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ZAPADNÉ KARPATY

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Západné Karpaty, séria paleontológia 11, P. 7—34, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Miloš Siblík

Carnian rhynchonellid brachiopods from the Slovak Karst area

19 text-figs., 4 pls. (I—IV), Czech summary

Abstract. The paper completes the study of the Carnian rhynchonellids from the Slovak Karst. The first part dealing with *Austriellula* STRAND 1928 was published recently (SIBLÍK 1982). The descriptions of the following taxa including two new genera are given in the present paper: *Caucasorhynchia elegans elegans* ssp.n., *C. elegans consobrina* ssp.n., *Volirhynchia dux* sp.n., *Costirhynchopsis variata variata* ssp.n., *C. variata glabra* ssp.n., *Amoenirhynchia* gen.n., *A. seydeli* (BITTNER 1891), *Rimirhynchopsis* aff. *rimulata* (BITTNER 1890), *Apertirhynchella triplex* gen.n., sp.n. and *Norella obesa* sp.n.

This paper deals with the Carnian rhynchonellid brachiopod fauna the large collection of which was made by the Triassic working group led by J. BYSTRICKÝ (Bratislava) and by the present author during last 30 years in the Slovak Karst area, South-East Slovakia. The first contribution to the topic was published recently (SIBLÍK 1982) and treated smooth rhynchonellids of the genus *Austriellula* STRAND 1928. The present part in which the remaining mainly ribbed rhynchonellid taxa are dealt with completes the study.

The author is deeply grateful for making available their collections or museum material to: Dr. J. BYSTRICKÝ, DrSc. and his collaborators from the Triassic working group (Bratislava); Dr. R. LEIN (Vienna) and the staff of the Geologische Bundesanstalt-Museum (Vienna). The kind procuring IGCP funds for Project n. 4 by Prof. Dr. H. ZAPFE (Vienna) rendering the author's study in Vienna possible is gratefully recognized.

Carnian brachiopods from the Slovak Karst come from two areas — from the surroundings of the village Silická Brezová on the Silica Plateau and from the locality Ostré vŕšky Hill (elevation point 775.0) and its vicinity on the Plešivec Plateau.

Brachiopods from the locality Silická Brezová were found SW of the village at the former BALOGH'S locality I. (1940) and its surroundings (see also J. BYSTRICKÝ 1964 and text-fig. 2 in M. KOCHANOVÁ—V. KOLLÁROVÁ-ANDRUSOVOVÁ 1983). Lower part of the outcrop (= partly 2nd horizon with brachiopods according to J. BYSTRICKÝ 1964, incl. localities BP-1, BP-2 and

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BP-3 in M. KOCHANOVÁ—V. KOLLÁROVÁ-ANDRUSOVOVÁ 1983) is represented by light-coloured coquina limestone (Tisovec Limestone) passing upwards into greyish and flesh-coloured micritic limestone in the upper part (transition to the Hallstatt Limestone; = 3rd horizon with brachiopods of J. BYSTRICKÝ, 1964 incl. outcrop BP-5 in M. KOCHANOVÁ—V. KOLLÁROVÁ-ANDRUSOVOVÁ 1983). According to V. KOLLÁROVÁ-ANDRUSOVOVÁ—J. BYSTRICKÝ 1974 both these parts of the section correspond to the Middle Tuvalian-*Subbullatus* Zone. Recently the Upper Tuvalian-*Anatropites* Zone is admitted for the uppermost part of BP-5 and some other near-by points on the base of the ammonites by M. KOCHANOVÁ—V. KOLLÁROVÁ-ANDRUSOVOVÁ 1983. A small collection of rhynchonellids was made by the author also in the section W of Silická Brezová studied by R. MOCK (see R. MOCK in M. MIŠÍK—K. BORZA 1976, fig. 3 or M. KOCHANOVÁ—V. KOLLÁROVÁ-ANDRUSOVOVÁ 1983, fig. 2).

The age of the brachiopod localities in the Tisovec Limestone in the Ostré vŕšky Hill area was also stated Tuvalian on the basis of the study of the accompanying fauna made by V. KOLLÁROVÁ-ANDRUSOVOVÁ, M. KOCHANOVÁ, R. MOCK and J. PEVNÝ (see M. SIBLÍK 1982).

Brachiopods constitute the prevailing part of all macrofauna both at BALOGH'S locality I. in Silická Brezová and at Ostré vŕšky Hill — locality B_2A, while ammonites and pelecypods are not so common. The former locality yielded numerous ribbed rhynchonellids of the genera *Caucasorhynchia* and *Costirhynchopsis*, then *Gemerithyris hungarica hungarica* (BALOGH) and *Laballa suessi* (ZUGMAYER). The latter locality is rich in *Caucasorhynchia elegans consobrina* ssp.n. and spiriferinids ex gr. *halobiarum* BITTNER, while terebratulids, retziids and athyridids occur rarely.

Complete list of Carnian rhynchonellid brachiopods so far known from the Slovak Karst (incl. *Austriellula*-species in M. SIBLÍK 1982):

Caucasorhynchia elegans elegans ssp.n.,
Caucasorhynchia elegans consobrina ssp.n.,
Volirhynchia dux sp.n.,
Costirhynchopsis variata variata ssp.n.,
Costirhynchopsis variata glabra ssp.n.,
Amoenirhynchia seydeli (BITTNER 1891),
Rimirhynchopsis aff. *rimulata* (BITTNER 1890),
Apertirhynchella triplex gen.n., sp.n.,
Norella obesa sp.n.,
Austriellula angulifrons (BITTNER 1890),
Austriellula gomorensis (BALOGH 1940),
Austriellula halophila (BITTNER 1890),
Austriellula undosa SIBLÍK 1982.

Descriptions

Rhynchonellida KUHN 1949
Rhynchonellacea GRAY 1848
Praecyclothyrididae MAKRIDIN 1964
Caucasorhynchia DAGYS 1963

***Caucasorhynchia elegans* sp.n.**

***Caucasorhynchia elegans elegans* ssp.n.**
Pl. I, figs. 2, 4, 7; text-figs. 1—7.

Holotype: Figured on plate I, fig. 2 and deposited in the collections of the Slovak National Museum in Bratislava under registered number SNM Z 19412.

Stratum typicum et locus typicus: Tuvalian, *Subbulatus* Zone; Silická Brezová.

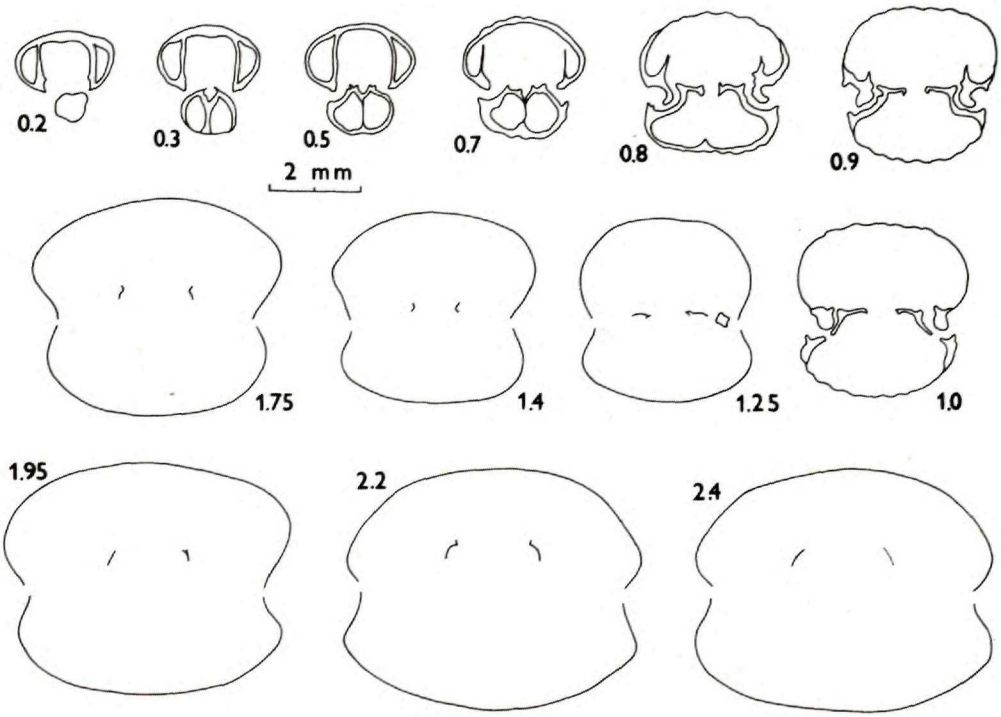

Fig. 1. *Caucasorhynchia elegans elegans* ssp.n. Silická Brezová, lower part of BALOGH's locality. Serial sections through the posterior part of the shell. Original length 12.4 mm. Enlarged.

Material: 71 internal moulds with shell remains. Dimensions of the figured specimens: 14.5 × 17.1 × 7.9 mm (pl. I, fig. 2, holotype); 11.4 × × 10.1 × 5.1 mm (pl. I, fig. 7); 7.7 × 7.8 × 3.7 mm (pl. I, fig. 4).

Description: Medium sized ribbed rhynchonellids with relatively flat valves, up to 14.5 mm long, 17.1 mm wide and 9.8 mm thick. Shells equibiconvex in profile and subtrigonal in outline, with rounded antero-lateral angles. The maximum width situated in the anterior third — to half of shell. No true fold

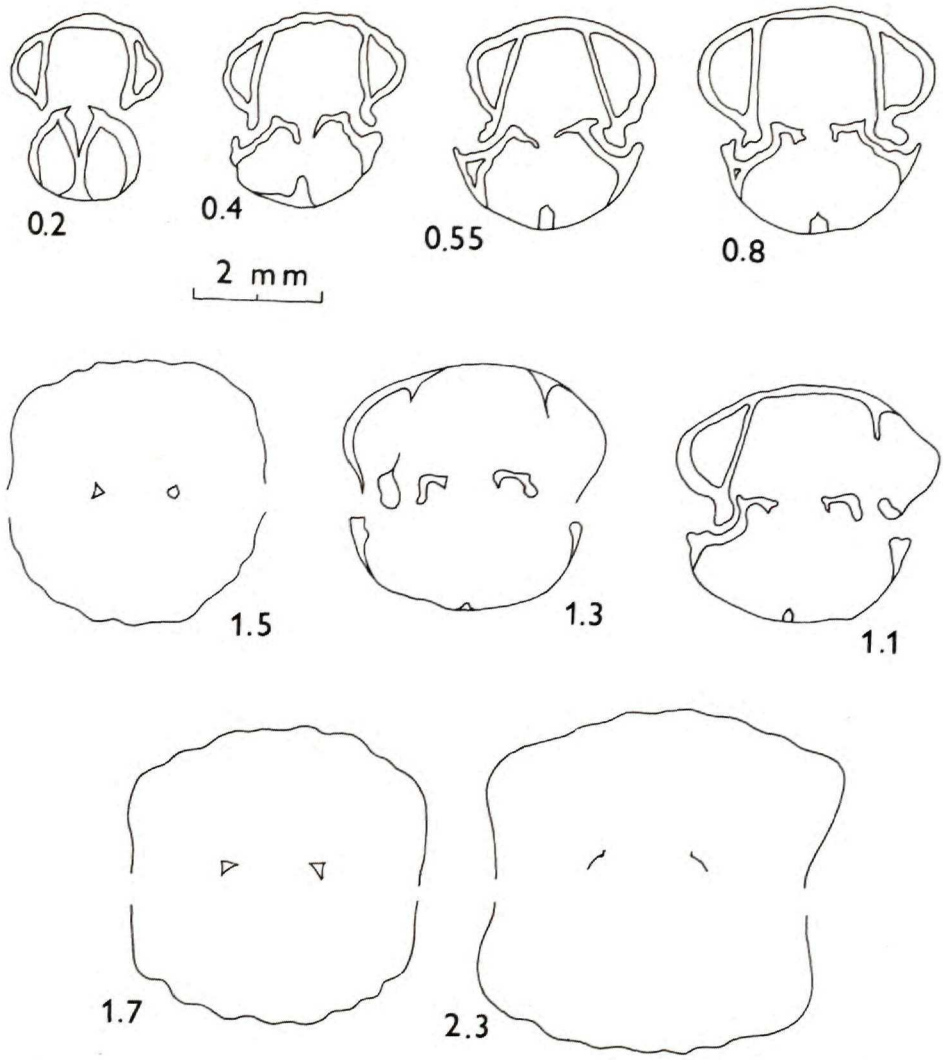

Fig. 2 *Caucasorhynchia elegans elegans* ssp.n. Locality as in fig. 1. Numbers indicate distance from brachial umbo. Length 11.1 mm. Enlarged.

or sulcus developed, but slight sulcation recognizable on brachial valves of some young specimens. Posterolateral parts of shell flattened or forming slightly concave planareas. Lateral commissure straight. Anterior part of shell mostly rectimarginate, rarely a hint of slight plication. Narrow sharpened beak suberect to erect in position, accompanied with well marked beak ridges. Foramen submesothyrid. Apical angles between 80—110 degrees. Branching and inequality of ribs well remarkable. There are 10—19 sharp ribs at the anterior margin of shell, the stronger of them reaching apices of valves, the weaker arising by bifurcation in various distances from the anterior margin of shell.

Number of ribs at the anterior margin of brachial valve	10	11	12	13	14	15	16	17	18	19	Total of specimens
Number of specimens	1	3	10	3	15	8	8	4	7	4	63

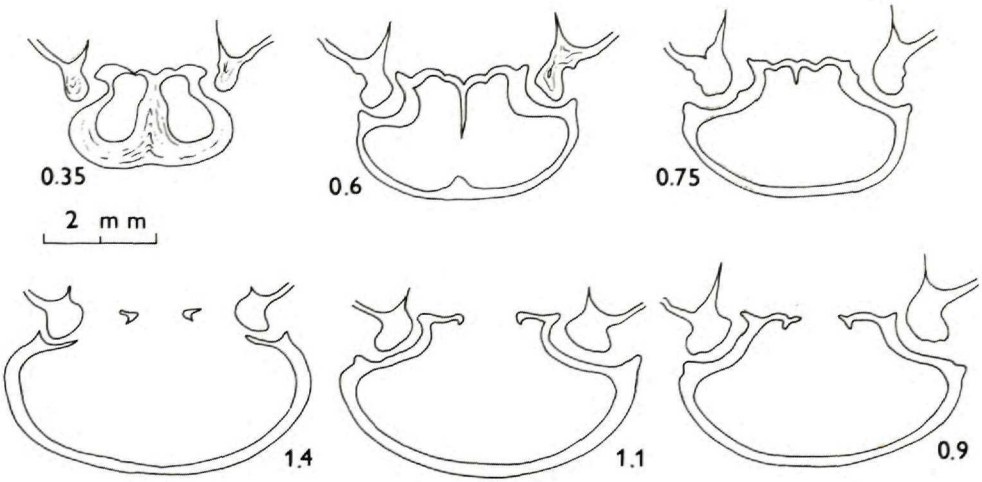

Fig. 3 *Caucasorhynchia elegans elegans* ssp.n. Locality as in fig. 1. Length 12.0 mm. Enlarged.

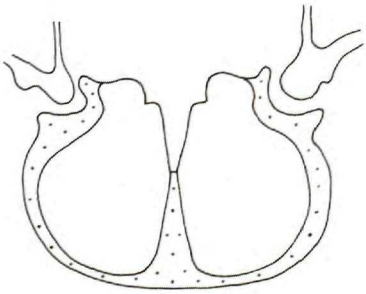

Fig. 4 *Caucasorhynchia elegans elegans* ssp.n. Locality as in fig. 1. Section of a young specimen showing well defined septalial plates. Length 6.9 mm. Enlarged.

Delthyrial cavity large, subquadrate, between well developed, but short subparallel or slightly dorsally diverging dental lamellae. Hinge teeth strong and laterally expanded, lacking in evident crenulation in most specimens. Denticula poorly marked, if developed. Hinge plates subhorizontal, well separated from both inner socket ridges and septalial plates. Sockets large and in some specimens crenulated. Short septalium present close to umbo. Dorsal septum very short coming into contact with septalial plates only at the posterior extremity. Low and short septoidal ridge visible in the brachial valve of most specimens. Crura of general radulifer type starting from the inner parts of hinge plates and becoming to be flattened and diverging anteriorly. The terminations of crura in cross section semicircular, concave toward each other. Some sections showing certain similarity with arcuifer type of crura. Muscle scars not ascertainable.

Remarks: *Caucasorhynchia elegans elegans* ssp.n. differs from all other species of *Caucasorhynchia* in having nearly rectimarginate shells of relatively lesser thickness. Considerable resemblances could be found in the specimens of the Upper Triassic genus *Fissirhynchia* PEARSON 1977 concerning both external (esp. type of ribbing) and internal characters (short, poorly developed dorsal septum and similarly shaped crura). In any case, both these genera merit further comparison.

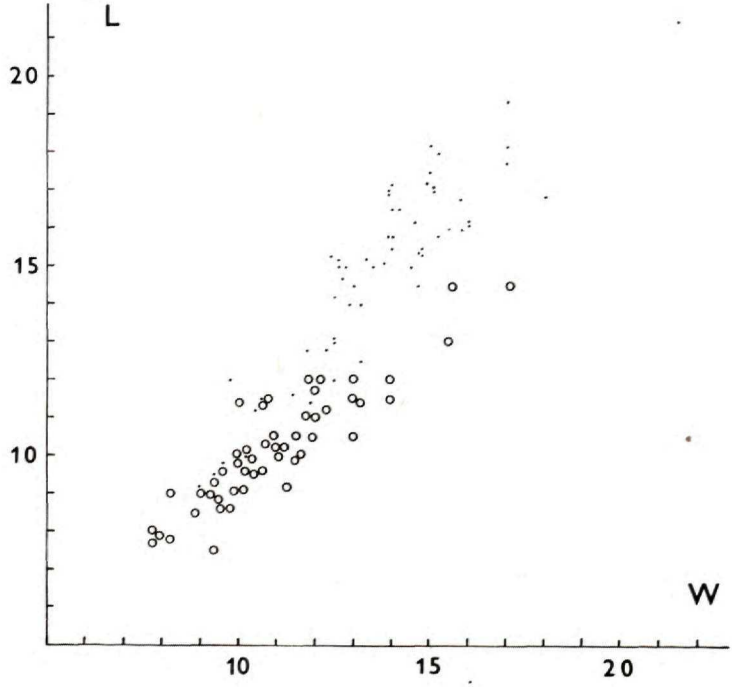

Fig. 5 Length-width scattergram for *Caucasorhynchia elegans elegans* ssp. n. (circles) and *C. elegans consobrina* ssp.n. (dots). Localities as in figs. 1 and 8, resp.

Occurrence: Silická Brezová, lower part of the BALOGH'S locality; point M-46, M-52 and 60 m ESE of M-49 in MOCK'S section (R. MOCK in M. MIŠÍK—K. BORZA 1976, fig. 3), loc. 10 and 11 in J. BYSTRICKÝ—A. BIELY (1966, fig. 10).

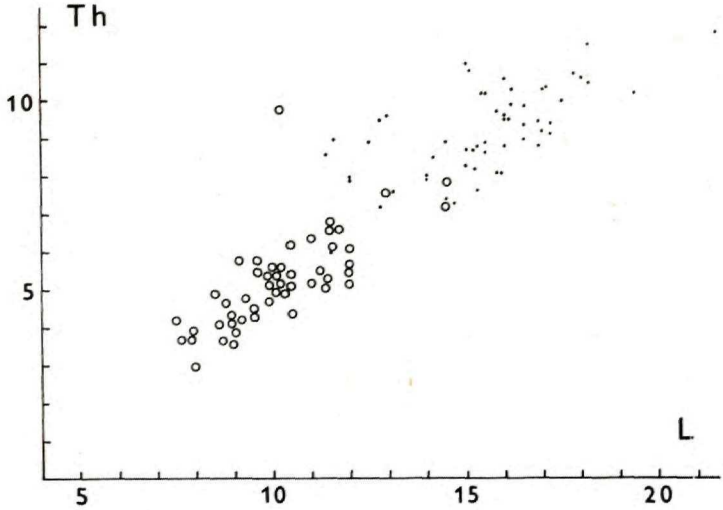

Fig. 6 Thickness- length scattergram (see fig. 5).

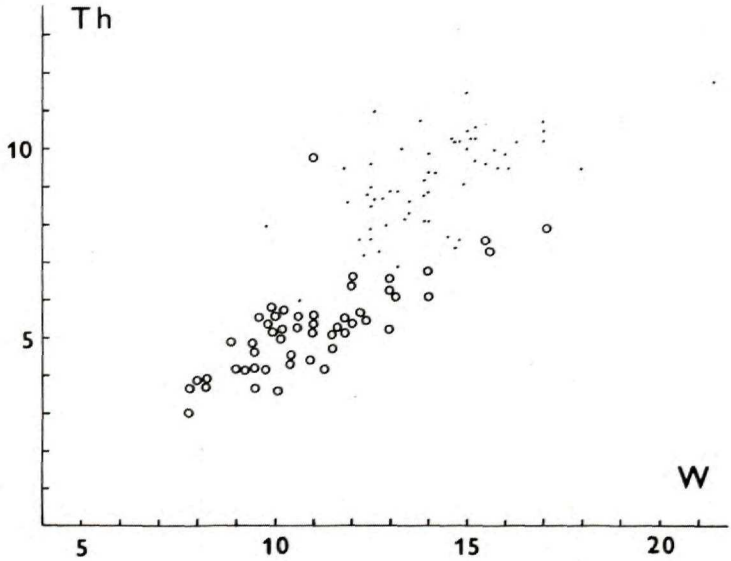

Fig. 7 Thickness- width scattergram (see fig. 5).

***Caucasorhynchia elegans consobrina* ssp.n.**
Pl. I, figs. 1, 3; text-figs. 5—10

Holotype: The specimen figured on plate I, fig. 3 is herein designated as holotype. It is deposited in the Slovak National Museum in Bratislava under number SNM Z 19415.

Stratum typicum and locus typicus: Tuvalian, *Subbulatus* Zone; Ostré vŕšky Hill, locality B_2A.

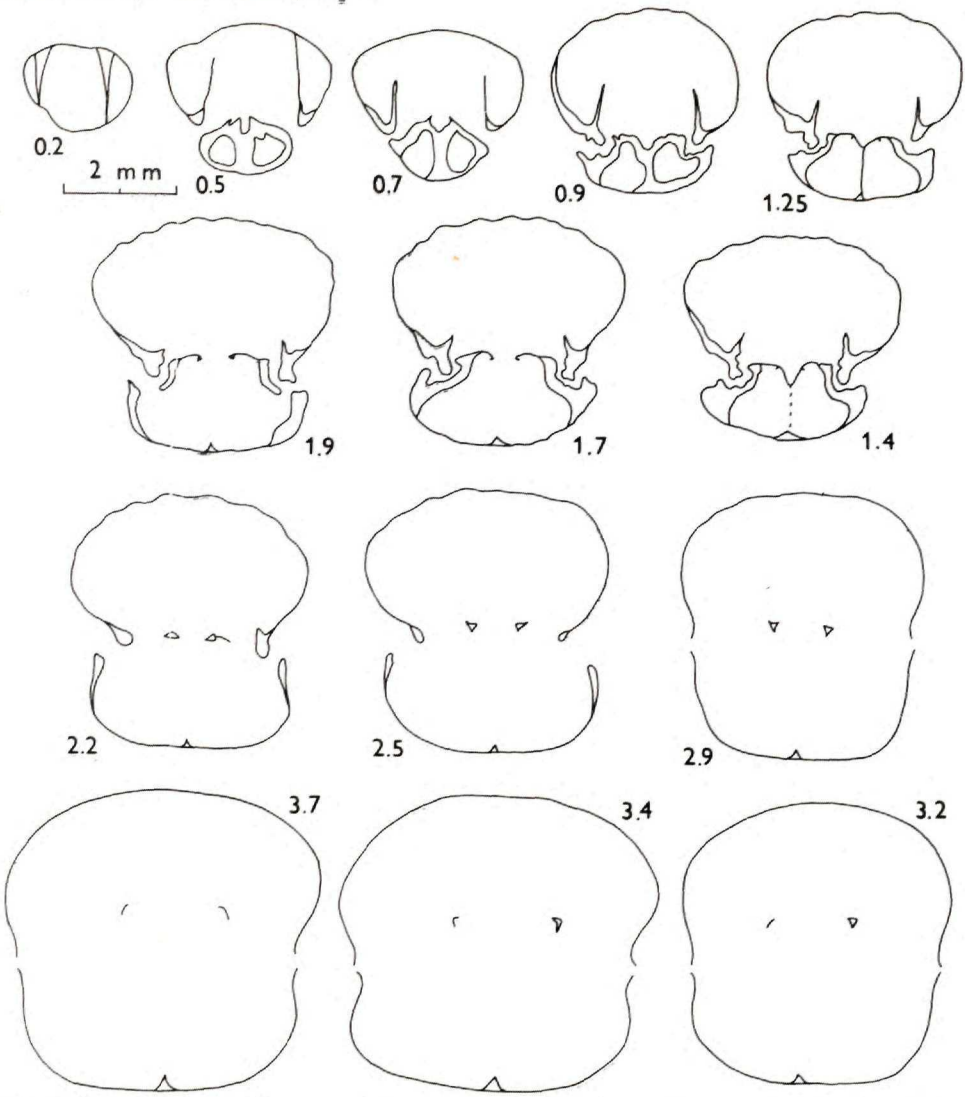

Fig. 8 *Caucasorhynchia elegans consobrina* ssp.n. Ostré vŕšky Hill, loc. B_2A. Length 15.5 mm. Enlarged.

Material: 112 more or less fragmentary and decorticated specimens. The dimensions in mm of the figured specimens are as follows: 16.6 × 14.0 × 9.6 (pl. I, fig. 3, holotype); 15.6 × 13.8 × 8.1 (pl. I, fig. 1).

Description: Equibiconvex ribbed rhynchonellids of moderate size, up to 21.5 mm long, 21.4 mm wide and 11.8 mm thick, varying in outline from subtrigonal to rounded pentagonal. Length apparently exceeding width in most specimens. Shell subelliptic in anterior view. Some specimens with tendency to globosity. Fold and sulcus absent but a very low uniplication mostly developed. Planareas well delimited. Beak relatively narrow. Apical angle between 75—100 degrees. Strong ribs branching, there are 12—18 of them at the anterior margin of brachial valve.

Internal characters corresponding in general features with those of the nominate subspecies and differing only in even shorter dental lamellae.

Remarks: The subspecies under consideration differs externally from the nominate subspecies in having slightly plicated and relatively thicker shell (greater Th/W ratio), subelliptic anterior view, length mostly exceeding width, better delimited planareas and in having less frequent branching of ribs. Small collection of this subspecies was made in Styria and kindly sent to me for study by Dr. R. LEIN (Geological Institute of the University of Vienna). The Alpine specimens have low but well developed uniplication and both externally and internally fit well our material (text-fig. 10).

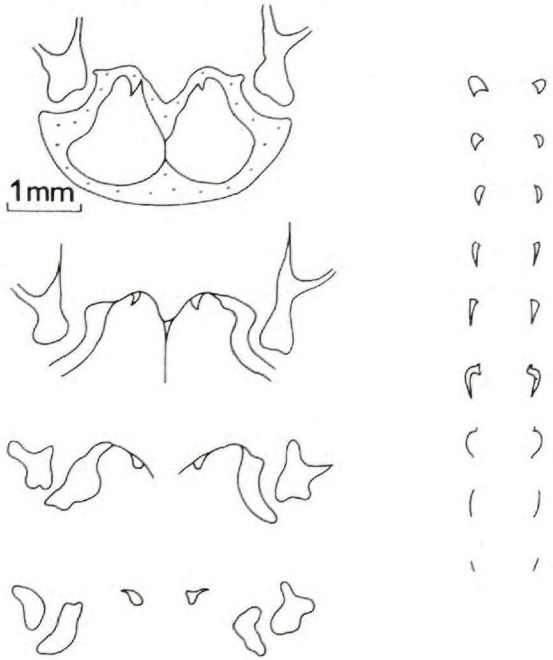

Fig. 9 *Caucasorhynchia elegans consobrina* ssp.n. Ostré vŕšky Hill, loc. B_2A. Length 18.2 mm. Enlarged.

Occurrence: Ostré vŕšky, loc. B_2A. Austria: Styria, Teufelsbadstube in the Mürztaler Alpen ("Dachstein Limestone", LEIN's loc. E. 24 = G 32).

Volirhynchia DAGYS 1974

***Volirhynchia dux* sp.n.**

Pl. II, figs. 1—2, text-fig. 11

Holotype: Figured on plate II, fig. 2 and deposited in the Slovak National Museum in Bratislava under number SNM Z 19426.

Stratum typicum et locus typicus: Tuvalian, *Subbulatus* Zone; Silická Brezová.

Material: 7 partly fragmentary internal moulds. Dimensions of better preserved specimens in mm: 17.6 × 22.9 × 15.9 (pl. II, fig. 2, holotype); 20.4 × 22.9 × 15.1 (pl. II, fig. 1); 19.0 × 22.4 × 13.8; 17.5 × 20.1 × 14.3.

Description: Medium sized, convexo-plane shells of subpentagonal outline. The maximum width and maximum convexity of brachial valve situated in

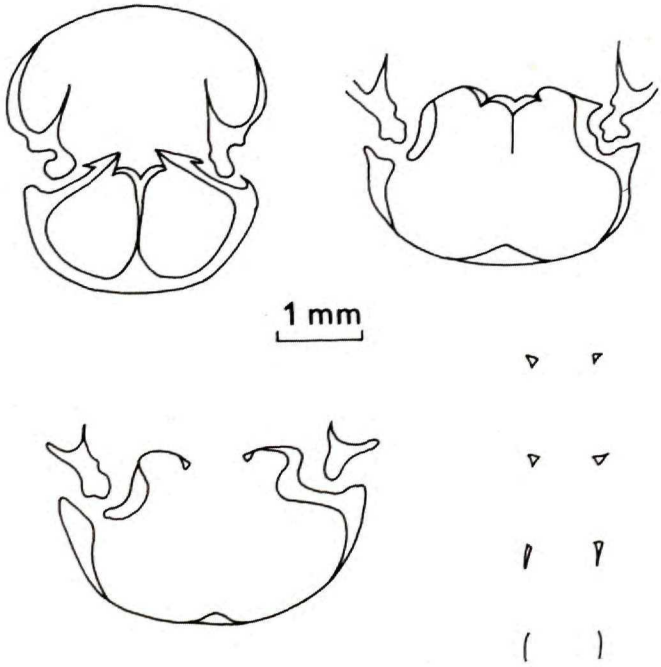

Fig. 10 *Caucasorhynchia elegans consobrina* ssp.n. Teufelsbadstube, Styria (leg. R. LEIN). Some sections for comparison with those of Slovak specimens. Length 15.1 mm. Enlarged.

the anterior third of shell. Fold distinctly raised above general surface of shell and traceable up to umbo, sulcus very large and distinctly delimited. Anterior commissure markedly uniplicated, steep-sided linguiform extension relatively wide, with straight dorsal edge. Flanks steeply sloping. Elongated, clearly delimited planareas present, with the greater part being situated on the brachial valve. Beak small, nearly straight to suberect in position, with long beak ridges. Pedicle opening small. Apical angle ranging between 90—100 degrees. Both valves with between 5—9 strong but blunt ribs (3—5 of them found in folded region) extending near to the umbones. Very small smooth area developed posteriorly.

Delthyrial cavity subquadrate in cross section, no pedicle collar observed. Long subparallel or slightly ventrally converging dental lamellae extending as far forward as the plane of articulation. Hinge teeth straight and expanded dorsally, without crenulation. Short stout denticula ascertained in 1 specimen. Hinge plates narrow and almost horizontal in orientation, well separated both from septalial plates and inner socket ridges. Septalium deep, median septum

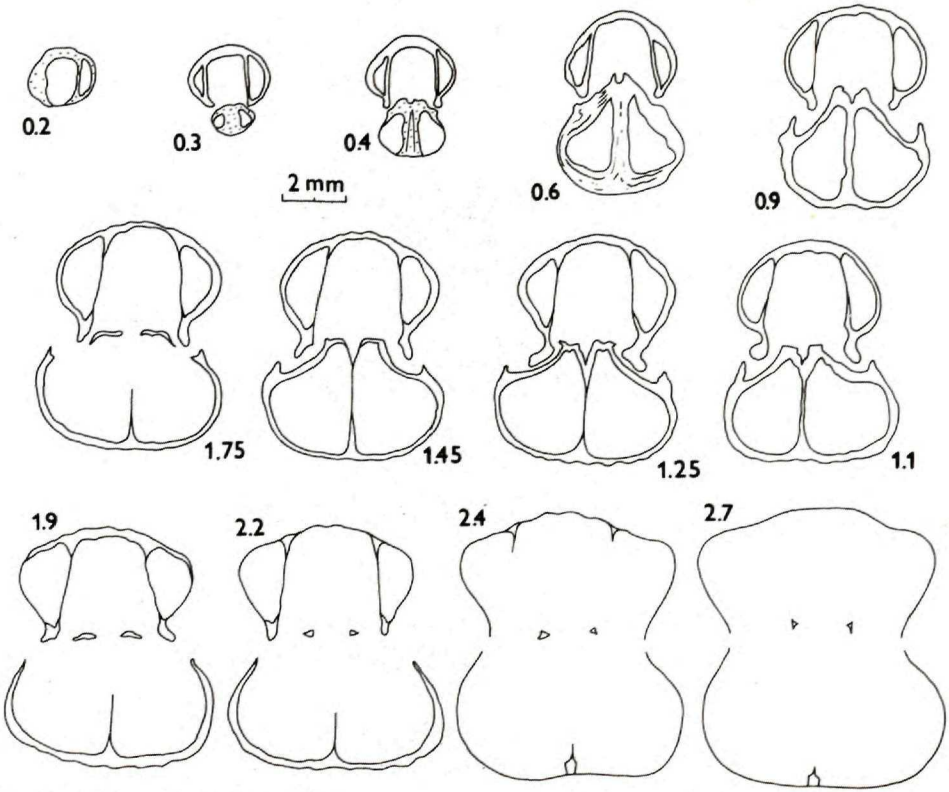

Fig. 11 *Volirhynchia dux* sp.n. Silická Brezová, lower part of BALOGH's locality. Termination of crura unclear, they disappear at 3.2 mm. Length 17.8 mm. Enlarged.

very long, anteriorly reduced into a ridge. Sockets very large, with better developed outer ridges. Crura trigonal posteriorly in cross section, but due to the recrystallization of all 3 specimens sectioned their distal terminations not preserved.

Remarks: The species is referred tentatively to *Volirhynchia*, mainly on the basis of its convexo-plane shells, protruding ventral beak, type of ribbing and of some internal characters. This generic attribution is for the present not considered definite, mainly owing to the poor knowledge of complete crura. *Volirhynchia dux* sp.n. differs from other *Volirhynchia* species — e.g. *V. volitans* (BITTNER), *V. vivida* (BITTNER) and *V. teutonica* (BITTNER) in having larger dimensions of shell, stronger ribbing and well developed planareas.

Occurrence: Silická Brezová, lower part of BALOGH'S locality.

Costirhynchopsis DAGYS 1977

(syn. *Costirhynchia* DAGYS 1974, non BUCKMAN 1918)

***Costirhynchopsis variata* sp.n.**

***Costirhynchopsis variata variata* ssp.n.**

Pl. III, figs. 1—5; text-figs. 12—15

Holotype: Figured on plate III, fig. 1 and deposited in the Slovak National Museum in Bratislava under number SNM Z 19420.

Stratum typicum et locus typicus: Tuvalian, *Subbulatus* Zone; Silická Brezová.

Material: 125 partly fragmentary specimens preserved as internal moulds with shell remains. The dimensions (in mm) of the figured specimens are as follows:

Length	width	thickness	
10.8	16.0	10.6	pl. III, fig. 4
10.9	14.6	7.9	pl. III, fig. 1, holotype
9.7	11.5	6.8	pl. III, fig. 5
9.2	12.0	7.8	pl. III, fig. 3
8.9	10.9	6.7	pl. III, fig. 2

Description: Small to medium sized ribbed shells, up to 13.2 mm long, 16.0 mm wide and 10.6 mm thick, subtrigonal or subpentagonal in outline and dorsibiconvex in profile. Width normally exceeding length. The maximum width lying in the anterior third to half of shell. Brachial valve much thicker and more convex than the pedicle one. Anterior commissure broadly plicate, the linguiform extension subangular, turning steeply from the commissure. Posterolateral parts of valves flattened, or very shallow planareas developed lying prevail-

ingly on the flank of brachial valve. Fold present and expressive in the anterior third of brachial valve, whereas shallow sulcation well noticeable only near the anterior margin of pedicle valve. Beak large and suberect in lateral view, accompanied by short and mostly poorly developed beak ridges. Foramen submesothyrid, if preserved. Ribs numbering between 14 and 24 on the valve (4—8 of them being confined to fold), strong and sharp only near the anterior margin of shell losing rapidly their expression toward posterior parts of valves and becoming very faint near apices.

Number of ribs in the fold	4	5	6	7	8	Total of specimens
Number of specimens	4	25	48	29	11	117

Dental lamellae well developed, converging ventrally. Hinge teeth strong, expanded dorsally in the sockets and vertically orientated in most specimen sectioned. Crenulation present. Denticula low but well developed. Pedicle collar

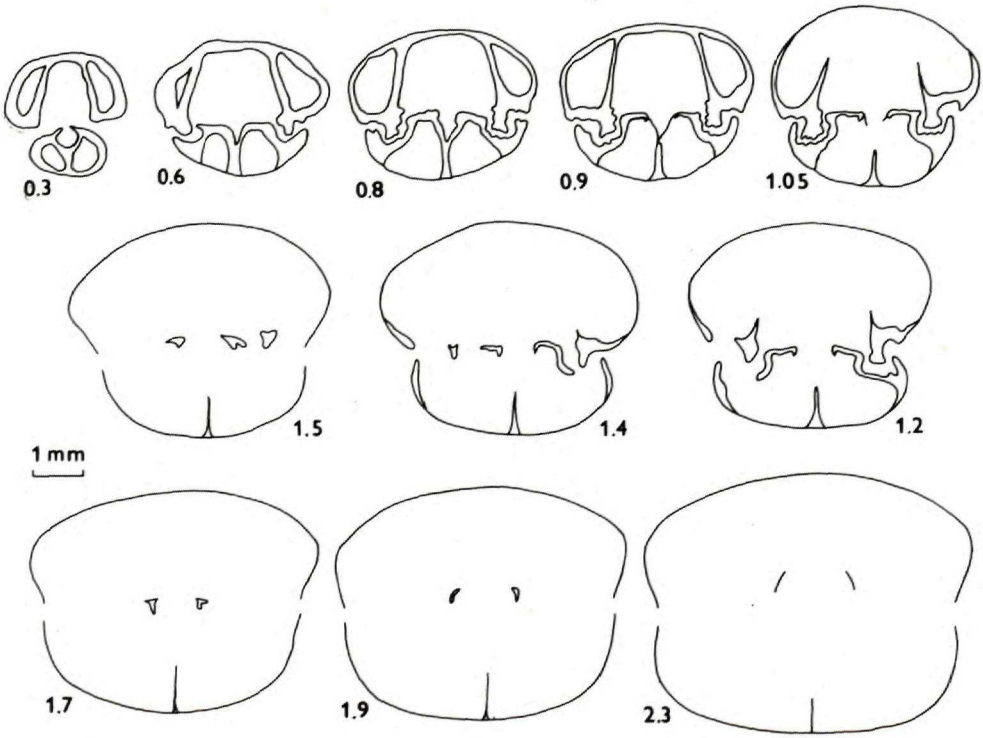

Fig. 12 *Costirhynchopsis variata variata* ssp.n. Silická Brezová, lower part of BALOGH's locality. Numbers indicating distance from brachial umbo. Length 12.0 mm. Enlarged.

not ascertained. Strong hinge plates commonly of horizontal orientation, their convergence towards pedicle valve ascertained only rarely. Septalium large but short, with septalial plates well delimited from hinge plates. Sockets large, mostly crenulated, with better developed outer socket ridges. Dorsal septum very long. Crural bases distinguishable on dorsal side of inner ends of hinge plates. Crura trigonal in cross section approaching at first the common radulifer type, distally becoming elongated and concave. Muscle scars faint and visible in both valves of some specimens.

Remarks: Only few generic names for Triassic ribbed rhynchonellids have been erected. Both external and internal characters of our specimens agree well with characteristic features of *Costirhynchopsis* DAGYS. Considerable external resemblance can be found also in the specimens of *Excavatorhynchia* CHING—FENG 1977 and in *Yidunella* CHING—SUN—YE 1979 in Palaeontological Atlas of NW China. However, internal characters of these two genera differ from those of our material.

There are several Upper Triassic BITTNER'S rhynchonellids in the Alpine realm externally resembling Slovakian specimens. "*Rhynchonella*" *fringilla* and "*Rhynchonella*" *carantana* have, however, equibiconvex shells and lower plication. "*Rhynchonella*" *raxana* (type species of *Excavatorhynchia* CHING-FENG 1977) has shells of different outline with concave flanks. "*Rhynchonella*" *concordiae* differs in having lower plication and stronger ribbing.

Occurrence: Silická Brezová, lower and rarely upper part of BALOGH'S locality; points M-46 and M-52 in MOCK'S section; loc. 10 in J. BYSTRICKÝ—A. BIELY (1966, fig. 10); outcrop N of Ostré vŕšky Hill (collected only by J. BYSTRICKÝ); localities Ostré vŕšky Hill B_2A and LB_2.

Costirhynchopsis variata glabra ssp.n.

Pl. IV, figs. 1—2; text-figs. 13—16

Holotype: The specimen figured on pl. IV, fig. 2. It is deposited in the Slovak National Museum under number SNM Z 19422.

Stratum typicum et locus typicus: Tuvalian, *Subbulatus* Zone (?); Silická Brezová.

Material: 55 mostly decorticated specimens. Dimensions of the figured specimens in mm: ca 11.0 × 14.2 × 9.7 (pl. IV, fig. 1); 10.9 × 12.0 × 8.6 (pl. IV, fig. 2, holotype).

Description: Subpentagonal medium sized shells, up to 14.1 mm long, 15.6 mm wide and 9.4 mm thick, with width exceeding length. Brachial valve about three times higher than pedicle one. Subangular plication rising steeply from the commissural plane. Flat fold noticeable in the anterior third of the brachial valve. Elongated planareas slightly concave and poorly delimited. Beak strong and high, in some specimens swollen, accompanied by badly marked

beak ridges. The character of beak emphasized by concave posterolateral outlining of shell (in dorsal view). Each valve with up to 15 sharp ribs developed near the anterior margin of shell (4—9 of them confined to the fold) and perceptible in the anterior half of valves.

Internal details of the same character as in *C. variata variata* ssp.n. in despite of even shorter septalium and more oblique dental lamellae. These differences are too trivial to be considered important, fitting well in the internal variability range.

Remarks: For practical purpose "*glabra*" was established a separate taxon occurring in the upper part of BALOGH'S locality I. Only further finds of suitable sections with fauna in the Carpathian-Alpine area could better elucidate the phylogenetic stock of *Costirhynchopsis* and solve the taxonomic status of "*glabra*" more satisfactorily. *Costirhynchopsis variata glabra* ssp.n. differs from *C. variata variata* ssp.n. in type of ribbing and in much stronger development of umbonal part of pedicle valve.

Occurrence: Silická Brezová, upper part of BALOGH'S locality; point M-42 in MOCK'S section; point A 1—77 in M. KOCHANOVÁ—V. KOLLÁROVÁ-ANDRUSOVOVÁ (1983, text-fig. 2).

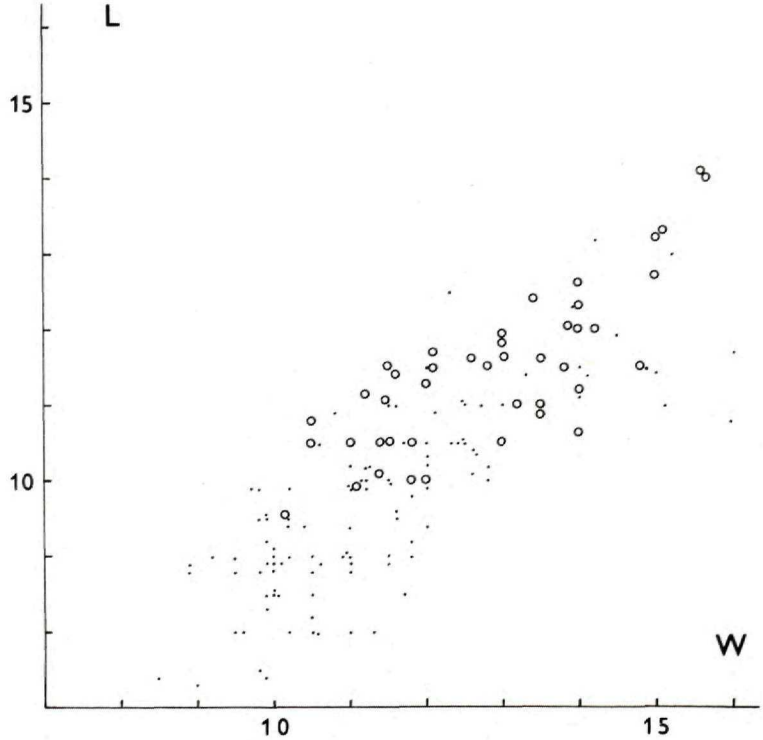

Fig. 13 Length-width scattergram for *Costirhynchopsis variata variata* ssp.n. (dots) and *C. variata glabra* ssp.n. (circles). Localities as in figs. 12 and 16, resp.

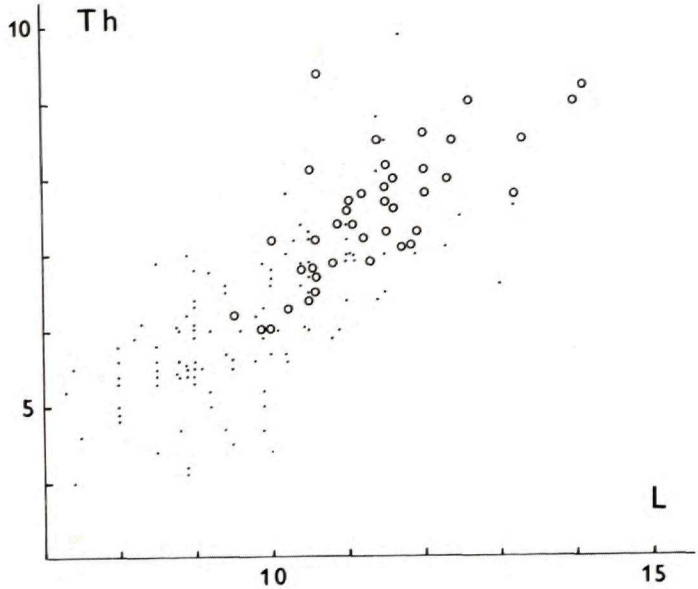

Fig. 14 Thickness-length scattergram (see fig. 13).

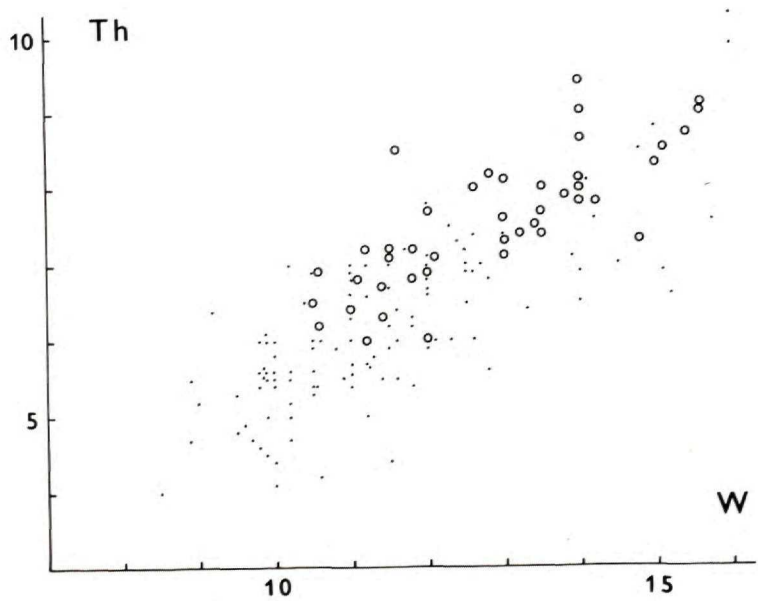

Fig. 15 Thickness-width scattergram (see fig. 13).

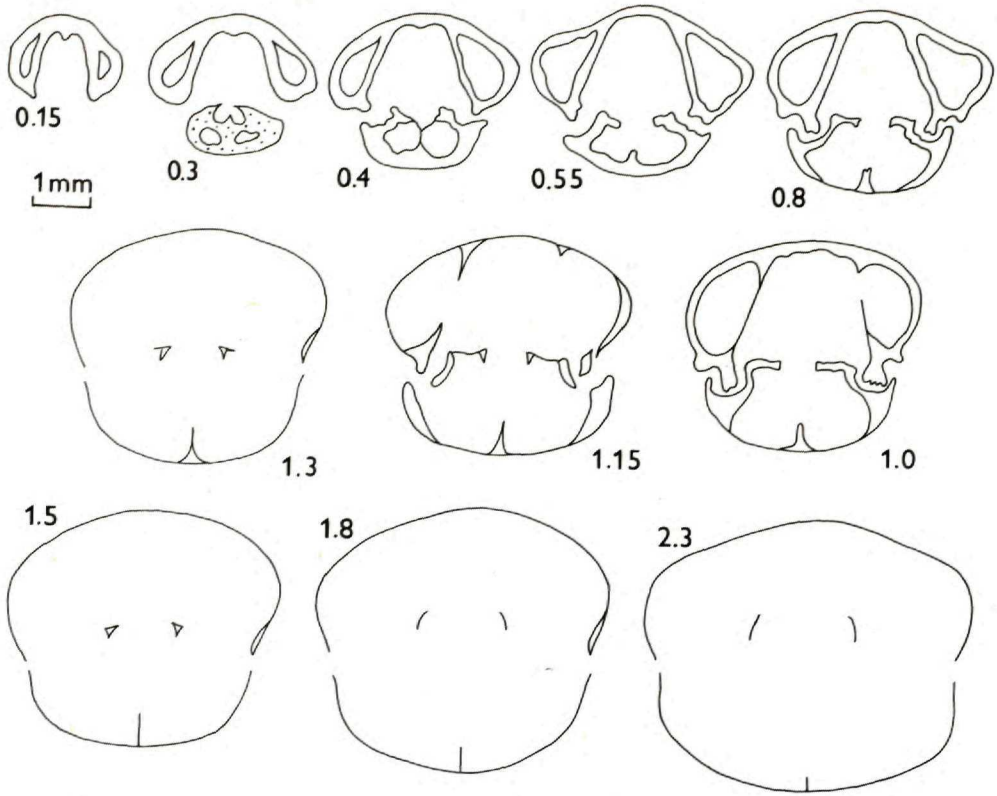

Fig. 16 *Costirhynchopsis variata glabra* ssp.n. Silická Brezová, upper part of BALOGH's locality. Dorsal septum disappeared at 2.4 mm and crura at 2.6 mm. Length 11.5 mm. Enlarged.

Amoenirhynchia gen.n.

Type species: *Rhynchonella Seydelii* BITTNER, 1891, Upper Triassic of Raxalpe, Lower Austria.

Diagnosis: Small triangular rhynchonellids, equibiconvex in profile and elliptical in anterior view, rectimarginate or slightly plicated. No perceptible fold. Planareas concave, well developed. Beak suberect. Ornamentation weak, low ribs developed only anteriorly. Umbonal cavities much infilled with secondary shell material. Dental lamellae very long, dorsally divergent. Hinge teeth strong without crenulation, inserted into broad sockets. Lateral denticula stout, well developed. Very short septalium may occur posteriorly, dorsal septum reduced. Crura of the radulifer type, triangular in cross section and originated from the distal ends of horizontal or dorsally inclined hinge plates. No distinct crural bases differentiated. Well marked muscle scars visible in the brachial valve.

Remarks: Characteristic external features of *Amoenirhynchia* gen. nov. are triangular outline (incl. concave flanks of brachial valve in dorsal view), smooth posterior parts of valves and well developed lateral planareas. The only parallel within the Triassic can be found in *Trigonirhynchella* DAGYS 1963 to which "*seydeli*" was with some hesitation attributed by A. S. DAGYS (1963, p. 41, 44). This genus has, however, no planareas, shows stronger ribs and shallow sulcations on both valves, and differs internally in having entire hinge plates and prefalcifer crura.

Included species: At present only the type species is recognized as belonging to *Amoenirhynchia* gen.n. but following two nominal species could also quite well belong to the new genus though their internal characters have not been investigated:

Rhynchonella brasoviae JEKELIUS (1936, p. 52, pl. 3, fig. 5) and
Rhynchonella cornaliana BITTNER (1889, p. 169).

Distribution: Middle and Upper Triassic.

Amoenirhynchia seydeli (BITTNER 1891)

Pl. I, figs. 5—6; text-fig. 17

1891 *Rhynchonella Seydelii* nov. spec. — BITTNER, p. 56.
1892 *Rhynchonella Seydelii* nov. spec. — BITTNER, p. 30, pl. 4, fig. 6—15.
1892 *Rhynchonella pumilio* nov. spec. — BITTNER, p. 31, pl. 4, fig. 16—17.

Lectotype (here designated): The specimen figured by BITTNER 1892 on plate 4, fig. 9 and deposited in the collections of the Geologische Bundesanstalt (Museum) in Vienna. It derives from Raxalpe (Lower Austria).

Material: 6 partly damaged specimens — internal moulds — with shell remains. Dimensions of the better preserved specimens: 8.7 × ca. 9.0 × 6.1 mm (pl. I, fig. 5); ? 8.3 × 9.7 × 3.8 mm; ca. 8.0 × 7.3 × 5.2 mm (pl. I, fig. 6); 7.9 × 9.6 × 5.3 mm.

Description: Equibiconvex shells of small size and triangular outline, subelliptical in anterior view. Both valves sloping steeply to the anterior and lateral commissures in some specimens. Shell nearly rectimarginate or with a slight plication. No distinct fold or sulcus. Lateral planareas well delimited and in some specimens concave. Suberect beak narrow, with sharp beak ridges. Ornamentation poorly developed. Blunt and often rounded ribs developed anteriorly, being little more than only plications of the anterior commissure. Growth lines absent.

Internal characters as described for the genus.

Remarks: Eight specimens of those figured by A. BITTNER (1892) were found 1984 by the present author in the collections of the Geologische Bundesanstalt (Museum) in Vienna (see also R. SIEBER 1981). They show some variability in the length of ribs and in the shape of anterior commissure. The only form likely to be confused with *A. seydeli* was *Rhynchonella pumilio* BITTNER 1892

that had been distinguished from "*seydeli*" by its stronger ribbing and stronger beak. BITTNER'S figures make, however, this separation suspect and both species are here considered synonymous. Our specimens fit well with BITTNER'S figures. The only difference in external features is that they have, on the average, slightly stronger and sharper ribs at the anterior commissure, and approach in this respect BITTNER'S specimens on pl. 4, figs. 16 and 17 (described as *Rhynchonella pumilio*).

Occurrence: Silická Brezová; it seems to be restricted to the upper part of BALOGH'S locality — material only collected by J. BYSTRICKÝ; Austria — Raxalpe (Lower Austria), Neun Kögerln/Mariazell (Styria). The site and stratigraphical position of the type locality of *A. seydeli* is not up today quite clear. The site is according to A. BITTNER (1892, p. 34, 35) different from that of *Tetractinella* (?) *dyactis* (BITTNER) from Raxalpe, the age of which was recently

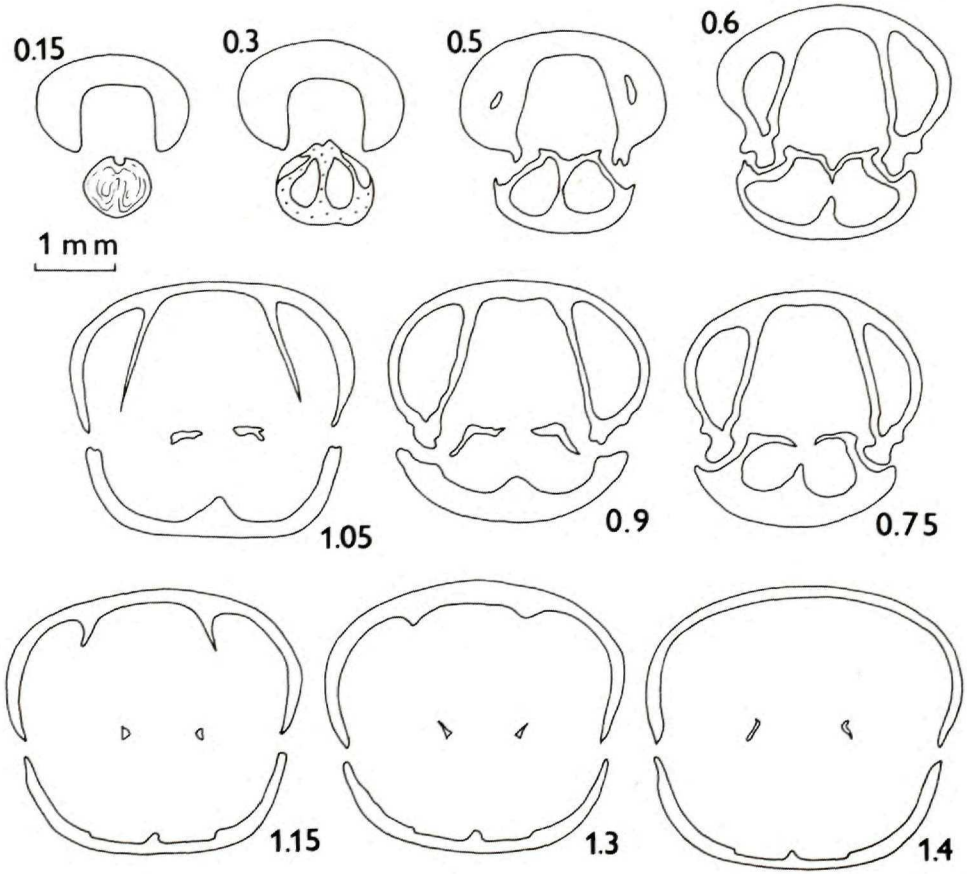

Fig. 17 *Amoenirhynchia seydeli* (BITTNER). Silická Brezová, most probably upper part of BALOGH'S locality (leg. J. BYSTRICKÝ). Length 8.3 mm. Enlarged.

presented as Cordevolian by R. LEIN—M. SIBLÍK (1978). *A. seydeli* could be well derived from the Carnian after the stratigraphical comparisons and interpretation made by R. LEIN (in LEIN—SIBLÍK 1978) who admitted Tuvalian age for the uppermost parts of the Rax plateau.

Rimirhynchopsis DAGYS 1963

***Rimirhynchopsis* aff. *rimulata* (BITTNER 1890)**

Pl. II, fig. 3

aff. 1890 *Rhynchonella rimulata* n.sp. — A. BITTNER, p. 228, pl. 41, fig. 8.

Material: 1 brachial valve 7.8 mm long and 8.3 mm wide.

Description: Small, moderately convex valve of subtrigonal outline, with apical angle nearly 90 degrees. Plication of the anterior commissure low, subangular in form. Corresponding fold standing up markedly in the anterior third of valve. There are 14 rounded costellae posteriorly on valve, giving place to 10 strong costae anteriorly (4 of them confined to fold). The change-over situated slightly below mid-length of valve. Small smooth area around umbo present. Dorsal septum clearly visible in posterior third of internal mould.

Remarks: Double type of ribs is extremely rare among the Triassic brachiopods. Except for Norian *R. triadicus* DAGYS 1963 (type-species of *Rimirhynchopsis*) from the Caucasus, this type of ornamentation was ascertained and described by A. BITTNER in one specimen from the Hallstatt Limestone (*Rhynchonella rimulata* BITTNER 1890), and in several specimens from the Dachstein Limestone of the Alps (*Rhynchonella* ex aff. *variabilis* SCHLOTHEIM in BITTNER 1890). Similar species was also found in NW China and described as *Rimirhynchopsis simplex* CHING, SUN, YE 1979 in Paleontological Atlas of NW China. The Slovak specimen resembles considerably BITTNER'S "*rimulata*" but it differs in its sharper costae and posterior smoothness. Further comparisons are for the present impossible owing to the poor material.

Occurrence: Silická Brezová, lower part of BALOGH'S locality (collected by J. BYSTRICKÝ).

Wellerellidae LIKHAREW 1956

Apertirhynchella gen.n.

Type species: *Apertirhynchella triplex* sp.n.; Tuvalian of Silická Brezová, SE Slovakia.

Diagnosis: Small to medium sized rhynchonellids of subtrigonal outline. Fold and sulcus well developed, although low, clearly separated from the lateral slopes. Anterior commissure uniplicate. Beak low. Valves characteristically tripartite; few low, blunt ribs may develop in the fold and sulcus, lateral

parts of valves smooth. Slight sulcation posteriorly in the brachial valve occurs. Delthyrial cavity subquadrate, wide, with shallow muscle impressions ventrally. Dental lamellae underdeveloped or very short. Hinge plates subhorizontal in orientation. Sockets large. Dorsal septum absent. Crura arcuifer.

Remarks: A series of externally similar small rhynchonellids from the Middle Triassic (e.g. *Rhynchonella begum* BITTNER 1893) was attributed by A. S. DAGYS (1974, p. 110) to his new genus *Holcorhynchella*. This genus (type species *Rhynchonella delicatula* BITTNER 1890) differs internally from *Apertirhynchella* gen.n. in having a septalium, well developed dorsal septum and calcarifer crura.

Included species: Apart from the type species *A. schoenni* (BITTNER 1890) (incl. *Rhynchonella sublevata* BITTNER 1890) is at present supposed as belonging to *Apertirhynchella* gen.n. Potential member of this genus is *Rhynchonella altaplecta* BÖCKH 1873 as figured by J. BÖCKH 1873 and A. BITTNER 1890 from Hungary (Middle Triassic) that was not long ago referred to *Caucasorhynchia* DAGYS 1963 in M. SIBLÍK (1971). Tripartite smooth shell can be found also in *Rhynchonella protractifrons* BITTNER 1890, esp. as figured by W. SALOMON 1895 (pl. 3, fig. 16—24) from Marmolata.

Distribution: Middle (?) and Upper Triassic.

Apertirhynchella triplex sp.n.
Pl. II, figs. 4—6; text-fig. 18

Holotype: The specimen figured on plate II, fig. 4 and deposited in the Slovak National Museum in Bratislava under number SNM Z 19430.

Stratum typicum et locus typicus: Tuvalian, *Subbulatus* Zone (?); Silická Brezová.

Material: 21 mostly fragmentary internal moulds. The dimensions of completely preserved or figured specimens in mm:

Length	width	thickness	
12.5	12.4	8.6	
11.5	14.7	7.8	Pl. II, fig. 4, holotype
10.3	13.0	7.6	
10.2	10.8	6.7	
9.9	11.0	6.9	
8.0	8.5	6.2	Pl. II, fig. 5
6.8	7.2	3.8	Pl. II, fig. 6
4.8	5.2	2.9	

Description: Small to medium sized uniplicate rhynchonellids, subpentagonal in outline and dorsibiconvex in profile. Width slightly exceeding length in most specimens. Maximum width situated close to the mid-length of brachial valve. Dorsal view of the shell tripartite, well developed fold and corresponding

sulcus being clearly delimited from the lateral parts of respective valves and traceable nearly up to the umbones. Linguiform extension steeply rising from the anterior commissure, with its dorsal side straightly limited. Posterolateral flanks of shell flattened. Large but low beak showing nearly straight to suberect attitude, with moderately well developed beak ridges. Apical angle ranging between 85—120 degrees. Middle part of brachial valve corresponding to fold is smooth or with up 5 blunt low ribs as seen at the anterior margin. Short ribs originating by splitting of the 1—2 main ribs reaching up to umbo. Lateral parts of valves smooth, rarely with faint initial ribbing. Young specimens sulcate.

Internal characters in general as described for the genus.

Remarks: Considerable external resemblances to *A. triplex* sp.n. can be found in *Rhynchonella sublevata* BITTNER 1890 (esp. specimen on pl. 12, fig. 7) and in *Rhynchonella schoenni* BITTNER 1890, both derived from the Hallstatt Limestone. All figured specimens of these two BITTNER'S species are housed in the Museum of the Geologische Bundesanstalt in Vienna and were studied by the present author in 1980 and 1984. Basing on this revision, "*sublevata*" is taken for synonym of "*schoenni*" that reveals better specific characters. "*Schoenni*" was represented by two BITTNER'S originals from which that of fig. 8 on pl. 12 (derived from Feuerkogel-Röthelstein) is better preserved and is here selected

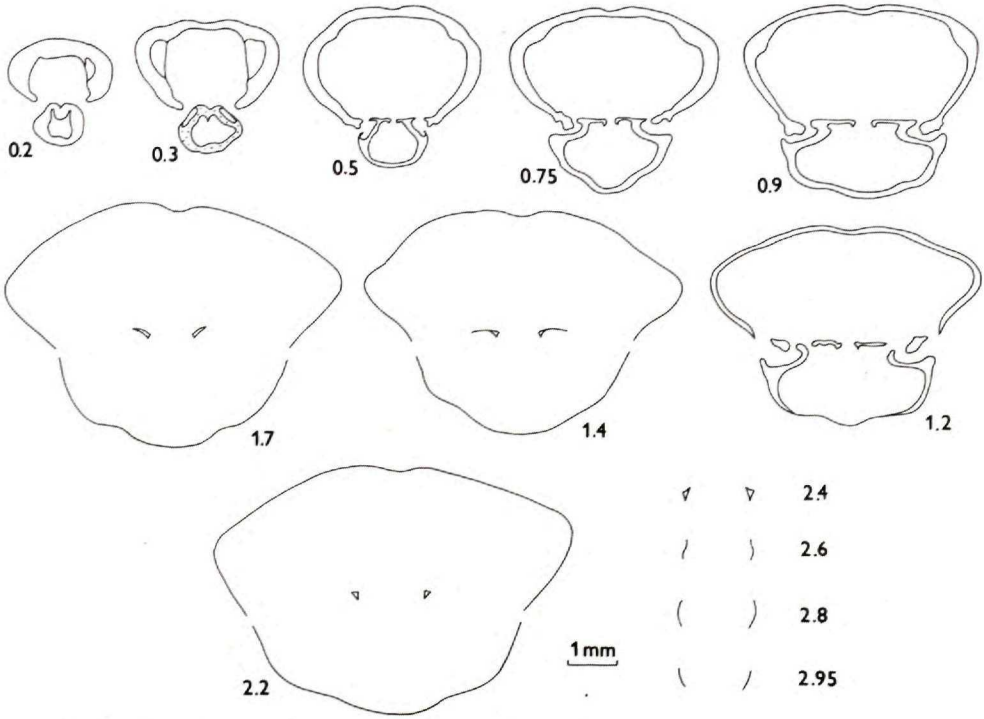

Fig. 18 *Apertirhynchella triplex* gen.n., sp.n. Silická Brezová, upper part of BALOGH'S locality. Length 10.3 mm. Enlarged.

as lectotype. Generic attribution of "*schoenni*" to *Apertirhynchella* gen.n. is tentative only, due to its unknown internal details. *A. schoenni* differs from *A. triplex* sp.n. in having ventribiconvex shell, shorter folding with sulcate posterior part of brachial valve, suberect to erect beak, and in the absence of ribbing.

Occurrence: Silická Brezová, upper part of BALOGH'S locality, point M-42 in MOCK'S section, Ostré vršky Hill, loc. B_2A (3 young sulcate specimens.)

Basiliolacea COOPER 1959
Norellidae AGER 1959
Norella BITTNER 1890

Norella obesa sp.n.
Pl. IV, figs. 3—4; text-fig. 19

Holotype: The specimen figured on pl. IV, fig. 3 and deposited in the collections of the Slovak National Museum in Bratislava under number SNM Z 19424.

Stratum typicum and locus typicus: Tuvalian, *Subbulatus* Zone (?); Silická Brezová.

Material: 3 completely preserved internal moulds with shell fragments: Figured specimens measure: 9.7 × 9.4 × 8.4 mm (holotype, pl. IV. fig. 3) and 9.6 × 9.9 × 7.7 mm (pl. IV, fig. 4, sectioned).

Description: Small sulcate rhynchonellid, globose. Shell smooth, subtrigonal in outline, ventribiconvex in profile and semicircular to nearly circular in anterior view. Maximum length about the same as width. Large shallow sulcus developed in the anterior part of brachial valve. Corresponding ventral fold hardly distinguishable from the lateral shell curvature. Shell flanks steeply sloping. Anterior commissure forming deep and broad subangular sinus, sharply bent from the commissural plane. Beak strong, incurved. Pedicle opening mesothyrid, accompanied by poorly marked beak ridges. Faintly zigzagged anterior commissure giving rise to initial ribbing may occur (pl. IV, fig. 4).

Shell comparatively thick. Pedicle collar supposedly missing. Delthyrial cavity large, dental lamellae underdeveloped. Hinge teeth strong, with blunt denticula developed laterally. Ventral muscle scars clearly impressed. Hinge plates well divided from inner socket ridges and inclined dorsally, with dorsally directed crural bases at their distal ends. Sockets large. Crura arcuifer. Low median ridge noticeable in bottom of the brachial valve.

Remarks: *Norella obesa* sp.n. is established above all on account of its globose character and its broad subangular sinus. On the base of these characters it is distinguished well from *Norella nucleata* (ROTHPLETZ 1886), *N. imitatrix* (BITTNER 1890) and *N. refractifrons* (BITTNER 1890) that resemble most our

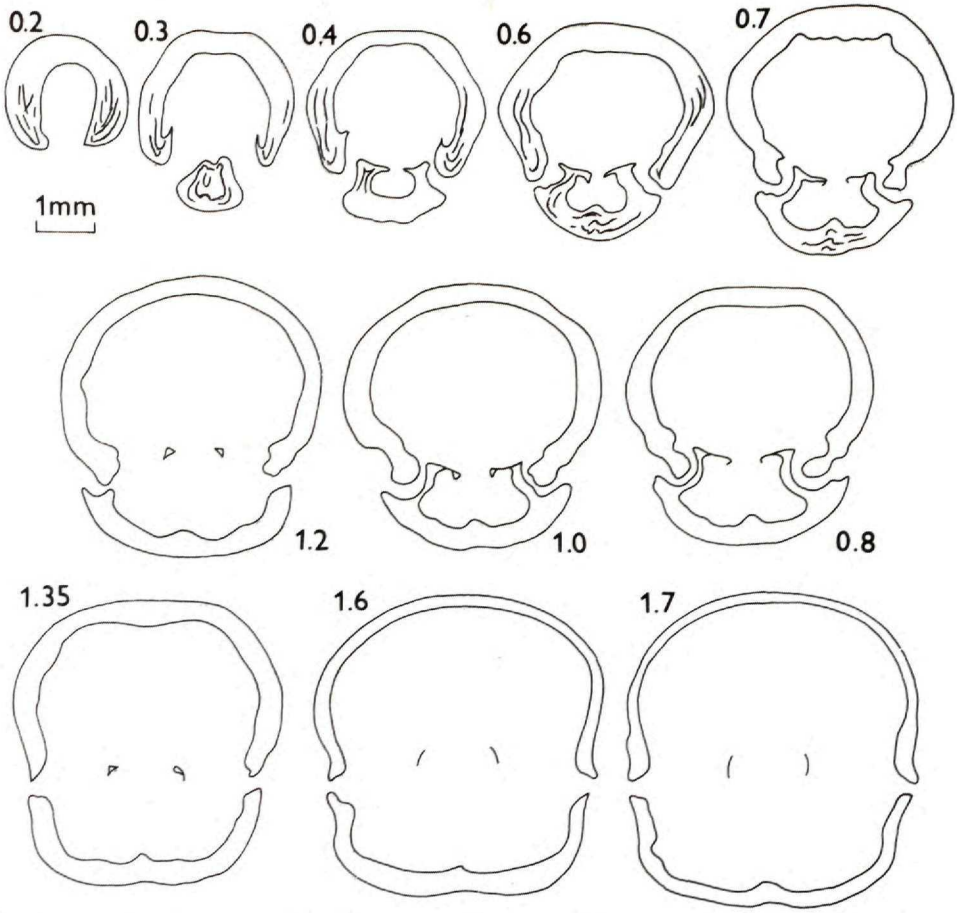

Fig. 19 *Norella obesa* sp.n. Silická Brezová, upper part of BALOGH'S locality. Length 9.6 mm. Enlarged.

specimens. New species shows a considerable resemblance to the Italian *N. gortanii* DE TONI 1913 but differs from it in having twice as smaller dimensions, a shallower and shorter sulcus, an angular sinus, and initial ribbing.

