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Ostracodes from the Silurian of central Bohemia

Ostrakodi středočeského siluru

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Abstract: In this study 74 ostracode taxa belonging to 47 genera of 6 orders are described. 1 family, 3 genera (*Kolednikella*, *Kosovobolbina* and *Admirabilinella*), 1 subgenus [*Bolbozoe* (*Parabolbozoe*)] and 25 species and subspecies have been newly established. The majority of the ostracodes discussed has been used to compare them with allied genera and species from the Silurian foreign regions and to define the migration relations between them. On the basis of some most frequent species found at the Silurian localities in the Barrandian (between Praha and Beroun) several new local-range ostracode biozones have been added to those erected by Bouček (1936b, 1937), Bouček and Přibyl (1955) and Přibyl (1960). Their present number is 12. The ostracode assemblages (= biozones) have been correlated with graptolite biozones of the Silurian of Bohemia.

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Introduction

Eight Silurian species of seven genera (*Briartina rarissima, Herrmannina solitaria, Isochilina formosa, Bolbozoe anomala, Bolbozoe bohemica, Richteria migrans, Parahippa rediviva* and *Rhomboentomozoe rhomboidalis*) that were described by Barrande (1872) under various generic names are redescribed and refigured in this paper. Simultaneously, all Silurian taxa recorded by Bouček (1936b, 1937) from central Bohemia and the species described by Bouček and Přibyl (1955) have been revised and sixty-nine new or very little known ostracode species coming from the Motol Member of the Liteň Formation and from the Kopanina and Přídolí Formations are described. All taxa have been found in the area between Praha (Prague), Suchomasty, Koněprusy and Králův Dvůr near Beroun. The author had also the opportunity to study several Upper Silurian species from central Bohemia described by Krůta (1980).

Bouček (1936b) placed in the uppermost Bohemian Silurian also the ostracode assemblage from Javorka Hill near Karlštejn, derived from beds overlying the several metres thick *Scyphocrinites* layer. This, however, belongs to the basal part of the Lower Devonian (Lochkovian) and the ostracodes it contained to the biozone with *Acanthoscapha bohemica* and *Ulrichella remesi*.

From the Bohemian Silurian here are described for the first time several genera (e.g. *Aitilia*, *Craspedobolbina*, *Cryptophyllus*, *Hemiaechminoides*, *Kloedenella*, *Shiderelites*), which were thus far known mainly from the Silurian of England, Scandinavia (Gotland) and partly from North America, where they constitute characteristic taxa of individual ostracode assemblages. The genera *Aechmina*, *Craspedobolbina*, *Ctenobolbinella*, *Cystomatochilina*, *Cytherellina*, *Cryptophyllus*, *Daleiella*, *Laccochilina*, *Parahippa* and other are represented in the Silurian of central Bohemia by several closely related taxa identified hitherto in the European Silurian, chiefly in Gotland and Great Britain. The genus *Shiderelites* is represented in the middle part of the Motol Member by the species *Shiderelites bouceki* sp. n., which is very near to the North American species *Shiderelites typus* MORRIS and HILL, 1951, from the Waldron Shale, Indiana. The type species of the genus *Hemiaechminoides* (*H. monospinosus*) MORRIS and HILL, 1952 comes from the Newson Shale of Tennessee (USA). The species *Hemiaechminoides monstratus* sp. n., however, was ascertained in the basal beds of the Kopanina Formation, and is as yet the only species of *Hemiaechminoides* found in the Silurian of Bohemia. In contrast, the representatives of the genus *Cystomatochilina* have been assessed in the Ordovician of Europe and North America and in the Silurian of Europe and Asia, and the genus *Laccochilina* in the Ordovician of Europe and North America. Recently, both genera have been recognized in the Silurian of central Bohemia. The genus *Parahippa* has been discovered not only in the Motol Member, being present in two species (*Parahippa lodenicensis* sp. n. and *P. droseron* sp. n.) but also in the upper Kopanina Formation and throughout the Přídolí Formation [*Parahippa rediviva* (Barr.)].

The genera *Aechmina*, *Aparchites*, *Briartina*, *Herrmannina*, *Isochilina* and *Cryptophyllus* are of a considerable stratigraphic, almost cosmopolitan distribution. The preponderant part of these genera occurred in the Lower Palaeozoic (Ordovician, Silurian and Devonian) of Europe, North America, Asia and Australia. The genus *Cryptophyllus* was found in all world regions (except Antarctic) where the Lower and Upper Palaeozoic exists. The interesting genus has only recently been discovered in Bohemia, namely in the Kopanina Formation, where it is very frequent, and in the lower layers of the Přídolí Formation.

Survey of previous studies

The Silurian ostracode fauna of Bohemia was studied first by BARRANDE, who in 1872 described eight Silurian species which are now assigned to seven genera. In addition, he recorded several species of Ordovician and Devonian age. As late as in 1930' BOUČEK (1936a,b, 1937) published two relevant papers on the Silurian ostracodes of Bohemia. This palaeontologist described not only more than sixty species from many Bohemian localities but also thirteen new genera and subgenera [e.g. *Alanella* (recte *Acanthoscapha*), *Basslerella* (recte *Boucia*), *Berounella*, *Budnia-*

nella, Daleiella, Ectoprimitia, Karlsteinella, Mirochilina, Neoaparchites, Novakina, Tricornina, Ulrichella and *Vltavina*] and several families and subfamilies. Of these more than sixty species originally reported from the Silurian, thirty-four belong in reality to the Lower Devonian (Lochkovian), because they occur above the several metres thick *Scyphocrinites* bed, which forms the boundary between the Upper Silurian and Lower Devonian. The *Scyphocrinites* bed itself is placed in the Lower Devonian, as is the Javorka locality near Karlštejn, where Bouček's specimens were collected.

In 1955 BOUČEK and PŘIBYL described ten more Upper Silurian species and one new genus (*Kosoviellina*). Since 1950' the investigation of the Bohemian Silurian and Devonian ostracodes has been carried out by PŘIBYL, who during 1950—1958 described many new genera and species and discovered a number of genera thus far unrecorded from Bohemia. Additionally, it was KRŮTA who started to study Silurian ostracodes in 1980. This author described and depicted in his manuscript eight known and new taxa, including three new genera (*Klonkina, Vania* and *Ziva*). Even before (in 1968) he described the genus *Orechina* from the Upper Ordovician of Bohemia, and in cooperation with SCHALLREUTER (1980) recorded the representatives of the genus *Hippula*. In 1986 Krůta described the genus *Klonkina*.

Mode of Preservation

Most Bohemian ostracodes from the Liteň, Kopanina and Přídolí Formations are preserved only as internal moulds of individual valves ascertained in black-grey to grey platy and flaggy limestones, calcareous concretions or calcareous to mixed shales. Individual specimens of ostracodes also occur in the tuffaceous layers of the lower part of the Kopanina Formation or in massive grey to grey-brown limestone of the Ananaspis fecunda Horizon. They are well preserved in part; the smooth-shell podocopid and platycopid genera and species are possible to obtain as complete carapaces free from the matrix. Many well preserved ostracodes have been found in the platy limestones of the lower part of the Přídolí Formation, especially in the Pseudomonoclimacis? ultima Biozone. Absence of complete carapaces in these limestones may indicate the dissociation of valves due to current action prior to burial.

