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CARNIAN CORALS FROM THE MALÉ KARPATY MOUNTAINS, WESTERN CARPATHIANS, SLOVAKIA

EWA RONIEWICZ[1] and JOZEF MICHALÍK[2]

[1]Institute of Paleobiology, Polish Academy of Sciences, Twarda 51/55, 00-818 Warszawa, Poland; eron@twarda.pan.pl
[2]Geological Institute, Slovak Academy of Sciences, Dúbravská cesta 9, 842 26 Bratislava, Slovak Republic; geolmich@savba.sk

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Abstract: Carnian small scleractinian coral fauna found in the Malé Karpaty Mts (Western Carpathians), is closely related to early late Carnian corals of the Dolomites (Southern Alps). The former fauna includes three new genera: *Carpathiphyllia* (type species: *C. regularis* sp.n.), *Pontebbastraea* (type: *Stylophyllopsis pontebbanae* Volz), *Protostylophyllum* (type: *Stylophyllum praenuntians* Volz), and a new species of *Volzeia* (*V. carpathica* sp.n.). The Carnian age of the upper part of the Veterlín platform sequence proves the continuous development of Triassic carbonate platform, which was never interrupted by the Lunz/Rheingraben clastic interval (unlike to the Choč- and/or Lunz Nappe sequences).

Key words: Western Carpathians, late Carnian, reef assemblages, taxonomy, Scleractinia, Anthozoa.

Introduction

In spite of abundant coral findings from several European Ladinian Carnian localities, namely from Germany (Wöhrmann 1889), Italy (Salomon 1895; Volz 1896; Montanaro-Gallitelli 1976; Cuif 1977), Hungary (Papp 1911; Kolosváry 1958a) Rumania (Kühn 1936), Slovakia (Kolosváry 1957, 1958a,b, 1963, 1966), Slovenia (Turnšek & Buser 1989 — with other bibliography), and Greece (Celet 1962; Matarangas et al. 1995), only those from Italy (Dolomites) have a complete paleontological documentation, thanks to perfectly preserved aragonitic coral skeletons (Cuif 1977 — with other bibliography; Montanaro-Gallitelli 1976 — with other bibliography). Data collected by Kolosváry (1957, 1958a,b, 1963, 1966), who studied Ladinian/Carnian corals from Slovakia, and among others those from the Malé Karpaty Mts, need a re-examination, as his descriptions and illustrations are insufficiently treated and do not permit adequate comparisons. New coral findings in the Wetterstein facies of the Veterlín and Havranica partial nappes (southwestern end of the Western Carpathians) enable stratigraphical correlation between both West-Carpathian and South Alpine coral-bearing beds.

Remarks and discussion on the Carnian corals from the Malé Karpaty Mts

The northern part of the Malé Karpaty Mts is formed by a nappe slices pile, thrust backward on the margin of the Central Western Carpathians (Michalík 1984; Plašienka et al. 1991). These bodies (designated the "higher" nappes, namely Veterlín-, Havranica- and Jablonica nappes, Fig. 1) consist of Triassic carbonate sequences similar to these preserved in the Ötscher- or the Göller nappes of the Northern Limestone Alps nearby. The Ladinian/Carnian sequence represents non-terrigeneous clastic infilling of a tensional basinal system in the external rim of the Alpine-Carpathian carbonate shelf (Michalík 1993, 1994). During Early Carnian, the reef front (preserved in the Havranica partial nappe) prograded basinwards by a slope talus megabreccia (across the Veterlín partial nappe; Michalík et al. 1993, 1999; Fig. 2). The Veterlín basin was filled by fine carbonate debris irresistent to dolomitization fluids (Lintnerová et al. 1988; Lintnerová & Hladíková 1992; Lintnerová & Soták 1994), instead of clay matrix which en-

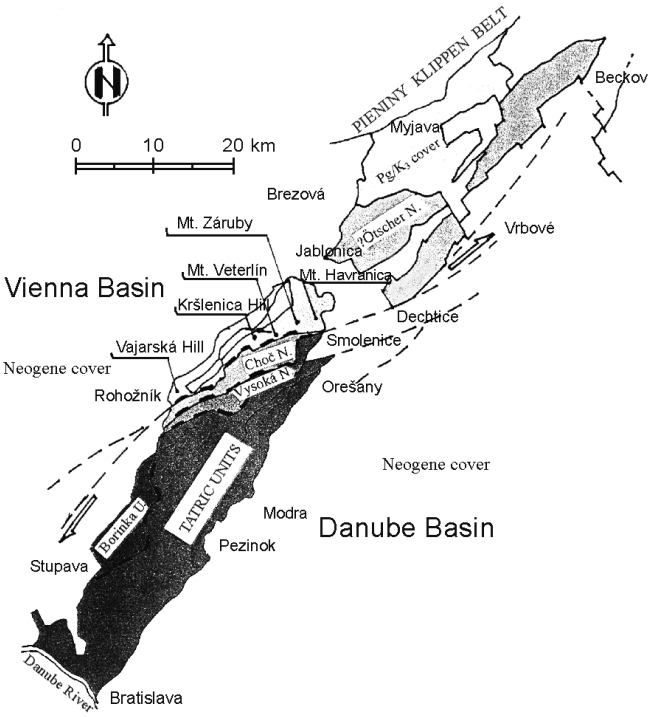

Fig. 1. Sketch map of northwestern part of the Malé Karpaty Mts with indication of main tectonic units and the distribution of the Veterlín carbonate platform.

