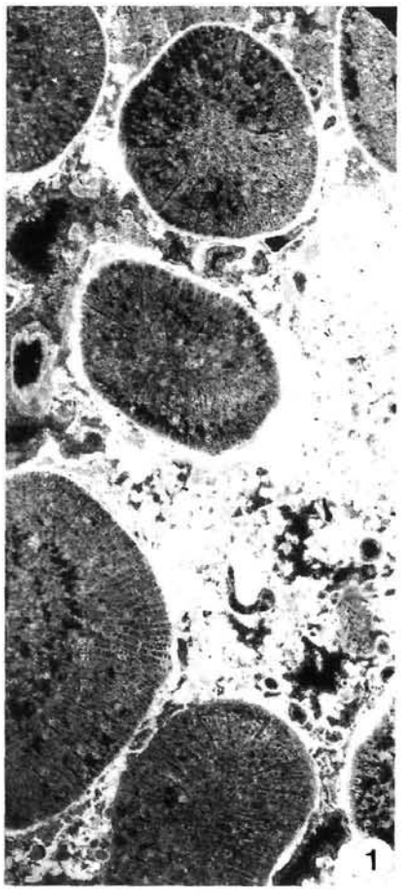

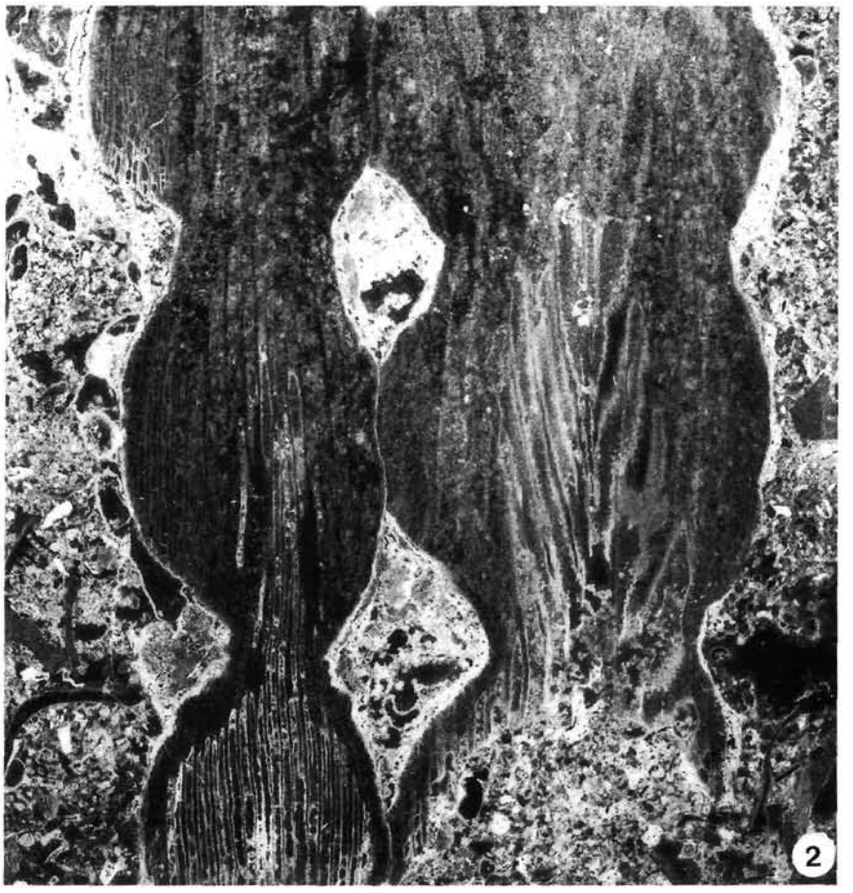

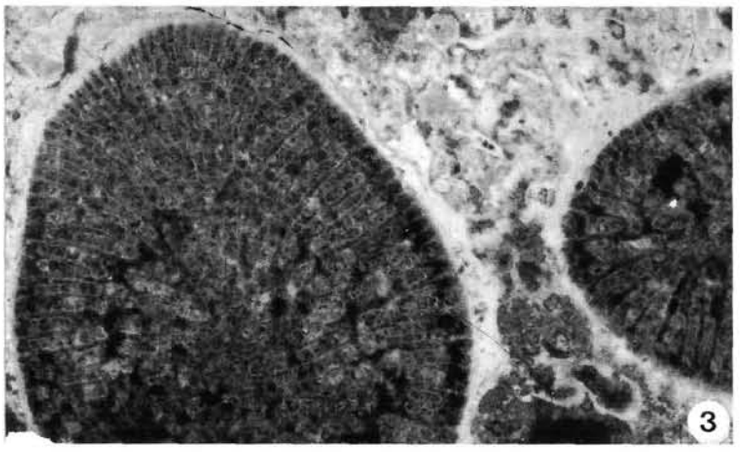

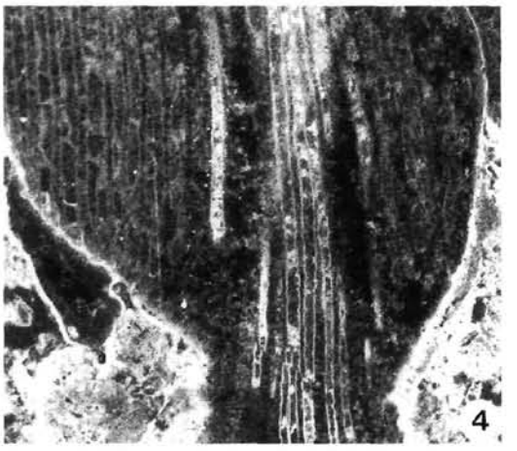

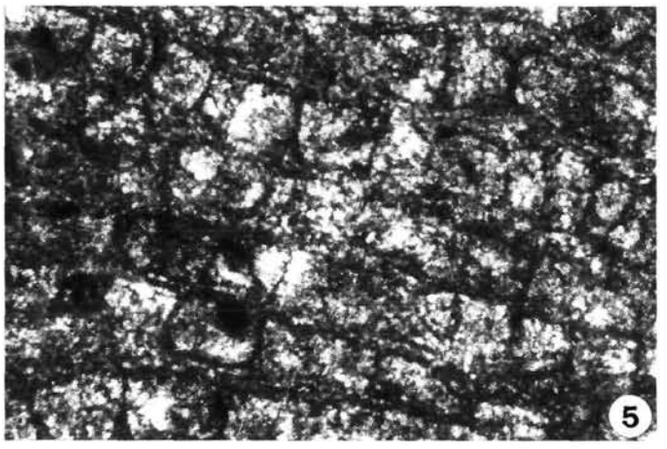

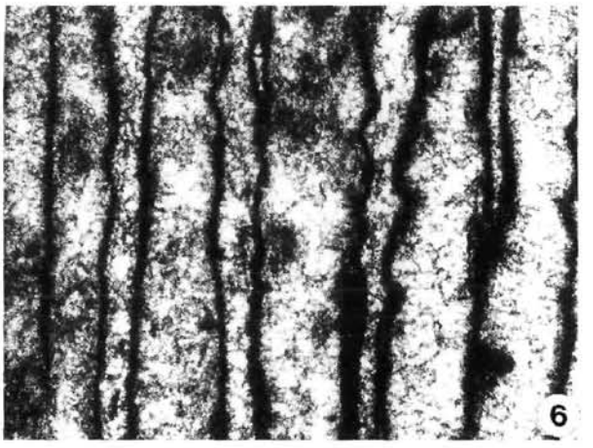

Plate 8

Figs. 1–5: ***Hydrasmilia fossulata* n.g. n.sp.**

Fig. 1: Transverse section of corallites showing long fossula with trabecular columella.
A-57b, holotype, × 4.

Fig. 2: Longitudinal section of two corallites.
A-57a, × 4.

Fig. 3: Detail from Fig. 1, × 8.

Fig. 4: Microstructure in transverse section.
A-57b, × 50.

Fig. 5: Microstructure in longitudinal section.
A-57a, × 50.