Palaeoecology

Most well preserved Silurian ostracodes and their mode of preservation indicate that they lived in relatively quiescent, warm shallow water of the marine environment as the inhabitants of vagrant benthos. Among the marine ostracodes of the Silurian of central Bohemia, some belong to groups of genera and species that were probably crawlers and burrowers and other could have belonged to forms that were

probably capable of swimming for short distances just above the bottom. Of this type might have been especially the forms of myodocopid ostracodes; it is known that antennae of the recent myodocopid ostracodes are modified as swimming organs. The crawlers, which occasionally swim over a small distance, are not true swimmers. Many of the crawlers belong to the ornamented species. Ostracodes with smooth carapaces lived probably on fine sedimentary bottom. The swimming ostracodes could have been omnivorous and the crawling and burrowing species probably fed on detritus on the sea floor.

Ocean currents and bottom play an important role in the distribution of recent ostracodes. Also the supply of food is an important factor in their distribution. It may be supposed that the same held true also for the Palaeozoic marine benthic ostracodes. The distribution of ostracode genera and species, however, is largely a function of species abundance, which may be limited to varying degrees by environmental factors (e.g. salinity, temperature, water depth, light, food, water circulation, type and stability of substrate). BENSON (1959, 1961), BRONDOS and KASLER (1976), ELOFSON (1941) and other authors ascertained that many of these ecological factors are highly intercorrelated, and that in evaluating their effects on an ostracode assemblage the mode of life of ostracodes must be considered. ELOFSON (1941) showed that the number of marine species decreased with the lowering of salinity and that some species are restricted to colder waters, well-defined depth zones, or particular kinds of substrates. He also observed that the carapaces of shelf species inhabiting similar environments have often a similar structure, such as burrowers often having smoother and more strongly calcified valves than non-burrowing benthic forms. This author pointed out that the marine ostracodes are larger in cold waters than in warmer water. BENSON (1959) noted that the structure and abundance of plants was a major biological factor in determining the distribution of ostracodes, particularly in shallow waters. The abundance and diversity of ostracode species are related to environmental conditions and may be high in the nearshore zone.

It is very probable that the Palaeozoic ostracodes lived in environmental conditions of the early oceans and seas analogous to those in which recent species exist.

Terminology

The terminology used here to describe the Silurian ostracodes of Bohemia is mostly after KESLING (1951), JAANUSSON (1957), MARTINSSON (1962), BERDAN and COPELAND (1973), COPELAND (1977, 1982) and Treatise (1961). The orientation of ostracode valves adopted is that of KESLING (1951), JAANUSSON (1957), MARTINSSON (1962), COPELAND (1977, 1982) and others.

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Systematic descriptions

Class *Ostracoda* LATREILLE, 1806

Order *Leperditiida* POKORNÝ, 1953 (= *Leperditicopida* SCOTT, 1961)

Superfamily *Leperditiacea* JONES, 1856

Family *Leperditiidae* JONES, 1856

Genus *Briartina* Kegel, 1932

Type species: *Leperditia quenstedti* GÜMBEL, 1874. Middle Devonian of Germany.

Briartina ? rarissima (Barrande, 1872)

Pl. I, fig. 2

1872 *Leperditia rarissima* sp. n.; BARRANDE, p. 531, pl. 27, fig. 21.
1934 *Leperditia rarissima* BARRANDE; BASSLER - KELLETT, p. 398.
1936a *Leperditia (Briartina) rarissima* BARRANDE; BOUČEK, p. 6.
1936b *Leperditia (Briartina ?) rarissima* BARRANDE; BOUČEK, p. 36.
1954 *Leperditia rarissima* BARRANDE; HUGHES, p. 43.

Holotype: Left valve figured by BARRANDE (1872) on pl. 27, fig. 21 and here on pl. I, fig. 2 (NM-ČE 1 196, Inv. No. 1 614; NM-L 23 659).

Type stratum and type locality: Lower layers of the Kopanina Formation. According to BOUČEK (1936b) the holotype of this species was found with "*Cromus*" *beaumonti* and "*Encrinurus*" *transiens*. Kosoř near Praha.

Material: Holotype only.

A detailed description of this species was given by Barrande (1872, p. 531). It was first figured and described as *Leperditia rarissima*. The holotype figured here is a subelongate left valve with a broken-off surface; only posterior part of the surface is preserved. Anterior end narrowly rounded, sloping ventrally to more broadly rounded posterior margin. Free margin smooth, regularly curved, evenly convex. Hinge line long and straight occupying nearly six-sevenths the valve length. Anterior and posterior cardinal angles are hidden by the rock. Greatest length in dorsomedian part, greatest height in the posterior part of valve. Large, slightly subovate adductor muscle spot near dorsal margin in the posterior part of the anterior half of valve; it consists of numerous secondary scars. From this adductor spot many fine laths or ridges divergent down and obliquely backwards. Small anterodorsal eye spot in front of adductor scar. Lateral surface mooth

Dimensions of holotype: Length 20.4 mm; height 10.1 mm. L/H ratio: 2.01.

Discussion: This species was figured by BARRANDE (1872) on pl. 27, fig. 21, who assigned it to *Leperditia* ROUAULT, 1851. BASSLER and KELLETT (1934) left it with the same genus. Later BOUČEK (1936b) referred this species to *Leperditia*

(*Briartina ?*) KEGEL, 1932 but with some doubt. For the present I place it with hesitation in the genus *Briartina* with respect to the shape of valve which agrees with the typical representatives of this genus.

Occurrence: This species is known from Kosoř near Praha from the lower layers of the dark grey limestone of the Kopanina Formation. Horizon with "*Cromus*" *beaumonti*, together with *Bohemograptus bohemicus* and *Colonograptus colonus* (= lower Ludlow).

Subfamily *Herrmanninae* ABUSHIK, 1958

Genus *Herrmannina* KEGEL, 1933

Type species: *Herrmannella waldschmidti* PAECKELMANN, 1922. Middle Devonian of Germany.

Herrmannina solitaria (BARRANDE, 1872)

Pl. II, figs. 1–4

1872 *Leperditia solitaria* sp. n.; BARRANDE, p. 532, pl. 23, figs. 1–5; pl. 34, figs. 14–17.
1934 *Leperditia solitaria* BARRANDE; BASSLER - KELLETT, p. 400 (see synonymy).
1936a *Leperditia (Hermanella) solitaria* BARRANDE; BOUČEK, p. 6.
1936b *Leperditia (Hermanella) solitaria* BARRANDE; BOUČEK, p. 36.
1954 *Leperditia solitaria* BARRANDE; HUGHES, p. 43.

Holotype: Carapace figured by BARRANDE (1872) on pl. 23, figs. 1–5 and on pl. 34, figs. 14–17. (NM-ČE 1 195, Inv. No. 1 699; L-23 656).
Type stratum and type locality: Uppermost cephalopod band of the Přídolí Formation. Karlštejn.
Material: Holotype only.

Description: *Herrmannina solitaria* was originally established by BARRANDE (1872, p. 532) and placed to *Leperditia*. Valves of the well preserved carapace are large, elongate subovate in lateral view. Anterior margin lower than posterior. Right valve larger, overlapping left valve along the entire free margin except at hinge; maximum overlaps ventrally. Hinge line straight, occupying two-thirds greatest length. Maximum height posterior, maximum length above midvalve. Cardinal angles obtuse, about 115—120°. Anterior end narrowly rounded, sloping ventrally to more broadly rounded ventral and posterior margins. Relatively large adductor muscle scar with numerous, uniform-size tubercles, is located in the posterior part of the anterior half of valve. Eye spot small, near dorsal margin. Chevron-like muscle scar subjacent the eye spot. Lateral surface smooth. In dorsal view the carapace is elongate subovate in shape, of largest thickness about the middle. The posterior end of valves pointed, the anterior obtusely pointed.