Occurrence: Silická Brezová, upper part of BALOGH'S locality.

References

BALOGH, K. 1940: Daten zur geologischen Kenntnis der Umgebung von Pelsöcardó. Tisia, 4, Debrecen, 151—200.

BITTNER, A. 1889: Revision der Brachiopoden von Sct. Cassian. Verh. k.k. geol. Reichsanst., 8, Wien, 159—170.

BITTNER, A. 1890: Brachiopoden der alpinen Trias. Abh. k. k. geol. Reichsanst., 14, Wien, 1—320.

BITTNER, A. 1891: Triasbrachiopoden von der Raxalpe und vom Wildangergebirge bei Hall in Tirol. Verh. k.k. geol. Reichsanst., 3, Wien, 55—60.

BITTNER, A. 1892: Brachiopoden der alpinen Trias. Nachtrag I. Abh. k.k. geol. Reichsanst., 17, Wien, 1—39.

BITTNER, A. 1903: Brachiopoden und Lamellibranchiaten aus der Trias von Bosnien, Dalmatien und Venetien. Jb. k.k. geol. Reichsanst., 52, (1902), Wien, 495—643.

BÖCKH, J. 1873: Die geologische Verhältnisse des südlichen Theiles des Bakony (I. Th.). Mittheil. a. d. Jb. k. ung. geol. Anst., II, 2, Pest, 27—180.

BYSTRICKÝ, J. 1964: Slovenský kras. ÚÚG, Bratislava, 1—197.

BYSTRICKÝ, J.—BIELY, A. 1966: Trias der Westkarpaten. Exkursionsführer, Kolokvium über die Stratigraphie der Trias. Geol. Inst. Slow. Akad. Wiss., Bratislava, 1—64.

CHING, Y. K.—FENG, B. X. 1977: Upper Triassic brachiopod fauna from the area in the east of the Hengduan Mountains, Western Yunnan. Mesoz. Foss. from Yunnan, China, 2, 39—66.

DAGYS, A. S. 1963: Upper Triassic Brachiopods of the Southern USSR. Acad. Sci. USSR, Siber. branch, Moscow, 1—238 (in Russ.).

DAGYS, A. S. 1974: Triassic Brachiopods. Trans. Inst. Geol. Geophys., Acad. Sci. USSR, Siber. branch, 214, Novosibirsk, 1—322.

DAGYS, A. S. 1977: New name for the Triassic rhynchonellid genus. Palaeont. Journal, 3, Moscow, 139 (in Russ.).

DE TONI, A. 1914: Illustrazione della fauna triassica di Valdepena (Cadore). Mem. Ist. geol. Univers. Padova, 2, Padova, 113—194.

JEKELIUS, E. 1936: Der weisse Triaskalk von Brasov und seine Fauna. Anuar. Inst. Geol. al Român., 17 (1932), Bucuresti, 1—106.

KOCHANOVÁ, M.—KOLLÁROVÁ-ANDRUSOVOVÁ, V. 1983: Obertriasische Bivalven und Ammonoideen der westlichen Umgebung von Silická Brezová (Slowakischer Karst, Westkarpaten). Geol. zborník, 34, Bratislava, 535—590.

KOLLÁROVÁ-ANDRUSOVOVÁ, V.—BYSTRICKÝ, J. 1974: Übersicht über den gegenwärtigen Stand der Biostratigraphie der Trias der Westkarpaten. Schriftenr. Erdwiss. Komm. Österr. Akad. Wiss., 2, Wien, 125—136.

LEIN, R.—SIBLÍK, M. 1978: A brachiopod fauna from the Spielkogel (Muerztaler Alpen, Styria): New data concerning the stratigraphic emplacement of Tetractinella (?) dyactis (Bittner). Mitt. Ges. Geol. Bergbaustud., 25, Wien, 205—221.

MIŠÍK, M.—BORZA, K. 1976: Obere Trias bei Silická Brezová. Acta geol. geogr. Univ. Comen., 30, Bratislava, 5—49.

PALAEONTOLOGICAL ATLAS of Northwest China (Fascicle Qinghai), 1. Geol. Publ. House, Pejing, 1979, 1—342.

PEARSON, D. A. B. 1977: Rhaetian Brachiopods of Europe. N. Denkschr. naturhist. Mus., 1, Wien, 1—65.

ROTHPLETZ, A. 1886: Geologisch-palaeontologische Monographie der Vilser Alpen mit besonderen Berücksichtigung der Brachiopoden-Systematik. Palaeontographica, 33, Stuttgart, 1—180.

SALOMON, W. 1895: Geologische und palaeontologische Studien über die Marmolata. Palaeontographica, 42, Stuttgart, 1—210.

SIBLÍK, M. 1971: New Anisian Rhynchonellid from Slovakia. Geol. zborník, 22, Bratislava, 159—167.

SIBLÍK, M. 1982: Genus Austriellula Strand, 1928 (Brachiopoda) from the Upper Triassic. Záp. Karpaty, paleont., 8, Bratislava, 41—70.

SIBLÍK, M. 1983: Triassic brachiopods of the Northern Alps and their generic attribution. Schriftenr. Erdwiss. Komm. Österr. Akad. Wiss., 5, Wien, 277—286.

SIEBER, R. 1981: Katalog der Typen und Abbildungsoriginale der Geologischen Bundesanstalt. 4. Teil: Brachiopoden der Trias. Verh. geol. Bundesanst., 1979, Wien, A187—A205.

Miloš Siblík

Rhynchonelidní ramenonožci karnu z oblasti Slovenského krasu

Resumé

Článek dokončuje zpracování karnických rhynchonel ze Slovenského krasu, jehož první část, zabývající se hladkými rhynchonelami rodu *Austriellula* STRAND 1928, byla publikována nedávno (SIBLÍK 1982). Dále zde byly zjištěny a v této práci jsou popsány většinou žebernaté rhynchonely následujících taxonů: *Caucasorhynchia elegans elegans* ssp.n., *C. elegans consobrina* ssp.n., *Volirhynchia dux* sp.n., *Costirhynchopsis variata variata* ssp.n., *C. variata glabra* ssp.n., *Amoenirhynchia* gen.n., *A. seydeli* (BITTNER 1891), *Rimirhynchopsis* aff. *rimulata* (BITTNER 1890), *Apertirhynchella triplex* gen.n., sp.n. a *Norella obesa* sp.n.

Vysvětlivky k tabulím I—IV

Všichni fotografovaní jedinci byli poběleni chloridem amonným. Jsou nyní uloženi ve sbírkách Slovenského národního muzea v Bratislavě (SNM). Ostatní autorův materiál je uložen v Ústavu geologie a geotechniky ČSAV v Praze. Foto J. BROŽEK a M. PÁRALOVÁ

Tab. I

1 *Caucasorhynchia elegans consobrina* ssp.n. Ostré vršky, lok. B_2A. SNM Z 19416, zvětš. × 2
2 *Caucasorhynchia elegans elegans* ssp.n. Holotyp. Silická Brezová, spodní část Baloghovy lokality. SNM Z 19412, × 2,5.
3 Jako obr. 1. Holotyp. SNM Z 19415, × 2.
4 Jako obr. 2. Mladý jedinec. SNM Z 19414, × 3.
5 *Amoenirhynchia seydeli* (BITTNER). Silická Brezová, svrchní (?) část Baloghovy lokality. Nález J. BYSTRICKÝ. SNM Z 19428, × 3.
6 Jako obr. 5. SNM Z 19429, × 3.
7 Jako obr. 2. SNM Z 19413, × 2,5.

Tab. II

1 *Volirhynchia dux* sp.n. Silická Brezová, spodní část Baloghovy lokality. SNM Z 19427, × 2.
2 Jako obr. 1. Holotyp. SNM Z 19426, × 2.
3 *Rimirhynchopsis* aff. *rimulata* (BITTNER). Silická Brezová, spodní část Baloghovy lokality. Nález J. BYSTRICKÝ. SNM Z 19433, × 3.
4 *Apertirhynchella triplex* sp.n. Holotyp. Silická Brezová, svrchní část Baloghovy lokality. SNM Z 19430, × 3.
5 Jako obr. 4. SNM Z 19431, × 3.
6 Jako obr. 4. Mladý jedinec. SNM Z 19432, × 3.

Tab. III

1 *Costirhynchopsis variata variata* ssp.n. Holotyp. Silická Brezová, spodní část Baloghovy lokality. SNM Z 19420, × 2,5.
2 Jako obr. 1. SNM Z 19417, × 2,5.
3 Jako obr. 1. SNM Z 19418, × 3.
4 Jako obr. 1. Extrémně plikátní, až subcynocefální jedinec, SNM Z 19421, × 2,5.
5 *Costirhynchopsis variata variata* ssp.n. Silická Brezová, lokalita č. 10 v práci J. BYSTRICKÝ—A. BIELY, 1966. SNM Z 19419, × 3.

Tab. IV

1 *Costirhynchopsis variata glabra* ssp.n. Silická Brezová, svrchní část Baloghovy lokality. SNM Z 19423, ×3.
2 Jako obr. 1. Holotyp. SNM Z 19422, ×3.
3 *Norella obesa* sp.n. Holotyp. Silická Brezová, svrchní část Baloghovy lokality. SNM Z 19424, ×4.
4 Jako obr. 3. SNM Z 19425, ×4.

Explanation of plates I—IV

All figured specimens were coated with ammonium chloride before photographing. They are now deposited in the collections of the Slovak National Museum in Bratislava (SNM). The other author's material is housed in the Institute of Geology and Geotechnics, Czech. Academy of Sciences, Praha. Photographs by Mrs. M. PÁRALOVÁ and Mr. J. BROŽEK.

Plate I

1 *Caucasorhynchia elegans consobrina* ssp.n. Ostré vršky Hill, loc. B_2A. SNM Z 19416, magnif. ×2.
2 *Caucasorhynchia elegans elegans* ssp.n. Holotype. Silická Brezová, lower part of BALOGH's locality. SNM Z 19412, ×2.5.
3 As fig. 1. Holotype. SNM Z 19415, ×2.
4 As fig. 2. Young specimen. SNM Z 19414, ×3.
5 *Amoenirhynchia seydeli* (BITTNER). Silická Brezová, upper (?) part of BALOGH's locality. Collected by J. BYSTRICKÝ. SNM Z 19428, ×3.
6 As fig. 5. SNM Z 19429, ×3.
7 As fig. 2. SNM Z 19413, ×2.5.

Plate II

1 *Volirhynchia dux* sp.n. Silická Brezová, lower part of BALOGH's locality. SNM Z 19427, ×2.
2 As fig. 1. Holotype. SNM Z 19426, ×2.
3 *Rimirhynchopsis* aff. *rimulata* (BITTNER). Silická Brezová, lower part of BALOGH's locality. Collected by J. BYSTRICKÝ. SNM Z 19433, ×3.
4 *Apertirhynchella triplex* sp.n. Holotype. Silická Brezová, upper part of BALOGH's locality. SNM Z 19430, ×3.
5 As fig. 4. SNM Z 19431, ×3.
6 As fig. 4. Young specimen. SNM Z 19432, ×3.

Plate III

1 *Costirhynchopsis variata variata* ssp.n. Holotype. Silická Brezová, lower part of BALOGH's locality. SNM Z 19420, ×2.5.
2 As fig. 1. SNM Z 19417, ×2.5.
3 As fig. 1. SNM Z 19418, ×3.
4 As fig. 1. Extremely plicated, subcynocephalous specimen. SNM Z 19421, ×2.5.
5 *Costirhynchopsis variata variata* ssp.n. Silická Brezová, locality 10 in J. BYSTRICKÝ—A. BIELY 1966. SNM Z 19419, ×3.

Plate IV

1 *Costirhynchopsis variata glabra* ssp.n. Silická Brezová, upper part of BALOGH's locality. SNM Z 19423, ×3.
2 As fig. 1. Holotype. SNM Z 19422, ×3.
3 *Norella obesa* sp.n. Holotype. Silická Brezová, upper part of BALOGH's locality. SNM Z 19424, ×4.
4 As fig. 3. SNM Z 19425, ×4.

Translated by author.

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Jozef Michalík—Kamil Zágoršek

Biostratigraphy, lithofacial Development and Fauna of Badenian Sediments in the Devín-Záhradky Section (Bratislava)

4 text-figs., 3 Pls. (V—VII), Slovak summary

Abstract. Mentioned section on southern foot of Mt. Devínska Kobyla encovers transgressive Badenian sedimentary sequence. Clastic and organoclastic sediments yielded rich and diverse mollusc fauna accompanied by sponges, corals, echinoderms, brachiopods and calcareous algae. The paper brings a description of *Crania badensis* n.sp., along with eight mollusc taxa and one echinoid taxon, which have been not described from this area until now yet.

Introduction

Mt. Devínska Kobyla (514 m) is one of the southernmost outcrops of pre-Tertiary basement in the Czechoslovak part of Malé Karpaty Mts. along eastern Vienna-Basin border. This elevation is rounded by rests of Miocene sediments yielding a lot of famous paleontological localities. However, majority of collectors paid attention on western and northern slopes of this mount. Group of small outcrops on southern Šibeničník-Hill (Galgenberg, 310 m) slopes approximately 1 km eastward from Devín (Záhradky area) was introduced by KOUTEK and ZOUBEK (1937), who considered them as poor in fossil content. ŠVAGROVSKÝ (1981) dealt more detailed with this locality: however, his paper also does not contain complete list of fauna. Detailed lithological and faunal characteristics have not been published until as well. Thorough investigation of lithological rock sequences helped us to distinguish in 70 m thick Upper Badenian clastic formation six lithologically and faunistically different members (α—ζ).

The lower, about 40 m thick part (α—δ) of this complex consists mostly of arcose sands; despite of clastic character it contains rich and diverse assemblage of faunal remnants. Approximately 20 m thick pelitic member containing a monotypic association of Ostrea cf. lamellosa follows above it. The highest mem-

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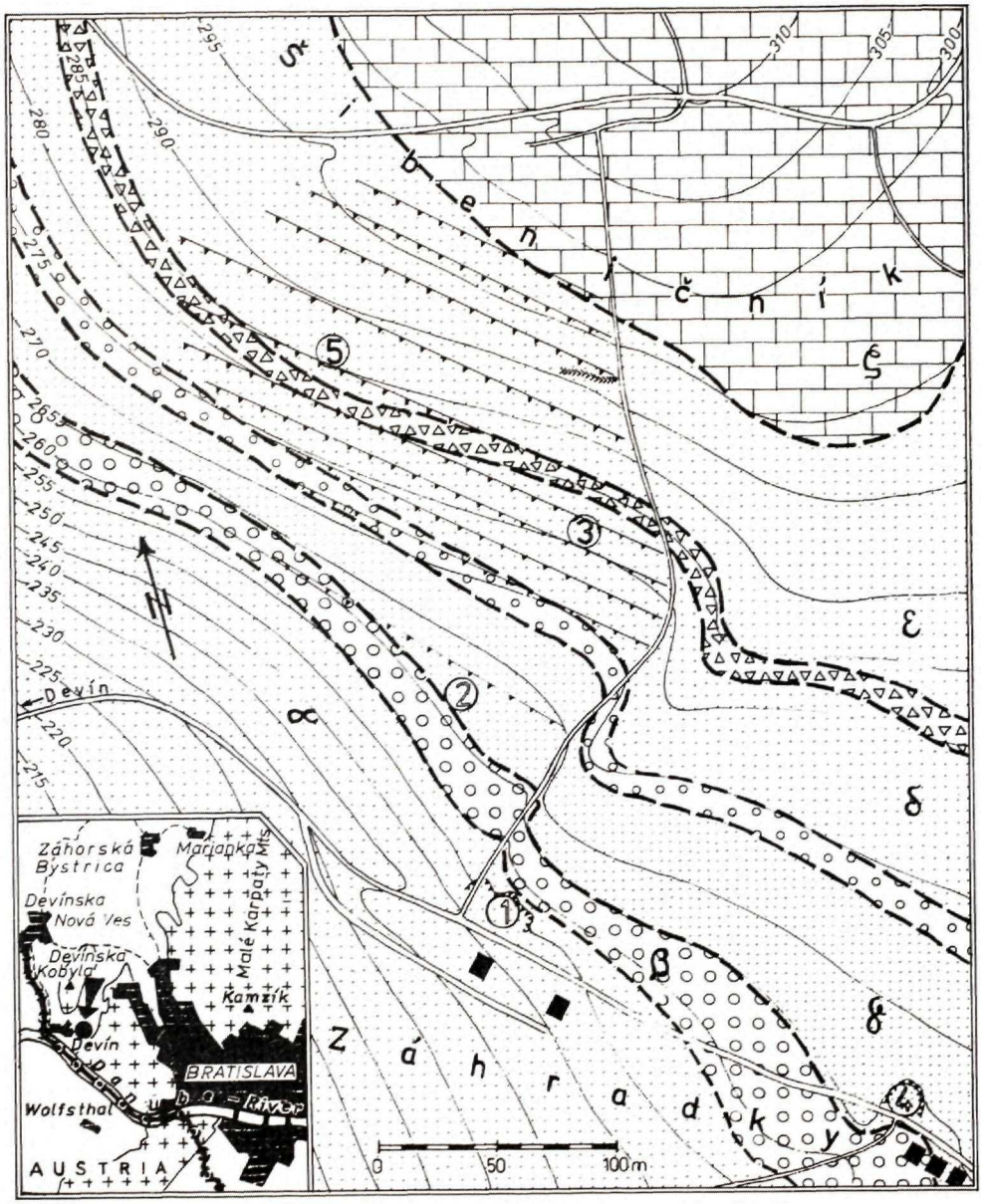

Fig. 1 Geographical localization (lower left corner) and geological sketch of the Devín-Záhradky locality on southern slope of Šibeničník-Hill near Bratislava. Localization scheme: white — Neogene sediments (partially with the Quaternary cover; crosses — Pre-Neogene basement. Geological sketch: stippled — sands, circles — rough reworked detrite, triangles — angular clasts, brick-like hatching — limestone. Greek initials — lithostratigraphical units (see the written text), Arabian numbers — fossil sampling sites.

ber, five meters thick, Lithotamnium-Limestone layer yielded incompletely preserved bryozoan-, worm-, and molluscan remnants (this part could be characterized as faunistically impoverished).

The faunal diversity of section studied is remarkable: it yielded 93 taxa (47 of them belong to Bivalvia and 22 to Gastropoda). The richness of the locality is most apparent when compared with protected paleontological locality named Piesočný vrch (Sandberg) on western Devínska Kobyla slope, which yielded 44 bivalve- and 19 gastropod taxa according to ŠVAGROVSKÝ (1981). Several species are important as stratigraphical indicators (see Table 1 for stratigraphical distribution of the Záhradky-species). The paleontological type material described in this paper is deposited in Slovak National Museum collections in Bratislava.

Lithofacial development and biostratigraphy

The lowest revealed member (α) originated during transgression of Paratethys across Mesozoic carbonates, crystalline slates and granitoids of Malé Karpaty Mts. Approximately 16 m thick complex consists of white coarse-grained arcose sand with small (to 2 cm) pebbles of crystalline rocks. Bedding of sediment is indistinct, almost chaotic in some places. However, the coarse material is in several levels arranged into concave lenses, indicating rests of ripple stratification (Fig. 2). Although the organic remnants are often fragmentarily preserved, well preserved bivalve valves of *Ostrea* sp. and brachiopod valves of *Crania badensis* sp.n. occur amidst the fragments. Two 15 cm thick intercalations of gradationally bedded coarse detrite occur in the middle of the sequence revealed. Their bases formed by quartz pebbles and rough shell- and skeleton fragments irregularly cut the ripple sands. Small antelope tooth (determination of Dr. P. HOLEC) has been found here. These coarse-grained intercalations evidently represent products of stormy sedimentation (tempestites) intercalated into shallow neritic sandy sequence of the Paratethyan nearshore. Despite of unfavourable conditions of fossilization, this lithostratigraphical member is the most fossiliferous one. The tables 1 and 2 illustrate stratigraphical range of the fossils represented here.

Several meters thick sequence of rough unsorted clastics (coarse gravels with 5—10 cm pebbles to arcose pebble sands: 0,2 to 2 cm) occurs above the ripple sands complex. Although the rock clasts and shell fragments are disoriented, their size diminishes upwards. This gradation indicates a sudden, rapid deposition of the sediment. The matrix is calcitic, causing resistence and morphological productivity of this member (denoted as β) in weathering and erosional process. The association of fossils contains frequent mollusc shells, coral fragments (*Actinastrea* sp., *Porites* sp., *Siderastrea lomnickii* and several other taxa occurring in this part of the sequence only, cf. Tabs. 1. and 2.) are less frequent.

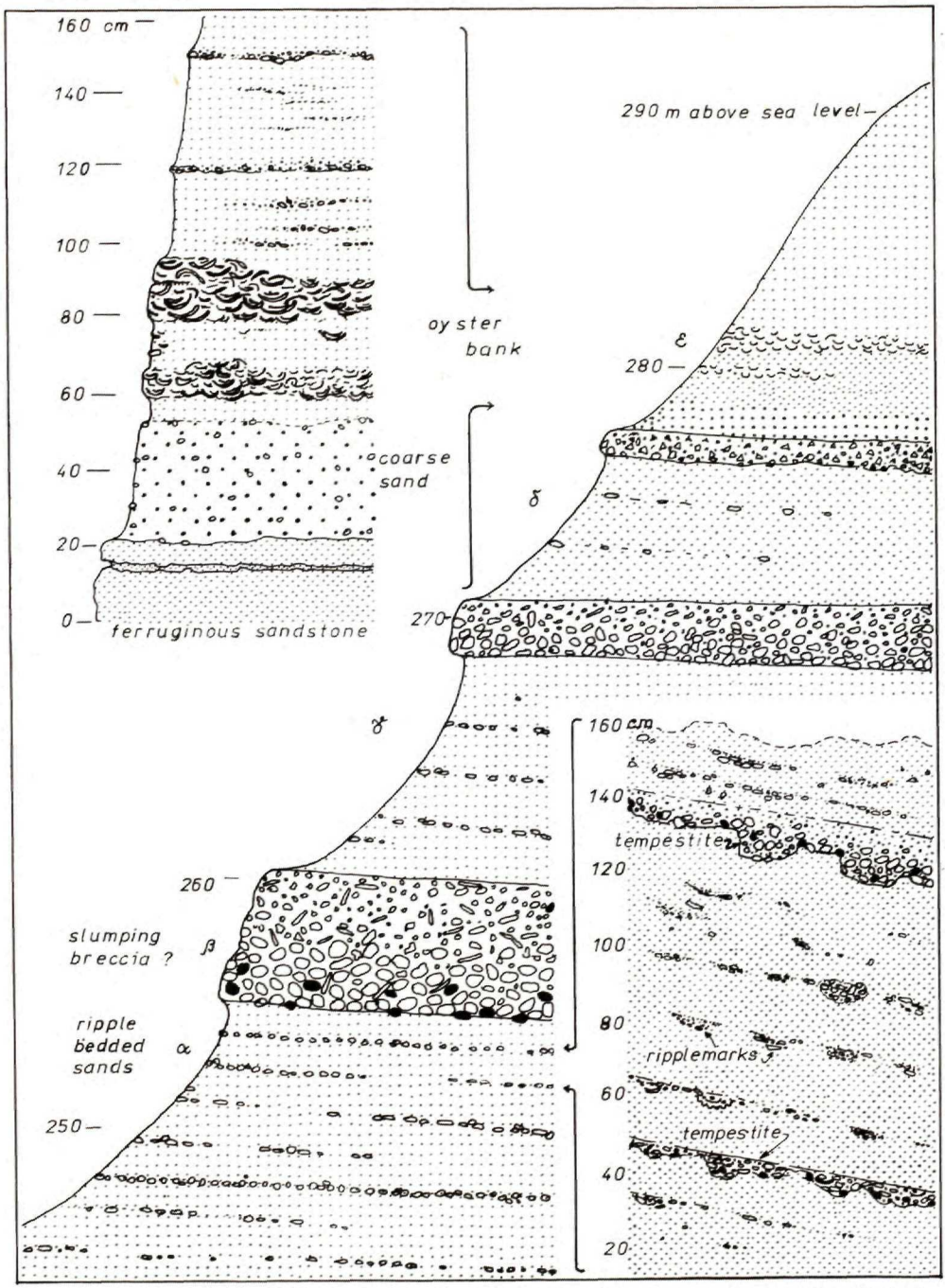

Fig. 2 Vertical lithological section through the sequence described (explanations in the text). Vertical dimension strongly exaggerated.

Following member, denoted as "γ" (cca 18 m thick) consists of pale inconsistent coarse arcose sandstone (or sand) with angular grains, 0,9 to 5 mm in diameter. Faunal remnants are very abundant, typical Badenian molluscan taxa prevail. The most illustrative, but recently vanished section No. 4 (Fig. 1) yielded rich gastropod fauna (*Cypreacea* and *Conacea*).

A new 13 m thick layer of firmly cemented limestone and quarzite breccia cropping out in the slope contains numerous shells. Badenian molluscan taxa are most remarkable: *Crisia* cf. *hoernesi* REUSS 1847, *Glossus (G.) hoernesi* (DALL 1903), *Pecten (O.) adunctus* EICHWALD 1856, *Flabellipecten leythajanus* PARTSCH 1870. Both the echinoid *Scutella vindobonensis* LAUBE 1871 and the gastropod *Conus (L.) mercati* BROCCHI 1814 are dominating the fauna (see Tabs. 1 and 2 for complete faunal list of this assemblage).

Arcose sands and breccias are higher-up followed by 20 m thick yellowish fine aleuritic marls, indicating decreasing intensity of clastic support into the basin during culminating transgression. ŠVAGROVSKÝ(1981) estimated the depth of Devín—Dúbravka seaway in this time as 80—120 m. Both the lack of coarse clastics and mostly preserved life-orientation of fossils prove for calm quiet sedimentary conditions below current- and oscillation zone. This supposition could be well illustrated by distribution of oysters *Ostrea* cf. *lamellosa* BROCCHI, 1814 and *O. digitalina* DUBOIS 1831, occurring in nest- and lense-like aggregates. This marls differ from those occurring at Sandberg ones by impoverishing of foraminifer- and brachiopod constituents of the fauna. The Devín-Záhradky marls contain frequent, but poorly preserved asteroid fragments of *Valvaster* cf. *striatus* and, less frequently (with the exception of dominating oysters) bivalve shells: *Codakia (C.) haidingeri* (HOERNES 1870) (= typical Badenian species), *Thracia (C.) pubescens* (PULTENEY 1799), *Gastrana fragilis* cf. *fragilis* (LINNAEUS 1752), *Lutraria lutraria* cf. *jeffreysi* DE GREGORIO 1884, *Schizoporella unicors* (JOHNSTON 1847), several hydrobian specimens and other fossils (see Tabs. 1 and 2).

The top member (ζ) of Devínska Kobyla lithofacial sequence consists of five meters thick oncolite limestone bed formed by red algae incrustations. SCHALEKOVÁ (1969) supposed Sandberg oncolite limestone to be produced in littoral (characterized by presence of reworked oncolithic clasts) to shallow neritic zone. As similar reworked pebbles derived of algal biostromes frequently occur also in the Devín-Záhradky section, presence of shallows adjoining to southern mouth of Devín—Dúbravka seaway seems to be probable. These limestones contain indeterminable bryozoan fragments (probable *Crisia*-like), as well as small gastropods *Bittium (B.) reticulatum* (COSTA 1778) etc.

Investigated locality yielded 93 taxa of organic remnants occurring in several fossil associations. Table 2 illustrate their occurrence in individual members of this locality as well as their correlation with those coming from the most important Badenian localities in Czechoslovakia.

Table 1. Stratigraphical distribution of individual taxa on the Šibeničník (Devín-Záhradky) locality. Compiled according to various sources.

***	EOCENE	OLIGOCENE	EGERIAN	EGGENBURGIAN	OTTNANGIAN	KARPATIAN	MORAVIAN	VIELICIAN	KOSOVIAN	SARMATIAN	PANNONIAN	PONTIAN	DACIAN	RUMANIAN	RECENT
							BADENIAN								
Echinocyamus dacicus	—	—	·····	·····	·····	·····	·····	·····	—						
Gryphaea cyathula cf. *cyathula*		—	—	—	—	—	—	—	—						
Anomia ephippium rugulosostriata		—	—	—	—	—	—	—	—					—	
Ficus condita?			—	—	—	—	—	—	—						
Odontaspis acutissima acutissima			—	—	—	—	—	—	—			—			
Zonaria globosa			—	—	—	—	—	—	—						
Lutraria lutraria cf. *jeffreysi*			—	—	—	—	—	—	—						
Panopea menardi			—	—	—	—	—	—	—						
Neverita josephina olla			—	—	—	—	—	—	—						
Ostrea digitalina			—	—	—	—	—	—	—	·····					
Brechites miocaenicus			—	—	—	—	—	—	—	—	—				
Psammobia protracta			—	—	—	—	—	—	—	—	—				
Strombus bonnellii			—	—	—	—	—	—	—	—	—	—			
Latirus valenciennesi			—	—	—	—	—	—	—	—	—	—			
Conus mercati			—	—	—	—	—	—	—	—	—	—			
Barbatia eichwaldi			—	—	—	—	—	—	—	—	—	—			
Thracia pubescens			—	—	—	—	—	—	—	—	—	—			
Beguina crassa cf. *parva*			—	—	—	—	—	—	—	—	—	—			
Chama gryphina			—	—	—	—	—	—	—	—	—	—			
Scutella vindobonensis			—	—	—	—	—	—	—	—	—	—	—		
Aetobatis arcuatus			—	—	—	—	—	—	—	—	—	—	—		
Corbula basteroti cf. *basteroti*			—	—	—	—	—	—	—	—	—	—	—	—	
Discors spondyloides			—	—	—	—	—	—	—	—	—	—	—	—	
Gastrana fragilis cf. *fragilis*			—	—	—	—	—	—	—	—	—	—	—	—	—
Arbacina cf. *monilis*			—	—	—	—	—	—	—	—	—	—	—	—	—
Arca noae			—	—	—	—	—	—	—	—	—	—	—	—	—
Solenocurtus antiquatus cf. *miocaenica*			—	—	—	—	—	—	—	—	—	—	—	—	—
Venus multilamella			—	—	—	—	—	—	—	—	—	—	—	—	—
Linga columbella			—	—	—	—	—	—	—	—	—	—	—	—	—
Ditrupa cornea				—	—	—	—	—	—	·····					
Haliotis volhynica				—	—	·····	·····	·····	—						
Patella valiscatelli?				—	—	·····	·····	·····	—						
Patella miohercule a				—	—	—	·····	·····	—						
Ostrea lamellosa				—	—	—	—	—	—						
Trona aff. *loibersdorfensis*					—	·····	·····	·····	—						
Modiolus hoernesi					—	—	—	—	—	—					
Chama gryphoides					—	—	—	—	—	—					

Table 1 — continuation

	EOCENE	OLIGOCENE	EGERIAN	EGGENBURGIAN	OTTNANGIAN	KARPATIAN	BADENIAN: MORAVIAN	BADENIAN: VIELICIAN	BADENIAN: KOSOVIAN	SARMATIAN	PANNONIAN	PONTIAN	DACIAN	RUMANIAN	RECENT
Glycymeris pilosa cf. *deshayesi*					—	—	—	—	—						
Ancilla obsoleta					—	—	—	—	—						
Conus dujardini dujardini					—	—	—	—	—						
Dentalium cf. *tetragona karreri*					—	—	—	—	—						
Chlamys multistriata					—	—	—	—	—						
Gari affinis					—	—	—	—	—	.....					
Acteocina cf. *lajonkaireana*					—	—	—	—	—		—				
Chlamys varia					—	—	—	—	—						
Glycymeris cor						—	—	—	—						
Bittium reticulatum						—	—	—	—						
Chlamys latissima nodosiformis						—	—	—	—						
Circompalus basteroli aff. *taurinensis*						—	—	—	—						
Siderastrea lomnickii							..	—	—						
Polydora hoplura								—	—						
Crisia cf. *hoernesi*								—	—						
Diloma orientalis orientalis								—	—						
Turritella spirata								—	—						
Cerithium exdoliolum								—	—						
Eocypraea cf. *miobadensis*								—	—						
Conus fuscocingulatus								—	—						
Conus dujardini brezinae								—	—						
Turbonilla scala								—	—						
Striarca rollei?								—	—						
Pecten besseri								—	—						
Atrina pectinata cf. *vindobonensis*								—	—						
Spondylus crassicosta								—	—						
Codakia leonina								—	—						
Codakia haidingeri								—	—						
Cordites partschi								—	—						
Glossus hoernesi								—	—						
Chlamys seniensis								—	—						
Schizoporella unicors?								—	—	—					
Ocenebra cf. *credneri*								—	—	—					
Pecten leythajanus								—	—						
Pecten aduncus								—	—						
Chlamys elegans								...	—						
Crania badensis sp.n.									—						

Table 2. Geographical distribution of the taxa mentioned in this paper in south-western part of Western Carpathians (compiled according to Švagrovský 1981 and other authors). Explanations to the species density: — absent, r — rare (1 to 15 specimens), c — current (16—30 specimens), a — abundant (more than 30 specimens).

	Dúbravská Hlavica	Devín-Terasy	Sandberg	Vinohrady	Rohožník Konopiská	Stupava	Mikulov	Modra Kráľová	Borský Mikuláš
Cliona sp.	r	r	a	a	c	r	a	c	c
Actinastrea sp.	—	r	—	r	r	—	—	—	—
Siderastrea crenulata	—	—	—	r	r	—	—	—	—
Discotrochus sp.	—	—	—	—	c	—	—	—	—
Porites sp.	r	—	—	r	r	—	—	—	—
Flabellum sp.	—	—	—	r	c	—	—	—	—
Serpula sp.	c	a	r	c	a	—	c	—	a
Ditrupa cornea	r	c	a	a	a	—	c	r	c
Polydora hoplura	c	—	—	c	—	—	r	—	c
Crisia cf. *hoernesi*	a	c	c	r	c	r	—	—	r
Schizoporella unicors?	r	r	—	—	—	—	—	—	—
Cryptosula sp.	—	—	c	—	—	—	—	—	r
Crania badensis sp.n.	—	—	—	—	—	—	—	—	—
Diloma orientalis orientalis	c	c	r	a	c	r	r	c	a
Haliotis volhynica	r	r	r	r	—	—	—	—	—
Patella valiscatelli?	r	—	—	—	—	—	—	—	—
Patella mioherculea	r	—	—	—	—	—	—	—	—
Turritella spirata	a	a	a	a	a	c	r	c	a
Cerithium exdoliolum	—	—	—	—	—	—	r	r	—
Bittium reticulatum	r	a	a	c	a	r	c	a	a
Neverita josephina olla	—	r	—	—	—	—	a	a	a
Strombus bonellii	a	—	—	c	—	—	—	—	a
Trona aff. *loibersdorfensis*	r	—	—	—	—	—	—	c	—
Eocypraea cf. *miobadensis*	—	—	r	—	—	—	—	—	—
Zonaria globosa	r	r	—	c	r	—	—	—	c
Ficus condita?	—	r	r	c	—	—	—	—	r
Ocenebra cf. *credneri*	r	—	—	—	c	—	—	—	—
Latirus valenciennesi	r	r	—	—	a	—	r	—	c
Ancilla obsoleta	c	c	c	c	a	—	a	—	c
Conus fuscocingulatus	r	—	c	c	c	r	c	r	c
Conus mercati	c	—	c	c	—	—	c	—	—
Conus dujardini dujardini	—	c	a	a	a	—	r	c	c
Conus dujardini brazinae	—	r	c	a	a	r	r	c	—
Turbonilla scala	r	c	—	—	—	—	—	c	c
Acteocina cf. *lajonkaireane*	—	—	—	—	a	—	—	c	c
Dentalium cf. *tetragona karreri*	r	—	c	—	a	—	r	—	c
Arca noae	—	—	—	—	—	—	—	—	—
Striarca rollei?	—	—	—	—	—	—	c	a	a
Barbatia eichwaldi	—	—	—	—	c	—	—	—	—
Glycymeris pilosa cf. *deshayesi*	r	c	a	a	c	c	c	c	a
Pecten besseri	a	a	a	a	c	c	r	a	a
Pecten leythajanus	r	r	c	r	—	—	—	—	r
Pecten aduncus	a	c	a	a	r	—	c	—	a
Chlamys multistriata	r	c	r	—	c	—	r	—	a
Chlamys sp.2.	—	r	—	—	—	—	—	—	—
Chlamys elegans	r	a	a	a	c	—	—	—	c

	Dúbravská Hlavica	Devín-Terasy	Sandberg	Vinohrady	Rohožník Konopiská	Stupava	Mikulov	Modra Kráľová	Borský Mikuláš
Chlamys latissima nodosiformis	r	r	c	r	—	r	—	—	—
Chlamys varia	r	—	—	—	—	—	—	—	—
Chlamys sp.1.	—	—	—	—	—	—	—	—	—
Chlamys seniensis	—	r	—	—	r	—	—	—	—
Modiolus hoernesi	—	r	—	r	a	—	—	r	r
Atrina pectinata cf. *vindobonensis*	r	c	r	a	r	—	r	—	c
Ostrea lamellosa	a	a	a	c	a	c	r	—	r
Ostrea digitalina	a	c	a	c	r	r	r	c	c
Ostrea sp.	—	—	—	—	—	—	—	—	—
Gryphaea cyathula cf. *cyathula*	a	c	r	c	—	—	r	r	—
Spondylus crassicosta	r	r	c	c	r	—	r	—	—
Anomia ephippium rugulosostriata	r	c	a	a	r	—	c	c	a
Solen sp.	r	—	—	a	—	—	—	—	—
Solenocurtus antiquatus cf. *miocaenica*	r	—	—	—	c	—	—	—	—
Thracia pubescens	c	a	—	a	—	—	—	—	r
Brechites miocaenicus	r	—	r	c	—	r	r	—	c
Lutraria lutraria cf. *jeffreysi*	r	—	r	—	—	—	—	—	—
Psammobia protracta	r	—	—	—	—	—	—	—	—
Gastrana fragilis cf. *fragilis*	r	—	c	a	—	—	—	—	—
Angulus sp.	c	r	—	a	—	—	—	—	—
Panopea menardi	r	c	a	a	—	—	r	—	r
Corbula basteroti cf. *basteroti*	r	—	r	a	a	—	—	c	a
Codakia leonina	r	—	—	c	—	—	r	—	c
Codakia haidingeri	c	—	c	c	—	—	r	—	—
Plastomiltha sp.	r	—	—	c	a	—	—	—	—
Discors spondyloides	—	r	c	a	c	r	—	—	—
Gari affinis	—	—	—	—	r	—	r	—	c
Cardites partschi	a	a	a	a	c	c	a	—	a
Glossus hoernesi	—	a	c	a	c	r	r	—	—
Beguina crassa cf. *parva*	r	r	r	r	—	—	—	—	—
Venus multilamella	c	a	c	—	c	—	c	—	a
Circomphalus basteroti aff. *taurinensis*	r	c	r	r	c	—	r	—	c
Linga columbella	a	r	a	a	r	—	c	r	c
Chama gryphoides	r	—	—	—	c	r	r	—	r
Chama gryphina	r	—	—	—	r	r	—	—	—
Portunus sp.	a	r	c	r	—	r	r	—	—
Plegiocidaris sp.	c	—	—	—	—	—	—	—	r
Arbacina cf. *monilis*	r	—	—	—	r	—	—	—	r
Echinocyamus dacicus	—	—	—	—	—	—	—	—	—
Scutella vindobonensis	c	—	r	c	r	r	—	—	r
Odontaspis acutissima acutissima	r	—	a	—	a	—	—	—	—
Aetobatis arcuatus	r	—	c	—	—	—	—	—	r
Sparus sp.	r	—	a	—	c	—	r	—	c
Cryptozonida?	—	—	—	—	—	—	—	—	—
Litothamniidae	c	c	a	c	a	a	c	c	—
Glycymeris cor	r	c	—	a	c	r	r	c	a

Systematics

This chapter deals with some stratigraphically important taxa as well as with the taxa, which has not been described from the Devinska Kobyla area untill now (nine species, one species is new). As we were unsuccessfull in obtaining of original diagnoses of the species described, we introduce new established diagnoses according to accessible literary data combined with our own observations. On the other hand, *Echinocyamus dacicus* PÁVAY 1874 diagnosis is original one.

Family *Craniidae* MENKE 1828

Genus *Crania* RETZIUS 1781

***Crania badensis* sp.n.**

Plate V, figs. 1—5

Diagnosis: Circular concavoconvex massive shells with reduced ornamentation. Seven pairs of muscle scars on eight muscle bases in posterior part of the shell. Median septum small, low. Pallial canals of pinnate type. Shell edge rimmed with granulated thickened marginal zone.

Holotype: Brachial valve with well preserved pallioglyphes coming from α-member, Šibeničník locality, is deposited in Slovak National Museum collections under inventary number SNM Z 18787.

Paratypes: Four isolated brachial valves deposited in Slovak National Museum collections under No SNM Z 18788—Z 18791, locality is the same.

Material: 28 brachial valves (including typical series), 19 of them are complete, the rest only fragmentarily preserved. Three of them have been collected in γ-member, the others in α-member at Šibeničník locality. Valve surface is often covered by cementing Lithotamnium-like algae, worms, bryozoans, foraminifers and by other fossils and their fragments, another surfaces being slightly abraded or weathered. Merely eight specimens are preserved sufficiently the remnants of sculpture to be observable.

Sizes of the specimens figured:

	width	length
	8,5 mm	9,1 mm
	9,0 mm	8,6 mm
	9,6 mm	8,6 mm
Plate V, figs. 2, 4:	10,4 mm	9,3 mm
	10,8 mm	11,3 mm
Plate V, fig. 5:	11,6 mm	11,0 mm
	13,0 mm	9,1 mm
	13,8 mm	8,8 mm
	17,4 mm	14,8 mm

Locus typicus: Šibeničník-Hill southern slope, localities 1 and 2 (Záhradky section), southern foot of Mt. Devínska Kobyla (Bratislava, ČSSR), (see Fig. 1.).

Stratum typicum: Arcose sands (α and γ members). Upper Badenian — Kosovian (M4d).

Description: The valves are punctate, calcitic, thick-shelled, circular (sometimes rounded rhomboidal) in outline, considerably convex. Maximum width in the middle, or slightly shifted posteriorly (see Text-fig. 4 for size parameters). Outer sculpture consists of strongly reduced ribs, more-less visible in peripheral part of the valve only. Valve surface is mostly smooth, being only irregularly undulated. Umbo is inconspicuous, rounded, situated in the posterior half of the valve (only exceptionally near to the middle part.). Valve height (and convexity) is very variable (2—7 mm). Convexity rate controls the expressiveness of inner morphological elements: supporting devices and sarcoglyphes.

Posterior half of the valve interior surface bears several pairs of muscle scars. Brachial protractors were attached to elevated base formed by antero-dorsal process of median septum. This slender triangular element is divided by longitudinal median ridge into two muscle scars (Text-fig. 3.). Several other muscles (brachial elevators, anterior adductors, oblique inner muscle) attached to strongly developed pair of diversified 1,5—2 mm high bases derived of medial terminations of plates, which converge obliquely from posterolateral valve margins (see Text-figs. 3—4 for size of these bases). These plates are low,

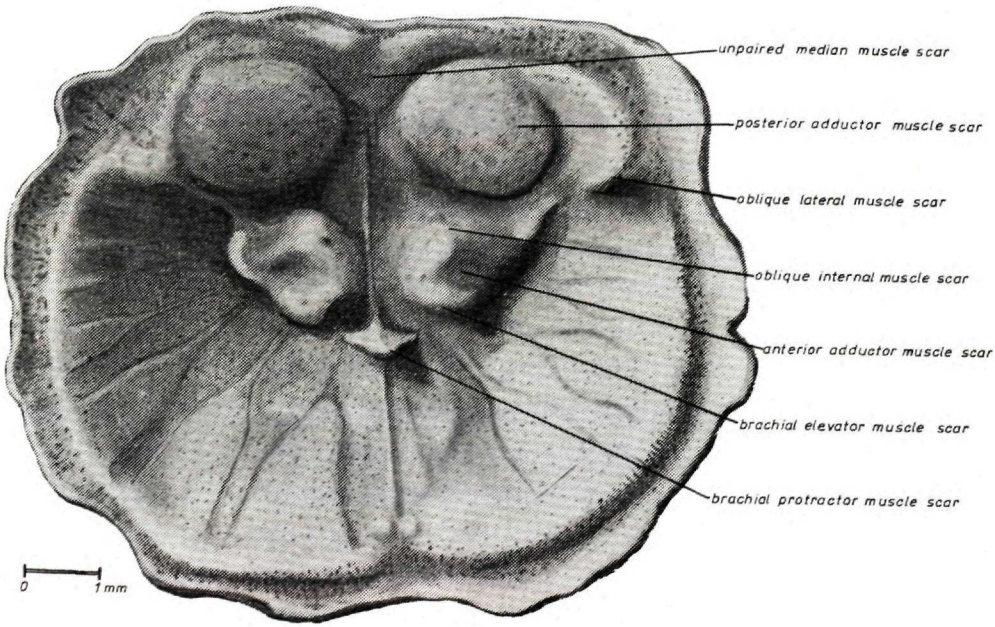

Fig. 3 The interior of brachial valve of *Crania badensis* sp.n. Original J. MICHALÍK

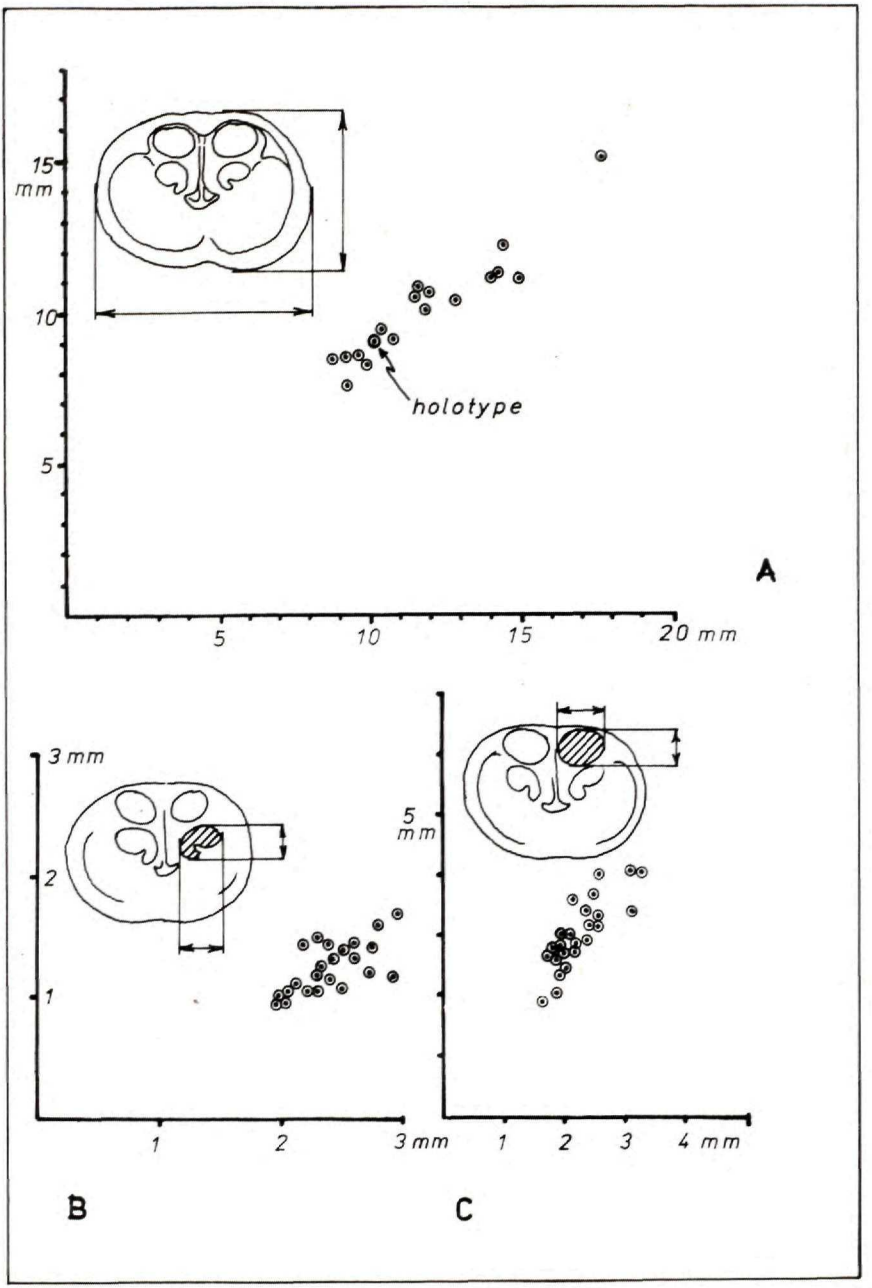

Fig. 4 Comparison of several parameters on *Crania badensis* sp.n. brachial valves. A — lengt (width ratio, B — length) width ratio of anterior muscle fields, C — the same of posterior m. fields.

indistinct, terminated posteriorly by another process, bearing the base of oblique lateral muscle. The most extensive bases, situated in posterior half of the valve belonged to posterior adductors. They are elliptic to circular in outline, button-like elevated above valve bottom (see Text-figs. 3—4 for their size). Posterior middle part of the fringe is slightly depressed and triangularly widened forming indistinct platform of unpaired median muscle. Distinct dark colour of the muscle platforms indicates development of myotest. Median septum is low, approximately 1 mm elevated above valve bottom and (as a rule, in the valve centre) terminated by variable shaped but almost sharply triangular median process. Septum lenght is equal to 1/8—1/10 (1/5—1/14 as an extreme) of valve lenght. The palioglyphes are more distinct anteriorly from muscle platforms. They consist of simply pinnate (3—7) canals, running from lateral visceral part of valve. Brachial valve edge is rimmed by distinctly thickened 1—2 mm wide granulated fringe (Text-fig. 3).

Stratigraphical and geographical distribution: Kosovian marine sands, Devín-Záhradky section at Šibeničník locality.

Family *Patellidae* RAFINESQUE 1815
Genus *Patella* LINNAEUS 1758
Subgenus *Patella* LINNAEUS 1758

Patella (Patella) miocaerulea SCHAFFER 1912
Plate VI., fig. 3

Material: Three complete shells and 18 fragments.

Parameters:

	Length	width	height
	18,7 mm	13,9 mm	13,8 mm
	20,0 mm	15,3 mm	15,1 mm
Pl. VI, fig. 3:	21,4 mm	16,5 mm	16,2 mm

Diagnosis: funnel-shaped shells of elliptical outline bear numerous (70—90) variable thick radial ribs, crossed by 3—4 less pronounced concentric growth ribs. Umbo situated centrally. Muscle scars of horse-shoe outline.

Comparison: Investigated specimens are more oval and more expressively radially ribbed if compared with STEININGER'S (1971) specimens. On the other hand, the rib number and shape as well as the general sculpture pattern of both the sample series are quite identical.

West Carpathian occurrences: Šibeničník (Devín-Záhradky) locality, scarcely also Dúbravská Hlavica-Hill locality.

Stratigraphical and geographical distribution: Eggenburgian (Ml) Roggendorf locality in Alpine Fore-deep (STEININGER 1971), Badenian localities in Vienna Basin.

Family *Pectinidae* LAMARCK 1801
Genus *Chlamys* BOLTEN in RÖDING 1798

Chlamys varia **LINNAEUS 1758**
Plate VI, fig. 2.

1939 — *Chlamys varia* LINN.—ROGER, p. 157., pl. 22., figs. 21—23.
1973 — *Chlamys varia* LINN.—STEININGER, p. 479, pl. 15., fig. 4./cum syn.

Material: seven damaged valves, 56 fragments.

Parameters:

	width	lenght
	16,5 mm	21,6 mm
	18,6 mm	23,7 mm
	25,1 mm	30,5 mm
	30,9 mm	32,1 mm
Plate VI, fig. 2:	32,8 mm	41,0 mm

Diagnosis: equally convex slightly elongated shells with 25—27 spiny radial ribs. Unequal alae bear 3—4 or 5—6 ribs, respectively. One large muscle scar.

Comparisons: Shell outline and number of ribs in specimens investigated are comparable with those described in STEININGER (1973). The latter specimens differ in having less expressive spines on the ribs.

West Carpathian occurrences: Borský Mikuláš, Šibeničník (Devín--Záhradky locality: α, β, γ members), less frequent also in Dúbravská Hlavica--Hill and in Rohožník (Konopiská locality).

Stratigraphical and geographical distribution: Egerian (OM) Várpalota locality in Pannonian Basin (STEININGER 1973) to Recent Mediterranean Sea.

Family *Psammobiidae* FLEMING 1828
Subfamily *Psammobiinae* FLEMING 1828
Genus *Gari* SCHUMACHER 1817
Subgenus *Psammobia* LAMARCK 1818

***Gari (Psammobia) affinis* (DUJARDIN 1837)**
Plate VI, fig. 4

1910 *Psammobia affinis* DUJARDIN—COSSMANN et PEYROT, p. 297, pl. 10, figs. 38—40., pl. 11, figs. 10—13.
1973 *Gari (P.) affinis* (DUJ.)—PAPP et al., p. 524, pl. 26, fig. 11.

Material: six damaged specimens with identifiable sculpture and shape.

Parameters:

	width	length
Plate VI, fig. 4	18,6 mm	9,7 mm
	20,9 mm	11,9 mm
	25,9 mm	16,9 mm
	29,8 mm	12,7 mm
	30,1 mm	21,3 mm

Diagnosis: Thin-shelled elongated shells with rounded anterior margin, but obliquely cutted posterior end. Fine concentric sculpture comprises also 2—3 rounded posterior radial costae. Umbo central. Hinge of each valve consists of two cardinal teeth.

Comparisons: Very similar *Costedoleda psammobiaeformis* has taxodont hinge and slightly anteriorly shifted umbo. Our specimens have identical sculpture, but more elongated outline if compared with the specimens figured in STEININGER et col. (1973).

West Carpathian occurrences: Borský Mikuláš, Šibeničník (Devín-Záhradky, β-member), rarely Konopiská by Rohožník (all the localities are situated in the Vienna Basin).

Stratigraphical and geographical distribution: Ottnangian Várpalota locality (v-133) in Pannonian Basin (STEININGER et col., 1973), Badenian sediments of the Vienna Basin.

Familia *Clavagellidae* D'ORBIGNY, 1843
Genus *Brechites* GUETTARD, 1770

***Brechites miocaenicus* (VADÁSZ, 1906)**
Plate VII, fig. 5

1906 *Aspergillum miocaenicum* n.sp. — VÁDÁSZ, p. 270, pl. 10, fig. 6.
11971 *Brechites miocaenicus* (VAD.) — STEININGER et col., p. 472, pl. 50, fig. 4.

Material: 16 complete nuclei with part of burrows.
Parameters: width 19, 6 to 28,3 mm; length 10,8 to 21,4 mm

Diagnosis: small egg-like shells. Vigorous anterior tubus consists of numerous small pipes, wide siphon is situated posteriorly. Umbo shifted anteriorly. Complete shells usually occur in fillings of wide and up to 15 cm long siphon with preserved fragments of organic substance.

Comparisons: Anterior margin of the specimens investigated is more subtle and more rounded than otherwise identical Steininger's (1971) specimens.

West Carpathian occurrences: With exception of our Šibeničník (Devín-Záhradky, α-member) locality, mentioned species is most abundant in Vinohrady (ŠVAGROVSKÝ 1981), Borský Mikuláš, Piesočník (Sandberg), Dúbravská Hlavica, Devín-Terasy a Mikulov localities.

Stratigraphical and geographical distribution: Central and Eastern Paratethys during all the Miocene (with culmination during Badenian).

Family *Fibulariidae* GRAY, 1855
Genus *Echinocyamus* van PHELSUM, 1774

Echinocyamus dacicus PÁVAY, 1874

1874 *Echinocyamus dacicus* sp.n. PÁVAY, p. 248, pl. 8., figs. 7 a—c, a′—c′.

Material: six completely preserved shells.

Parameters:

width	length
2,6 mm	3,0 mm
3,0 mm	3,6 mm
3,2 mm	4,1 mm
5,4 mm	7,2 mm
7,3 mm	9,1 mm

Diagnosis: Vaulted egg-shaped discoidal shell with pillow-like margins and deeply concave base. Umbo situated centrally. Internal septa radially arranged. Ambulacra long, spear-shaped, closed below. Pores inequivalent, furrows not connected transversally. Centrally situated mouth under madreporite plate is rimmed by perioral funnel. Relatively large anus in the middle between mouth and posterior margin.

Comparisons: Our material is practically identical with the Pávay's (1874) specimens (with exception of lesser size of the later group: width being 2—5 mm, length 5—12 mm).

West Carpathian occurrences: Šibeničník, Devín-Záhradky locality, β-member.

Stratigraphical and geographical distribution: Central Paratethyan Eocene localities (Hungarian Buda- and Roumanian Claudiopolis localities, cf. PÁVAY 1874); Vienna Basin Miocene localities.

References

ATANACKOVIĆ, M. A. 1969: Analyse paléontologique et biostratigraphique de la faune tortonienne de la région de Podkozarje (Bosnie Nord-Occidentale). Acta geol., 6, Zagreb, 223—234.

BÁLDI, T.—SENEŠ, J. 1975: Chronostratigraphie und Neostratotypen. Miozän OM Egerien. Veda SAV, Bratislava. 1—580.

COSSMANN—PEYROT, J. 1910: Conchologie Néogènique de la Aquitanie 2. Actes Soc. Linn., 69, Bordeaux, 157—365.

CSEMEGHY—MEZNERICS, I. 1960: Pectinidés du Néogène de la Hongrie et leur importance biostratigraphique. Mém. Soc. géol. France, N. S. Mém., 92, Paris, 1—58.

KOROBKOV, I. A. 1954: Spravočnik i metodičeskoje rukovodstvo po tretičnym molljuskam. Gostoptechizdat, Leningrad. 1—444.

KOUTEK, J.—ZOUBEK, B., 1937: Vysvětlivky ke geologické mapě v měřítku 1 : 75 000, list Bratislava 4758. Stát. geol. ústav ČSR. Praha, 1—150.

PÁVAY, E. 1874: A Budai márga ásatag tüskönczei. Die fossilen Seeigel des Ofner Mergels. In: Természetrajz. Khór és Wein Könyvnyomdája. Budapest, 251—335.

ROGER, M. 1939: Le genre Chlamys dans les formations néogènes de l'Europe. Mém. Soc. géol. France, n.s., 40, Paris 1—294.

SENEŠ, J. 1955: Stratigrafický a biofaciálny výskum niektorých sedimentov východného Slovenska na základe makrofauny. Geol. Práce, Zošit, 40, Geol. Úst. D. Štúra Bratislava, 1—49.

SCHALEKOVÁ, A. 1969: Zur näheren Kenntniss der Corallinaceen im Leithakalk des Sandbergs bei Devínska Nová Ves (Theben-Neudorf) in der Südwestslowakei. Acta geol. geogr., Geol. 18, Bratislava, 93—102.

SMITH, H. C. 1847: On the algae of the Tertiary Beds of the Tagus. London, 1—45.

STEININGER, F. et col. 1971: Chronostratigraphie und Neostratotypen. Miozän M_1 Eggenburgien. Veda SAV, Bratislava, 1—827.

STEININGER, F. 1973: Die Anthozoen — Fauna des Ottnangien. In: PAPP A.—RÖGL F.—SENEŠ J. (eds.): Chronostratigraphie und Neostratotypen. Niozän M_2 Ottnangien. Veda SAV, Bratislava, 356—379.

STEININGER, F et col. 1973: Die Molluskenfaunen des Ottnangien. In: PAPP A.—RÖGL F.—SENEŠ J. (eds.): Chronostratigraphie und Neostratotypen. Miozän M_2 Ottnangien. Veda SAV, Bratislava, 380—615.

STEININGER, F.—SCHULTZ, O.—STOJASPAL, F. et al. 1978 :Die Molluskenfauna des Badenien. In: Chronostratigraphie und Neostratotypen. Miozän M_4 Badenien. Veda SAV, Bratislava, 327—405.

ŠVAGROVSKÝ, J., 1981: Lithofazielle Entwicklung und Molluskenfauna des oberen Badeniens (Miozän M_{4g}) in dem Gebiet Bratislava-Devínska Nová Ves. Západné Karpaty, Paleont. 7, Geol. Úst. D. Štúra, Bratislava, 1—203.

TEJKAL, J.—ONDREJÍČKOVÁ, A.—CSEPREGHY-MEZNERICS, I. 1967: Die Mollusken der Karpatischen Serie. In: CICHA I. et al. (eds.): Chronostratigraphie und Neostratotypen. Miozän M_3 Karpatien. Veda SAV, Bratislava, 149—212.

VÁDÁSZ, I., 1906: Über die obermediterrane Fauna von Budapest-Rakos. Földtani közlöny, 36, Budapest, 1—36.

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Table 3. Stratigraphical distribution of important fossils in individual lithostratigraphical units of the Šibeničník (Devín-Záhradky) section.

Šibeničník (Devín-Záhradky)	α	β	γ	δ	ε	ζ
Ostrea sp.	■					
Acteocina cf. *lajonkaireana*	■					
Ancilla obsoleta	■					
Eocypraea cf. *miobadensis*	■					
Portunus sp.	■	■	■			
Anomia ephippium rugulosostriata	■	- - -	- - -	- - -	- - -	
Crisia cf. *hoernesi*	■	■	■	■	- - -	
Pecten aduncus	■	■	■	■	- - -	
Ostrea lamellosa	■	■	■	■	■	
Pecten besseri	■	■	■	■		■
Arca noae						
Solen sp.						
Corbula basteroti cf. *basteroti*						
Gari affinis						
Siderastrea crenulata						
Flabellum sp.						
Cerithium exdoliolum						
Arbacina cf. *monilis*						
Echinocyamus dacicus		■				
Dentalium cf. *tetragona karreri*						
Chama gryphoides						
Ditrupa cornea						
Cardites partschi			- - -			
Glossus hoernesi			- - -		■	
Gryphaea cyathula cf. *cyathula*		■	■	- - -		
Atrina pectinata cf. *vindobonensis*						
Psammobia protracta						
Plastomiltha sp.						
Glycymeris cor						
Chlamys sp.1.						
Chlamys sp.2.			■			
Glycymeris pilosa cf. *deshayesi*			■			
Pecten leythajanus			■			
Turritella spirata				- - -	- - -	
Bittium reticulatum			■	- - -	- - -	■
Beguina crassa cf. *parva*						
Codakia haidingeri						
Panopea menardi						
Angulus sp.						
Lutraria lutraria cf. *jeffreysi*						
Schizoporella unicors?						
Thracia pubescens					■	
Gastrana fragilis cf. *fragilis*					■	
Chlamys seniensis					■	
Turbonilla scala						
Polydora hoplura			■			

Table 3 — continuation

Šibeničník (Devín-Záhradky)	α	β	γ	δ	ε	ζ
Neverita josephina olla						
Ocenebra cf. *credneri*						
Codakia leonina						
Circomphalus basteroti aff. *taurinensis*						
Chama gryphina						
Aetobatis arcuatus						
Sparus sp.						
Ficus condita?						
Striarca rollei?						
Discors spondyloides						
Odontaspis acutissima acutissima						
Discotrochus sp.						
Cryptosula sp.						
Chlamys latissima nodosiformis						
Spolenocurtus antiquatus cf. *miocaenica*						
Conus dujardini brezinae						
Conus fuscocingulatus						
Barbatia eichwaldi						
Linga columbella						
Chlamys varia						
Conus mercati						
Haliotis volhynica						
Modiolus hoernesi						
Cryptozonida?						
Chlamys elegans						
Diloma orientalis orientalis						
Zonaria globosa						
Patella valiscatelli?						
Patella mioherculea						
Trona aff. *loibersdorfensis*						
Brechites miocaenicus						
Plegiocidaris sp.						
Actinastrea sp.						
Conus dujardini dujardini						
Latirus valenciennesi						
Crania badensis sp.n.						
Porites sp.						
Venus multilamella						
Strombus bonellii						
Spondylus crassicosta						
Scutella vindobonensis						
Chlamys multistriata						
Serpula sp.						
Litothamniidae						
Cliona sp.						
Ostrea digitalina						

Jozef Michalík—Kamil Zágoršek

Biostratigrafia, litofaciálny vývoj a fauna bádenských sedimentov v profile Devín-Záhradky

Resumé

Práca opisuje málo známu paleontologickú lokalitu Devín-Záhradky ležiacu asi 1 km východne od Devína, južne od Devínskej Kobyly na južných svahoch Šibeničníku (kóta 310).

Štúdium bolo zamerané na litologický opis lokality a na jej makrofaunu. Nájdené druhy (hlavne *Pecten aduncus, P. leythajanus, Conus fuscocingulatus, Crisia* cf. *hoernesi*) potvrdzujú vrchnobádenský vek tohto súvrstvia.

Na lokalite a v jej najbližšom okolí sme rozlíšili šesť litologicky a faunisticky odlišných členov. Spodné štyri sú tvorené hrubozrnným klastickým materiálom — arkózovitými pieskami, ktoré obsahujú bohatú a diverzibilnú asociáciu makrofauny mäkkýšov. Jednotlivé členy sa od seba odlišujú zrnitosťou, textúrou, materiálovým zložením a odlišnými asociáciami fauny. Najspodnejší vrstevný člen arkózovitých pieskov vznikol sedimentáciou málo triedeného a nepatrne opracovaného zvetralinového materiálu z malokarpatského kryštalinika. Ďalší člen vznikol v príbrežnej zóne, postihovanej účinkami búrkového vlnenia. Následné dve polohy sú tvorené ostrohrannými úlomkami starších hornín.

V nadloží arkózovitých pieskov leží poloha jemnozrnného žltkastého slieňa bez hrubšej klastickej primesi. Sediment obsahuje biostromatické telieska, zložené zo schránok ústric, machoviek a riasových hľúz. Typickou fosíliou tejto polohy je *Ostrea lamellosa* BROCCHI 1814 zachovaná v pozícii rastu a v prirodzenom spoločenstve ostatných živočíchov.

Nad slieňom sa nachádzajú onkolitické vápence zložené z riasových hľúz a ich čiastočne opracovaných úlomkov. Sú produktom biogénnej sedimentácie v oblasti fotickej zóny plytčín (pravdepodobne litorálne pásmo). V nej tvorili súvislé porasty litotamniové riasy, ktorých trsy boli príbojom rozrušené a opracované.

V systematickej časti opisujeme nový druh inartikulárneho brachiopóda *Crania badensis* sp.n. a ďalších osem taxónov ešte z Devínskej Kobyly doteraz neznámych. V tabuľke 1 podávame výpočet všetkej tu nájdenej makrofauny.

Tab. 1 Stratigrafické rozšírenie jednotlivých taxónov na lokalite Šibeničník (Devín-Záhradky). Zostavené podľa rôznych zdrojov.
Tab. 2. Geografické rozšírenie taxónov uvedených v tejto práci v juhozápadnej časti Západných Karpát (zostavené podľa Švagrovského 1981 a iných autorov). Vysvetlivky k hustote rozšírenia druhov: — chýba, r — zriedkavý (1 až 15 jedincov), c — bežný (16 až 30 jedincov), a — hojný (viac ako 30 jedincov).
Tab. 3 Stratigrafické rozšírenie významných fosílií v jednotlivých litostratigrafických jednotkách profilu Šibeničník (Devín-Záhradky).

Obr. 1 Geografická lokalizácia (dolný ľavý roh) a geologický náčrt lokality Devín-Záhradky na južnom svahu Šibeničníka pri Bratislave. Schéma lokalizácie: biele — neogénne sedimenty (čiastočne s kvartérnym pokryvom), križiky — predneogénny podklad. Geologický náčrt: bodkované — piesky, kruhy — hrubo opracovaný detrit, trojuhoľníky — ostrohranné klasty, tehlovité šrafovanie — vápence. Grécke iniciálky: litostratigrafické jednotky (viď písaný text), arabské čísla — miesta zbierania fosílií.
Obr. 2 Vertikálny litologický profil popísaným vrstevným sledom (vysvetlivky v texte). Vertikálny rozmer silne prevýšený.
Obr. 3 Vnútrajšok chrbtovej misky *Crania badensis* sp.n. Originál J. MICHALÍK.
Obr. 4 Porovnanie niekoľkých parametrov na chrbtových miskách *Crania badensis* sp.n.
A — pomer dĺžka/šírka, B — pomer dĺžka/šírka predných polí svalových odtlačkov, C — to isté u zadných polí svalových odtlačkov.

Explanations to Plates V—VII

Plate V

1—5 *Crania badensis* sp.n., Šibeničník-Hill, Devín-Záhradky locality.
1—2 Specimen No SNM Z-18 788, α-member, magn. 4× (Fig. 1) and 3× (Fig. 2), respectively;
3—4 Holotype specimen No SNM Z-18 787, γ — member, magn. 3×.
5 α — member. specimen No SNM Z-18 789, magn. 4×.
6 *Chlamys* sp. 1., Šibeničník-Hill, γ — member, magn. 3×.

Plate VI

1 *Chlamys* sp. 2., Šibeničník-Hill, Devín-Záhradky locality, β — member, magn. 1,5×.
2 *Chlamys varia* LINNAEUS 1758, α — member, magn. 1,6×.
3 *Patella (P.) mioherculae* SCHAFFER 1912, γ — member, magn. 3,5×.
4 *Gari (P.) affinis* (DUJARDIN 1837), β — member, magn. 2×.

Plate VII

1—2 *Ostrea* sp., Šibeničník-Hill, α — member, magn. 3× (interior side),
3—4 *Ostrea* sp., Šibeničník-Hill. α — member, magn. 3× exterior view.
5 *Brechites miocaenicus* (VADÁSZ 1906), α — member, magnification 2×. All the photos have been made by C. Michalíková.