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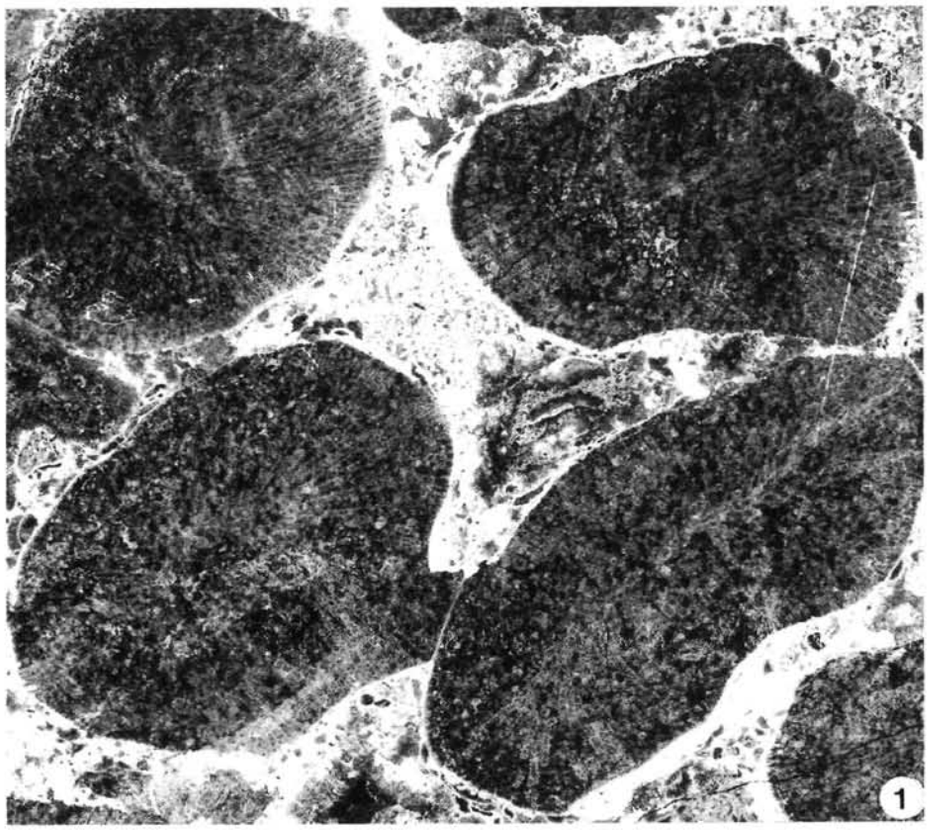
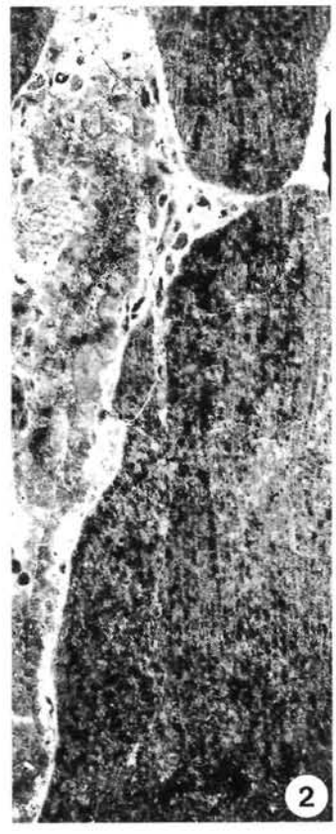
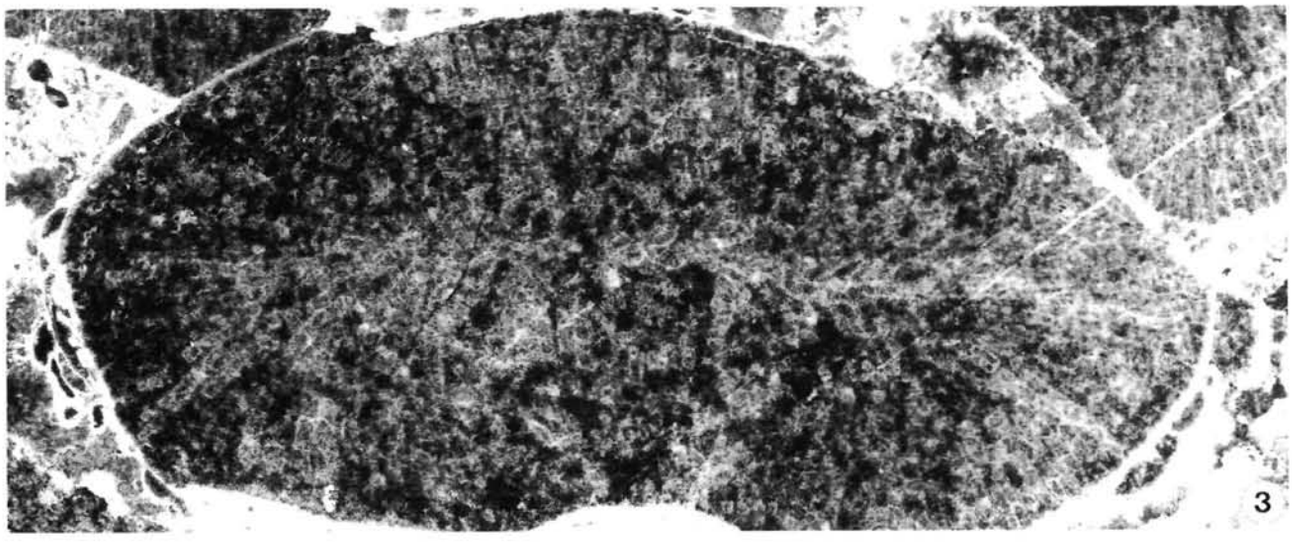