Dimensions of holotype: Length 14.3 mm; height 9.15 mm (right valve), 8.40 mm (left valve); width 6.40 mm. L/H ratio: 1.56.

Discussion: This species is distinguished from many other species of *Herrmannina* by the large size of valves, a large overlap, greatest ventrally, and by the presence of eye spot. Only *H. phaseolus* (HISINGER, 1831) from the Silurian of Gotland and Ukraine is similar to *H. solitaria* (BARR.) but is not conspecific with it as supposed by KRANDIJEVSKY (1963, p. 15).

Occurrence: Karlštejn, Přídolí Formation, very rare in the uppermost layers of the Přídolian, in the band with cephalopods.

Family *Isochilinidae* SWARTZ, 1949

Genus *Isochilina* JONES, 1858

Type species: *Leperditia (Isochilina) ottawa* JONES, 1858. Middle Ordovician of Canada.

Isochilina formosa BARRANDE, 1872

Pl. I, fig. 1

1872 *Isochilina (Leperditia) formosa* sp. n.; BARRANDE, p. 534, pl. 23, figs. 22–25; pl. 34, figs. 1–3.
1891 *Isochilina (Leperditia) formosa* BARRANDE; JONES, p. 79.
1934 *Isochilina formosa* BARRANDE; BASSLER - KELLETT, p. 339.
1936a *Isochilina formosa* BARRANDE; BOUČEK, p. 6.
1936b *Isochilina formosa* BARRANDE; BOUČEK, p. 36.
1954 *Leperditia (Isochilina ?) formosa* BARRANDE; HUGHES, p. 43.

Holotype: Incomplete right valve figured by BARRANDE (1872) on pl. 23, figs. 22–25; pl. 34, figs. 1–3 (NM-ČE 1 197, Inv. No. 1 694; L 23 657).
Type stratum and type locality: Uppermost layers of the Přídolí Formation. Praha - Podolí (= formerly Dvorce.)
Material: Holotype only.

A detailed description of this species was given by BARRANDE (1872, p. 534). Up to now we know only the right valve of holotype, which is very large (29 mm) but incomplete; the posterior part of the valve is broken off and the most part of the lateral surface is exfoliated. Only the anterior part and the ventral margin are preserved. It is characterized by a typical elongate shape of valve, whose L/H ratio is 1.69. Eye spot evident but not large, near dorsal margin. Adductor muscle scar large with numerous uniform-size tubercles. Dorsal margin straight, about seven-tenths the greatest length. Shallow, but distinct subtriangular furrow on lateral surface posteriorly to eye spot and extending from the base of dorsal margin to posterodorsal edge of adductor scar. Chevron scar present. Free margin with flat border. Surface smooth but uneven.

Dimensions of holotype: Length 29.0 mm; height 17.1 mm. L/H ratio: 1.69.

Discussion: A strikingly large size and the form of valve differentiates this species from most of the known *isochilinids*.

Occurrence: Rare in the dark grey limestone of the uppermost layers of the Přídolí Formation, in the Colonograptus transgrediens Biozone. Praha - Podolí (formerly Dvorce; Dworetz, according to BARRANDE, 1872).

Order *Beyrichiida* POKORNÝ, 1953
(= *Palaeocopida* HENNINGSMOEN, 1953)

Suborder *Beyrichiomorpha* HENNINGSMOEN, 1953

Superfamily *Beyrichiacea* MATTHEW, 1886

Family *Beyrichiidae* MATTHEW, 1886

Subfamily *Craspedobolbininae* MARTINSSON, 1962

Genus *Craspedobolbina* KUMMEROW, 1924

Type species: *Craspedobolbina dietrichi* KUMMEROW, 1924, from a drift boulder in the German Democratic Republik. Silurian, late Llandovery or early Wenlock.

Craspedobolbina (*Artiocraspedon*) SIVETER, 1980

Type species: *Craspedobolbina* (*Mitrobeyrichia*) *boltoni* COPELAND, 1974. Lower Chicote Formation, Upper Silurian of Anticosti Island, Quebec.

Craspedobolbina (*Artiocraspedon*) *morinensis* sp. n.

Pl. V, figs. 5–7; pl. XII, fig. 3; text-fig. 3/1

Name: After Mořina locality near Karlštejn.

Holotype: Right tecnomorphic valve figured here on pl. V, fig. 6 (AP-SV-12).

Type stratum and type locality: Lower layers of the Kopanina Formation. "Amerika" quarry, field 18, near Mořina.

Material: Apart from the holotype a few immature and over twenty-five full-grown tecnomorphic specimens have been found.

Description: Valves subamplete to preplete in lateral outline with straight hinge line occupying about five-sixths of the total length. Anterior margin convex, rather higher than the posterior margin. Ventral margin convex. Anterior and posterior cardinal angles obtuse; anterior angle approximately 100—105°, posterior about 95—98°. Anterior lobe (L_1) directly confluent with syllobium. Preadductorial node (L_2) elevated relative to the broad and convex anterior lobe and syllobium. Prenodal sulcus (S_1) narrow and shallow. Adductorial sulcus (S_2) smooth, deep, running out from the middle of the dorsal margin, nearly vertical, up to 2/3 distance from dorsal margin to the velum. L_2 and syllobial lobe are connected in the ventromedial part of the valve with broad, but slightly marked zygal arch. Syllobial groove absent. Tecnomorphs with a relatively broad velum with fine striae, extending

along free margin, widest midventrally. Between the velum and the internal part of valve is a distinct furrow or depression. On the lateral surface of the well preserved specimens there is scarce granulation and reticulation, except for S_2 and velum.

Dimensions: Length of holotype 0.96 mm; height 0.65 mm (AP-SV-12). Paratypes (AP-SV-11; AP-SV-13—14). Length 0.95—1.07 mm; height 0.65 to 0.71 mm. L/H ratios ranging from 1.47 to 1.50; ⌀ 1.48. Immature specimens (instars 4.—7.) have 0.58—0.81 mm in length and 0.37—0.42 mm in height. Average adult specimens are 0.95—1.07 mm in length and 0.65—0.71 mm in height.

Discussion: This species resembles *C. (A.) glabra* (HARPER, 1940) from the middle and upper Telychian (= lower Llandovery) of England in general outline of valve, but it may be easily distinguished by a smaller valve with a broader but less marked zygal arch and a smaller preadductorial node (L_2) lying lower than in *C. (A.) glabra*. S_2 is deeper and smooth, practically vertical. Lateral surface of *C. (A.) morinensis* sp. n. is sparsely granulated to reticulated. This new taxon is similar to *C. (A.)* aff. *glabra* (HARPER, 1940) — (cf. KRŮTA MS, 1980) from the upper Přídolí Formation of Bohemia, but is distinguishable from it in having a different shape of valve, narrower velum, and sparsely granulated to reticulated lateral surface. In my opinion *C. (A.)* aff. *glabra* KRŮTA, 1980 MS (non HARPER, 1940) represents a new species of *Craspedobolbina* (*Artiocraspedon*).

Occurrence: Type locality only, relatively common. Lower layers of grey to white-grey platy limestones of the Kopanina Formation, "Cromus" beaumonti Horizon (= lower Ludlow).

Genus *Aitilia* MARTINSSON, 1962

Type species: *Aitilia calcarata* MARTINSSON, 1962. Silurian of Gotland.

Aitilia kosoviana sp. n.

Pl. III, figs. 1, 2, ?3; text-fig. 2/7, 8

Name: This species is named after the type locality Kosov.

Holotype: Left heteromorphic valve figured here on pl. III, fig. 1 (AP-SV-01).

Type stratum and type locality: Kopanina Formation, underlying beds of the *Saetograptus linearis* Biozone. Kosov quarry near Beroun.