Vysvetlivky k fotografickým tabuľkám

Tabuľka V

1 *Crania badensis* sp.n.; vrstvený člen γ, 4× zväčšené
2 *Crania badensis* sp.n.; vrstevný člen α, 3× zväčšené; holotyp
3 *Crania badensis* sp.n.; vrstevný člen γ, 3× zväčšené; rovnaký exemplár ako obr. 1, len iný uhol osvetlenia
4 *Crania badensis* sp.n.; vrstevný člen α, 3× zväčšené; holotyp, iný uhol osvetlenia
5 *Crania badensis* sp.n.; vrstevný člen α, 4× zväčšené
6 *Chlamys (A) macrotis* (SOWERBY, 1847); vrstevný člen γ, 3× zväčšené

Tabuľka VI

1 *Chlamys (A) malvinae* (DUBOIS, 1851); vrstvený člen β, 1,5× zväčšené
2 *Chlamys varia* LINNÉ, 1758; vrstevný člen α, 1,6× zväčšené
3 *Patella (P) mioherculea* SCHAFFER, 1912; vrstevný člen γ, 3,5× zväčšené
4 *Gari (P) affinis* (DUJARDIN, 1837); vrstevný člen β, 2× zväčšené

Tabuľka VII

1 *Vulsella (V.)* cf. *deperdita* LAMARCK; vrstevný člen α, 3× zväčšené, vnútorná strana
2 *Vulsella (V.)* cf. *deperdita* LAMARCK; vrstevný člen α, 3× zväčšené, vnútorná strana
3 *Vulsella (V.)* cf. *deperdita* LAMARCK; vrstevný člen α, 3× zväčšené, vonkajšia strana exempláru na obr. 2
4 *Vulsella (V.)* cf. *deperdita* LAMARCK; vrstevný člen α, 3× zväčšené. Vonkajšia skulptúra exempláru na obr. 1
5 *Brechites miocaenicus* (VADÁSZ, 1906); vrstevný člen α, 2× zväčšené

Fotografovala C. Michalíková

Západné Karpaty, séria paleontológia 11, P. 57—76, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Štefan Meszároš

Anomálie schránok mäkkýšov z vrchnobádenských sedimentov lokalít okolia Malých Karpát

5 fotogr. tabuliek (VIII—XII) anglické resumé

Abstrakt. V práci sú rozdelené zistené patologické a teratologické anomálie schránok fosílnych mäkkýšov, z morských vrchnobádenských sedimentov (M 4-d) viedenskej a podunajskej panvy, z lokalít v okolí Malých Karpát. Podľa ich známej alebo predpokladanej etiológie a patogenézy boli rozdelené do štyroch skupín. Tieto sú symptomaticky charakterizované s následným uvedením konkrétnych príkladov.

Systematickými zbermi z vrstiev vrchného bádenu okolia Malých Karpát som získal v rokoch 1979—1983 pomerne bohaté kolekcie fosílnej fauny, v ktorých sú najbohatšie zastúpené schránky mäkkýšov. Pri podrobnejšom spracúvaní tohto materiálu som zistil prítomnosť väčšieho množstva anomálnych jedincov. Tieto sú z hľadiska paleobiológie, ale i paleoekológie veľmi zaujímavými nálezmi. Z uvedenej oblasti neboli ešte podobné anomálie schránok mäkkýšov komplexnejšie spracované. Z týchto dôvodov som spomenuté nálezy podrobil dôkladnej analýze, ktorej výsledky tu predkladám.

Uvedomujem si, že predložená práca nevyčerpáva úplne danú problematiku. Nedovoľuje to množstvo okolností a nie je to ani mojím cieľom. Má byť skôr podnetom, upriamujúcim pozornosť aj na tieto otázky.

Anomálne jedince, ktoré v práci opisujem, pochádzajú z morských sedimentov, patriacich k vrchnému bádenu (M 4-d) viedenskej a podunajskej panvy. Sú z nasledujúcich lokalít:

— Okolie Devínskej Kobyly (Bratislava) — Devínska Nová Ves-Sandberg, vinohrady „Útočnica",
— Rohožník, ťažobná jama — ílovisko Cementární „Záhorie",
— Borský Mikuláš, terasy novozakladaného vinohradu JRD — „Vinohrádky",
— Smolenice, časť — Stanová, materiál z kopanej studne,
— Modra-Kráľová, materiál z výkopu základov ZDŠ,

Presnejšie údaje o miestach nálezov uvádzam pri jednotlivých opisoch.

Š. Meszároš, Kuklovská 5, 841 04 Bratislava

Rozdelenie anomálií schránok

Rôzne typy zistených anomálií schránok som rozdelil podľa ich charakteru, do dvoch základných skupín. Sú to patologické anomálie v širšom slova zmysle a teratologické anomálie v širšom slova zmysle.

Patologické anomálie som ďalej delil na dve skupiny: na posttraumatické deformácie a novotvary, a na patologické anomálie (s. s.).

Teratologické anomálie, ako anomálie z porúch vnútorného pôvodu som rozdelil na teratologické anomálie (s. s.) a senilné deformácie.

Rozdelenie anomálií schránok podľa ich známej alebo predpokladanej etiológie a patogenézy prehľadne znázorňuje nasledujúca tabuľka.

Tabuľka 1

Základné rozdelenie	Podrobné rozdelenie anomálií	Predpokladané príčiny anomálií
Patologické anomálie (sensu lato)	Posttraumatické deformácie a novotvary	Mechanické poškodenia živočíchov
		Vniknutie cudzích telies do schránok
		Poškodenie vŕtavými organizmami
	Patologické anomálie (sensu stricto)	Poškodenie parazitmi
		Ochorenia neznámej etiológie
Teratologické anomálie (sensu lato)	Teratologické anomálie (s. s.)	Odlišná funkcia alebo tvar orgánov
	Senilné deformácie	Starobné zmeny orgánov

Priradenie konkrétnych fosílnych nálezov k určitému typu anomálií je pomerne obťažné. Má to viacero príčin. Napríklad u väčšiny nálezov ide zvyčajne o neúplný materiál zmenený fosilizáciou, na ktorom anomálie nemusia byť vždy zreteľne zachované. Ďalej rôzne príčiny vzniku mohli viesť k vytvoreniu morfologicky podobných abnormít. Pri teratologických anomáliách je pomerne nejasná aj hranica medzi postihnutými jedincami a exemplármi s fyziologicky normálnym tvarom schránky (napríklad u taxónov so širokou vnútrodruhovou tvarovou variabilitou). Rozličné anomálie sa tiež nevyskytujú iba jednotlivo. Bývajú často rôzne kombinované, čo môže spôsobiť aj potlačenie niektorých ich charakteristických znakov. Preto nemusia byť vždy typicky vyvinuté.

Vzhľadom na rozsah predloženej práce pri výbere materiálu pre opisy snažil som sa vystihnúť exempláre s manifestnými znakmi jednotlivých typov anomálií.

Posttraumatické deformácie a novotvary schránok mäkkýšov, z príčin mechanického poškodenia

Tieto defekty schránok fosílnych mäkkýšov možno rozdeliť podľa predpokladaných príčin vzniku do troch skupín:

1. skupina — mechanické poškodenia schránok bez trvalého postihnutia plášťa mäkkýša;
2. skupina — mechanické poškodenie schránok a plášťa živočícha s trvalým zjazvením;
3. skupina — mechanické poškodenia zámky schránky s následným vytvorením novotvarov.

Prvá skupina združuje deformácie schránok, u ktorých príčinou boli rôzne zlomeniny, bez súčasného poranenia plášťa živočícha, alebo s jeho slabým, bez následkov vyhojiteľným poškodením. Mohli vzniknúť po náraze živočícha na tvrdý predmet v okolí, ale aj po napadnutí predátormi. Prejavujú sa ako rôzne nepravidelnosti prírastkov, až zjazvené miesta na povrchovej skulptúre. U ulitníkov, pri rozsiahlejšom poškodení ústia, môže dôjsť k nepresnému nasadaniu ďalších prírastkov schránky, v niektorých prípadoch až ku zmene smeru osi vinutia. Vo všetkých prípadoch majú však ďalšie prírastky schránok bezo zmien charakteristickú skulptúru. Uvedené deformácie bývajú na schránkach fosílnych mäkkýšov veľmi časté a patria k bežným nálezom.

Poškodenia druhej skupiny boli z hľadiska postihnutých živočíchov oveľa závažnejšie práve kvôli ťažším poraneniam plášťa. Príčiny ich vzniku sú podobné ako u prvej skupiny. Plášť mal v poškodenom mieste trvale zmenenú schopnosť produkovať vrstvy schránky, čo sa prejavovalo až do konca života živočícha zmenou jej tvaru, skulptúry a hrúbky. U lastúrnikov bývajú tieto deformácie vyvinuté iba lokálne. Naproti tomu ulitníky, pretože majú relatívne krátky okraj plášťa, sú poškodené ťažšie a často všetky nasledujúce závity majú výrazne zmenenú skulptúru. Podľa charakteru zranenia možno ešte rozoznať dve základné formy týchto úrazov. Je to forma plošná, pri postihnutí väčšieho úseku plášťa a forma bodová. Obe formy sa od seba vzhľadovo dosť odlišujú, hoci majú spoločnú patogenézu. Obrazom prvej formy sú rôzne plošné znetvoreniny, deformujúce štruktúru, povrchovú skulptúru a často výrazne aj obrys schránky. Druhá forma nemusí byť až natoľko nápadná. Dochádza pri nej k vytvoreniu ostrých brázd — jaziev so zvrásnenými okrajmi alebo len k rozdeleniu rebra na povrchovej skulptúre a podobne.

Tretiu skupinu predstavujú nálezy šiestich schránok lastúrnika druhu *Glycymeris (G.) pilosa deshayesi* (MAYER) s veľmi kuriózne postihnutou zámkou. Spomínané jedince boli zrejme pootvorené, vystavené silnému úderu, pričom došlo aj k vzájomnému posunutiu lastúr. Niektoré zuby v zámke tento náraz zlomil. Postihnutý lastúrnik výlučkami plášťa zámku síce opravil, ale vznikli tak rôzne deformácie trvalého charakteru. Prejavujú sa ako rozštiepenia zubov alebo zuby získali iný smer a podobne. Voľné úlomky zubov, ktoré sa správali ako cudzie telesá, živočícha dráždili. Preto ich obalil výlučkami a vytvoril tak

prirastené alebo voľné perly. V priebehu ďalšieho rastu jedinca perly svojím objemom zatláčali okolité zuby. V zámkovej ploche oboch lastúr sa tým vytvorili akési lôžka zodpovedajúceho tvaru. Hoci vznikli tieto komplikované deformácie, funkcia zámky bola aj naďalej zachovaná.

Príklady posttraumatických deformácií a novotvarov schránok na konkrétnych nálezoch

***Conus (Chelyconus) fuscocingulatus* M. HOERNES 1856**
(Tab. VIII, obr. 4)

Materiál: 5 pomerne dobre zachovaných schránok s vyhojenými zlomeninami

Lokalita: Borský Mikuláš-„Vinohrádky" — staré a nové odkryvy.

Rozmery: Tab. VIII, obr. 4. — výška 33,9 mm, šírka 20,8 mm

Anomálne znaky: Všetky spomenuté jedince nesú zreteľné stopy po zlomeninách ústia alebo aj časti telesného závitu. Po následnom zajazvení poškodeného úseku boli produkované normálne prírastky hmoty schránky v celej dĺžke ústia. Schránka tak získala skoro normálny obrys, čo naznačuje, že plášť živočícha nebol postihnutý. Pretrvávajúcim defektom okrem zajazveného miesta bola u ťažšie poškodených jedincov zmena smeru sifonálneho kanálika. Zapríčinilo ju zajazvenie zlomeniny. Odchýlka od normálneho smeru však nepresahuje viac ako 25°, čo pre živočícha nemohlo byť citeľným obmedzením.

Výskyt: Podobné defekty schránok sú veľmi časté aj u iných taxónov fosílnych mäkkýšov. V materiáli, ktorý som mal k dispozícii, boli zastúpené od drobných poškodení, prejavujúcich sa iba nepravidelnosťami prírastkových línií až po rozsiahle zlomeniny schránok, výrazne deformujúcich tvar. U niektorých ulitníkov rodu *Turritella* bola dokonca ako poúrazový defekt pozorovateľná zmena smeru osi vinutia ďalších závitov.

***Chlamys (Macrochlamys) latissima nodosiformis* (M. SERES in G. PUSCH 1837)**
(Tab. VIII, obr. 1—3)

Materiál: Jedna poškodená kompletná schránka.

Lokalita: Devínska Nová Ves-Sandberg.

Rozmery: Výška — 195,0 mm, šírka — 201,7 mm.

Anomálne znaky: V blízkosti dorzálneho okraja ľavej lastúry je 63 mm dlhá fraktúra oblúkovitého tvaru, vyhojená ostro vykrojenou jazvou. Tvar jazvy a jej povrchový vzhľad naznačujú, že plášť živočícha nebol po vyhojení zranenia schopný normálnej produkcie hmoty lastúry. Postihnutý je aj vnútorný povrch ľavej lastúry, na ktorom v poškodenom mieste vidno zaoblený výbežok, čnejúci dovnútra schránky. Na pravej lastúre, v zodpovedajúcej rovine,

je na vnútornom povrchu trojuholníková jamka, do ktorej spomínaný výbežok zapadal. Povrchová skulptúra pravej lastúry bola v mieste poranenia postihnutá iba nepatrne a ďalej nasledujú prírastky s normálnou skulptúrou. Okraj lastúry je tu však mierne vykrojený zrejme preto, aby aspoň čiastočne zodpovedal obrysu ľavej lastúry a nedochádzalo tak k väčšiemu obnažovaniu tejto časti voľného okraja plášťa.

Príčiny poškodenia: Pretože v tomto prípade ide o starého jedinca, ktorého schránka bola veľmi masívna a pevná, možno vylúčiť ako príčinu poranenia útok krabov alebo menších rýb. Toto zranenie nemohlo vzniknúť vzhľadom na okolitý piesčitý sediment ani nárazom o pevný predmet na dne. Do úvahy prichádza iba útok väčších dravcov.

Poznámky: Zaujímavým faktom je, že v opisovanom prípade, i keď došlo k rozsiahlej fraktúre lastúry a k súčasnému poraneniu plášťa, nie sú prítomné ani náznaky miestneho opuchu tkaniva v procese hojenia. Rovnako aj pri ostatných podobných nálezoch možno konštatovať absenciu deformít po vaskulárnych nádoroch v zmysle prác I. Peka—J. Mareka 1983 alebo J. Kříža 1975. Je možné, že takéto zdurenie plášťa mäkkýša je príznakom plošného septického procesu v dôsledku kontaminácie rany bakteriálnou flórou. Tieto zárodky však nemuseli byť v dobre preslnenej a prekysličenej vode piesčitého sublitorálu vždy prítomné. Nasvedčovali by tomu aj vyššie uvedené zistenia.

Glycymeris pilosa deshayesi (MAYER 1868)

(Tab. VIII, obr. 5)

Materiál: jedna dobre zachovaná pravá lastúra.

Lokalita: Borský Mikuláš-„Vinohrádky", nové odkryvy pri zakladaní vinohradu JRD.

Rozmery: Výška — 88,3 mm, dĺžka — 85,0 mm, klenutosť — 34,3 mm.

Anomálne znaky: V zadnej polovici lastúry na vonkajšom povrchu sa nachádzajú 3 ostré brázdy, vyčleňujúce dve rebrá nerovnakej šírky. Maximálna šírka rebier pri okraji lastúry je 11 mm a 9 mm. Rebrá sú ploché, mierne vyvýšené nad ostatný povrch lastúry. Ich začiatok v juvenilných štádiách rastu schránky nemožno kvôli zvetraniu priamo pozorovať. Krátke prerušenie rastu po úraze, obvyklé v podobných prípadoch, je však zreteľne viditeľné. Na vnútornom povrchu lastúry nie sú žiadne deformácie okrem nepravidelne vyvinutých okrajových zúbkov. Výrazne je poznačený obrys lastúry.

Príčiny deformácie: V juvenilnom štádiu rastu jedinec utrpel drobné zranenia na troch miestach voľného okraja plášťa. Poranenia mali bodový charakter a po zjazvení plášť tu už nebol schopný normálnej sekrécie. Podobné zranenia spôsobujú najčastejšie predátori.

Výskyt: Jazvy po bodových zraneniach s trvalým postihnutím plášťa nie sú na fosílnom materiáli zriedkavé.

***Glycymeris pilosa deshayesi* (MAYER 1868)**
(Tab. VIII, obr. 7; Tab. IX, obr. 1, 2)

Materiál: 2 kompletné schránky a 4 voľné lastúry.

Lokalita: Staré a nové odkryvy lokality Borský Mikuláš-„Vinohrádky".

Rozmery: Tab. VIII, obr. 7 — výška 79,0 mm, dĺžka 74,8 mm, klenutosť 31,75 mm; tab. IX, obr. 1, 2 — výška 101,4 mm, dĺžka 96,85 mm, klenutosť 38,6 mm.

Anomálne znaky: Všetky jedince majú v zámke prítomné perly alebo perlám zodpovedajúce lôžka, deformujúce tento priestor. Najčastejšie sú umiestnené pri vnútornom okraji zámky, rovnako často v jeho prednej i zadnej časti. U dvoch exemplárov sa podarilo nájsť prirastené perly in situ. Menšia má maximálny priemer 4,55 mm, väčšia 6,60 mm. K perlám sa často pridružujú aj iné poškodenia zámky, ako napríklad rozštepenie zubov alebo aj rozsiahlejšie deštrukčné zmeny.

Príčiny deformácií: Príčinou vo všetkých prípadoch bolo zrejme prudké posunutie lastúr šikmo oproti sebe pri pootvorenej schránke. Voľné úlomky zlomených zubov nemohol živočích zo schránky vytlačiť, preto boli pritmeľované a obaľované v tesnej blízkosti miesta odštiepenia. U takto vzniknutých novotvarov nie je na rozdiel od normálnych perál jadrom cudzorodá látka.

Výskyt: Spomenutých 6 nálezov so zámkovými perlami pripadá asi na 500 normálnych exemplárov. Tieto novotvary som doposiaľ zistil len u jedincov z lokality v Borskom Mikuláši.

Posttraumatické novotvary, zapríčinené vniknutím cudzích telies do schránok mäkkýšov

Do tejto skupiny posttraumatických zmien patria novotvary, ktoré vznikli v dôsledku obranných reakcií živočícha na vniknutie cudzích telies medzi jeho plášť a vnútorný povrch schránky. Boli to drobné zrnká piesku, plošné znečistenia bahnom a podobne. Drsnosťou povrchu dráždili plášť mäkkýša, ktorý, ak sa nedali vytlačiť von, obalil ich a pritmelil ku schránke výlučkami. Uchytené telieska postupne prekrýval ďalšími vylúčenými vrstvami, až vznikol útvar, ktorý ho dráždil iba minimálne. U fosílnych lastúrnikov som zistil päť tvarovo odlíšiteľných typov takýchto novotvarov. Ich rozličný vzhľad je výsledkom rôzneho spôsobu prekrývania cudzích teliesok výlučkami plášťa. Sú to: drobné jednoduché hrbolčeky, kruhové vyvýšené dvorce so stredovým hrbolkom, prirastené perly, ploché nepravidelné hrboly prekrývajúce plošné znečistenia, alebo aj voľné perličky.

Príklady novotvarov na konkrétnych nálezoch

***Anadara fichteli* (DESH.)**
(Tab. IX, obr. 3, 4; tab. X, obr. 1)

Materiál: Tri dobre zachované voľné lastúry.

Lokalita: Modra-Kráľová, žltý íl zo základov ZDŠ, hĺbka neznáma.

Rozmery: Tab. IX, obr. 3, 4 — výška 27,4 mm, dĺžka zachovanej časti 42,35 mm, klenutosť 18,0 mm; tab. X, obr. 1 — výška 31,6 mm, dĺžka 39,4 mm, klenutosť 15,45 mm.

Anomálne znaky: V prednej polovici na vnútornom povrchu ľavej lastúry (tab. IX, obr. 3, 4.) je veľký novotvar — prirastená perla. Celý útvar má drobnozrnitý povrch a skoro pravidelný, ostro ohraničený polguľovitý tvar; rozmery: maximálna šírka 7,2 mm, výška 2,6 mm.

Na pravej lastúre (tab. X, obr. 1) sa nachádza novotvar odlišného vzhľadu. Je to kruhový, mierne vyvýšený dvorec, so stredovým hrbolkom, kryjúcim cudzie teliesko. Šírka dvorca je 8,85 mm. Podobný novotvar deformuje aj vnútorný povrch tretieho nálezu.

Patogenéza novotvarov: U oboch typov uvedených novotvarov bola príčina vzniku rovnaká — drobné cudzie teliesko, iritujúce plášť lastúrnika. Rozdiel bol iba v ukladaní prekrývajúcich výlučkov. V prvom prípade boli vylučované vo zvýšenej miere priamo na dráždiaci objekt. Pri utváraní novotvaru druhého typu bola väčšia časť výlučkov ukladaná v jeho okolí. Zdá sa, že v tomto prípade mali skôr vyrovnať výšku medzi vnútornou plochou lastúry a vzniknutým hrbolkom.

Poznámka: Samotné cudzie telieska sa nepodarilo identifikovať, pretože pod novotvarom je hmota schránky vždy veľmi zvetraná, neumožňujúca nábrus. Na RTG snímkach neboli v stene lastúr zistené žiadne telieska, odlišujúce sa tvrdosťou od okolia.

Anomia ephippium rugulosostriata (Bronn 1831)

(Tab. VIII, obr. 6)

Materiál: Jedna mierne poškodená lastúra.

Lokalita: Borský Mikuláš-„Vinohrádky" — nové odkryvy.

Rozmery: Výška 40,0 mm, dĺžka 39,2 mm.

Anomálne znaky: Na vnútornom povrchu lastúry je narastený veľký plochý hrbol nepravidelne oválneho tvaru, so šupinovite rozpraskaným povrchom. Na niekoľkých miestach je obnažený povrch úlomku ílu, ktorý celý útvar vypĺňa. Maximálna dĺžka deformácie je 19,60 mm, šírka 11,25 mm. Prevýšenie nad ostatným povrchom lastúry je maximálne 2,10 mm.

Patogenéza anomálie: K vzniku opísanej deformácie dalo podnet plošné znečistenie lastúry kúskom vápnitého ílu. Podobné útvary sa nachádzajú na vnútornom povrchu schránok fosílnych lastúrnikov (zriedkavejšie ulitníkov) pomerne často. Časté sú aj u recentných lastúrnikov žijúcich na bahnitom sedimente, napríklad u rodov *Unio*, alebo *Anodonta*. U voľne pohyblivých foriem táto skutočnosť ani neprekvapuje. Avšak v opisovanom prípade ide o lastúrnika so sesílnym spôsobom života. Je teda oddôvodnené podozrenie, že úlomok ílu sa v tomto prípade dostal do schránky zásahom iného živočícha (ryby?).

Glycymeris pilosus LINNAEUS
Nález voľných perál
(Tab. X, obr. 2)

Materiál: 70 voľných perličiek z obsahu uzavretej schránky, ktorá sa však rozpadla.

Lokalita: Borský Mikuláš-„Vinohrádky", nové odkryvy pri zakladaní vinohradu JRD.

Veľkosť: Priemer najväčšej perly — 3,35 mm, priemer najmenšej perly — 1,05 mm, (v prílohe označené šípkou).

Opis novotvarov: Perličky sú drobné, guľatého až hruškovitého tvaru. Všetky sú silne zvetrané najmä znútra. Pri pokuse o nábrus sa pevnejšia povrchová škrupinka sféricky rozpadá a uvoľňuje sa mäkká biela výplň, v ktorej nie sú prítomné žiadne tvrdé zrnká. Preto nebolo možné zistiť, aké cudzie telieska boli príčinou ich vzniku.

Poznámka: Neprítomnosť tvrdých zrniek v jadrách perličiek však naznačuje, že príčinou ich vzniku mohli byť telieska z organickej látky, ktorá nezanechala stopy. Perličky vznikli všeobecne známym spôsobom, zrejme v plášti živočícha. Ide o vzácny ojedinelý nález.

Posttraumatické deformácie a novotvary z príčin poškodenia schránky vŕtavými živočíchmi

Tento typ anomálií možno rozdeliť podľa pôvodcov poškodení do dvoch základných skupín:

— Deformácie vnútorného povrchu z príčiny prevŕtania schránok vŕtavými lastúrnikmi.

— Deformácie vytvorené následkom navŕtania schránok vŕtavým organizmom neistej príslušnosti (červami?).

Prvú skupinu predstavujú deformácie na vnútornom povrchu schránok lastúrnikov v podobe rôznych oválnych až zaoblených nepravidelných hrbolov. Ide o relatívne tenké vrstvy vylúčením, kryjúce miesta úplného prevŕtania steny lastúr vŕtavými lastúrnikmi rodov *Gastrochaena, Coraliophaga a Hiatella.* Ich drobné schránky sa pri niektorých nálezoch ešte nachádzajú vo vyvŕtaných dutinách (napríklad tab. XI, obr. 3—5). Tieto vŕtavé lastúrniky napádali schránky živých mäkkýšov pomerne často, najmä však druhy s masívnejšou schránkou. Deformácie vznikali iba po porušení vnútorného povrchu schránky, inak vŕtajúci lastúrnik napadnutého zrejme nedráždil.

Druhá, tvarovo pestrejšia skupina deformácií, má spoločného pôvodcu, ktorého sa však doteraz nepodarilo s určitosťou identifikovať. Fosílny sa nezachoval, prítomné sú len stopy po jeho činnosti — červovito poskrúcané chodbičky, vyvŕtané v mase lastúr. Podľa tvaru týchto stôp by mohlo ísť o štetinaté červy (pozri tab. X, obr. 3—5). Spomínané chodbičky som nachádzal na fosíliách

z lokality v Borskom Mikuláši veľmi často. V prípadoch, keď došlo k navŕtaniu schránky živého mäkkýša, možno dobre pozorovať aj určité zákonitosti napadnutia. Poväčšine ide o lastúrniky s masívnou schránkou a k navŕtaniu dochádzalo hlavne v zadnej tretine ich lastúr. Častá je tiež kombinácia dutiny vŕtavého lastúrnika a spomenutých červovitých chodbičiek. V poškodených miestach mali zrejme vŕtavé živočíchy lepšiu príležitosť k prenikaniu pod povrch lastúr.

K úplnému prevŕtaniu steny lastúry dochádzalo u lastúrnika druhu *Megacardita jouanneti* (BASTEROT 1825) v priestore zadného svalového odtlačku, najčastejšie pri okraji. Poškodené miesto v týchto prípadoch kryjú vylúčeniny viac-menej kužeľovitého, pretiahnutého tvaru. Spôsobil to ťah svalov mäkkýšov. Na ostatnej ploche lastúr pri narušení vnútorného povrchu vznikali oválne oblé hrboly.

Rovnaké defekty sa vyskytujú aj na prevŕtaných lastúrach druhu *Glycymeris pilosa deshayesi* (MAYER 1868), ale vždy sa k nim pridružujú aj rozsiahle deformácie lastúr. K deformáciám dochádzalo taktiež pri nenarušenom vnútornom povrchu a dokonca aj pri veľmi nepatrnom rozsahu prítomných chodbičiek. Vŕtanie u napadnutého lastúrnika spôsobovalo lokálne obmedzenie sekrečnej činnosti plášťa, preto sú v týchto miestach lastúry zreteľne redukované v ploche i v priereze.

Predpokladám, že pri tejto druhej opisovanej skupine aj napriek vytvoreným deformáciám schránok nejde o napadnutie skutočnými parazitmi. Usudzujem tak preto, že vnútorný povrch schránok bol porušený iba pomerne zriedkavo a tieto miesta boli vzápätí prekryté mäkkýšom, čím sa takýto incident končil. Vŕtavý živočích ani nejavil tendenciu dostať sa dovnútra schránky. Svedčia o tom chodbičky vedúce niekedy tesne pod vnútorným povrchom lastúr bez jeho porušenia. V rámci interšpeciálnych vzťahov je opisovaná interakcia organizmov najbližšie komensalizmu alebo amensalizmu.

Príklady posttraumatických deformácií a novotvarov z príčin poškodenia schránok vŕtavými organizmami na konkrétnych nálezoch

***Chama gryphoides* (LINNÉ 1758)**
(Tab. XI, obr. 2)

Materiál: Jedna dobre zachovaná ľavá lastúra.

Lokalita: Rohožník — hlinisko Cementární „Záhorie", zadná stena ťažobnej jamy. Horizont žltého až šedého ílu s litotamniami, asi 6 m pod úrovňou ťažbou neporušeného terénu; (stav z roku 1981).

Rozmery: Výška lastúry 14,85 mm, dĺžka 17,6 mm.

Anomálne znaky: Lastúra bola navŕtaná na dvoch miestach, pričom došlo aj k narušeniu jej vnútorného povrchu. Otvory boli následne prekryté výlučkami plášťa, čím vznikli dva okrúhle, vypuklé hrboly s hladkým povrchom. Hrbol pri zadnom okraji lastúry sa nezachoval, po jeho odlomení bola znútra obnažená vyvŕtaná dutina. Zachovaný hrbol má priemer 2,8 mm.

Etiológia deformácií: Pôvodcom dierok bol pravdepodobne vŕtavý lastúrnik *Hiatella (Saxicava) arctica* (LINNÉ), ktorého drobné lastúry sú hojné vo výplavoch z materiálu okolia opísaného nálezu.

Poznámka: Lastúrniky rodov *Gastrochaena* a *Coralliophaga*, ktoré spôsobovali časté deformácie tohto typu na lastúrach rodu *Glycymeris* z lokality v Borskom Mikuláši (napríklad tab. XI, obr. 3—5), som vo výplavoch z rohožníckej lokality nenašiel.

Glycymeris pilosa deshayesi **(MAYER 1868)**
(Tab. X, obr. 3, 4)

Materiál: 7 kompletných schránok, 6 celých voľných lastúr, veľké množstvo poškodených voľných lastúr a úlomkov.

Lokalita: Borský Mikuláš-„Vinohrádky", staré a nové odkryvy.

Rozmery: Výška 57,5 mm, dĺžka 53,85 mm klenutosť 22,9 mm.

Anomálne znaky: Postihnuté lastúry sú výrazne asymetrické. Vždy zadná tretina až polovica je plošne redukovaná. Hrúbka lastúr je v postihnutom úseku na priereze zmenšená. Povrchová skulptúra je tu v dôsledku nepresného nasadania jednotlivých prírastkov šupinovitá. Zúbky na vnútornom okraji sú slabšie vyvinuté. Stopy po navŕtaní na povrchu lastúr bývajú niekedy iba nepatrné. Avšak v stene lastúr sú vždy prítomné červovito poskrúcané chodbičky kruhového prierezu a šírky cca 0,6 mm. Napadnuté bývajú pravé i ľavé lastúry rovnako často.

Poznámka: Juvenilné jedince tohto druhu, do priemeru 2,5 cm nie sú nikdy napadnuté. Uvedený typ deformácie som doposiaľ zistil len na schránkach rodu *Glycymeris* z lokality v Borskom Mikuláši. Podobné chodbičky tu možno nájsť aj na schránkach mäkkýšov iného taxonomického zaradenia, avšak bez príznakov opisovanej deformácie.

Patologické anomálie z parazitárnych ochorení mäkkýšov

Tento typ anomálií sa v spracovanom materiáli vyskytol iba pomerne zriedkavo. Zároveň bolo problematické odlíšiť príznaky parazitárnych ochorení, u ktorých dochádzalo iba k nepatrným zmenám v tvare schránky (napríklad z prítomnosti parazita na žiabrach živočícha), od anomálií inej etiológie alebo patogenézy. Preto podobné nálezy v tejto práci neuvádzam, hoci sa v zozbieranom materiáli vyskytli. Ostatné nálezy nesúce anomálne znaky tohto typu bolo možné rozdeliť do dvoch, zreteľne odlíšených skupín.

Prvú skupinu predstavujú nálezy taxodontných lastúrnikov (rodov *Glycymeris* a *Anadara*), napadnuté vŕtavým parazitom neznámej zoologickej príslušnosti, ktorý svojou činnosťou spôsobil najmä vznik charakteristických novotvarov na vnútornom povrchu lastúr, v priestoroch pod vrcholom.

V utváraní anomálií tejto skupiny možno rozlíšiť diskrétny a manifestný vývoj

ochorenia. Diskrétny vývoj prebiehal v niekoľkých etapách. Prvou etapou bolo navŕtanie drobného incidenčného otvoru, najčastejšie umiestneného v okolí vrcholu lastúry, na hranici kardinálnej arey. Následne boli vyvŕtané drobné červovité chodbičky kruhového prierezu v prizmatickej vrstve lastúry. V ďalšej etape došlo k postupnému rozširovaniu vyvŕtaného priestoru odbúravaním stien medzi susediacimi chodbičkami. Vznikli tak dutinky oválneho prierezu s koncentrickou požerkovou skulptúrou plochších stien. V poslednej etape parazit prevŕtal stenu lastúry úplne a narušil jej vnútorný povrch. V tomto štádiu sa začína aj manifestný vývoj ochorenia. V hypostraku parazit naďalej zväčšoval vyhlodaný priestor do strán, najmä však smerom do stredu lastúry. Napadnutý lastúrnik bol prinútený viac razy nadstavovať prekrývajúce vylúčeniny. Takto vznikol polozapustený nádorovitý útvar s priestornou dutinou, ukončenou veľkým zaobleným komunikačným otvorom.

Celé ochorenie malo progresívny priebeh a súdiac podľa veľkosti postihnutých schránok z Borského Mikuláša, končilo sa pre napadnutého mäkkýša fatálne.

Z charakteru jednotlivých etáp tohto parazitárneho ochorenia je možné usudzovať, že v diskrétnom období napadnutia prekonával zavŕtaný parazit určitú časť ontogenetického vývoja.

Druhú skupinu anomálií predstavujú nálezy dvoch lastúr druhu *Anadara diluvii*, z lokalít — Modra-Kráľová a Rohožník-ílovisko. V oboch prípadoch sa vyvinuli podobné abnormity — drobné, husté perličky, výrazne zdrsňujúce vnútorný povrch lastúr. Napadnuté boli nielen laloky plášťa, ale aj adduktory lastúrnikov. V stene lastúr nie sú prítomné žiadne stopy po prípadnom vŕtaní.

U jedinca z modranskej lokality sú všetky príznaky podstatne výraznejšie, postihnutý je aj vonkajší povrch lastúry.

Zoologickú príslušnosť pôvodcu uvedených abnormít sa mi doposiaľ nepodarilo zistiť, ale predpokladám, že ide o parazitárne ochorenie.

Príklady patologických parazitárnych anomálií schránok mäkkýšov na konkrétnych nálezoch

Glycymeris pilosa deshayesi **(MAYER, 1868)**
(Tab. XII, obr. 3—7)

Materiál: Dve celé voľné lastúry a jeden úlomok vrcholovej časti lastúry.
Lokalita: Borský Mikuláš-„Vinohrádky" — nové odkryvy pri zakladaní vinohradu JRD.

Veľkosť: Tab. XII, obr. 3, výška 19,0 mm, dĺžka 19,9 mm, klenutosť 6,2 mm; tab. XII, obr. 4, výška 59,2 mm, dĺžka 60,1 mm, klenutosť 21,3 mm.

Anomálne znaky: Všetky tri nálezy nesú zjavné stopy po napadnutí rovnakým druhom parazita. Dokazujú to rovnako vyvinuté diskrétne znaky

postihnutia, ako aj charakteristické novotvary, nachádzajúce sa pod vrcholmi na vnútornom povrchu lastúr. Všetky tieto znaky sú najlepšie pozorovateľné na spomenutom úlomku lastúry. Prelomením bola tu obnažená rozšírená dutinka v stene lastúry. Dobre je pozorovateľná jej stavba i koncentrická požerková skulptúra plochších stien. Ich okraje ohraničujú kanáliky, ktoré sú pozostatkom pôvodne samostatných, súbežne vyvŕtaných chodbičiek (pozri tab. XII, obr. 5). Maximálna šírka dutinky je 2,5 mm.

Vrcholový novotvar má vzhľad ostro ohraničeného nádora nepravidelného tvaru so zapustenou bázou. Kryje priestrannú zväčšujúcu sa dutinu, ukončenú veľkým komunikačným otvorom. Staršie otvory boli lastúrnikom prekryté, alebo parazit pokračoval v činnosti v priamom smere. V tomto prípade oddeľujú jednotlivé prírastky novotvaru zreteľné švy. Na nábruse spomínaného úlomku má novotvar veľmi premenlivú hrúbku stien. Smerom ku komunikačnému otvoru sa však pozorovateľne stenčujú, čo naznačuje, že táto časť je aj z celého útvaru najmladšia.

Výskyt: Na fosílnom materiáli z Borského Mikuláša sa častejšie vyskytujú diskrétne príznaky napadnutia schránok týmto parazitom. Z nich rozlíšiteľné sú najmä dutinky s požerkovou koncentrickou skulptúrou stien. K rozvinutiu manifestných znakov — k vytvoreniu novotvarov dochádzalo, podľa počtu takýchto nálezov, zrejme iba ojedinele.

K dispozícii som mal tiež jeden nález s manifestnými znakmi ochorenia, na lastúre druhu *Anadara fichteli* (DESH.), z lokality Smolenice-Stanová. Jedinec pochádzal z materiálu získaného pri výkope súkromnej studne.

Anadara (Anadara) diluvii palotensis (STRAUSZ et SZALAI 1943)

(Tab. XII, obr. 8)

Materiál: Jedna ľavá, veľmi dobre zachovaná lastúra.

Lokalita: Modra-Kráľová — žltý íl zo základov stavby ZDŠ.

Rozmery: Výška 24,95 mm, dĺžka 33,85 mm, klenutosť 13,35 mm.

Anomálne znaky: Vnútorný povrch lastúry je husto posiaty drobnými kužeľovitými výrastkami. Tieto sa smerom dozadu zhusťujú a predlžujú. Dostávajú postupne pretiahnuto-kužeľovitý až jazykovitý, nazad uklonený tvar. Postihnutý je aj zadný svalový odtlačok, na ktorom je drobné, husté perlenie. Na ploche medzi plášťovou čiarou a ventrálnym až dorzálnym okrajom lastúry je povrch normálne hladký, bezo zmien. Povrchová skulptúra v zadnej polovici lastúry bola silne naleptaná ešte za života mäkkýša. Bol to následok nedostatočného prekrytia povrchu periostrakom. Celkový tvar lastúry je normálny.

Etiológia anomálie: Pôvodcu tohto ochorenia sa nepodarilo určiť. S veľkou pravdepodobnosťou však ide o príznaky parazitárneho ochorenia, postihujúceho plášť živočícha, ale aj epitel, produkujúci schránku v mieste pripevnenia svalu. Postihnutý bol určite aj voľný okraj plášťa, konkrétne v miestach produkcie periostraka.

Poznámka: Podobne bola postihnutá aj jedna lastúra druhu *A. diluvii diluvii* z lokality v Rohožníku. Táto značne poškodená lastúra má drobné perlenie na oboch svalových odtlačkoch. Na ostatnej vnútornej ploche o niečo redšie a menšie ako u exemplára z Modry. Ani vonkajšia skulptúra nebola postihnutá.

Patologické anomálie z ochorenia neznámej etiológie

K tomuto typu anomálií priraďujem dva nálezy lastúrnika druhu *Megacardita jouanneti* (BASTEROT 1825), z lokality Devínska Nová Ves-vinohrady „Útočnica", u ktorých došlo v postjuvenilných rastových štádiách bez zjavnej príčiny k postupnému vymiznutiu typických znakov skulptúry — rebier.

Pretože takéto postihnutie povrchovej skulptúry sa môže vysvetľovať rôznymi príčinami, je zaradenie tohto úkazu k patologickým anomáliám iste iba podmienečne správne.

Vzhľad patologických anomálií neznámej etiológie na konkrétnych nálezoch

***Megacardita jouanneti* (BASTEROT 1825)**
(Tab. XI; obr. 6)

Materiál: Dve veľmi dobre zachované, voľné ľavé lastúry.

Lokalita: Devínska nová Ves-vinohrady „Útočnica" — pole západne od vrcholu borovicového lesíka, v sonde — 30 cm pod povrchom.

Rozmery: Tab. XI, obr. 6 — výška 55,0 mm, dĺžka 65,6 mm, klenutosť 21,7 mm.

Anomálne znaky: Obe lastúry majú rovnaké anomálie v utváraní povrchovej skulptúry. Približne od stredu lastúr dochádza k znižovaniu klenutosti rebier, brázdy oddeľujúce jednotlivé rebrá sa postupne splytčujú a smerom k ventrálnemu okraju charakteristická skulptúra postupne úplne vyznieva. Nahrádzajú ju koncentrické prírastkové línie až zreteľné valy, naznačujúce častejšie prerušenie rastu. K vymiznutiu rebier došlo však iba na strednej ploche lastúr. Predná a zadná časť povrchu má rebrá normálne vyvinuté. V ich výraznosti je smerom k stredu postupný prechod. Vnútorný povrch a obrys lastúr je normálny.

Patogenéza anomálie: V oboch opísaných prípadoch ide o zjavné postihnutie ventrálnej časti voľného okraja plášťa. Vzhľadom na to, že vymiznutie skulptúry nevzniká náhle, v presne určiteľnom mieste rastového štádia lastúr, možno tu konštatovať iba postupný patologický proces neznámeho pôvodu. Mohlo by ísť napríklad o chronické zápalové ochorenie s plazivým, nevýrazným začiatkom.

Výskyt: Len opisované dva nálezy zo spomínanej lokality.

Teratologické anomálie schránok fosílnych mäkkýšov

Sú to anomálie, ktoré vznikli v dôsledku odlišnej stavby alebo funkcie orgánov živočíchov. Majú teda svoje príčiny v poruchách vnútorného pôvodu. Môže ísť o rôzne endokrinné poruchy, čiže o narušenie hormonálnej rovnováhy organizmu alebo môžu nastať aj následkom mutácií. Prirodzene u fosílneho materiálu nie je možné tieto príčiny takto detailne rozlíšiť. Uvádzam ich len preto, aby som znova zdôraznil už spomínanú nejasnosť hranice medzi teratologicky postihnutými a normálnymi jedincami u taxónov so širokou tvarovou variabilitou.

Fosílne schránky mäkkýšov s teratologickými anomáliami patria k zriedkavým nálezom, pričom prejavy týchto anomálií sú veľmi rôznorodé. Na jedincoch, ktoré som priradil k tomuto typu anomálií, sú prítomné abnormity v celkovom tvare alebo v povrchovej skulptúre schránok. V jednom prípade došlo k vytvoreniu nadpočetného výbežku ústia ulity.

Príklady teratologických anomálií na konkrétnych nálezoch

***Megacardita jouanneti* (BASTEROT 1825)**
(Tab. XI, obr. 7)

Materiál: Jedna veľmi dobre zachovaná ľavá lastúra.

Lokalita: Borský Mikuláš-„Vinohrádky", nové odkryvy pri zakladaní vinohradu JRD.

Rozmery: Výška 38 mm, dĺžka 57,75 mm, klenutosť 18,7 mm.

Anomálne znaky: Opisovaná lastúra je extrémne pretiahnutého tvaru. Aj keď ide v tomto prípade o dosť variabilný druh lastúrnika, nález vykazuje výrazné odchýlky od normálnych rozmerových hodnôt. Priemerný pomer dĺžky k výške u päťdesiatich zmeraných exemplárov z rovnakej lokality je 1,3. Pri spomínanej lastúre je tento pomer zreteľne vyšší — 1,5. Ide zrejme o teratologicky postihnutého jedinca.

Poznámka: Na okraji lastúry, najmä v jej prednej polovici, sú tiež prítomné znaky senilných zmien.

Výskyt: Ojedinelý vzácny nález.

***Flabellipecten besseri* (ANDRZEJOWSKI 1830)**
(Tab. XI, obr. 1)

Materiál: 7 pravých lastúr.

Lokalita: Devínska Nová Ves-Sandberg.

Rozmery: Tab. XI, obr. 1 — výška 68,95, dĺžka 75,8, klenutosť 21,95 mm.

Anomálne znaky: Všetky nálezy majú vyvinuté rovnaké anomálne znaky. Vždy siedme rebro od zadného okraja lastúry je zreteľne slabšie vyvinuté

oproti dvom susedným. Zároveň aj medzirebrové brázdy ktoré ho vyčleňujú, sú výrazne zúžené. Anomália je jasne rozpoznateľná už od juvenilných rastových štádií a jej vzhľad sa vekom jedinca nemenil. Pri niektorých jedincoch je však iba slabo naznačená.

Príčiny anomálie: Ide o teratologickú anomáliu, zapríčinenú pravdepodobne mutáciou, ktorá bola po viacero generácií dedične prenosná. Podľa nálezov sa vyskytovala iba u malého počtu jedincov spomenutého druhu. Jej prítomnosť bola z hľadiska živočícha zrejme nepodstatná.

Výskyt: Tento druh anomálie som doposiaľ zistil iba na exemplároch z lokality Sandberg.

Aporrhais pespelecani **(LINNÉ 1758)**
(Tab. XII, obr. 1, 2)

Materiál: Jedna slabo poškodená schránka.

Lokalita: Smolenice-Stanová, materiál z kopanej súkromnej studne.

Rozmery: Výška — 22,09 mm. Maximálna šírka (s ústím) — 20,45 mm.

Anomálne znaky: Na vonkajšom lábiu schránky je prítomný nadpočetný prstovitý výbežok. Vyrastá v priestore medzi dvoma obvykle vyvinutými výbežkami a veľkosťou im je rovnocenný. Na povrchovej skulptúre pri báze výbežkov je naznačené prerušenie rastu, avšak bez stôp po poškodení.

Výskyt: Ojedinelý vzácny nález.

Senilné deformácie

Nálezy schránok so znakmi senilných zmien sú pomerne časté. Vo všetkých prípadoch ide o ľahko rozoznateľné, posledné prírastky lastúr alebo ulít s charakteristicky pozmenenou skulptúrou. Bývajú tu vyvinuté aj normálne znaky skulptúry, ale náhle výrazne prevládajú nepravidelné prírastkové prvky a stopy po častých prerušeniach rastu. Nasadenie jednotlivých prírastkov nie je precízne, takže vznikajú až strieškovité lamely. Pozmenená býva tiež hrúbka schránok a v niektorých prípadoch aj smer ich rastu.

Za príčinu týchto deformít možno označiť predpokladaný vznik endokrinných porúch s následnou insuficienciou plášťa rôzneho stupňa, ale vždy progresívneho charakteru. Príčinou mohol byť však aj nedostatočný prívod živín do okrajových častí plášťa, z najrozličnejších dôvodov, vyplývajúcich z veku jedinca.

Príklad senilných deformácií na konkrétnych nálezoch

Megacardita jouanneti **(BASTEROT 1825)**
(Tab. XII, obr. 9)

Materiál: Jedna kompletná schránka a 5 voľných lastúr.

Lokalita: Devínska Nová Ves-„Utočnica", pole západne od vinohradov — zber.

Rozmery: Tab. XII, obr. 9 — výška — 50,6 mm, dĺžka — 74,7 mm, šírka — 45,8 mm.

Anomálne znaky: Opisovaná kompletná schránka nesie výrazné znaky senilných zmien. Posledné prírastky lastúry v šírke až 10 mm majú charakteristicky pozmenenú skulptúru. Zároveň je aj pozmenený smer ich rastu, takže pri pohľade na schránku spredu sú lastúry pri okraji výrazne zalomené k sebe. Najvýraznejšie vyvinuté sú tieto deformácie na prednom a brušnom okraji schránky. Na dorzálnom okraji postupne vyznievajú.

Patogenéza anomálie: Starobou jedinca vznikli endokrinné poruchy, zapríčiňujúce insuficienciu v sekrečnej činnosti plášťa alebo plášť nebol dostatočne zásobovaný živinami.

Výskyt: Podobne postihnuté exempláre tohto druhu sú pomerne bežné aj v nálezoch z iných lokalít. Uvedené deformácie sa vyskytujú aj u mäkkýšov iného taxonomického zaradenia.

Literatúra

ČTYROKÝ, P. 1969: The family Pectinidae in the Burdigalian of Czechoslovakia. Sbor. geol. věd, R. P., 10, Praha, 7—66.

KŘÍŽ, J. 1979: Silurian Cardiolidae (Bivalvia). Sbor. geol. věd, Paleont., 22, Praha, 5—157.

PEK, I.—MAREK, J. 1983: Pathological effect in *Lyropecten* (Aequipecten?) ternatus (Muenster, 1833) from the Cretaceous of Czechoslovakia. Věst. ÚÚG, 58, Praha, 49—51.

ŠVAGROVSKÝ, J. 1981: Lithofazielle Entwicklung und Molluskenfauna der oberen Badeniens (Miozän M4d) in dem Gebiet Bratislava-Devinska Nová Ves. Západné Karpaty, ser. paleont., Bratislava, 7, Geol. Úst. D. Štúra, 5—204.

ŠVAGROVSKÝ, J. 1981: Bivalvia des oberen Badeniens (Miozän) von Borský Mikuláš (NO — Teil des Wiener Beckens) und ihr Lebensmilieu. Geol. zbor. Geol. carpath. 32, Bratislava, 4, 387—426.

ŠVAGROVSKÝ, J. 1982: Archaeogastropoda und Mesogastropoda des oberen Badeniens von Borský Mikuláš (NO — Teil des Wiener Beckens) und ihre Stratigraphische bedeutung. In: Geol. zbor. carpath. 33,1 Bratislava, 3—50.

TASNÁDI—KUBACSKA, A. 1962: Paläopathologie, Pathologie der vorzeitlichen Tiere. Jena, 7—269.

Štefan Meszároš

Anomalies of Upper Badenian mollusc shells from localities in vicinity of the Malé Karpaty Mts.

Summary

From Upper Badenian sediments of six localities in the vicinity of the Malé Karpaty Mts. are numerous finds of anomalous mollusc shells. The established anomalies can roughly be divided into two groups, into pathological a teratological anomalies. These fundamental groups are further distinguishable into four groups, according to the supposed etiology and pathogeny: into post-traumatic deformations and new forms, pathological anomalies (sensu stricto), teratological anomalies (s. s.) and senile deformations (see the table in text). In the presented paper these subgroups are characterized, with the following mentioned concrete examples.

There may be three supposed causes of origin of post-traumatic deformations and new forms: In the first place, they formed after various mechanical damages of molluscs or their shells. The appearance of such defects is very characteristic. They are variously healed fractures of shells, scarred places after features with simultaneous wounding of the pallium of the mollusc or various new forms (pearls), formed after more serious mechanic damaging of the shell hinges. The so originated anomalies are evidenced on concrete finds of gastropods of the species *Conus (Chelyconus) fuscocingulatus* and lamellibranchs of the species *Chlamys (Macrochlamys) latissima nodosiformis, Glycymeris pilosa deshayesi.*

Besides mechanical causes of origin also posttraumatic deformations and new forms, brought forth by penetration of other bodies into the mollusc shells, were found. They are various pearls, free or attached, then small tubercles at the inner surface of shells, flat, irregular tubercles, covering surficial contamination of shells etc. These anomalies were found on lamellibranch shells of the species *Anadara fichteli, Glycymeris pilosus, Anomia ephippium rugolosostriata.*

The last group of post-traumatic anomalies formed after damaging of shells by boring organisms. They are deformations of the inner surface of shells or after complete boring through the wall of valves by boring lamellibranchs of the genera *Gastrochaena, Coraliophaga* and *Hiatella* or deformations originated as a consequence of boring of shells by boring organisms of uncertain assignment (worms?). This group is shown on lamellibranch shells of the species *Chama gryphoides* and *Glycymeris pilosa deshayesi.*

The established pathological anomalies (s. s.) arose from two types of parasitary sicknesses. The first type is represented by finds of lamellibranchs of the subspecies *Glycymeris pilosa deshayesi,* bored by extending distorted burrows and a large open new form in the place of boring through the valve wall. There was obviously a parasitary sickness of progressive character, with fatal end of the affected mollusc. The second type, described in the work on lamellibranchs of the species *Anadara diluvii,* is characterized by affected pallium of the mollusc. It is shown as fine, dense pearling on the inner surface of valves or with associated further damages.

Besides parasitary sicknesses also one pathological anomaly of lamellibranchs was established, caused by sickness of unknown etiology. There is gradual disapearance of typical marks of the sculpture — ribs, in the central part of shells of the species *Megacardita jouanneti.* There could be a chronical inflammation sickness of the free pallium margin with creeping, indistinct beginning.

Teratological anomalies (s. s.) are rare on fossil mollusc shells. In one case a supernumerary projection of the mouth of the conch in the species *Aporrhais pespelecani* was stated. In the work also a find of an extremely backward elongated valve of the species *Megacardita jouanneti* and reduced ribs of the surface sculpture of lamellibranchs of the species *Flabellipecten besseri* are described. In the last mentioned case there was probably an anomaly caused by mutation, which was transferable by heritage for several generations.

Senile deformations are relatively often in the finds. They are shown as easily recognizable last growth lines of shells with characteristic changed sculpture but also thickness of valve walls and direction of their growth. The causes of these deformations are resulting from organic changes conditioned by the age of specimens. The described deformations are common on valves of the species *Megacardita jouanneti.*

Explanations to Plates VIII—XII

Plate VIII

1 *Chlamys (Macrochlamys) latissima nodosiformis* (M. SERES in G. PUSCH, 1837) — post-traumatic deformation of shell, view of the left valve.
Devínska Nová Ves-Sandberg. × 0,5

2 Equal specimen — detail of healed fracture at the outer surface of of left valve. × 0,7

3 Equal specimen — detail of inner surface in the damaged place. × 0,7

4 *Conus (Chelyconus) fuscocingulatus* HOERNES, 1856 — Healed large fracture of body whorl.
Borský Mikuláš-„Vinohrádky". × 1,24

5 *Glycymeris pilosa deshayesi*, (MAYER, 1868) — outer surface of right valve, deformed by rils.
Borský Mikuláš-„Vinohrádky", new outcrops. × 0,6

6 *Anomia ephippium regulosostriata* (BRONN, 1831) — inner surface of valve, deformed by flat tubercle, covering a piece of calcareous clay.
Borský Mikuláš-„Vinohrádky", new outcrops. × 1,4.

7 *Glycymeris pilosa deshayesi* (MAYER, 1868) — in the hinge field of the valve is a distinct pit-scar after pearl.
Borský Mikuláš-„Vinohrádky". × 0,5

Plate IX

1 *Glycymeris pilosa deshayesi* (MAYER, 1868) — detail of left valve with pearl and pit after pearl in the hinge.
Borský Mikuláš-„Vinohrádky", old outcrop. × 0,8

2 Opposite valve, detail of damaged hinge. × 0,8

3 *Anadara fichteli* (DESHAYES) — damaged valve with attached pearl. Modra-Kráľová, foundations of the ZDŠ (Fundamental Nine Years School). × 1,5

4 Equal specimen-X-ray picture, in the area of the new form no distinguishable forms are present. × 1

Plate X

1 *Anadara fichteli* (DESHAYES) — inner surface with circular new form, with central grain.
Modra-Kráľová, foundation of the ZDŠ. × 1,5

2 Minute free pearls, washed out from the sandy content of closed lamellibranch shell of the species *Glycymeris pilosa deshayesi* (MAYER, 1868).
Borský Mikuláš-„Vinohrádky", old outcrop. × 1,5

3 *Glycymeris pilosa deshayesi* (MAYER, 1868) — extremely deformed specimen.
Borský Mikuláš-„Vinohrádky". × 1,04

4 Equal specimen — X-ray picture representing strongly bored valve wall. Warm-like burrows even overlapping mutually. × 1

5 Moulds of worm-like burrows from a valve fragment of the genus *Glycymeris*. The burrows were filled up with thinned varnish, the valve matter subsequently dissolved.
Borský Mikuláš-„Vinohrádky", new outcrops. × 1,2

6 *Glycymeris pilosa deshayesi* (MAYER, 1868) — detail of surface of the the posterior part of valve, bored by burrows.
Borský Mikuláš-„Vinohrádky". × 1,2

Plate XI

1 *Flabellipecten besseri* (ANDRZEJOWSKI, 1830) — right valve, with reduced sevent rib (posterior view).
Devínska Nová Ves-Sandberg. × 0,7.

2 *Chama gryphpides* LINNÉ 1758 — outer surface with bored hole. Rohožník — loam-pit of cement worls. × 1,7

3 *Gastrochaena intermedia* (M. HOERNES) — complete shells in uncovered cavity, bored in a valve of the genus *Glycymeris*.
Borský Mikuláš-„Vinohrádky". × 1,3

4 *Gastrochaena intermedia* (M. HOERNES) — the X-ray picture revealed two bored cavities, in one of them is still a shell of boring lamellibranch in situ, twisted burrows (worms?) are also present
Borský Mikuláš-„Vinohrádky", new outcrops, × 1

5 *Gastrochaena intermedia* (M. HOERNES) — detail of valve surface of the genus *Glycymeris* with openings after siphons of boring lamellibranchs.
Borský Mikuláš-„Vinohrádky". × 1,3

6 *Megacardita jouanneti* (BASTEROT, 1825) — sculpture affected by unknown pathological process.
Devínska Nová Ves-„Útočnica". × 0,9

7 *Megacardinata jouanneti* (BASTEROT, 1825) — teratologically affected shell.
Devínska Nová Ves-„Útočnica". × 1,4

Plate XII

1, 2 *Aporrhais pespelecani* LINNÉ, 1858 — shell with superfluous projection of mouth. Smolenice-Stanová, dug well. × 1,7

3 *Glycymeris pilosa deshayesi* (MAYER, 1868) — valve with parasitic new form after the apex. Borský Mikuláš-„Vinohrádky", new outcrops. × 2

4 *Glycymeris pilosa deshayesi* (MAYER, 1868) — detail showing an attached parasitic new form. Borský Mikuláš-„Vinohrádky". × 1,2

5—7 *Glycymeris* sp. — fragment from the upper side, from the lower side (with new form) and in cross section.
Borský Mikuláš-„Vinohrádky". × 1,6

8 *Anadara diluvii, palotensis* (L. STRAUSZ et T. SZALAI 1943) — inner surface of valve deformed by pearls.

9 *Megacardita jounneti* (BASTEROT, 1825) — the knicked ventral margin of the shell is a senile deformation.
Devínska Nová Ves-„Útočnica". × 1,1

Translation: J. Pevný

Vysvetlivky k fotografickým tabuľkám

Tab. VIII

1 *Chlamys (Macrochlamys) latissima nodosiformis* (M. SERES in G. PUSCH 1837) — posttraumatická deformácia schránky, pohľad na ľavú lastúru.
Devínska Nová Ves-Sandberg. 0,5 ×

2 Rovnaký exemplár — detail vyhojenej zlomeniny na vonkajšom povrchu ľavej lastúry. 0,7 ×

3 Rovnaký exemplár — detail vnútorného povrchu v postihnutom mieste. 0,7 ×

4 *Conus (Chelyconus) fuscocingulatus* HOERNES 1856 — Vyhojená veľká zlomenina telesného závitu.
Borský Mikuláš-„Vinohrádky". 1,24 ×

5 *Glycymeris pilosa deshayesi* (MAYER 1868) — vonkajší povrch pravej lastúry, deformovaný rebrami.
Borský Mikuláš-„Vinohrádky", nové odkryvy. 0,6 ×

6 *Anomia ephippium rugulosostriata* (BRONN 1831) — vnútorný povrch lastúry, deformovaný plochým hrbolom, kryjúcim kúsok vápnitého ílu. Borský Mikuláš-„Vinohrádky", nové odkryvy. 1,4 ×

7 *Glycymeris pilosa deshayesi* (MAYER 1868) — v zámkovom políčku lastúry je výrazná jamka — lôžko po perle. Borský Mikuláš-„Vinohrádky". 0,5 ×

Tab. IX

1 *Glycymeris pilosa deshayesi* (MAYER 1868) — detail ľavej lastúry s perlou a jamkou po perle v zámku. Borský Mikuláš-„Vinohrádky", starý odkryv. × 0,8

2 Protiľahlá lastúra, detail postihnutého zámku. × 0,8

3 *Anadara fichteli* (DESHAYES) — poškodená lastúra s prirastenou perlou. Modra-Kráľová, základy ZDŠ. × 1,5

4 Rovnaký exemplár — Rtg snímka, v priestore novotvaru nie sú prítomné žiadne rozlíšiteľné útvary. × 1

Tab. X

1 *Anadara fichteli* (DESHAYES) — vnútorný povrch s kruhovitým novotvarom, so stredovým zrnkom. Modra-Kráľová, základy ZDŠ. × 1,5

2 Drobné voľné perličky, vyplavené z piesočnatého obsahu uzatvorenej schránky lastúrnika druhu *Glycymeris pilosa deshayesi* (MAYER 1868). Borský Mikuláš-„Vinohrádky", starý odkryv. × 1,5

3 *Glycymeris pilosa deshayesi* (MAYER 1868) — extrémne deformovaný jedinec.
Borský Mikuláš-„Vinohrádky". × 1,04

4 Rovnaký exemplár — Rtg snímok zobrazuje silne rozvŕtanú stenu lastúry. Červovité chodbičky sa až navzájom prekrývajú. × 1

5 Odliatky červovitých chodbičiek z úlomku lastúry rodu *Glycymeris*. Chodbičky boli vyplnené zriedeným lakom, hmota lastúry následne rozpustená.
Borský Mikuláš-„Vinohrádky", nové odkryvy. × 1,2

6 *Glycymeris pilosa deshayesi* (MAYER 1868) — detail povrchu zadnej časti lastúry, rozvŕtanej chodbičkami. Borský Mikuláš-„Vinohrádky". × 1,2

Tab. XI

1 *Flabellipecten besseri* (ANDRZEJOWSKI 1830) — pravá lastúra, s redukovaným siedmym rebrom (odzadu).
Devínska Nová Ves-Sandberg. × 0,7

2 *Chama gryphoides* LINNÉ 1758 — vonkajší povrch s navŕtanou dierkou. Rohožník — hlinisko cementární. × 1,7

3 *Gastrochaena intermedia* (HOERNES) — kompletná schránka v obnaženej dutine, vyvŕtanej v las túre rodu *Glycymeris*. Borský Mikuláš-„Vinohrádky". × 1,3

4 *Gastrochaena intermedia* (HOERNES) — Rtg snímka odhalila dve vyvŕtané dutiny, pričom v jednej je ešte schránka vŕtavého lastúrnika in situ, prítomné sú aj poskrúcané chodbičky (červy?).
Borský Mikuláš-„Vinohrádky", nové odkryvy. × 1

5 *Gastrochaena intermedia* (HOERNES) — detail povrchu lastúry rodu *Glycymeris* s otvormi po sifónoch zavŕtaných lastúrnikov.
Borský Mikuláš-„Vinohrádky". × 1,3

6 *Megacardita jouanneti* (BASTEROT 1825) — skulptúra postihnutá neznámym patologickým procesom.
Devínska Nová Ves-„Útočnica". × 0,9

7 *Megacardita jouanneti* (BASTEROT 1825) — teratologicky postihnutá schránka.
Devínska Nová Ves — „Útočnica". × 1,4

Tab. XII

1, 2 *Aporrhais pespelecani* LINNÉ 1858 — schránka s nadpočetným výbežkom ústia.
Smolenice-Stanová, kopaná studňa. × 1,7

3 *Glycymeris pilosa deshayesi* (MAYER 1868) — lastúra s parazitickým novotvarom pod vrcholom.
Borský Mikuláš-„Vinohrádky", nové odkryvy. × 2

4 *Glycymeris pilosa deshayesi* (MAYER 1868) — Detail, zobrazujúci narastený parazitický novotvar.
Borský Mikuláš-„Vinohrádky". × 1,2

5—7 *Glycymeris* sp. — úlomok z vrchnej strany, zospodu (s novotvarom) a v priereze.
Borský Mikuláš-„Vinohrádky". × 1,6

8 *Anadara diluvii palotensis* (STRAUSZ et SZALAI 1943) — perličkami deformovaný vnútorný povrch lastúry.
Modra-Kráľová, základy ZDŠ. × 1,6

9 *Megacardita jouanneti* (BASTEROT 1825) — zalomenie brušného okraja schránky je senilnou deformáciou. Devínska Nová Ves-„Útočnica". × 1,1

Západné Karpaty, séria paleontológia 11, P. 77—88, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Miroslav Plička

A new "Body Fossil" and a new trace fossil from the Outer Carpathian Flysch of Moravia (Czechoslovakia)

5 text-figs., 4 pls. (XII—XVI), Czech summary

Abstract. The author describes a new problematic fossil *Carpatia tubiformis* n. gen. n. sp., found in the Soláň Formation of the Magura nappe in Chřiby (Paleocene) on two localities. The new fossil trace *Godulaichnium tenue* n. ichnogen n. sp. was found in sandstones of the Godula beds of the Silesian nappe (Cretaceous, Cenomanian). Both the fossil trace and the problematic fossil are as a positive hyporelief on the undersurface of the sandstones.

Introduction

The study of rock joints in the Carpathian Flysch on the Czechoslovak territory in 1960—1965 (M. PLIČKA 1968) included occasional study of fossil traces and various problematic fossils. The material was treated in stages with a certain lapse of time. The lapse of time is positive, because new data concerning this problem in other areas like the Inner-Carpathian Paleogene in Slovakia (M. PLIČKA 1981, 1983, 1984), the Carpathian Flysch in Poland (M. KŠIAŽKIEWICZ 1977) and other sedimentary areas of the world (W. HÄNTZSCHEL 1975) facilitate more exact study of these phenomena and a comparison in the evaluation of the individual sedimentation areas.

Fig. 1 Schematic map of localities Staré Hutě (1), Jankovice (2) — (*Carpatia tubiformis* n. gen. n. sp.) and Pustevny (3) — (*Godulaichnium tenue* n. ichnogen. n. sp.).

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Now I am treating and evaluating samples including the new fossil remains from the undersurface of sandstones of the Soláň Formation (Paleocene) in the Rača Unit of the Magura Flysch, from the following two localities: a quarry near the village Staré Hutě, and quarry 1 km E of Jankovice. The samples represent most likely fossil remains of tubes of sessile marine worms. They are denoted as *Carpatia tubiformis* n. gen. n. sp. On the locality Staré Hutě four samples were taken from the undersurface of sandstone, in the quarry near Jankovice the fossil remains were studied on the locality, because it was impossible to take samples. New, very fine fossil traces on the undersurface of Cretaceous Godula sandstones (Silesian nappe) in the abandoned quarry in the road bend to Pustevny are denoted as *Godulaichnium tenue* n. ichnogen n.sp. In both cases the fossils represent a positive hyporelief. All samples studied are deposited at the Moravian Museum in Brno.

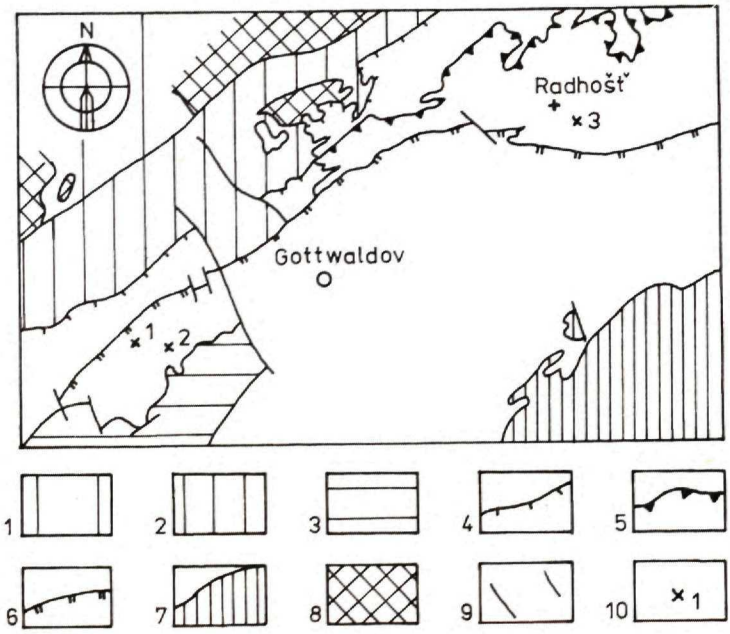

Fig. 2 Geological scheme of occurrences of new problematic trace (1, 2) and new fossil trace (3). Tectonic map of Czechoslovakia 1 : 1 000 000, T. Buday et al., 1960 was used. 1 — Neogene; 2 — Neogene of Carpathian Foredeep; 3 — Neogene of Vienna Basin; 4 — overthrust line of Ždánice — Subsilesian Unit; 5 — overthrust line of Silesian nappe; 6 — overthrust line of Magura nappe; 7 — inner Klippen Belt; 8 — Paleozoic of Bohemian massif (Lower Carboniferous — Culm Devonian); 9 — faults; locality of problematic fossil (1 — Staré Hutě, 2 — Janovice) and of fossil trace (3 — quarry pod Pustevnami).

Systematical description

Genus: *Carpatia* n. gen.

Type species: *Carpatia tubiformis* n. sp.

Denomination: according to the place of occurrence — the Carpathians, the Carpathian Flysch.

Diagnosis: Fossil remains of flattened, elongated form, 1—2.5 mm wide, up to 6 cm long, several tenths of mm high. They are yellowish grey. They show sharp vertical termination and slight longitudinal uplift.

Carpatia tubiformis n. sp.

Plate XIII, XIV; Fig. 3.

Holotype: Sample 11/82-B 586-D; deposited at the Moravian Museum in Brno (Pl. XIII., Fig. 1, Fig. 3-C in text).

Type locality: Staré Hutě, an abandoned quarry near a road in a forest near the northern periphery of the village.

Type level: The Soláň Formation of the Magura Flysch, the sandstone facies, Paleocene. The Inner-Carpathian Flysch.

Denomination: According to the shape reminding of flattened fragments of sessile marine worms.

Material: Four fragments of sandstone with irregular platy parting. Dimensions of the sample 11/82-B 586-D (holotype) are 13 × 10 × 2 cm (Pl. XIII, Fig. 1, Fig. 3-C in text); dimensions of the sample 11/82-B 586-C are 13 × 11 × 1,5 cm (Pl. XIV, Fig. 1, Fig. 3-A in text); the sample 11/82-B 586-B is 23 × 8 × 2 cm (Pl. XIV, Fig. 2, Fig. 3-B in text); the sample 11/82-B 586-E is 12 × 5,5 × 1.5 cm (Pl. XIII, Fig. 2, Fig. 3-D in text). It was impossible to take samples on the locality Jankovice.

Diagnosis: Flattened, elongated fossils remains, 1—2.5 mm wide, up to 6 cm long, several tenths of mm high (thick), yellowish-grey colour. The fragments are mostly vertically terminated and uplifted on margins.

Description: Light-coloured (straight or slightly bent, see Fig. 3-E in text), short, irregularly dispersed fragments on the undersurface of fine-grained sandstones. They are about 2 mm wide, and several tenths of mm high. Their surface is smooth, without transversal dissection. The margins are somewhat uplifted (e. g. the sample 11/82-B 586-C, Pl. XIV, Fig. 1 — holotype, and sample 11/82-B 586-B, Pl. XIV, Fig. 2). The uplift near the margin reminds of a flattened tube of a sea organism. A detailed study of the remains revealed a kind of an oval opening of the tube as seen on the sample of the holotype inventory No. 11/82-B 586-B in Plate XIII, Fig. 1 and in Fig. 3-C in text. Light-coloured and finer substance of the fossil remains of organisms is non-calcareous.

