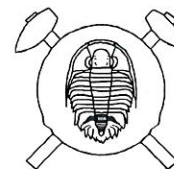


Two new corals from the Koněprusy Limestone (Lower Devonian, Pragian, Barrandian, Czech Republic)

Dva noví koráli z koněpruských vápenců

(spodní devon, prag, Barrandien, Česká republika) (Czech summary)



(1 text-fig., 2 plates)

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Two new species, one of them considered a new genus, are described from the Pragian Koněprusy Limestone. Members of the new genus display characters of both disphyllids and phillipsastraeids. Ecology and sedimentology of the Koněprusy Limestone is briefly discussed and the morphology of the Koněprusy reef is mentioned.

Key words: Tabulata, Rugosa, new species, new genus, reef morphology, limestone sedimentology

Introduction

As stated in Oliver and Galle (1971), „Lower Devonian rugose corals are not common anywhere in the world...“. This is true also of the tabulate corals. The entire coral fauna of the Koněprusy Limestone was described in the monograph of Počta (1902). This paper as well as two earlier and one later works mentioning the Koněprusy rugose corals, i.e., Quenstedt (1881), Sherzer (1892) and Prantl (1951) are discussed in detail in the revision of Oliver and Galle (1971a, b). Tabulatormorphs were described, besides Počta (1902), in Kettnerová (1933a, b), Křiciz (1934), Galle (1973, 1978), Marek and Galle (1976), and Hladil (1989). Papers mentioned also compare the Koněprusy with Pragian coral faunas of the world. One species (*Pseudamplexus obesus*) presumably derived from Koněprusy Lst., was – with certain doubt – newly described from Eifelian–Lower Givetian Acanthopyge Lst. of Koněprusy (Galle 1994).

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Paleoecology

The *Joachimastrea barrandei* sp. nov. corallites are relatively long, straight, and slender, with septotheca massive, but much less so than in most of the Koněprusy corals as

described in Oliver and Galle, 1971. Very often they are covered with epibionts. These characters, in our opinion, indicate differences between the life habits of *Joachimastrea barrandei* sp. nov. and most of previously described rugose corals of the Koněprusy Limestone: species with dilated septa (rugosans *Acanthophyllum baculoides*, *Lyriasma columnum*, *Pseudamplexus bohemicus*, *Chlamydothyllum obscurum*, and some *Xystriphyllum interlineatum* and *Pseudochonophyllum pseudohelianthoides*, and tabulates *Fossopora minimorum* and some *Roemeripora bohemica*) are usually common (Oliver – Galle 1971, Galle 1978). They were worn as pebbles, apparently after their death, burial in the sediment, and diagenesis, because the sparitic fills of their skeleton cavities are worn together with corallites. We suppose that these corals were recycled into the sediment as pebbles in gravel derived from the emerged parts of the reef. On the other hand, species with attenuate septa are usually rare and unworn (*Spongophylloides* sp., *Syringaxon* spp.). Some specimens of *Xystriphyllum interlineatum* and *Pseudochonophyllum pseudohelianthoides* are common, attenuate, unworn, and some are in life position.

Joachimastrea barrandei sp. nov. has heavily dilated septa but its overall structure with free long slender corallites growing rather widely apart is rather delicate, so that its ability to survive rigorous conditions close to wave-resistant parts of the reef is small. The worn corallites are unknown. On the contrary, corallites covered with epibionts as well as delicate structures on the corallites' surfaces are well-preserved. We consider *Joachimastrea barrandei* sp. nov. the member of the second, attenuate and slightly younger group of corals.

To reconstruct the life conditions of the Koněprusy corals, we suppose that the dilated species lived close to or on the wave-resistant reef wall and were postmortally deposited on the reef flat (reef flat A) close to the reef proper, roughly comparable to the *Heliopora* Zone of Recent reefs (Wells 1954). Subsequently, after their lithification (time necessary to that process could have been relative-