Material: Holotype and twelve well preserved tecnomorphic and heteromorphic valves (mostly internal moulds).

Description: A species of *Aitilia* with narrow velum in both sexes and long sausage-shaped crumina in heteromorphs; a very small calcarine tubercle near the mid-ventral part of tecnomorphs, which is often missing. Valves elongate subovate in lateral outline, slightly amplete to preplete, with a straight hinge line occupying about five-sixths of the total valve length. Its maximum length in the midvalve; the

maximum height in the middle part of valve or near the midvalve. Anterior margin broadly rounded, more convex than the posterior one. Anterior and posterior cardinal angles obtuse. Ventral margin gently curved. Anterior lobe (L_1) smaller than sylobium (S_3). Preadductorial node (L_2) ovate, situated in front of adductorial sulcus (S_2), which is relatively wide, smooth, curved ventrally. Free margin smooth. Lateral surface densely granulated, punctation indistinct. On the lateral surface of well preserved valve from Kozolupy well developed scattered pits. Hinge unknown.

Dimensions: Length of holotype 1.64 mm; height of holotype 1.10 mm. (AP-SV-01). Length of other specimens (AP-SV-02 to 07; AP-SV-47), 1.07 to 1.38 mm; and height 0.56 to 0.70 mm. L/H ratio: ranging from 1.49 to 1.97; ⌀ 1.79.

Discussion: This representative of *Aitilia* MARTINSSON, 1962 has been recognized for the first time in the Upper Silurian of Bohemia. *A. kosoviana* sp. n. seems to be related to some species of *Aitilia* from Gotland, especially to *A. calcarulata* MARTINSSON, 1962. It is distinguished from them in having a longer S_2 and lengthened crumina, often without calcarine spine and with denser granulation. The adult tecnomorphs have larger dimensions (1.60—1.64 mm long) and L/H ratio is different: ⌀ 1.79.

Occurrence: Kosov quarry near Beroun. In the brownish tuffaceous shales and tuffaceous flaggy limestones of the Kopanina Formation, beds underlying the *Saetograptus linearis* Biozone, together with rich benthic brachiopod fauna and "*Encrinurus*" *transiens*.

Aitilia cf. jaanussoni SETHI, 1979

Pl. VII, fig. 1

cf. 1979 *Aitilia jaanussoni* sp. n.; SETHI, p. 165, fig. 52A–H.

Remarks: Only one tecnomorphic valve has been found during the present study. This specimen appears to be related more intimately to *Aitilia jaanussoni* SETHI, 1979, from the Wenlockian Högklint Limestone of Gotland (see SETHI, fig. 52E). A calcarine spine of the specimen is broken off, but it lies close below the level of S_2; in the type species of *A. jaanussoni* it lies lower, close above the velum. Therefore I designate this Bohemian specimen as *Aitilia cf. jaanussoni* SETHI, 1979.

Dimensions: Length 1.42 mm; height 0.85 mm. L/H ratio: 1.67.

Occurrence: "Kouřící" lom near Kozolupy, not far from Mořina. Brownish organodetrital limestones of the lower layers of the Kopanina Formation, "Cromus" beaumonti Horizon (= lower Ludlow).

Genus *Kolednikella* gen. n.

Type species: *Eurychilina(?) inexspectata* BOUČEK and PŘIBYL, 1955. Upper Silurian of Bohemia.
Synonym: *Eurychilina* in BOUČEK and PŘIBYL, 1955; *Beyrichia* in BOUČEK and PŘIBYL, 1955.

Diagnosis: Unisulcate ostracodes with punctate or punctate-granulose valves and narrow, smooth, entire concave velum. Adductorial sulcus (S_2) distinct, deep, S-shaped to arcuately bent forwards, lies in the dorsomedian part of each valve. Prenodal sulcus (S_1) indistinct or absent. Long, sausage-shaped crumina occupying most of the ventral border tapers slightly posteriorly, without spur or spine in the posteroventral part of crumina. Preadductorial node (L_2) in front of S_2; node is visible, but almost fused with the anterior part of the valve wall. Syllobium (L_3) relatively wide, slightly convex.

Discussion: The tecnomorphic valves of the type species of this genus (*Koledníkella inexspectata*) has previously been assigned to *Eurychilina* ULRICH, 1889 and the heteromorphic valve to *Beyrichia* MC COY, 1846. *Koledníkella* g. n. differs from *Eurychilina* in having a narrower, smooth, concave velum in both sexes and a shorter sausage-shaped crumina in heteromorphs. The lateral surface of valves is distinctly punctate or punctate-granulose. This genus appears to be intermediate between *Aitilia* and *Loutriella*. From *Aitilia* it is distinguished by the absence of spur in the posteroventral part of crumina in heteromorphs, or a calcarine spine near the midventral to posteroventral part of velum in tecnomorphs. From the genus *Loutriella* it differs in having an adductorial sulcus, deep S-shaped to arcuately bent forwards, a quite different shape of crumina in ventral view, and a distinct L_2. No dolonoid scar and fold. *Koledníkella* g. n. shows closer affinity to *Loutriella* than to *Aitilia* and *Clientiella*.

Koledníkella inexspectata (BOUČEK and PŘIBYL, 1955)

Pl. III, fig. 5; pl. VI, figs. 2, 3; text-fig. 1/2–8

1955 *Eurychilina ? inexspectata* sp. n.; BOUČEK - PŘIBYL, pp. 590–591, 617–619, 642–644; pl. 1, figs. 4–7; pl. 3, figs. 1–3 (= tecnomorphic valves).