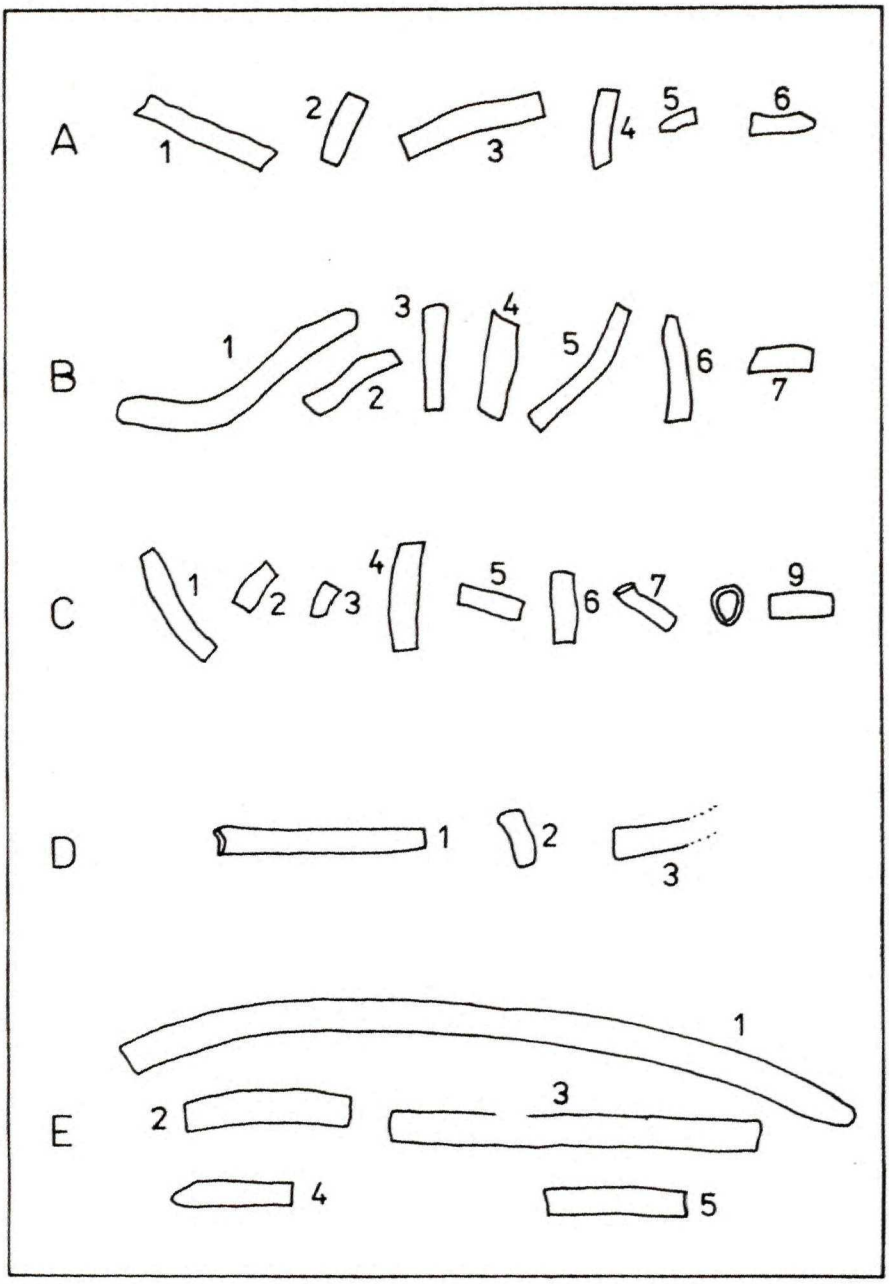

Fig. 3 Remains of organisms (*Carpatia tubiformis* n. gen. n. sp.) from sandstone undersurface of the Soláň Formation (Paleocene) in a quarry near Staré Hutě. A — sample inv. No. 11/82-B 586-C; B — sample inv. No. 11/82-B 586-B; C — sample inv. No. 11/82-B 586-D (holotype); D — sample inv. No. 11/82/B 586-E; E — sample inv. No. 11/82-B 586-F. Samples are at the Moravian Museum in Brno. × 1,7.

Remark: Such minute light-coloured organic remains have so far not been found in the area of the Carpathian Flysch on our territory, neither in the area of the Carpathian Flysch in Poland (M. KSIAŹKIEWICZ 1977), nor in sediments elsewhere in the world (W. HÄNTZSCHEL 1975). The remains of organisms may easily be overlooked during the field work. They represent a positive, yet not too conspicuous hyporelief. Interesting is their three-dimensional spatial order. The lighter and finer sandy substance is distinct in contrast to the wall rock and forms a several tenths of millimetres thick layer on the undersurface of the sandstone.

Sediment: Yellowish-grey, non-calcareous, fine-grained sandstone with irregular platy parting. The sandstone is slightly fine-micaceous. The fragments of the samples are from the lower part of a sandstone bed, over 50 cm thick.

Association: Near the remains of organisms in the quarry at Staré Hutě there are circular uplifts aligned in a row by 3, 6, 8 or isolatedly. In one case their course in the row is bent in a right angle. The circular fragments are 3—5 mm in diameter, with a dimple in their centre. They represent a new fossil trace whose description and evaluation I am preparing for print. Sandstone fragments from the quarries at Staré Hutě and at Jankovice contained tubular fossil traces of the genus *Planolites* NICHOLSON 1873. The Soláň Formation near the locality Staré Hutě also comprised fossil traces of the genus *Cosmorhaphe* FUCHS 1895, *Agrichnium* PFEIFFER 1968 and *Subphyllochorda* GÖTZINGER and BECKER 1932 (Z. STRÁNÍK et al. 1982).

Origin: The new found "Body Fossil" represents most likely remains of tubes of sessile marine worms (*Polychaeta, Sedentaria*). The worms were small. The substance of the tubes is similar to those of recent marine worms of the family *Sabellidae* (P. FAUVEL 1927). The tubes are non-calcareous.

Distribution: Paleocene, sandstones of the Soláň Formation of the Rača Unit in the Magura Nappe, Inner-Carpathian Flysch. An abandoned quarry at the northern periphery of the village Staré Hutě, a quarry 1 km E of the village Jankovice.

Ichnogenus *Godulaichnium* n. ichnogen.

Type species: *Godulaichnium tenue* n. ichnosp.

Denomination: According to the place of occurrence, the Godula beds, the Godula nappe in the Silesian Unit.

Diagnosis: A fine, cylindrical, somewhat flattened trace; branching in places, with a conspicuous horizontal furrow. The trace is up to 1.2 mm wide, without transverse dissection on its surface. Its course is slightly twisted. The trace is on the undersurface of sandstone (a positive hyporelief).

***Godulaichnium tenue* n. ichnosp.**
Plate XV, XVI, Fig. 1, 2, Fig. 4, 5 in text.

Holotype: Sample No. 11/82-B 586-A, deposited at the Moravian Museum in Brno.

Type locality: An abandoned quarry in the road bend to Pustevny, 11 km ENE of Rožnov pod Radhoštěm.

Type level: The Godula Beds of the Silesian nappe, sandstones, Cretaceous.

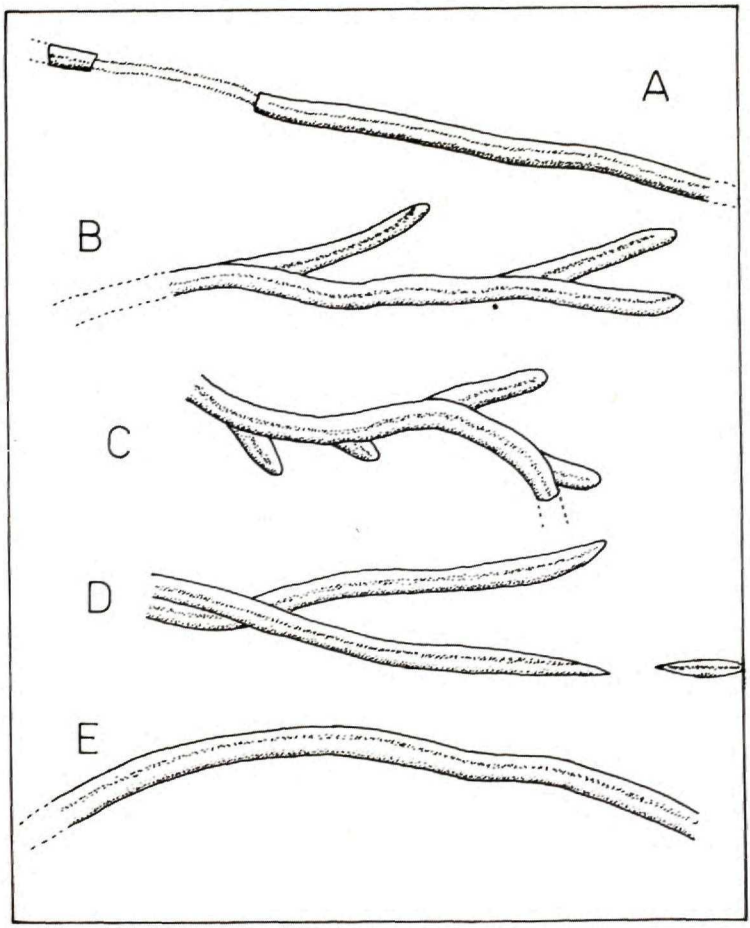

Fig. 4 Fossil trace *Godulaichnium tenue* n. ichnogen n. sp. on sandstone undersurface of Godula beds (Cretaceous). Quarry in bend of road to Pustevny. A — trace has interrupted course. Its continuation may be traced according to negative hyporelief in form of double groove (holotype, sample inv. No 11/82-B 586-A), × 2,5; B — branching trace (Pl. XVI, Fig. 2), × 3,5; C — trace with 4 times branched course (Pl. XVI, Fig. 1), × 3,5; D — two mutually overlapping traces, one of them "submerges" in sediment (slight upward arching of its course in sediment Pl. XVI, Fig. 1), × 3; E — arcuate course of trace (Pl. XVI, Fig. 1); × 3.

Denomination: According to appearance and size of the trace, from the Latin "tenuis", thin, narrow, fine.

Material: 8 fragments of bedded fine-grained sandstones.

Diagnosis: A cylindrical, slightly flattened trace, with a distinct longitudinal groove in its centre. The trace is gently twisted. It is up to 1.2 mm wide, without transverse dissection. Its length exceeds 12 cm. The trace is on the undersurface of the sandstone as positive hyporelief.

Description: On the undersurface of the fine-grained, calcareous sandstone with platy parting traces are associated with other small fossil traces — tiny fibrous traces, slightly twisted, in places arcuate, with frequent indications of branching. The branches range in length to several mm, up to 12 mm (Fig. 4B, C in text). In the place where the trace cylinder parts off from the sandstone undersurface, remain two parallel grooves as a negative hyporelief.

The trace course is gently waved (depressing in the rock-originally clay) so the trace on the sandstone undersurface "wedges out" and seemingly ends in its course. As seen in Fig. 5 in text, the fossil trace in the transverse section is flattened in the form of two parallel, mutually connected cylinders. The organism moved over the clayey surface and its most part was pressed down in the clayey basis. There were seven such traces on the sandstone undersurface on the sample 11/82-B 586-A (holotype).

Remarks: In its outlook the trace resembles the trace of the genus *Subphyllochorda* GÖTZINGER and BECKER, 1932 (W. HÄNTZSCHEL 1975). If differs in its size and the absence of transverse dissection. It is frequently overlooked by

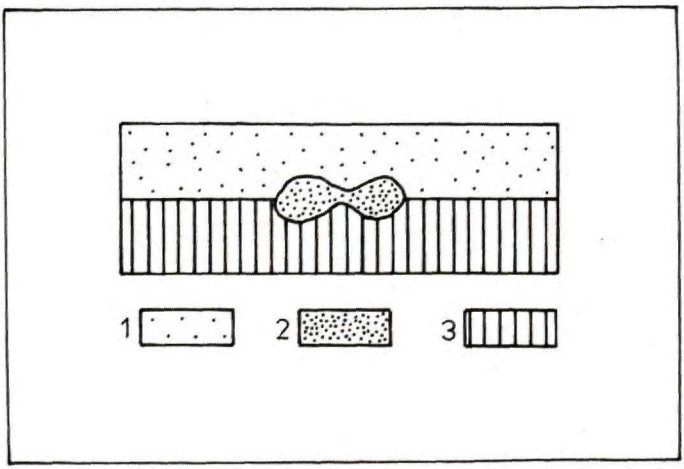

Fig. 5 Schematic drawing of transverse section of fossil trace *Godulaichnium tenue* n. ichnogen. n. sp. Explanations: 1 — sandstone, 2 — fine-grained sandstone, filling of fossil trace, 3 — claystone (basement of sandstone). Trace is 1.2 mm wide.

geologists and paleontologists because of its small size and because it is pressed down in the underlying sediment (clay) only in a short segment and emerges again. It is also overlooked in association with other larger and more distinct fossil traces.

Sediment: The holotype is on the undersurface of greenish-gray, calcareous, fine-grained, strongly fine-micaceous sandstone with platy parting. In places the sandstone is convolute-bedded.

Association: Near the new fossil trace (the sample of holotype in the figure on Pl. XV) are also the fossil trace *Capodistria vettersi*, VYALOV 1964 and traces of the genus *Planolites* NICHOLSON, 1873 (W. HÄNTZSCHEL 1975). On the sandstone undersurface are indistinct current marks but they do not affect the orientation of the new fossil trace. Sandstone fragments from the quarry contained fossil trace *Subphyllochorda* sp., *Scolicia* sp. and *Taprhelminthopsis* sp. One sandstone fragment also contained the trace of *Zoophycos* sp.

Origin: The new fossil trace is most likely after small sea worms moving over the clayey surface of the sea floor.

Distribution: The Godula beds of the Silesian nappe (Cretaceous, Cenomanian), the Inner-Carpathian Flysch. An abandoned quarry in the bend of the road to Pustevny, 11 km ENE of Rožnov pod Radhoštěm.

Ecology and paleoecology

The fossil remains *Carpatia tubiformis* n. gen. n. sp. represent most likely fragments of tubes of sessile marine worms (*Annelida, Polychaeta*) living in colonies on the clayey surface of the sea floor. The rests of the tubes were covered and compressed by sandy material. The find from the Godula beds of the Silesian nappe represents the fossil trace *Godulaichnium tenue* n. ichnogen, n. sp., most likely also of sea worms of small size, moving over the muddy sea floor. Since in both cases the traces are after sea worms easily adaptable to depth conditions in the sea (F. DAHL 1971), the depth conditions cannot be reliably characterized on the basis of these finds. But fossil traces *Godulaichnium tenue* n. ichnogen. n. sp. may indicate very favourable conditions for the evolution and activities of these organisms on the sea floor in the place of their occurrence. There they were abundant in an extremely varied assemblage which might indicate a shallow-water environment.

Conclusions

Fossil traces occurring in marine sediments in all the world must be paid much attention and every sample is to be studied most thoroughly. Many traces are overlooked because of their small size or uninteresting outlook, and especially because of the nearness of larger and striking forms as it was with the fossil trace

Belonidopsisichnium carpaticum (M. PLIČKA 1982). The fossil remains *Carpatia tubiformis* n. gen. sp. were found directly on the locality when a large sandstone undersurface was studied with extraordinary interest. The fossil trace *Godulaichnium tenue* n. ichnogen. n. sp. was revealed during the laboratory examination of the samples. So the new results complement our data on the distribution of sea organisms in the sedimentation area of the Carpathian Flysch. The newly found fossil trace in the Godula beds of the Silesian nappe in the quarry pod Pustevnami is another evidence of an extremely rich assemblage of fossil trace in this area. There are another two new fossil traces from the mentioned locality, whoses description I am preparing for print.

References

BUDAY, T. et al. 1960: Tektonická mapa Československa, 1 : 1 000 000, Ústřední ústav geologický, Praha.

DAHL, F. 1971: Die Tierwelt Deutschlands, Annelida, Borstenwürmer, Polychaeta. G. Fischer, Jena, 1—594.

FAUVEL, P. 1927: Faune de France, 16, Polychètes sédentaires. L. Lechevalier, Paris. 1—494.

HÄNTZSCHEL, W. 1975: Trace fossils and problematica. — In R. C. Moore—C. Teichert (eds.): Treatise on Invertebrate Paleontology, p. W, Miscellanea, Boulder, Lawrence, 1—269.

KSIAŹKIEWICZ, M. 1877: Trace Fossils in the Flysch of the Polish Carpathians. Paleontologia polonica, Polska ak. nauk, Warszawa—Kraków, 1—208.

PLIČKA, M. 1968: Joint Zones in the flysch of the Czechoslovak Carpathians and in the Paleozoic of the SE border of the Czech Massif. Geol. Práce, Správy 44—45, Bratislava, 119—227.

PLIČKA, M. 1981: Calixichnium häntzscheli n. ichnogen. n. sp. from the Eocene Flysch of Slovakia. Věst. Ústř. Úst. geol., 56, 4, Praha, 232—236.

PLIČKA, M. 1982: Belonidopsisichnium carpaticum n. ichnogen. n. sp. from the Outer Carpathian Flysch in East Slovakia, Czechoslovakia. Záp. Karpaty, sér. Paleont., 8, Geol. Úst. D. Štúra, Bratislava, 149—158.

PLIČKA, M. 1983: Popradichnium erraticum ichnogen. n. sp. n. — a new trace fossil from the Eocene Flysch of Slovakia. Věst. Ústř. Úst. geol., 58, 5, Praha, 301—303.

PLIČKA, M. 1984: Eulalites obscurus gen. n. sp. n., "Body Fossil" of the Eocene flysch of Slovakia. Věst. Ústř. Úst. geol., 59, 3, Praha, 183—186.

STRÁNÍK, Z. et al. 1982: Zpráva o geologických poměrech území pro výstavbu dálnice D1 Brno—Trenčín ve Chřibech. Geofond Praha, 1—21.

Miroslav Plička

Nová „Body Fossil" a nová fosilní stopa z vněkarpatského flyše na Moravě (Československo)

V západní obslasti vněkarpatského flyše na Moravě byly při studiu puklinatosti hornin v letech 1960—1965 (M. PLIČKA 1968) příležitostně sledovány na lokalitách i fosilní stopy a různé, často problematické fosilní zbytky. Tyto materiály jsou zpracovávány dodatečně po etapách se značným časovým odstupem od doby jejich příležitostného sběru. Jak se později ukázalo, není tento časový odstup na závadu.

K prvním vzorkům, které nyní zpracovávám a zhodnocuji patřil nález nových fosilních zbytků, zjištěných na spodní vrstevní ploše pískovců soláňského souvrství (paleocén) račanské jednotky magurského flyše na dvou lokalitách v Chřibech. Jednou z nich je lom při s. okraji obce Staré Hutě, druhou lokalitou je lom 1 km v. od Jankovic (viz obr. 1 a 2 v textu). Jedná se pravděpodobně o fosilní zbytky trubiček mořských přisedlých červů (*Polychaeta, Sedentaria*). Byl pro ně zvolen název *Carpatia tubiformis* n. gen. n. sp. (Tab. XIII, XIV, obr. 3 v textu).

Fosilní zbytky tvoří na spodní vrstevní ploše pískovce sploštělé, protáhlé tvary, široké 1—2,5 mm, dlouhé až 6 cm, vysoké jen několik desetin milimetru. Oproti okolní hornině jsou tyto tvary barevně odlišné, mají žlutavěšedé zbarvení. Jsou úlomkovité povahy, většinou ukončené kolmo napříč. Při okraji podél jsou poněkud vyvýšené, takže vyvolávají představu sploštělých trubiček nějakého mořského organizmu. Povrch těchto zbytků je hladký. Oproti okolní hornině světlejší a jemnější substance těchto fosilních zbytků je nevápnitá.

Pískovec, na jehož spodní vrstevní ploše jsou tyto fosilní zbytky, je žlutavěšedý, jemnozrnný, nepravidelně destičkovitě dělitelný, slabě jemně slídnatý, nevápnitý.

V těsné blízkosti popisovaných zbytků organizmů byly zjištěny v lomu ve Starých Hutích na spodní vrstevní ploše pískovce kruhovité vyvýšeniny, uspořádané v řadě za sebou v počtu 3, 6, 8 nebo jsou vyvýšeniny ojedinělé. Byl zjištěn i případ, kdy se jejich průběh v řadě lomí v pravém úhlu. Kulaté tvary (pozitivní hyporelief) mají průměr 3—5 mm a uprostřed mají dolík. Představují zcela novou fosilní stopu. Dále byly na úlomcích pískovců v lomu ve Starých Hutích i v lomu u Jankovic zjištěny trubičkovité fosilní stopy rodu *Planolites* NICHOLSON 1873. V blízkém okolí lokality Staré Hutě byly zjištěny v soláňském souvrství na dalších výchozech ještě fosilní stopy rodu *Cosmorhaphe* FUCHS 1895, *Agrichnium* PFEIFFER 1968 a *Subphyllochorda* GÖTZINGER and BECKER 1932 (Z. STRÁNÍK et al. 1982).

V lomu v ohybu silnice na Pustevny, 11 km vsv. od Rožnova pod Radhoštěm, byly na spodní vrstevní ploše úlomků pískovců godulských vrstev zjištěny nové, jemné fosilní stopy, které představují rovněž pozitivní hyporelief. V uvedeném lomu jsou odkryté godulské vrstvy slezského příkrovu, křídového stáří. Lokalita patří do oblasti Beskyd. Pro novou fosilní stopu byl zvolen název dle místa výskytu *Godulaichnium tenue* n. ichnogen. n. sp. (Tab. XV, XVI; obr. 4 v textu).

Fosilní stopa má podobu sploštělého válečku, který se místy větví a uprostřed podél má výraznou rýžku (viz obr. 5 v textu). Stopa je mírně zprohýbaná, v jednom případě je obloukovitě prohnutá. Je široká maximálně 1,2 mm, nemá příčné členění. Větve dosahují délky jen několik milimetrů, maximálně 12 mm (viz obr. 4B, C v textu). V místě, kde se váleček stopy odloupne od spodní vrstevní plochy pískovce, zůstávají na ní dvě paralelně probíhající rýžky, jako negativní hyporelief. Jejich vzájemný rozestup je menší než je šířka stopy. Délka stopy přesahuje 12 cm.

Průběh stopy je vzhledem k vrstevní ploše mírně zvlněný (zahlubování do podložní horniny, původně jílu), takže stopa na spodní vrstevní ploše pískovce „vykliňuje" a zdánlivě končí ve svém průběhu. Organizmus se pohyboval po jílovitém povrchu mořského dna a byl do jílovitého podkladu větší částí zahlouben. U holotypu (vz. č. 11/82-B 586-A) bylo zjištěno celkem sedm těchto stop (Tab. XV).

Svým vzhledem se nová stopa podobá poněkud stopě rodu *Subphyllochorda* GÖTZINGER and BECKER, 1932 (W. HÄNTZSCHEL 1975). Liší se však jednak výrazně svými rozměry a hlavně tím, že nová stopa nemá příčné členění.

Pískovce s fosilní stopou *Godulaichnium tenue* n. ichnogen. n. sp. na spodní vrstevní ploše jsou zelenavěšedé, vápnité, silně jemně slídnaté, destičkovitě dělitelné.

V blízkosti výskytů nově zjištěné fosilní stopy je u vzorku holotypu (Tab. XV) fosilní stopa *Capodistria vettersi* VYALOV, 1964 a dále fosilní stopy rodu *Planolites* NICHOLSON, 1873 (W. HÄNTZSCHEL 1975). Kromě toho byly na úlomcích pískovců v lomu zjištěny tyto fosilní stopy: *Subphyllochorda* sp., *Scolicia* sp., *Taprhelminthopsis* sp., na jednom úlomku pískovce byl zjištěn i otisk *Zoophycos* sp.. Nová fosilní stopa vznikla pravděpodobně činností mořských červů malých rozměrů, pohybujících se po jílovitém povrchu mořského dna.

Zjištění nových fosilních stop malých rozměrů je dokladem toho, že studium fosilních stop, vyskytujících se v mořských sedimentech na celém světě vyžaduje, aby jim byla věnovaná velká pozornost a každý vzorek, případně vrstevní plocha přímo v terénu byla dobře prohlédnuta. Mnohé ze stop unikají v terénu pozornosti pracovníka buď pro své nepatrné rozměry nebo nenápadný

vzhled, zvláště když v jejich blízkosti upoutávají pozornost vzhledově výraznější a větší formy, jak je tomu například u nově zjištěné fosilní stopy *Belonidopsisichnium carpaticum* PLIČKA, v jejíž těsné blízkosti nápadně vyniká a převládá fosilní stopa *Scolicia prisca* DEQUATREFAGES (M. PLIČKA 1982).

Vysvětlivky k obrázkům v textu

Obr. 1 Schematická mapa lokalit Staré Hutě (1), Jankovice (2) — (*Carpatia tubiformis* n. gen. n. sp.) a Pustevny (3) — (*Godulaichnium tenue* n. ichnogen. n. sp.).

Obr. 2 Geologické schéma místa výskytů nové problematické stopy (1, 2) a nové fosilní stopy (3). Použita Tektonická mapa Československa 1 : 1,000.000 T. BUDAY et al., 1960. 1 — neogén; 2 — neogén karpatské předhlubně; 3 — neogén Vídeňské pánve; 4 — přesunová linie jednotky ždánicko-podslezské; 5 — přesunová linie slezského příkrovu; 6 — přesunová linie magurského příkrovu; 7 — vnitřní bradlové pásmo; 8 — paleozoikum Českého masívu (spodní karbon—kulm, devon); 9 — zlomy; lokalita s problematickou fosilií (1 — Staré Hutě, 2 — Jankovice) a fosilní stopou (3 — lom pod Pustevnami).

Obr. 3 Nákres zbytků organizmů (*Carpatia tubiformis* n. gen. n. sp.) na spodní vrstevní ploše pískovců, odebraných ze spodní vrstevní plochy pískovce soláňských vrstev (paleocén) v lomu u obce Staré Hutě. A — vzorek inv. č. 11/82-B 586-C; B — vzorek inv. č. 11/82-B 586-B; C — vzorek inv. 4. 11/82-B 586-D (holotyp); D — vzorek inv. č. 11/82-B 586-E; E — vzorek inv. č. 11/82-B 586-F. Vzorky jsou uloženy ve sbírkách Moravského musea v Brně. × 1,7.

Obr. 4 Nákres fosilní stopy *Godulaichnium tenue* n. ichnogen n. sp. na spodní vrstevní ploše pískovce godulských vrstev (křída). Lom v ohybu silnice směrem na Pustevny. A — stopa je ve svém průběhu přerušená. Její pokračování je sledovatelné dle negativního hyporeliefu v podobě dvojité rýžky (holotyp, vzorek inv. č. 11) 82-B 586-A, × 2,5; B — větvící se stopa (Tab. XVI, obr. 2), × 3,5; C — stopa se ve svém průběhu 4× větví (Tab. XVI, obr. 1). × 3,5. D — dvě stopy se navzájem překrývají, jedna z nich se ve svém průběhu „ponořuje" do sedimentu (mírné vyklenutí průběhu směrem vzhůru v sedimentu, Tab. XVI, obr. 1). × 3; E — obloukovitě prohnutý průběh stopy (Tab. XVI, obr. 1). × 3.

Obr. 5 Schematický nákres příčného řezu fosilní stopou *Godulaichnium tenue* n. ichnogen. n. sp. Vysvětlivky: 1 — pískovec; 2 — pískovec poněkud jemnějšího zrna, výplň fosilní stopy; 3 — jílovec (podloží pískovce). Stopa je široká 1,2 mm.

Vysvětlivky k tabulkám XIII—XVI

(Foto M. Hofer, tab. XIII, XIV, M. Plička, tab. XV, XVI)

Tab. XIII

1 *Carpatia tubiformis* gen. n. sp. n. na spodní vrstevní ploše pískovce soláňských vrstev (paleocén), magurský příkrov. Lom u obce Staré Hutě, holotyp, vzorek inv. č. 11/82-B 586-D. × 2.

2 *Carpatia tubiformis* gen. n. sp. n. na spodní vrstevní ploše pískovce soláňských vrstev (paleocén), magurský příkrov. Lom u obce Staré Hutě. Vzorek inv. č. 11/82-B 586J-E, × 2.

Tab. XIV

1 *Carpatia tubiformis* gen. n. sp. n. na spodní vrstevní ploše pískovce soláňských vrstev (paleocén), magurský příkrov. Lom u obce Staré Hutě. Vzorek inv. č. 11/82-B 586-C.

2 *Carpatia tubiformis* gen. n. sp. n. na spodní vrstevní ploše pískovce soláňských vrstev (paleocén), magurský příkrov. Lom u obce Staré Hutě, vzorek inv. č. 11/82-B 586-B.

Tab. XV

Godulaichnium tenue ichnogen. n. sp. n. na spodní vrstevní ploše pískovce godulských vrstev (křída), slezský příkrov. Stopa je provázena i jinými bioglyfy. Lom v ohybu silnice na Pustevny. Holotyp, vzorek inv. č. 11/82-B 586-A. Místa výskytu nové fosilní stopy jsou vyznačena x.

Tab. XVI

1 *Godulaichnium tenue* ichnogen. n. sp. n. na spodní vrstevní ploše pískovce godulských vrstev (křída), slezský příkrov. Lom v ohybu silnice na Pustevny. V jednom místě je znatelné větvení stopy, v jiném vzájemné překrývání stopy. × 1.

2 *Godulaichnium tenue* ichnogen. n. sp. n. na spodní vrstevní ploše pískovce godulských vrstev (křída), slezský příkrov. Lom v ohybu silnice na Pustevny. V jednom místě je znatelné větvení stopy — × 0,9.

Explanations to Plates XIII—XVI

(Photographed by M. Hofer — Pl. XIII, XIV, M. Plička — Pl. XV, XVI)

Plate XIII

1 *Carpatia tubiformis* gen. n. sp. n. on sandstone undersurface from Soláň Formation (Paleocene), Magura nappe. Quarry near Staré Hutě, holotype inv. No. 11/82-B 586-D; × 2.

2 *Carpatia tubiformis* gen. n. sp. n. on sandstone undersurface from Soláň beds (Paleocene), Magura nappe. Quarry near Staré Hutě. Sample inv. No. 11/82-B 586-E; × 2.

Plate XIV

1 *Carpatia tubiformis* gen. n. sp. n. on sandstone undersurface from Soláň beds (Paleocene), Magura nappe. Quarry near Staré Hutě. Sample inv. No. 11/82-B 586-C.

2 *Carpatia tubiformis* gen. n. sp. n. on sandstone undersurface from Soláň beds (Paleocene), Magura nappe. Quarry near Staré Hutě, sample inv. No. 11/82-B 586-B.

Plate XV

Godulaichnium tenue ichnogen. n. sp. n. on sandstone undersurface from Godula beds (Cretaceous), Silesian nappe. Trace occurs with other bioglyphs. Bend of road to Pustevny. Holotype, sample inv. No. 11/82-B 586-A. Places of occurrence of new fossil trace are marked with x.

Plate XVI

1 *Godulaichnium tenue* ichnogen. n. sp. n. on sandstone undersurface from Godula beds (Cretaceous), Silesian nappe. Quarry in bend of road to Pustevny. In one place the traces branches, in the other place the traces mutually overlap each other. × 1.

2 *Godulaichnium tenue* ichnogen. n. sp. n. on undersurface of sandstone from Godula beds (Cretaceous), Silesian nappe. Quarry in bend of road to Pustevny. In one place branching of trace is visible; × 0,9.

Translation: E. Jassingerová

Západné Karpaty, séria paleontológia 11, P. 89—98, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Zdeněk Novák—Miroslav Plička

Enormichnium badenicum n. ichnogen. n. sp. — new fossil trace from the Lower Badenian of the Carpathian fore-deep in Moravia, Czechoslovakia

5 text-figs., 2 pls. (XVII—XVIII) Czech summary

Abstract. In the present paper a new fossil trace — *Enormichnium badenicum* n. ichnogen. n. sp. is mentioned, coming from the facies of Lithothamnium limestones of the Carpathian fore-deep in Moravia. The fossil trace is of areal character and considerable dimensions. It probably originated from creeping of a large marine snail.

Introduction

During sedimentological studies of Lower Badenian algal sediments in the central part of the Carpathian fore-deep in Moravia in the years 1972—1975 (Z. NOVÁK 1975) a new fossil trace has been found, which is the subject of the presented paper. The trace has been found at a quarry, opened at the S slope of the hill Pracký vrch for the purpose of stone exploitation for the construction of the Peace Tumulus — the monument of the famous battle of "Three Emperors" in the time of Napoleonic Wars. The site is 9 km WSW from Slavkov near Brno and 1 km ESE from elev. p. Pracký vrch.

Fig. 1 Schematic outline of the locality Pracký vrch hill not far from Slavkov near Brno (*Enormichnium badenicum* n. ichnogenn. sp.).

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There is a relatively large areal fossil trace, identical with the bedding plane surface. The trace found is the fragment of the original trace. It is 70 cm long and up to 19 cm wide. The surface of trace is smoothed and parallel to the direction of trace are narrow ridges. Approximately in the middle of the trace is a central rampart, reaching width of up to 13 mm. On the smooth surface of the trace are conspicuous nest-like concentrated, small lenticular shapes of diameter up to 7 mm, which probably represent piling up of capsules with eggs and of mollusc eggs. The pilings up have preserved as impressions of these organic remnants. The trace is deepened in very sandy, coarse-grained algal limestone. These are alternating with sands and sandstones of algal lithofacies in the bed sequence.

Systematic description

Ichnogenus *Enormichnium* n. ichnogen.

Type specimen: *Enormichnium badenicum* n. ichnosp.

Derivation of name: In compliance with "enormis" (Latin.) — uncommonly large.

Diagnosis: Areal trace with smoothed surface, in the central part of which is a continuous rampart up to 15 mm wide. The width of trace varies from 12 to 19 centimetres and the trace is more than 70 cm long. The trace is a negative epirelief and parallel to the bedding plane.

Distribution: Lower Badenian of the Outer Carpathian Neogene.

***Enormichnium badenicum* n. ichnosp.**

Plate XVII, XVIII, Figs. 4, 5

Holotype: Sample No. 32-1975 is deposited in the collections of the Central Geological Survey, branch Brno.

Type locality: Quarry at the S slope of the Pracký vrch hill, 9 km WSW from Slavkov near Brno, 1 km ESE from elev. p. of the hill.

Stratum typicum: Lithofacies of lower Badenian algal limestones of the Carpathian fore-deep in Moravia.

Derivation of name: According to stratigraphical position — Lower Badenian.

Material: One large fragment (block) of dimensions 35 × 80 × 18 cm.

Diagnosis: Areal trace with smoothed surface. In its central part is a continuous rampart up to 13 mm wide. In the place of arch-like bend of the

trace the rampart approaches the inner part of the arch. Approximately parallel with the central rampart smaller elongated ridges are running, the course of which is sometimes interrupted. The width of trace varies from 12 to 19 centimetres. The trace is more than 70 cm long and represents a negative epirelief. It is parallel to the bedding plane.

Description: The newly described fossil trace forms a deep cut into the bed surface. Deepening is about 5 cm. The trace is arch-like bent and moderately S-shaped vaulted. At the outer margin of the arch the trace in places is incised into the surrounding rock, which, however, can be a secondary mark. A distinct rampart up to 13 mm wide and up to 5 mm high is running through the central part of the trace (Figs. 4,5 in the text, letter "a"). The rampart can be traced continuously. In its middle the rampart is moderately arched, with fine longitudinal striation. In the place of maximum bend the central rampart approaches the inner arch.

Besides this rampart numerous fine, very elongated elevations are on the surface of trace, of direction approximately parallel to the orientation of the central rampart (Figs. 4,5, in text, letter "b").

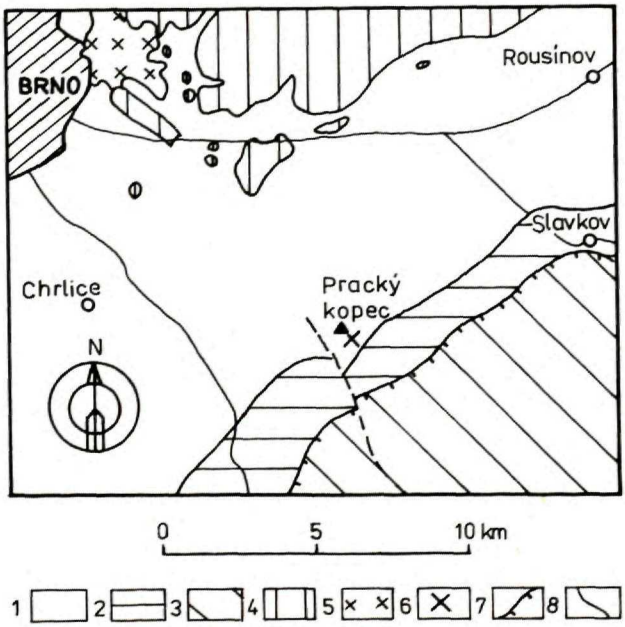


Fig. 2 Geological schematic map with the place of occurrence of the new fossil trace *Enormichnium badenicum* n. ichnogen n. sp. As basis the geological map of Czechoslovakia 1 : 200 000 was used, map sheet Brno M-33-XXIX, T. BUDAY 1963. Explanations: 1 — Badenian; 2 — Karpatian; 3 — Carpathian flysch; 4 — Mesozoic and Paleozoic of the Bohemian massif; 5 — crystalline rocks of the Bohemian massif; 6 — place of occurrence of the new fossil trace; 7 — overthrust line of Carpathian nappes; 8 — state road.

On the contrary their course is often interrupted. Maximum width of these longitudinal elevations is 4 mm, height up to 1 mm.

At the surface of trace are nest-like arranged small lenticular shapes of diameter 1 to 10 millimetres (Fig. 4 in text, letter "c"). In places they also cover the course of elongated fine ridges. Greatest concentration of these shapes is at termination of the trace (Fig. 4, letter "b").

Remarks: Contrary to fossil traces known so far, forming an epirelief in the sediment and usually characterized by distinct transversal segmentation, as for instance in the fossil trace of genus *Scolicia* DE QUATREFAGES 1849 (W. HÄNTZSCHEL 1975), the new fossil trace shows a smooth surface without segmentation with distinct linear elements, elongated in direction of the trace course which formed with movement of organisms on the sea-floor.

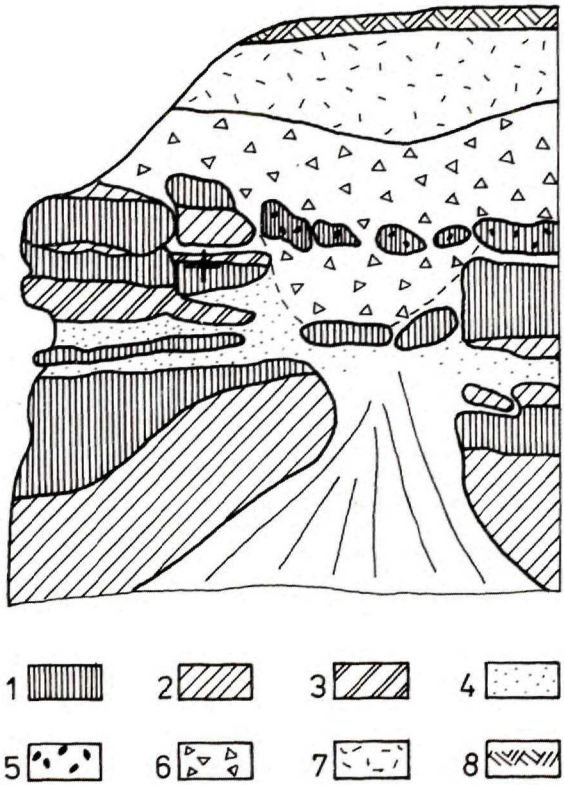


Fig. 3 Schematic outline of part of the western face in the abandoned quarry at the S slope of Pracký vrch hill at the view from south. Explanations: 1 — calcareous sandstones with variable content of red algae; 2 — highly calcareous sandstones to sandy limestones rich in stalks of red algae; 3 — taphoherm limestones; 4 — sand and sandstone; clay galls; 6 — breccias; 7 — sandy-clayey sand; 8 — arable soil. Place of occurrence of the new fossil trace is designated with cross.

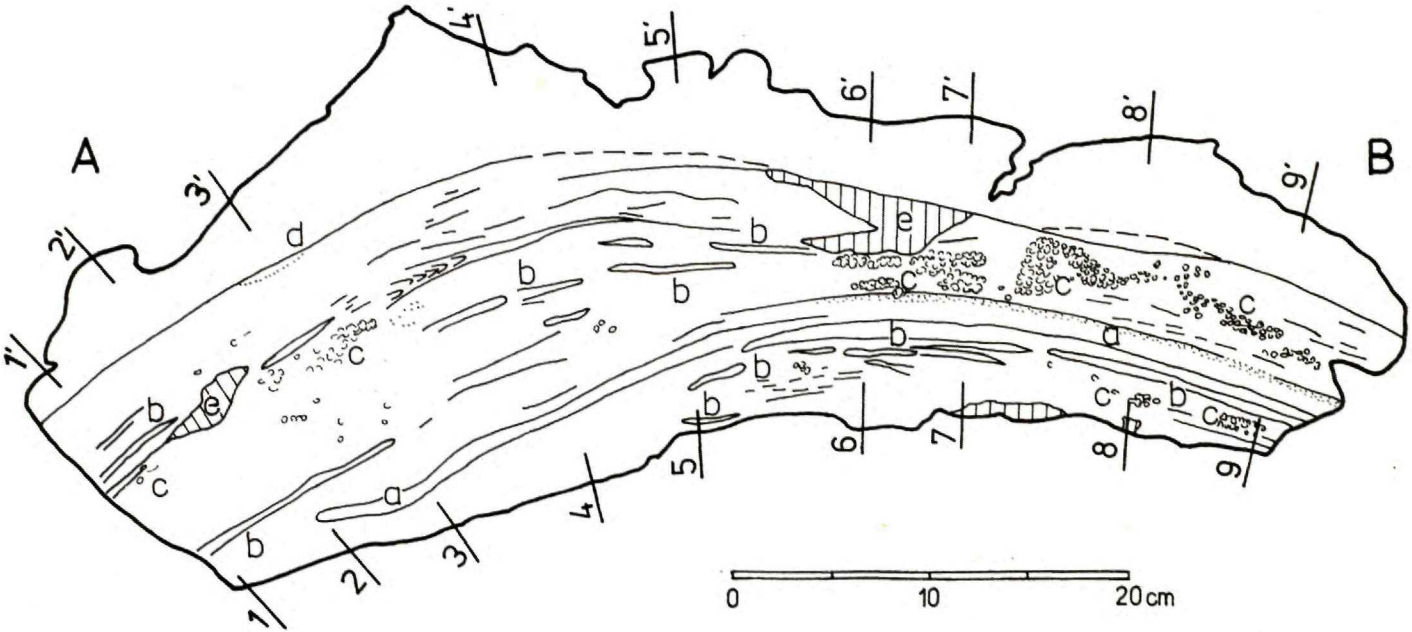
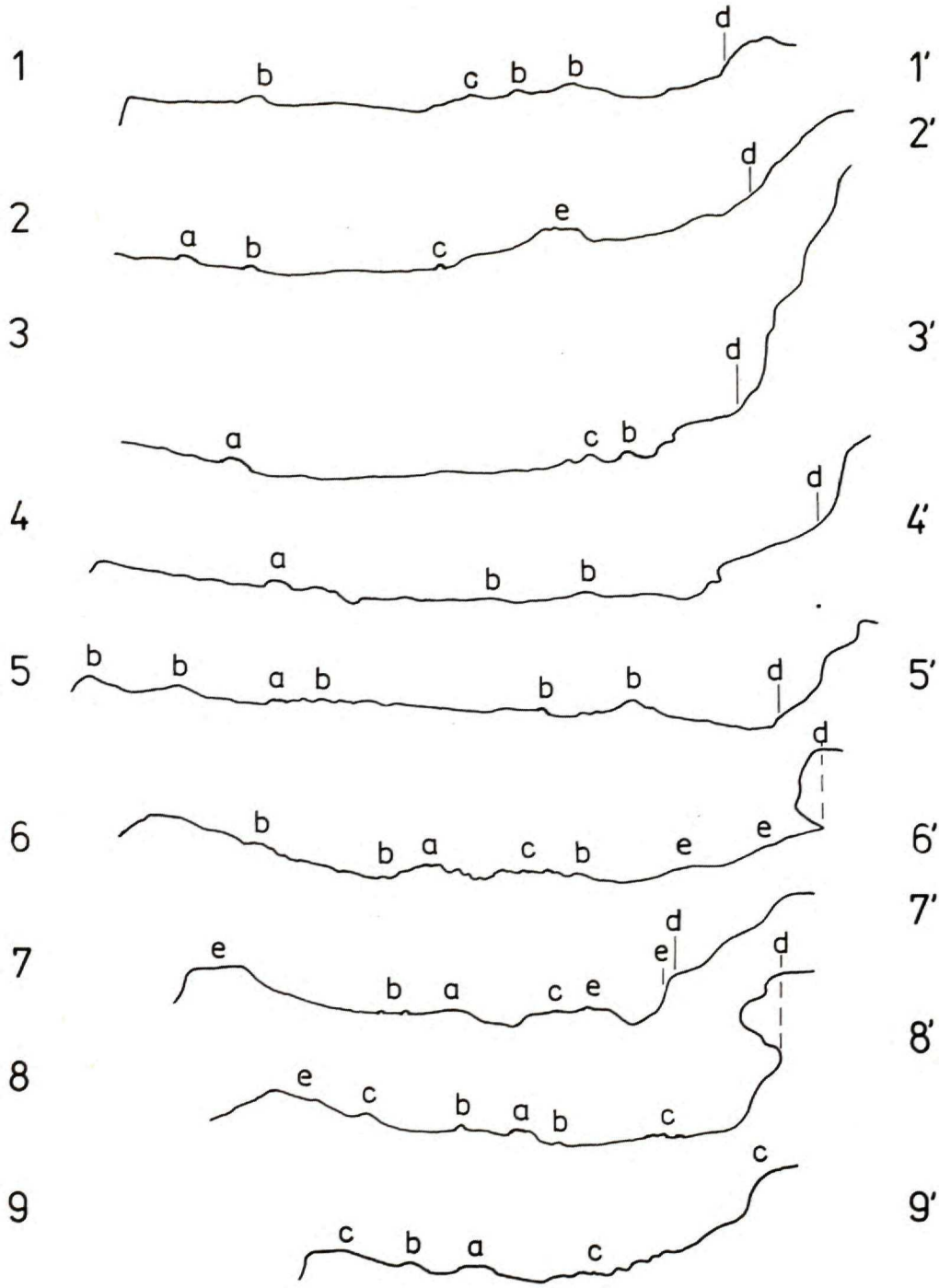


Fig. 4 Schematic outline of the new fossil trace *Enormichnium badenicum* m. ichnogen n. sp. Explanations: A, B — termination of trace; a — distinct median rampart; b — fine elongated elevations (ridges); c — piled up small lenticular forms; d — outer margin of trace; e — part of trace covered with overlying rock; 1—1′ — cross sections of the trace (see Fig. 5 in text); ×0,25.


1
1'
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2'
3
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4
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5'
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6'
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8'
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9'

Sediment: Highly sandy algal limestones, in the structure of which, besides stalks of red algae, also fragments of mollusc shells and bryozoan zoaria take part. The content of non-carbonate clastic components varies most often within the range of 35—45 %.

Association: At the locality studied, besides the described trace, also a fossil trace of the genus *Planolites* NICHOLSON 1873 (V. HÄNTZSCHEL 1975) and fossil traces of the new genus *Praceichnium tejkali* n. ichnog., n. ichnosp. were found (Z. NOVÁK, in press). Further on, fossil remains of red algae of the family *Melobesioidae*, fragments of bryozoan zoaria and fragments of mollusc shells were established (Z. NOVÁK 1975).

Origin: On the basis of the shape of trace and its surface with regard to its surface structure it can be supposed that it originated with creeping of some large representative of marine snails. At present, for example, *Dolium galea* (L.), belonging to the family *Dolidae* (R. RIEDEL 1963) is living at the coast of the Mediterranean Sea. The mentioned mollusc is living, for example, in the Adriatic Sea or at the northern coast of Africa (Libya) in shallow-water environment with sandy sea-floor. The conch of the mentioned snail attains a diameter of up to 25 cm.

Distribution: Lower Badenian of the Carpathian fore-deep in Moravia, shallow-water lithofacies of algal limestones. The new fossil trace *Enormichnium badenicum* n. ichnogen n. sp. has so far been found only at an abandoned quarry at the S slope of the hill Pracký vrch, 9 km WSW from Slavkov near Brno.

Ecology and paleoecology

On the basis of the association of algae, found in sediments uncovered by the above mentioned quarry (Z. NOVÁK 1975) with regard to the occurrence of these associations in the present-day Adriatic Sea (J. SENEŠ 1973) it may be supposed that the originator of the described new fossil trace inhabited detritic sea-floors in the area of the intralittoral and shallower circalittoral zones (J. M. PERES–J. PICARD 1964).

Conclusion

The newly established fossil trace, found in a highly sandy limestone of the Lower Badenian of the Carpathian fore-deep near Slavkov in the area of Brno enriches our knowledge on the sedimentation environment and conditions of formation of algal lithofacies rocks. No proper attention has been devoted to the

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Fig. 5 Cross sections of the new fossil trace *Enormichnium badenicum* n. ichnogen n. sp. Explanations: a — median distinct rampart; b — fine elongated elevation (ridge); c — piled up small lenticular forms; 1—1′ — cross sections of the trace (see Fig. 4 in text); ×0,25.

study of fossil traces in Neogene sediments in our country so far. It is shown, however, as the results of later investigations indicate, that also this sphere is very hopeful in this direction from the viewpoint of investigations (Z. NOVÁK, in press a, b). The results of investigation can be used also in other marine sedimentation areas for more precise determination of sedimentation and bathymetric conditions.

References

BUDAY, T. 1963: Geologická mapa ČSSR 1:200 000 M-33-XXIX Brno. ČSAV Praha.

HÄNTZSCHEL, W. 1975: Trace fossils and problematica. In R. C. Moore—C. Teichert (eds.): Treatise on Invertebrate Paleontology, p. w., Miscellanea, suppl. 1 Boulder, Lawrence, W 1—269.

NOVÁK, Z. 1975: Spodnobadenské vápence karpatské předhlubně na Moravě. Kandidát. práce, MS PF UJEP, Brno, 1—222.

NOVÁK, Z. v tisku (a): Praceichnium tejkali n. ichnogen n. sp. ze spodního badenu karpatské předhlubně na Moravě (Československo). Věstník ÚÚG, Praha.

NOVÁK, Z. v tisku (b): Tubifexides moravicum ze sedimentů karpatu severní Moravy (Československo).

PERES, J. M. 1964: Nouveau manual de bionomie benthique de la Mer méditeranée. Extrait du Recueil Traveaux de la Station Marine d'Endaume. Bull. No. 31, 47, 1—125.

RIEDL, R. 1963: Fauna und Flora der Adria. Verlag Paul Parey, Hamburg und Berlin, 1—640.

SENEŠ, J. 1973: Faciálne analýzy adriatického šelfu z aspektu potrieb geológie. M, GÚ SAV, Bratislava.

Zdeněk Novák—Miroslav Plička

Enormichnium badenicum n. ichnogen. n. sp. — nová fosilní stopa ze spodního badenu karpatské předhlubně na Moravě (Československo)

Resumé

Při sedimentologických studiích řasových sedimentů spodního badenu ve střední části Karpatské předhlubně na Moravě v letech 1972—1975 (Z. NOVÁK 1975) byla zjištěna nová fosilní stopa, která je předmětem předložené práce. Stopa byla nalezana v opuštěném lomu na j. svahu Prackého vrchu, 9 km zjz. od Slavkova u Brna (Fig. 1 a Fig. 2 v textu).

Jedná se o relativně velikou plošnou fosilní stopu, shodnou s rovinou vrstevní plochy. Nalezená stopa je fragmentem původní stopy. Je dlouhá 70 cm a je široká až 19 cm. Tvoří hluboký zářez do povrchu vrstvy. Zahloubení činí asi 5 cm. Stopa je oblukovitě prohnutá a mírně esovitě vyklenutá. Při vnějším okraji oblouku se stopa místy zařezává do okolní horniny (viz obr. 4 a obr. 5 v textu). Toto zařezávání může být znakem sekundárním. Středovou partii stopy probíhá výrazný val (písmeno „a" na obr. 4 a obr. 5 v textu), široký až 13 mm a vysoký až 5 mm. Val je průběžně sledovatelný. Ve svém středu je mírně vyklenutý a jemně podélně rýhovaný. V místě maximálního ohybu stopy se centrální val přibližuje k vnitřnímu oblouku.

Kromě tohoto valu jsou na povrchu stopy ještě četné, jemné, velmi protáhlé vyvýšeniny, směrově přibližně paralelní s orientací centrálního valu (písmeno „b" na obr. 4 a obr. 5 v textu). Na rozdíl od něj je jejich průběh často přerušován. Maximální šířka těchto podélných vyvýšenin činí 4 mm, výška až 1 mm.

Na povrchu stopy jsou hnízdovitě rozmístěné drobné čočkovité tvary od průměru jednoho milimetru do 10-ti mm (písmeno „c" na obr. 4 a obr. 5 v textu). Místy překrývají i průběh

protáhlých, jemných hřbítků. Největší koncentrace těchto tvarů je při ukončení stopy (viz písmeno „b", nákres na obr. 4 v textu).

Na rozdíl od dosud známých fosilních stop, představujících epirelief v sedimentech a vyznačujících se obvykle výrazným příčným segmentováním, jak je tomu například u fosilní stopy rodu *Scolicia* DE QUATREFAGES 1849 (W. HÄNTZSCHEL 1975), má nová fosilní stopa povrch hladký bez segmentace s výraznými podélnými lineárními prvky, které vznikly při pohybu organizmu po mořském dně. Na základě tvaru stopy a jejího povrchu, s přihlédnutím na její povrchovou strukturu lze předpokládat, že vznikla při lezení nějakého velikého zástupce mořských plžů.

Na základě společenstva řas, obsaženého v sedimentech, odkrytých výše uvedeným lomem (Z. NOVÁK 1975) a s přihlédnutím k výskytu těchto společenstev řas, v současném Jadranu (J. SENEŠ 1973) lze předpokládat, že původce fosilní stopy obýval detritická mořská dna v oblasti intralitorálu a mělčího circalitorálu (J. M. PERES—J. PICARD 1964).

Nově zjištěná stopa, obohacuje naše znalosti o sedimentačním prostředí a podmínkách vzniku hornin řasové litofacie. Výsledků výzkumu lze použít i v jiných mořských sedimentačních oblastech pro upřesnění podmínek sedimentace a bathymetrických poměrů.

Vysvětlivky k obrázkům

Obr. 1 Schematický nákres lokality Pracký vrch nedaleko Slavkova u Brna (*Enormichnium badenicum* n. ichnogen. sp.).

Obr. 2 Geologická schematická mapka s místem výskytu nové fosilní stopy *Enormichnium badenicum* n. ichnogen. n. sp. Jako podkladu byla použita geologická mapa Československa 1 : 200 000, list Brno M-33-XXIX, T. BUDAY 1963. Vysvětlivky: 1 — baden; 2 — karpat; 3 — karpatský flyš; 4 — mesozoikum a paleozoikum Českého masívu; 5 — krystalinikum Českého masívu; 6 — místo výskytu nové fosilní stopy; 7 — přesunová linie karpatských příkrovů; 8 — státní silnice.

Obr. 3 Schematický nákres části západní stěny v opuštěném lomu na j. svahu Prackého vrchu při pohledu od jihu. Vysvětlivky: 1 — vápnité pískovce s proměnlivým obsahem ruduch; 2 — silně vápnité pískovce až písčité vápence bohaté stélkami ruduch; 3 — tafohermní vápenec; 4 — písek a pískovec; 5 — jílovité závalky; 6 — brekcie; 7 — písčito-jílovitý písek; 8 — ornice. Místo výskytu nové fosilní stopy je označeno křížkem.

Obr. 4 Schematický nákres nové fosilní stopy *Enormichnium badenicum* n. ichnogen. n. sp. Vysvětlivky: A, B — ukončení stopy; a — středový výrazný val; b — jemné protáhlé vyvýšeniny (hřbítky); c — nahloučené drobné čočkovité tvary; d — vnější okraj stopy; e — část stopy překrytá nadložní horninou; 1—1′ — příčné řezy stopou (viz obr. 5 v textu); ×0,25.

Obr. 5 Příčné řezy novou fosilní stopou *Enormichnium badenicum* n. ichnogen. n. sp. Vysvětlivky: a — středový výrazný val; b — jemná protáhlá vyvýšenina (hřbítek); c — nahloučené drobné čočkovité tvary; d — vnější okraj stopy; e — část stopy překrytá nadložní horninou; 1—1′ — příčné řezy stopou (viz obr. 4 v textu); ×0,25

Vysvětlivky k tabulkám XVII—XVIII
(Foto Z. Novák)

Tab. XVII
Enormichnium badenicum n. ichnosp., nová fosilní stopa na svrchní vrstevní ploše hrubozrnného, písčitého řasového vápence. Nahloučeniny čočkovitých tvarů na povrchu stopy jsou pravděpodobně zbytky tobolek s vajíčky nebo vajíčka měkýšů. Spodní baden karpatské předhlubně, lom na j. svahu Prackého kopce. Vzorek (holotyp) je uložen ve sbírkách Ústředního ústavu geologického, pobočka Brno.

Tab. XVIII
1 *Enormichnium badenicum* n. ichnosp. (holotyp), část vzorku.
2 *Enormichnium badenicum* n. ichnosp. (holotyp), část vzorku.

Explanations to Plates XVII—XVIII
(Photo Z. Novák)

Plate XVII
Enormichnium badenicum n. ichnosp., new fossil trace on the upper bedding plane of coarse-grained, sandy algal limestone. Accumulations of lenticular forms at the surface of the trace are probably remnants of capsules with eggs and mollusc eggs. Lower Badenian of the Carpathian fore-deep, quarry at the S slope of the hill Pracký kopec. The sample (holotype) is deposited in the collections of the Central Geological Institute, branch Brno.

Plate XVIII
1 *Enormichnium badenicum* n. ichnosp. (holotype), part of sample.
2 *Enormichnium badenicum* n. Ichnosp. (holotype), part of sample.

Západné Karpaty, séria paleontológia 11, P. 99—107, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Zdeněk Novák—Helena Peslová

Flyschichnium plickai n. ichnogen. n. sp. — new fossil trace from the Upper Paleogene of the Carpathian flysch in Moravia (Czechoslovakia)

4 Figs. in text., 2 pls. (XIX—XX), Czech summary

Abstract. In the paper presented a new fossil trace from the Biele Karpaty unit of the Magura Flysch is described — *Flyschichnium plickai* n. ichnogen. n. sp., found at the quarry near the village of Bzová, not far from Bojkovice.

Introduction

With exploiting works at the Bzová quarry a fossil trace was found by the employees of the quarry J. Rapant and S. Husařík, which was later given for study to members of the Brno branch of the Central Geological Survey. It is a relatively large trace, lying at the surface of the bedding plane. The trace is of ribbon appearance 90 mm wide, of bilateral symmetry, formed by the central axis, bordered by distinct transversal asymmetric ramparts. It is found in grey, medium-to coarse-grained, calcareous psammite, greyishbrown to brown-weathering.

Geological position of the find

The Bzová quarry, situated at the SE margin of the village of equal name, about 6 km SSE from Bojkovice, is opened in the innermost facial-tectonic unit of the Magura Flysch in the Biele Karpaty unit. The quarry uncovered a flysch sequence with prevalence of sandstones over claystones of Paleogene age. These beds are ranged to the lithostratigraphical complex designated as the upper division of the Paleogene and on the basis to the predominating sandstone component to the so called Vlára development (A. MATĚJKA—Z. ROTH 1965).

prom. geol. H. Peslová, RNDr. Z. Novák, CSc., Ústřední ústav geologický, Leitnerova 22, Brno.

Fig. 1 Situation of Bzová locality

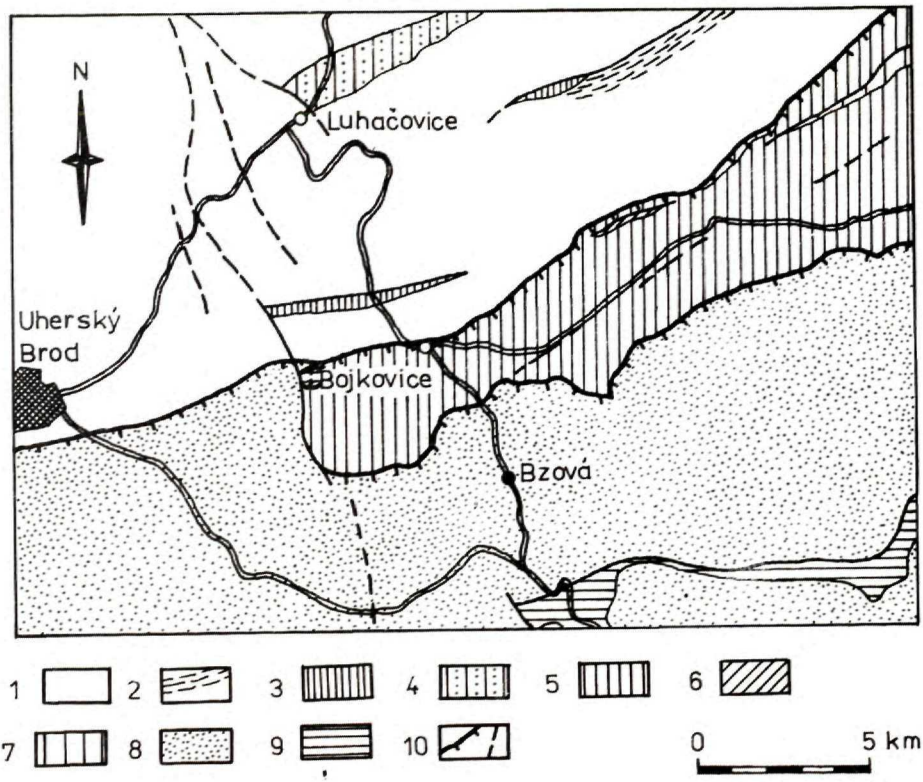


Fig. 2 Geological situation of the area of the find site. Adopted from the geological map of Czechoslovakia 1 : 200 000 M-33-XXX — Gottwaldov.
Legend: 1—4 — Rača unit: 1 — Upper Zlín beds, 2 — Lower Zlín beds, 3 — Beloveža beds, 4 — Soláň beds; 5—7 — Bystrica unit: 5 — Zlín beds, 6 — Beloveža beds, 7 — Soláň beds; 8—9 Biele Karpaty unit: 8 — Upper Paleogene division, 9 — Lower Paleogene division, 10 — significant tectonic boundaries. The site of find is indicated with full circle.

The detailed lithological character of the complex of strata of the upper division of the Paleogene of the Biele Karpaty unit is best documented by the profile of borehole Komňa-1, situated in strike continuation about 4 km WSW from the quarry Bzová (M. ELIÁŠ—M. PLIČKA 1962). The complex is prevailingly formed by flysch cycles with graded bedding of centimetre to metre thicknesses. In zones with highly prevailing sandstones some of the flysch cycles are of fluxoturbidite character.

In the composition of the lower part of flysch cycles, in which the newly described trace was found, coarse-to fine-grained psammites or fine-grained psephites or clastic carbonates take part. The upper parts of flysch cycles are formed by pelites or fine-grained carbonates with psammitic admixture. Laminations caused by the change of grain size, clayey and organic substances, are usually found at transitions between fine-grained psammites and fine-psammitic pelites. It is continuous and discontinuous, straight, oblique, wavy and convolute. In psammites claystone fragments (sometimes also armoured) ranging from several mm to several cm to dm in size are abundant.

Systematic description

Ichnogenus Flyschichnium n. ichnogen.

Type species: *Flyschichnium plickai* n. ichnosp.

Derivation of name: name derived from the place of find region in the Carpathian flysch.

Diagnosis: Planary, unbranched, bilaterally symmetric trace parallel to the bedding surface, of negative epirelief character. The fossil trace is formed by the central axis, bordered on both sides by transversal ramparts arch-like to moderately S-shaped bent. The width of trace varies within the range of 88—90 mm. The total length of the trace, 285 cm over an area of 115 × 87 cm, is a mere fragment of the supposed original extent only.

Distribution: Biele Karpaty unit of the Magura Flysch-Upper Paleogene division.

***Flyschichnium plickai* n. ichnosp.**

Pls. XIX—XX, Figs. 3, 4 in text.

Holotype: Sample 32, Central Geological Survey (ÚÚG) Brno. Pls. XIX, XX, Figs. 3, 4 in text.

Type locality: The Bzová quarry, opened at the SE margin of the village of equal name, about 6 km SSE of Bojkovice.

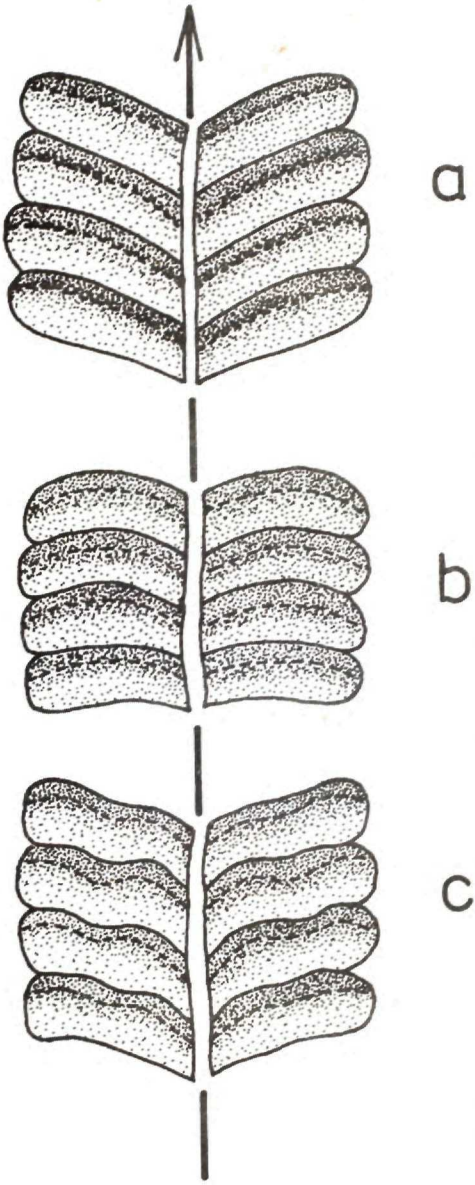


Fig. 3 Schematic outline of the fundamental types of course of transversal ramparts of the fossil trace *Flyschichnium plickai* n. ichnogen. n. sp.: a — transversal ramparts of oblique orientation, b — transversal ramparts perpendicular to the axial part of trace, c — undulated transversal ramparts.

Type horizon: Flysch sequence with prevalence of sandstones over claystones- the so called Vlára development, Eocene (A. MATĚJKA—Z. ROTH 1956).

Derivation of name: In honour of the prominent Czechoslovak ichnopaleontologist Dr. MIROSLAV PLIČKA.

Material: One block of sandstone of dimensions 115 × 87 × 12 cm

Diagnosis: Planar, unbranched bilaterally symmetric fossil trace of negative epirelief character lying on the surface of bedding plane. It is formed by the central axis bordered on both sides by transversal asymmetric ramparts, arch-like to moderately S-shaped bent. The width of trace varies from 88 to 90 mm and its total length on the rock block attains 285 cm.

Description: The newly described fossil trace is irregularly arch-like bent in surface and insignificantly deepened into the upper bedding plane. Its central part is formed by a continuous axial groove 1—1,5 mm deep and 3—4 mm wide with sharp centre, forming a distinct trench. The angle of trace curvature at the surface, observed best at the course of the axial part of the trace, is much variable. The unevennesses of the axis are of two kinds:

a) distinct changes of axis direction, with which the direction of trace is changing,

b) fine undulation with preservation of the general direction of trace. Unevennesses of type "b" are found approximately in 5 per cent of the trace studied.

The axial groove is bordered on both sides by low, maximum 5 mm high asymmetric ramparts closely connected with the trace axis, formed by the activi-

ty of the movement organ of the animal. These ramparts are usually distinctly arch-like vaulted, sometimes also with S — shaped bending. The angle of attachment of the ramparts to the trace axis is varying from 25 to 40°, most often, however, between 35 and 40°. Approximately in one third of the ramparts length they are turning to a direction perpendicular or almost perpendicular to the trace axis and continue in straight direction (Fig. 3c), with free ends bent backward against the direction of animal movement. The rampart axis less often continues in a direction close to attachment to the trace axis, only with moderate backward bend of the free rampart ends (Fig. 3a). The paired ramparts are not always symmetric, however usually very close in shape. The shape of ramparts was conditioned by the velocity of animal creeping and bottom surface. The fact whether the animal was moving in straight direction or arch, obviously played some rôle. The distance between the individual ramparts was probably also depending on movement, varying between 14 and 23 mm. With faster movements of the animal this distance was greater and the arcs of ramparts more vaulted. Distinctly greater distances are also between ramparts lying at the outer arc than at the inner arc of the trace.

The frontal slope of the rampart is always steeper than the opposite slope and this difference was originally probably more distinct. The ridge parts of the ramparts were torn off with disconnection of beds so that we may only conclude on the total original shape of ramparts. (Fig. 4).

The traces are crossing by overlapping; the trace younger in time overlaps the trace older in time.

Sediment: Grey, medium-to coarse-grained, highly light-micaceous calcareous sandstone, of greyishbrown to brown colour after weathering.

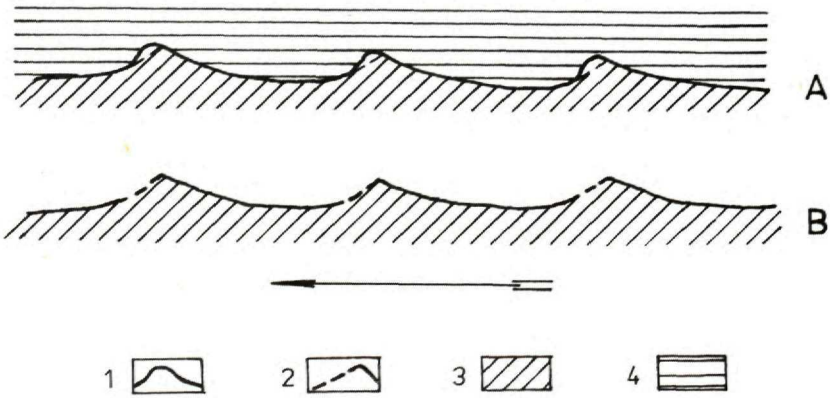


Fig. 4 Longitudinal section of the fossil trace with indicated directions of animal movement: A — original shape of transversal ramparts, B — transversal ramparts with destructed ridge parts after disconnection of overlier. Legend: 1 — surface of fossil trace, 2 — place of breaking off part of rock, 3 — mother sediment, 4 — overlier.

Association: At the studied locality also *Zoophycos* MASSALONGO, 1855 and fossil traces of the genus *Planolites* NICHOLSON 1873 were established besides the described trace (M. PLIČKA 1968).

Origin: On the basis of the shape of trace, its position on the bedding plane and surface structure, also with regard to similar traces reliably left by arthropods, the fossil trace *Flyschichnium plickai* n. ichnogen. n. sp. is obviously a product of movement of some large representative of the phyllum *Arthropoda*, probably a fossil representative of the order *Xiphosura* (for instance of the genus *Limulus*) on the sea floor (W. CROME et al. 1967; R. RIEDL 1963).

Remarks: Contrary to traces known so far, represented by an epirelief in the sediment and characterized also by a distinct transversal segment, the newly described fossil trace is conspicuously wider. It differs from traces after creeping of some Silurian and Devonian trilobites (T. P. CRIMES 1975), besides in size, also in a different shape of the central axis, the ratio of the distance of neighbouring ramparts to their length and in more equal lengths of transversal ramparts.

Distribution: Flysch sediments of Paleogene age, characterized by prevalence of sandstone component. The newly described fossil trace *Flyschichnium plickai* n. ichnogen. n. sp. has been found in only one specimen so far, at the quarry Bzová, opened not far from the village of equal name.