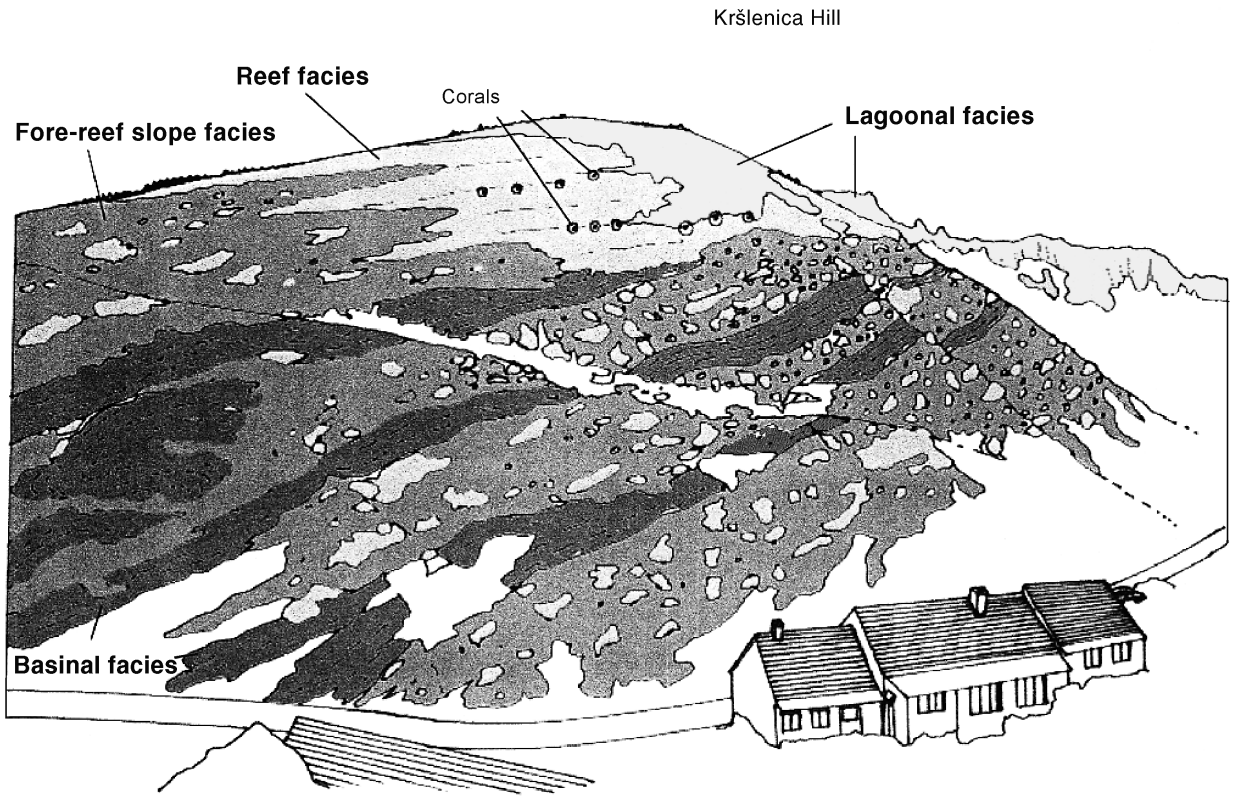

Fig. 2. View on the Kršlenica Hill showing Carnian carbonate platform progradation across the slope megabreccia.

abled unique fine preservation of the famous Cipit blocks in a similar situation in the South-Alpine St. Cassiano Basin.

The middle part of the Kršlenica section (Fig. 3) developed in a slope facies yielded findings of *Gondolella polygnathiformis* Budurov & Stefanov, *Gladigondolella tethydis* (Huckriede) and other conodonts (Papšová in Michalík et al. 1993). According to Vrielynck (in Graciansky et al. 1998), the co-occurrence of the two former species is typical of Early Carnian Aonoides- and Austriacum Zones. On the other hand, the occurrence of the foraminifer *Aulotortus pregaschei* (Koehn-Zaninetti) along with sporadic *Galeanella* sp. higher up in the section indicates early Late Carnian age of the prograding platform wedge sediments containing the coral fauna. This fauna is composed of Protoheterastraeidae (*Protoheterastraea, Carpathiphyllia* gen.n., *Pontebbastraea* gen.n.), Volzeiidae (*Volzeia*), Margarophylliidae (*Margarosmilia*), and Stylophyllidae (*Protostylophyllum* gen.n.). These are characterized either by particular (minitrabecular, and non-trabecular, that is, fascicular: Roniewicz 1989; Roniewicz & Morycowa 1989, 1993) microstructures or by large-scale features (thick wall, tabuloid endotheca). According to Roniewicz & Morycowa (1993), such a faunal composition is typical of the pre-Alaunian time.

With the exception of *Carpathiphyllia regularis* sp.n., all species of this fauna strongly resemble that from the Cipit limestone boulders from marly St. Cassiano Formation in the Dolomites, Southern Alps. The age of these deposits is estimated to be early Late Carnian (Russo et al. 1991). The taxonomic affinity of the Malé Karpaty fauna and that of the Dolomites suggests that both faunas lived in geographical proximity to each other. This affinity is interesting from the ecological point of view, too: due to the different environments in which the faunas developed, the coral-bearing deposits of both the regions were of different facies. The Veterlín reef builders were mostly represented by *Tubiphytes obscurus*, *Thaumatoporella*, porostromates, calcareous algae, sponges and other organisms. Although the corals lived rather subordinately in the inner part of the reef only, a small collection under examination obtained from light, hard biodetrital limestone came from a diversified fossil assemblage, as the only eight found specimens represent as many as six different genera. The fauna consists of four solitary species and two others with a phaceloid growth form (Table 1). Although variable in taxonomic composition, this fauna belongs to a non-reef category due to solitary and phaceloid growth forms and epithecal walls of corals. These features characterize rather a low hydrodynamic environment (Roniewicz & Stolarski 1999).