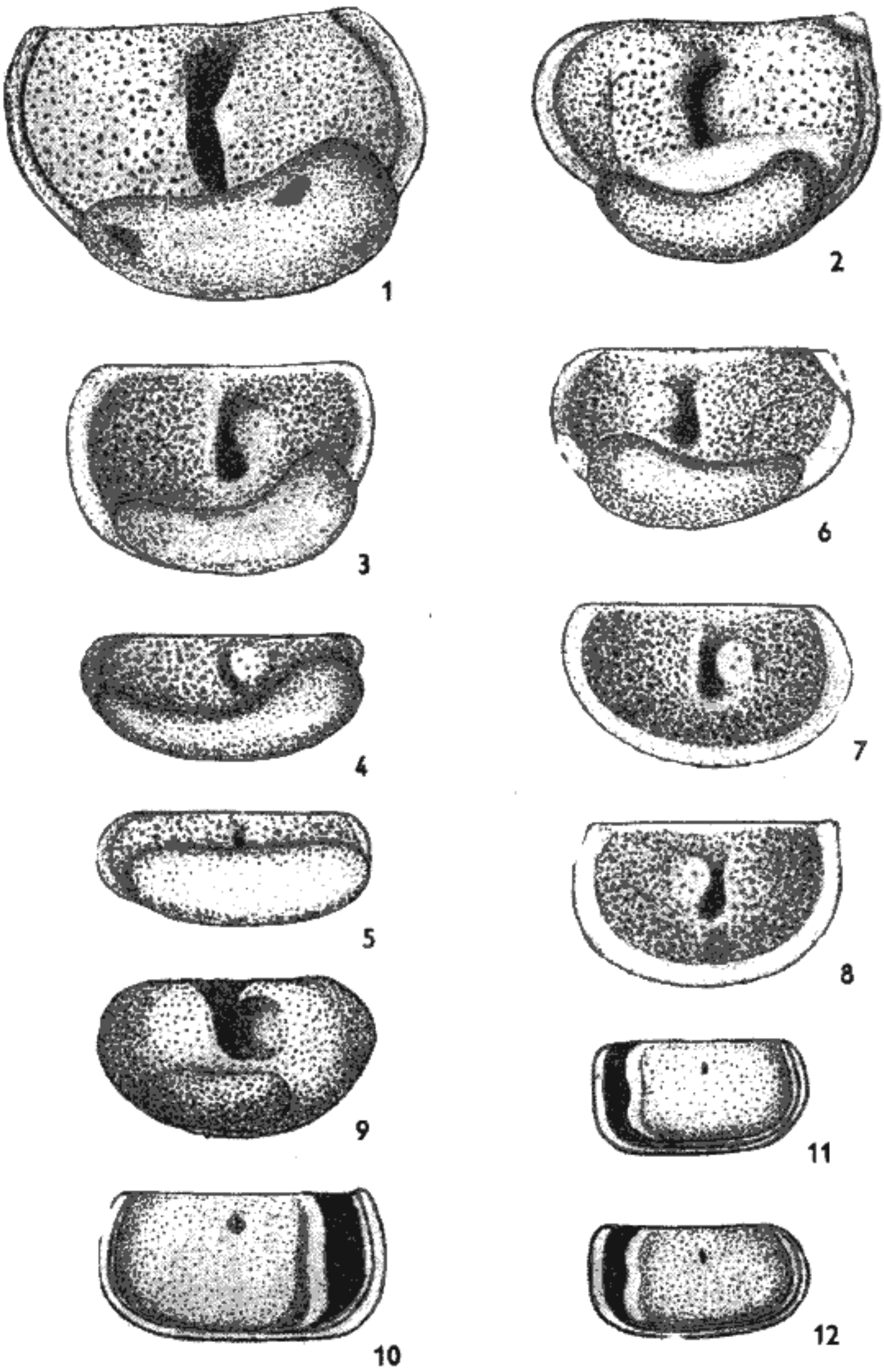
1955 *Beyrichia inusitata* sp. n.; BOUČEK - PŘIBYL, pp. 592–593, 620–621, 645–646, pl. 1. fig. 8; pl. 3, fig. 4 (= heteromorphic valve).

Holotype: Right tecnomorphic valve figured by BOUČEK and PŘIBYL (1955) on pl. 1, fig. 6 (NM-L 23 751).

Stratum typicum and type locality: Upper Silurian, Kopanina Formation, *Koledníkella inexspectata* and *Cryptophyllus copelandi* Biozone. Kosov quarry near Beroun.

Material: Over sixty right and left valves of both sexes embedded in the rock. Very good preservation.

Description: Detailed description of the tecnomorphic valves has been given by BOUČEK and PŘIBYL (1955, pp. 642—643). The heteromorphic valves are characterized by a narrow velum, somewhat broadened posteriorly and by a long inflated, smooth, unspured sausage-shaped crumina, widest anteriorly and tapering slightly posteriorly. Adductorial sulcus (S_2) somewhat arcuately bent forwards, runs out from the dorsomedian part of valves; it does not separate the preadductorial node (L_2) from the anterior part. Syllobium (L_3) relatively large, convex. Surface finely



1.1. *Kolednikella insolita* sp.n. Right heteromorphic valve in lateral view. Holotype (AP-SV-45c). × 35. Praha - Jinonice, "Na butovickém hradišti" locality. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

punctate, partly granulated, especially in the anterior and posterior parts of valves. Hinge unknown.

Dimensions: Length of tecnomorphic valves 1.10—1.56 mm; height of tecnomorphic valves 0.70—0.79 mm. L/H ratio: 1.57—1.97; ⌀ 1.77. Length of heteromorphic valves 1.33—1.64 mm; height of heteromorphic valves 0.99—1.12 mm. L/H ratio: 1.34—1.46; ⌀ 1.40.

Discussion: This species appears to be closely related to *Kolednikella insolita* sp. n. from the lower Přídolí Formation of Bohemia but differs from it in having a shorter, more curved S_2, larger L_2, and a narrower crumina in the central and anterior parts of valve.

Occurrence: The quarries Kosov and Koledník (both near Beroun). Kopanina Formation, in the black-grey flaggy limestones with a rich ostracode assemblage of the ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Kolednikella insolita sp. n.

Pl. VI, fig. 1; text-fig. 1/1

Name: From the Latin *insolitus*, unusual.

Holotype: Right heteromorphic valve figured here on pl. VI, fig. 1 (AP-SV-45c).

Type stratum and type locality: Lower part of the Přídolí Formation. Praha - Jinonice, Butovice.

Material: Apart from the holotype (heteromorphic valve) one tecnomorph (internal mould) embedded in the rock.

Description: Valve amplete to slightly preplete, relatively large. Dorsal margin straight, long, rather shorter than the maximum length. Cardinal angles obtuse. Anterior and posterior margins broadly rounded, ventral margin curved. Maximum length and height near midvalve. Anterior lobe (L_1) slightly convex, broad, terminates at hinge line. Preadductorial node (L_2) indistinct, low, anterior to S_2, situated near the midvalve. Syllobium wide, slightly convex, not protruding beyond the hinge line. Adductorial sulcus (S_2) relatively wide, smooth, less curved

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2—8. *Kolednikella inexspectata* (Bouček and Přibyl). 2. Right heteromorphic valve in lateral view. Holotype of invalid species of *Beyrichia inusitata* figured by Bouček and Přibyl (1955) on pl. 1, fig. 8, and on pl. 3, fig. 4. × 32. 3—5. Another heteromorphic valve. Lateral (3), dorsal (4), and ventral (5) oblique views (AP-SV-44). × 24. 6—8. Two left and one right lateral views of three valves (6 = heteromorphic and 7, 8 = tecnomorphic valves) (AP-SV-48, 47, 56). × 24 (6), and × 25 (7, 8). Kosov quarry near Beroun. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

9. *Ctenobolbinella pridoliana* sp.n. Right lateral heteromorphic valve. Holotype (AP-SV-26). × 50. Kosov quarry near Beroun. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

10. *Kosoviellina silurica silurica* Bouč. and Přib. Right valve in lateral view (AP-SV-57). × 50. Kosov quarry near Beroun. Kopanina Formation, ibid. biozone as figs. 2—8.

11, 12. *Kosoviellina silurica pusilla* subsp. n. Two left valves in lateral views. Holotype (11) and paratype (12). (AP-SV-37-38). × 50. Kosov quarry near Beroun. Přídolí Formation, ibid. as fig. 9.

ventrally, situated in the central part of the valve, close above the crumina. Heteromorphic valve with smooth, long sausage-shaped crumina, widest anteriorly and with a concave dorsal contour. Velar ridge in tecnomorphs and heteromorphs relatively narrow. The lateral surface of valve consists of scattered, relatively dense punctae and densely spaced fine granulae. Hingement not observed.

Dimensions of holotype: Length 1.56 mm; height 1.15 mm. L/H ratio: 1.35. Length of tecnomorphic valve is 1.42 mm and height 0.82 mm (AP-SV-45). L/H ratio: 1.73.

Discussion: This is the youngest known *Kolednikella* species recorded from the Upper Silurian (Přídolian) of Bohemia. It is very similar to *K. inexspectata* (BOUČEK and PŘIBYL, 1955) but has a broader crumina, mainly in the anterior part of the valve, smaller preadductorial node (L_2), and the adductorial sulcus (S_2) is longer, less curved and located in the midvalve close above the crumina. Punctation on the lateral surface of valves is relatively denser, with densely spaced fine granulae.