ly very short) they were freed by wave action or currents and moved as pebbles in gravel and sand of another – younger – reef flat B together with other particles, as are rock pebbles, crinoid columnals, and broken pieces of stromatolites. Gravel surface of the reef flat B is comparable to reef flats of Recent atoll Arno (Wells 1952), Rotuma (Gardiner 1898), Yonge's reef in the outer Great Barrier Reef (Stephenson et al. 1931, and Manton 1935), or Murray Islands (Mayor 1918). The reef flat B was populated with large coral heads of attenuate *Xystriphyllum interlineatum*, *Favosites intricatus*, *Squameofavosites cecchicus* and *Roemeripora bohémica*. In their lee and in the lee of sand and gravel banks as well as in the depressions of the ?shallow reef flat B lived more delicate species as are attenuate *Pseudochonophyllum pseudohelianthoides*, *Spongophylloides* sp. and *Favosites sphaericus*, heliolitids, and other sessile and vagile benthos, whereas *Syringaxon* spp. and branched tabulates *Yacutipora bohémica*, *Scoliopora* (*Protoscoliopora*) *franciscæ*, *Platyaxum* (*Levisicoenites*) *equiaurei*, *Coenites carnosus*, *C. dungenensis* and *C. crassus* (Hladil 1989) probably lived in deeper relatively quiet-water pools of the reef flat. Pachyporids are rare in the assemblages of the reef pools, being linked mostly to corals with primarily thickened skeletons. *Joachimastrea barrandei* sp. nov. probably lived in the protected cavities of the rough block reef debris.

We suppose that the Koněprusy area is a relic of larger reef complex comparable to Recent oceanic atolls or barrier reefs and, as such, requires massive supply of oceanic water from the deep and large basin providing nutrients, carbonates, and aeration (Maxwell 1969). As the known non-reef Barrandian Pragian does not meet conditions mentioned, we suppose an existence of such basin close to Barrandian in the Pragian time.

Systematic paleontology

Tabulata Milne-Edwards and Haime, 1850
Auloporida Sokolov, 1947
Aulocystidae Sokolov, 1950

Remesia Kettner, 1934

Type species: *Remesia tubulosa* Kettner, 1934, ?uppermost Eifelian–Givetian, Čelechovice, Moravia.
Diagnosis: see Byra, 1983, and Birenheide, 1985.
Occurrence: Lower and Middle Devonian, Europe, ?Asia.

Remesia koneprusiana sp. nov.

Pl. I, figs. 8, 9; Pl. II, figs. 6–8

Derivatio nominis: After the village of Koněprusy under the Zlatý Kůň Hill, the type locality of the new species.

Material and occurrence: Holotype AG 1564, figured here, Pl. I, figs. 1, 2, and Pl. II, fig. 6 (two transverse and one longitudinal sections); paratypes AG 1559 (one transverse and one longitudinal section), AG 1560 (transverse section), AG 1561, Pl. II, fig. 7 (longitudinal section), AG 1562, Pl. II, fig. 8 (one oblique and one longitudinal sections), and AG 1563 (four transverse sections). All the material listed has

been derived from the Koněprusy Limestone, Pragian, Lower Devonian, Koněprusy, quarry Čertovy Schody-West, „Mramorová stěna“ under the Zlatý Kůň Hill. It is deposited in the Geological Institute AS CR.

Diagnosis: *Remesia* with small coralla, average corallite diameter under 2 mm, and wall 0.1–0.6 mm thick.
Description: Small coralla composed of several corallites, with very rare connecting tubes. Corallites are cylindrical, erect, relatively thick-walled. Corallite outlines are circular or irregular in the cross-section, outer surfaces of the walls are smooth or crenulated. The wall is composed of thin epitheca preserved only in some places, darker laminar theca, and lighter laminar stereotheca covering proximal sides of the wall as well as numerous coarse septal trabeculae and some tabulae, particularly those building the syrinx. Tabulae are usually incomplete, steeply sloping towards the base and forming pronounced syrinx approximately 1/3 d wide with stereoplasmatically thickened walls. Some tabulae are complete and horizontal.

Dimensions:

	d	w	tab/5 mm
OR	0.88–3.04	0.11–0.59	4.4–8.3
N	20	29	3
Σ	36.91	8.99	16 tabs/14.57 mm
x	1.8455	0.31	4.55

Discussion: *Remesia* sp. nov. differs from the type species *Remesia tubulosa* Kettner, 1934 from the ?uppermost Eifelian to Givetian of Čelechovice, Moravia, in smaller corallite diameter which reach 2.5–3 mm in Moravian species, and in thinner wall, reaching 0.5–0.8 mm in *R. tubulosa*.

Rugosa

Joachimastrea gen. nov.

Derivatio nominis: The name is derived from the given name of Joachim Barrande.