Surprisingly enough, this small portion of a diversified Carpathian fauna is distant taxonomically from the faunas de-

Table 1: Corals from the Veterlín carbonate platform of the Malé Karpaty Mountains.

Species	growth form
Protoheterastraea leonhardi (Volz)	solitary
Carpathiphyllia regularis sp. et gen.n.	solitary
Pontebbastraea sp.	solitary
Volzeia carpathica sp.n.	phaceloid
Margarosmilia cf. *richthofeni* Volz	phaceloid
Protostylophyllum praenuntians (Volz)	solitary

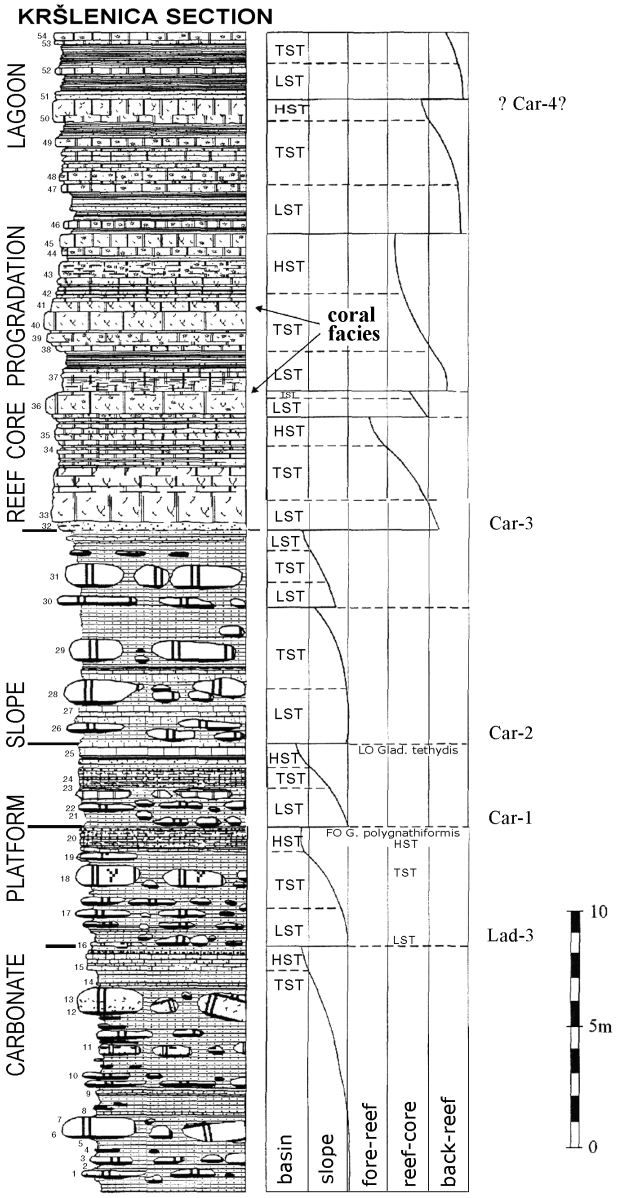

Fig. 3. The Kršlenica section: a correlation of lithological log with important faunal occurrences.

scribed from Slovenia (Turnšek et al. 1982, 1987; Ramovš & Turnšek 1984), Rumania (Kühn 1936) and Hungary (Papp 1911).

Material

The collection under study consists of eight specimens, collected by Stanislav Buček (1988) mostly from loose blocks, and housed in the Slovak National Museum of Natural History in Bratislava (abbreviated as SNM 23 034–SNM 23 041). The corals are recrystallized and their microstructure has been completely obscured. Comparison of this material with the Cassian corals from the Dolomites (Volz 1896) was based on Volz's original thin sections housed at the Geological Museum of Wrocław University (MGUWr), and *Protoheterastraea leonhardi* lectotype housed in the Museum für Naturkunde Berlin (MB).

Abbreviations used in the text: d — corallite diameter (in mm), h — corallite height (in mm), s — number of septa in the coralite, nS1... — number of septa of the succeeding size orders, sd/mm — septal density, number of septa per millimeter measured directly at the wall in cross-section.

Taxonomy

Suborder **Caryophylliina** Vaughan et Wells, 1943
Superfamily **Volzeioidea** Melnikova, 1974

The corals from the families Protoheterastraeidae, Volzeiidae and Margarophylliidae show a midseptal zone (called also a midseptal line) built of more or less clearly individualized small centres of calcification (minitrabeculae), a feature exclusively typical of the Caryophylliina. The epithecal wall differentiates the Triassic families from Recent caryophylliines having septothecal, trabeculothecal or marginothecal walls, and allows us to embrace them into the superfamily Volzeioidea (compare Stolarski 1995, 1996; Roniewicz & Stolarski 1999).