Occurrence: Praha - Jinonice, at the "Na butovickém hradišti" locality. Lower layers of the dark grey to brownish flaggy limestones of the Přídolí Formation, in the Pseudomonoclimacis (?) ultima Biozone, with *Acanthoscapha decurtata*, *Cryptophyllus butovicensis*, and the typical ostracode assemblage of these beds.

Subfamily *Amphitoxotidinae* MAARTINSSON, 1962

Genus *Ziva* KRŮTA, 1988

Type species: *Ctenobolbina bohemica* BOUČEK, 1936. Upper Silurian of Bohemia.

Diagnosis: The genus of the subfamily *Amphitoxotidinae* with well developed lobes and sulci. Valves subelliptic, preplete in lateral view. Hinge line straight, very long. Anterior lobe (L_1), preadductorial node (L_2) and syllobium (L_3) are connected in the ventromedial part of valve. Anterior lobal cusp and slightly larger syllobial cusp sometimes rather protruding above hinge line (only in type species). Prenodal sulcus (S_1) shorter than adductorial sulcus (S_2). Velum of tecnomorphs well developed, extending along free margin. One row of spines along free margin. Crumina of medium size, rounded and inflated in lateral view; velar edge on crumina of heteromorphs. Marginal spines are not developed in heteromorphs. Lateral surface granulate to reticulate. Hinge unknown.

Discussion: In many respects this genus shows similarity with *Undipila* SIVETER, 1980 and *Zorotoxis* SIVETER, 1980 but differs from both these genera by the different lobal and sulcal morphology, adventral structure, and by the presence of one row of relatively long spines along free margin of the tecnomorphic valves.

Occurrence: Upper Silurian of Bohemia.

Ziva bohemica (BOUČEK, 1936)

1936a *Ctenobolbina bohemica* sp. n.; BOUČEK, p. 7.
1936b *Ctenobolbina bohemica* sp. n.; BOUČEK, pp. 64–65, pl. 3, figs. 14–16.
1955 *Ctenobolbina bohemica* BOUČEK; BOUČEK - PŘIBYL, p. 586.
1980 *Ziva bohemica* (BOUČEK); KRŮTA, pp. 25–34, pl. 1, figs. 1–8; pl. 2, figs. 1–8; pl. 3, figs. 1–8; text-fig. 9.

Holotype: Right tecnomorphic valve figured by BOUČEK (1936b) on pl. 3, fig. 14a,b (NM-L 14 014).
Type stratum and type locality: Lower layers of the Přídolí Formation. Koledník quarry near Beroun.
Material: Over thirty-three specimens (right and left tecnomorphic valves and two heteromorphic valves) embedded in the rock.

A detailed description of this species was given by BOUČEK (1936b, pp. 64—65) and later by KRŮTA (1980, pp. 25—29). The diagnosis of the species corresponds to the diagnosis of the genus *Ziva*.

Dimensions: Length of holotype 0.40 mm; height of holotype 0.25 mm (perhaps 7th larval stage). Length of various larval stages: 0.35—0.38 mm (8th larval stage) to 1.36—1.47 mm (1st stage — mature valves); height of various larval stages: 0.19—0.21 mm (8th stage) to 0.96—1.08 mm (2nd stage). L/H ratio: 1.46 to 1.98; ○ 1.72.

Occurrence: Lower and upper layers of the Přídolí Formation. Mirochilina jarovensis Superbiozone. Koledník and Kosov quarries near Beroun (lower beds of the Přídolí Formation), further Suchomasty (Klonk Hill) and Radotín ("U topolů" locality) — (uppermost layers of the Přídolí Formation).

Ziva havliceki sp. n.

Text-fig. 3/9, 10

Name: This species is named in honour of Dr. Vladimír Havlíček of the Geological Survey, Praha.
Holotype: Right tecnomorphic valve figured here as text-fig. 3/9, 10 (AP-SV-61).
Type stratum and type locality: Kopanina Formation, horizon with *Diacanthaspis* (*Acanthalomina*) *minuta*. Kosov quarry near Beroun.
Material: Apart from the holotype one right tecnomorphic valve embedded in the rock.

Description: Tecnomorphic valves unisulcate to weakly bisulcate, preplete; dorsal margin long and straight, nearly equal to maximum valve length. Maximum length in dorsal half, maximum height before midvalve. Anterior cardinal angle obtuse (about 110—115°), posterior angle acute, nearly 90°. Anterior margin more broadly rounded than the lower posterior. Ventral margin curved. Prenodal sulcus (S_1) very shallow or indistinct. Adductorial sulcus (S_2) slit-like, narrow, deepest near the median part of valve, relatively shallow in dorsal part, extending to midvalve. Preadductorial node (L_2) subcircular, situated anteriorly to S_2. Another subcircular node lies in the midventral area of valve, below S_2; a very small node

behind S_2 in the posteromedian part of valve. Syllobium (L_3) convex, larger than anterior lobe (L_1), nearly equally convex. Velum may be broken off. Along free margin of tecnomorphic valves a row of spines of conformable size is developed. Lateral surface of valves granular. Hinge unknown and heteromorphs as well.

Dimensions: Length of holotype 0.76 mm; height of holotype 0.43 mm. Length of dorsal margin 0.71 mm. L/H ratio: 1.76.

Discussion: This species is similar to immature specimens of *Ziva bohemica* (BOUČEK, 1936) but differs from it in being granulate rather than reticulate, and in having narrower S_2, subcircular L_2 and two additional nodes (the larger lies in midventral part of valve and the smaller behind S_2 in the posteromedian part of valve). Spines along the free margin of *Ziva bohemica* (BOUČ.) are much denser than in *Z. havliceki* sp. n.

Occurrence: Very rare in the Kopanina Formation, in the grey to dark grey limestones with *Neocucullograptus inexspectatus* and *Diacanthaspis* (*Acanthalomina*) *minuta*, together with some indeterminable valves of smooth podocopid ostracodes. Kosov quarry near Beroun.

Subfamily ? *Beyrichiinae* MATTHEW, 1886

Genus *Ctenobolbinella* KUMMEROW, 1953

Type species: *Ctenobolbinella carinata* KUMMEROW, 1953. Early Middle Devonian of the German Democratic Republic.

Diagnosis: See KUMMEROW (1953, p. 40).

Ctenobolbinella pridoliana sp. n.

Text-fig. 1/9

Name: *Pridoliana*, after Přídolí Formation.

Holotype: Right heteromorphic valve figured here in text-fig. 1/9 (AP-SV-26). Kosov quarry near Beroun.

Type stratum and type locality: Lowest layers in the Přídolí Formation, graptolite biozone with *Pseudomonoclimacis* (G) *ultima*. Kosov quarry near Beroun.

Material: Apart from the holotype, one heteromorphic valve embedded in the rock (internal mould).

Description: Valves small, in lateral outline amplete to slightly preplete. Dorsal margin straight, occupying five-sevenths the greatest length. Anterior and posterior cardinal angles obtuse, posterior more than anterior. Maximum length above midvalve, maximum height near the middle. Anterior and posterior margins broadly rounded, ventral margin curved. Free margin smoothly curved. Anterior lobe (L_1) slightly convex, broad, terminates at hinge line. Preadductorial node or knob (L_2) low, anterior to S_2, situated in dorsal half of valve. Syllobium (L_3) wide,

slightly convex, protruding beyond the dorsal line. Adductorial sulcus (S_2) deep, relatively wide, smooth, extending from dorsum to midvalve, inclined towards anteroventral margin, close above the crumina. Heteromorphs with smooth, sausage-shaped crumina, widest anteriorly and with a slightly concave dorsal contour and rounded at the posterior end. Tecnomorphic valves unknown. Lateral surface smooth. Hinge and adductor muscle scars unknown.