Type species: *Joachimastrea barrandei* sp. n., Lower Devonian, Pragian, Koněprusy Lst. of the quarry on Zlatý Kůň Hill at Koněprusy, Central Bohemia.

Diagnosis: Rugose coral morphologically close to disphyllids but with horseshoe-shaped dissepiments between the parent corallites and offsets.

Discussion: The systematic position of *Joachimastrea* is unclear. It resembles phillipsastraeids in its possession of horseshoe dissepiments; lack of rhipidacanth and of the trabecular fans contradicts it. Besides it, it remains the disphyllids in both gross and fine septal structure; however it differs from *Disphyllum* in presence of well-developed horseshoe-shaped dissepiments unknown in disphyllids.

The occurrence of horseshoes in the coral with horizontal monacanth or holacanth is exceptional. The horseshoes occur always at the boundary between the parent

corallite and the offset. Offset begins as the gap in the parent corallite wall filled with the single series of horseshoe dissepiments. Horseshoes do not develop in the interseptal chambers but rather they interrupt the septa. Later on, the dimensions of the offset increase, horseshoes are apparently arranged in several parallel rows forming the wall between the parent corallite and offset. Finally, the offset diverges from the parent corallite and the horseshoes disappear.

We suppose that the parent corallite and the offset were connected through their joint basal disc which folded during the upward growth of the calice margin (text-fig. 1). The fold functioned as that in phillipsastraeids and produced the horseshoes as long as the parent corallite was connected to the offset.

Diagnosis: Fasciculate *Joachimastrea* with corallite diameter about 10 mm, approximately 30 septa undifferentiated to majors and minors, and 4 tabulae per 5 mm of length.

Description: Weakly fasciculate coralla up to 10 cm in diameter, or a single large corallum. It is composed of subparallelly arranged straight, slender, cylindrical corallites. Individual corallites are 4–21 ($d = 9.19$) mm apart. Corallite surfaces are smooth or only very slightly grooved. Calices are deep, their edges are sharp (Pl. I, fig. 5).

Corallites are often covered with epibionts, namely massive bryozoans (Pl. II, fig. 1). Orientation of the epibionts indicates that they probably grew during the hosts' life.

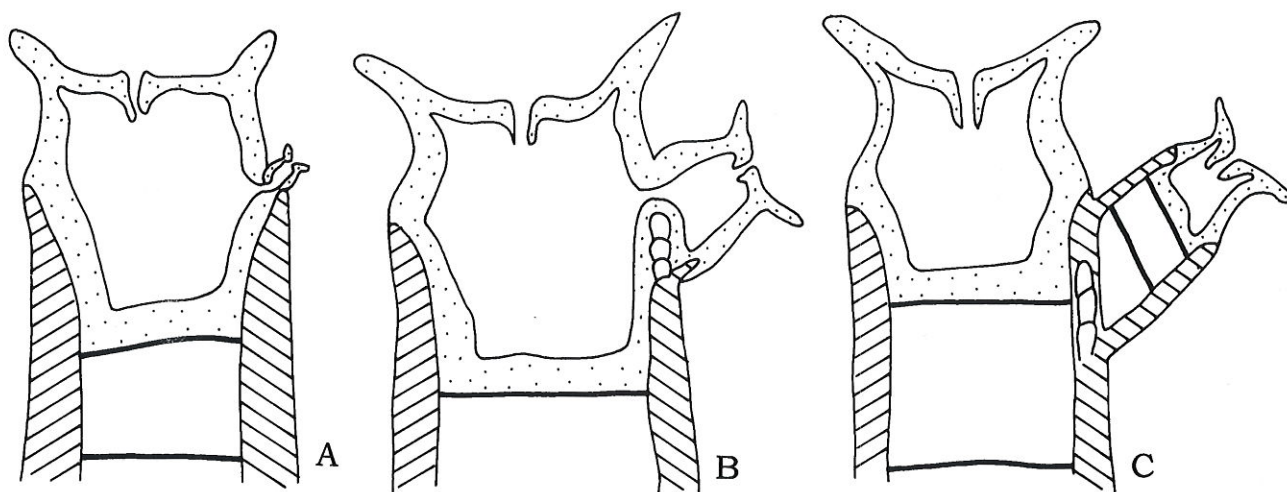


Fig. 1. A – *Joachimastrea* with small offset and no skeleton changes; B – Fold of the basal disc between the parent polyp and offset produces horseshoes; C – Polyps and corallites are separated.