Family **Protoheterastraeidae** Cuif, 1977
("*Protoheterastraea* group" of Cuif, 1977)

Protoheterastraea Wells, 1934

Wells 1934 replaced the homonyme *Hexastraea* Volz with *Protoheterastraea* and designated *P. leonhardi* (Volz) its type species. The second coral described by Volz 1896 under the generic name *of Hexastraea*, that is, *Hexastraea fritshi*, represents the genus *Quenstedtiphyllia* Melnikova, 1975 (Roniewicz & Stolarski 2001) from the family Amphiastraeidae, suborder Pachythecaliina Eliášová, 1976. The corals of this suborder have pachythecal wall of modular structure different from the epitheca in the caryophylliine corals, and very thin septa lacking structural ornamentation (microarchitecture).

The assignement of two other Carnian species, that is, *P. hudajuznensis* Turnšek, 1982 and *P. minor* Turnšek, 1989, and two early Norian: *P. alakirensis* Cuif, 1974 and *P. razorensis* Turnšek, 1991 needs revision.

In the Malé Karpaty collection, the genus is represented by the type species, *P. leonhardi* (Volz, 1896). Up to now, this species has been recorded from the Dolomites only.

Protoheterastraea leonhardi (Volz, 1896)
Fig. 4.1,2a–c

pars 1896 *Hexastraea Leonhardi* Volz: p. 92, Pl. 11: Figs 22–25 (non Fig. 21).

non 1973 *Protoheterastraea leonhardi* Volz: Cuif, p. 258, Figs. 23–26.

Material: Specimen No. SNM 23034 (loc. 278a/84): fragmentary corallite in the organodetrital limestone (bindstone–wackestone), associated with *Carpathiphyllia regularis* gen. et sp.n. Two thin sections.

Reference material: Lectotype specimen (MB) illustrated by Volz in Pl. 11: Fig. 22, and Volz's original thin sections executed from this specimen (MGUWr 139sz) presented by Volz in Pl. 11: Figs. 23, 25, and herein Fig. 4.2a–c.

Measurements (in mm): h — >15; d — 5–7; s — 48 (6 S1 + 6 S2 + 12 S3 + 24 S4).

Description and remarks: Corallite high, cylindrical, slightly enlarging distally. Wall very thick, epithecal. Regularly distributed radial elements are differentiated into 4 size orders (Fig. 4.1,2a,b). The septa S1 are the thickest and approaching near to the axis. Other septa are shorter and thinner depending on the order; the septa S3 and S4 are zigzag. The section of the lectotype specimen (MGUWr 139sz) shows tabular endotheca formed of thin, rare elements (Fig. 4.2a).

Microstructure: The radial elements observed in the lectotype specimen show fan-like arrangement of minitrabeculae composing midseptal zone. Lateral stereome in radial elements S1 and S2 is very thick and covered with irregular, sharp, abundant granulations. The epitheca is fascicular in structure and it forms a thick composite wall together with the thickened peripheral ends of radial elements (Fig. 4.2c).

Remarks: The material examined, as well as the type specimen, show regularly hexameral symmetry (Fig. 4.1,2a). This evidences that *P. leonhardi* represents corals of a solitary growth form, not a fragment of a phaceloid corallum increasing by budding or division that disturb each symmetry.

Cuif (see synonymy) under the name of *P. leonhardi* described some corals differing from the type in their septothecal wall and phaceloid growth form. Volz (1896) in the Pl. 11, Fig. 21 showed a phaceloid coral that cannot belong to the same taxon as the rest of the series illustrated in Figs. 22–25.

Occurrence: Carpathians — Malé Karpaty Mts, southern slope of the Mt Záruby–Mt Havranica ridge, Ladinian/Carnian Veterlín carbonate platform. Dolomites — Middle Carnian St. Cassiano Formation (probably Stuores, after Volz 1896) and Alpe di Specie Member overlying it.

Carpathiphyllia gen.n.
Type species: *Carpathiphyllia regularis* gen. et sp.n.

Diagnosis: Solitary, radial elements scarce, distributed in regular systems, and differentiated into 4 orders. Wall independent of other skeletal elements. Endotheca tabuloid.

Remarks: This new (monotypic) genus is included in Protoheterastraeidae due to septal apparatus composed of regularly distributed septa, wall independent from other skeletal elements and tabuloid endothecal elements. It differs from *Protoheterastraea* in equally thick septa, and in size (a range of magnitude greater) of corallite diameter.

Carpathiphyllia regularis sp.n.
Fig. 4.3

Holotype: Specimen No. SNM 23035, Fig. 4.3.

Type locality: Malé Karpaty, Malá Skalka rock (loc. 365/85) on southern slope of Mt Veterlín.

Type horizon: Veterlín carbonate platform, Wetterstein facies.

Diagnosis: *Carpathiphyllia* with a diameter of approximately 20 mm and with about 90 septa.

Material: Two fragmentary coralla: a well preserved distal fragment No. SNM 23035 (holotype) and a fragment of a middle part of the corallum from southern slope of Mt Záruby (767 m a.s.l), — Mt Havranica ridge (No. SNM 23034, loc. 278a/84); organodetrital limestone; packestone. One thin section.

Measurements (in mm): d — 20; s — e. 96 (12 S1).

Description: Solitary coral, circular in cross-section, more than 15 mm high. The radial elements are thin, differentiated by length into four orders. The septa S1, ca. 12 in number, approach the central cavity. The length of the septa S2 is equal to half the radius or longer, that of the septa S3 is about 1/3 the radius. The septa S4 are short, regularly distributed. Septa laterally ornamented by sharp, scarce granulations. Wall most probably epithecal, without any traces of structural dependence from septa or endotheca. The endotheca visible in transverse section of the corallum is made of rare tabulae.