Dimensions: Length of holotype (AP-SV-16) 0.58 mm; height of holotype 0.39 mm. L/H ratio: 1.48. A non-figured heteromorph is 0.58 mm long and 0.39 mm high. L/H ratio: 1.48.

Discussion: *Ctenobolbinella pridoliana* sp. n. resembles *C. carinata* KUMMEROW, 1953 in general outline and shape of valves but differs from it in having a much smaller preadductorial node (L_2), deeper and broader S_2, the crumina located in the mid-ventral part, and smaller valves. *C. carinata* KUM., however, has a higher L/H ratio (1.85) than *C. pridoliana* sp. n. (1.48).

Occurrence: Kosov quarry near Beroun, basal layers of the Přídolí Formation, the graptolite biozone with *Pseudomonoclimacis ? ultima*, together with *Primitiella ? kolednikensis*, *Acanthoscapha decurtata*, *Mirochilina jarovensis*, *Klonkina praecornigera* etc.

Genus *Kosovobolbina* gen. n.

Type species: *Kosovobolbina inflata* (BOUČEK and PŘIBYL, 1955). Upper Silurian of Bohemia.

Diagnosis: Unisulcate *beyrichiid* ostracode with lateral surface smooth or covered with low granules or punctae. Anterior cardinal angles acute; posterodorsal end jutting out into a well perceptible wing. L_3 convex, occupying posterior half of valve. L_1 and L_2 usually coalescent; L_2 more distinct than L_1. Tecnomorphs with low and flat velar ridge along lateral free margin of valve, parallel to marginal structure and extending anteriorly, ending in L_1. Heteromorphs [only after *K. dubia* (Copeland)] with velar ridge interrupted by broad anteroventral crumina extending below free margin of valve, with three prominent horizontal ridges on ventral surface.

Discussion: This new genus may be confused on cursory examination with *Podolobolbina* ABUSHIK and SARV, 1983, from the Middle Ordovician of Podolia (USSR), but it is distinguishable by a well perceptible wing in the posterodorsal end of valve and by a broad anteroventral crumina of heteromorphs. It seems that *Kosovobolbina* g. n. is most likely allied with *Bingeria* MARTINSSON, 1962, from the Silurian of Europe (mainly of Gotland) but it differs from the latter genus by the presence of velar ridge along free margin of valve, and by a distinct wing in posterodorsal part of valve; S_2 is much smaller and the crumina is broad and conspicuously extending over the whole anteroventral part. These characters likewise distinguish it not only from the genus *Plethobolbina* ULRICH and BASSLER, 1923, where COPELAND (1974) assigned the species "*Plethobolbina* (recte *Kosovobolbina*) *dubia* COPE-

LAND, 1974, but also from the representatives of *Yukonobolbina* BERDAN and COPELAND, 1973.

Kosovobolbina inflata (BOUČEK and PŘIBYL, 1955)

Pl. VI, figs. 4–7; text-fig. 3/2–6

1955 *Ctenobolbina ? inflata* sp. n.; BOUČEK - PŘIBYL, pp. 596, 624, 649, pl. 1, fig. 9.

Holotype: Left tecnomorphic valve figured by BOUČEK and PŘIBYL (1955) on pl. 1, fig. 9 (NM-L 23 747a). Relatively poor preservation (internal mould).

Type stratum and type locality: Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone. Kosov quarry near Beroun.

Material: Apart from the holotype twenty-three right and left tecnomorphic valves embedded in the rock, mostly preserved as internal moulds.

Description: Valves subovate to elongate subovate in lateral outline, slightly preplete. Dorsal margin long, straight, occupying about six-sevenths the maximum valve length. Anterior cardinal angle approximately 125—135°, posterior angle about 90—100°, often with a well perceptible posterior wing. Maximum length in dorsal half, maximum height midvalve or before midvalve. Anterior margin more broadly rounded than the posterior; ventral margin curved. Adductorial sulcus (S_2) slit-like, slightly curved around the posterior part of L_2, deepest ventrally, relatively shallow in dorsal part, reaching below mid-height of valve. Preadductorial node (L_2) distinct, ovate to subovate, situated anteriorly to S_2, sometimes coalescing with L_1. Syllobium more convex than L_1 and occupying posterior half of valve. Lateral surface punctated, excluding the smooth area at posterodorsal end. Some specimens are slightly granulate and punctate. Tecnomorphs with narrow velar ridge along lateral free margin of each valve, parallel to marginal structure and extending anteriorly, ending in L_1. Hinge structure and adductor muscle scars unknown. In dorsal view outline elongate oval; maximum width in posterior half of valves.

Dimensions of holotype: Length 1.56 mm; height 0.79 mm. L/H ratio: 1.97. Length of paratypes and other specimens: 1.22—1.30 mm; height of paratypes and other specimens: 0.71—0.73 mm. L/H ratio: 1.71—1.78. Length of dorsal margin 0.99—1.13 mm.

Discussion: This species was assigned by BOUČEK and PŘIBYL (1955) to the genus *Ctenobolbina* ULRICH, 1890 tentatively only. After new finds of well preserved specimens it has been recognized as the representative of a new genus. *Kosovobolbina inflata* (BOUČEK and PŘIBYL, 1955) is similar to *Kosovobolbina dubia* (COPELAND, 1974) from the Silurian upper Jupiter Formation of Anticosti Island (Canada), especially in the size and position of lobes, and in the position of velar ridge. Our species has punctate and slightly granulate surface and a well perceptible posterodorsal wing.

Occurrence: Fairly common in the lower layers of the upper part of the Kopanina Formation, together with *Koledníkella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.

Genus *Moierina* ABUSHIK, 1960

Type species: By original designation; *Moierina simplex* ABUSHIK, 1960, from the Upper Silurian of East Siberia.

Moierina cf. *simplex* ABUSHIK, 1960

1955 *Aparchites* sp.; BOUČEK - PŘIBYL, pp. 586, 614, 639, pl. 2, figs. 1–5; pl. 3, figs. 7–10.
?1960 *Moierina simplex* sp. n.; ABUSHIK, pp. 323, 324, pl. 63, figs. 1, 2.

Bohemian material: One carapace only (NM-L 23 721).

The Bohemian specimen was described by BOUČEK and PŘIBYL (1955). Later, ABUSHIK (1960) described very similar specimens from the Ludlovian of the Moiero River Basin as a new species *Moierina simplex*. He based this species (1960, pp. 323, 324) on the heteromorphic and tecnomorphic carapaces from eastern Siberia.

Dimensions of the Bohemian carapace: Length 0.48 mm; height 0.35 mm; width 0.30 mm. L/H ratio: 1.37.

Discussion: Without heteromorphic valves it is impossible to assign this Bohemian specimen to the Siberian species *Moierina simplex*. Although the tecnomorphic specimens from the two distant Silurian areas are very similar, I designate our specimen as *Moierina* cf. *simplex*.

Occurrence: Very rare in the upper part of the Kopanina Formation (Ananaspis fecunda Horizon). Koledník quarry near Beroun.