Occurrence: *Joachimastrea* occurs in the Pragian Koněprusy Lst. of the quarry on Zlatý Kůň Hill at Koněprusy, Central Bohemia.

Joachimastrea barrandei sp. nov.

Pl. I, figs. 1–7; Pl. II, figs. 1–5

Derivatio nominis: The species name is derived from the family name of Joachim Barrande.

Material and occurrence: Holotype AG 1556 A–F, figured here, Pl. I, figs. 1–4 (three transverse, one oblique transverse, and two longitudinal sections); paratypes AG 1553, Pl. I, fig. 5 and Pl. II, fig. 1 (longitudinal section of several corallites); AG 1554 A–D, Pl. I, fig. 6 (two transverse and two longitudinal sections); AG 1555 A–C, Pl. II, fig. 5 (two transverse and one longitudinal sections); AG 1557 A–C, Pl. I, fig. 7 and Pl. II, figs. 2, 3 (one transverse, one oblique, and one longitudinal sections); and AG 1558 A–B, Pl. II, fig. 4 (one transverse and one oblique longitudinal sections). All the material listed has been derived from the Koněprusy Limestone, Pragian, Lower Devonian, Koněprusy, quarry Čertovy Schody-West, „Mramorová stěna“ under the Zlatý Kůň Hill. It is deposited in the Geological Institute AS CR. One specimen is deposited also in the collections of the Westfälische Wilhelms-Universität in Münster, Germany.

Septa are radially arranged, short, thick. They are slightly amplexoid and they do not exceed boundaries of the marginarium except as occasional short blunt ridges upon the upper surface of the tabulae (Pl. I, figs. 4, 7). The septa are in full lateral contact, they are of the same length so that the majors and minors can not be recognized (Pl. I, fig. 3) although, in some places, recrystallisation formed the semblance of the alternation of major and minor septa (Pl. I, fig. 7, Pl. II, fig. 2).

Septa are built of coarse trabeculae lying almost horizontally, under the angle 78–92° (mean value 84°). Trabeculae are straight, arched, or sigmoidally bent (Pl. I, fig. 5, Pl. II, fig. 3). No inner structure of the trabeculae is visible, and trabeculae appear to be monacanthous.

Dissepiments are developed mostly in the neighbourhood of the offsets. Well-developed horseshoes are present in the axis of the wall (Pl. I, fig. 6, Pl. II, fig. 4), while single series of asymmetric globose dissepiments, each of them resting on the corallite wall and on an older dissepiment, can be present either inside the parent corallite or inside the offset (Pl. I, fig. 2, Pl. II, fig. 1). A gap in the wall between the parent corallite and the offset is

filled with continuous wall built of horseshoe-shaped dissepiments (Pl. I, fig. 1).

Tabulae are usually complete and horizontal, although incomplete, oblique, convex, or concave tabulae are also common. Peripheral tabellae seem to be present at some places (Pl. I, fig. 4, Pl. II, fig. 2).

Nonparricidal intracalicular increase occurs. Offset begins as the gap in the parent corallite wall filled with the single series of horseshoe dissepiments. Horseshoes seem to develop not in the interseptal chambers but rather they interrupt the septa and fill the surviving gap in the marginarium (Pl. I, figs. 3, 6, Pl. II, fig. 4). The wall between the parent corallite and the offset is built of the single row of the horseshoe-shaped dissepiments (Pl. I, fig. 1). Later on, the dimensions of the offset increase and it diverges from the parent corallite (Pl. I, fig. 6).

Dimensions (in mm):

	d	nI+II	w	tab/5 mm	diss/5 mm
OR	2.6–5.8	20–40	0.22–0.89	2.9–5.7	5.6–10.5
N	20	8	20	11	3
Σ	86.6	246	9.68	45.6	26.51
x	4.33	30.75	0.484	4.1454	8.8367

(d = corallite diameter; nI+II = number of major and minor septa; w = wall thickness; tab/5 mm = number of tabulae per 5 mm; diss/5 mm = number of horseshoes in offsets per 5 mm).