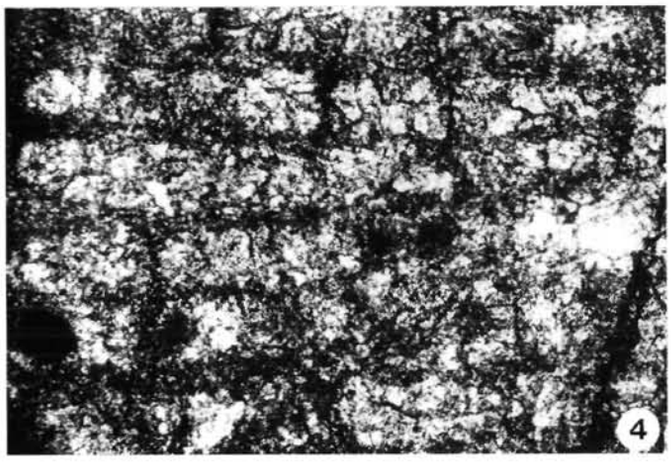


Plate 9

Figs. 1–4: ***Hydrasmilia ornamenta* n.g. n.sp.**

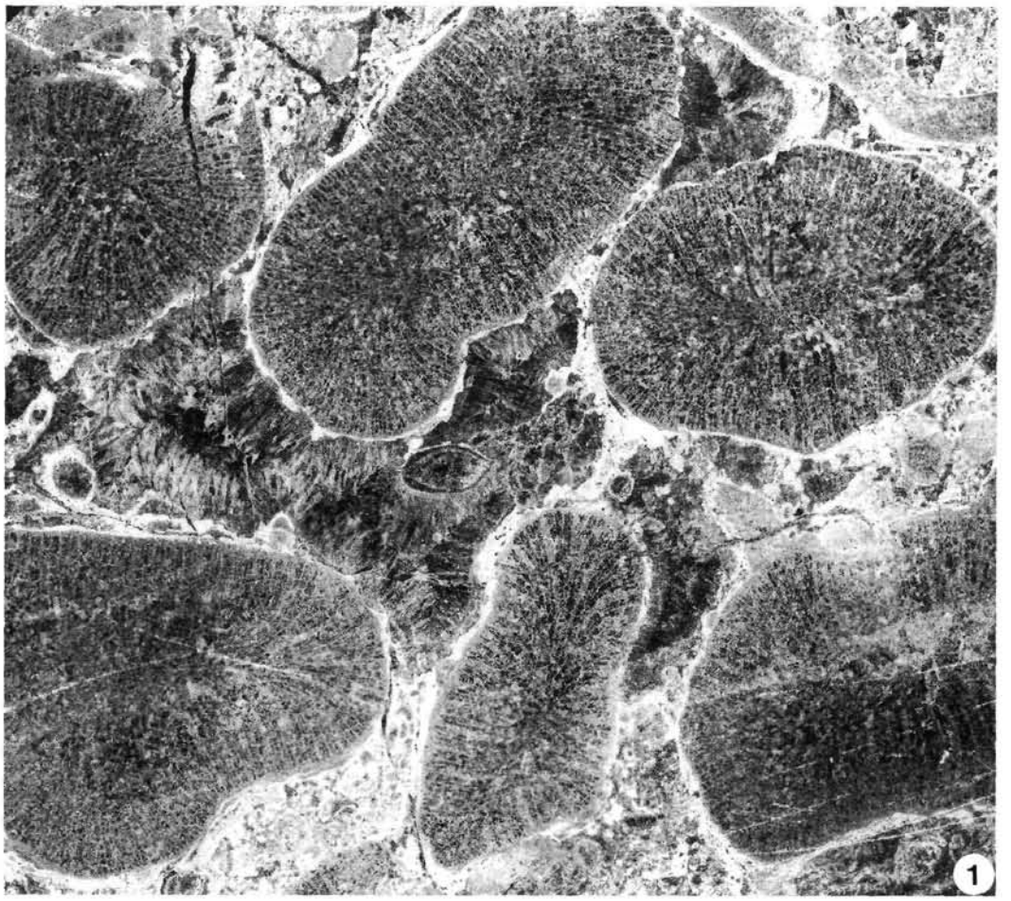
Fig. 1: Transverse section of corallites.
A-289, holotype, × 4.