Occurrence: Western Carpathians — Malé Karpaty Mts, Mt Veterlín, Veterlín carbonate platform, Wetterstein facies.

Pontebbastraea gen.n.
Type species: *Stylophyllopsis pontebbanae* Volz, 1896

Diagnosis (based on the lectotype, MGUWr 69sz, Volz 1896: Pl. 11, Figs. 9, 10). Phaceloid. Wall epithecal, radial in structure. External ends of radial elements embedded in the wall. Radial elements wavy in shape, equal in thickness, differentiated into three irregular orders and ornamented with rare, sharp granulations. Endotheca subtabuloid. Microstructure minitrabecular.

Species included: *P. pontebbanae* (Volz, 1896) and *P.* sp. described herein.

Remarks: The type species, originally assigned to *Stylophyllopsis*, reveals volzeiid/protoheterastreid morphology and ornamentation of radial elements (compare volzeiid microstructure in Cuif 1975: Figs. 17, 20–24). Their minitrabecular septal structure differs from this of stylophyllids which bear non-trabecular septa formed of septal spines build by fascicles of fibres (compare Roniewicz 1989; Roniewicz & Morycowa 1989). The new genus differs from *Volzeia* in having subtabuloid endothecal elements, and approaching a protoheterastreid pattern of the endothecal structure, if compared with the simple vesicular dissepiments of *Volzeia*.

Pontebbastraea sp.
Fig. 4.4a,b

Material: Specimen No. SNM 23036 (loc. 518), distal portion of a corallite; four thin sections.

Reference material: Thin sections MGUWr 69sz executed from the lectotype of the type species, *P. pontebbanae* (Volz), Dolomites, Stuores (according to supposition of Volz 1896), a member overlying Middle Carnian St. Cassiano Formation figured herein Fig. 4.5a–c

Measurements (in mm): d — 10; s — 24 (6 S1 + 6 S2 + 12 S3).

Description: The corallite is circular in section, high. Central pit circular and empty. Wall thick with characteristic vertical furrows answering the position of septa of a low order merging into the wall. Radial elements differentiated into 3