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Dva nové koráli z koněpruských vápenců (spodní devon, prag, Barrandien Česká republika)

Mezi koněpruskými rugosními a tabulárními korály lze rozlišit hojně se zesílenými septy (*Rugosa Acanthophyllum baculoides*, *Lyriellasma columnum*, *Pseudamplexus bohemicus*, *Chlamydothyllum obscurum*, a některé *Xystriphyllum interlineatum* a *Pseudochonophyllum pseudohelianthoides*, a tabuláty *Fossopora minimorum* a některé *Roemeripora bohemia*). Tyto formy jsou opracované jako valouny, a to postmortálně, po pohřbení v sedimentu a po diagenězi, protože sparitické výplně dutin v jejich skeletech jsou opracovány spolu s koralitami. Předpokládáme, že tyto koráli byli resedimentováni jako valouny ve štěrku pocházejícím z vnořených částí rifu. Druhy s tenkými septy jsou obvykle řídké a neopracované (*Spongophylloides* sp., *Syringaxon* spp.). Někteří jedinci druhů *Xystriphyllum interlineatum* a *Pseudochonophyllum pseudohelianthoides* jsou četní, zesílení, neopracovaní, a někteří jsou v životní pozici.

Předpokládáme, že druhy se zesílenými septy žily na vlnovzdorné rifové stěně nebo v její blízkosti a byly po smrti uloženy na rifové plošině A blízko vlastního rifu, v prostředí zhruba srovnatelném s helioporovou zónou recentních rifů. Po litifikaci byly uvolněny ze sedimentu činností vln nebo proudů a opracovány jako valouny na jiné, mladší rifové plošině B. Šterkový povrch plošiny B byl obydlen velkými

„korálovými hlavami“ nezesílených druhů *Xystriphyllum interlineatum*, *Favosites intricatus*, *Squameofavosites cechicus* a *Roemeripora bohemica*. V jejich krytu a v krytu písčinych a šterkových lavic stejně jako v depresích ?mělké rifové plošiny B žily křehčí druhy jako *Pseudochonophyllum pseudohelanthoides* s tenkými septy, *Joachimastrea barrandei* sp. nov., *Spongophylloides* sp. a *Favosites sphaericus*, heliolitidi a další sesilní a vagilní benthos, kdežto *Syringaxon* spp. and větevnatí tabuláti *Yacutipora bohemica*, *Protoscoliopora francisciae*, *Leviscoenites equitauri*, *Coenites* aff. *carinosus*, *C. cf. Junginensis* and *C. crassus* žili asi v hlubší klidnovodní části rifové plošiny B.

Předpokládáme, že oblast Koněprus je tvořena zbytkem většího rifového komplexu srovnatelného s recentními oceánskými atoly nebo bariérovými rify, který ke své existenci vyžaduje masivní přísun oceánské vody z rozsáhlé a hluboké pánve, která rifu poskytuje živiny, karbonáty a větrání. Protože nerifový prag Barrandienu tyto podmínky nesplňuje, předpokládáme existenci takové pánve v pragu v těsné blízkosti Barrandienu.

Jsou popsáni koráli *Remesia koneprusiana* sp. nov. s průměrem koralitů pod 2 mm, a nový rod *Joachimastrea* gen. nov., podobný disphyllidu s podkovovitými dissepimenty, a nový fascikulární druh *Joachimastrea barrandei* sp. nov.

Explanation of plates

All the objects figured are thin sections. They were photographed by Mr. Josef Brožek, Geological Institute AS CR, and are provisionally deposited in the collection of A. Galle, Geological Institute AS CR, Rozvojová 135, CZ-165 00 Praha 6-Suchbát.

Plate I

Joachimastrea barrandei sp. nov.

1. Oblique transverse section with wall of horseshoe-shaped dissepiments. Holotype, specimen AG 1556 b, x6.
2. Longitudinal section, small offset with horseshoes. Holotype, specimen AG 1556 f, x6.
3. Oblique transverse section with septa of equal length and small offset. Holotype, specimen AG 1556 c, x6.
4. Transverse section with amplexoid septa and longitudinal section with tabellae. Holotype, specimen AG 1556 a, x6.
5. Longitudinal section; calice with sharp edges and coarse trabeculae. Paratype, specimen AG 1553, x4.5.
6. Longitudinal section, offset with horseshoes. Paratype, specimen AG 1554 d, x6.
7. Transverse section, three corallites with both well-preserved and recrystallized septa. Paratype, specimen AG 1557 b, x6.