Fig. 2: Longitudinal section of two corallites.
G-274, × 4.

Fig. 3: Detail from Fig. 1, showing ornamented septa.
× 8.

Fig. 4: Microstructure in transverse section.
A-289, × 50.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.



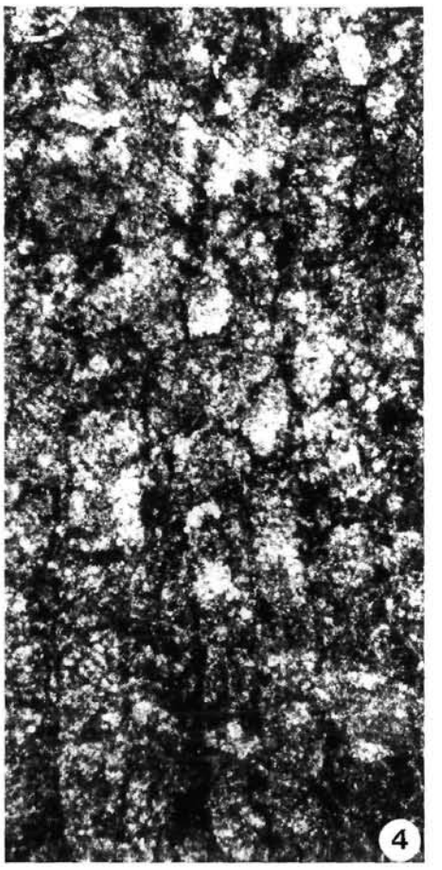


Plate 10

Figs. 1–4: ***Conophyllia hellenica* n.sp.**

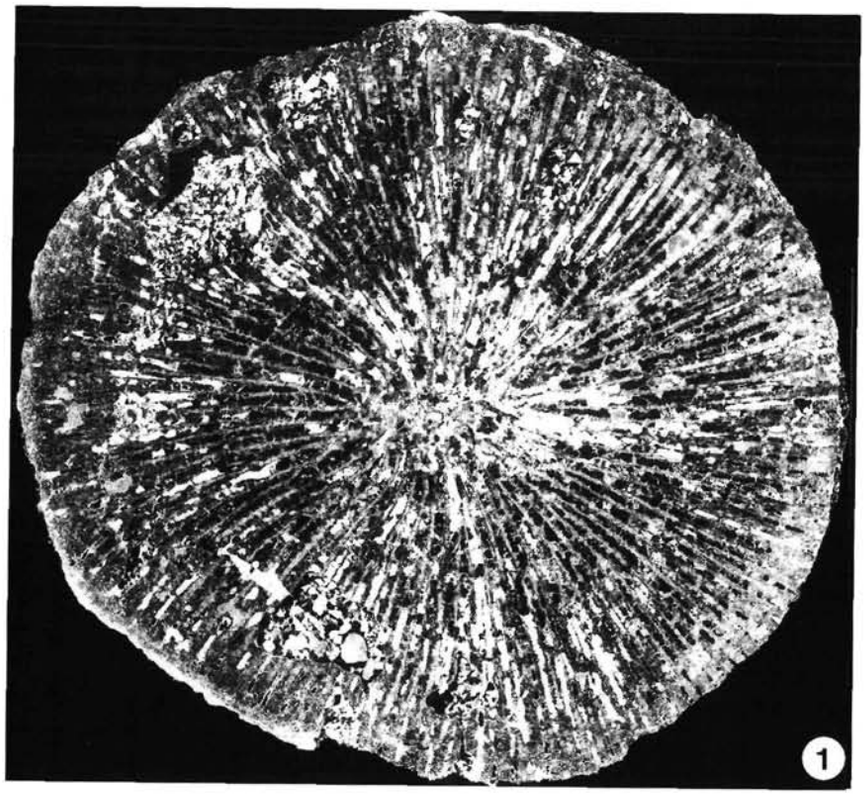
Fig. 1: Transverse section of corallum.
G-539/2, holotype, × 4.