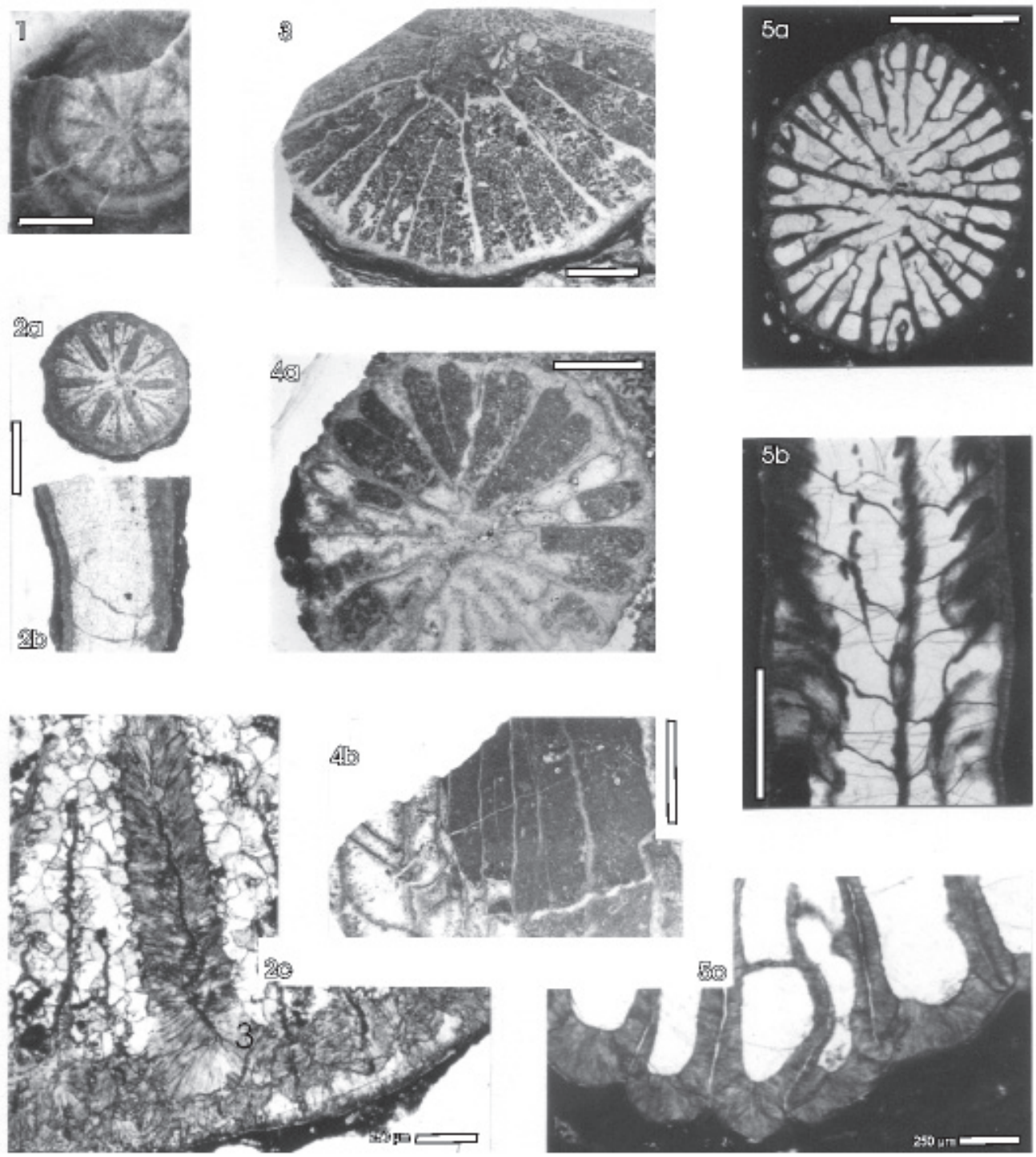

Fig. 4. 1. *Protoheterastraea leonhardi* (Volz). Malé Karpaty Mts, Mt Záruby–Mt Havranica ridge, Veterlín carbonate platform. Polished surface of the sample No. SNM 23034 (= 278a/84). **2.** *Protoheterastraea leonhardi* (Volz). Dolomites, St. Cassiano (Stuores after Volz), a member overlying the St. Cassiano Formation, Middle Carnian. Lectotype, original Volz's thin section, MGUWr 139sz: a, b — cross and longitudinal sections; note scarce endothecal tabulae; c — a fragment showing a structure of the wall composed of thick epithecal stereome incorporating external margins of radial elements. **3.** *Carpathiphyllia regularis* gen. et sp.n., holotype; Malé Karpaty Mts, Malá skalka on S Mt Veterlín slope, Veterlín carbonate platform, sample No. SNM 23035 (= 365/85): cross-section showing thick wall, regularly distributed radial elements and a section of the tabuloid endothecal element, forming a periaxial ring. **4.** *Pontebbastraea* sp. Malé Karpaty Mts, Ambrové Hills near to Prievaly, Veterlín carbonate platform, sample No. SNM 23036 (= 518): a — cross-section showing rare, long radial elements and wavy wall; b — longitudinal section showing rare, tabuloid elements of endotheca. **5.** *Pontebbastraea pontebbanae* (Volz). Dolomites, Stuores (after supposition of Volz), St. Cassiano Formation, Middle Carnian. Lectotype, Volz's original thin section, MGUWr 69sz: a — cross-section showing rare, long radial elements; b — longitudinal section with scarce, tabuloid, concave endothecal elements (note the upside down position of this section in Volz 1896, Pl.11:10); c — a fragment showing a wall with furrows facing peripheral ends of radial elements. Scale bars: 2.5 mm if not stated otherwise.