Remesia koneprusiana sp. nov.

8. Transverse section with excentric tabellae. Holotype, specimen AG 1564 b, x6.
9. Oblique longitudinal section with syrinx. Holotype, specimen AG 1564 c, x6.

Plate II

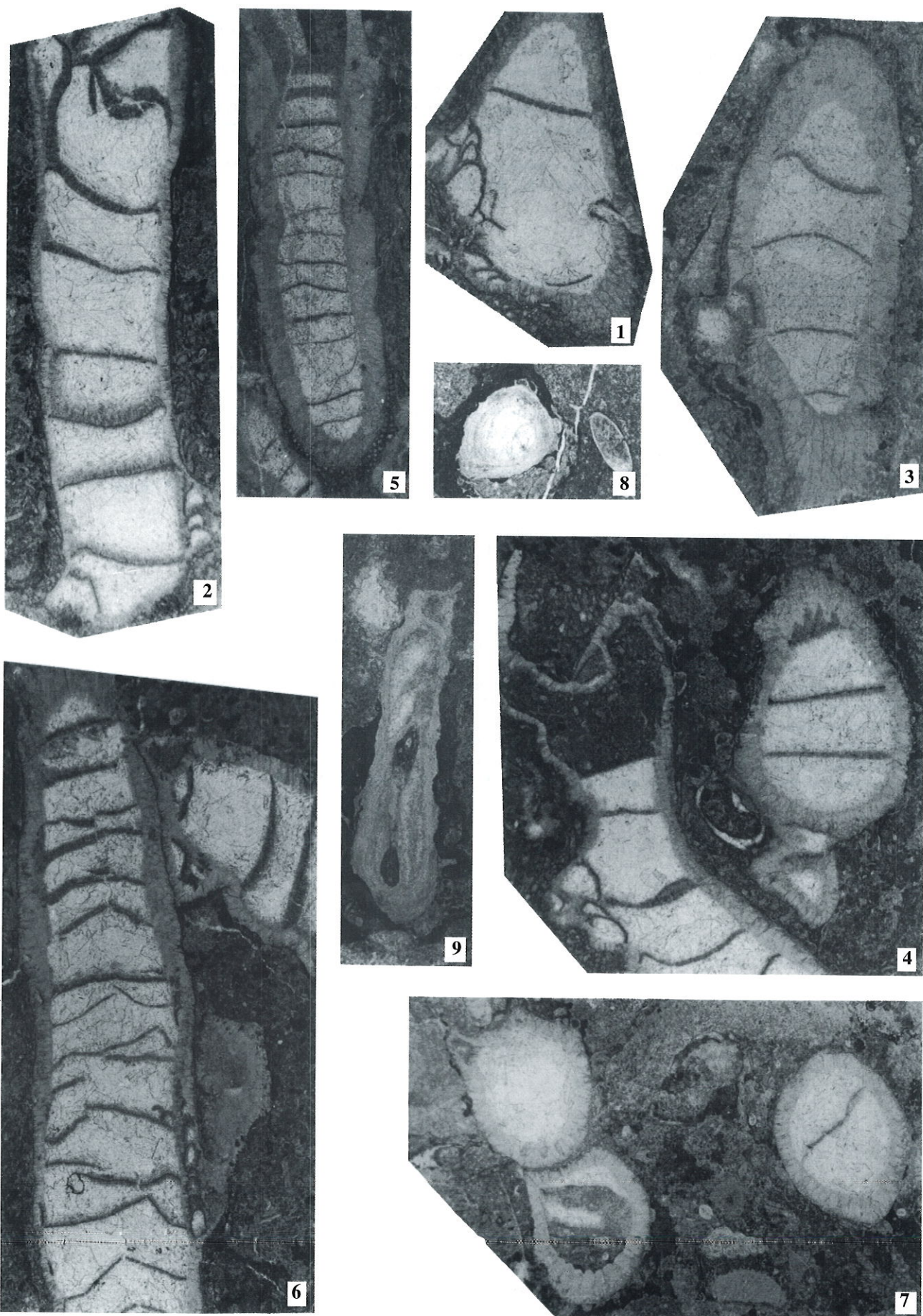
Joachimastrea barrandei sp. nov.