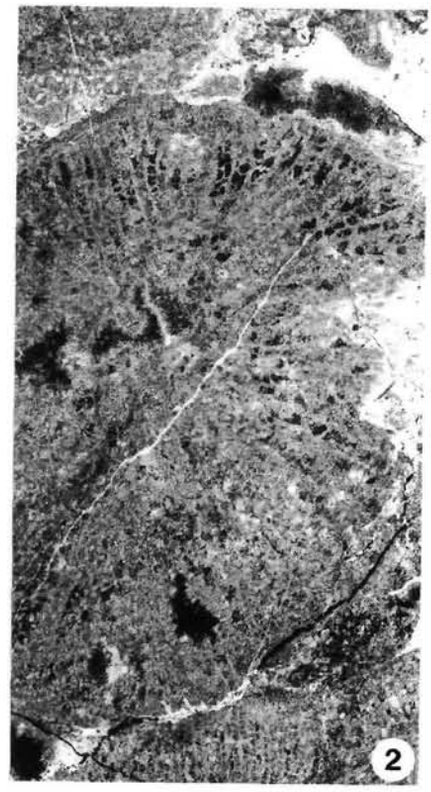
Fig. 2: Transverse section of another corallum.
A-20, × 4.

Fig. 3: Detail from Fig. 1.
× 20.

Fig. 4: Detail from Fig. 1 showing microstructure.
× 50.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.





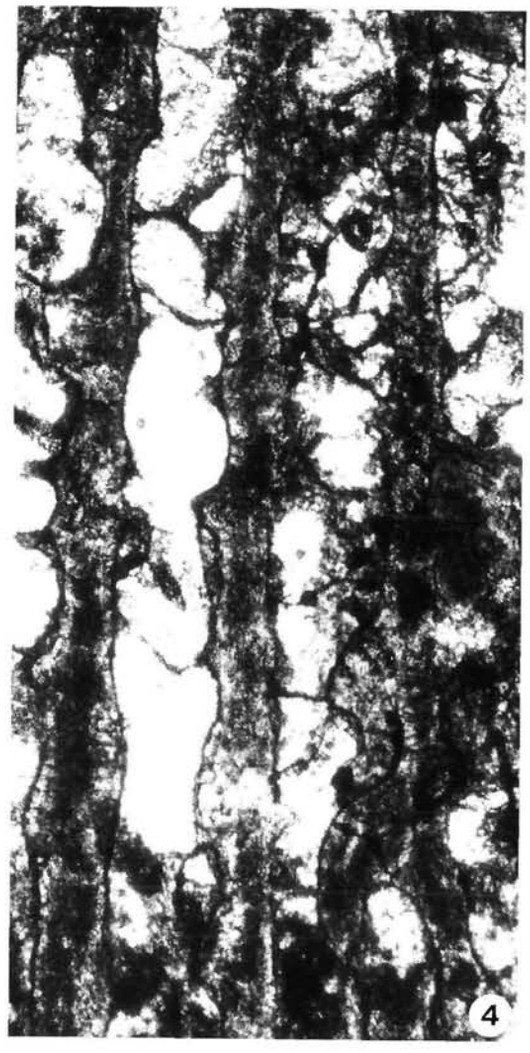


Plate 11

Figs. 1–6: ***Craspedosmilia graeca*** **n.g. n.sp.**

Fig. 1: Transverse section of colony with rare corallites.
A-628a, holotype, × 4.