Ecology and paleoecology

On the basis of the common occurrence with sabellid worms of the genus *Zoophycos* MASSALONGO 1855 and of the character of mother sediment it may be supposed that the originator of the fossil trace inhabited sea-floors, corresponding bathymetrically to the deeper infralittoral and shallower circalittoral (J. M. PERES—J. PICARD, 1964).

Conclusion

The newly established fossil trace, found in sandstone of the Biele Karpaty unit at the quarry near Bzová not far from Bojkovice, contributes to enrich our knowledge on the sedimentation environment. The occurrence of this trace in association with forms of sabellid worms represented by members of the genus *Zoophycos* MASSALONGO 1855 makes knowledge of bathymetric conditions of the existence of its originator more precise. At the same time it enriches our knowledge on the association of animals inhabiting the sea-floor under conditions of accelerated flysch sedimentation. Of no less importance is also the identification that it is the first fossil trace in the region of the Flysch Carpathians, the origin of which we may reliably range to living marks of forms of the phyllum *Arthropoda*.

Although considerable attention was paid to the study of fossil traces in this region in the past, mainly because of lacking occurrences of fossils, it has been shown that even new, important finds in the direction are not excluded in future.

References

BUDAY, T. 1963: Geologická mapa ČSSR 1 : 200 000 (mapa předčtvrtohorních útvarů) M-33-XXX Gottwaldov. ÚÚG Brno.

CRIMES, T. P. 1975: The stratigraphical significance of trace fossils. In FREY R. W. et al. (Ed): The study of trace fossils; Springer-Verlag New York, 109—130.

CROME, W. et al. 1967: Urania Tierreich (Wirbellose Tiere 2) Urania Verlag, Leipzig—Jena—Berlin, 1—623.

ELIÁŠ, M.—PLIČKA, M. 1962: Příspěvek ke studiu vrstev svrchního paleogénního oddílu jednotky bělokarpatské — vrt Komňa 1. Práce VÚ-ČND, 19, Brno, 85—98.

PERES, J. M.—PICARD, J. 1964: Nouveau manuel de bionomie benthique de la Mèr méditeranée. Extraid du Recueil de Traveaux de la station Marine à Endoume, Bull. 31, fasc. 47.

PLIČKA, M. 1968: Zoophycos and a proposed classification of Sabellid Worms. Jour. of Pal., 42, 3, Menasha, Wisconsin, 836—849.

RIEDL, R. 1963: Fauna and Flora der Adria. Verlag Paul Parey, Hamburg und Berlin, 1—640.

Zdeněk Novák—Helena Peslová

Flyschichnium plickai n. ichnogen. n. sp. — nová fosilní stopa ze svrchního paleogénu karpatského flyše na Moravě (Československo)

Resumé

Při těžebních pracech byla v lomu Bzová, situovaném při JV okraji stejnojmenné obce nalezena nová fosilní stopa, která je předmětem předložené práce. Lom, v němž byla stopa nalezena, je otevřen v nejvnitřejší faciálně tektonické jednotce magurského flyše — v jednotce bělokarpatské (svrchní paleogénní oddíl, eocén).

Jedná se o relativně velkou, bilaterálně symetrickou, nevětvenou fosilní stopu pentlicového tvaru, charakteru negativního epireliéfu, uloženou v rovině vrstevní plochy. Šířka stopy kolísá od 88 do 90 mm a její úhrnná délka na získaném horninovém bloku dosahuje 285 cm. Stopa je nepravidelně v ploše zprohýbaná a nepatrně zahloubená do svrchní plochy. Centrální část stopy, která má charakter osy, je tvořena průběžným žlábkem s ostrým středem, tvořícím výraznou rýhu. Úhel zakřivení stopy v rovině je velmi proměnlivý. Osní žlábek je oboustranně lemován nízkými, maximálně 5 mm vysokými asymetrickými valy, vzniklými činností pohybového ústrojí živočicha. Tyto valy (obr. 3 a—c), někdy esovitě prohnuté, jsou na koncích stočeny do protisměru pohybu živočicha. Párové valy nejsou vždy symetrické, obvykle jsou si však tvarově velmi blízké. Vzdálenosti mezi valy a stupeň vyklenutí valů jsou závislé převážně na rychlosti pohybu. Čelní svah valu je vždy výrazně strmější a spolu s volnými konci valů napomáhá k určení směru pohybu organizmu po mořském dně (obr. 4). Stopy se kříží překrýváním, stopa časově mladší překrývá stopu časově starší.

Fosilní stopa *Flyschichnium plickai* n. ichnogen. n. sp. se tvarově nejvíce podobá (nepřihlížíme-li k velikosti, která je u nově popsané stopy větší) některým stopám po lezení silurských a devonských trilobitů. Je velmi pravděpodobné, že náleží fosilním předchůdcům řádu *Xiphosura*, např. rodu *Limulus*. Na základě společného výskytu s fosilními zbytky sabelidních červů rodu *Zoophycos*

MASSALONGO 1855 (M. PLIČKA 1968) lze předpokládat, že živočichové, kteří ji zanechali, obývali relativně mělká, detritická dna, odpovídající bathymetricky hlubšímu infralitorálu až mělčímu circalitorálu (J. M. PERES—J. PICARD 1964).

Nově zjištěná fosilní stopa *Flyschichnium plickai* n. ichnogen n. sp. obohacuje a rozšiřuje naše znalosti o sedimentačním prostředí i o složení živočišné asociace, obývající mořské dno v podmínkách zrychlené flyšové sedimentace. Výsledků výzkumu bude možno použít pro upřesnění bathymetrických poměrů a podmínek sedimentace i v jiných mořských sedimentačních oblastech.

Obr. 1 Situace lokality Bzová

Obr. 2 Geologická situace okolí místa nálezu. Převzato z geologické mapy ČSSR 1:200 000 M-33-XXX — Gottwaldov.
Legenda: 1—4 — račanská jednotka: 1 — svrchní zlínské vrstvy, 2 — spodní zlínské vrstvy, 3 — belovežské vrstvy, 4 — soláňské vrstvy; 5—7 — bystrická jednotka: 5 — zlínské vrstvy, 6 — belovežské vrstvy, 7 — soláňské vrstvy; 8—9 — bělokarpatská jednotka: 8 — svrchní oddíl paleogénu, 9 — spodní oddíl paleogénu, 10 — význačné tektonické hranice. Plným kroužkem je vyznačeno místo nálezu.

Obr. 3 Schematický nákres základních typů průběhu příčných valů fosilní stopy *Flyschichnium plickai* n. ichnogen. n. sp.: a — kose orientované příčné valy, b — příčné valy kolmé na osní část stopy, c — zvlněné příčné valy.

Obr. 4 Podélný řez fosilní stopou s vyznačením směru pohybu živočicha: A — původní tvar příčných valů, B — příčné valy s destruovanými hřbetními partiemi po odpojení nadloží. Legenda: 1 — povrch fosilní stopy, 2 — místo odlomu části horniny, 3 — mateřský sediment, 4 — nadloží

Vysvětlivky k tabulkám XIX—XX
(Foto V. Skala)

Tab. XIX
Flyschichnium plickai n. ichnogen. n. sp. na svrchní vrstevní ploše pískovce — celkový pohled. Bělokarpatská jednotka magurského flyše — svrchní paleogenní oddíl (eocén). Vzorek má rozměry 115 × 87 × 12 cm a je uložen pod č. 32 u Ústředního ústavu geologického, pobočka Brno. ×0,22

Tab. XX
Flyschichnium plickai n. ichnogen. n. sp. na svrchní vrstevní ploše pískovce. Bělokarpatská jednotka magurského flyše — svrchní paleogénní oddíl (eocén). Detail centrální části vzorku s šipkami vyznačenými směry pohybu živočicha. Vzorek č. 32, Ústřední ústav geologický, pobočka Brno. ×0,4

Explanations to plates XIX—XX
(Photo by V. Skala)

Pl. XIX
Flyschichnium plickai n. ichnogen. n. sp. on the upper bedding plane of sandstone — total view. Biele Karpaty unit of the Magura Flysch-Upper Paleogene division (Eocene). The sample is of dimensions 115 × 87 × 12 cm and is deposited under no. 32 at the Central Geological Survey, branch Brno. ×0,22

Pl. XX

Flyschichnium plickai n. ichnogen. n. sp. on the upper bedding plane of sandstone. Biele Karpaty unit of the Magura Flysch-Upper Paleogene division (Eocene). Detail of the central part of the sample with directions of animal movement indicated by arrows. Sample 32, Central Geological Survey, branch Brno. ×0,4.

Západné Karpaty, séria paleontológia 11, P. 109—113, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Zdeněk Novák

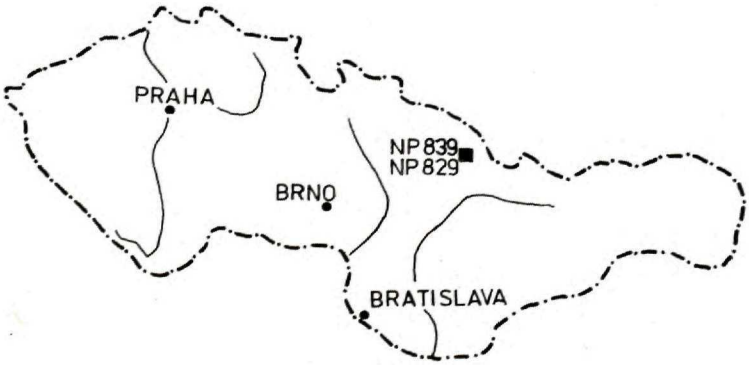
Tubifexides moravicus n. ichnogen. n. sp. from Karpatian sediments of northern Moravia (Czechoslovakia)

2 pls. (XXI—XXII), Czech summary

Abstract. In the presented work a characterization of the new fossil trace *Tubifexides moravicus* n. ichnogen. n. sp., found in Karpatian sediments in the northern part of the Carpathian fore-deep in Moravia, is submitted. A new generic and species name was established for it. The finds come from boreholes NP 829 and NP 839, realized by national enterprise Geological Exploration, plant Ostrava.

Introduction

In the frame of sedimentological investigations of the Neogene of the northern part of the Carpathian fore-deep in Moravia small cylindrical forms, representing burrow fillings of organisms, which inhabited fine oozes of sea-floor during their life, were found in borehole NP 829 situated 5 km SE of Frýdlant at depth 1201—1202 m. Later similar burrows were also found by the author in sediments, encountered by borehole NP 839 (Lichnov). Whereas in borehole NP 829 the described ichnofossils were established only in Karpatian grey beds, in borehole NP 839 they were proved in grey as well as variegated basal beds of the same stratigraphic stage. The obtained material has provided sufficient informa-



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tion on life and biological competence of the originators of these traces. On the basis of own burrows with regard to the impression of several body segments it may be supposed that the organisms which had formed the burrows belonged among annelids.

The studied rock samples are represented in all cases by greyishblack, very fine-micaceous non-calcareous to slightly calcareous claystone, laminated light--grey to grey aleurite with platy parting along lamination planes. The fossil burrows are bound exclusively to clayey rock parts. 25 fragments of these burrows, up to 20 mm long, were available. Their diameter varied from 0,6 to 1,8 mm.

For delivering of rock samples with the studied ichnofossils I am indebted to Dr. A. Jurková.

Systematic description

Ichnogenus *Tubifexides* n. ichnogen.

Type specimen: *Tubifexides moravicus* n. sp.

Derivation of name: According to resemblance of burrows to burrows of recent annelids belonging to the family *Tubificidae*.

Diagnosis: Straight to moderately arch-like bent burrows of cylindrical shape of diameter 0,6—1,8 mm with smooth unsegmented surface, scarcely with indications of segmentation. They are found inside a bedded body parallel to the bedding plane or forming a sharp angle, maximum 30 degrees.

Distribution: Aleuritic-clayey development of the Karpatian in the northern part of the Neogene Carpathian fore-deep in Moravia.

Tubifexides moravicus n. sp.

Pls. XXI—XXII

Holotype: The sample is deposited in the collections of the Central Geological Survey Prague, branch Brno.

Type locality: Borehole NP 829 situated 5 km SE of Frýdlant.

Stratum typicum: pelitic development of the Karpatian, Carpathian fore-deep in Moravia, section North.

Derivation of name: According to the area of occurrence — Moravia.

Material: 7 fragments of drill core.

Diagnosis: Straigth or moderately arch-like bent, unbranched cylindrical burrows of diameter 0,6—1,8 mm (Plate XXI), prevailingly with smooth, unsegmented surface, only sometimes with indication of segmentation, found inside a bedded body parallel to the bedding plane or forming a sharp, maximum 30 degrees angle, with it (Plate XXII).

Description: The crossing of burrows is of passing by character, the burrows younger in time are passing by the older ones. Their filling is formed by grey to light-grey material of aleurite laminae. The contingent segmentation distinct at the burrow surface represents an impression of the body of the deceased animal. The distance between the individual segments corresponds to two thirds of burrow diameter. The bend of burrows is gradual, the flanks form an angle 150—180°. The course of burrows, projected into the bedding plane, is omnidirectional.

Sediment: Greyishblack, fine-light-micaceous claystone, laminated by light-grey aleurite. The occurrence of ichnofossils is bound to claystone layers.

Association: In the borehole NP 839 at depth 772,5 m (variegated basal Karpatian beds), together with the newly described fossil trace, also cylindrical burrows of diameter 6 mm were established, belonging to the genus *Planolites* NICHOLSON 1873, at depth 603,2—605,65 m of the same borehole (Karpatian grey schlier beds), then small, closer not determinable fish remnants.

Origin: the described burrows most probably formed by activity of small marine annelids, moving in clayey material of the seafloor and nourishing on organic matter scattered in it (G. HARWICH et al., 1969). In their shape and size they are very similar to burrows of recent forms of the family Tubificidae; contrary to them, however, the direction of their movement is horizontal or almost horizontal.

Distribution: Karpatian in clayey-aleuritic development.

Established localities: Boreholes NP 829 and NP 839 in the northern part of the Carpathian fore-deep in Moravia.

Ecology and Paleoecology: The thin cylindrical burrows of *Tubifexides moravicus* n. ichnogen n. sp. are owing their origin probably to the activity of small annelids, inhabiting under suitable conditions abundantly muddy bottoms of relatively shallow seas. Although the new trace was found in sediments, which we may suppose most likely as deposits of shallower circalittoral (J. SENEŠ 1973), on the basis of structural marks and the general geological position, the possibility of their occurrence in the whole extent of this bathymetric stage cannot be excluded. These conclusions are justified by the results of new investigations of the life of seaworms, showing that bathymetric adaptability of these organisms is often considerable. Detailed sedimentological investigations have also indicated their considerable resistance to strong freshening of water environment (Z. NOVÁK 1983).

Table 1 Diameter of burrows (in mm)

Diameter of burrow	Number of burrows	Diameter of burrow	Number of burrows
0,6	1	1,1	3
0,7	2	1,2	5
0,8	2	1,3	1
0,9	4	1,5	1
1,0*	5	1,8	1

* segmented burrow

Table 2 Angle of burrow axis with bedding plane (in degrees)

Angle	Number of burrow	Angle	Number of burrow
0— 5*	14	16—20	2
6—10	4	21—25	1
11—15	1	26—30	1

* segmented burrow

Conclusion

The newly established fossil trace *Tubifexides moravicus* n. ichnogen. n. sp. comes from Karpatian sediments and was found in boreholes NP 829 and NP 839, situated in the northern part of the Carpathian fore-deep in Moravia. It is exclusively bound to pelites, rich in organic matter in the time of their deposition, which served as nourishment to small annelids, represented by their burrows. Sections of burrows with transversal segmentation are also scarcely found, showing the place of decease of the animal and the surface impression of its body. These organisms reached a greater development in relatively shallow, calm parts of the sedimentation basin with minimum deposition of clastic components.

References

HARTWICH, G. et al. 1969: Urania Tierreich — Wirbellose Tiere 2. Urania Verlag, Leipzig.

NOVÁK, Z. 1983: Petrografie sedimentů karpatu v úseku „Sever" v karpatské předhlubni na Moravě. Záv. zpráva ÚÚG, MS, Brno.

SENEŠ, J. 1973: Faciálne analýzy adriatického šelfu z aspektu potrieb geológie. MS, GÚ SAV, Bratislava.

Zdeněk Novák

Tubifexides moravicus n. ichnogen n. sp.
ze sedimentů karpatu severní Moravy (Československo)

Resumé

V šedých vrstvách karpatu, zastižených vrty NP 829 (Frýdlant) a NP 839 (Lichnov) byly uvnitř vrstev zjištěny drobné, hladké, nevrstevnaté válcovité fosilní chodby, orientované nejčastěji paralelně nebo téměř paralelně s rovinou vrstevnatosti, dosud v literatuře neuvedené. Stejné fosilní stopy byly zjištěny i v sedimentech pestrých bazálních vrstev karpatu ve vrtu NP 839 (Lichnov).

Fosilní stopy se vyskytují ve vápnitých šedočerných pelitických sedimentech, laminovaných světle šedými prachovci. Vlastní výskyt ichnofosilií je vázán na polohy jílovce. V jednom případě byl zjištěn článkovaný fragment, představující otisk části těla uhynulého živočicha.

Popisované chodby vznikly pravděpodobně činností drobných mořských kroužkovitých červů, pohybujících se v jílovitém materiálu mořského dna a živících se organickou hmotou v něm rozptýlenou. Tvarem a velikostí nápadně připomínají chodby recentních zástupců čeledi *Tubificidae*, na rozdíl od nich však směr jejich pohybu není vertikální. K většímu rozvoji organizmů, které fosilní chodby vytvořily, docházelo v klidných, na organickou složku bohatých partiích sedimentační pánve s minimálním ukládáním klastické konponenty, bathymetricky odpovídajících mělčímu circalitorálu.

Explanations to Plates XXI—XXII

Plate XXI

1 *Tubifexides moravicus* n. ichnogen. n. sp. dark-grey claystone laminated by light-grey aleurolite (Karpatian). Borehole NP 829, depth 1201—1202 m. Holotype, sample no. 2503/1, Central Geological Survey, branch Brno. × 1,8.

2 *Tubifexides moravicus* n. ichnogen. n. sp. dark-grey claystone (Karpatian). Borehole NP 839, depth 772,5 m. Sample no. 2504/1, Central Geological Survey, branch Brno. × 2,4.

Plate XXII

1 *Tubifexides moravicus* n. ichnogen. n. sp. dark-grey claystone (Karpatian). Borehole NP 839, depth 603,2—605,65 m. Sample no. 2504/2, Central Geological Survey, branch Brno. × 2,2.

2 *Tubifexides moravicus* n. ichnogen n. sp. dark-grey claystone (Karpatian). Borehole NP 839, depth 603,2 m. Sample no. 2504/3, Central Geological Survey, branch Brno. × 2.

3 *Tubifexides moravicus* n. ichnogen. n. sp. dark-grey claystone (Karpatian). Borehole NP 829, depth 1201—1202 m. Sample no. 2503/5. Central Geological Survey, branch Brno. × 2,85.

With letter "T", the traces of *Tubifexides moravicus* n. ichnogen. n. sp. are designated in the photographs.

Západné Karpaty, séria paleontológia 11, P. 115—122, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Paulína Snopková

New species from the Paleogene of the eastern part of the Danube lowland, Hornonitrianska kotlina and Liptovská kotlina depressions

6 Pls. (XXIII—XXVIII), Slovak summary

Abstract. In the study of microflora from the Paleogene of Slovakia 6 new taxa from Upper Lutetian sediments, the Priabonian and Rupelian of the eastern part of the Danube lowland (Budín development), from the Priabonian to Lower Oligocene (flysch lithofacies — Zuberec Formation) of the Hornonitrianska kotlina depression and Priabonian (claystone lithofacies — Huty Formation) of the Liptovská kotlina depression were determined. They are: *Toroisporis rupelensis* n. sp., *Polypodiaceoisporites rakosi* n. sp., *Verrucingulatisporites kedvesi* n. sp., *Clavatisporites planderovae* n. sp., *Arecipites nagyi* n. sp. and *Arecipites grossi* n. sp.

In the palynological investigation of Paleogene sediments of the West Carpathians of Slovakia some taxa were found, which could not be determined from palynological literature available so far, therefore we described them as new species. The new taxa come from Upper Lutetian, Priabonian and Rupelian sediments of the eastern part of the Danube lowland (the Buda Paleogene in the sense of D. ANDRUSOV 1965), from the Upper Priabonian to Lower Oligocene (flysch lithofacies — Zuberec Formation), Hornonitrianska kotlina depression and from the Priabonian (claystone lithofacies — Huty Formation in the sense of P. GROSS—B. KÖHLER—O. SAMUEL 1984) of the Liptovská kotlina depression. The detailed biostratigraphical characterization of Paleogene sediments in Budín development of the Hornonitrianska kotlina and Liptovská kotlina depressions is mentioned in the works by O. SAMUEL—M. VÁŇOVÁ (1967), O. SAMUEL—J. SALAJ (1968), O. FRANKO—P. GROSS—O. SAMUEL et al. (1977). The palynological characterization is mentioned by P. SNOPKOVÁ (1977, 1980, 1983).

It was possible to describe 6 new taxa, from spores of ferns the species *Toroisporis rupelensis* n. sp., *Polypodiaceoisporites rakosi* n. sp., *Clavatisporites planderovae* n. sp., and from angiosperm plants *Arecipites nagyi* n. sp. and *A. grossi* n. sp.

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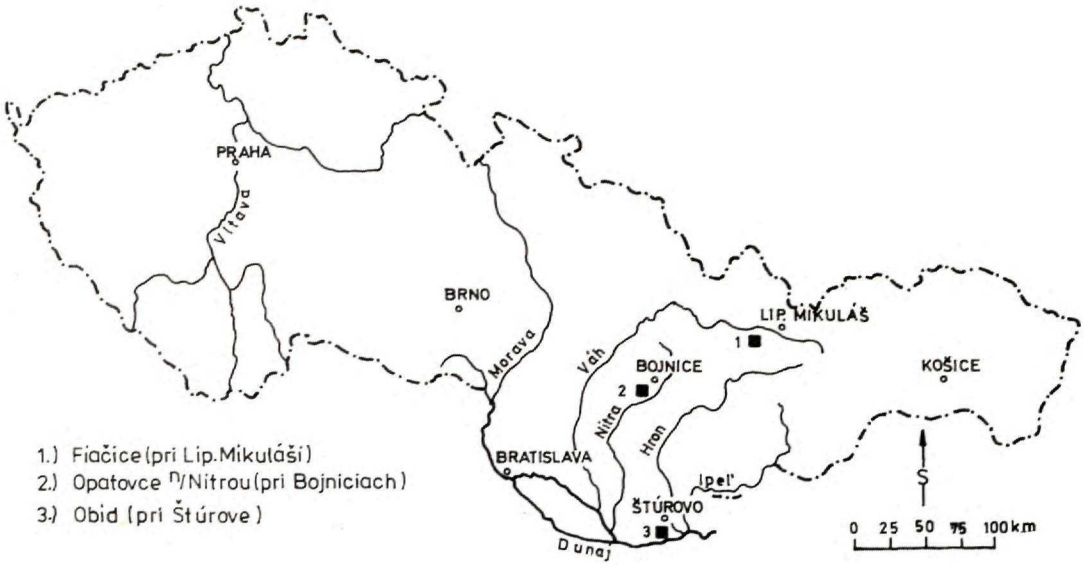

SPORITES R. POTONIÉ 1893

Genus: *Toroisporis* W. KRUTZSCH 1959

Type genus: *Toroisporis torus* (PF. 1953) W. KR. 1959

***Toroisporis rupelensis* n. sp.**

Pl. XXIII, Figs. 1—2, 6, Pl. XXIV, Figs. 1—2

Holotype: borehole Štúrovo 1, 437,90—439,20 m, new species figured in Pl. XXIII, Figs. 1—2, 6, Pl. XXIV, Figs. 1—2, preparation no. 1, cross stage (105,2 46,4), Dionýz Štúr Institute of Geology

Locus typicus: borehole Štúrovo 1, eastern part of the Danube lowland.

Stratum typicum: Rupelian, grey marly claystones to marls

Derivatio nominis: according to the stage Rupelian.

Diagnosis: spore of triangular shape with concave walls. Characteristic is the narrow thorus, which shows circular termination in each corner of the spore.

Description: Size 35 mi. Spore of triangular shape with concave walls, slightly rounded at the corners. The trilete mark is thin, its rays reach circular termination of thorus. Around the trilete mark is the thorus about 4 mi. wide, which surrounds circularly the trilete mark at the corners of spore.

Remark: The described new taxon differs from the species *Toroisporis*

(Toroisporis) eocenicus KDS. in having a narrower thorus, which surrounds circularly the Y-scar at the corners.

Occurrence: Sporadical in the Rupelian of borehole Štúrovo I, 437,90—439,20 m

Genus: *Polypodiaceoisporites* R. POTONIÉ 1956

Type genus: *Polypodiaceoisporites speciosus* (R. POT. 1954) R. POT. 1956

***Polypodiaceoisporites rakosi* n. sp.**

Pl. XXIII, Figs. 3—4, Pl. XXV, Figs. 1—2

Holotypus: borehole NB-1, 51,60—54,0 m, new species figured in Pl. XXIII, Figs. 3—4, Pl. XXV, Figs. 1—2, preparation no. 1., cross stage (38,6, 114,9), Dionýz Štúr Institute of Geology

Locus typicus: borehole NB-1, locality Opatovce nad Nitrou, Hornonitrianska kotlina depression

Stratum typicum: Upper Priabonian — Lower Oligocene, flysch lithofacies (Zuberec Formation)

Derivatio nominis: according to Dr. RAKOSI, an experienced prominent specialist in Palynology of the Paleogene in Hungary.

Diagnosis: Spore of oval shape, size 35 × 40 mi. The cingulum (zone) about 10 mi. wide and dark border with convex walls around the spore body are characteristic.

Description: Spore shape oval, size 35 × 40 mi. *Cingulum* (zone) about 10 mi. wide. It is bordered from the spore body by a dark hem with convex walls. The surface of the body is verrucose, "thorus" around Y — scar. The scar is thin, its rays reach the hem margins.

Occurrence: Scarce in the Upper Priabonian to Lower Oligocene of the Hornonitrianska kotlina depression (flysch lithofacies — Zuberec Formation).

Genus: *Verrucingulatisporites* KEDVES 1961

Type genus: *Verrucingulatisporites verrucatus* KEDVES 1961

***Verrucingulatisporites kedvesi* n. sp.**

Pl. XXIII, Fig. 5, Pl. XXVI, Figs. 1—2

Holotype: borehole Obid — 13, 52,0—53,0 m, new taxon is figured in Pl. XXIII, Fig. 5, Pl. XXVI, Figs. 1—2, Dionýz Štúr Institute of Geology

Locus typicus: borehole Obid — 13, eastern part of the Danube lowland

Stratum typicum: Rupelian, fine-sandy foraminifer marls.

Derivatio nominis: according to Dr. Sc. M. KEDVES, a prominent palynologist from Hungary

Diagnosis: Zonotrilete spore, of triangular shape, much rounded at the corners. Sculpture elements on the surface of spore body are characteristic. They are of water drop shape. They are connected single or mutually.

Description: Size 50 mi, triangular shape with much rounded corners. The cingulum (zone) is considerably wavy, fine crenate, about 10 mi. wide. The sculpture elements are distinct, of water drop shape of size 5 to 10 mi. They are relatively thin- scattered on the surface of the central body of the spore. Among the distinct sculpture elements finegrained granules are found. The trilete mark is thin, its rays reaching the corners of the spore body.

Occurrence: Scarce in the Rupelian of the eastern part of the Danube lowland.

Genus: *Clavatisporites* KEDVES—SIMONCSICS 1964

Type genus: *Clavatisporites clarus* KEDVES—SIMONCSICS 1964

Clavatisporites planderovae n. sp.

Pl. XXVII, Figs. 1—6

Holotype: borehole Štúrovo 1, 437,90—439,20 m, new species figured in Pl. XXVII, Figs. 1—6, preparation no. 1, cross stage (34,1, 102,2), Dionýz Štúr Institute of Geology

Locus typicus: borehole Štúrovo 1, eastern part of the Danube lowland.

Stratum typicum: Rupelian, grey marly claystones to marls

Derivation nominis: according to Dr. E. PLANDEROVÁ, CSc., specialist in palynology of the West Carpathians of Slovakia

Diagnosis: Spore of oval shape with characteristic clavate sculpture elements, which in places are passing into verrucose formations, mainly in the centre of spore.

Description: Size 30 mi, shape of spore oval, surface covered with "clavae", of size 1 to 2 mi. The clavae are arranged radially and reach beyond the margin of spore wall. In the middle of the spore they pass into verrucae, which from a distinct circular arrangement. Y — scar is thin, hardly visible, its rays reach the spore margins.

Remark: The described new taxon differs from species of the genus *Clavatisporites*, mentioned by M. KEDVES—P. SIMONCSICS (1964), in finer "clavae" as well as thinner spore wall.

Occurrence: Scarce in the Rupelian of the eastern part of the Danube lowland.

POLLENITES R. POTONIÉ 1931

Genus: *Arecipites* WODEHOUSE 1933

Type genus: *Arecipites punctatus* WODEHOUSE 1933

***Arecipites nagyi* n. sp.**

Pl. XXVIII, Figs. 1—3

Holotype: borehole Obid — 6, 557,0 m, the new taxon is figured in Pl. XXVIII, Figs. 1—3, preparation no. 1, cross stage (103,2, 38,9), Dionýz Štúr Institute of Geology

Locus typicus: borehole Obid — 6, eastern part of the Danube lowland, area of Štúrovo

Stratum typicum: Upper Lutetian, sandy marls and sands

Derivatio nominis: according to Dr. Sc. E. Nagy, a prominent specialist in Neogene palynology in Hungary

Diagnosis: Pollen grain of oval-elongated shape, a fine dense reticulate sculpture on the surface of the exine and splitting (as spore) at the polar and distal ends of the pollen grain are characteristic

Description: size of pollen grain is 40 × 25 mi., shape oval-elongated, exine about 0,5 mi strong. The surface of exine is covered with a dense, fine reticular sculpture. Size of reticules from 0,5 to 1 mi. The colpa is thin, visible in the middle of the pollen grain only.

Remark: The described new species in shape, size is related to the species *A. gossmarensis* W. KR. It differs in splitting at the proximal and distal end of the pollen grain and fine reticulate sculpture.

Occurrence: Scarce in the Upper Lutetian of the eastern part of the Danube lowland.

***Arecipites grossi* n. sp.**

Pl. XXVIII, Figs. 4—6

Holotype: Eastern margin of Fiačice, new taxon figured in Pl. XXVIII, Figs. 4—6, Dionýz Štúr Institute of Geology

Locus typicus: Liptovská kotlina depression, claystone lithofacies — Huty Formation.

Stratum typicum: Priabonian, Liptovská kotlina depression

Derivatio nominis: According to dr. P. Gross, CSc., specialist in geology of inner Carpathian Paleogene.

Diagnosis: Shape oval — elliptical, a coarse-reticulate sculpture is characteristic.

Description: Size of pollen grain 60 mi., shape oval- elliptical. On the

surface of the pollen grain is a distinct reticulate sculpture. The colpa is thin (about 0,5 mi.), well visible.

Remark: The described morphotype differs from other species of the genus *Arecipites* in being larger and having a distinct reticulate sculpture.

Occurrence: Scarce in the Priabonian (claystone lithofacies — Huty Formation) of the Liptovská kotlina depression.

Literatúra

ANDRUSOV, D. 1965: Geológia Československých Karpát III. vyd. Slov. Akad. Vied, Bratislava, 1—392.

FRANKO, O.—GROSS, P.—SAMUEL, O. a kol. 1977: Štruktúrne hydrogeologické vrty v Hornonitrianskej kotline. Region. geol. Záp. Karpát. Geol. Úst. D. Štúra, Bratislava, 1—170.

GROSS, P.—KÖHLER, E. a kol. 1980: Geológia Liptovskej kotliny. Vyd. Geol. Ústav. D. Štúra, Bratislava, 7—236.

GROSS, P.—KÖHLER, E.—SAMUEL, O. 1984: Nové litostratigrafické členenie vnútrokarpatského paleogénu. Geol. Práce, Správy 81. Geol. Úst. D. Štúra, Bratislava, 103—117.

KEDVES, M.—SIMONCSICS, P. 1964: Microstratigraphy of the carbonate manganese ore layers of the shaft III of Urkút on the basis of palynological investigations. Acta mineral. petrogr. 16, 2, Szeged, 1—48.

SAMUEL, O.—SALAJ, J. 1968: Microbiostratigraphy and Foraminifera of the Slovak Carpathians Paleogene. Geol. Úst. D. Štúra, Bratislava, 1—232.

SAMUEL, O.—VÁŇOVÁ, M. 1967: Nové poznatky o stratigrafii eocénu v okolí Štúrova. Geol. Práce, Správy 41, Geol. Úst. D. Štúra, Bratislava, 41—51.

SNOPKOVÁ, P. 1974: Morfológia stratigraficky významných sporomorf z rupelu južného Slovenska. Manuskript-archív Geol. Úst. D. Štúra, Bratislava.

SNOPKOVÁ, P. 1977: Mikrostratigrafia východoslovenského flyša, vnútrokarpatského a budínskeho paleogénu Slovenska na základe spór a peľových zŕn. Manuskript-archív Geol. Úst. D. Štúra, Bratislava.

SNOPKOVÁ, P. 1980: Paleogene Sporomorphs from West Carpathians. Záp. Karpaty, sér. Paleont. 5, Geol. Úst. D. Štúra, Bratislava, 7—74.

SNOPKOVÁ, P. 1983: Indexové fosílie paleogénu Západných Karpát. Sporomorphy. Manuskript--archív Geol. Úst. D. Štúra, Bratislava.

Paulína Snopková

Nové druhy z paleogénu východnej časti Podunajskej nížiny, Hornonitrianskej a Liptovskej kotliny

Resumé

Pri štúdiu mikroflóry z paleogénu Slovenska bolo identifikovaných 6 nových taxónov zo sedimentov vrchného lutétu, priabónu a rupelu východnej časti Podunajskej nížiny (budínsky vývoj) z priabónu až spodného oligocénu (flyšová litofácia — zuberecké súvrstvie) Hornonitrianskej kotliny a priabónu (ílovcová litofácia — hutianske súvrstvie) Liptovskej kotliny. Sú to: *Toroisporis rupelensis* n. sp., *Polypodiaceoisporites rakosi* n. sp., *Verrucingulatisporites kedvesi* n. sp., *Clavatisporites planderovae* n. sp., *Arecipites nagyi* n. sp. a *Arecipites grossi* n. sp.

Vysvetlivky k tabuľkám

Tabuľka XXIII

1—2 *Toroisporis rupelensis* n. sp., vrt Štúrovo 1, 437,90—439,20 m, východná časť Podunajskej nížiny, zv. 1000 ×.

3—4 *Polypodiaceoisporites rakosi* n. sp., vrt NB-1, lokalita Opatovce nad Nitrou, Hornonitrianska kotlina, zv. 1000 ×

5 *Verrucingulatisporites kedvesi* n. sp., vrt Obid-13, 52,0—53,0 m, východná časť Podunajskej nížiny, zv. 1000 ×

6 *Toroisporis rupelensis* n. sp., vrt Štúrovo-1, 437,90—439,20 m, východná časť Podunajskej nížiny, zvýraznený tórus a Y-jazva, zv. 2000 ×

Tabuľka XXIV

1—2 *Toroisporis rupelensis* n. sp., vrt Štúrovo-1, 437,90—439,20 m, východná časť Podunajskej nížiny, zv. 2000 ×

Tabuľka XXV

1—2 *Polypodiaceoisporites rakosi* n. sp., vrt NB-1, lokalita Opatovce nad Nitrou, 51,60—54,0 m, Horehronská kotlina, zv. 2000 ×

Tabuľka XXVI

1—2 *Verrucingulatisporites kedvesi* n. sp., vrt Obid-13, 52,0—53,0 m, východná časť Podunajskej nížiny, zv. 2000 ×

Tabuľka XXVII

1—6 *Clavatisporites planderovae* n. sp., vrt Štúrovo-1, 437,90—439,20 m, východná časť Podunajskej nížiny, obr. 1—2, 5—6 sú zv. 1000 ×, obr. 3—4 zv. 2000 ×

Tabuľka XXVIII

1—3 *Arecipites nagyi* n. sp., vrt Obid-6, 557,0 m, východná časť Podunajskej nížiny, zv. 1000 ×

4—6 *Arecipites grossi* n. sp., lokalita východný okraj Fiačic, Liptovská kotlina, obr. 4—5 sú zv. 1000 ×, obr. 6 zv. 2000 ×

Explanations to Plates XXIII—XXVIII

Plate XXIII

1—2 *Toroisporis rupelensis* n. sp., borehole Štúrovo 1, 437,90—439,20 m, eastern part of the Danube lowland, magnif. 1000 ×.

3—4 *Polypodiaceoisporites rakosi* n. sp., borehole NB-1, locality Opatovce nad Nitrou, Hornonitrianska kotlina depression, magnif. 1000 ×.

5 *Verrucingulatisporites kedvesi* n. sp., borehole Obid-13, 52,0—53,0 m, eastern part of the Danube lowland, magnif. 1000 ×

6 *Toroisporis rupelensis* n. sp., borehole Štúrovo-1, 437,90—439,20 m, eastern part of the Danube lowland, distinct thorus and Y-scar, magnif. 2000 ×.

Plate XXIV

1—2 *Toroisporis rupelensis* n. sp., borehole Štúrovo-1 437,90—439,20 m, eastern part of the Danube lowland, magnif. 2000 ×

Plate XXV

1—2 *Polypodiaceoisporites rakosi* n. sp., borehole NB-1, locality Opatovce nad Nitrou, 51,60—54,0 m, Horehronská kotlina depression, magnif. 2000 ×

Plate XXVI

1—2 *Verrucingulatisporites kedvesi* m. sp., borehole Obid-13, 52,0—53,0 m, eastern part of the Danube lowland, magnif. 2000 ×

Plate XXVII

1—6 *Clavatisporites planderovae* n. sp., borehole Štúrovo-1, 437,90—439,20 m, eastern part of the Danube lowland, Figs. 1—2, 5—6 are magnif. 1000 ×, Figs. 3—4 magnif. 2000 ×

Plate XXVIII

1—3 *Arecipites nagyi* n. sp., borehole Obid-6, 557,0 m, eastern part of the Danube lowland, magnif. 1000 ×

4—6 *Arecipites grossi* n. sp., locality eastern margin of Fiačice, Liptovská kotlina depression, Figs. 4—5 are magnif. 1000 ×, Fig. 6 magnif. 2000 ×

Západné Karpaty, séria paleontológia 11, P. 123—242, Geologický Ústav Dionýza Štúra, Bratislava, 1986

Ondrej Samuel

List of newly described taxa from Slovak West Carpathians

Abstract. Presented is the list of taxa from the West Carpathians, described since the beginning of their research up to 1985.

Contents

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Introduction

The paleontological group of the Slovak Geological Society decided to publish a "catalogue" of newly described taxa from the Slovak West Carpathians, since so far no catalogue presenting a complex survey has been elaborated in Slovakia. The "catalogue" only contains basical data on publication, deposition and primary stratigraphic occurrences of the taxa.

The list comprises data collected since the beginning of the past century up to 1985. It is compiled in a taxative way according to groups. The validity and systematic appurtenance of individual taxa is not revised. We hope that the list will stimulate revision and deposition of paleontologic material in the Slovak National Museum as significant factologic material accessible for the study by specialists at home and in abroad.

FORAMINIFERIDA

Aeolisaccus ELLIOTT, 1958

***Aeolisaccus tintinniformis* nov. sp. — MIŠÍK, 1971**

Holotype: P. 169—172, Pl. 1, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Thin-section No. 1871.
Stratigraphical range: Triassic (Ladinian).

Agathammina NEUMAYER, 1887

***Agathammina multispira* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 98, Pl. 50, Fig. 13—15.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 5904.
Stratigraphical range: Triassic (Uppermost Norian — Lower Rhaetian).

***Agathammina parafusiformis* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 97, Pl. 50, Fig. 7—12.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 6380.
Stratigraphical range: Triassic (Norian).

Ammobaculites CUSHMAN, 1910

***Ammobaculites alveolatus* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 73, Pl. 17, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. By. 4671.
Stratigraphical range: Triassic (Carnian).

***Ammobaculites hoheneggeri* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 73—74, Pl. 19, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 5286.
Stratigraphical range: Triassic (Uppermost Norian — Lower Rhaetian).

Amphorella nov. gen. — BORZA—SAMUEL, 1977a

Type species: *Amphorella bicamerata* nov. gen., nov. sp., P. 100.

***Amphorella bicamerata bicamerata* nov. ssp. — BORZA—SAMUEL, 1977a**

Holotype: P. 100—101, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5639.
Stratigraphical range: Triassic (Norian).

***Amphorella bicamerata intermedia* nov. ssp. — BORZA—SAMUEL, 1977a**

Holotype: P. 102, 103, Pl. 1, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6297.
Stratigraphical range: Triassic (Carnian).

***Amphorella bicamerata minuta* nov. ssp. — BORZA—SAMUEL, 1977a**

Holotype: P. 104—105, Pl. 2, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section N. 6299.
Stratigraphical range: Triassic (Carnian).

***Amphorella bilongicamerata bilongicamerata* nov. ssp. — BORZA—SAMUEL, 1977a**

Holotype: P. 104, Pl. 1, Fig. 13.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6293.
Stratigraphical range: Triassic (Carnian).

***Amphorella lageniformis* nov. sp. — BORZA—SAMUEL, 1977a**

Holotype: P. 106, 108, Pl. 2, Fig. 6.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5993.
Stratigraphical range: Triassic (Norian).

***Amphorella subsphaerica* nov. sp. — BORZA—SAMUEL, 1977a**

Holotype: P. 108, 110, Pl. 2, Fig. 10.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6327.
Stratigraphical range: Triassic (Carnian).

Angulodiscus KRISTAN, 1957

***Angulodiscus glomospirelloides* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 145, Pl. 107, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 6583.
Stratigraphical range: Triassic (Rhaetian).

***Angulodiscus pokornyi* SALAJ, nov. sp. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967**

Holotype: P. 128, Pl. 7, Fig. 4a.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 4.
Stratigraphical range: Triassic (Norian/Rhaetian).

Arenobulimina CUSHMAN, 1927

***Arenobulimina? gerochi* nov. sp. — SAMUEL—SALAJ, 1962**

Holotype: P. 316, Pl. 9, Fig. 3a—b.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Paleogene (Eocene).

Arenoturrispirillina TAIROV, 1956

***Arenoturrispirillina concavata* nov. sp. — SAMUEL—SALAJ, 1962**

Holotype: P. 315, Pl. 9, Fig. 2a—c.

Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Paleogene (Priabonian).

Arenovidalina Ho, 1959 emend. Salaj, 1967

***Arenovidalina hybensis* Salaj, nov. sp. — in J. Salaj—A. Biely—J. Bystrický, 1967**

Holotype: P. 125, Pl. 4, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 4.
Stratigraphical range: Triassic (Norian/Rhaetian).

Aulotortus Weynshenk, 1956

***Aulotortus broennimanni* Salaj, nov. sp. — in J. Salaj—A. Biely—J. Bystrický, 1967**

Holotype: P. 127—128, Pl. 6, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 1534.
Stratigraphical range: Triassic (Norian).

Austrocolomia Oberhauser, 1960

***Austrocolomia primitiva* n. sp. — Salaj—Borza—Samuel, 1983**

Holotype: P. 130, Pl. 143, Fig. 10.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Triassic (Lower Illyrian).

Bispiranella nov. gen. — Samuel—Salaj—Borza, 1981

Type species: *Bispiranella subcarinata* nov. sp. — Samuel—Salaj et Borza, 1981, p. 88, Pl. 31, Fig. 31.

***Bispiranella ovata* nov. sp. — Samuel—Borza, 1981**

Holotype: P. 89, Pl. 32, Fig. 1.

Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6311.
Stratigraphical range: Triassic (Carnian).

Bispiranella subcarinata nov. sp. — SAMUEL—SALAJ—BORZA, 1981

Holotype: P. 88—39, Pl. 31, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6293.
Stratigraphical range: Triassic (Carnian).

Bathysiphon SARS, 1972

Bathysiphon microrhaphidus nov. sp. — SAMUEL, 1977

Holotype: P. 19—20, Text-fig. 1a.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Paleogene (Priabonian).

Bullopora QUENSTEDT, 1856

Bullopora multicamerata n. sp. — SCHEIBNER, 1968

Holotype: P. 83—85, Text-fig. 9.
Depository: Deposited in Slg. Munich Prot. 2858; Thin-section G 961a/68.
Stratigraphical range: Paleogene (Paleocene).

Calcisacculus BRESTENSKÁ, 1977

Type species: *Calcisacculus piriformis* BRESTENSKÁ, 1977, p. 120, Pl. 63, Fig. 1.

Calcisacculus piriformis BRESTENSKÁ, 1977

Holotype: P. 121, Pl. 63, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 8721.
Stratigraphical range: Miocene.

Calcisacculus amphoraeformis BRESTENSKÁ, 1977

Holotype: P. 122, Pl. 64, Fig. 1.

Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 8711.
Stratigraphical range: Miocene.

Cribrostomoides CUSHMAN, 1910

***Cribrostomoides columbiensis moravica* n. ssp. — CICHA—ZAPLETALOVÁ, 1963**

Holotype: P. 90, Text-fig. 8a—b.
Depository: Deposited at the Central Geological Institute in Prague.
Stratigraphical range: Neogene (Tortonian).

Cucurbita n. g. — JABLONSKÝ, 1973

Type species: *Cucurbita infundibuliforme* n. g. et ssp., P. 420.

***Cucurbita infundibuliforme* n. g. et sp. — JABLONSKÝ, 1973**

Holotype: P. 420, 422—423, Pl. 3, Fig. 2.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Thin-section No. 4278.
Stratigraphical range: Triassic (Cordevolian).

Cyclammina BRADY, 1876

***Cyclammina karpatica* n. sp. — CICHA—ZAPLETALOVÁ, 1963**

Holotype: P. 108—109, Text-fig. 17a—b.
Depository: Deposited at the Central Geological Institute in Prague.
Stratigraphical range: Neogene (Carpathian).

***Cyclammina zemlinica* n. sp. — CICHA—ZAPLETALOVÁ, 1963**

Holotype: P. 115—117, Text-fig. 21a—c.
Depository: Deposited at the Central Geological Institute in Prague.
Stratigraphical range: Neogene "Tortonian".

Discorbis LAMARCK, 1804

***Discorbis ornatus* nov. sp. — SAMUEL, 1962**

Holotype: P. 197 (resp. 167—168), Pl. 3, Fig. 4a—c.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Cretaceous (Cenomanian).

Earlandinita CUMMINGS, 1955

Earlandinita elongata SALAJ, nov. sp.—in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967

Holotype: P. 120, Pl. 1, Fig. 4.
Depository: Deposited at D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Triassic (Anisian).

Earlandinita grandis n. sp. — SALAJ, 1974

Holotype: P. 108, Pl. 3, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 820.
Stratigraphical range: Triassic (Anisian).

Earlandinita ladinica n. sp. — SALAJ, 1978

Holotype: P. 109, Pl. 2, Fig. 8.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 88/56.
Stratigraphical range: Triassic (Anissian—Norian).

Earlandinita oberhauseri SALAJ, nov. sp. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967

Holotype: P. 120, Pl. 1, Fig. 21.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 183 (7/61-B).
Stratigraphical range: Triassic (Anissian).

Earlandinita soussi n. sp. — SALAJ, 1978

Holotype: P. 109, Pl. 3, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 2268.
Stratigraphical range: Triassic (Ladinian).

Endothyra PHILLIPS, 1846

Endothyra elegans **n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 89, Pl. 39, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. By. 1655.
Stratigraphical range: Triassic (Carnian).

Endothyranella GALLOWAY et HARLTON, in GALLOWEY et RYNIKER, 1930

Endothyranella bicamerata **SALAJ, nov. sp. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967**

Holotype: P. 121, Pl. 1, Fig. 15.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 162 (76/56).
Stratigraphical range: Triassic (Anissian).

Endothyranella pentacamerata **SALAJ, nov. sp. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967**

Holotype: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 784 (R-147).
Stratigraphical range: Triassic (Anissian).

Endothyranella robusta **n. sp. — SALAJ, 1974**

Holotype: P. 110, Pl. 3, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 820 (313/1957).
Stratigraphical range: Triassic (Anissian).

Endothyranella tricamerata **SALAJ, nov. sp. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967**

Holotype: P. 121, Pl. 1, Fig. 9.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 820 (213/57).
Stratigraphical range: Triassic (Anissian).

Fissurina REUSS, 1850

***Fissurina carpathica* nov. sp. — SAMUEL, 1975**

Holotype: P. 129, Pl. 68, Fig. 1a—c.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 733/74 (Fig. 1a), No. 717/74 (Fig. 1b), No. 5353/73 (Fig. 1c).
Stratigraphical range: Paleogene (Priabonian).

Gaudryina D'ORBIGNY, 1839

***Gaudryina inflata* n. sp.—JENDREJÁKOVÁ, 1968**

Holotype: P. 272, Pl. 3, Fig. 1a—d.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; No. 978/61.
Stratigraphical range: Cretaceous (Albian).

Glabratella DORREEN, 1948

***Glabratella hronica* nov. sp. — SAMUEL, 1975**

Holotype: P. 143, Pl. 85, Fig. 3a—c.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 3411/74 (Fig. 3a), No. 3415/75 (Fig. 3b), No. 3414/74 (Fig. 3c).
Stratigraphical range: Paleogene (Priabonian).

Globigerina D'ORBIGNY, 1826

***Globigerina baconica* nov. sp. — SAMUEL, 1972b**

Holotype: P. 170—171, Pl. 26, Fig. 2a—c.
Deposited: Deposited at the Slovak National Museum in Bratislava; No. Z-16544.
Stratigraphical range: Eocene (Upper Lutetian).

***Globigerina? bolivariana pannonica* nov. subsp. — Samuel, 1972b**

Holotype: P. 172—173, Pl. 35, Fig. 2a—c.

Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-16548.
Stratigraphical range: Eocene (Upper Lutetian).

Globigerina linaperta transdanubica nov. subsp. — SAMUEL, 1972b

Holotype: P. 181—183, Pl. 38, Fig. 1a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-16548.
Stratigraphical range: Eocene (Lower Priabonian).

Globigerina praeglobigerinoides n. sp. — KANTOROVÁ, 1977

Holotype: P. 109—110, Pl. 60, Fig. 1—3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; (Scanning-electron micrograph No. 4187/72, 4188/72, 4178/72).
Stratigraphical range: Miocene (Lower).

Globigerinatheca BRÖNNIMANN, 1952, Emend. PROTO—DECIMA et BOLLI, 1970

Globigerinatheca globosa nov. sp. — SAMUEL, 1981

Holotype: P. 81, Pl. 27, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Paleogene (Lutetian).

Globorotalia CUSHMAN, 1927

Globorotalia hungarica nov. sp. — SAMUEL, 1972b

Holotype: P. 191—192, Pl. 50, Fig. 3a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava. No. Z-16611.
Stratigraphical range: Eocene (Lower Priabone).

Globorotalia irregularis nov. sp. — SAMUEL, 1981

Holotype: P. 81—82, Pl. 29, Fig. 1a—d.
Depository: Deposited at D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Paleogene (Illerdian).

***Globorotalia pseudospinulosa* nov. sp. — SAMUEL, 1972a**

Holotype: P. 217—218, Pl. 59, Fig. 4a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-16666.
Stratigraphical range: Eocene (Lower Lutetian).

Globotruncana CUSHMAN, 1927

***Globotruncana biconvexa biconvexa* nov. sp. n. ssp. — SAMUEL—SALAJ, 1962**

Holotype: P. 316—317, Pl. 9, Fig. 4a—c.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Cretaceous (Turonian).

***Globotruncana biconvexa gigantea* nov. sp. nov. ssp. — SAMUEL—SALAJ, 1962**

Holotype: P. 317, Pl. 9, Fig. 5a—d.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Cretaceous (Turonian).

***Globotruncana carpathica* n. sp. — SCHEIBNEROVÁ, 1963a**

Holotype: P. 140—141, Text-fig. 2a—c.
Depository: Unknown.
Stratigraphical range: Cretaceous (Middle Turonian).

***Globotruncana sigmoconcavata* n. sp. — SCHEIBNEROVÁ, 1963b**

Holotype: P. 262—263, Text-fig. 77a—c.
Depository: Unknown.
Stratigraphical range: Cretaceous (Coniacian).

***Globotruncana turonica* nov. sp. — SAMUEL—SALAJ, 1962**

Holotype: P. 317—318, Pl. 10, Fig. 1a—c.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Cretaceous (Turonian).

Glomospira RZEHAK, 1885

***Glomospira inconstans* n. sp. — MICHALÍK—JENDREJÁKOVÁ—BORZA, 1979**

Holotype: P. 78—79, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 119/23/M.
Stratigraphical range: Triassic (Rhaetian).

Glomospira inflata n. sp. — MICHALÍK—JENDREJÁKOVÁ—BORZA, 1979

Holotype: P. 79—80, Pl. 1, Fig. 6.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 119/23/M.
Stratigraphical range: Triassic (Rhaetian).

Glomospirella PLUMMER, 1945

Glomospirella biedai nov. sp. — SAMUEL, 1977

Holotype: P. 29, Pl. 3, Fig. 16a—b.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava;
Stratigraphical range: Paleogene (Eocene).

Glomospirella fatrica n. sp. — MICHALÍK—JENDREJÁKOVÁ—BORZA, 1979

Holotype: P. 82, Pl. 2, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 119/23/M.
Stratigraphical range: Triassic (Rhaetian).

Glomospirella minima n. sp. — MICHALÍK—JENDREJÁKOVÁ—BORZA, 1979

Holotype: P. 84, 86, Pl. 3, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 119/23/M.
Stratigraphical range: Triassic (Rhaetian).

Glomospirella paucispira n. sp. — MICHALÍK—JENDREJÁKOVÁ—BORZA, 1979.

Holotype: P. 86, 88, Pl. 3, Fig. 11.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section, No. 119/23/M.
Stratigraphical range: Triassic (Rhaetian).

Gyroidinella LE CALVEZ, 1949

Gyroidinella carpathica nov. sp. — SAMUEL—KÖHLER, 1979

Holotype: P. 114—116, Pl. 19, Fig. 1.
Depository: Deposited at Geology Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2/M.
Stratigraphical range: Paleogene (Middle Eocene).

Haddonia CHAPMAN, 1898

***Haddonia praeheissigi* nov. sp. — SAMUEL—KÖHLER—BORZA, 1977**

Holotype: P. 88—91, Pl. 47, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 16/K.
Stratigraphical range: Cretaceous (Upper Senonian).

Haplophragmium REUSS, 1860

***Haplophragmium maamouri* n. sp. — SALAJ, 1978**

Holotype: P. 108, Pl. 2, Fig. 9.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 1051.
Stratigraphical range: Triassic (Anisian).

Haplophragmoides CUSHMAN, 1910

***Haplophragmoides ovalis* n. sp. — JENDREJÁKOVÁ, 1963**

Holotype: P. 288—290 (resp. 293—294), Text-fig. 3a—c.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; No. 63.
Stratigraphical range: Cretaceous (Albian).

Hyperammina BRADY, 1878

***Hyperammina rara* SAMUEL, 1977**

Holotype: P. 22, Pl. 9, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 5-5286/75; 6-5300/75.
Stratigraphical range: Paleogene (Lower Eocene).

Involutina TERQUEM, 1862

***Involutina muranica* n. sp. — JENDREJÁKOVÁ, 1972**

Holotype: P. 197—200, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2820.
Stratigraphical range: Triassic (Upper Norian — Rhaetian).

Labyrinthina WEYNSCHENK, 1951

***Labyrinthina falsomirabilis* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 75, Pl. 20, Fig. 4.
Depository: Deposited at Geological institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. By. 4981.
Stratigraphical range: Triassic (Lower Rhaetian).

Lituotuba RHUMBLER, 1895

***Lituotuba carpathica* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 71—72, Pl. 141, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. Sj. H-1.
Stratigraphical range: Triassic (Lower Illyrian).

Meandrospira LOEBLICH et TAPPAN, 1946

***Meandrospira deformata* SALAJ, nov. sp. — in SALAJ—BIELY—BYSTRICKÝ, 1967**

Holotype: P. 122, Pl. 2, Fig. 3d.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. 2700.
Stratigraphical range: Triassic (Anissian).

***Meandrospiranella samueli* SALAJ, nov. sp. — in SALAJ—BIELY—BYSTRICKÝ, 1967**

Type species: *Meandrospiranella samueli* SALAJ 1967, P. 122, Pl. 1, Fig. 1.

Meandrospiranella irregularis **SALAJ nov. sp. — in SALAJ—BIELY—BYSTRICKÝ, 1967**

Holotype: P. 123, Pl. 1, Fig. 13b.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. B-2114/63.
Stratigraphical range: Triassic (Anissian).

Meandrospiranella samueli **SALAJ nov. sp. — in SALAJ—BIELY—BYSTRICKÝ, 1967**

Holotype: P. 122—123, Pl. 1, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 1668/509/58.
Stratigraphical range: Triassic (Anissian).

Miliola LAMARCK, 1804

Miliola ? andrusovi **nov. sp. — SAMUEL—KÖHLER—BORZA, 1977**

Holotype: P. 91—92, Pl. 51, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section, 4/K.
Stratigraphical range: Paleogene (Montian-Thanetian).

Miniacina GALLOWAY, 1933

Miniacina multiformis **n. sp. — SCHEIBNER, 1968**

Holotype: P. 87—88, Pl. 7, Fig. 1, 3.
Depository: Deposited in Slg. Munich Prot. 2860; Thin-section G954, a/68.
Stratigraphical range: Paleogene (Paleocene).

Multiseptida BYKOVA, 1952

Multiseptida ? arcata **n. sp. — SALAJ—BORZA— SAMUEL, 1983**

Holotype: P. 85—86, Pl. 83, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. By. 2159.
Stratigraphical range: Triassic (Carnian).

Multiseptida elongata n. sp. — SALAJ—BORZA—SAMUEL, 1983

Holotype: P. 86, Pl. 83, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. Sj. 2.
Stratigraphical range: Triassic (Upper Anissian).

Nodubacularia RHUMBLER, 1895

Nodobacularia cylindriformis n. sp. — SALAJ—BORZA—SAMUEL, 1983

Holotype: P. 112, Pl. 141, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. Sj. H-1.
Stratigraphical range: Triassic (Anissian).

Nodosaria trifonovae n. sp. — SALAJ—BORZA—SAMUEL, 1983

Holotype: P. 119, Pl. 144, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Triassic (Lower Illyrian).

Nummulites LAMARCK, 1801

Nummulites anomalus lopuchovensis VAŇOVÁ, 1977

Holotype: P. 125—127, Pl. 111, Fig. 1:
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. 51.
Stratigraphical range: Paleogene (Upper Lutetian — Upper Priabonian).

Nummulites garnieri sturi ssp. n. — VAŇOVÁ, 1972

Holotype: 56—59, Pl. 8, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. 63.
Stratigraphical range: Paleogene (Upper Lutetian).

Nummulites subplanatus mehesi ssp. n. — VAŇOVÁ, 1972

Holotype: 32—38, Pl. 1, Fig. 6, Pl. 14, Fig. 6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. 62.
Stratigraphical range: Paleogene (Upper Lutetian).

***Nummulites subtilis maior* ssp. n. — KECSKEMÉTI, (in T. KECSKEMÉTI—M. VAŇOVÁ) 1972**

Holotype: P. 127—128, Pl. 29, Fig. 1.
Depository: Deposited in the collections of the Természettudományi Múzeum Föld-és Öslénytár, Budapest; No. M. 71.176.
Stratigraphical range: Paleogene (Upper Lutetian).

***Nummulites subtilis subtilis* sp. n. — VAŇOVÁ, 1972**

Holotype: P. 45—48, Pl. 4, Fig. 6A.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. 58.
Stratigraphical range: Paleogene (Upper Lutetian).

Ophthalmipora ZANINETTI et BROENNIMANN, 1972

***Ophthalmipora falsoexiguum* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 116, Pl. 70, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section, No. Bo. 6303.
Stratigraphical range: Triassic (Carnian).

Orbitoides D'ORBIGNY, 1847

***Orbitoides apiculata plana* n. ssp. — KÖHLER, 1962**

Holotype: P. 106—109 (resp. 125—126). Pl. 10, Fig. 5.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; thin-section No.2—353.
Stratigraphical range: Cretaceous (Maastrichtian).

***Orbitoides gensacicus praevius* n. ssp. — KÖHLER, 1962**

Holotype: P. 111—112 (resp. 126), Pl. 12, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. K 364.
Stratigraphical range: Cretaceous (Maastrichtian).

Paraophthalmidium nov. gen. SAMUEL—BORZA, 1981

Type species: *Paraophthalmidium carpathicum* nov. sp. — SAMUEL—BORZA, 1981

***Paraophthalmidium carpaticum* (recte *P. carpathicum*) nov. sp. — SAMUEL—BORZA, 1981**

Holotype: P. 68, Pl. 19, Fig. 4.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6752.
Stratigraphical range: Triassic (Carnian).

***Paraophthalmidium salaji* nov. sp. — SAMUEL—BORZA, 1981**

Holotype: P. 69—71, Pl. 20, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6296.
Stratigraphical range: Triassic (Carnian).

Paratintinnina nov. gen. — SAMUEL—BORZA, 1981

Type species: *Paratintinnina tintiniformis* BORZA—SAMUEL, 1977b, Pl. 69, Fig. 1.

***Paratintinnina tintiniformis* nov. sp. — BORZA—SAMUEL, 1977b**

Holotype: P. 143—144, Pl. 69, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5604.
Stratigraphical range: Triassic (Carnian).

***Paratintinnima tulipaformis* nov. sp. — BORZA—SAMUEL, 1977b**

Holotype: P. 144—145, Pl. 77, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6326.
Stratigraphical range: Triassic (Carnian).

Permodiscus DUTKEVICH et CHERNYSHEVA, 1948

***Permodiscus praecommunis* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 139, Pl. 86, Fig. 4.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. By. 123.
Stratigraphical range: Triassic (Norian — Rhaetian).

***Permodiscus praeimpressus* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 139—140, Pl. 105, Fig. 2c.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 123.
Stratigraphical range: Triassic (Carnian).

***Permodiscus praetenuis* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 140, Pl. 93, Fig. 12.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 5137.
Stratigraphical range: Triassic (Norian — Rhaetian).

Pilammina PANTIĆ, 1965

***Pilammina grandis* SALAJ, nov. sp. — in SALAJ—BIELY—BYSTRICKÝ, 1967**

Holotype: P. 123—124, Pl. 3, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 1473.
Stratigraphical range: Triassic (Anissian).

***Pilammina kuthani* SALAJ, nov. sp. — in SALAJ—BIELY—BYSTRICKÝ, 1967**

Holotype: P. 124, Pl. 3, Fig. 5.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 2169.
Stratigraphical range: Triassic (Carnian).

***Pilamminella* nov. gen. — SALAJ, 1977**

Type species: *Pilamminella grandis* SALAJ, 1967 (in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967), P. 123—124, Pl. 3, Fig. 4.

***Pilamminella falsofriedli* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: The holotype depicted in P. BROENNIMANN—A. POISSON et L. ZANINETTI 1970. Text-fig. 4(1).
Stratigraphical range: Triassic (Norian — Rhaetian).

Planiinvoluta LEISCHNER, 1961

***Planiinvoluta irregularis* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 106, Pl. 63, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 6.583.
Stratigraphical range: Triassic (Upper Rhaetian).

Planiinvoluta regularis n. sp. — SALAJ—BORZA—SAMUEL, 1983

Holotype: P. 106, Pl. 64, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 5135.
Stratigraphical range: Triassic (Uppermost Norian — Lower Rhaetian).

Planomalina LOEBLICH et TAPPAN, 1957

Planomalina puchovensis n. sp. — SCHEIBNEROVÁ, 1963b

Holotype: P. 243—244, Text-fig. 40a—c.
Depository: Unknown.
Stratigraphical range: Cretaceous (Coniacian).

Planorbulina D'ORBIGNY, 1826

Planorbulina uva n. sp. — SCHEIBNER, 1968

Holotype: P. 85—86, Pl. 4, Fig. 2.
Depository: Deposited in Slg. Munich Prot. 2859; Thin-section G 963 a/68.
Stratigraphical range: Paleogene (Upper Paleocene).

Praeglobotruncana BERMÚDEZ, 1952

Praeglobotruncana hagni n. sp. — SCHEIBNEROVÁ, 1962

Holotype: P. 219—221 (resp. 225—226), Text-fig. 6a—c.
Depository: Unknown.
Stratigraphical range: Cretaceous (Middle Turonian).

Praeglobotruncana klausi n. sp. — SCHEIBNEROVÁ, 1963a

Holotype: P. 141—142, Text-fig. 3a—c.
Depository: Unknown.
Stratigraphical range: Cretaceous (Middle Turonian).

***Praeglobotruncana oraviensis* n. sp. — SCHEIBNEROVÁ, 1960**

Holotype: P. 85—86 (resp. 87, 89—90). Text-fig. 4.
Depository: Unknown.
Stratigraphical range: Cretaceous (Turonian).

***Praeglobotruncana oraviensis trigona* n. ssp. — SCHEIBNEROVÁ, 1960**

Holotype: P. 86—87 (resp. 88—89, 90), Text-fig. 5.
Depository: Unknown.
Stratigraphical range: Cretaceous (Turonian).

***Pseudocucurbita* nov. gen. — BORZA—SAMUEL, 1978**

Type species: *Pseudocucurbita globosa* nov. sp., P. 69.

***Pseudocucurbita campanulaformis* nov. sp. — BORZA—SAMUEL, 1978**

Holotype: P. 72, Pl. 1, Fig. 7.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6341.
Stratigraphical range: Triassic (Carnian).

***Pseudocucurbita fusani* nov. sp. — BORZA—SAMUEL, 1978**

Holotype: P. 74, Pl. 2, Fig. 4.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6331.
Stratigraphical range: Triassic (Carnian).

***Pseudocucurbita globosa* nov. sp. — BORZA—SAMUEL, 1978**

Holotype: P. 69, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6326.
Stratigraphical range: Triassic (Carnian).

***Pseudocucurbita subglobosa* nov. sp. — BORZA—SAMUEL, 1978**

Holotype: P. 70, Pl. 1, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6348.
Stratigraphical range: Triassic (Carnian).

Pseudonodosaria BROOMGAART, 1949

***Pseudonodosaria gemerica* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 121—122, Pl. 145, Fig. 6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Triassic (Lower Illyrian).

***Pseudonodosaria gombaseki* n. sp. — SALAJ—BORZA— SAMUEL, 1983**

Holotype: P. 122, Pl. 145, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Triassic (Lower Illyrian).

Rakusia SALAJ, nov. gen. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967; emend. SALAJ—BORZA—SAMUEL, 1983

Type species: *Rakusia oberhauseri* SALAJ — in J. SALAJ—A. BIELY—J. BYSTRICKÝ 1967, Pl. 4, Fig. 3.

***Rakusia oberhauseri* SALAJ, nov. sp. — in J. SALAJ—A. BIELY—J. BYSTRICKÝ, 1967**

Holotype: P. 129, Pl. 5, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 1062.
Stratigraphical range: Triassic (Norian).

***Rakusia ploechingeri* n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 143, Pl. 105, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. Sj. 34-21.
Stratigraphical range: Triassic (Norian — Rhaetian).

Rectoseptaglomospiranella REYTLINGER, 1961

***Rectoseptaglomospiranella memmii* n. sp. — SALAJ, 1978**

Holotype: P. 110, Pl. 4, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 816.
Stratigraphical range: Triassic (Anissian).

Reophax MONTFORT, 1808

Reophax pseudoscalaria **SAMUEL, 1977**

Holotype: P. 36, Pl. 3, Fig. 4a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Cretaceous — Paleogene (Upper Senonian — Paleocene).

Rotalipora BROTZEN, 1942

Rotalipora bicarinata **nov. sp. — SAMUEL—SALAJ, 1962**

Holotype: P. 318, Pl. 10, Fig. 6a—c.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Cretaceous (Cenomanian).

Sigmoilina SCHLUMBERGER, 1887

Sigmoilina ? excentrica **n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 115, Pl. 74, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 5428.
Stratigraphical range: Triassic (Norian).

Sigmoilina multicarinata **n. sp. — SALAJ—BORZA—SAMUEL, 1983**

Holotype: P. 114—115, Pl. 74, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci, in Bratislava; Thin-section No. Bo. 6376.
Stratigraphical range: Triassic (Carnian — Norian).

Spiriamphorella nov. gen. — BORZA—SAMUEL, 1977a

Type species: *Spiriamphorella carpathica* n. gen. et nov. sp., P. 110.

Spiriamphorella carpathica carpathica **nov. ssp. — BORZA—SAMUEL, 1977a**

Holotype: P. 110—111, Pl. 3, Fig. 1.

Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6288.
Stratigraphical range: Triassic (Carnian).

Spiriamphorella carpathica gemerica nov. ssp. — BORZA—SAMUEL, 1977a

Holotype: P. 111—112, Pl. 3, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6293.
Stratigraphical range: Triassic (Carnian).

Spiriamphorella irregularis nov. sp. — BORZA—SAMUEL, 1977a

Holotype: P. 116, 118, Pl. 6, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6328.
Stratigraphical range: Triassic (Carnian).

Spiriamphorella ovata nov. sp. — BORZA—SAMUEL, 1977a

Holotype: P. 116, Pl. 5, Fig. 4.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6307.
Stratigraphical range: Triassic (Carnian).

Spiriamphorella rectilineata districta nov. ssp. — BORZA—SAMUEL, 1977a

Holotype: P. 114, 116, Pl. 4, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6282.
Stratigraphical range: Triassic (Carnian).

Spiriamphorella rectilineata rectilineata nov. ssp. — BORZA—SAMUEL, 1977a

Holotype: P. 112, 114, Pl. 4, Fig. 5.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6292.
Stratigraphical range: Triassic (Carnian).

Spiroplectammina CUSHMAN, 1927

Spiroplectammina spiralis n. sp. — SALAJ—BORZA—SAMUEL, 1983

Holotype: P. 76, Pl. 20, Fig. 5.

Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. B. 51—33.
Stratigraphical range: Triassic (Uppermost Norian — Lower Rhaetian).

Stensioeina BROTZEN, 1942

***Stensioeina pokornyi* n. sp. — SCHEIBNEROVÁ, 1963a**

Holotype: P. 139—140, Text-fig. 1a—c.
Depository: Unknown.
Stratigraphical range: Cretaceous (Middle Turonian).

Textularia DEFRANCE (in DE BLAINVILLE, 1824)

***Textularia gramen maxima* n. ssp. — CICHA—ZAPLETALOVÁ, 1965**

Holotype: P. 115—116, Text-fig. 10a—c.
Depository: Deposited at the Central Geological Institute in Prague.
Stratigraphical range: Neogene ("Tortonian").

***Textularia laevigata aplanata* n. ssp. — CICHA—ZAPLETALOVÁ, 1965**

Holotype: P. 118—120, Text-fig. 13a—c.
Depository: Deposited at the Central Geological Institute in Prague.
Stratigraphical range: Neogene ("Tortonian").

Turborotalia CUSHMAN et BERMÚDEZ, 1949

***Turborotalia (Acarinina) alteconica* nov. sp. — SAMUEL, 1972a**

Holotype: P. 196—197, Pl. 55, Fig. 1a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-16641.
Stratigraphical range: Paleogene (Upper Lutetian).

***Turborotalia (Acarinina) istropolitana* nov. sp. — SAMUEL, 1972b**

Holotype: P. 218—219, Pl. 58, Fig. 4a—c.

Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-16662.
Stratigraphical range: Paleogene (Montian — Thanetian).

Turborotalia (Acarinina) vicespinuloinflata nov. sp. — SAMUEL, 1972b

Holotype: P. 219—220, Pl. 59, Fig. 1a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-16663-5.
Stratigraphical range: Paleogene (Lower Lutetian).

Urnulinella nov. gen. — BORZA—SAMUEL, 1977a

Type species: *Urnulinella andrusovi* nov. gen., nov. sp., P. 118.

Urnulinella andrusovi nov. gen., nov. sp.— BORZA—SAMUEL, 1977a

Holotype: P. 118—119, P. 7, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6326.
Stratigraphical range: Triassic (Carnian).

Valvulina D'ORBIGNY, 1826

Valvulina azzouzii n. sp. — SALAJ, 1978

Holotype: P. 108, Pl. 2, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 2144.
Stratigraphical range: Triassic (Anissian).

Vsevolodia n. gen. — KANTOROVÁ, 1975

Type species: *Vsevolodia czechoviczi* n. sp. — KANTOROVÁ, 1975, P. 87—89, Pl. 55, Fig. 1—2.

Vsevolodia czechoviczi plicata n. ssp. — KANTOROVÁ, 1975

Holotype: P. 90, Pl. 56, Fig. 3—4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron-micrograph No. 5570/1972.
Stratigraphical range: Neogene (Lower Miocene).

***Vsevolodia czechoviczi* n. sp. — KANTOROVÁ, 1975**

Holotype: P. 89—90, Pl. 55, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 4207/1972.
Stratigraphical range: Neogene (Lower Miocene).

RADIOLARIA

Acaeniotyle FOREMAN, 1973

***Acaeniotyle diaphorogona* FOREMAN *variata* n. subsp. — OŽVOLDOVÁ, 1979b**

Holotype: P. 251, Pl. 1, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Jurassic (Callovian — Oxfordian).

Angulobracchia BAUMGARTNER, 1980

***Angulobracchia biordinale* OŽVOLDOVÁ, n. sp. — in L. OŽVOLDOVÁ—M. SÝKORA, 1984**

Holotype: P. 262, Pl. 2, Fig. 1,3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; Z-18250.
Stratigraphical range: Cretaceous (Berriasian).

Anthocorys HAECKEL, 1882

***Anthocorys podbielensis* n. sp. — OŽVOLDOVÁ, 1979b**

Holotype: P. 257—258, Pl. 4, Fig. 1—3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-13256.
Stratigraphical range: Jurassic (Callovian — Oxfordian).

Cinguloturris new genus — DUMITRICĂ, in P. DUMITRICĂ—J. MELLO, 1982

Type species: *Cinguloturris carpatica* DUMITRICĂ, n. sp. P. 22, Pl. 4, Fig. 9.

Cinguloturris carpatica DUMITRICĂ n. sp. — in P. DUMITRICĂ—J. MELLO, 1982

Holotype: P. 23, Pl. 4, Fig. 9.
Depository: Rumania.
Stratigraphical range: Jurassic (Oxfordian).

Crucella PESSAGNO, 1971, Emend BAUMGARTNER, 1980

Crucella ? contorta OŽVOLDOVÁ, n. sp. — in L. OŽVOLDOVÁ—M. SÝKORA, 1984

Holotype: P. 203—264, Pl. 6, Fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-18251.
Stratigraphical range: Cretaceous (Berriasian).

Crucella ? imbricata n. sp. — OŽVOLDOVÁ, 1979b

Holotype: P. 254—255, Pl. 3, Fig. 4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-13254.
Stratigraphical range: Jurassic (Callovian — Oxfordian).

Crucella zeallis n. sp. — OŽVOLDOVÁ, 1979b

Holotype: P. 254, Pl. 2, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-13253.
Stratigraphical range: Jurassic (Callovian — Oxfordian).

Dictyomitra ZITTEL, 1876

Dictiomitra pinna n. sp. — OŽVOLDOVÁ, 1975

Holotype: P. 81, Pl. 102, Fig. 2.

Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10325 (Scanning-electron micrograph Nr. 2810/75).
Stratigraphical range: Jurassic (Callovian — Argovian).

Dictyastrum EHRENBERG, 1860

***Dictyastrum crassum* n. sp. — OŽVOLDOVÁ, 1979a**

Holotype: P. 10—11, Pl. 2, Fig.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10324 (Scanning-electron micrograph No. 1636).
Stratigraphical range: Cretaceous (Albian).

Emiluvia FOREMAN, 1973; emend PESSAGNO, 1977

***Emiluvia ordinaria* OŽVOLDOVÁ, n. sp. — in L. OŽVOLDOVÁ—M. SÝKORA, 1984**

Holotype: P. 265, Pl. 4, Fig. 7, 8; Pl. 5, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-18253.
Stratigraphical range: Cretaceous (Berriasian).

Heitzeria nov. gen. — OŽVOLDOVÁ, 1975

Type species: *Heitzeria spinosa* OŽVOLDOVÁ, 1975; P. 78—79, Pl. 101, Fig. 2a.

***Heitzeria spinosa* OŽVOLDOVÁ, 1975**

Holotype: P. 78—79, Pl. 101, Fig. 2a.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10321 (Scanning-electron micrograph No. 2819/75).
Stratigraphical range: Jurassic (Callovian — Argovian).

Higumastra BAUMGARTNER, 1980

***Higumastra coronarica* OŽVOLDOVÁ, n. sp. — in L. OŽVOLDOVÁ—M. SÝKORA, 1984**

Holotype: P. 266, Pl. 7, Fig. 2.

Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-18252.
Stratigraphical range: Cretaceous (Berriasian).

Lithocampe EHRENBERG, 1838

***Lithocampe ruesti* n. sp. — OŽVOLDOVÁ, 1975**

Holotype: P. 83, pl. 103, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10323 (Scanning-electron micrograph No. 2795).
Stratigraphical range: Jurassic (Callovian — Argovian).

Lithostrobus BÜTSHLI, 1882

***Lithostrobus brevicostatus* OŽVOLDOVÁ, 1975**

Holotype: P. 84, Pl. 102, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10326 (Scanning-electron micrograph No. 2805).
Stratigraphical range: Jurassic (Callovian — Argovian).

Pseudocrucella BAUMGARTNER, 1980

***Pseudocrucella procera* OŽVOLDOVÁ, n. sp. — in L. OŽVOLDOVÁ—M. SÝKORA, 1984**

Holotype: P. 270, Pl. 12, Fig. 8.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-18254.
Stratigraphical range: Cretaceous (Berriasian).

***Spinosicapsa* nov. gen. — OŽVOLDOVÁ, 1975**

Type species: *Spinosicapsa ceblienica* OŽVOLDOVÁ, 1975; P. 80, Pl. 101, Fig. 1.

Spinosicapsa ceblienica n. sp. — OŽVOLDOVÁ, 1975

Holotype: P. 80—81, Pl. 101, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10322 (Scanning-electron micrograph No. 2810/75).
Stratigraphical range: Jurassic (Callovian — Argovian).

Staurolonche HAECKEL, 1882

Staurolonche grandipora OŽVOLDOVÁ, 1975

Holotype: P. 76, Pl. 100, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-10327.
Stratigraphical range: Jurassic (Callovian — Argovian).

Staurosphaera HAECKEL, 1881

Staurosphaera tympanica n. sp. — OŽVOLDOVÁ in L. OŽVOLDOVÁ—M. SÝKORA, 1979a

Holotype: P. 250—251, 01. 1, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. Z-13255.
Stratigraphical range: Jurassic (Callovian — Oxfordian).

TINTINNINA

Chitinoidella DOBEN, 1963

Chitinoidella colomi sp. n. — BORZA, 1966

Holotype: P. 261—262, Pl. 10, Fig. 4.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 16.
Stratigraphical range: Jurassic (Tithonian).

Chitinoidella dobeni sp. n. — BORZA, 1966

Holotype: P. 259—261, Pl. 9, Fig. 1.
Depository: Deposited at Geological Institute of The Slovak Academy of Sci. in Bratislava; Thin-section No. 15.
Stratigraphical range: Jurassic (Tithonian).

Chitinoidella slovenica n. sp. — BORZA, 1964

Holotype: P. 76—77, Pl. 66, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2780/D.
Stratigraphical range: Jurassic (Tithonian).

Chitinoidella tithonica n. sp. — BORZA, 1969

Holotype: P. 77—80, Pl. 67, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2780/D.
Stratigraphical range: Jurassic (Tithonian).

Parachitinoidella TREJO, 1972

Parachitinoidella ornata n. sp. — BORZA, 1979

Holotype: P. 343—346, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 7210.
Stratigraphical range: Cretaceous (Aptian).

Praecalpionellopsis n. gen. — BORZA, 1971

Type species: *Praecalpionellopsis generiensis* n. sp. P. 133, Fig. 3.

Praecalpionellopsis gemeriensis n. sp. — BORZA, 1971

Holotype: P. 133—134, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 3576.
Stratigraphical range: Upper Triassic.

Praecolomiella nov. gen. — BORZA, 1979

Type species: *Praecolomiella trejoi* n. sp., Pl. 354, Pl. 4, Fig. 5.

***Praecolomiella boneti* n. sp. — BORZA, 1979**

Holotype: P. 356, Pl. 4, Fig. 5.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 7350.
Stratigraphical range: Cretaceous (Aptian).

***Praecolomiella trejoi* n. sp. — BORZA, 1979**

Holotype: P. 354—356, Pl. 3, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 7208.
Stratigraphical range: Cretaceous (Aptian).

***Praetintinopsella* gen. n. — BORZA, 1969**

Type species: *Praetintinopsella andrusovi* n. sp., P. 80, Pl. 69, Fig. 9.

***Praetintinopsella andrusovi* n. sp. — BORZA, 1969**

Holotype: P. 80—81, Pl. 69, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2775/D.
Stratigraphical range: Jurassic (Tithonian).

Sturiella nov. gen. — BORZA, 1981

Type species: *Sturiella oblonga* n. sp. — BORZA, 1981, P. 93, Pl. 35, Fig. 1.

***Sturiella oblonga* n. sp. — BORZA, 1981**

Holotype: P. 93—96, Pl. 35, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 7229.
Stratigraphical range: Cretaceous (Berriasian).

Tintinnopsella COLOM, 1948

***Tintinnopsella remanei* n. sp. — BORZA, 1969**

Holotype: P. 96—97, Pl. 80, Fig. 7.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2724.
Stratigraphical range: Jurassic (Tithonian).

INCERTAE SEDIS

Cadosinidae WANNER, 1940
Calcisphaerulinidae BONET, 1956
Stomiosphaeridae WANNER, 1940

Cadosina WANNER, 1940

***Cadosina gigantea* n. sp. — BORZA, 1969**

Holotype: P. 58—59, Pl. 59, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 1600.
Stratigraphical range: Cretaceous (Albian).

***Cadosina minuta* n. sp. — BORZA, 1980**

Holotype: P. 263—266, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2728.
Stratigraphical range: Cretaceous (Valanginian).

***Cadosina nagyi* n. sp. — BORZA, 1969**

Holotype: P. 55, Pl. 56, Fig. 1—2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2679.
Stratigraphical range: Jurassic (Kimmeridgian).

Cadosina oraviensis n. sp. — BORZA, 1969

Holotype: P. 57—58, Pl. 57, Fig. 18.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2947.
Stratigraphical range: Cretaceous (Albian).

Cadosina pieniniensis n. sp. — BORZA, 1969

Holotype: P. 56, Pl. 56, Fig. 10.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2682.
Stratigraphical range: Jurassic (Kimmeridgian).

Cadosina spinosa n. sp. — BORZA, 1972

Holotype: P. 142—144, Fig. 7.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 8K.
Stratigraphical range: Cretaceous (Upper Senonian).

Cadosina undosa n. sp. — BORZA, 1972

Holotype: P. 139—142, Fig. 2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 4633-c.
Stratigraphical range: Cretaceous (Upper Senonian).

Cadosina vogleri n. sp. — BORZA, 1969

Holotype: P. 56—57, Pl. 56, Fig. 12.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2195.
Stratigraphical range: Cretaceous (Hauterivian).

Cadosinopsis SCHEIBNER, 1967

Cadosinopsis nowaki n. sp. — BORZA, 1984

Holotype: P. 650—656, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. Bo. 863.
Stratigraphical range: Cretaceous (Hauterivian).

Palinosphaera REINSCH, 1905

***Palinosphaera brezovica* n. sp. — BORZA, 1972**

Holotype: P. 148—150, Fig. 37.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2915.
Stratigraphical range: Cretaceous (Campanian).

Pithonella LORENZ, 1902

***Pithonella multicava* n. sp. — BORZA, 1972**

Holotype: P. 144—146, Fig. 13.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2933-3.
Stratigraphical range: Cretaceous (Campanian).

Colomisphaera NOWAK, 1968

***Colomisphaera conferta* n. sp. — ŘEHANEK, 1985**

Holotype: P. 171, Pl. 1, Fig. 1—2.
Depository: Deposited in the petrographic collections of the Moravian Petroleum Industry in Hodonín; Thin-section N. 1256/2.
Stratigraphical range: Cretaceous (Valanginian).

Stomiosphera WANNER, 1940

***Stomiosphaera carpathica* n. sp. — BORZA, 1964**

Holotype: P. 191—192, Pl. 1, Fig. 3.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 8.
Stratigraphical range: Jurassic (Kimmeridgian).

***Stomiosphaera malmica* n. sp. — BORZA, 1964**

Holotype: P. 192, Pl. 1, Fig. 5.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 14.
Stratigraphical range: Jurassic (Kimmeridgian).

***Stomiosphaera pulla* n. sp. — BORZA, 1964**

Holotype: P. 192, P. 2, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 12.
Stratigraphical range: Jurassic (Kimmeridgian).

***Stomiosphaera wanneri* n. sp. — BORZA, 1969**

Holotype: P. 62—63, Pl. 61, Fig. 4—6.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2600.
Stratigraphical range: Cretaceous (Berriasian).

COELENTERATA

Astraeopora BLAINVILLE, 1830

Palastraeopora nov. subgen. — KÜHN; in KÜHN, O.—ANDRUSOV, D. 1937

Type species: *Palastraeopora carpathica* nov. sp. KÜHN, 1937

Astraeopora (Palastraeopora) carpathica nov. sp. — KÜHN; in KÜHN, O.—ANDRUSOV, D. 1937

Holotype: P. 9 (Separat.), Text-fig. 2 (of the basis monotype).
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Cretaceous (Senonian).

Astrocaenia EDWARDS et HAIME, 1848

***Astrocaenia intermedia* nov. sp. — ALLOITEAU, 1949**

Holotype: P. 5—6, Pl. 1, Fig. 1, Pl. 4, Fig. 1.
Depository: Unknown.
Stratigraphical range: Paleogene (Lutetian).

Cenomanosmilia nov. gen. — ALLOITEAU, 1949

Type species: *Lophosmilia cenomana* de FROM. 1862

***Cenomanosmilia bojnicensis* nov. sp. — ALLOITEAU, 1949**

Holotype: P. 25—26, Pl. 2, Fig. 9a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z2946.
Stratigraphical range: Paleogene (Lutetian).

Circophyllia EDWARDS et HAIME, 1848

***Circophyllia costata* nov. sp. — ALLOITEAU, 1949**

Holotype: P. 28—30, Pl. 2, Fig. 10a—b.
Depository: Unknown.
Stratigraphical range: Paleogene (Lutetian).

Coelosmilia EDWARDS et HAIME 1850

***Coelosmilia carpathica* nov. sp. — KÜHN; in KÜHN, O.—ANDRUSOV, D., 1930**

Holotype: P. 7—8 (Separat.), Pl. 1, Fig. 1—2.
Depository: Unknown.
Stratigraphical range: Cretaceous (Senonian).

Craspedophyllia VOLZ, 1896

***Craspedophyllia jablonicae* n. sp. — KOLOSVARY, 1966**

Holotype: P. 184—185, Pl. 8, Fig. 4—6.
Depository: Unknown.
Stratigraphical range: Middle Triassic.

Cretastrea nov. gen. — KÜHN; in KÜHN, O.—ANDRUSOV, D. 1930

Type species: *Cretastrea andrusovi* KÜHN, 1930

***Cretastrea andrusovi* nov. spec. — KÜHN; in KÜHN, O.—ANDRUSOV, D., 1930**

Holotype: P. 5 (Separat.), Pl. 1, Fig. 3; Pl. 2, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z11634.
Stratigraphical range: Cretaceous (Campanian).

Flabellum LESSON, 1831

Flabellum senesi **KOPEK, 1952**

Holotype and Paratype: P. 76—77, Pl. 14, Fig. 5a—b; Pl. 15, Fig. 1a—b.
Depository: Unknown.
Stratigraphical range: Neogene (Upper Helvetian).

Margarosmilia VOLZ, 1896

Margarosmilia asymetrica **n. sp. — KOLOSVÁRY, 1966**

Holotype: P. 183, Pl. 7, Fig. 3 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Middle Triassic.

Margarosmilia carpatica **n. sp. — KOLOSVÁRY, 1958**

Holotype: P. 28, Pl. 2, Fig. 8, Pl. 3, Fig. 9, Pl. 5, Fig. 1 (Fig. not established).
Depository: Unknown.
Stratigraphical range: Middle Triassic.

Myriophyllia

Myriophyllia smolenicae **n. sp. — KOLOSVÁRY, 1966**

Holotype: P. 180, Pl. 7, Fig. 1 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Middle Triassic.

Oppelismilia DUNCAN, 1867

Oppelismilia dedinhyensis **n. sp. — KOLOSVÁRY, 1966**

Holotype: P. 185—186, Pl. 8, Fig. 7. (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Upper Triassic.

Pattalophyllia D'ARCHIARDI, 1867

? Pattalophyllia conica **nov. sp. — ALLOITEAU, 1949**

Holotype: P. 13—15, Pl. 1, Fig. 5a—b, Pl. 8, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 2940.
Stratigraphical range: Paleogene (Lutetian).

Placosmilia EDWARDS et HAIME, 1848

***Placosmilia bojnicensis* nov. sp. — ALLOITEAU, 1949**

Holotype: P. 20—23, Pl. 2, Fig. 8a—b, Pl. 7, Fig. 2.
Depository: Unknown.
Stratigraphical range: Paleogene (Lutetian).

Procyclolites, FRECH 1980

***Procyclolites podhradiensis* n. sp. — KOLOSVÁRY, 1967**

Holotype: P. 104
Depository: Unknown.
Stratigraphical range: Triassic.

Siderofungia REUSS, 1889

***Siderofungia andrusovi* nov. sp. — ALLOITEAU, 1949**

Holotype: P. 9—10, Pl. 1, Fig. 2a—b, Pl. 6, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 2945
Stratigraphical range: Paleogene (Lutetian).

***Siderofungia bojnicensis* nov. sp. — ALLOITEAU, 1949**

Holotype: P. 10—11, Pl. 1, Fig. 3a—b, Pl. 6, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 2947
Stratigraphical range: Paleogene (Lutetian).

Stylosmilia, EDWARDS et HAIME, 1848

***Stylosmilia (?) carpathica* nov. spec. — KÜHN; in KÜHN, O.—ANDRUSOV, D., 1937**

Holotype: P. 6—7 (Separat.), Text-fig. 1.

Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z2851.
Stratigraphical range: Cretaceous (Senonian).

Thamnasteria LESAUVAGE, 1823

***Thamnasteria smithiformis* n. sp. — KOLOSVÁRY, 1963**

Holotype: P. 211, Pl. 2, Fig. 7 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Triassic.

BRACHIOPODA

Antiptychina ZITEL, 1880

***Antiptychina puchoviensis* sp. n. — PEVNÝ, 1969**

Holotype: P. 156—157, Pl. 29, Fig. 2a—d.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-3549.
Stratigraphical range: Jurassic (Bajocian).

Austriellula STRAND, 1928

***Austriellula undosa* sp. n. — SIBLÍK, 1982**

Holotype: P. 63—65, Pl. 17, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-1765.
Stratigraphical range: Triassic (Carnian).

Caucasorhynchia DAGYS, 1963

***Caucasorhynchia altaplecta acuticostata* ssp. n. — SIBLÍK, 1971**

Holotype: P. 159—166, Pl. 1, Fig. 2.
Depository: Deposited in the collection of the Geological collection of the Geological Survey in Prague (MS-08).
Stratigraphical range: Triassic (Upper Anisian).

Cirpa DI GREGORIO, 1930

***Cirpa langi carpathica* ssp. n. — SIBLÍK, 1965**

Holotype: P. 73—78, Pl. 5, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Jurassic (Domerian).

Dispiriferina gen. n. — SIBLÍK, 1965

Type species: *Spiriferina Davidsoni* EUDES-DESLONGCHAMPS, 1955

Gemerithyris gen. n. SIBLÍK, 1977

Type species: *Waldheimia (Aulacothyris) supina* var. *hungarica,* BALOGH, 1940

***Gemerithyris hungarica globosa* ssp. n. — SIBLÍK, 1977**

Holotype: P. 211—217, Pl. 109, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Triassic (Tuvalian).

Rhaetina WAAGEN, 1882

***Rhaetina hybensis* n. sp. — MICHALÍK, 1975**

Holotype: P. 59—62, Pl. 4, Fig. 1—5.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-10318
Stratigraphical range: Triassic (Sevatian — ? Lower Rhaetian).

Spiriferina D'ORBIGNY, 1847

***"Spiriferina" parvula* sp. n. — SIBLÍK, 1981**

Holotype: P. 21—22, Pl. 9, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-13279.
Stratigraphical range: Triassic (Ladinian).

***Spiriferina slovenica* sp. n. — SIBLÍK, 1965**

Holotype: P. 78—79, Pl. 5, Fig. 4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Jurassic (Domerian).

Stolzenburgiella BITTNER, 1903

***Stolzenburgiella baloghi* sp. n. — SIBLÍK, 1981**

Holotype: P. 16—20, Pl. 10, Fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-13285.
Stratigraphical range: Triassic (Ladinian).

BIVALVIA — LAMELIBRANCHIATA

Angulus MEGERLE, 1811

***Angulus (Peronidia) kovačovensis* nov. sp. — SENEŠ, 1958**

Holotype: P. 113, Pl. 17, Fig. 216.
Depository: Unknown.
Stratigraphical range: Neogene ("Aquitanian").

***Angulus (Peronidia) nysti regularis* nov. sp. (var.) — SENEŠ, 1958**

Holotype: P. 112, Pl. 17, Fig. 217.
Depository: Unknown.
Stratigraphical range: Neogene ("Aquitanian").

Bakevellia KING, 1848 emend. COX, 1940

***Bakevellia (Neonakevellia) robusta* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 160, Pl. 1A, Fig. 13.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-12/1.
Stratigraphical range: Triassic (Rhaetian).

Bathyarca KOBELT, 1891

***Bathyarca devinica* sp. n. — ŠVAGROVSKÝ, 1981**

Holotype: P. 39—40, Pl. 2, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-17720.
Stratigraphical range: Neogene (Badenian).

Bystrickaya n. gen. — LUPU, 1976

Type species: *Bystrickaya andrusovi* n. sp., P. 36.

***Bystrickaya andrusovi* n. sp. — LUPU, 1976**

Holotype: P. 36, 38—39, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-11629.
Stratigraphical range: Cretaceous (Campanian).

Cardita BRUGUIÈRE, 1792

***Cardita carpatica* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 191, Pl. 7A, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-56/1.
Stratigraphical range: Triassic (Rhaetian).

Cardium LINNÉ, 1758

***Cardium (Acanthocardia) andrusovi latecostatum* nov. ssp. — SENEŠ, 1955**

Holotype: P. 81—82 (resp. 150), Pl. 4, Fig. 1—3.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

***Cardium (Laevicardium) kovácovense* nov. sp. — SENEŠ, 1958**

Holotype: P. 79—80, Pl. 15, Pl. 182.
Depository: Unknown.
Stratigraphical range: Neogene ("Aquitanian").

***Cardium (Limnocardium) kolesnikovi* nov. sp. — SENEŠ, 1955**

Holotype: P. 85 (resp. 153—154), Pl. 4, Fig. 11—12.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

***Cardium (Limnocardium) lamellosum* n. sp. — SENEŠ, 1955**

Holotype: P. 82—83 (resp. 151—152), Pl. 4, Fig. 9.

Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Cardium (Limnocardium) plicatoforme nov. sp. — SENEŠ, 1955

Holotype: P. 83—84 (resp. 152), Pl. 4, Fig. 7.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Cardium (Limnocardium) rotundum nov. sp. — SENEŠ, 1955

Holotype: P. 84—85 (resp. 153), Pl. 4, Fig. 8.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Cardium (Limnocardium) solense nov. sp. — SENEŠ, 1955

Holotype: P. 82—84 (resp. 151), Pl. 4, Fig. 5—6.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Cardium (Limnocardium) subplicatofittoni nov. sp. — SENEŠ, 1955

Holotype: P. 84 (resp. 152), Pl. 4, Fig. 13.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Cardium (Parvicardium) parvissimum n. sp. — SENEŠ, 1960

Holotype: P. 38—39 (resp. 127—128), Pl. 1, Fig. 7.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3247
Stratigraphical range: Neogene ("Tortonian").

Cardium radiatum sp. n. — ŠVAGROVSKÝ, 1971

Holotype: P. 158—160, Pl. 10, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 5631
Stratigraphical range: Neogene (Sarmatian).

Cassianella BEYRICH, 1862

***Cassianella gemerica* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 162—163, Pl. 2A, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-8/1.
Stratigraphical range: Triassic (Rhaetian).

Crassatella LAMARCK (1799) 1801

***Crassatella (Crassitina) carpatica* nov. sp. — SENEŠ, 1960**

Holotype: P. 113—114 (resp. 110—112), Text-fig.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3616
Stratigraphical range: Miocene ("Burdigalian").

Ctenostreon ECHWALD, 1862

***Ctenostreon vrsateciensis* sp. n. — KOCHANOVÁ, 1979**

Holotype: P. 22—23, Pl. 1, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. BP-1.
Stratigraphical range: Triassic (Bathian — Callovian).

Donax LINNÉ, 1758

***Donax dentiger parvulus* n. ssp. — ŠVAGROVSKÝ, 1960b**

Holotype: P. 66—67, Pl. 1, Fig. 3—4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6629.
Stratigraphical range: Neogene (Sarmatian).

Ervilia TURTON, 1822

***Ervilia (?) minima* nov. sp. — SENEŠ, 1953**

Holotype: 233—234, Pl. 33, Fig. 19—20.
Depository: Unknown.
Stratigraphical range: Neogene (Sarmatian).

Eumarcia IREDALE, 1924

***Eumarcia (Textivenus) karpathica* n. sp. — ANDRUSOV 1953**

Holotype: P. 439, Pl. 47, Fig. 4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 2931
Stratigraphical range: Paleogene (Lutetian).

Gafrarium (BOLTEN) RÖDING, 1798

***Gafrarium (Circe) carpatica* nov. sp. — ONDREJIČKOVÁ et SENEŠ, 1965**

Holotype: P. 187 (resp. 197), Pl. 6, Fig. 58—59.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-3426.
Stratigraphical range: Oligocene.

Horehronia n. gen. — ANDRUSOV, 1976

Type species: *Horehronia kuehni* n. gen., n. sp., P. 26, Fig. 13.

***Horehronia kuehni* n. gen., n. sp. — ANDRUSOV, 1976**

Holotype; P. 26—28, Fig. 13.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-9149.
Stratigraphical range: Cretaceous (Santonian — Campanian).

Chlamys (BOLTEN) RÖDING, 1798

***Chlamys andrusovi* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 163—164, Pl. 3A, Fig. 11.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-18/1.
Stratigraphical range: Triassic (Rhaetian).

***Chlamys carsensis* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 164—165, Pl. 4A, Fig. 6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-19/1.
Stratigraphical range: Triassic (Rhaetian).

***Chlamys fascistriata* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 165—166, Pl. 3A, Fig. 2.
Depository: Deposited at the D. Štúr, Institute of Geology in Bratislava; No. JK-20/1.
Stratigraphical range: Triassic (Rhaetian).

***Chlamys pseudodispar* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 166—167, Pl. 3A, Fig. 5.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-22/1.
Stratigraphical range: Triassic (Rhaetian).

***Chlamys rapovensis* nov. sp. — HANO—SENEŠ, 1953**

Holotype: P. 323, Pl. 43, Fig. 1a—d, Pl. 44, Fig. 1—2.
Depository: Unknown.
Stratigraphical range: Lower Miocene (Aquitanian).

***Chlamys silicensis* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 167—168, Pl. 3A, Fig. 7.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-17/1.
Stratigraphical range: Triassic (Rhaetian).

***Chlamys stuerzenbaumi* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 168—169, Pl. 4A, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-21/1.
Stratigraphical range: Triassic (Rhaetian).

Lima BRUGUIÈR, 1792

***Lima drnavensis* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 179—180, Pl. 5A, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-30/1.
Stratigraphical range: Triassic (Rhaetian).

Limnocardium STOLICZKA, 1871

***Limnocardium fittoniforme* nov. sp. — SENEŠ, 1953**

Holotype: P. 231, Pl. 10, Fig. 4, 8.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4562.
Stratigraphical range: Neogene (Sarmatian).

Limnocardium gilleti nov. sp. — SENEŠ, 1953

Holotype: P. 231—232, Pl. 33, Fig. 12, 16.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4561.
Stratigraphical range: Neogene (Sarmatian).

Limopsis SASSI, 1827

Limopsis (Pectunculina) reticulifera sp. n. — ŠVAGROVSKÝ, 1981

Holotype: P. 42—43, Pl. 3, Fig. 6.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 17719.
Stratigraphical range: Neogene (Badenian).

Lutraria LAMARCK, 1799

Lutraria sanna longa nov. ssp. — SENEŠ, 1955

Holotype: P. 86—87 (resp. 154), Pl. 5, Fig. 5.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Mysidioptera SALOMON, 1895

Mysidioptera submulticostata KOCHANOVÁ sp. n. — KOCHANOVÁ, 1975

Holotype: P. 48—49, Pl. 5, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. NT-2.
Stratigraphical range: Triassic (Julian).

Neomegalodon GUEMBEL, 1882

Neomegalodon (Neomegalodon) carpaticus KOCHANOVÁ sp. n. — KOCHANOVÁ, 1973b

Holotype: P. 181 (resp. 192), Pl. 32—34, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. NT-3.
Stratigraphical range: Triassic (Upper Carnian — Lower Norian).

Ornithopecten Cox, 1962

Ornithopecten liptovensis **Kochanová sp. n. — Kochanová, 1975**

Holotype: P. 42—43, Pl. 5, Fig. 1, 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; NT-1.
Stratigraphical range: Triassic (Cordevolian).

Parallelodon Neek et Worthen, 1866

Parallelodon subimbricarius **sp. n. — Kochanová, 1973a**

Holotype: P. 154—155, Pl. IA, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-1/1.
Stratigraphical range: Triassic (Norian).

Pholadomya Sowerby, 1823

Pholadomya andrusovi **nov. sp. — Seneš, 1958**

Holotype: P. 10—13 (resp. 4—8), Pl. 1, Fig. 1—3.
Depository: Unknown.
Stratigraphical range: Neogene ("Aquitanian").

Pitaria Römer, 1857

Pitaria (Paradione) chropovensis **n. sp. — Bílek, 1966**

Holotype: P. 36 (resp. 16—17), Pl. 2, Fig. 10.
Depository: Unknown.
Stratigraphical range: Neogene ("Burdigalian").

Plagiostoma Sowerby, 1814

Plagiostoma succinctaeformis **sp. n. — Kochanová, 1973a**

Holotype: P. 185, Pl. 6A, Fig. 1.

Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-37/1.
Stratigraphical range: Triassic (Rhaetian).

***Plagiostoma sturi* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 183—185, Pl. 6A, Fig. 5.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava, No. JK-39/1.
Stratigraphical range: Triassic (Rhaetian).

***Plagiostoma subnodulosum* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 186, Pl. 6A, Fig. 4.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-38/1.
Stratigraphical range: Triassic (Rhaetian).

Pseudomyoconcha ROSSI-RONCHETTI et ALLASINAZ, 1966

***Pseudomyoconcha ackeri* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 192—193, Pl. 8A, Fig. 18.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-53/1.
Stratigraphical range: Triassic (Rhaetian).

Pteria SCOPOLI, 1777

***Pteria minuta* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 157—158, Pl. 1A, Fig. 12.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-3/1.
Stratigraphical range: Triassic (Rhaetian).

Tutcheria COX, 1964

***Tutcheria slovenica* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 193—195, Pl. 8A, Fig. 13.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-57/1.
Stratigraphical range: Triassic (Rhaetian).

Venus LINNÉ, 1758

***Venus (Clausinella) basteroti elongatus* nov. sp. (var.?) — SENEŠ, 1958**

Holotype: P. 96—97, Pl. 16, Fig. 207.
Depository: Unknown.
Stratigraphical range: Neogene ("Aquitanian").

GASTROPODA

Actaeon MONTFORT, 1810

***Actaeon pygmaeus* nov. sp. — SENEŠ, 1955**

Holotype: P. 99 (resp. 159), Pl. 9, Fig. 17.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Alvania RISSO, 1926

***Alvania (Alvania) helenae latior* n. ssp. — ŠVAGROVSKÝ, 1982**

Holotype: P. 11, Pl. 3, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18824.
Stratigraphical range: Neogene ("Tortonian").

Belgrandiella WAGNER, 1927

***Belgrandiella slovenica* n. sp. — LOŽEK—BRTEK, 1964**

Holotype: P. 203, Text-Fig. 2 (2).
Depository: Deposited in the collections of the National Museum in Prague; No. 3341.
Stratigraphical range: Quaternary.

***Belgrandiella slovenica alticola* n. sp. — LOŽEK—BRTEK, 1964**

Holotype: P. 205, text-Fig. 2—3.
Depository: Deposited in the collections of the National Museum in Prague; No. 343.
Stratigraphical range: Quaternary.

***Belgrandiella slovenica bojnicensis* n. sp. — LOŽEK—BRTEK, 1964**

Holotype: P. 203—204, Text-Fig. 2 (1).
Depository: Deposited in the collections of the National Museum in Prague; No. 3342.
Stratigraphical range: Quaternary.

Belgrandiella slovenica kalasi n. sp. — LOŽEK—BRTEK, 1964

Holotype: P. 205—206, Text-Fig. 2—4.
Depository: Deposited in the collections of the National Museum in Prague; No. 3344.
Stratigraphical range: Quaternary.

Bitillaria BENSON, 1842

Bitillaria turbai n. sp. — ANDRUSOV, 1953

Holotype: P. 450—451, Pl. 69, Fig. 8—9.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 2923.
Stratigraphical range: Paleogene (Lutetian).

Calliostoma SWAINSON, 1840

Calliostoma gradaespira gradaespira n. sp. et n. ssp. — ŠVAGROVSKÝ, 1957

Holotype: P. 212—214 (resp. 222), Pl. 2, Fig. 5.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 8017.
Stratigraphical range: Neogene (Sarmatian).

Calliostoma gradaespira latitesta n. ssp. — ŠVAGROVSKÝ, 1957

Holotype: P. 215—217 (resp. 223), Pl. 2, Fig. 13.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Sarmatian).

Calliostoma gradaespira misslensis n. ssp. — ŠVAGROVSKÝ, 1957

Holotype: P. 214—215 (resp. 222), Pl. 2, Fig. 10.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 8032.
Stratigraphical range: Neogene (Sarmatian).

Calliostoma planata striatella n. ssp. — ŠVAGROVSKÝ, 1957

Holotype: P. 210—212 (resp. 221—222), Pl. 2, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 7989.
Stratigraphical range: Neogene (Sarmatian).

Cerithium BRUGUIÈRE, 1789

***Cerithium danubicum* nov. sp. — ONDREJIČKOVÁ—SENEŠ, 1965**

Holotype: P. 173 (resp. 196), Pl. 3, Fig. 23—24.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3425.
Stratigraphical range: Oligocene.

***Cerithium danubicum pyramidale* nov. ssp. — ONDREJIČKOVÁ—SENEŠ, 1965**

Holotype: P. 173 (resp. 196—197), Pl. 3, Fig. 25—26.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3424.
Stratigraphical range: Oligocene.

***Cerithium (Chondrocerithium?) incertum* GRATELOUP var. *minuta* nov. var. — ŠVAGROVSKÝ, 1954**

Holotype: P. 34—37 (resp. 61), Pl. 3, Fig. 39—40.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 12654.
Stratigraphical range: Neogene (Sarmatian).

***Cerithium jakeliusi* nom. nov. — ŠVAGROVSKÝ, 1971**

Holotype: P. 359—361, Pl. 21, Fig. 25.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Sarmatian).

***Cerithium (Pithocerithium) rubiginosum* EICHWALD var. *gracilis* nov. var. — ŠVAGROVSKÝ, 1954**

Holotype: P. 32—34 (resp. 60—61), Pl. 3, Fig. 22—24.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Sarmatian).

***Cerithium (Thericium) boettgeri* nom. nov. — SENEŠ, 1960**

Holotype: P. 77—79 (resp. 139), Pl. 7, Fig. 12.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Cingula (FLEMING, 1828) ADAMS, 1854

***Cingula (Pseudosetia) laevigata hispida* n. ssp. — SENEŠ, 1960**

Holotype: P. 67—68 (resp. 135—136), Pl. 6, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3280.
Stratigraphical range: Neogene ("Tortonian").

Clava MARTYN, 1784

***Clava (Pseudovergatus) čechoviči* n. sp. — ANDRUSOV, 1953**

Holotype: P. 452. Pl. 71, Fig. 7.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 2904.
Stratigraphical range: Paleogene (Lutetian).

Clavatula LAMARCK, 1801

***Clavatula (Clavatula) contorta* n. sp. — ŠVAGROVSKÝ, 1958**

Holotype: P. 15—16 (resp. 50—51), Pl. 4, Fig. 5.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3076.
Stratigraphical range: Neogene ("Tortonian").

***Clavatula (Clavatula) kuzmicensis* n. sp. — ŠVAGROVSKÝ, 1958**

Holotype: P. 18 (resp. 51—52), Pl. 5, Fig. 13.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3103.
Stratigraphical range: Neogene ("Tortonian").

Clithon MONTFORT, 1810

***Clithon (Vittoclithon) pictus ventrosus* nov. ssp. — SENEŠ, 1955**

Holotype: P. 88 (resp. 154—155), Pl. 6, Fig. 5—6.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Drillia GRAY, 1838

***Drillia (Stenodrillia) dorae iniustecarinata* n. ssp. — ŠVAGROVSKÝ, 1958**

Holotype: P. 25—26 (resp. 52), Pl. 8, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3103.
Stratigraphical range: Neogene ("Tortonian").

Gibbula LEACH in RISSO, 1826

***Gibbula andrussovi* n. sp. — ŠVAGROVSKÝ, 1957**

Holotype: P. 208—210 (resp. 221), Pl. 1, Fig. 6—9.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Miocene ("Tortonian").

***Gibbula (Colliculus) subscalata teres* n. ssp. — ŠVAGROVSKÝ, 1982**

Holotype: P. 6—7, Pl. 1, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18814.
Stratigraphical range: Neogene (Badenian).

***Gibbula tenuistriata* n. sp. — ŠVAGROVSKÝ, 1957**

Holotype: P. 206—208 (resp. 220—221), Pl. 1, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3178.
Stratigraphical range: Neogene ("Tortonian").

Glauconia GIEBEL, 1852

***Glauconia coquandiana prasnikensis* nov. subspec. — CZABALAY, 1969**

Holotype: P. 165—166, Pl. 22, Fig. 14—15.
Depository: Deposited at Geological Institute of Hungary in Budapest; No. 6240.
Stratigraphical range: Cretaceous (Senonian).

Hinia LEACH in GRAY, 1847

Hinia (Hinia) adae propinqua ssp. n. — ŠVAGROVSKÝ, 1982

Holotype: P. 394, Pl. 3, Fig. 4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18930.
Stratigraphical range: Neogene (Badenian).

Hinia (Hinia) retusata sp. n. — ŠVAGROVSKÝ, 1982

Holotype: P. 394—395, Pl. 3, Fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18929.
Stratigraphical range: Neogene (Badenian).

Hydrobia HARTMANN, 1821

Hydrobia pseudoselia SENEŠ, 1953

Holotype: P. 197, Pl. 24, Fig. 26.
Depository: Unknown.
Stratigraphical range: Neogene (Sarmatian).

Hydrobia punctum sarmatica SENEŠ, 1953

Holotype: P. 197, Pl. 24, Fig. 22.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3561.
Stratigraphical range: Neogene (Sarmatian).

Hydrobia (Solia) suturatocostata nov. sp. — SENEŠ, 1955

Holotype: P. 89 (resp. 155), Pl. 6, Fig. 16, 19.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Latirus MONTFORT, 1810

Latirus (Pseudolatirus) bilineatus minutus ssp. n. — ŠVAGROVSKÝ, 1982

Holotype: P. 389—390, Pl. 9, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Badenian).

Littorina FERRUSSAC, 1821

***Littorina costata* nov. sp. — SENEŠ, 1955**

Holotype: P. 89 (resp. 155), Pl. 6, Fig. 14—15.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Mohrensternia STOLICZKA, 1868

***Mohrensternia globosa* n. sp. — ŠVAGROVSKÝ, 1971**

Holotype: P. 317—321, Pl. 54, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 11424.
Stratigraphical range: Neogene (Sarmatian).

***Mohrensternia krachi* nov. sp. — SENEŠ, 1955**

Holotype: P. 93—94 (resp. 158—159), Pl. 7, Fig. 25.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Neogene ("Tortonian").

***Mohrensternia rectecostata* n. sp. — ŠVAGROVSKÝ, 1971**

Holotype: P. 311—315, Pl. 53, Fig. 6.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Sarmatian).

***Mohrensternia subnitida subnitida* nov. sp. — SENEŠ, 1955**

Holotype: P. 90—91 (resp. 156—157), Pl. 7, Fig. 1—4.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

***Mohrensternia subnitida žižčenkovi* nov. ssp. — SENEŠ 1955**

Holotype: P. 91—92 (resp. 157), Pl. 7, Fig. 7, 8.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Mohrensternia tortonica graciliformis nov. ssp. — SENEŠ, 1955

Holotype: P. 92—93 (resp. 158), Pl. 7, Fig. 21.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Mohrensternia tortonica paucicostata nov. ssp. — SENEŠ, 1955

Holotype: P. 93 (resp. 158), Pl. 7, Fig. 23.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Mohrensternia tortonica tortonica nov. sp. — SENEŠ, 1955

Holotype: P. 92 (resp. 157—158), Pl. 7, Fig. 11, 20.
Depository: Unknown.
Stratigraphical range: Neogene ("Tortonian").

Nassa BOLTEN, 1798

Nasa (Hinia) dorsaniformis n. sp. — SENEŠ, 1960

Holotype: P. 91—93 (resp. 143—144), Pl. 10, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-3204.
Stratigraphical range: Neogene ("Tortonian").

Nassa (Phrontis) dujardini levis n. ssp. — SENEŠ, 1960

Holotype: P. 97—98 (resp. 145—146), Pl. 12, Fig. 7.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z-3284.
Stratigraphical range: Neogene ("Tortonian").

Pirenella GRAY, 1847

Pyrenella aspera sp. n. — ŠVAGROVSKÝ, 1982

Holotype: P. 22—23, Pl. 6, Fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18844.
Stratigraphical range: Neogene (Badenian).

***Pirenella virgata* n. sp. — ŠVAGROVSKÝ, 1982**

Holotype: P. 23, Pl. 7, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18848.
Stratigraphical range: Neogene (Badenian).

Pseudamnicola PAULUCCI, 1878

***Pseudamnicola (Staja) acutecarinata prisca* n. ssp. — ŠVAGROVSKÝ, 1971**

Holotype: P. 252—253, Pl. 36, Fig. 10.
Depository: Deposited in the collections of the Slovak national Museum in Bratislava; No. SNM-Z 9977.
Stratigraphical range: Neogene (Sarmatian).

Raphitoma BELLARDI, 1848

***Raphitoma polyacantha paucicostata* n. ssp. — ŠVAGROVSKÝ, 1958**

Holotype: P. 29—30 (resp. 52—53), Pl. 8, Fig. 11.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3112.
Stratigraphical range: Neogene ("Tortonian").

***Raphitoma subcostata zemplinica* n. ssp. — ŠVAGROVSKÝ, 1958**

Holotype: P. 30—31 (resp. 53), Pl. 9, Fig. 5.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3119.
Stratigraphical range: Neogene ("Tortonian").

Rissoa (FRÉMINVILLE) DESMAREST, 1814

***Rissoa certa* n. sp. — ŠVAGROVSKÝ, 1971**

Holotype: P. 273—277, Pl. 41, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 9974.
Stratigraphical range: Neogene (Sarmatian).

***Rissoa gracilis* n. sp. — ŠVAGROVSKÝ, 1971**

Holotype: P. 277—282, Pl. 38, Fig. 5.

Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 9975.
Stratigraphical range: Neogene (Sarmatian).

Rissoa mucronata n. sp. — ŠVAGROVSKÝ, 1971

Holotype: P. 265—268, Pl. 39, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 9976.
Stratigraphical range: Neogene (Sarmatian).

Rissoa rugosa n. sp. — ŠVAGROVSKÝ, 1971

Holotype: P. 268—273, Pl. 40, Fig. 1.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 9973.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) acuta nov. sp. — SENEŠ, 1953

Holotype: P. 203—204, Pl. 28, Fig. 7.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4553.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) andrusovi nov. sp. — SENEŠ, 1953

Holotype: P. 223, Pl. 27, Fig. 3—4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4554.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) cechovici nov. sp. — SENEŠ, 1953

Holotype: P. 225, Pl. 27, Fig. 8.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4559.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) cincta nov. sp. — SENEŠ, 1953

Holotype: P. 208—209, Pl. 25, Fig. 21—22.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3556.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) fragilis nov. sp. — SENEŠ, 1953

Holotype: P. 224, Pl. 27, Fig. 5—6.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4549.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) friedbergi nov. sp. — SENEŠ, 1953

Holotype: P. 223—224, Pl. 26, Fig. 24—27.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4548.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) granensis nov. sp. — SENEŠ, 1953

Holotype: P. 220, Pl. 26, Fig. 19.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z3554.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) irregularis nov. sp. — SENEŠ, 1953

Holotype: P. 221—222, Pl. 27, Fig. 1—2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4558.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) kicindica nov. sp. — SENEŠ, 1953

Holotype: P. 219—220, Pl. 26, Fig. 22—23.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4555.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) longa nov. sp. — SENEŠ, 1953

Holotype: P. 206—207, Pl. 25, Fig. 15—16.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4557.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) minor nov. sp. — SENEŠ, 1953

Holotype: P. 0. 211, Pl. 25, Fig. 27.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4556.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) multicostata minor nov. ssp. — SENEŠ, 1953

Holotype: P. 213, Pl. 26, Fig. 6.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3555.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) multicostata nov. sp. — SENEŠ, 1953

Holotype: P. 212—213, Pl. 26, Fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4552.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) nuda nov. sp. — SENEŠ, 1953

Holotype: P. 216, Pl. 26, Fig. 9.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4547.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) polonica nov. sp. — SENEŠ, 1953

Holotype: Friedberg 1911—28, P. 387, Pl. 23, Fig. 7a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3553.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) pseudogranensis nov. sp. — SENEŠ, 1953

Holotype: P. 221, Pl. 26, Fig. 21.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4551.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) pseudopolonica nov. sp. — SENEŠ, 1953

Holotype: P. 217, Pl. 25, Fig. 19—20.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3551.
Stratigraphical range: Neogene (Sarmatian).

Rissoa (Mohrensternia) pupa nov. sp. — SENEŠ, 1953

Holotype: P. 225, Pl. 26, Fig. 28.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4550.
Stratigraphical range: Neogene (Sarmatian).

***Rissoa (Mohrensternia) spiralocostata* nov. sp. — SENEŠ, 1953**

Holotype: P. 201, Pl. 25, Fig. 3—4;
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 4560.
Stratigraphical range: Neogene (Sarmatian).

Seila ADAMS, 1861

***Seila (Seila) conitesta* n. sp. — ŠVAGROVSKÝ, 1954**

Holotype: P. 40—41, Pl. 4, Fig. 19.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Sarmatian).

***Seila (Seila) costatonodosa* n. sp. — ŠVAGROVSKÝ, 1954**

Holotype: P. 38—40 (resp. 62), Pl. 4, Fig. 19.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Sarmatian).

Terebra BRUGUIÈRE, 1789

***Terebra (Terebra) bistriata boriana* ssp. n. — ŠVAGROVSKÝ, 1982**

Holotype: P. 407—408, Pl. 7, Fig. 4.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Badenian).

***Terebra (Terebra) pseudopertusa badeniana* ssp. n. — ŠVAGROVSKÝ, 1982**

Holotype: P. 405—406, Pl. 6, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Neogene (Badenian).

Trochotoma DESLONGCHAMPS, 1843

***Trochotoma carpatica* sp. n. — KOCHANOVÁ, 1973a**

Holotype: P. 198, Pl. 10A, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. JK-64/1.
Stratigraphical range: Triassic (Rhaetian).

Tympanotonos SCHUMACHER, 1817

***Tympanotonos ajkaënsis* SZÖTS, var. *balleghi* nov. var. — ANDRUSOV, 1953**

Holotype: P. 447—449, Pl. 69, Fig. 17—18.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava.
Stratigraphical range: Paleogene (Lutetian).

Weinkaufia MONTEROSATO, 1884

***Weinkaufia pumila* n. sp. — ŠVAGROVSKÝ, 1971**

Holotype: P. 420—421. Pl. 72, Fig. 14.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 12653.
Stratigraphical range: Neogene (Sarmatian).

CEPHALOPODA

Aegoceras (Microdecoceras HYATT, 1871)

***Aegoceras (Microdecoceras) kettneri* n. sp. — ANDRUSOV, 1931**

Holotype: P. 148—149, Pl. 8, Fig. 2, P. 9, Fig. 11.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 19370.
Stratigraphical range: Liassic (Sinemurian).

Alsatites HAUG, 1894

***Alsatites viskupi* RAKÚS, 1975**

Holotype: 12—14, Pl. 104, Fig. 2a—b, Text-fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6321.
Stratigraphical range: Jurassic (Hettangian).

Ammonites

***Ammonites Liptoviensis* n. sp. — ZEUSCHNER, 1856**

Lectotype: P. 181, Pl. 2, Fig. 1a—c.
Depository: Deposited in the Muzeum of Geologische Bundensanstalt in Vienna.
Stratigraphical range: Cretaceous (Barremian—Aptian).

Cycloceltites MOJSISOVICS, 1893

***Cycloceltites corneus* sp. n. — KOLLÁROVÁ-ANDRUSOVOVÁ; in V. KOLLÁROVÁ--ANDRUSOVOVÁ—M. KOCHANOVÁ, 1973**

Holotype: P. 59—64, Pl. 9, Fig. 2—12, Pl. 11, Text-Fig. 23—26.
Depository: Deposited at Geological institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 6—1968.
Stratigraphical range: Triassic (Norian).

Ectocentrites WÄHNER, 1887

***Ectocentrites purkynei* n. sp. — ANDRUSOV, 1931**

Holotype: P. 139, Pl. 7, Fig. 1, Pl. 9, Fig. 6.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 19362.
Stratigraphical range: Liassic (Lotharingian).

***Ectocentrites waehneri* sp. n. — RAKÚS, 1975**

Holotype: P. 10—11, Text-fig. 4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6322.
Stratigraphical range: Jurassic (Hettangian — Sinemurian).

Monophyllites MOJSISOVICS, 1879

***Monophyllites Clio* n. sp., — MOJSISOVICS, 1893**

Lectotyp: P. 789, Pl. 128, Fig. 26a—b.
Depository: Hungarian Geological Survey in Budapest.
Stratigraphical range: Triassic (Norian).

Morphoceras DOUVILLÉ, 1880

Morphoceras kostelecense n. sp. — RAKÚS, 1965

Holotype: P. 171—172 (resp. 176—177). Pl. 10, Fig. 3—4, Text-fig. 3—4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4336.
Stratigraphical range: Jurassic (Bajosian—Bathian).

Nannolytoceras BUCKMAN, 1905

Nannolytoceras paucisulcatum n. sp. — RAKÚS, 1965

Holotype: P. 176—177 (resp. 169—170). Pl. 9, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z4337.
Stratigraphical range: Jurassic (Bajocian—Bathonian).

Oxynoticeras HYATT, 1874

Oxynoticeras perneri n. sp. — ANDRUSOV, 1931

Holotype: P. 153, Pl. 7, Fig. 4, Pl. 9, Fig. 1, 13.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-19381.
Stratigraphical range: Jurassic (Lotharingian).

Oxynoticeras schroederi n. sp. — ANDRUSOV, 1931

Holotype: P. 150—151, Pl. 8, Fig. 1, Pl. 9, Fig. 3, 15.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z19409.
Stratigraphical range: Jurassic (Lotharingian).

Peripleurites MOJSISOVICS, 1893

Peripleurites boeckhi n. sp., MOJSISOVICS, 1893

Syntype: P. 567, Pl. 133, Fig. 20a—b, 18a—b.
Depository: Hungarian Geological Survey in Budapest.
Stratigraphical range: Triassic (Norian).

Peripleurites stuerzenbaumi n. sp., — MOJSISOVICS, 1893

Holotype: P. 367—368, Pl. 133, Fig. 19A, b.
Depository: Hungarian Geological Survey in Budapest; No. T. 1363.
Stratigraphical range: Triassic (Norian).

BELEMNITIDA

Mesoteuthis LISSAJOUS, 1915

***Mesoteuthis parvulus* n. sp. — ČINČUROVÁ, 1974c**

Holotype: P. 29, Pl. 1, Fig. 3a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6328.
Stratigraphical range: Jurassic (Toarcian).

Passaloteuthis LISSAJOUS, 1915

***Passaloteuthis andrusovi* n. sp. — ČINČUROVÁ, 1984**

Holotype: P. 3—5, Pl. 1, Fig. 1a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 17991.
Stratigraphical range: Jurassic (Liasic).

***Passaloteuthis krimholzi* n. sp. — ČINČUROVÁ, 1974b**

Holotype: P. 1—3, Pl. 1, Fig. 1a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6319.
Stratigraphical range: Jurassic (Sinemurian).

Salpingoteuthis LISSAJOUS, 1915

***Salpingoteuthis carpaticus* n. sp. — ČINČUROVÁ, 1971**

Holotype: P. 62—63, Pl. 5, Fig. 1a—c.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 3490.
Stratigraphical range: Jurassic (Toarcian).

***Salpingoteuthis podbielicus* n. sp. — ČINČUROVÁ, 1974b**

Holotype: P. 3—4, Pl. 1, Fig. 2a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6320.
Stratigraphical range: Jurassic (Toarcian).

***Salpingoteuthis slovacus* n. sp. — ČINČUROVÁ, 1974a**

Holotype: P. 1—3, Pl. 1, Fig. 1a—b.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 6871.
Stratigraphical range: Jurassic (Toarcian).

ECHINODERMATA (CRINOIDEA, ECHINOIDEA)

Crinoidea
Cyrtocrynus JAEKEL, 1891

***Cyrtocrynus stiavnikiensis* sp. n. — ŽÍTT—MICHALÍK, 1984**

Holotype: P. 612, Pl. 8, Fig. 1—2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18761/1.
Stratigraphical range: Jurassic (Oxfordian).

Phyllocrinus D'ORBIGNY, 1850

***Phyllocrinus borcicensis* sp. n. — ŽÍTT—MICHALÍK, 1984**

Holotype: P. 607—609, Pl. 7, Fig. 11.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18759/1.
Stratigraphical range: Jurassic (Oxfordian).

***? Phyllocrinus skalensis* n. sp. — ŽÍTT—MICHALÍK, 1984**

Holotype: P. 609—610, Pl. 8, Fig. 3—4.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18561/1.
Stratigraphical range: Jurassic (Oxfordian).

Echinoidea
Lovenia DESOR, 1847

***Lovenia mortenseni* n. sp. — ČTYROKÝ, 1965**

Holotype: P. 108—118, Pl. 1, Fig. 1.

Depository: Deposited at the Central Geological Institute in Prague.
Stratigraphical range: Neogene (Carpathian).

Trachyaster POMEL, 1869

***Trachyaster hlinensis* nov. sp. — SENEŠ, 1955**

Holotype: P. 26—27, Pl. 1, Fig. 3,
Depository: Unknown.
Stratigraphical range: Neogene ("Helvetian").

HOLOTHURIAN — SCLERITES

Acanthotheelia FRIZZEL et EXLINE, 1956

***Acanthotheelia helios* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 3—4, Pl. 1, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/200.
Stratigraphical range: Triassic (Sevatian).

***Acanthotheelia pseudospinosa* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 5—6, Pl. 1, Fig. 19.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/190.
Stratigraphical range: Triassic (Norian).

***Acanthotheelia pulchra* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 4—5, Pl. 1, Fig. 2.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/182.
Stratigraphical range: Triassic (Norian).

Biacumina MOSTLER, 1970

***Biacumina rariperforata* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 6, Pl. 2, Fig. 11.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/137.
Stratigraphical range: Triassic (Norian).

Biacumina spinosa n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 6, Pl. 2, Fig. 15.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/121.
Stratigraphical range: Triassic (Sevatian).

Calclamna FRIZZEL et EXLINE, 1956

Calclamna misiki n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 6—7, Pl. 2, Fig. 19.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/137.
Stratigraphical range: Triassic (Sevatian).

Calclamna norica n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 7, Pl. 3, Fig. 8.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/177.
Stratigraphical range: Triassic (Norian).

Eocaudina MARTIN, 1952

Eocaudina longa n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 8, Pl. 4, Fig. 6.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/193.
Stratigraphical range: Triassic (Norian).

Eocaudina mostleri n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 8, Pl. 4, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/209.
Stratigraphical range: Triassic (Norian).

Kuehnites MOSTLER, 1969

Kuehnites andrusovi n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 8—9, Pl. 2, Fig. 2.

Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/162.
Stratigraphical range: Triassic (Sevatian).

Praeeuphronides MOSTLER, 1968

***Praeeuphronides complexus* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 11, Pl. 4, Fig. 19.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/145.
Stratigraphical range: Triassic (Norian).

Priscopedatus SCHLUMBERGER, 1890

***Priscopedatus bogschi* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 12, Pl. 6, Fig. 10.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/213.
Stratigraphical range: Triassic (Norian).

***Priscopedatus slovakensis* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P.13, Pl. 6, Fig. 16.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/104.
Stratigraphical range: Triassic (Illyrian).

***Priscopedatus triangularis* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 14, Pl. 6, Fig. 24.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/195.
Stratigraphical range: Triassic (Illyrian).

Semperites MOSTLER, 1970

***Semperites longiramosus* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 16, Pl. 6, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/141.
Stratigraphical range: Triassic (Norian).

Theelia SCHLUMBERGER, 1891

Theelia praenorica n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 19, Pl. 9, Fig. 10.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/180.
Stratigraphical range: Triassic (Norian).

Theelia praeseniradiata n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 19—20, Pl. 10, Fig. 7.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/153.
Stratigraphical range: Triassic (Norian).

Theelia pseudoplanata n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 20—21, Pl. 11, Fig. 14.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II-80.
Stratigraphical range: Triassic (Norian).

Theelia simoni n. sp. — KOZUR—MOCK, 1972a

Holotype: P. 21—22, Pl. 8, Fig. 7.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/184.
Stratigraphical range: Triassic (Sevatian).

Theelia stellifera bistellata n. subsp. — KOZUR—MOCK, 1972a

Holotype: P. 22, Pl. 11, Fig. 5.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/156.
Stratigraphical range: Triassic (Sevatian).

Theelia variabilis slovakensis n. subsp. — KOZUR—MOCK, 1972a

Holotype: P. 23, Pl. 12, Fig. 13.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/160A.
Stratigraphical range: Triassic (Norian).

***Theelia zawidzkae* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 24—25, Pl. 9, Fig. 13.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/90.
Stratigraphical range: Triassic (Norian).

Triradites MOSTLER, 1964

***Triradites transitus* n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 25, Pl. 6, Fig. 7.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/166.
Stratigraphical range: Triassic (Norian).

Uniramosa n. gen. — KOZUR—MOCK, 1972a

Type species: *Uniramosa bystrickyi* n. gen., n. sp.; P. 25—26, Pl. 6, Fig. 5.

***Uniramosa bystrickyi* n. gen. n. sp. — KOZUR—MOCK, 1972a**

Holotype: P. 25—26, Pl. 6, Fig. 5.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. II/62.
Stratigraphical range: Triassic (Norian).

PISCES

Antigonia LOWE, 1843

***Antigonia postangusta* n. sp. — HOLEC, 1975**

Holotype: P. 262, 264—265, Pl. 1, Fig. 3a—b.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. I.42a, b.
Stratigraphical range: Miocene (Badenian).

Belonidopsisichnium n. ichnogen. — PLIČKA, 1982

Type species: *Belonidopsisichnium carpaticum* PLIČKA, 1982, P. 150, Pl. 57—60.

***Belonidopsisichnium carpaticum* n. ichnosp. — PLIČKA, 1982**

Holotype: P. 150—156, Pl. 57—60.
Depository: Deposited in the collection of Central Geological Institute in Brno; No. 2.
Stratigraphical range: Eocene (Middle Eocene).

Micromesistius GILL, 1864

***Micromesistius schwarzhanzi* n. sp. — HOLEC, 1975**

Holotype: P. 261—262, Pl. 2, Fig. 2a—b.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. I. 92.
Stratigraphical range: Miocene (Badenian).

Otolithus

***Otholithus (Myctophidarum) acutirostrum* n. sp. — HOLEC, 1975**

Holotype: P. 258—259, Pl. 1, Fig. 5a—b.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. 42 aa.
Stratigraphical range: Miocene (Badenian).

Roderosignus ichnog. nov. — MICHALÍK, 1977

Type species: *Roderosignus quinqueradialis* MICHALÍK, 1977, P. 340, Fig. 14(2).

***Roderosignus quinqueradialis* n. ichnospec. — MICHALÍK, 1977**

Holotype: P.340, Text.-fig. 14.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 11733.
Stratigraphical range: Triassic (Rhaetian).

Coelurosaurüchnus

***Coelurosaurüchnus tatricus* nov. ichnospec. — MICHALÍK—SÝKORA; in MICHALÍK—PLANDEROVÁ—SÝKORA, 1976**

Holotype: P. 304—305, Text-fig. 3.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava;
Stratigraphical range: Triassic (Rhaetian).

CONODONTS

Epigondolella MOSTLER, 1968

Epigondolella japonica ciernensis n. sp. KOZUR—MOCK, 1972b

Holotype: P. 3, Pl. 1, Fig. 9.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. I/1.
Stratigraphical range: Triassic (Ladinian).

Gondolella STAUFFER et PLUMMER, 1932

Gondolella carpathica n. sp. — MOCK, 1979

Holotype: P. 73—173, Pl. 1, Fig. 1—5.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. XXX/11.
Stratigraphical range: Triassic (Tuvalian).

Misikella n. gen. KOZUR—MOCK, 1974a

Type species: *Misikella longidentata* n. gen. n. sp., P. 135—136.

Misikella longidentata nov. gen. n. sp. — KOZUR—MOCK, 1974a

Holotype: P. 136—137, Pl. 1, Fig. 4.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. IV/1.
Stratigraphical range: Triassic (Norian).

Misikella posthernsteini — n. sp. — KOZUR—MOCK, 1974b

Holotype: P. 247—249, Fig. 1—2.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Triassic (Rhaetian).

Parvigondolella nov. gen. — KOZUR—MOCK, 1972b

Type species: *Parvigondolella andrusovi* nov. gen. n. sp., P. 4.

Parvigondolella andrusovi nov. gen. n. sp. — KOZUR et MOCK, 1972b

Holotype: P. 5, Pl. 1, Fig. 11.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. I/2.
Stratigraphical range: Triassic (Norian).

Parvigondolella lata n. sp. — KOZUR—MOCK, 1974a

Holotype: P. 137—138, Pl. 1, Fig. 8.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. IV/3.
Stratigraphical range: Triassic (Sevatian).

Prioniodina BASSLER, 1925

Prioniodina sweeti sweeti n. sp. — KOZUR—MOCK, 1972b

Holotype: P. 5—6, Pl. 3, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; No. I/3.
Stratigraphical range: Triassic (Norian).

ANNELIDA (SERPULIDS)

Propomatoceras WARE, 1975

Propomatoceras slavicus spec. nov. — ZIEGLER et MICHALÍK, 1980

Holotype: P. 634—636, Fig. 8.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18790.
Stratigraphical range: Triassic (Rhaetian).

Spiraserpula REGENHARDT, 1961

Spiraserpula mikesia spec. nov. — ZIEGLER et MICHALÍK, 1980

Holotype: P. 630—632, Fig. 2.
Depository: Deposited in the collections of the Slovak National Museum in Bratislava; No. SNM-Z 18788.
Stratigraphical range: Triassic (Rhaetian).

MICOPHYTAE

Colospongia LAUBE, 1865

Colospongia andrusovi n. sp. — JABLONSKÝ, 1975

Holotype: P. 267—268, 272, Pl. 1, Fig. 1—2.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Thin-section No. 4870.
Stratigraphical range: Middle Triassic.

Paleoguttulina LOCQUIN—MIŠÍK, gen. nov. — in MIŠÍK—LOCQUIN, 1983

Type species: *Paleoguttulina muranii* LOCQUIN—MIŠÍK, 1983, P. 169, Pl. 1—2. Pl. 1—2.

Paleoguttulina muranii LOCQUIN—MIŠÍK sp. nov. — in MIŠÍK—LOCQUIN, 1983

Holotype: Non established, P. 169, Pl. 1, Fig. 1—4; Pl. 2, Fig. 1—4.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Thin-section No. MM 8301.
Stratigraphical range: Cretaceous (Hauterivian — Barremian).

?PYRRHOPHYTA

Pentagonium obidum nov. gen. — SNOPKOVÁ—SAMUEL, 1982

Type species: *Pentagonium obidum* SNOPKOVÁ et SAMUEL, 1982, P. 123, Pl. 48, Fig. 1—3.

Pentagonium obidum n. sp. — SNOPKOVÁ—SAMUEL, 1982

Holotype: P. 132, Pl. 48, Fig. 1—3 (Detail Pl. 49, Fig. 1—2 and Pl. 50, Fig. 1).
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 1.
Stratigraphical range: Paleogene (Upper Eocene — Priabonian).

COCCOLITHOPHORIDS

Discoaster TAN SIN HOK, 1927

Discoaster floreus n. sp. — BYSTRICKÁ, 1964

Holotype: P. 212—213, Pl. 6, Fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Upper Eocene.

Discoaster lubinaensis n. sp. — BYSTRICKÁ, 1966

Holotype: P. 237—239, Text-fig. 1.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Prepar. P-26.
Statigraphical range: Eocene (Upper Lutetian).

Discoaster multiradiatus pedunculatus n. subsp. — BYSTRICKÁ, 1966

Holotype: P. 240. Text-fig. 10.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Prepar. No. P-139.
Stratigraphical range: Eocene (Upper Eocene).

Discoaster multiradiatus robustus n. subsp. — BYSTRICKÁ, 1966

Holotype: P. 239—240, Text-fig. 4.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava.
Stratigraphical range: Paleogene (Lower Eocene).

Discoaster triangularis n. sp. — BYSTRICKÁ, 1966

Holotype: P. 239, Text-fig. 8.
Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Prepar. No. P-327/J.
Stratigraphical range: Eocene (Upper Eocene).

Pontosphaera LOHMAN, 1902

Pontosphaera cornifera n. sp. — LEHOTAYOVÁ, 1979

Holotype: P. 161—162, Pl. 40, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 0908/75.
Stratigraphical range: Oligocene.

Reticulofenestra HAY, MOHLER—WADE, 1966

***Reticulofenestra excavata* n. sp. — LEHOTAYOVÁ, 1975**

Holotype: P. 39—40, Pl. 1, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Scanning-electron micrograph No. 0908/75.
Stratigraphical range: Neogene; Eggenburgian (Burdigalian).

Cruciplacolithus HAY et MOHLER, 1967

***Cruciplacolithus devinensis* nov. sp. — LEHOTAYOVÁ, 1970**

Holotype: P. 163, Pl. 19, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; electron micrograph No. 13/70.
Stratigraphical range: Neogene (Badenian).

DIATOMS

Actinocyclus EHRENBERG

***Actinocyclus boryanus* PANT. n. s. PANTOCSEK, 1905**

Holotype: P. 4, Pl. 30, Fig. 441.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Actinoptychus EHRENBERG

***Actinoptychus boryanus* n. s. — PANTOCSEK, 1903b.**

Holotype: P. 107, Pl. 22, Fig. 329.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Actinoptychus Petitić* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 7, Pl. 7, Fig. 112.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Actinoptychus Schmidtii **PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 7, Pl. 4, Fig. 65.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Actinoptychus Staubii **PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 8, Pl. 6, Fig. 88.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Actinoptychus Szontághii **n. s. — PANTOCSEK, 1903b**

Holotype: P. 110, Pl. 21, Fig. 321.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Alloeoneis SCHUM.

Alloeoneis Castracanei **n. s. — PANTOCSEK, 1903b**

Holotype: P. 56, Pl. 23, Fig. 344.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Amphora EHRENBERG, 1840

Amphora acuta **GREG. var.** ***neogena*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 9, Pl. 12, Fig. 187.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Amphora boryana **PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 9, Pl. 38, Fig. 531.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Amphora gigantea **GRUN. var.** ***andesitica*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 10, Pl. 17, Fig. 243.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Amphora Lima* A. SCHM. var. *fossilis* PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 11, Pl. 23, Fig. 347.
Depository: Unknown.
Stratigraphical range: Miocene—Pliocene.

***Amphora megapora* n. s. — PANTOCSEK, 1903b**

Holotype: P. 39, Pl. 29, Fig. 418.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Amphora Nova Caledonica* GRUN. var. *hungarica* PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 11, Pl. 15, Fig. 227.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Amphora staurophora* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 11, Pl. 15, Fig. 228.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Amphora vittata* PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 13, Pl. 22, Fig. 326.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Aulacodiscus

***Aulacodiscus boryanus* PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 16, Pl. 3, Fig. 43.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Biddulphia GRAY

***Biddulphia permagna* n. s. — PANTOCSEK, 1903b**

Holotype: P. 87, Pl. 25, Fig. 372 et Pars III, Pl. 35, Fig. 500.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Biddulphia permagna* n. sp. — PANTOCSEK, 1905**

Holotype: P. 87, Pl. 25, Fig. 372.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Biddulphia Tuomeyi* (BAIL.) ROP. var. *boryana* n. v. — PANTOCSEK, 1903b**

Holotype: P. 88 (2 zv.); Pl. 11, Fig. 185 (3. zv. — 1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Campylodiscus EHRENBERG

***Campylodiscus boryanus* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 23, Pl. 40, Fig. 550.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Campylodiscus Brassayi* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 23, Pl. 30, Fig. 443.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Campylodiscus Kidstonii* PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 26, Pl. 13, Fig. 200.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cerataulus EHRENBERG

***Cerataulus boryanus* PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 28, Pl. 29, Fig. 421; Pl. 32, Fig. 463.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cerataulus turgidus E.* var. *hispidissimus* PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 29, Pl. 27, Fig. 404.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Clavicula PANTOCSEK, 1903

Clavicula Kinkerii **PANT. nov. sp. — PANTOCSEK, 1905**

Holotype: P. 31, Pl. 3, Fig. 50.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Climacosphaenia EHRENBERG

Climacosphaenia moniligera **EHRBG. var.** ***hungarica*** **n. v. — PANTOCSEK, 1903b**

Holotype: P. 69, Pl. 30, Fig. 426.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cocconeis EHRENBERG, 1838

Cocconeis andesitica **PANT. sp. nov. — PANTOCSEK, 1905**

Holotype: P. 31, Pl. 10, Fig. 170.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cocconeis boryana **PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 31, Pl. 2, Fig. 33.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cocconeis californica **GRUN. var.** ***hungarica*** **PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 31, Pl. 10, Fig. 164.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cocconeis dubravicensis **PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 32, Pl. 36, Fig. 509.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cocconeis grunowii **n. s. — PANTOCSEK, 1903b**

Holotype: P. 59, Pl. 25, Fig. 364.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cocconeis Raeana n. s. — PANTOCSEK, 1903b

Holotype: P. 60, Pl. 24, Fig. 354.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Coscinodiscus EHRENBERG

Coscinodiscus Boeckhii PANT. nov. spec. PANTOCSEK, 1905

Holotype: P. 35, Pl. 35, Fig. 497.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Coscinodiscus Debyi n. s. — PANTOCSEK, 1903b

Holotype: P. 119, Pl. 26, Fig. 378.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella AGARDH, 1830

Cymbella abnormis GRUN. var. *fossilis* PANT. n. v. — PANTOCSEK, 1905

Holotype: P. 39, Pl. 17, Fig. 255.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella cistula (E.) HEMPR. var. *hungarica* PANT. n. v. — PANTOCSEK, 1905

Holotype: P. 40, Pl. 3, Fig. 40.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella clementis PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 41, Pl. 20, Fig. 303.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cymbella cymbiformis* var. *dorse — punctata* ŘEHÁKOVÁ var. n. — ŘEHÁKOVÁ, 1980**

Holotype: P. 151—152, Pl. 17, Fig. 1.
Depository: ÚÚG; Prepar. No. 1044.
Stratigraphical range: Neogene (Upper Miocene).