1. Longitudinal section, offset with horseshoes, epibiotic bryozoan. Paratype, specimen AG 1553, x4.5.
2. Oblique transverse and longitudinal section with altered septal structure and with tabellae. Paratype, specimen AG 1557 a, x6.
3. Longitudinal section with amplexoid septa and well-preserved trabeculae. Paratype, specimen AG 1557 c, x6.
4. Oblique transverse section, horseshoes between parent corallite and offset. Paratype, specimen AG 1558 b, x6.
5. Oblique transverse section with tabellae. Paratype, specimen AG 1555, x6.

Remesia koneprusiana sp. nov.

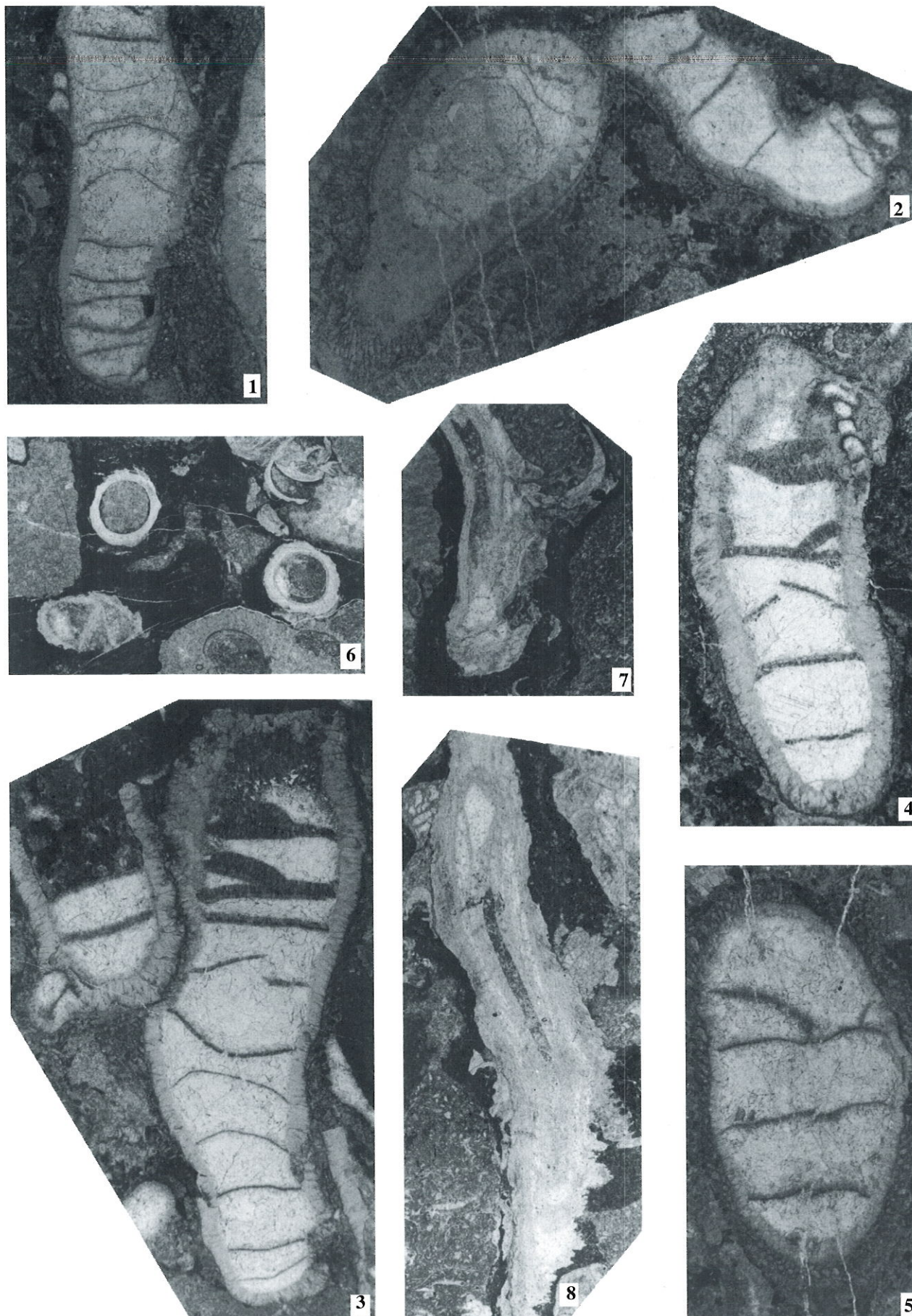
6. Transverse section through small corallites. Holotype, specimen AG 1564 a, x6.
7. Longitudinal section with excentric syrinx. Paratype, specimen AG 1561, x6.
8. Longitudinal section with syrinx in axis and septal trabeculae. Paratype, specimen AG 1562, x6.