Fig. 2: Detail from Fig. 1 with one corallite.
× 8.

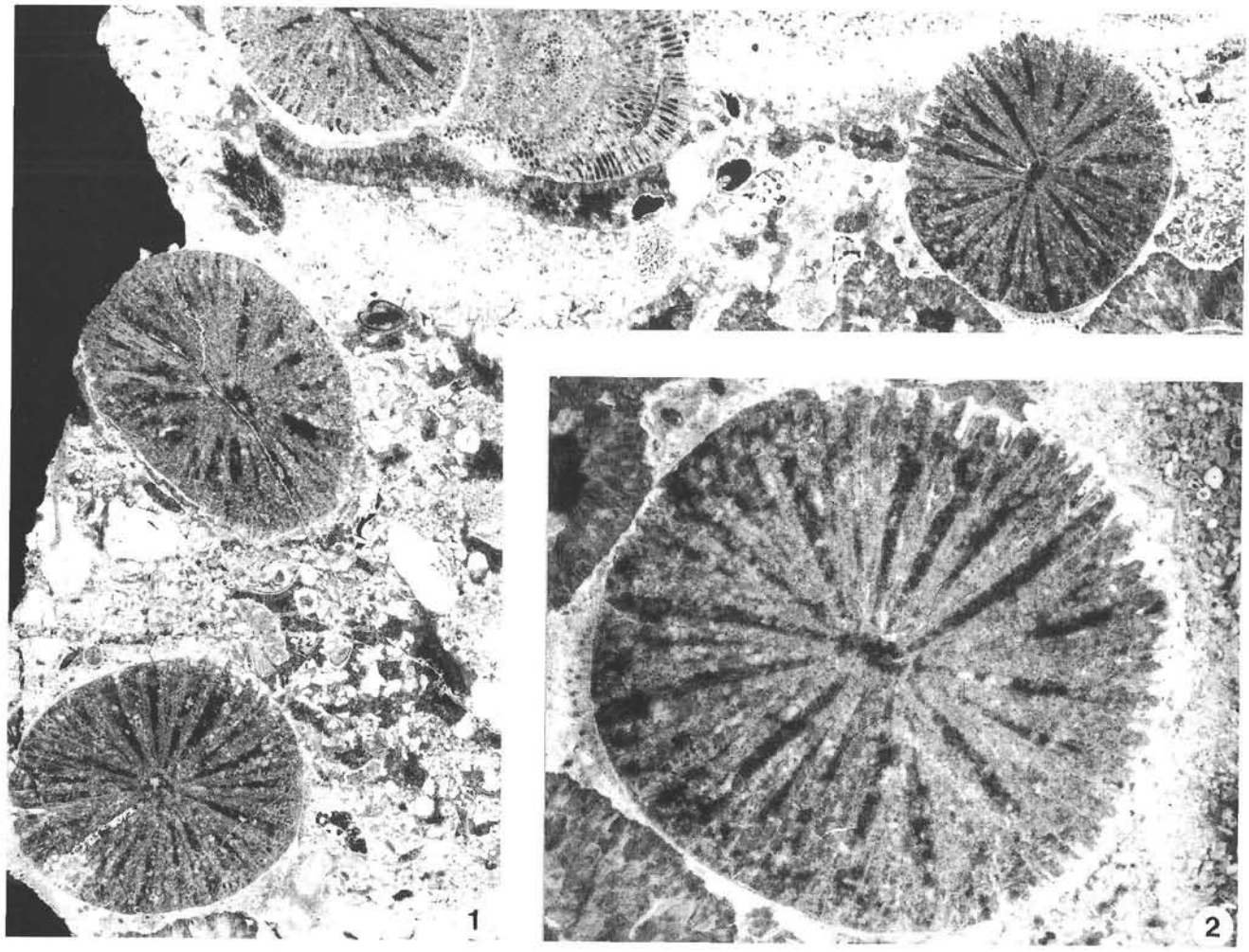
Fig. 3: Longitudinal section of two corallites.
A-628d, × 4.