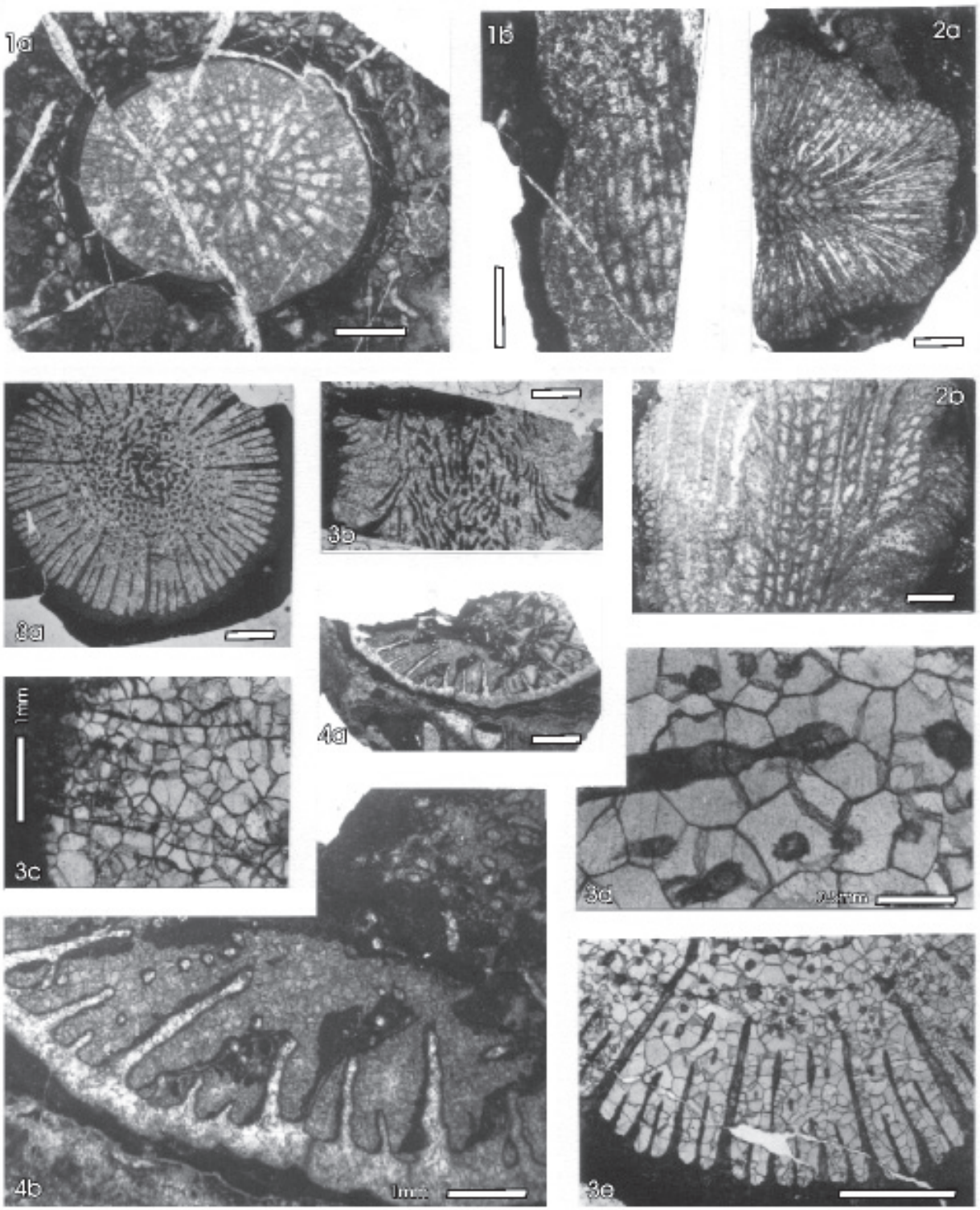

Fig. 5. 1. *Volzeia carpathica* sp.n., holotype. Malé Karpaty Mts, Javorinky Hill above the Mokrá Valley by Plavecký Mikuláš, Veterlín carbonate platform, sample No. SNM 23037 (= 475/85): a — cross-section; b — longitudinal section showing large dissepiments. **2.** *Margarosmilia* cf. *richthofeni* Volz. Malé Karpaty Mts, Javorinky Hill above the Mokrá Valley by Plavecký Mikuláš, Veterlín carbonate platform, No. SNM 23038 (= 475/85): a — cross-section of lobate corallite; b — longitudinal section showing vesicular endotheca. **3.** *Protostylophyllum praenuntians* (Volz), Dolomites, Valparola, St. Cassiano Formation, Middle Carnian. Lectotype, original Volz's thin section, MGUWr 71sz: a — cross-section with septal blades disassociated adaxially into septal spines; b — longitudinal section showing a septum compacted peripherally (black, at the left) and disassociating adaxially into isolated, regular septal spines; c — a fragment of *b* with thin tabulae; d, e — septal spines showing a typical coarse micro-ornamentation. Note a development of a loose columella-like structure occupying a large axial region. **4.** *Protostylophyllum praenuntians* (Volz), Malé Karpaty Mts, eastern part of the Mt Veterlín ridge, the Veterlín carbonate platform (No. SNM 23041, loc. 297a/85): a — distal portion of the corallum in slightly oblique cross-section; b — a fragment with internal septal portions dissociated into septal spines. Scale bars: 2.5 mm if not stated otherwise.

size orders: 6 septa S1 approaching the centre and subequal septa S2, and septa S3 about 1/4 the radius in length. Septal blades thin, slightly wavy or zigzag, enlarging toward the wall. Endotheca formed of rare, tabuloid dissepiments which are flat adaxially and slightly convex peripherally.

Remarks: *Pontebbastrea* sp. differs from the type species in its far larger diameter and lower number of septa; the lectotype specimen of *P. pontebbanae* (MGUWr 69sz) shows a corallite diameter of 5×6 mm, and number of septa equal to 32 (Fig. 4.5a). The endotheca is tabuloid (Fig. 4.5b). In the structure of the wall, the coral considered displays a very characteristic feature observed also in *P. pontebbanae* (Fig. 4.5c): the furrows which develop on the wall surface in the place where the septa of low orders merge into the wall.

Occurrence: Carpathians — Malé Karpaty Mts, Ambrové Hills near Prievaly, Veterlín carbonate platform, Wetterstein facies.

Family **Volzeiidae** Melnikova, 1974
Genus *Volzeia* Cuif, 1968

This Carnian genus is recorded from the European and Central Asiatic parts of the Tethys.

Volzeia carpathica sp.n.
Fig. 5.1a,b

Type specimen: Specimen No. SNM 23037, Fig. 5.1a,b.

Type locality: Malé Karpaty Mts, Javorinky Hill (loc. 475/85), above the Mokrá Valley near to Plavecký Mikuláš.

Type horizon: Veterlín carbonate platform.

Diagnosis: *Volzeia* with approximately 60 septa in a diameter of about 10–11 mm, and large dissepiments.

Material: A fragment of a colony of 6 corallites; organodetrital limestone; bindstone and packestone; nine thin sections.

Measurements (in mm): d — 8–11; s — 60; sd/3 — 4–6.

Description: Phaceloid coral composed of parallel corallites. Increase by equivalent division. Corallite surface smooth. Wall thin. Axial pit well marked, slightly elongated. Radial elements thin, differentiated into 4 size orders. Septa S1 reaching nearly to the axis, S2 markedly shorter than S1, S3 from a third to more than half the radius in length, septa S4 rare but well developed. Ornamentation not observed. Endotheca made of extended dissepiments deeply concave at the centre, and smaller dissepiments located at the periphery.

Remarks: The new species differs from *V. subloevis* (Münster), *V. subdichotoma* (Volz) and *V. badiotica* (Volz) in having larger calice diameters and lesser density of septal apparatus. In the lectotype specimens of the mentioned species (MGUW 75sz and 136sz, respectively) the measurements are as follows: *V. badiotica* (Volz 1896) — adults d 7–8 mm, s 58–64, sd 9–11/3 mm; *V. subdichotoma* (Volz 1896) — adults d 5.5 mm, s 40–45, sd 7–9/3 mm. The specimens of *V. subloevis* (Münster, 1841; MB: Volz's original collection) show diameters of 3.0–3.5 mm and number of septa 40–58. The new species differs from *V. hinzei* (Volz) (MGUWr 80sz) in its thin and spaced septa.