A. Galle – J. Hladil – A. May: Two new corals from the Koněprusy Limestone (Lower Devonian, Pragian, Barrandian, Czech Republic) (Pl. I)



For explanation see p. 185

A. Galle - J. Hladil - A. May: Two new corals from the Koněprusy Limestone (Lower Devonian, Pragian, Barrandian, Czech Republic) (Pl. II)



RECENZE

Ivo Chlupáč: **Vycházky za geologickou minulostí Prahy a okolí.** – 279 str., 8 příl. Academia, Praha 1999.

Pravděpodobně každý zájemce o geologickou minulost Prahy a středních Čech velmi uvítá nový ediční počín nakladatelství Academia. Po jedenácti letech se nám dostává do rukou druhé, doplněné vydání knihy Prof. Dr. Ivo Chlupáče, DrSc. o geologických zajímavostech širšího okolí Prahy (I. vydání – Geologické zajímavosti pražského okolí, 1988). Autor přednáší historickou a stratigrafickou geologii na Přírodovědecké fakultě Univerzity Karlovy a celý život se zabývá geologickým a paleontologickým výzkumem spodního paleozoika Barrandienu a dalších částí Českého masivu. Díky jeho odborné erudici a rozsáhlé pedagogické praxi není kniha jen poutavě napsaným exkurzním průvodcem, ale širší veřejnosti jistě poslouží též jako názorná učebnice geologie.

Domnívám se, že pro dnešní mladé zájemce o historii Země, geologii a paleontologii může být Chlupáčův průvodce stejným pokladem, jakým byl pro dvě předchozí generace dnes již klasický průvodce Boučkův (Geologické vycházky do pražského okolí, Praha, 1953).

Podobně jako u prvního vydání je kniha uvedena kapitolou o širších historicko-geologických souvislostech geologické stavby a vývoje pražského okolí. V následujících deseti kapitolách jsou popsány hlavní etapy geologického vývoje území od nejstaršího období – prekambria až do geologické současnosti. Na 44 vybraných vycházkách, tematicky zaměřených k jednotlivým kapitolám geologického vývoje území, se čtenář seznámí s geologickými zajíma-

vostmi, nalezišti zkamenělin a nerostů i s doklady o činnosti geologických procesů. Trasy většiny vycházek nás seznamují s geologickými a paleontologickými lokalitami Prahy a jejího nejbližšího okolí, další vycházky směřují do okolí Berouna a některé nás zavedou až k Českému Brodu (perm), do okolí Kralup nad Vltavou a Kladna (karbon a křída), do Posázaví (proterozoikum a variské horotvorné procesy), na Příbramsko (kambrium) či Křivoklátsko (kambrium okolí Skryjí a Týřovic). Kniha obsahuje též slovníček se stručným vysvětlením odborných výrazů a lokalitní rejstřík. Pro vážnější zájemce je zahrnut poměrně obsažný seznam odborné literatury.

Oproti prvnímu vydání je doplněna atraktivní vycházka do kambria okolí Příbrami a Jinců a jsou rozšířeny vycházky do Velké Chuchle a Slivence, na Kobylu a do Červeného lomu u Koněprus. I další vycházky jsou aktualizovány podle současného stavu popisovaných lokalit (např. vycházka na odvaly kladenských dolů). Je doplněno několik fotografií a kreslených obrázků.

Kniha obsahuje 154 fotografií, geologických mapek, profilů a blokdiagramů a 8 křídových příloh s vyobrazením charakteristických fosilií. Po zběžném pročtení jsem zjistil jen několik drobných nedostatků (např. ilustrace s ukázkami křídové květeny není příliš přesná a zahrnuje druhy, které se na popisovaných lokalitách nevyskytují).

Přes svůj zdánlivě menší formát a brožovanou vazbu působí nové vydání knihy prof. Chlupáče již na první pohled příznivým dojmem. Vezmeme-li v úvahu též přijatelnou cenu knihy, můžeme očekávat, že se ani toto vydání na pultech dlouho neohřeje.

Petr Štorch