***Cymbella cymbiformis E.* var. *producta* PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 41, Pl. 10, Fig. 174.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cymbella dubravicensis* GRUN. — fide PANTOCSEK, 1905**

Holotype: P. 41, Pl. 17, Fig. 251.
Depository: Unknown.
Stratigraphical range: Miocene—Pliocene.

***Cymbella Grunowii* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 42, Pl. 19, Fig. 283.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cymbella lanceolata E.* var. *fossilis* PANT. nov. var. PANTOCSEK, 1905**

Holotype: P. 43, Pl. 23, Pl. 344.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cymbella latestriata* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 43, Pl. 1, Fig. 9; Pl. 21, Fig. 316.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cymbella obtusa* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 43, Pl. 5, Fig. 79.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Cymbella pachyptera* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 43, Pl. 23, Fig. 304.

Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella plutonica PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 44, Pl. 20, Fig. 297.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella simplex PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 45, Pl. 21, Fig. 308.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella Staubii PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 45, Pl. 8, Fig. 131.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella turgida PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 46, Pl. 6, Fig. 103.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Cymbella vegeta PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 46, Pl. 24, Fig. 359.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Dimeregramma RALFS.

Dimeregramma boryanum n. s. — PANTOCSEK, 1903b

Holotype: P. 47, Pl. 23, Fig. 343.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Epithemia BRÉBISSON, 1838

Epithemia gibba (E.) **KG. var.** ***boryana*** **n. v. — PANTOCSEK, 1903b**

Holotype: P. 61 (1903b); Pl. 41, Fig. 558 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Epithemia gibberula **GRUN. var.** ***perlonga*** **n. v. — PANTOCSEK, 1903b**

Holotype: P. 61 (1903b); Pl. 10, Fig. 175 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Eudictya EHRENBERG

Eudictya boryana **n. s. — PANTOCSEK, 1903b**

Holotype: P. 116, Pl. 26, Fig. 384.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Eunotia EHRENBERG, 1837

Eunotia flexuosa **KG. var.** ***trachytica*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 51, Pl. 5, Fig. 80.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Eunotia gracilis (E.) **RAB. var.** ***fossilis*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 52, Pl. 24, Fig. 369.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Eunotia pectinalis **(KG.) RBH. var.** ***trachytica*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 52, Pl. 12, Fig. 197.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Gomphonema AGARDH, 1824

***Gomphonema dubravicensis* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 54, Pl. 20, Fig. 294.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Haynaldella PANT. nov. gen. et spec. — PANTOCSEK, 1905

Type species: *Haynaldella antiqua* n. gen. et spec. P. 57.

***Haynaldella antiqua* PANT. n. g. et spec. — PANTOCSEK, 1905**

Holotype: P. 57, Pl. 32, Fig. 459.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Hydrosera WALL.

***Hydrosera boryana* n. s. — PANTOCSEK, 1903b**

Holotype: P. 83, Pl. 30, Fig. 428.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Hydrosera boryana* n. s. *forma hexagona* — PANTOCSEK, 1903b**

Holotype: P. 83, Pl. 30, Fig. 428.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Mastogloia THWAIT.

***Mastogloia Szontághii* n. s. — PANTOCSEK, 1903b**

Holotype: P. 42, Pl. 29, Fig. 416.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Melosira AGARDH, 1824

***Melosira arenaria* MORE var. *hungarica* n. v. — PANTOCSEK, 1903b**

Holotype: P. 78 (1903b); Pl. 39, Fig. 546 (1905); Pl. 40, Fig. 555.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Melosira crenulata* KG. var. *debilis* PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 60, Pl. 22, Fig. 328.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Melosira granulata (E.)* RALFS var. *boryana* PANT. n. v.**

Holotype: P. 60, Pl. 7, Fig. 6,
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Melosira undulata (E.)* KG. var. *minor* n. v. — PANTOCSEK, 1905**

Holotype: P. 80 (1903b); Pl. 7, Fig. 118 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Melosira undulata* var. *triocellata* ŘEHÁKOVÁ, var. n. — ŘEHÁKOVÁ, 1980**

Holotype: P. 97—98, Pl. 2, Fig. 7—8.
Depository: ÚÚG; Prepar. No. 1047.
Stratigraphical range: Neogene (Upper Miocene).

Navicula BORY, 1822

***Navicula andesitica* n. s. — PANTOCSEK, 1903b**

Holotype: P. 43, Pl. 27, Fig. 390.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula bimaculata* n. s. — PANTOCSEK, 1903b**

Holotype: P. 44, Pl. 23, Fig. 346.

Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula boryana* n. s. — PANTOCSEK, 1903b**

Holotype: P. 44, Pl. 28, Fig. 407.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula carpathorum* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 65, Pl. 17, Fig. 246.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula halionata* PANT. var. *minor* n. v. — PANTOCSEK, 1903b**

Holotype: P. 47, Pl. 26, Fig. 381.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula Haynaldii* n. s. — PANTOCSEK, 1903b**

Holotype: P. 48, Pl. 24, Fig. 361.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula Hornigii* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 70, Pl. 16, Fig. 241.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula illustra* PANT. n. s. — PANTOCSEK, 1905**

Holotype: P. 70, Pl. 2, Fig. 17.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Navicula irregularis* n. s. — PANTOCSEK, 1903b**

Holotype: P. 50, Pl. 30, Fig. 424.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula Jarrensis **GRUN. var.** ***gracilior*** **n. v. — PANTOCSEK, 1903b**

Holotype: P. 56, Pl. 21, Fig. 323.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula Kellerii **n. s. — PANTOCSEK, 1903b**

Holotype: P. 50, Pl. 23, Fig. 351.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula latissima **GRG. var.** ***capitata*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 72, Pl. 32, Fig. 461.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula Le Tourneurii **n. s. — PANTOCSEK, 1903b**

Holotype: P. 51, Pl. 24, Fig. 358.
Depository: Unknown.
Stratigraphical range: Miocene—Pliocene.

Navicula major **KG. var.** ***andesitica*** **PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 73, Pl. 7, Fig. 113.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula mastogloidea **PANT. n. s. — PANTOCSEK, 1903b**

Holotype: I Ed. 2; 29, 21, Fig. 292.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula mesolepata (E.) **KG. var.** ***boryana*** **PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 75, Pl. 21, Fig. 312.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula mocsarensis **PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 75, Pl. 23, Fig. 340.

Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula neogena PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 75, Pl. 17, Fig. 252, Pl. 25, Fig. 372.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula Neumayeriana PANT. n. s. — PANTOCSEK, 1905

Holotype: P. 75, Pl. 4, Fig. 64.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula migricans PANT. n. s. — PANTOCSEK, 1905

Holotype: P. 76, Pl. 40, Fig. 552.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula praeflua PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 79, Pl. 15, Fig. 232.
Depositiry: Unknown.
Statigraphical range: Miocene-Pliocene.

Navicula Rattrayi PANT. n. s. — PANTOCSEK, 1903b

Holotype: P. 54, Pl. 30, Fig. 427.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula scythica PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 81, Pl. 23, Fig. 335.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula seriosa PANT. nov. spec. — PANTOCSEK, 1905

Holotype: P. 81, Pl. 32, Fig. 464.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula turgidula **PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 83, Pl. 32, Fig. 462.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Navicula viridis (E.) **KG. var.** ***fossilis*** **PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 84, Pl. 7, Fig. 193.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Odontella (AG.) GRUN.

Odontella boryana **n. s. — PANTOCSEK, 1903b**

Holotype: P. 89, Pl. 6, Fig. 89.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Odontella pygmaea **PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 85, Pl. 35, Fig. 493.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Orthoneis GRUN.

Orthoneis notata **n. s. — PANTOCSEK, 1903b**

Holotype: P. 58, Pl. 27, Fig. 392.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Paralia HEIBG.

Paralia Debyi **PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 86, Pl. 33, Fig. 475.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Peronia

Peronia ? boryana **PANT. n. s. — PANTOCSEK, 1905**

Holotype: P. 87, Pl. 8, Fig. 126.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Pinnularia EHRENBERG, 1843

Pinnularia major **var.** ***andesitica*** **f.** ***inferrupta*** **ŘEHÁKOVÁ f. n. — ŘEHÁKOVÁ, 1980**

Holotype: P. 145, Pl. 16, Fig. 1.
Depository: Deposited at the Central Geological Institute in Prague. Prepar. No. 1439.
Stratigraphical range: Upper Miocene — Lower Pliocene.

Plagiogramma GREV.

Plagiogramma ? boryanum **n. s. — PANTOCSEK, 1903b**

Holotype: P. 63 (1903b); Pl. 4, Fig. 55 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Plagiogramma Truanii **n. s. — PANTOCSEK, 1903b**

Holotype: P. 63 (1903b); Pl. 15, Fig. 224, Pl. 24, Fig. 351 (1905).
Depository: Unknown.
Stratigrpahical range: Miocene-Pliocene.

Podosira EHRENBERG

Podosira boryana **n. s. — PANTOCSEK, 1903b**

Holotype: P. 82, Pl. 25, Fig. 362.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Podosira constricta **PANT. n. s. — PANTOCSEK, 1905**

Holotype: P. 88, Pl. 33, Fig. 477; Pl. 36, Fig. 506.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Rhaphoneis EHRENBERG

***Rhaphoneis boryana* n. s. — PANTOCSEK, 1903b**

Holotype: P. 64, Pl. 28, Fig. 400.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Rhaphoneis ? Lorenziana* GRUN. var. *minor* PANT. n. v. — PANTOCSEK, 1903b**

Holotype: P. 65, Pl. 28, Fig. 401.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Salacia nov. gen. — PANTOCSEK, 1903b
P. 69

***Salacia boryana* n. s. — PANTOCSEK, 1903b**

Holotype: P. 70, Pl. 23, Fig. 341.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Stauroneis EHRENBERG, 1843

***Stauroneis boryana* PANT. n. s. — PANTOCSEK, 1905**

Holotype: P. 94, Pl. 5, Fig. 78.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Stauroneis Szontághii* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 95, Pl. 8, Fig. 143.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Stauroneis Grunowii* PANT. n. s. — PANTOCSEK, 1905**

Holotype: P. 95, Pl. 4, Fig. 66.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Stictodiscus GREV.

***Stictodiscus boryanus* n. s. — PANTOCSEK, 1903b**

Holotype: P. 113, Pl. 25, Fig. 371.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Surillella TURPIN, 1828

***Surillella fastuosa* E. var. *fossilis* n. v. PANTOCSEK, 1903b**

Holotype: P. 71 (1903b); Pl. 31, Fig. 450 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Surillella salsa* W. SM var. *hungarica* PANT. n. v. — PANTOCSEK, 1905**

Holotype: P. 101, Pl. 22, Fig. 325.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Surillella tenera* GREG. var. *fossilis* PANT. PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 102, Pl. 11, Fig. 176.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Surillella Vaszaryi* PANT. PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 103, Pl. 30, Fig. 431.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Synedra EHRENBERG, 1830

***Synedra crystallina* W.S. var. *fossilis* — PANTOCSEK, 1903b**

Holotype: P. 65, Pl. 28, Fig. 402.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Synedra dubravicensis* PANT. nov. spec. — PANTOCSEK, 1905**

Holotype: P. 104, Pl. 21, Fig. 320.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Synedra Ulna* (NITZSCH) E. var. *fossilis* PANT. nov. var. — PANTOCSEK, 1905**

Holotype: P. 104, Pl. 24, Fig. 370.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Tetracyclus RALFS, 1843

***Tetracyclus lacustris* RALFS var. *fossilis* n. v. — PANTOCSEK, 1905**

Holotype: P. 105, Pl. 3, Fig. 42, Pl. 4, Fig. 62, Pl. 5, Fig. 71.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

Triceratium EHRENBERG,

***Triceratium boryanum* n. s. — PANTOCSEK, 1903b**

Holotype: P. 90, (1903b); Pl. 33, Fig. 476.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Triceratium horridum* n. s. *forma tetragona* — PANTOCSEK, 1903b**

Holotype: P. 92, Pl. 25, Fig. 368.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Triceratium hungaricum* PANT. nov spec. — PANTOCSEK, 1905**

Holotype: P. 110, Pl. 17, Fig. 250.
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Triceratium junctum* A. S. var *fossilis* n. v. — PANTOCSEK, 1903b**

Holotype: P. 92 (1903b), Pl. 34, Fig. 480; Pl. 35, Fig. 502 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

***Triceratium Pileus* E. var. *robustior* n. v. — PANTOCSEK, 1903b**

Holotype: P. 95 (1903b); Pl. 42, Fig. 574 (1905).
Depository: Unknown.
Stratigraphical range: Miocene-Pliocene.

ALGAE

Aciculella PIA, 1930 emend. BYSTRICKÝ, 1975

Type species: *Aciculella bacillum* PIA, 1930 var. *Bacillum*

***Aciculella bacillum* nov. spec. — PIA, 1927 in M. HIRMER,**
P. 86 — nom. nud.

***Aciculella bacillum* PIA, 1930, P. 180, Pl. 4, Fig. 7—9, emend. BYSTRICKÝ, 1975, P. 4—7.**

Lectotyp: J. Pia (1930), Pl. 4, Fig. 8.
Depository: Unknown.
Stratigraphical range: Triassic (Ladinian).

***Aciculella bacillum* PIA var. *perforata*, var. nov. — BYSTRICKÝ, 1975**

Holotype: P. 7—8, Pl. 3, Fig. 6.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 1541.
Stratigraphical range: Triassic (Ladinian).

***Aciculella nikleri* sp. nov. — BYSTRICKÝ, 1975**

Holotype: P. 13, Pl. 2, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 4135.
Stratigraphical range: Triassic (Norian).

***Aciculella pantici* sp. nov. — BYSTRICKÝ, 1975**

Holotype: P. 8—10, Pl. 3, Fig. 10.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 633.
Stratigraphical range: Triassic (Ladinian).

***Aciculella sokaci* sp. nov. — BYSTRICKÝ, 1975**

Holotype: P. 11—13, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 4280.
Stratigraphical range: Triassic (Norian).

Aciculella spiculiformis sp. nov. — BYSTRICKÝ, 1975

Holotype: P. 10—11, Pl. 2, Fig. 9.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section 2841.
Stratigraphical range: Triassic (Carnian).

Andrusoporella nov. gen. — BYSTRICKÝ, 1962

Type species: *Andrusoporella fusani* nov. sp., P. 230 (resp. 237), Pl. 3, Fig. 5.

Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. V-3428/M.
Stratigraphical range: Triassic (Ladinian).

Dactylopora LAMARCK, 1816

Dactylopora deloffi sp. nov. — BYSTRICKÝ, 1976a

Holotype: P. 256—258, Pl. 3, Fig. 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 5240.
Stratigraphical range: Paleogene.

Dactylopora gusici sp. nov. — BYSTRICKÝ, 1976a

Holotype: P. 254, 256, Pl. 2, Fig. 1, 1a.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 5179.
Stratigraphical range: Paleogene (Paleocene).

Didemmum SAVIGNY, 1816

Didemmum carpaticum n. sp. — MIŠÍK—BORZA, 1978

Holotype: P. 320—322, Pl. 4, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Science in Bratislava; Thin-section No. 2103.
Stratigraphical range: Jurassic (Tithonian).

Digitella MORELLER et MORELLET, 1913

***Digitella radoicicae* sp. nov. — BYSTRICKÝ, 1976a**

Holotype: P. 258, 260—261, Pl. 3, Fig. 1, 1a.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 2877.
Stratigraphical range: Paleogene (Paleocene).

Diplopora SCHAFHÄUTL, 1863

***Diplopora borzai* nov. sp. — BYSTRICKÝ, 1978**

Holotype: P. 328, 331—336, Pl. 1, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5507.
Stratigraphical range: Triassic (Carnian).

Globochaete LOMBARD, 1945

***Globochaete hronica* n. sp. — BORZA, 1975**

Holotype: P. 204, 206, Pl. 1, Fig. 11—12.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5278.
Stratigraphical range: Triassic (Norian).

Gyroporella GÜMBEL, 1872 emend. BENECKE, 1876

***Gyroporella ladinica* sp. nov. — BYSTRICKÝ, 1962**

Holotype: P. 228—230 (resp. 236—237), Pl. 3, Fig. 4.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 1025.
Stratigraphical range: Triassic (Upper Ladinian).

Macroporella PIA, 1912

***Macroporella spectabilis* sp. nov. — BYSTRICKÝ, 1962**

Holotype: P. 227—228 (resp. 235—236), Pl. 3, Fig. 1.

Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 1528.
Stratigraphical range: Triassic (? Uppermost Ladinian).

Munieria DEECKE, 1883

***Munieria grambasti* sp. nov. — BYSTRICKÝ, 1976b**

Holotype: P. 48—63, Pl. 1, Fig. 6—7, 10—12, Pl. 2, Fig. 1, 4, 14—16, 18, 20—21, 25.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 4368.
Stratigraphical range: Cretaceous.

Muranella n. gen. — BORZA, 1975

Type species: *Muranella sphaerica* n. gen., n. sp.; P. 228 — BORZA, 1975.

***Muranella sphaerica* n. gen., n. sp. — BORZA, 1975**

Holotype: P. 228—230, Pl. 7, Fig. 9—10.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5618.
Stratigraphical range: Triassic (Carnian).

Petrascula GÜMBEL, 1873

***Petrascula stratenica* sp. nov. — BYSTRICKÝ, 1979**

Holotype: P. 330, 332—333, Pl. 7, Fig. 1.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Thin-section No. 5966.
Stratigraphical range: Triassic (Norian).

Pieninia n. gen. — BORZA—MIŠÍK, 1976

Type species: *Pieninia oblonga* n. sp. — BORZA—MIŠÍK, 1976, P. 65.

***Pieninia oblonga* n. sp. — BORZA—MIŠÍK, 1976**

Holotype: P. 65—70, Pl. 1, Fig. 1—2.

Depository: Deposited at the Department of Geology and Paleontology of the Faculty of Natural Sci. of the Comenius University in Bratislava; Thin-section No. 6151.
Stratigraphical range: Cretaceous (Barremian-Aptian).

Pleurozonaria WETZEL, 1933

***Pleurozonaria fusani* n. sp. — SNOPKOVÁ—SAMUEL, 1981**

Holotype: P. 150, Pl. 50, Fig. 3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava;
Stratigraphical range: Paleogene (Upper Eocene — Lower Oligocene).

***Pleurozonaria kedvesi* n. sp. — SNOPKOVÁ—SAMUEL, 1981**

Holotype: P. 150—151, Pl. 51, Fig. 2—3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Paleogene (Upper Eocene — Lower Oligocene).

Plexoramea n. gen. — MELLO, 1977

Type species: *Plexoramea cerebriformis*, P. 190—192, Pl. 91, Fig. 1.

***Plexoramea cerebriformis* n. g. n. sp. — MELLO, 1977**

Holotype: P. 191—192, Pl. 91, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Thin-section No. 51—78.
Stratigraphical range: Triassic (Ladinian).

PALYNOMORPHS

Annulopollis nov. gen. — ČORNA, 1968, P. 252.

Type species: *Annulopollis carpatiensis* sp. nov., P. 252, Pl. 8, Fig. 6—8.

***Annulopollis carpatiensis* sp. nov. — ČORNA, 1968**

Holotype: P. 252, Pl. 8, Fig. 6—8.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Prepar. No. 156.
Stratigraphical range: Cretaceous (Aptian — Albian).

Compositoipollenites R. POT., 1951

***Compositoipollenites cirsioides* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 265, Pl. 44, Fig. 11—14.
Depository: Deposited at D. Štúr Institute of Geology in Bratislava; No. of the cross--table 420/111.
Stratigraphical range: Pliocene (Rumanian).

Distanulisporites KLAUS, 1960

***Distanulisporites tomanovae* n. sp. — PLANDEROVÁ, in J. MICHALÍK—E. PLANDEROVÁ—M. SÝKORA, 1976**

Holotype: P. 309, 312, Pl. 4, Fig. 1—3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava.
Stratigraphical range: Triassic (Rhaetian).

Florinites S. W. B., 1944

***Florinites visendis* n. sp. — PLANDEROVÁ 1982**

Holotype: P. 122—123, Pl. 46, Fig. 5.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. 395/15.
Stratigraphical range: Carboniferous (Viséan).

Intratriporopollenites TH. et PH., 1953

***Intratriporopollenites maii* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 235—236, Pl. 19, Fig. 4—5.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 4/39, 10/119.
Stratigraphical range: Pliocene.

Karpatisporites n. g. — PLANDEROVÁ, 1973

Type species: *Karpatisporites sittleri* n. fsp., P. 162, Pl. 4, Fig. 18—19.

***Karpatisporites gracilis* n. fsp. — PLANDEROVÁ, 1973**

Holotype: P. 164, Pl. 7, Fig. 1—9.

Depository: Deposited at the D. Štúr Institute; Prep. 18, No. of the cross-table 8/25, 3/105.
Stratigraphical range: Permian (Upper Permian).

Karpatisporites minimus n. fsp. — PLANDEROVÁ, 1973

Holotype: P. 164, Pl. 7, Fig. 14—15.
Depositiry: Deposited at the D. Štúr Institute of Geology in Bratislava; Prep. 27, No. of the cross-table 0/13, 2/102.
Stratigraphical range: Permian (Upper Permian).

Karpatisporites oblonga n. fsp. — PLANDEROVÁ, 1973

Holotype: P. 163, Pl. 7, Fig. 10.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prep. 31, No. of the cross-table 6/17, 2/107.
Stratigraphical range: Permian (Upper Permian).

Karpatisporites sittleri n. fsp. — PLANDEROVÁ, 1973

Holotype: P. 163, Pl. 7, Fig. 16—19.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prep. 44, No. of the cross-table 1/15, 2/130.
Stratigraphical range: Permian (Upper Permian).

Liquidambarpollenites RAATZ, 1937

Liquidambarpollemites carpatians n. fsp. — PLANDEROVÁ, 1973

Holotype: P. 252, Pl. 34, Fig. 5—6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0,32, 2/112.
Stratigraphical range: Neogene (Pontian).

Periporopollenites THOMSON et PFLUG, 1953 emend KRUTZSCH, 1966

Periporopollenites komjatensis nov. sp. — SNOPKOVÁ—PETERČÁKOVÁ, 1982

Holotype: P. 128, Pl. 47, Fig. 1—10.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 1, cross-table 23, 7, 98, 7.
Stratigraphical range: Eocene (Upper Eocene — Priabonian).

***Periporopollenites nigricans* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 263, Pl. 43, Fig. 1—3.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0,38, 2114.
Stratigraphical range: Neogene (Pontian).

Podocarpidites COOKSON ex COUPER 1958

***Podocarpidites crassiformis* n. sp. — ČORNA, 1968**

Holotype: P. 244—246, Pl. 6, Fig. 1—2.
Depository: Deposited at Geological Institute of the Slovak Academy of Sci. in Bratislava; Prep. No. 162.
Stratigraphical range: Albian.

Polygalacearumpollenites NAGY, 1969

***Polygalacearumpollenites granulatus* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 251—252, Pl. 34, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0.39, 2 (117).
Stratigraphical range: Neogene (Pontian).

Potonieisporites

***Potonieisporites doubingeri* n. sp. — PLANDEROVÁ, 1980**

Holotype: P. 81—82, Pl. 55, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 211.
Stratigraphical range: Permian (Autunian).

***Potonieisporites minimus* n. sp. — PLANDEROVÁ, 1980**

Holotype: P. 84, Pl. 64, Fig. 1—6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 198.
Stratigraphical range: Permian (Autunian).

***Potonieisporites schwartsmani* n. sp. — PLANDEROVÁ, 1980**

Holotype: P. 83—84, Pl. 62, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 190.
Stratigraphical range: Permian (Autunian).

***Potonieisporites sivaki* n. sp. — PLANDEROVÁ, 1980**

Holotype: P. 83, Pl. 59, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 153.
Stratigraphical range: Permian (Autunian).

***Potonieisporites rotundus* n. sp. — PLANDEROPVÁ, 1980**

Holotype: P. 80—81, Pl. 51, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 178.
Stratigraphical range: Permian (Autunian).

Lusatisporis KRUTZSCH, 1963

***Lusatisporis slovenicus* n. sp. — PLANDEROVÁ, 1970 (in J. GAŠPARIK—E. PLANDEROVÁ, 1970)**

Holotype: P. 153, Pl. 1, Fig. 8—12.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. A.
Stratigraphical range: Neogene (Sarmatian).

Retitriletes (HAMMEN, 1956 ex PIERCE, 1961) EMEND (DÖ., W. KR., MAI et SCH., 1963).

***Retitriletes clavoferoides* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 224, Pl. 3, Fig. 1.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 7 (49, 3).
Stratigraphical range: Pliocene.

***Retitriletes moraviensis* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 223, Pl. 2, Fig. 7.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 5/116, 0/32.
Stratigraphical range: Neogene (Pontian).

Salixipollenites SRIVASTAVA, 1966

***Salixipollenites reticulatus* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 24, Pl. 29, Fig. 1—3.

Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0,37/2/109.
Stratigraphical range: Pliocene (Upper Pliocene).

Salixipollenites ulotrichii n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 245, Pl. 28, Fig. 16—19.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0,29/7/113.
Stratigraphical range: Neogene (Pontian).

Salixipollenites verus n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 245, Pl. 23, Fig. 13—15.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 7/35, 2/109.
Stratigraphical range: Pliocene.

Slovakipollis W. KR., 1962

Slowakipollis pliocaenicus n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 249, Pl. 33, Fig. 10—12.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 3/29, 0/113.
Stratigraphical range: Pliocene (Upper Pliocene).

Slowakipollis klausii n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 250, Pl. 33, Fig. 7—9.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0/38, 1/115.
Stratigraphical range: Neogene (Pontian).

Slowakipollis panonicus n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 250, Pl. 32, Fig. 1—6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0/44, 2/120.
Stratigraphical range: Neogene (Pontian).

Striomonosaccites BHARADW. 1962

Striomonosaccates striatus n. sp. — PLANDEROVÁ, 1980.

Holotype: P. 67, Pl. 69, Fig. 1—2.

Depository: Deposited at the D. Štúr, Institute of Geology in Bratislava; Prepar. No. 12.
Stratigraphical range: Permian (Autunian).

Striomonosaccites major n. sp. — PLANDEROVÁ, 1980

Holotype: P. 88, Pl. 73, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 232.
Stratigraphical range: Permian (Autunian).

Striomonosaccites nigratus n. sp. — PLANDEROVÁ, 1980

Holotype: P. 86, Pl. 67, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 44.
Stratigraphical range: Permian (Autunian).

Striomonosaccites oslavanensis n. sp. — PLANDEROVÁ, 1980

Holotype: P. 87, Pl. 71, Fig. 1, 2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 12.
Stratigraphical range: Permian (Autunian).

Triatriopollenites PFLUG, 1953

Triatriopollenites foveolatis n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 243—244, Pl. 27, Fig. 10—12.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 3/42, 7/112.
Stratigraphical range: Neogene (Pontian).

Tricolporopollenites PFLUG et THOMSON, 1953

Tricolpopollenites nagyi n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 257, Pl. 38, Fig. 9—13.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 0,39, 2/112.
Stratigraphical range: Neogene (Pontian).

Tricolpopollenites nigricans n. fsp. — PLANDEROVÁ, 1972

Holotype: P. 256—257, Pl. 37, Fig. 22—23.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 3/110, 5/49.
Stratigraphical range: Neogene (Pontian).

***Tricolporopollenites grandis* n. sp. — PLANDEROVÁ, 1970 (in J. GAŠPARIK—E. PLANDEROVÁ, 1970)**

Holotype: P. 142—143, Pl. 15, Fig. 5—6.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 9.
Stratigraphical range: Neogene (Sarmatian).

***Tricolporopollenites handlovensis* n. sp. — PLANDEROVÁ, 1970 (in J. GAŠPARIK —E. PLANDEROVÁ, 1970)**

Holotype: P. 154, resp. 141—142, Pl. 13, Fig. 12—14.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 5.
Stratigraphical range: Neogene (Sarmatian).

***Tricolporopollenites slovakensis* n. fsp. — PLANDEROVÁ, 1972**

Holotype: P. 260, Pl. 40, Fig. 1—2.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; No. of the cross--table 6/10, 1/101.
Stratigraphical range: Neogene (Pontian).

Trivestibulopollenites PFLUG, 1953

***Trivestibulopollenites karpatiensis* n. sp. — PLANDEROVÁ, 1970 (in J. GAŠPARIK —E. PLANDEROVÁ)**

Holotype: P. 153—154, Pl. 7, Fig. 12—13.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 6.
Stratigraphical range: Neogene (Sarmatian).

MACROFLOORS

Acer

***Acer jurenaki* n. sp. — STÚR, 1867**

Holotype: P. 195, Pl. 3, Fig. 5—7 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Neogene (Upper).

***Acer palaeosaccharinum* n. sp. — STÚR, 1867**

Holotype: P. 177—178, Pl. 3, Fig. 8. (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Neogene (Upper).

***Acer sanctae crucis* n. sp. — STÚR, 1867**

Holotype: P. 178—179, Pl. 3, Fig. 9—12 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Neogene (Upper).

Hakea

***Hakea schemnitziensis* n. sp. — STÚR, 1867**

Holotype: P. 189, Pl. 3, Fig. 17 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Neogene (Upper).

Phragmites

***Phragmites ungeri* n. sp. — STÚR, 1867**

Holotype: P. 137—138, Pl. 1, Fig. 4—8. (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Neogene (Upper).

Potamogeton

***Potamogeton martinianus* n. sp. — SITÁR, 1969**

Holotype: P. 112—113, Pl. 22, Fig. 2.
Depository: Unknown.
Stratigraphical range: Neogene (Sarmatian — Pannonian).

Rhus

***Rhus palaeoradicans* n. sp. — STÚR, 1867**

Holotype: P. 183, Pl. 3, Fig. 13 (On the basis of monotype).
Depository: Unknown.
Stratigraphical range: Neogene.

Typha

***Typha ungeri* n. sp. — STÚR, 1867**

Holotype: P. 143—146, Pl. 3, Fig. 22—32.
Depository: Unknown.
Stratigraphical range: Neogene (Upper).

Thuioxglon

Thuioxglon hlinikianum Unger (fide D. STÚR 1867)

Holotype and depository: Unknown.

INCERTAE SEDIS

Carpatochitinoides PLANDEROVÁ, n. gen.

Type species: *Carpatochitinoides bilinguis* PLANDEROVÁ, N. sp. — PLANDEROVÁ, 1975, P. 246, Pl. 1, Fig. 1—7.

Carpatochitinoides bilinguis PLANDEROVÁ, n. sp. — PLANDEROVÁ, 1975

Holotype: P. 246, 248, Pl. 1, Fig. 1—7.
Depository: Deposited at the D. Štúr Institute of Geology in Bratislava;
Stratigraphical range: Triassic (Rhaetian) — Liassic.

Carpatochitinoides cretaceus GAŠPARIKOVÁ, n. sp. — GAŠPARIKOVÁ, 1975

Holotype: Deposited at the D. Štúr Institute of Geology in Bratislava; Prepar. No. 310.
Stratigraphical range: Cretaceous (Santonian).

References

ALLOITEAU, J. 1949: Les Coraux de l'Éocène de Bojnice — les-bains près de Prievidza dans les Karpates Slovaques. Práce Štát. geol. Úst., Zošit 24, Bratislava, 1—30, Pl. 1—8.

ANDRUSOV, D. 1931: Etude geologique de la zone des Klippes internes des Carpathes Occidentales. II. Par.: Stratigraphie (Trias et Lias). Rozpr. Stát. geol. Úst. ČSR, 13, Praha, 85—167, Pl. 1—9.

ANDRUSOV, D. 1953: Nové paleontologické nálezy v karpatskom paleogéne. Geol. Sbor. Slov. Akad. Vied, 4, 1—2, Bratislava, 431—496.

ANDRUSOV, D. 1976: Neue Rudistenfaune aus den Westkarpaten und vom Ochridsee. Geol. Zbor. Geol. carpath. 27, 1, Bratislava, 11—34, Fig. 1—20.

BÍLEK, K. 1966: Burdigalská fauna chropovských slepenců. (Die Fauna des Burdigal in des Chropov-konglomeraten). Geol. Práce, Správy 40, Bratislava, 5—38, Pl. 1—5.

BORZA, K. 1964: Die Gattung Stomiosphaera Wanner, 1940 in den Westkarpaten. Geol. Zbor. 15, 2, Bratislava, 189—195, Pl. 1—2.

BORZA, K. 1966: Neue Arten der Gattung Chitinoidella Doben, 1962 in den Westkarpaten. Geol. Zbor. 17, 2, Bratislava, 259—263, Pl. 9—10.

BORZA, K. 1969: Die Microfazies und Microfossilien des Oberjuras und der Unterkreide der Klippenzone der Westkarpaten. Vyd. Slov. Akad. Vied (Verlag Slov. Akad. Wissenschaf.), Bratislava, 1—301, Pl. 1—88.

BORZA, K. 1971: Praeccalpionellopsis gemeriensis n. gen., aus der Oberen Trias der Westkarpaten. Geol. Zbor. Geol. carpath. 22, 1, Bratislava, 131—135, Fig. 1—6.

BORZA, K. 1972: Neue Arten der Gattungen Cadosina Wanner, Pithonella Lorenz und Palinosphaera Reinsch aus der Oberen Kreide. Geol. Zbor. Geol. carpath. 23, 1, Bratislava, 139—150, Fig. 1—42.

BORZA, K. 1975: Mikroproblematika aus der Trias der Westkarpaten. Geol. Zbor. Geol. carpath. 26, 2, Bratislava, 199—236, Pl. 1—8.

BORZA, K. 1979: Tintinnina aus dem oberen Apt und unteren Alb der Westkarpaten. Geol. Zbor. Geol. carpath. 30, 3, Bratislava, 341—361, Pl. 1—5.

BORZA, K. 1980: Cadosina minuta n. sp. aus der unteren Kreide der Westkarpaten. Geol. Zbor. Geol. carpath. 31, 3, Bratislava, 363—366.

BORZA, K. 1981: Sturiella nov. gen. (Calpionellidae Bonet, 1956) aus der unteren Kreide der Westkarpaten. Záp. Karpaty, Sér. Paleont. 6, Bratislava, 93—97, Pls. 35—36.

BORZA, K. 1984: Cadosinopsis nowaki n. sp. (Incertae sedis) from the Lower Cretaceous of West Carpathians. Geol. Zbor. Geol. carpath. 35, 5, Bratislava, 649—661, Pl. 1—3.

BORZA, K.—MIŠÍK, M. 1976: Pieninia oblonga n. gen., n. sp. aus kretazischen und paläogenen Kalken der Westkarpaten. Geol. Zbor. Geol. carpath. 27, 1, Bratislava, 65—77, Pl. 1—4.

BORZA, K.—SAMUEL, O. 1977a: New genera and species (incertae sedis) from the Upper Triassic in the West Carpathians. Geol. Zbor. Geol. carpath. 28, 1, Bratislava, 95—119, Pl. 1—7.

BORZA, K.—SAMUEL, O. 1977b: Paratintinnina tintinniformis and P. tulipaformis nov. gen. et nov. sp. (Incertae sedis) from Upper Triassic limestones of West Carpathians (Czechoslovakia). Záp. Karpaty, Sér. Paleont. 2—3, Geol. Úst. D. Štúra, Bratislava, 143—150, Pl. 69—70.

BORZA, K.—SAMUEL, O. 1978: Pseudocucurbita nov. gen. (Incertae sedis) from the upper Triassic of the West Carpathians (Czechoslovakia). Geol. Zbor. Geol. carpath. 29, 1, Bratislava, 67—75, Pl. 1—2.

BRESTENSKÁ, E. 1977: Thekamöben (Protozoa) des Neogens vom Kessel Turiec. Záp. Karpaty, Sér. Paleont. 2—3. Vyd. Geol. Úst. D. Štúra, Bratislava, 119—123, Pl. 63—64.

BROENNIMANN, P.—POISSON, A.—ZANINETTI, L. 1970: L'unité du Domuz Dag (Taurus lycies--Turquie). Microfaciès et Foraminifères du Trias et du Lias. Riv. ital. Paleont., 76, 1, Milano, 1—36.

BUJNOVSKÝ, A.—KOCHANOVÁ, M. 1973: Útesy hlavného dolomitu Revúckej doliny a ich megalodontová fauna. (Reefs of Hauptdolomite and the fauna of Megalodonts in the Revúcka dolina valley). Geol. Práce, Správy 60, Bratislava, 169—195, Pl. 13, Text-figs. 5.

BUJNOVSKÝ, A.—KOCHANOVÁ, M.—PEVNÝ, J. 1975: Korytnica limestones a new lithostratigraphical unit and its fauna. Geol. Práce, Správy 63, Bratislava, 21—53, Pl. 6, Text-figs. 5.

BYSTRICKÁ, H. 1964: Les Coccolithophoridés (Flagellés) de l'Éocène supérieur de la Slovaquie. Geol. zbor. 15, 2, Bratislava, 203—225, Pl. 5—8.

BYSTRICKÁ, H. 1966: Nouvelles espèces du genre Discoaster du Paléogène des Karpates occidentales. Geol. zbor. 17, 2, Bratislava, 237—240, Text-fig. 1—10.

BYSTRICKÝ, J. 1962: Nové Dasycladaceae triasu Slovenského krasu (New Dasycladaceae of the Triassic in the Slovak Karst). Geol. zbor. 13, 2, Bratislava, 227—240, Pl. 3—4.

BYSTRICKÝ, J. 1975: Genus Aciculella Pia, 1930 (Kalkalgen) in der Trias Westkarpaten. Geol. Zbor. Geol. carpath. 26, 1, Bratislava, 1—20, Pl. 1—4.

BYSTRICKÝ, J. 1976a: Genus Dactylopora Lamarck, Digitella Morellet et Morellet und Broeckella Morellet et Morellet (Dasycladaceae, Algae) in Kalken des Paläozäns der Westkarpaten. Geol. Zbor. Geol. carpath. 27, 2, Bratislava, 247—272.

BYSTRICKÝ, J. 1976b: Munieria grambasti sp. nov. in Kalk-Geröllen der "Upohlav-Konglomerate" des mittleren Váh—Gebietes (Klippen-zone, Westkarpaten). Geol. Zbor. 27, 1, Bratislava, 45—64, Pl. 1—3.

BYSTRICKÝ, J. 1978: Diplopora borzai nov. sp. (Dasycladaceae) of the Upper Triassic of the Muráň

plateau (the West Carpathians Mountains, Slovakia). Geol. Zbor. Geol. carpath. 29, 2, Bratislava, 327—336, Pl. 1—2.

BYSTRICKÝ, J. 1979: Dasycladaceae of the Upper Triassic of the Stratenská hornatina mountains (the West Carpathians). Geol. Zbor. Geol. carpath. 30, 3, Bratislava, 321—340, Pl. 1—8.

CÍCHA, I.—ZAPLETALOVÁ, I. 1963: Wichtige Vertreter der Familie Lituolidae Reuss, 1861 (Foraminifera) aus dem Miozän der Westkarpaten. Sbor. geol. Věd, Paleont. 1, Praha, 75—121, Text-fig. 1—21.

CÍCHA, I.—ZAPLETALOVÁ, I. 1965: Die Vertreter der Familie Textulariidae (Foraminifera-Protozoa) aus dem Miozän der Westkarpaten. Sbor. geol. Věd, Paleont. 6, Praha, 99—148, Text-fig. 1—29.

CZABALAY, B. L. 1969: Gastéropodes du Sénonien en Slovaquie. Geol. Práce, Správy 50, Bratislava, 161—170, Pl. 21—22.

ČINČUROVÁ, E. 1971: Stratigrafia liasu na základe belemnitov v Západných Karpatoch. Zbor. Slov. Nár. Múz., Prírod. vedy, 17, 1, Bratislava, 3—103.

ČINČUROVÁ, E. 1974a: Salpingoteuthis slovacus n. sp. — Eine neue Art aus dem oberen Lias der Manín — Einheit. Annotat. Zoolog. at Botan., 97, Bratislava, 1—3.

ČINČUROVÁ, E. 1974b: Neue Belemniten Arten aus dem Lias der Podbielischen Entwicklung. Annotat. Zool. et Botan., 95, Bratislava, 1—5.

ČINČUROVÁ, E. 1974c: Nové nálezy belemnitov z vrchného liasu manínskej jednotky pri Tuneziciach. Acta Rer. Nat. Mus. Nat. Slov., 20, Bratislava, 25—35.

ČINČUROVÁ, E. 1984: Passaloteuthis andrusovi n. sp. — Eine neue Art aus dem mittleren Lias der Manín — Einheit. Acta Rer. natur. slov., 30, Bratislava, 3—5.

ČORNÁ, O. 1968: Some Spores and Pollen from Aptian-Albian of the West Carpathians. Geol. Zbor. Geol. carpath. 19, 1, Bratislava, 225—254, Pl. 1—8.

ČTYROKÝ, 1965: Lovenia mortensei n. sp., a new species of Spatangoid Echinoid from the Miocene of the Viena Basin. Sbor. geol. Věd. Paleont. 5, Praha, 107—121, Pl. 1—6.

DUMITRICĂ, P.—MELLO, J. 1982: On the age of the Meliata Group and the Silica Nappe radiolarites (localites Držkovce and Bohúňovo, Slovak Karst, ČSSR). Geol. Práce, Správy 77, Bratislava, 17—28, Pl. 1—4.

GAŠPARIK, J.—PLANDEROVÁ, E. 1970: Korelácia sedimentov Handlovsko-nováckej panvy so Žiarskou kotlinou. Sbor. geol. Vied, rad Záp. Karpaty 13, Bratislava, 109—156, Pl. 1—16.

GAŠPARIKOVÁ, V. 1975: Carpatochitinoides cretaceus of the West Carpathians, Czechoslovakia. Micropal. 21, 2, New York, 250—252, Pl. 1.

HANO, V.—SENEŠ, J. 1953: Spodnomiocénna fauna pri Rapovciach. Geol. zbor. Slov. Akad. Vied a Umení 3, 3—4, Bratislava, 315—365, Pl. 43—60.

HOLEC, P. 1975: Fisch-Otoliten aus dem Baden (Miozän) des nordlichen Teiles des Wiener Beckens und der Donau-Tiefebene. Geol. Zbor. Geol. carpath. 26, 2, Bratislava, 253—266, Pls. 1—2.

JABLONSKÝ, E. 1973: Mikroproblematika aus der Trias der Westkarpaten. Geol. Zbor. Geol. carpath. 24, 2, Bratislava, 415—423, Pl. 1—3.

JABLONSKÝ, E. 1975: Colospongia andrusovi n. sp. — eine neue Art von segmentierten Kalkschvämmen (Sphinctozoa) aus der Trias der Westkarpaten. Geol. Zbor. Geol. carpath. 26, 2, Bratislava, 267—273, Pl. 1—3.

JENDREJÁKOVÁ, O. 1963: Zástupci rodu Haplophragmoides v albe Západných Karpát Slovenska. (Die Vertreter der Gattung Haplophragmoides im Alb der Westkarpaten des Slowakei). Geol. zbor. 14, 2, Bratislava, 287—294, Text-fig. 1—7.

JENDREJÁKOVÁ, O. 1968: Die benthosen Foraminiferen des Alb der Westkarpaten. Geol. Zbor. Geol. carpath. 19, 1, Bratislava, 255—278, Pl. 1—4, Text-fig. 1—7.

JENDREJÁKOVÁ, O. 1972: Involutina muranica n. sp. in der Oberen Trias der Westkarpaten. Geol. Zbor. Geol. carpath. 23, 1, Bratislava, 197—200, Fig. 1—6.

KANTOROVÁ, V. 1975: Vsevolodia a new foraminiferal genus from the Oncophora beds of southern Slovakia. Záp. Karpaty, Sér. Paleont. 1, Vyd. Geol. Úst. D. Štúra, Bratislava, 87—92, Pl. 55—58.

KANTOROVÁ, V. 1977: Planktonic foraminifers of Oncophora beds in the Ipeľská kotlina (depression). Záp. Karpaty, Sér. Paleont. 2—3, Bratislava, 97—118, Pl. 53—57.

KECSKEMÉTI, F.—VAŇOVÁ, M. 1972: Nummulites of the Dorog-Štúrovo basin. Zbor. geol. Vied, rad Záp. Karpaty 17, Bratislava, 105—145, Pl. 27—32.

KOCHANOVÁ, M. 1973a: in V. Kollárová-Andrusovová—M. Kochanová: Molluskenfauna des Bleskový prameň bei Drnava (Nor, Westkarpaten). Vyd. Slov. Akad. Vied, Bratislava, 1—214, Pl. 1—18; 1A—10A.

KOCHANOVÁ, M. 1973b: in Bujnovský, A.—Kochanová, M.: Útesy hlavného dolomitu Revúckej doliny a ich megalodontová fauna. Geol. Práce. Správy 60, Bratislava, 169—195, Pl. 1—13, text-fig. 1—5.

KOCHANOVÁ, M. 1975: in Bujnovský, A.—Kochanová, M.—Pevný, J.: Korytnica limestones — a new lithostratigraphical unit and its fauna. Geol. Práce, Správy 63, Bratislava, 21—53. Pl. 1—6.

KOCHANOVÁ, M. 1979: Die Bivalven des Jura Vršatec-Klippe. Záp. Karpaty, Sér. Paleont. 4, Bratislava, 7—34, Pl. 1—4, Text-fig. 1.

KOLLÁROVÁ-ANDRUSOVOVÁ, V.—KOCHANOVÁ, M. 1973: Molluskenfauna des Bleskový prameň bei Drnava (Nor, Westkarpaten). Vyd. Slov. Akad. Vied, Bratislava, 1—214, Pl. 1—18, 1A—10A.

KOLOSVÁRY, G. 1958: Triaskorallen aus Kleinen Karpathen in der ČSR. Geol. Práce, Správy 13, Bratislava, 25—31, Pl. 1—5.

KOLOSVÁRY, G. 1963: Triassische Koralen aus der ČSSR. Geol. Práce, Správy 30, Bratislava, 209—216, Pl. 1—5.

KOLOSVÁRY, G. 1966: V. Angave zur Kenntnis der Triaskorallen und der begleitenden Fauna der ČSSR. Geol. Práce, Správy 38, Bratislava, 179—188, Pl. 7—8.

KOLOSVÁRY, G. 1967: VI. Angabe zur Kenntnis der Triaskorallen und der begleitenden Fauna der ČSSR. Geol. Práce, Správy 43, Bratislava, 99—110, Pl. 5—9.

KOPEK, G. 1952: Juhoslovenské miocénne koraly. Geol. Sbor. Slov. Akad. Vied a Umení 3, 1—2; Vyd. Slov. Akad. Vied a Umení, Bratislava, 69—87, Pl. 12—16.

KOZUR, H.—MOCK, R. 1972a: Neue Holothurien-Sklerite aus der Trias der Slowakei. Geol. Pal. Mitt. Insbruck, 2, 12, Insbruck, 1—47.

KOZUR, H.—MOCK, R. 1972b: Neue Conodonten aus der Trias Slowakei und ihre stratigraphische Bedeutung. Geol. Paläont. Mitt. 2, 4, Insbruck, 1—20.

KOZUR, H.—MOCK, R. 1974a: Zwei neue Conodonten-Arten aus der Trias Slovakischen Karstes. Čas. min. geol. 19, 2, Praha, 135—139.

KOZUR, H.—MOCK, R. 1974b: Misikella posthernsteini n. sp. die jüngste Conodontenart der tethyalen Trias. Čas. min. geol. 19, 3, Praha, 245—250.

KÖHLER, E. 1962: Veľké foraminifery v senóne Brezovského pohoria. (Die Grossforaminiferen im Senon des Brezovské pohorie). Geol. zbor. 131, Bratislava, 91—128, Pl. 8—15.

KÜHN, O.—ANDRUSOV, D. 1930: Korallen aus der Klippenfülle der Karpathen. Věst. St. geol. Úst. Čs. Republ., 6, 4—6, Praha, 155—168 (separat. výtl. 1—14).

KÜHN, O.—ANDRUSOV, D. 1930: Korallen aus der Klippenhülle der Karpathen. Věst. St. geol. Úst. Čs. Republ., 6, 4—6, Praha, 155—168 (separat. výtl. 1—14).

KÜHN, O.—ANDRUSOV, D. 1937: Weitere Korallen aus der Oberkreide der Westkarpaten. Věst. Král. Čes. Společ. Nauk, roč. 1936, Praha, 1—18 (str. podľa separát.).

LEHOTAYOVÁ, R. 1970: Electron-Microscopic Examination of Calcareous Nannoflora from Badenian of Western Slovakia. Sbor. geol. Vied, rad Záp. Karpaty 13, Bratislava, 157—175.

LEHOTAYOVÁ, R. 1975: Reticulofenestra excavata n. sp. from the Eggenburgian to Karpatian of Central Slovakia. Záp. Karpaty, Sér. Paleont. 1; Vyd. Geol. Úst. D. Štúra, Bratislava, 39—40.

LEHOTAYOVÁ, R. 1979: Pontosphaera cornifera n. sp. in thanatocenoses of sediments from drill hole LU-2 (Horehronie). Záp. Karpaty, Sér. Paleont. 4, Bratislava, 161—162.

LOŽEK, V.—BRTEK, J. 1964: Neue Belgrandiella aus den Westkarpaten. Archiv für Molluskenkunde 93, 5—6, Frankfurt a. M. 201—207, Text-fig. 1—3.

LUPU, D. 1976: Un nouveau radiolitidé: Bystrickya andrusovi n. gen., n. sp. Geol. Zbor. Geol. carpath. 27, 1, Bratislava, 35—43, Fig. 1—8.

MELLO, J. 1977: Plexoramea cerebriformis n. gen. n. sp. and some other microproblematics and microfossils from Triassic limestones of West Carrpathians. Záp. Karpaty, Sér. Paleont. 2—3, Bratislava, 189—202, Pl. 80—90.

MICHALÍK, J. 1975: Genus Rhaetina Waagen, 1882 (Brachiopoda) in the upper most Triassic of the West Carpathians. Geol. Zbor. Geol. carpath. 26, 1, Bratislava, 47—76, Pl. 1—4.

MICHALÍK, J. 1977: Systematic and ecology of Weilleria bayle and other brachiopods in the Uppermost Triassic of West Carpathians. Geol. Zbor. Geol. carpath. 28, 2, Bratislava 323—346, Fig. 1—17.

MICHALÍK, J.—JENDREJÁKOVÁ, O.—BORZA, K. 1979: Some new foraminifera species of the Fatra--formation (upper-most Triassic) in the West Carpathians. Geol. Zbor. Geol. carpath. 30, 1, Bratislava, 61—91, Pl. 1—4.

MICHALÍK, J.—PLANDEROVÁ, E.—SÝKORA, M. 1976: To the stratigraphie and paleographic position of the Tomanová Formation in the Upper Triassic of the West Carpathians. Geol. Zbor. Geol. carpath. 27, 2, Bratislava, 299—318, Fig. 1—8.

MIŠÍK, M. 1971: Aelolisaccus tintinniformis n. sp. from the Triassic of the West Carpathian Mts. Geol. Zbor. Geol. carpath. 22, 1, Bratislava, 169—172, Pl. 1.

MIŠÍK, M.—BORZA, K. 1978: Gemeridella, Didemnoides, Didemnum und Körperchen änlicher Gestalt aus dem Mesozoikum der Westkarpaten. Geol. Zbor. Geol. carpath. 29, 2, Bratislava, 307—326, Pl. 1—5.

MIŠÍK, M.—LOCQUIN, M. V. 1983: Acrasiales fossiles dans les concrétions siliceuses du Barrémien des Carpathes occidentales (Tchécoslovaquie). Com. Ren. 108° Congr. Nat. Soc. Savantes, Grenoble 1983 Sec. des Sc., Fas. 1, 2, Paris, 167—171.

MOCK, R. 1979: Eine wichtige tuvalische Conodontenart. Geol. Paläont. Mitt. 9, 4, Insbruck, 171—174.

MOJSISOVICS, E. 1893: Die Cephalopoden der Hallstäter Kalke. III. Abh. geol. Reichsanst. 6, II, Hälfte, Wien.

ONDREJIČKOVÁ, A.—SENEŠ, J. 1965: Oligocén južného Slovenska a jeho fauna mäkkýšov (Das oligozän des Südslowakei und eine Molluskenfauna). Sbor. geol. Vied, Záp. Karpaty 4, Bratislava, 145—198, Pl. 1—6.

OŽVOLDOVÁ, L. 1975: Upper Jurassic Radiolarians from the Kysuca Series in the Klippen Belt. Záp. Karpaty, Sér. Paleont. 1, Vyd. Geol. Úst. D. Štúra, Bratislava, 73—86, Pl. 99—103.

OŽVOLDOVÁ, L. 1979a: Radiolarians from Rudina beds of the Kysuca series in the Klippen Belt from locality Brodno. Annot. zool. bot., 128, Bratislava, 1—15, Pl. 1—5.

OŽVOLDOVÁ, L. 1979b: Radiolarian assemblage of radiolarian cherts at Podbieľ (Slovakia). Čas. min. geol. 24, 3, Praha, 249—261, Pls. 1—5.

OŽVOLDOVÁ, L.—SÝKORA, M. 1984: The radiolarian assemblage from Čachtické Karpaty Mts. limestones (the locality Šipkov Háj). Geol. Zbor. Geol. carpath. 35, 2, Bratislava, 259—274, Pl. 1—16.

PANTOCSEK, J. 1903—1905: Beiträge zur Kenntnis der fossilen Bacilarien Ungarns. I. Berlin, 5—76, Pl. 1—30; II. — 1903, Berlin, 3—122, Pl. 1—30; III.— 1905 Pozsony (Bratislava), 3—118, Pl. 1—42.

PEVNÝ, J. 1969: Middle Jurassic Brachiopods in the Klippen Belt of the Central Váh valley. Geol. Práce, Správy 50, Bratislava, 133—170, Pl. 27—29.

PIA, J. 1927: Thallophyta (in M. Hirmer: Handbuch der Paläobotanik), München—Berlin, 31—113.

PIA, J. 1930: Upper Triassic Fossils from the Burma-Siamese frontier. Rec. Geol. Sur. India 68, 1, Calcutta, 177—181.

PIA, J. 1940: Wirtelalgen (Dasycladaceen) aus den anisischen Kalken des Szilicei fennsik in Nordungarn. Abh. Min. — geol. Inst. Sb. Tisza-Univ. "Tisia" 4, Debrecén.

PLANDEROVÁ, E. 1972: Pliocene Sporomorphs from the West Carpathians Mountains and their Stratigraphic Interpretation. Geol. Práce, Správy 59, Bratislava, 209—283, Pl. 1—50.

PLANDEROVÁ, E. 1973: Palynological research in the melaphyre series of the Choč unit in the NE part of Nízke Tatry between Spišský Štiavnik and Vikartovce. Geol. Práce, Správy 60, Bratislava, 143—168, Pl. 1—18.

PLANDEROVÁ, E. 1975: Carpatochitinoides, a new genus from the West Carpathian Mountains, Czechoslovakia. Micropal. 21, 2, New York, 246—248, Pl. 1.

PLANDEROVÁ, E. 1980: Monosaccate pollen of genera Potonieisporites Bharadw. from the Autunian (Oslany near Brno). Záp. Karpaty, Sér. Paleont. 5, Bratislava, 75—93, Pls. 45—76.

PLANDEROVÁ, E. 1982: The first find of Visean microflora in Gemerides in Slovakia. Záp. Karpaty, Sér. Paleont. 8, Bratislava, 111—126.

PLIČKA, M. 1982: Bellonidopsisichnium carpaticum n. ichnogen. n. sp. from the Outer Carpathian Flysh in East Slovakia. Záp. Karpaty, Sér. Paleont. 8, Bratislava, 149—158, Pls. 58—60.

RAKÚS, M. 1965: Biostratigrafia jury kosteleckého bradla Zur Biostratigraphie der Jura-Schichten in der Kostelec-Klippe. Geol. Práce, Správy 37, Bratislava, 163—177, Pl. 9—10.

RAKÚS, M. 1975: Hettangian ammonites from the Strážovská hornatina Mts. (West Carpathians). Záp. Karpaty, Sér. Paleont. 1; vyd. Geol. Úst. D. Štúra, Bratislava, 7—24, Pl. 104, Text-figs. 1—10.

ŘEHÁKOVÁ, 1980: Süsswasserdiatomeenflora des oberen Miozäns in der Tschechoslowakei. Sbor. Geol. Věd, Paleont. 23, Praha, 83—184, Pl. 1—20.

SALAJ, J. 1974: Contribution à la microbiostratigraphie du Trias Carpates Occidentales Tchécoslovaques. Annal. Min. Geol. 28 (Actes du VI Coll. Afric. de Micropaléont.), Tunis, 103—127, Pl. 1—6.

SALAJ, J. 1978: Contribution à la microbiostratigraphie du Trias des Carpates occidentales Tchécoslovaques. Act. du VIe Coll. Afr. Micropal., Tunis, 1974, Ann. Mines Géol., 28, Tunis, 103—127.

SALAJ, J.—BIELY, A.—BYSTRICKÝ, J. 1967: Die Trias-Foraminiferen in den Westkarpaten. Geol. Práce, Správy 42, Bratislava, 119—136, Pl. 1—8.

SALAJ, J.—BORZA, K.—SAMUEL, O. 1983: Triassic Foraminifers of the West Carpathians. Ed. Geol. Úst. D. Štúra, Bratislava, 1—213, Pl. 1—157.

SALAJ, J.—SAMUEL, O. 1977: A propos Du Cénomanien supérieur — Turonian de la zone Klippes des Carpates occidentales slovaques. Záp. Karpaty, Sér. Paleont. 2—3; Vyd. Geol. Úst. D. Štúra, Bratislava, 71—86, Pl. 33—46.

SAMUEL, O. 1962: Mikrobiostratigrafické pomery kriedových sedimentov vnútorného bradlového pásma v okolí Beňatiny. Geol. Práce, Správy 24, Bratislava, 153—197, Pl. 1—13.

SAMUEL, O. 1972a: New species of plantktonic forminifers from the Paleogene of the West Carpathians in Slovakia (Czechoslovakia). Sbor. geol. Vied, rad Záp. Karpaty, 17, Bratislava, 217—221, Pl. 58—59.

SAMUEL, O. 1972b: Planctonic Foraminifera from the Eocene in the Bakony mountains (Hungary). Sbor. geol. Vied, rad Záp. Karpaty 17, Bratislava, 165—215, Pl. 25.

SAMUEL, O. 1972c: Phylogenesis of Paleogene planktonic Foraminifera. Sbor. geol. Vied, rad. Záp. Karpaty 17, Bratislava, 223—240, Pls. 20.

SAMUEL, O. 1975: Foraminifera of Upper Priabonian from Ľubietová (Slovakia). Záp. Karpaty, Sér. Paleont. 1, Bratislava, 111—176, Pl. 65—98.

SAMUEL, O. 1977: Agglutinated foraminifers from Paleogene flysch formations in West Carpathians of Slovakia. Záp. Karpaty, Sér. Paleont. 2—3; Vyd. Geol. Úst. D. Štúra, Bratislava, 7—69, Pl. 1—32; Text-fig. 3.

SAMUEL, O. 1981: Two New Species of Planktonic Foraminifers from West Carpathian Paleogene. Záp. Karpaty, Sér. Paleont. 6, Bratislava, 79—85, Pls. 23—30.

SAMUEL, O.—BORZA, K. 1981: Paraophthalmidium nov. gen. (Foraminifera) from the Triassic of the West Carpathians. Záp. Karpaty, Sér. Paleont. 6, Bratislava, 65—78, Pls. 19—22.

SAMUEL, O.—KÖHLER, E. 1979: Foraminiferal genera Gyroidinella and Korobkovella from West Carpathian Eocene (Liptov Basin). Záp. Karpaty, Sér. Paleont. 4, Geol. Úst. D. Štúra, Bratislava, 113—122.

SAMUEL, O.—KÖHLER, E.—BORZA, K. 1977: Haddonia praeheissigi and Miliola? andrusovi, two new species from Upper-Senonian and Paleocene bioherm limestones of West Carpathians (Slovakia). Záp. Karpaty, Sér. Paleont. 2—3, Bratislava, 87—95, Pl. 47—52.

SAMUEL, O.—SALAJ, J. 1962: Nové druhy foraminifer z kriedy a paleogénu Západných Karpát (Einige neue Foraminiferenarten aus der Kreide und dem Paläogen von Westkarpaten). Geol. Práce, Zošit 62, Bratislava, 313—320, Pl. 9—10.

SAMUEL, O.—SALAJ, J.—BORZA, K. 1981: Bispiranella nov. gen. (Foraminifera from Upper Triassic of West Carpathians). Záp. Karpaty, Sér. Paleont. 6, Bratislava, 87—91, Pls. 31—34.

SENEŠ, J. 1953: Spodnosarmatská fauna pri Malej nad Hronom. Geol. zbor. Slov. Akad. Vied a Umení, 3, 3—4, Bratislava, 193—257, Pl. 24—35.
SENEŠ, J. 1955: Stratigrafický a biofaciálny výskum niektorých sedimentov východného Slovenska na základe makrofauny. (Stratigraphische und Biofazielle Untersuchung einiger neogener Sedimente der Ostslowakei auf Grund der Makrofauna). Geol. Práce, Zošit 40, Bratislava, 1—165, pl. 1—10.
SENEŠ, J. 1958: Pectunculus-Sande und Egerer Faunentypus in Tertiär bei Kováčov in Karpatenbecken. Geol. Práce, Monograf. sér. 1, Ed. Geol. Úst. D. Štúra, Bratislava, 1—232, Pl. 1—24.
SENEŠ, J. 1958: Pholadomya andrusovi nov. sp. zo spodného miocénu južného Slovenska. Geol. Práce, Správy 12, Bratislava, 3—13, Pl. 1—4.
SENEŠ, J. 1960: Burdigalská fauna v slienitých sedimentoch Považia (Burdigalische Molluskenfaunen aus mergeligen Ablagerungen des Waagtales in Westkarpaten). Geol. Práce, Správy 17, Bratislava, 105—114.
SCHEIBNER, E. 1968: Contribution to the knowledge of the Paleogene-reef-complexes of the Myjava —Hričov—Haligovka zone (West Carpathians). Mitt. Bayer. Staatssaml. Paläont. hist. Geol. 8, München, 67—97, Pl.
SCHEIBNEROVÁ, V. 1960: Poznámky k rodu Praeglobotruncana Bermudez z kysuckých vrstiev bradlového pásma. (Some Note on the Genus Praeglobotruncana Bermudez from the Kysuca Beds of the Klippen-Belt). Geol. zbor. 11, 1, Bratislava, 85—90.
SCHEIBNEROVÁ, V. 1962: Stratigrafia strednej a vrchnej kriedy tetýdnej oblasti na základe globotrunkanid (Stratigraphy of the Middle and Upper Cretaceous of mediterranen province on the basis of Globotruncanids). Geol. zbor. 13, 2, Bratislava, 197—226, Text-fig. 6a—c.
SCHEIBNEROVÁ, V. 1963a: Some new Foraminifera from the Middle Turonian of the Klippen Belt of West Carpathians in Slovakia. Geol. zbor. 14, 1, Bratislava, 139—143, Text-fig. 1—3.
SCHEIBNEROVÁ, V. 1963b: Some new informations on the Cretaceous of the Klippen Belt of West Carpathians. Geol. zbor. 14, 2, Bratislava, 221—268, Text-fig. 1—82.
SIBLÍK, M. 1965: Some New Liassic Brachiopods. Geol. Zbor. Geol. carpath. 16, 1, Bratislava, 73 —82, Text-fig. 1—6.
SIBLÍK, M. 1971: New Anisian Rhynchonellid from Slovakia. Geol. Zbor. Geol. carpath. 22, 1, Bratislava, 157—159.
SIBLÍK, M. 1977: Rod Gemerithyris gen. n. (Brachiopoda) ze slovenského triasu (New Brachipod genus Gemerithyris gen. n. from Slovak Triassic. Záp. Karpaty, Sér. Paleont. 2—3, Bratislava, 203—220, Pl. 107—109, Text-fig. 1—17.
SIBLÍK, M. 1981: Brachiopods from the Wetterstein Limestone of the Horný vrch Karst Plateau (SE Slovakia). Záp. Karpaty, Sér. Paleont, 6, Bratislava, 15—24, Pl. 9—11.
SIBLÍK, M. 1982: Genus Austriellula Strand, 1928 (Brachiopoda) from the Upper Triassic. Záp. Karpaty, Sér. Paleont. 8, Bratislava, 41—70.
SITÁR, V. 1969: Die Paläoflora des Turiec-Beckens und ihre Beziehung zu den mitteleuropäischen Floren. Acta Geol. Geogr. Univ. Comen. 17, Bratislava, 99—174, Pl. 21—58.
SNOPKOVÁ, P.—PETERČÁKOVÁ, M. 1982: Periporopollenites komjatensis- a new Upper Eocene species from Oravská vrchovina Mts. Západ. Karpaty, Sér. Paleont. 8, Bratislava, 127—130.
SNOPKOVÁ, P.—SAMUEL, O. 1981: Mikroplanktón z paleogénu Západných Karpát. Záp. Karpaty, Sér. Paleont. 6, Bratislava, 103—153, Pls. 40—61.
SNOPKOVÁ, P.—SAMUEL, O. 1982: Pentagonium obidum nov. gen. et nov. sp. (incertae sedis) from the Upper Eocene of the West Carpathians (The Podunajská nížina lowland). Záp. Karpaty, Sér. Paleont. 8, Bratislava, 131—133.
STÚR, D. 1867: Beiträge zur Kenntniss der Flora, der Süsswasserquerze, der Congerien — und Cerithien-Schichten im Wiener ungarischen Becken. Jb. k. -kön. geol. Reichsanstalt, 17, 1, Wien, 77—188, Pl. 1—3.
ŠVAGROVSKÝ, J. 1954: Neogénna fauna východného Slovenska. Geol. Práca, Zošit 37, Bratislava, 1 —64, Pl. 1—7.
ŠVAGROVSKÝ, J. 1957: Niekoľko nových miocénnych zástupcov čeľade Trochidae (Einige neue miozäne Vertreter der Familie Trochidae). Geol. zbor. 8, 2, Bratislava, 204—225.
ŠVAGROVSKÝ, J. 1958: Miocénne Pleurotomidae západoslovenských panví (Die Miozänen Pleuroto-

midae der Westkarpatischen Decken). Acta Geol. Geogr. Univ. Comen. 1, Bratislava, 5—56, Pl. 1—9.
ŠVAGROVSKÝ, J. 1960: Biostratigrafia a fauna mäkkýšov vrchného tortónu východného úpätia Slovenských hôr (Die Biostratigraphie und die Molluskenfauna aus dem obertorton des östlichen Fusses des Gebirges Slovenské hory). Geol. Práce, Zošit 57, Bratislava, 3—156, Pl. 1—14.
ŠVAGROVSKÝ, J. 1960b: Biostratigrafia miocénu a ekológia makrofauny oporného vrtu Sečovce 1. Práca Výzk. Úst. čs. naft. Dolů, 15, 55—61, Brno, 53—93.
ŠVAGROVSKÝ, J. 1971: Das Sarmat der Tschechoslowakei und seine Molluskenfauna. Acta Geol. Geogr. Univ. Comen. 20, Bratislava, 1—473, Pl. 1—91.
ŠVAGROVSKÝ, J. 1981: Lithofazielle Entwicklung und Molluskenfauna des oberen Badeniens (Miozän M_{4d}) in dem Gebiet Bratislava-Devinska Nová Ves. Záp. Karpaty, Sér. Paleont. 7, Bratislava, 1—204, Pl. 1—53.
ŠVAGROVSKÝ, J. 1982: Gastropoda, Prosobranchia. Teil I. Archaeogastropoda und Mesogastropoda des oberen Badenieus von Borský Mikuláš (NO-Teil des Wiener Beckens) und ihre stratigraphische Bedentung. Geol. Zbor. Geol. carpath. 33, 1, Bratislava, 3—49, Pl. 1—10.
ŠVAGROVSKÝ, J. 1982: Gastropoda, Prosobranchia. Teil II. Neogastropoda des oberen Badeniens von Borský Mikuláš (NO-Teil das Wiener Beckens) und ihre stratigraphische Gedeutung. Geol. Zbor. Geol. carpath. 33, 4, Bratislava, 383—435, Pl. 1—11.
VAŇOVÁ, M. 1972: Nummulites from the area of Bojnice, the upper Hron Depression, and the Budín Paleogene around Štúrovo. Zbor. geol. Vied, rad Záp. Karpaty 17, Bratislava, 5—104, Pl. 1—26.
VAŇOVÁ, M. 1977: A new subspecies of Nummulites from the locality Lopúchov. Záp. Karpaty, Sér. Paleont. 2—3; Vyd. Geol. Úst. D. Štúra, Bratislava, 125—132, Pl. 111.
ZEUSCHNER, L. 1856: Geognostische Beschriebung des Liaskalkes in der Fatra und in den Angrenzenden Gebirgen. S. B. Akad. Wiss. 19, Wien. 136—182.
ZIEGLER, V.—MICHALÍK, J. 1980: Late Triassic Serpulids (Annelids, Polychaetia, Sedentarida) in the Western Carpathians. Geol. Zbor. Geol. carpath., 31, 4, Bratislava, 627—640.
ŽÍTT, J.—MICHALÍK, J. 1984: Upper Jurassic crinoids in the West Carpathian Klippen Belt. Geol. Zbor. Geol. carpath. 35, 5, Bratislava, 601—617, Pl. 1—8, Text-fig. 1—4.

Ondrej Samuel

Zoznam novoopísaných taxónov zo Západných Karpát Slovenska

Vzhľadom k tomu, že doteraz nebol vypracovaný na Slovensku katalóg, ktorý by poskytoval ucelený pohľad o evidencii novoopísaných taxónov zo Západných Karpát Slovenska, z podnetu odbornej paleontologickej skupiny pri Slovenskej geologickej spoločnosti rozhodli sme sa takýto „katalóg" vydať. V tejto súvislosti treba poznamenať, že predkladaný „katalóg" poskytuje iba najzákladnejšie údaje o ich zverejnení, deponovaní a prvotnom stratigrafickom výskyte.