Occurrence: Carpathians — Malé Karpaty Mts, Ladinian-Carnian Veterlín carbonate platform.

Family **Margarophylliidae** Volz, 1896
Genus *Margarosmilia* Volz, 1896
Margarosmilia cf. *richthofeni* Volz, 1896
Fig. 5.2a,b

Material: Specimens Nos. SNM 23038 (loc. 475/85) and SNM 23039 (loc. 494/85) — long corallite fragments in the organodetrital packestone–bindstone. Specimen from southern slope of the Kršlenica Hill (SNM 23040) represents a fragment of a branching corallite in packstone–bindstone. Thirteen thin sections.

Measurements (in mm):

Specimen No.	SNM 23038	SNM 23039	SNM 23040
d	e. 20	e. 20	5×20
s	e.>100	e.>100	120
ds/5	15	10	>=10

Description: In cross-section, the corallites are lobate in shape and showing permanent ability to form offsets. The diameters in adults reach 15–20 mm. The radial elements, ca. 100 in number, in general, are thin, slightly fusiform, densely crowded and differentiated into five orders. The septa S1 approach the centre, their internal margins slightly enlarged; other septa are shorter depending on the order, the S5 reach at least 1/4 the length of the S1. The septal ornamentation is minute and granular. A thin epithecal wall covers the whole corallite surface. The endotheca is composed of very small vesicular dissepiments at the periphery and somewhat larger ones at the centre.

Remarks: The species in question in its dimensions and mode of branching resembles *Margarosmilia richthofen*i Volz (1896: p. 36, Pl. 1: Figs. 13 and 14). Its ultimate determination can be completed on the basis of the type material.

Occurrence: Carpathians — Malé Karpaty Mts, Mokrá Valley by Plavecký Mikuláš and little valley near to Plavecký Peter, Veterlín carbonate platform. *Margarosmilia richthofeni* is known from the Dolomites, from the member overlying San Cassiano Formation, early Late Carnian.

Suborder **Stylophyllina** Beauvais, 1981
emended Roniewicz, 1989

The emendation points to the fact that septal spines, wall, and dissepiments are built from the fascicular and scaly skeletal tissue, different from trabecular skeleton in all other corals.

Family **Stylophyllidae** Frech, 1890
Genus *Protostylophyllum* gen.n.
Type species: *Stylophyllum praenuntians* Volz, 1897

Diagnosis: Solitary. Septa thin, built of spines of equal thickness, subhorizontal at the wall and bending upwards at the coral axis. Wall thick. Endotheca built of rare, thin, horizontal tabulae.

Species assigned: Carnian — *P. praenuntians (*Volz, 1896); Norian — *P. bortepense* (Melnikova, 1972).

Remarks: The type of the new genus differs from *Stylophyllum* in: (i) septal spines growing out subhorizontally from

the wall and changing direction into subvertical at the corallite centre (in *Stylophyllum* the septal spines direct upwards from their beginning); (ii) endotheca perfectly tabuloid (in *Stylophyllum* the endotheca is vesiculous).

The second known species, Norian *P. bortepense* from the Pamirs shows similar structure of the septal spines, their abundance in the centre, and thin, tabular endotheca (Melnikova 1972). It differs from the type species in its far larger dimensions.

Protostylophyllum praenuntians (Volz, 1896)
Figs. 5.3a–e, 5.4a,b

1896 *Stylophyllum praenuntians* Volz, p. 87, Pl. 11: Figs. 1–4.
non 1973 *Stylophyllum praenuntians* Volz; Cuif, p. 254, Fig. 22b,c.

Material: Specimen No. SNM 23041 (loc. 297a/85): a fragment of corallite; organodetrital limestone; bindstone–wackstone, 1 thin section.

Reference material: Two thin sections MGUWr 71sz executed from the lectotype of *P. praenuntians* (Volz), figured by Volz 1896: Pl. 11: Figs. 1, 2, and herein, Fig. 5.3a–e.

Measurements (in mm): d — ca. 12; s — 45–50.

Description and remarks: Cross-section of the corallum is circular, with septa continuous at the wall and dicontinuous adaxially (Fig. 5.4a). The internal, large part of the corallum is filled with free septal spines (Fig. 5.4b). The wall and the septal elements are thin, non-thickened. The septal spines show typical, rough ornamentation formed with tips of skeletal fascicles emerging on the spine surface. The same features are seen in the type specimen (Fig. 5.3d,e). Unfortunately, in the specimen under study, the endotheca is not observable; in the type specimen it is composed of very thin, horizontal tabulae (Fig. 5.3c). The species is considered to be very rare: the Carpathian specimen is only the second one ever described.

The specimen from the Zlambach Beds presented as *S. praenuntians* Volz by Cuif (1973: Fig. 22a) shows all features of *Stylophyllopsis lindstroemi* Frech, 1890 and does not resemble *S. praenuntians* Volz. A section of one non-illustrated Volz's specimen (BSP AS I 662 — Cuif 1973: Fig. 22b,c) shows a set of features different from those observed in the lectotype specimen sectioned by Volz in transverse and longitudinal directions and illustrated by that author (Volz 1896: Pl. 11: Figs. 1, 2) and herein (Fig. 5.4a–c).

Occurrence: Carpathians — Malé Karpaty Mts, eastern part of the Mt Veterlín ridge, Veterlín carbonate platform. Dolomites — Valparola, early Late Carnian St. Cassiano Formation.

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