Fig. 4: Detail from Fig. 3.
× 8.

Fig. 5: *Microstructure in transverse section.*
A-628a, × 50.

Fig. 6: Microstructure in longitudinal section.
A-628d, × 50.

All figures enlarged × 2, × 4, × 8 are negatives, thin sections enlarged directly onto the photographic paper. The others are taken on film through the microscope. Note different manners of recrystallization of skeleton. All photographs are taken from thin sections.



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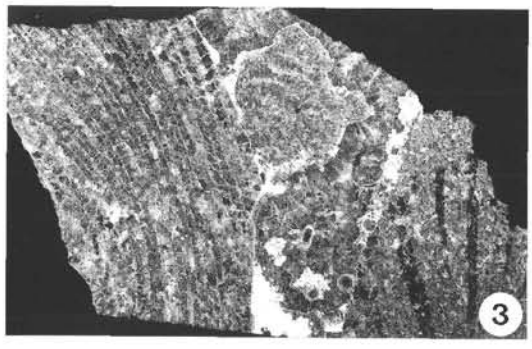

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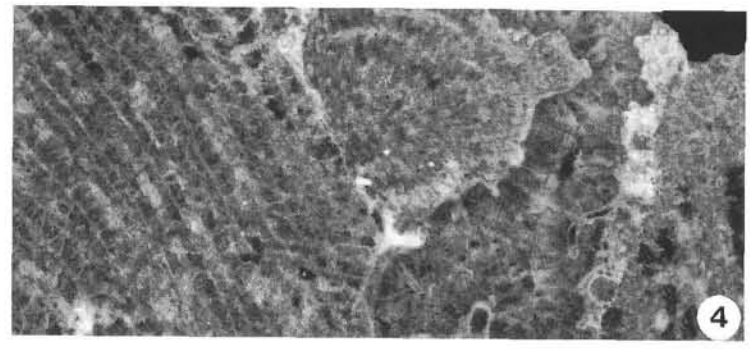

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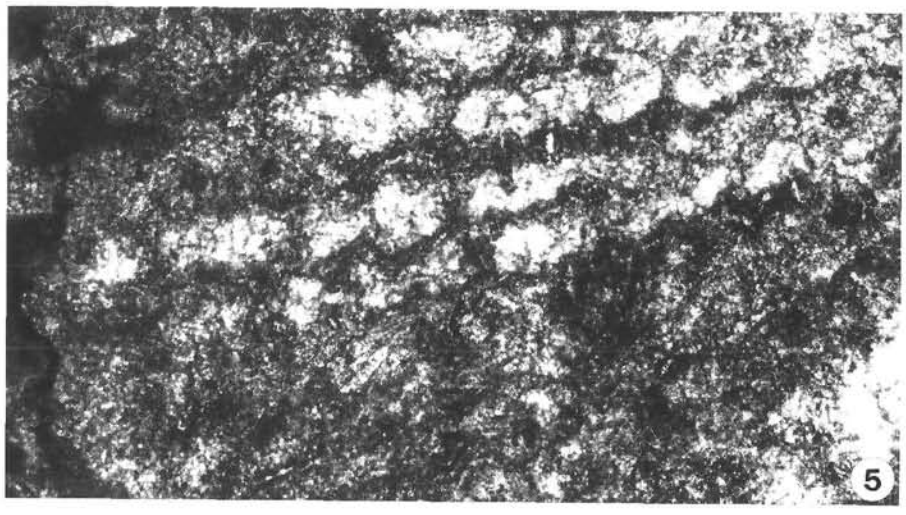

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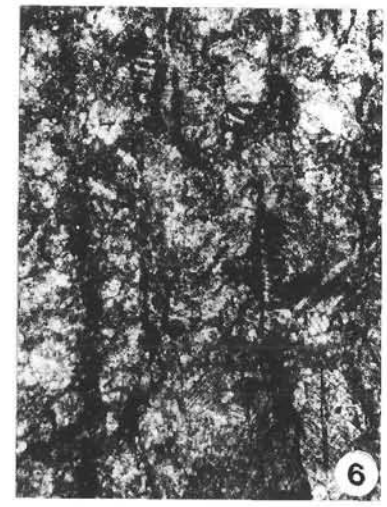

6

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