Zoznam obsahuje údaje od polovice minulého storočia až do roku 1985. Je spracovaný taxatívnym spôsobom podľa skupín, pričom validita a systematická príslušnosť jednotlivých taxónov nie je revidovaná. Dúfame, že predložený zoznam stane sa podnetom v prvom rade pre revidovanie a deponovanie paleontologického materiálu v Slovenskom národnom múzeu ako dôležitého študijného faktologického materiálu, ktorý bude dostupný širokému okruhu špecialistov nielen od nás, ale aj zo zahraničia.

ZÁPADNÉ KARPATY
SÉRIA
paleontológia 11

Vydal Geologický ústav Dionýza Štúra vo vydavateľskom oprávnení Vedy, vydavateľstva Slovenskej akadémie vied v Bratislave roku 1986

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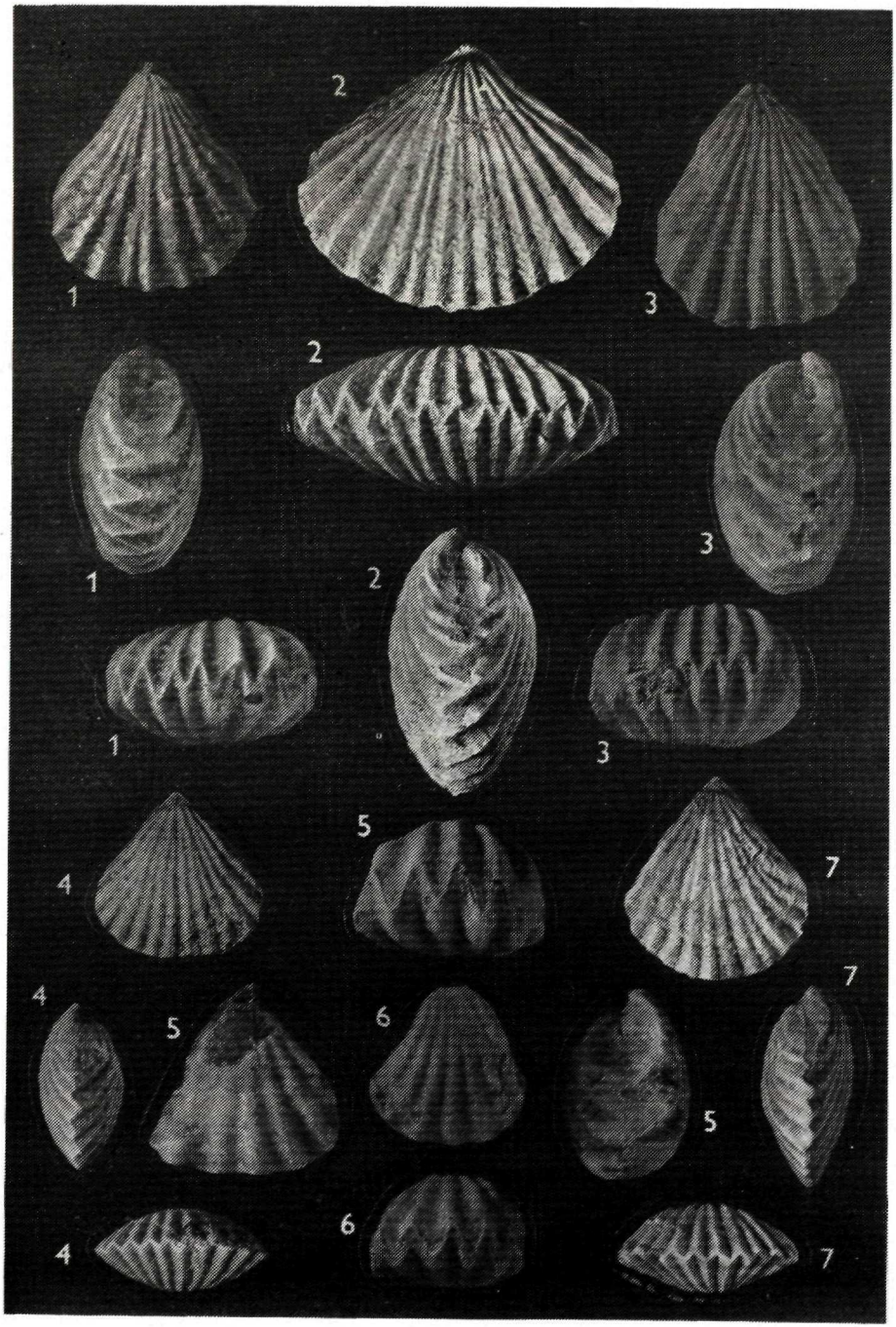
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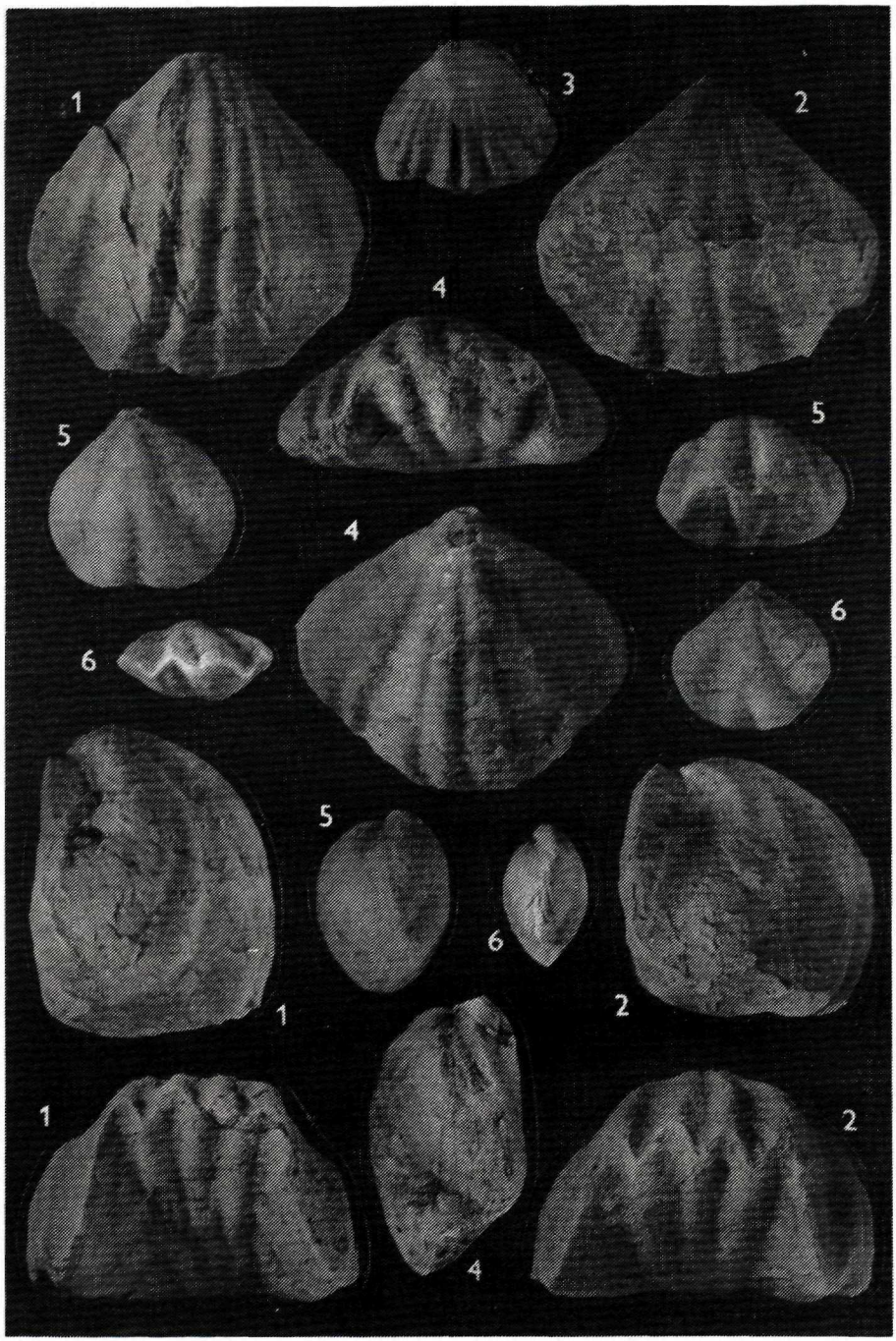
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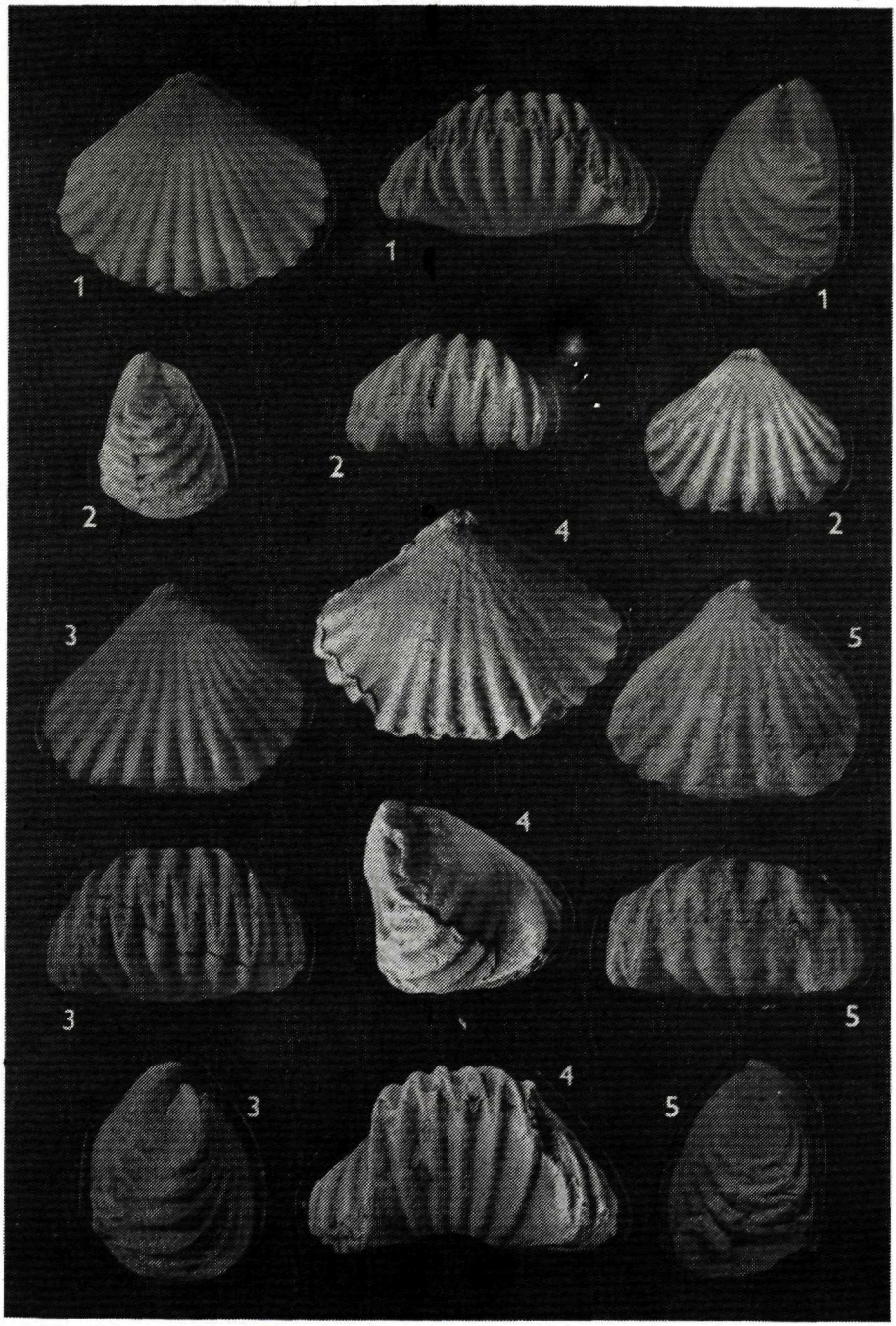
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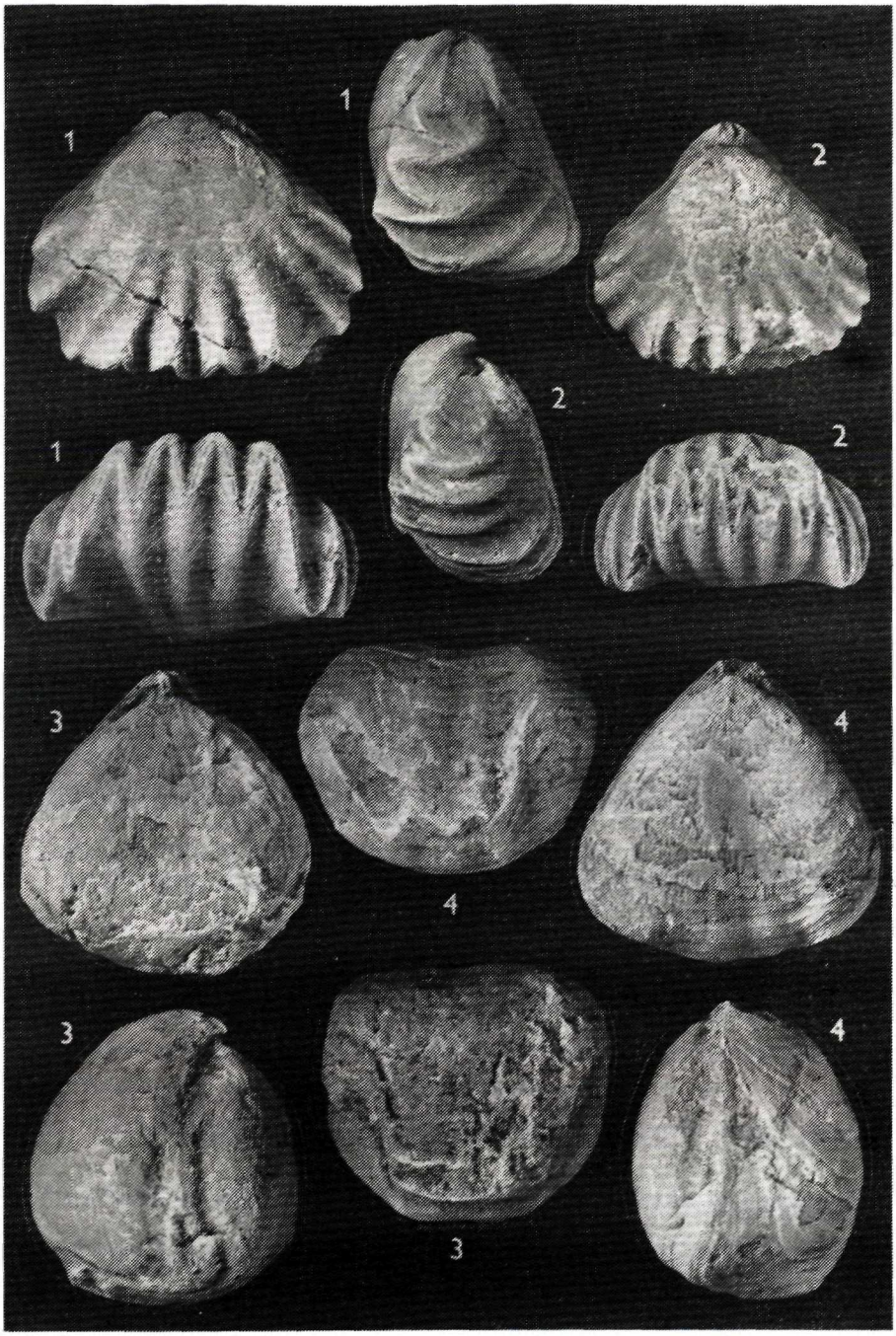
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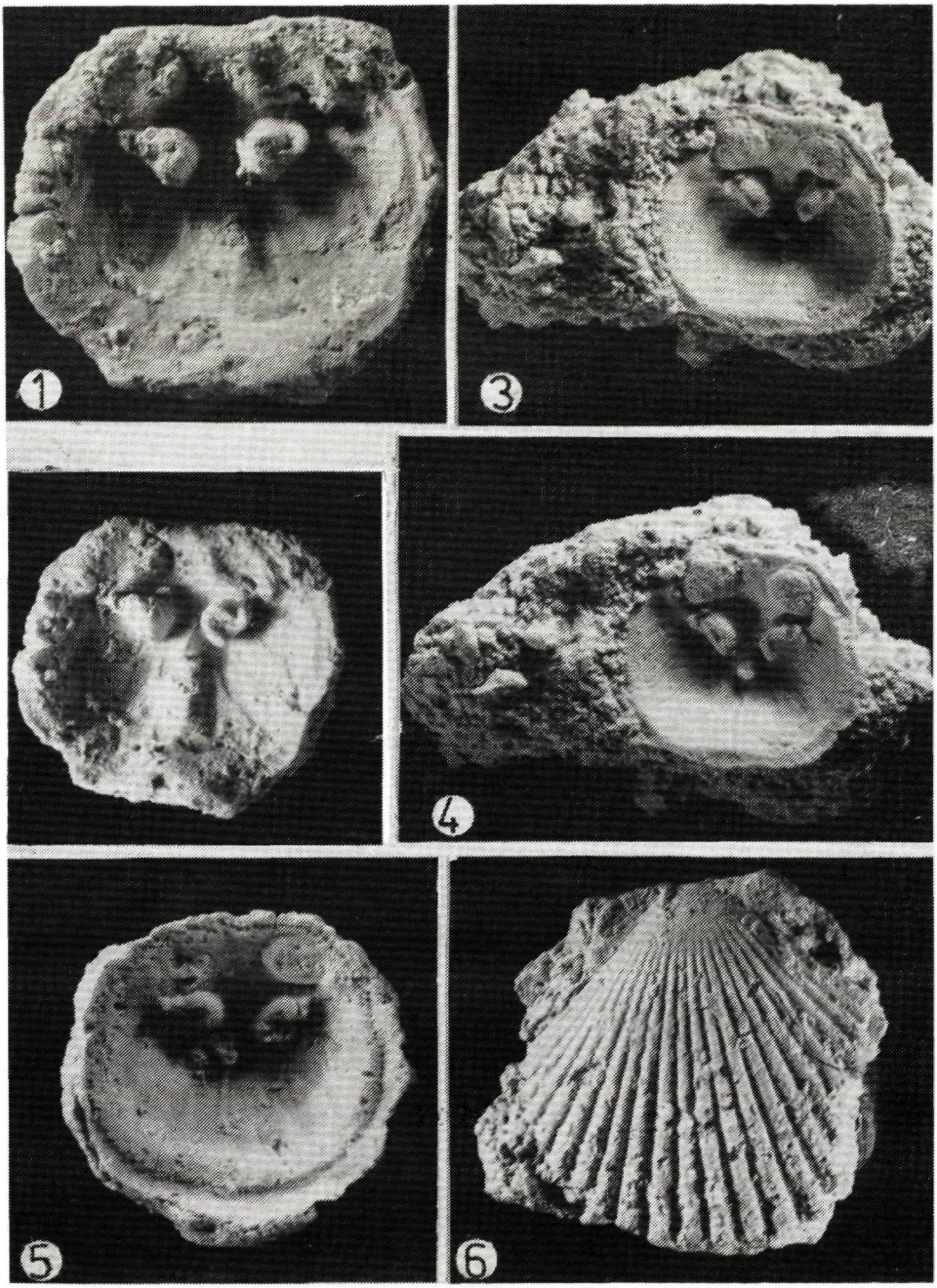
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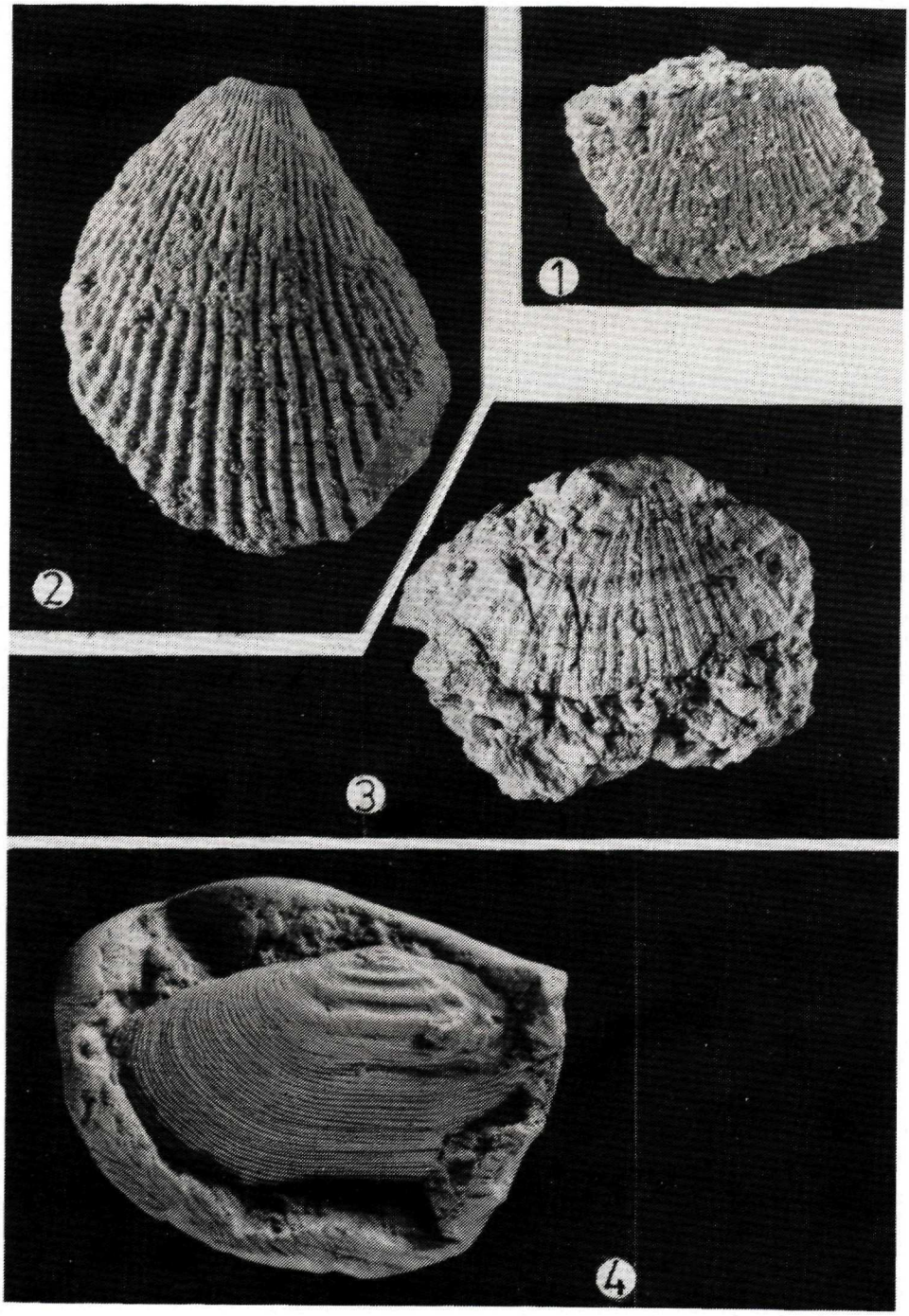
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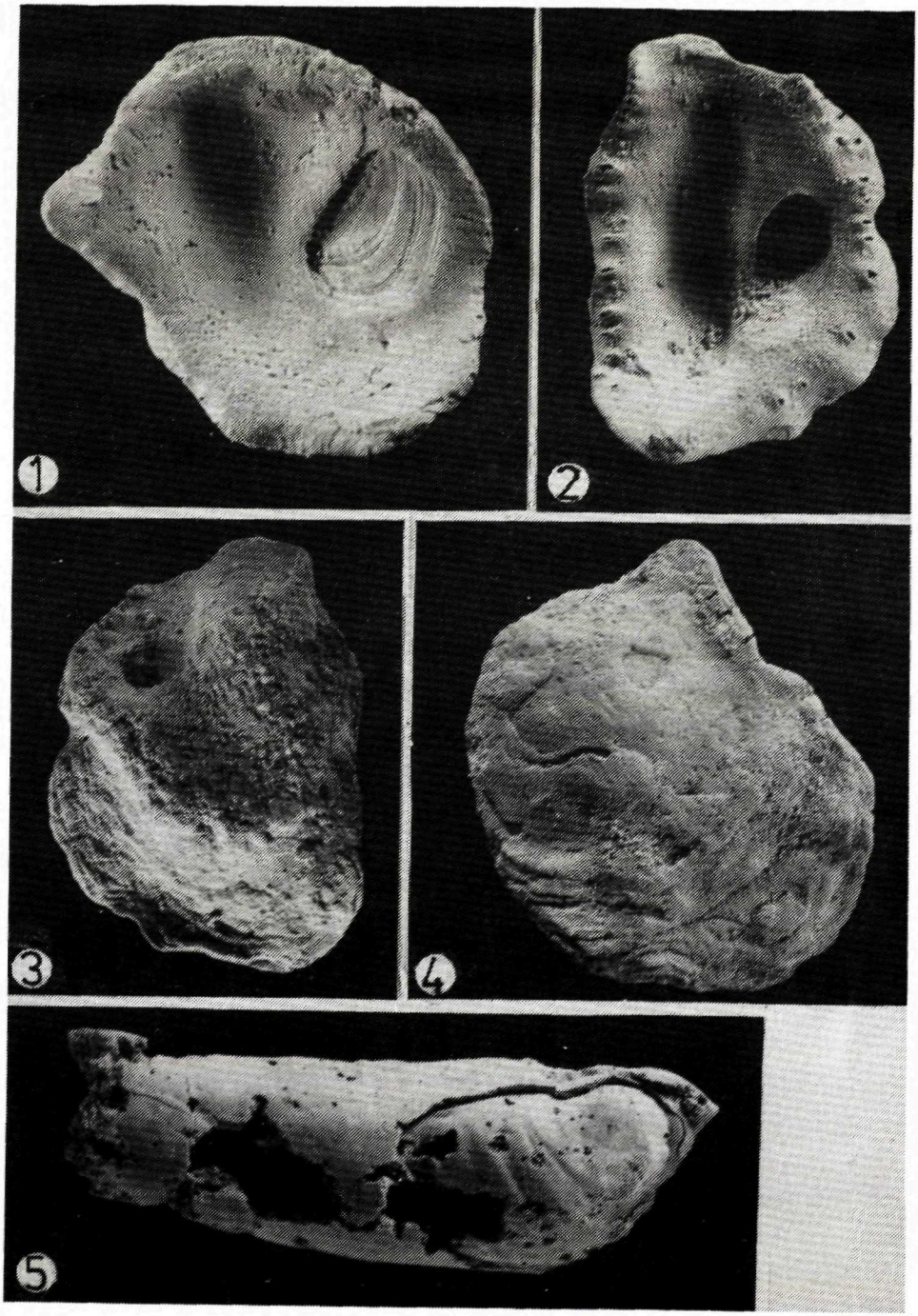
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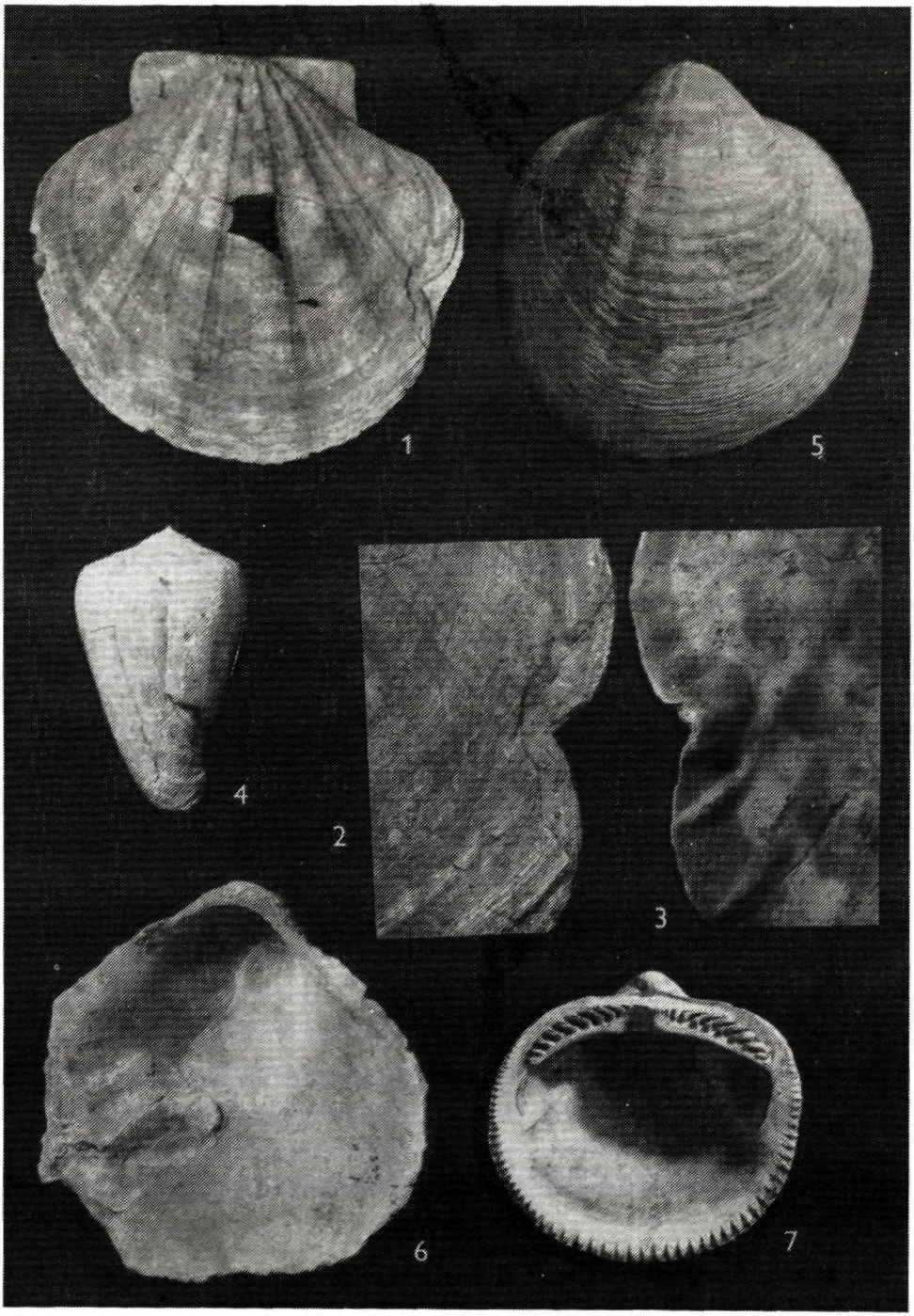
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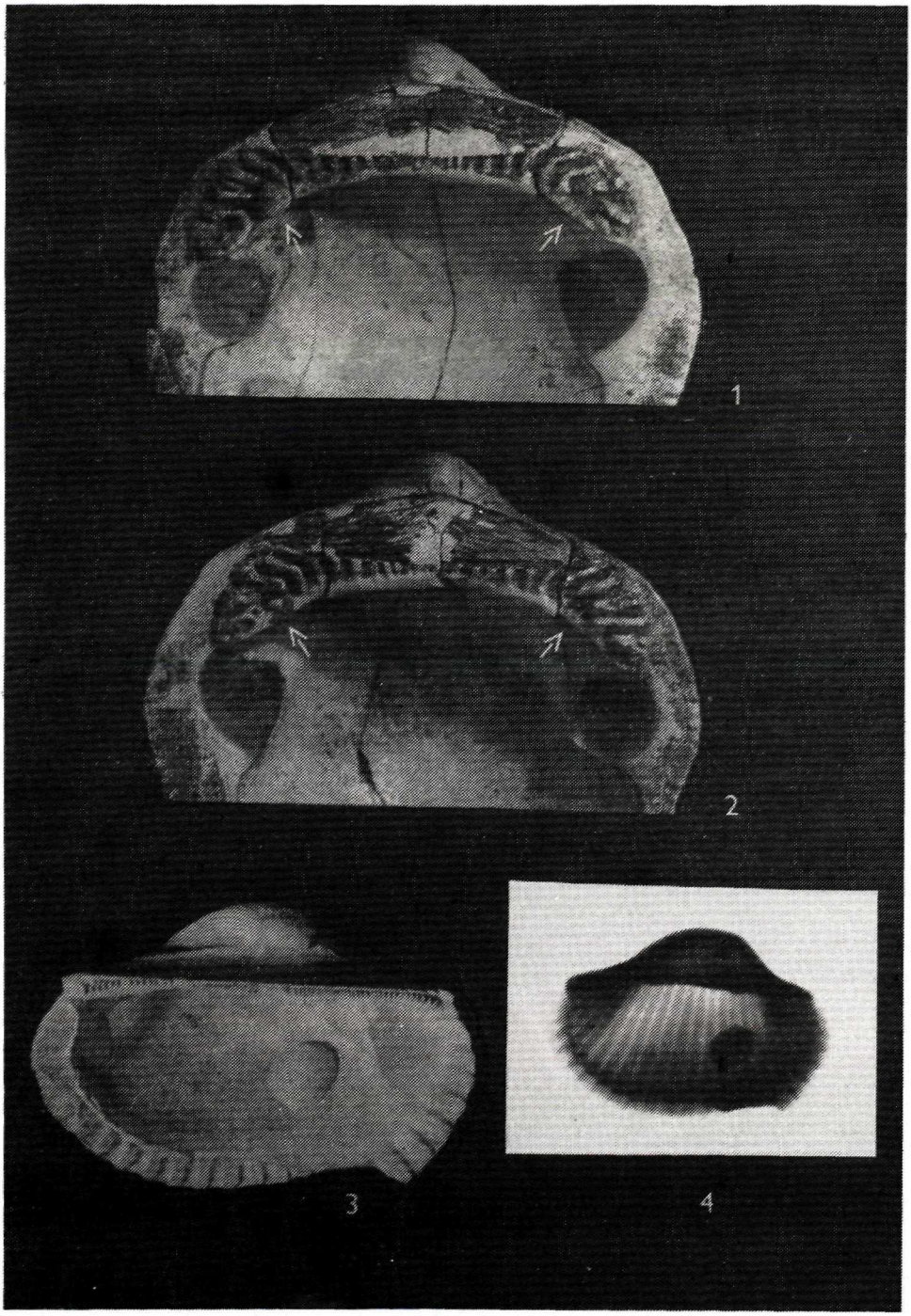
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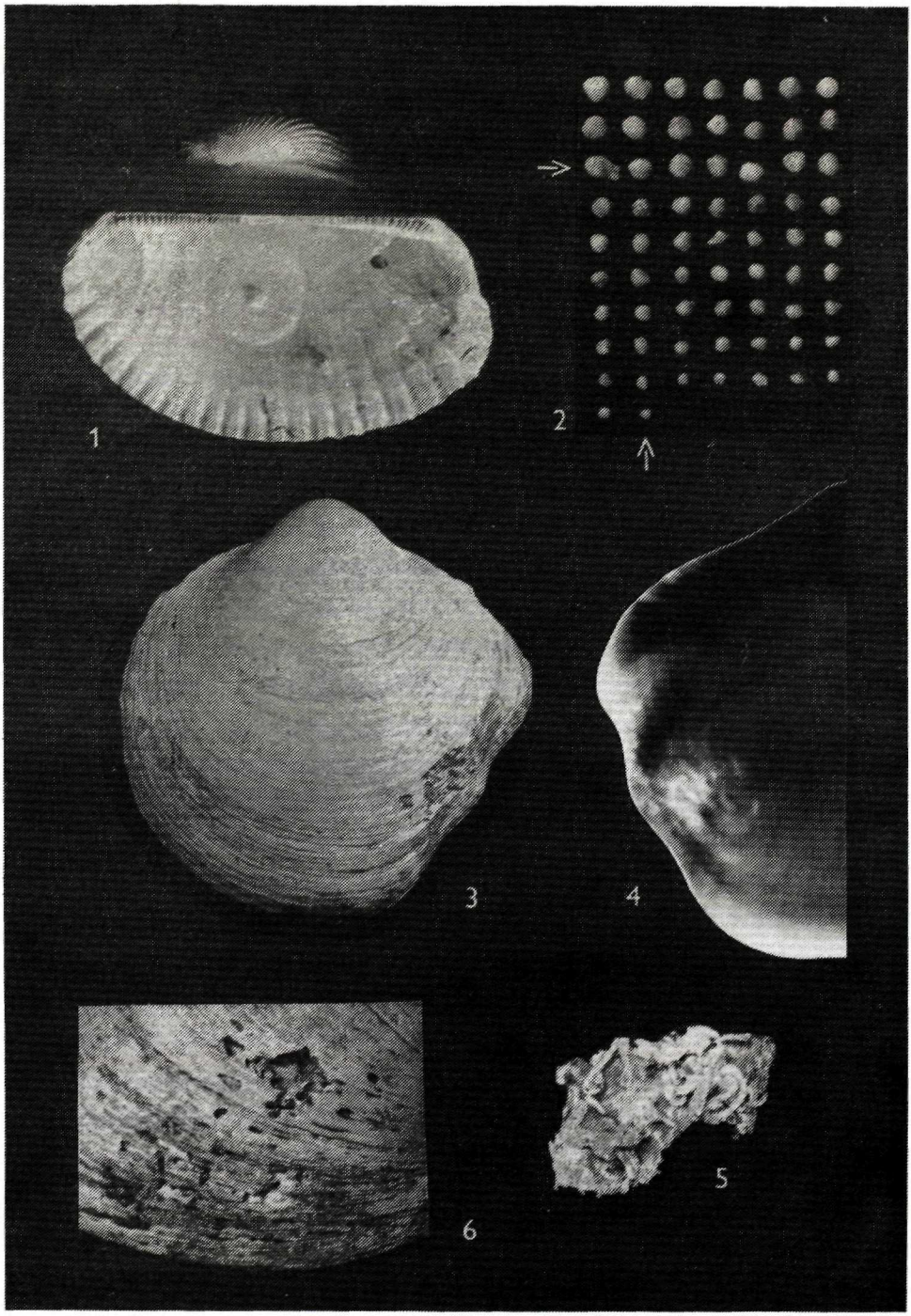
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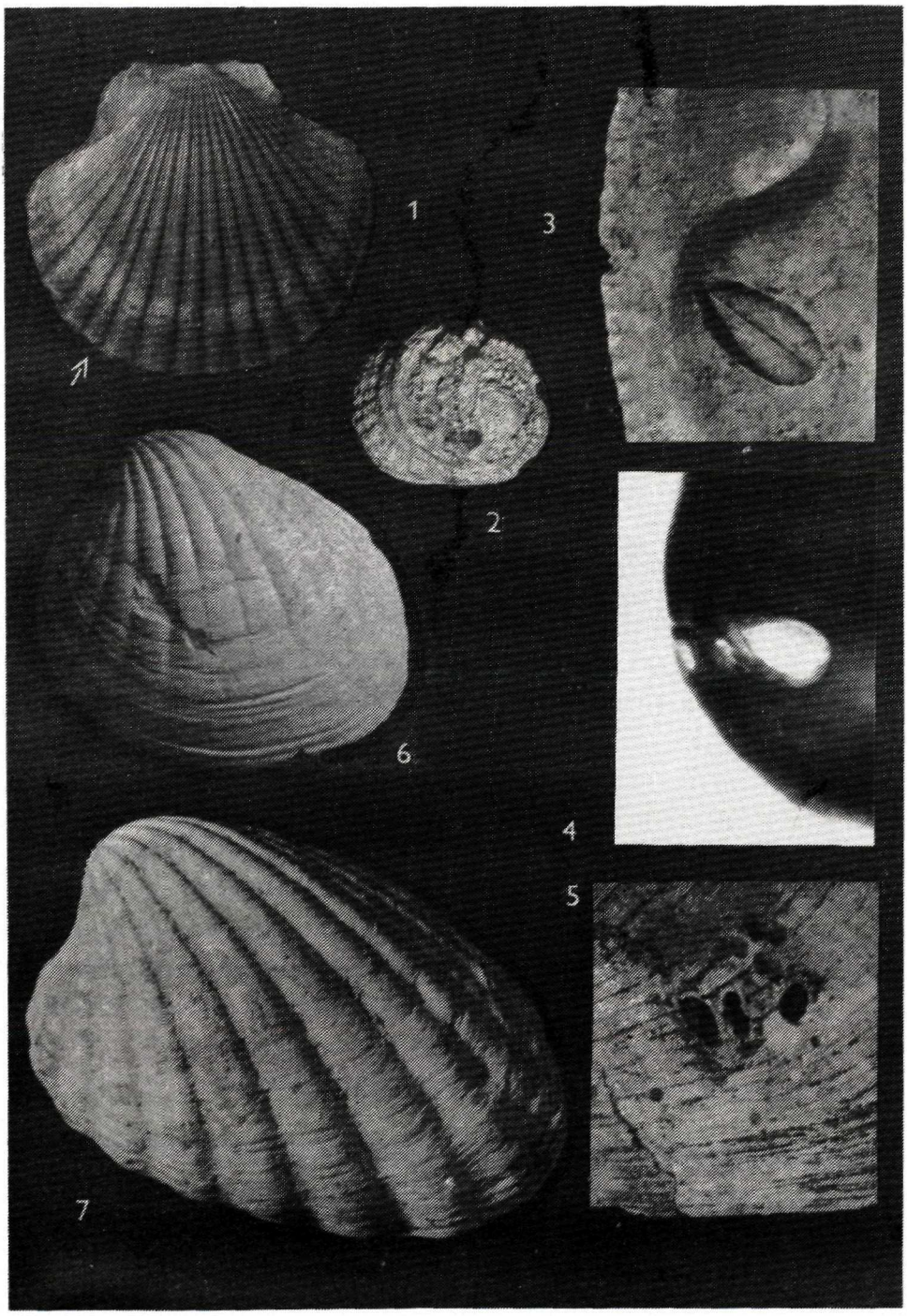
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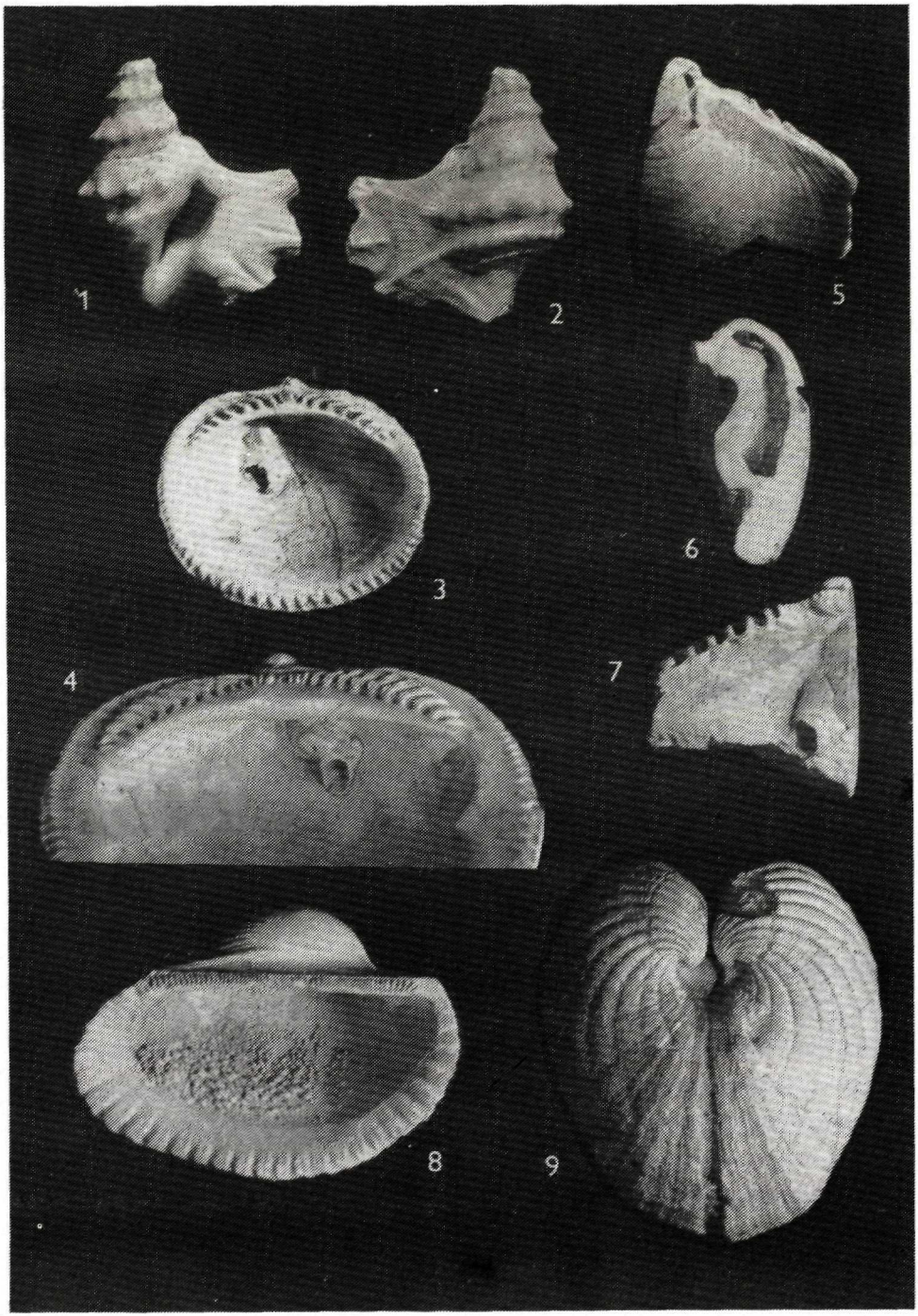
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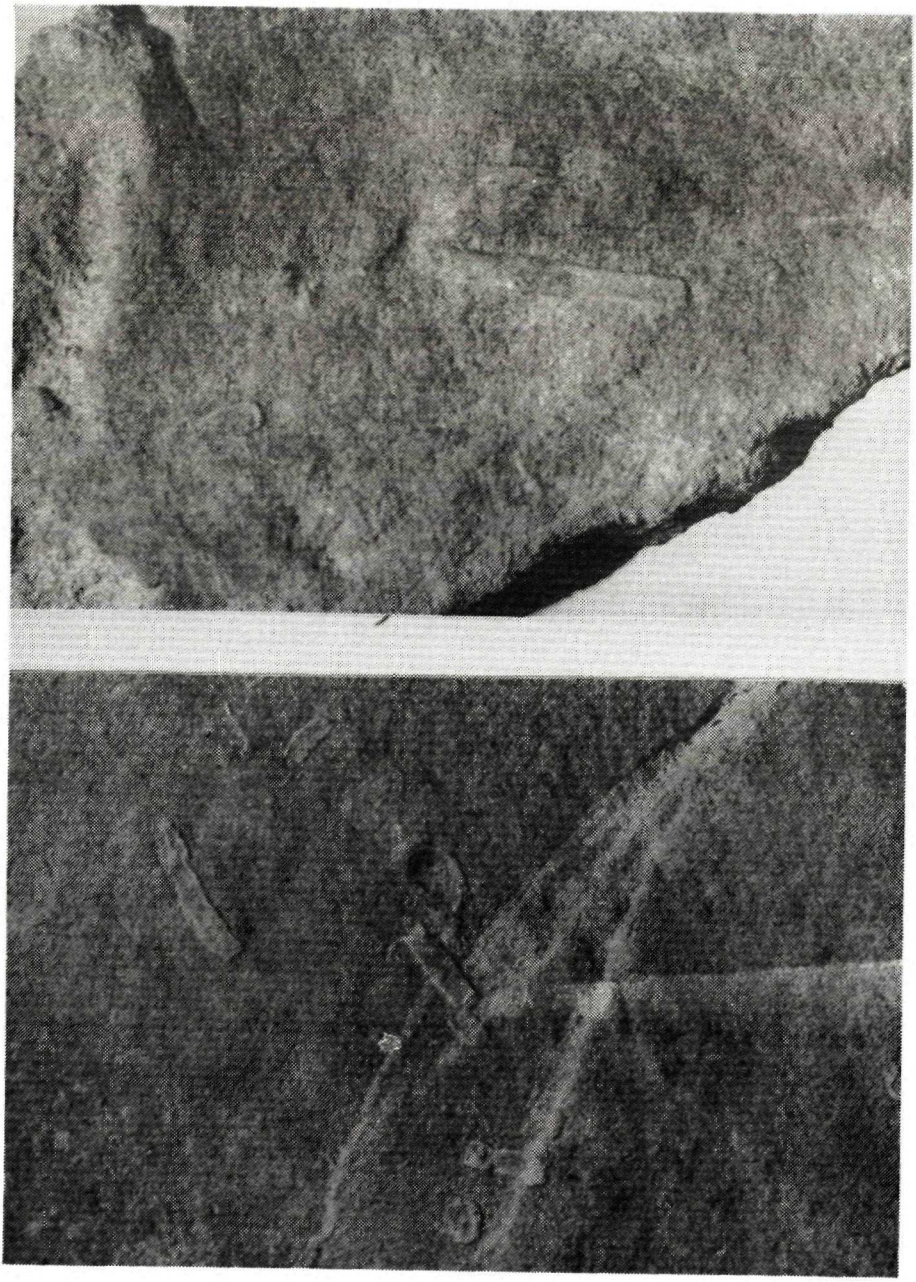


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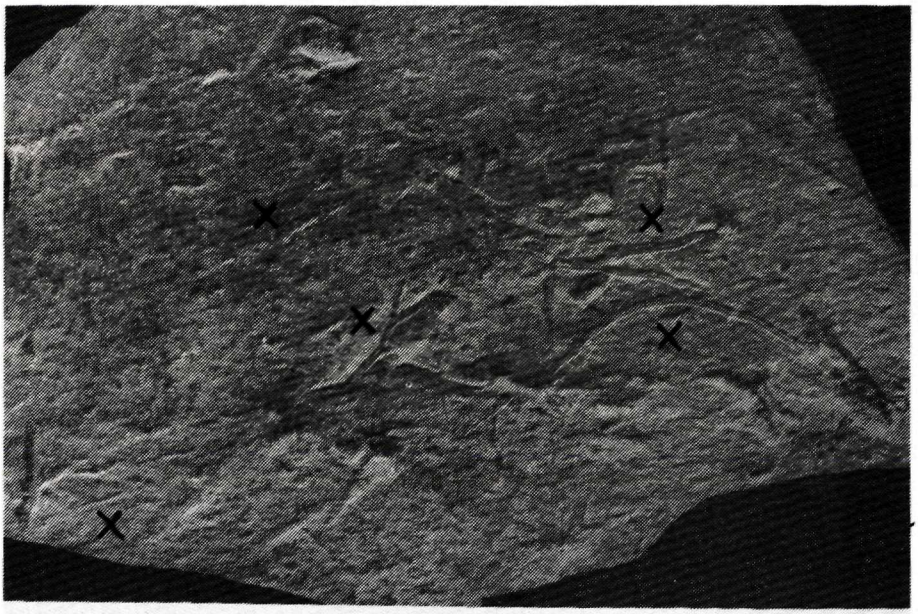

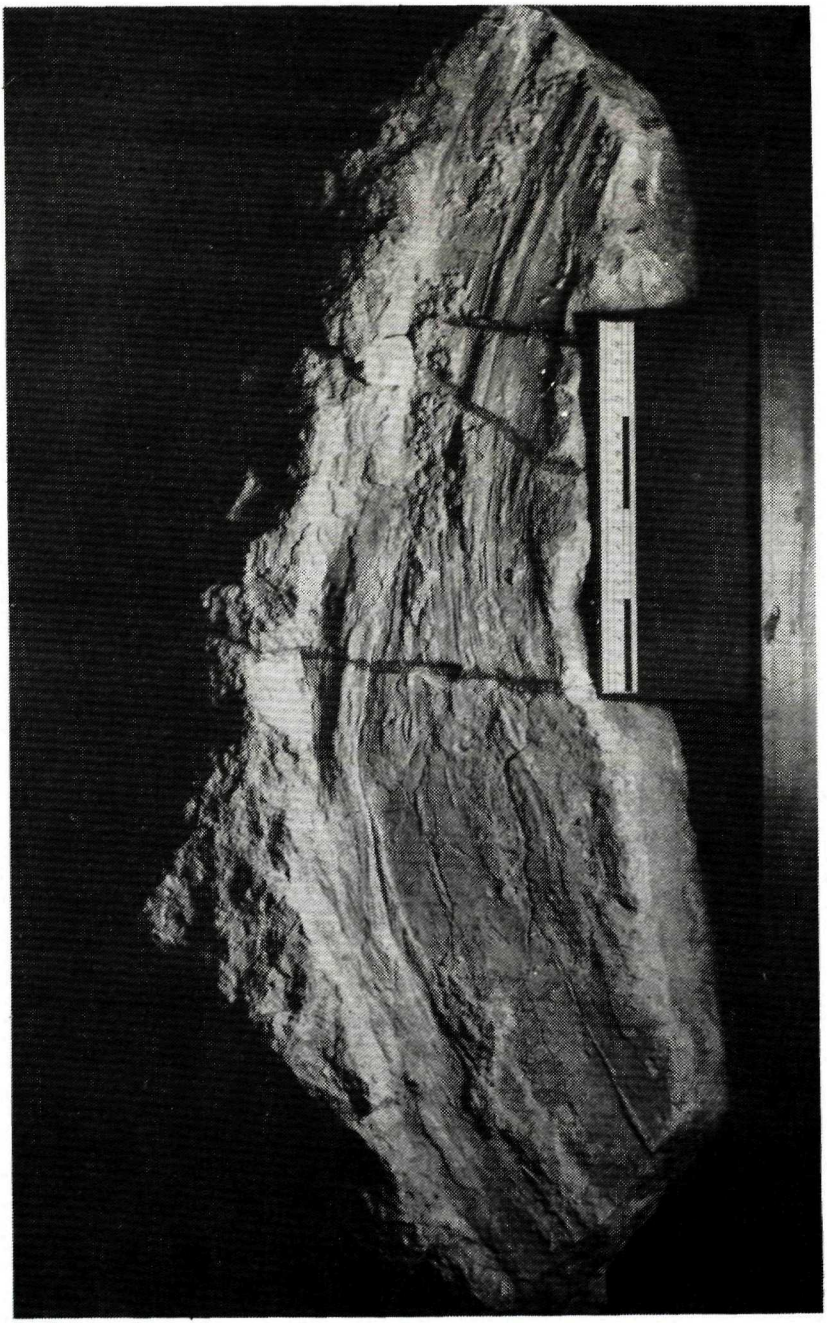

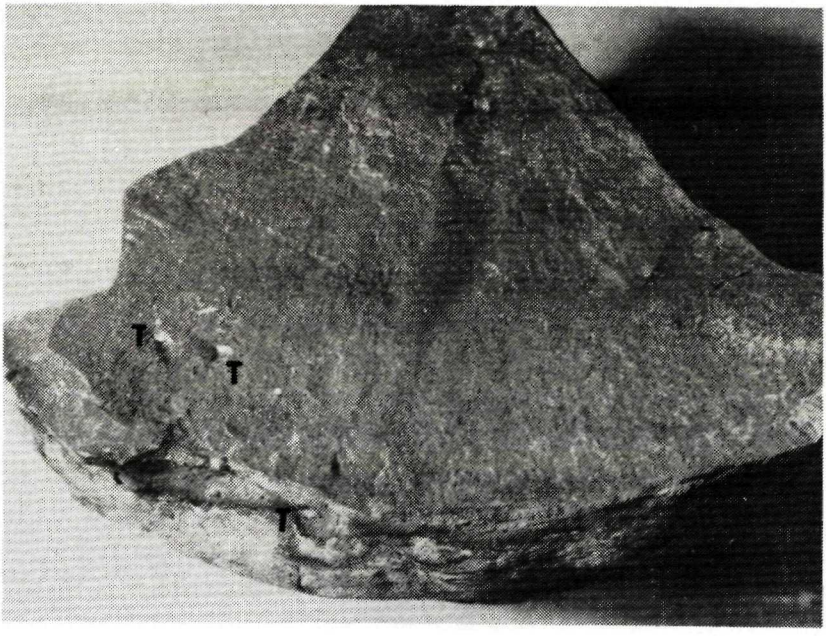
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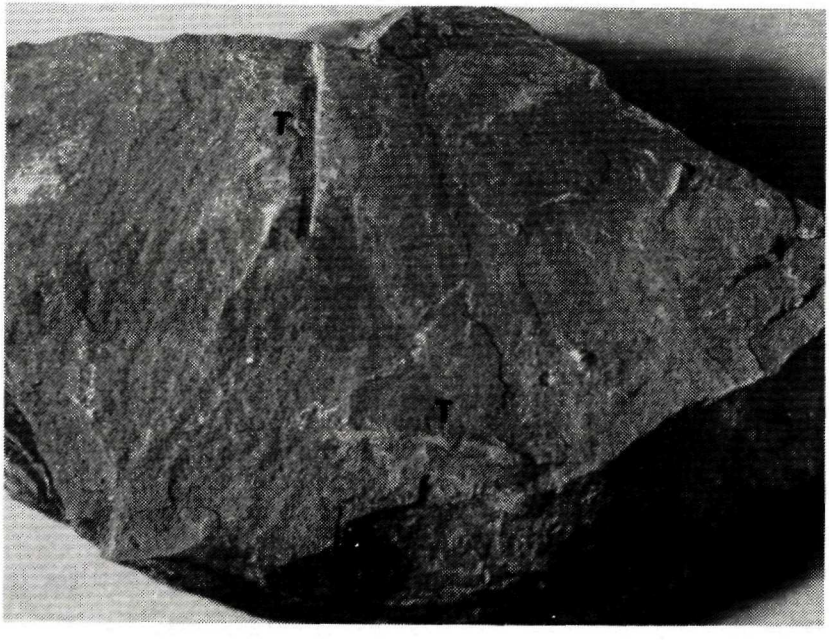
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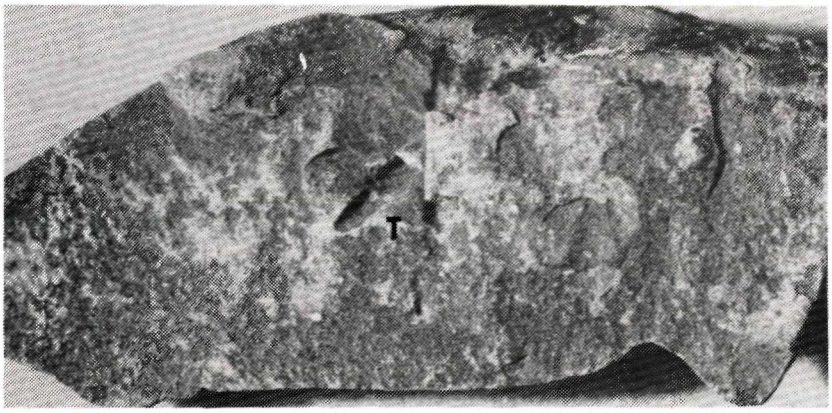
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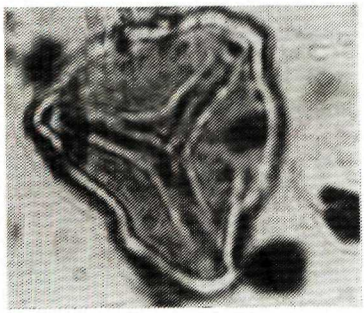

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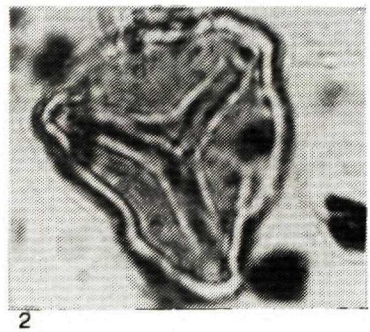

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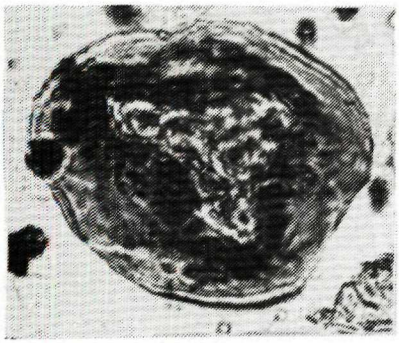

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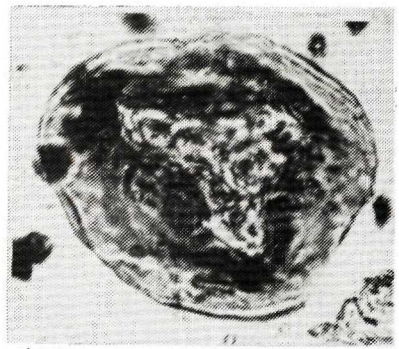

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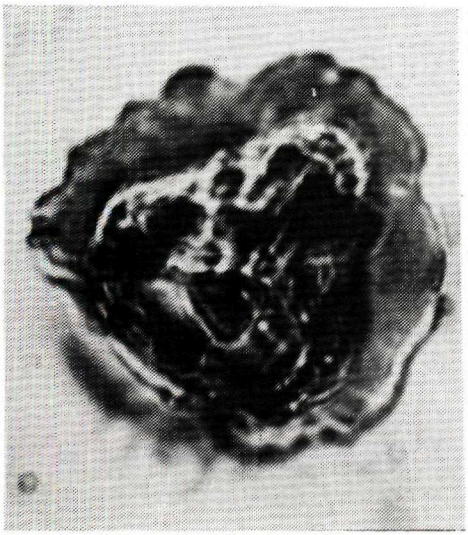

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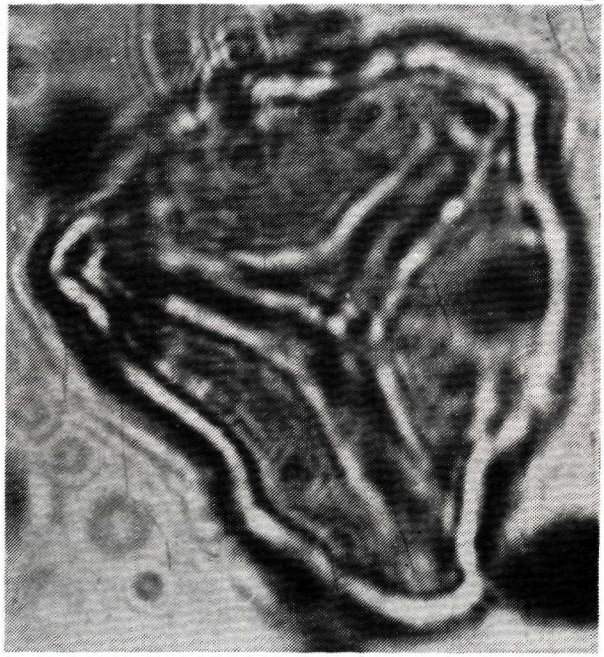

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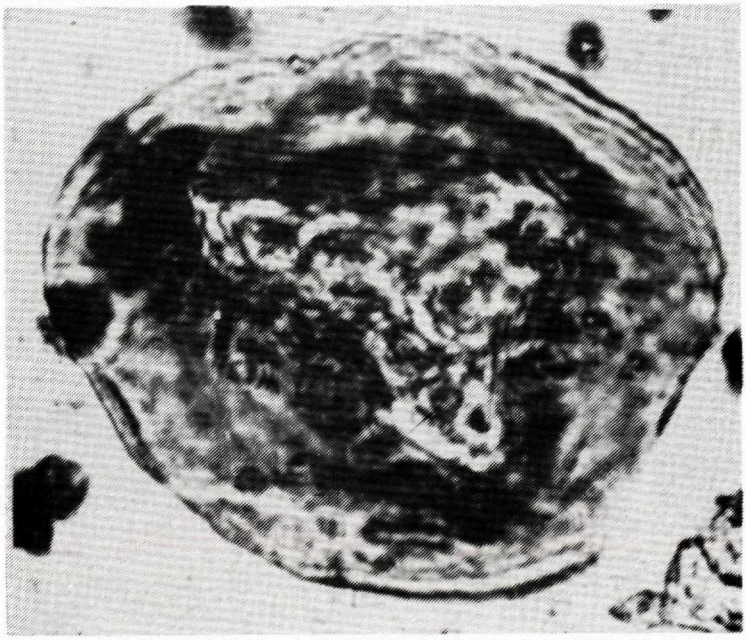

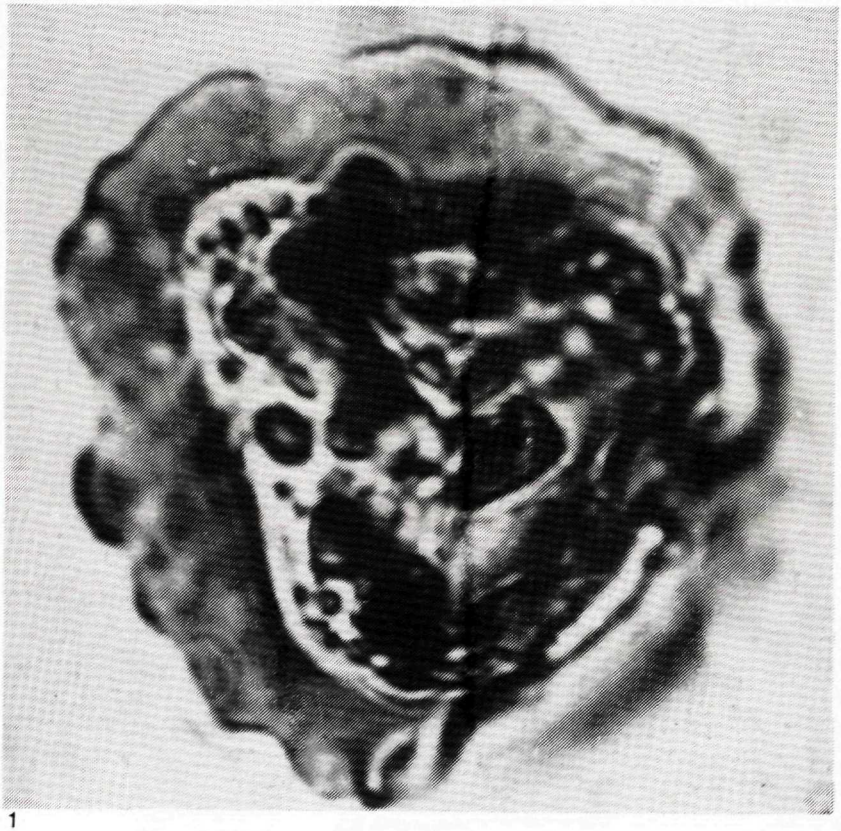

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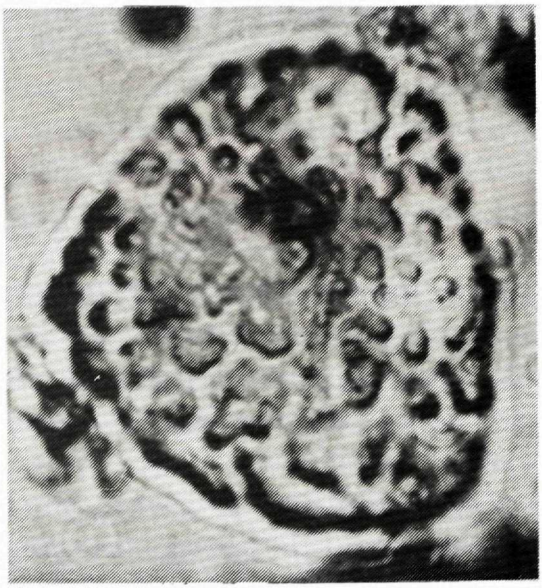
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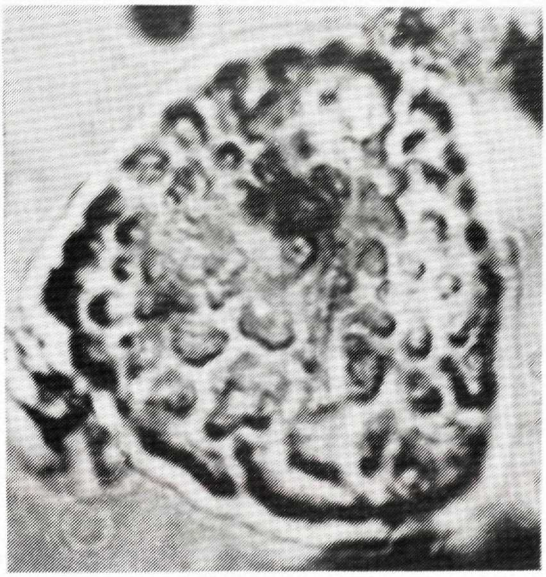
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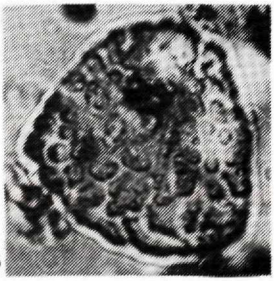
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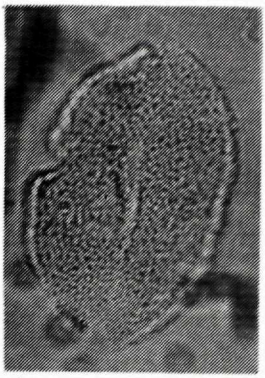
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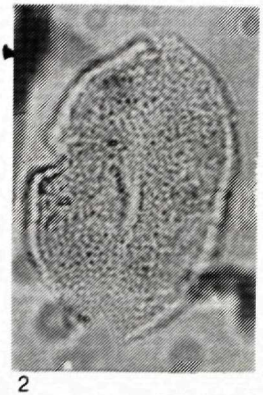
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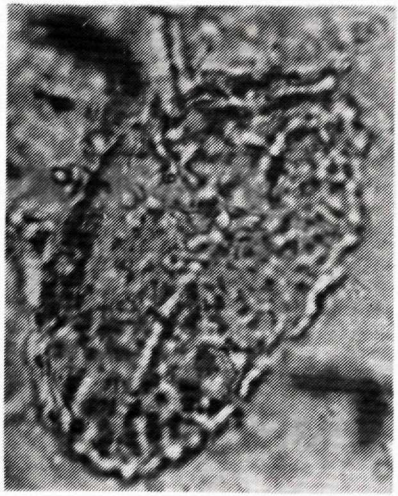
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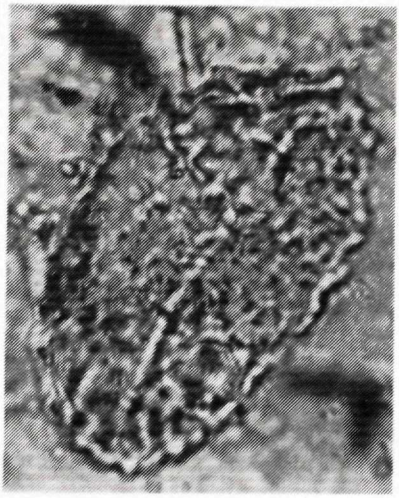
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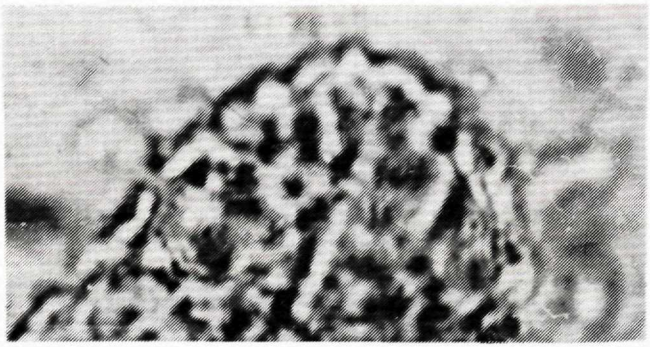
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