Suborder *Hollinomorpha* HENNINGSMOEN, 1965

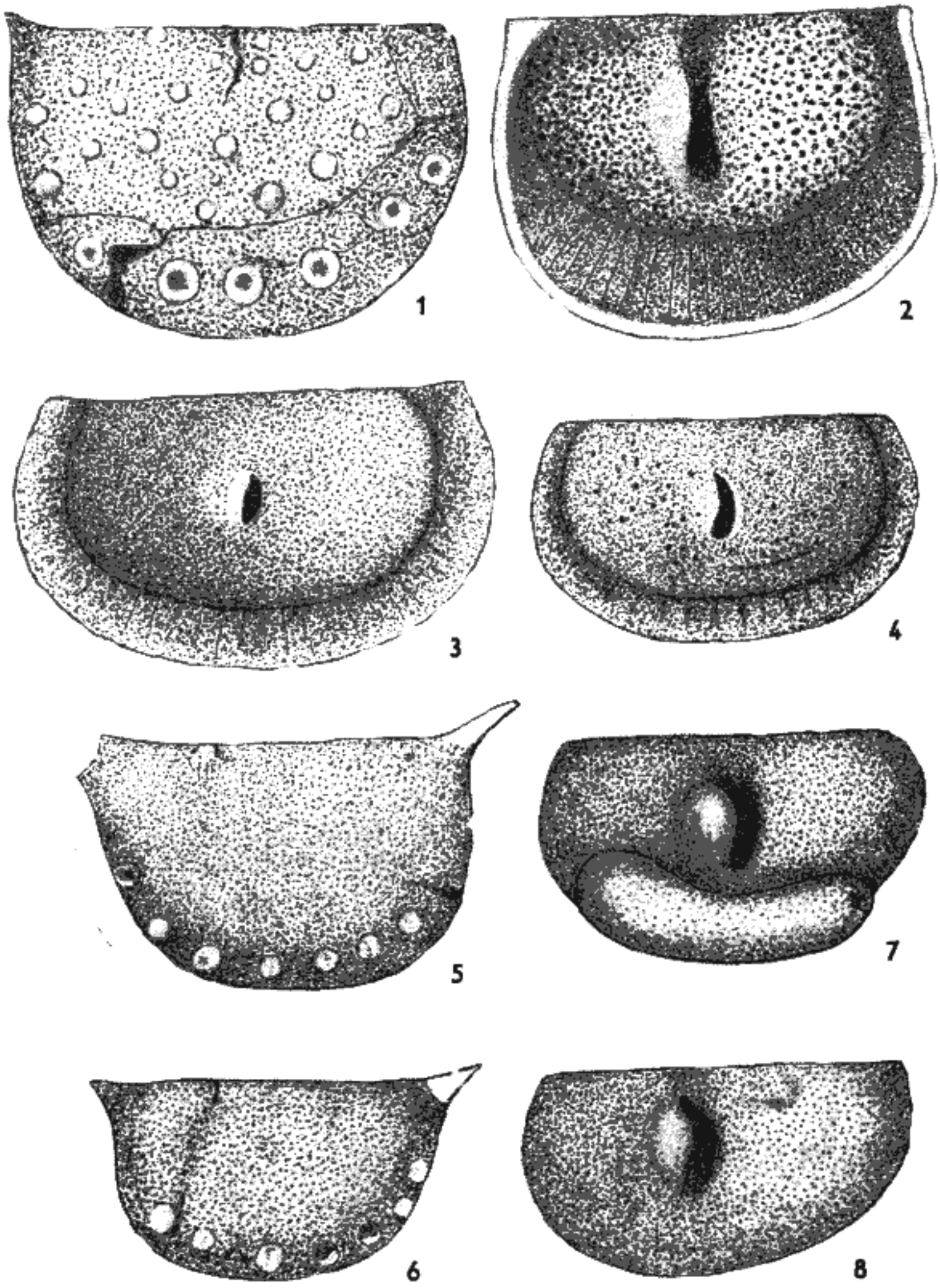
Superfamily *Eurychilinacea* ULRICH and BASSLER, 1923

Family *Eurychilinidae* ULRICH and BASSLER, 1923

Subfamily *Chilobolbininae* JAANUSSON, 1957

Genus *Cystomatochilina* JAANUSSON, 1957

Type species: By original designation; *Primitia* (*Ulrichia?*) *umbonata* KRAUSE, 1892, from the Upper Ordovician (Ashgill) of northern Germany.
Synonym: *Platybolbina* HENNINGSMOEN, 1954, pars.
Occurrence: Germany and Bohemia, Estonia and Gotland. Upper Ordovician and Silurian.



2.1. *Parahippa droseron* sp.n. Left valve in lateral view. Holotype (AP-SV-77). × 47. Loděnice near Beroun, Černidla hill. Motol Member, Liteň Formation, Monograptus flexilis Biozone.

2. *Cystomatochilina elegans* sp.n. Left tecnomorphic valve in lateral view. Holotype (AP-SV-66). × 40. Praha - Malá Chuchle, Motol Member, Liteň Formation.

3. *Laccochilina* (*Laccochilina*) *reporyjensis* sp.n. Left tecnomorphic valve in lateral view (recon-

Cystomatochilina elegans sp. n.

Pl. IV, figs. 1--3, 6; text-fig. 2/2

Name: Lat. *elegans* = elegant; referring to the nice shape of the carapace.

Holotype: Left tecnomorphic valve figured here on pl. IV, fig. 2 (AP-SV-66) and as text-fig. 2/2.

Paratypes: Left and right valves (AP-SV-67 to 69/1) figured here on pl. IV, figs. 1, 3, 6.

Type stratum and type locality: Upper layers of the Motol Member (= upper Wenlock), Liteň Formation. Praha - Malá Chuchle, Vyskočilka locality.

Material: Apart from the holotype eleven tecnomorphic valves embedded in the rock. Preservation good to excellent.

Description: Valves large, amplete, with broad concave, striate velum, extending along free margin and occupying one-third of the height. Dorsal margin long and straight. Cardinal angles obtuse, subequal. Maximum length in the dorsal half, maximum height midvalve. Anterior and posterior margins broadly rounded, equally high. Ventral margin curved. Adductorial sulcus (S_2) deep and long, extending from dorsum to midvalve, slightly curved anteriorly. Preadductorial node (L_2) ovate, inflated near midvalve. Posteroventral crest-like ridge absent. Lateral surface punctate to reticulate. Hinge unknown.

Dimensions of holotype: Length 1.48; height 1.07 mm. Length of the hinge line 1.35 mm. Length of paratypes and other specimens (AP-SV-67 to 69), 1.08 to 1.82 mm and height 0.64 to 1.24 mm. L/H ratio: 1.38—1.68; ⌀ 1.53. The specimens from Malá Chuchle (Vyskočilka locality) are somewhat larger than the specimens from Velká Chuchle as they attain a length up to 1.82 mm and a height of 1.24 mm. The valves from Velká Chuchle are only 1.08—1.42 mm in length and 0.64—0.98 in height.

Discussion: This species differs from most Silurian species of *Cystomatochilina* in having a very broad striate velum and a smaller ovate L_2. It exhibits, however, an apparently greater similarity to the type species of *Cystomatochilina* (*C. umbonata*), from which it is distinguished by an amplete outline of valves and thereby a different L/H ratio (⌀ 1.53), and by a smaller preadductorial node. *C. tiara* (HENNINGSMOEN, 1954) from the Upper Ordovician of Norway is on the whole similar to *C. elegans* sp. n. but differs from it by a narrower velum, smaller preadductorial node and the coarsely pitted and granulated surface of valve.

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struction) (AP-SV-07). × 50. Praha - Řeporyje, "Na Požárech" quarry. Kopanina Formation, Ananaspis fecunda Horizon.

4. *Laccochilina* (*Laccochilina*) sp. aff. *L. reporyjensis* sp.n. Left tecnomorphic valve in lateral view (AP-SV-45d). × 35. Praha - Jinonice, "Na butovickém hradišti" locality. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

5, 6. *Parahippa lodenicensis* sp.n. Right (5) and left (6) lateral views of two valves. 5. Holotype (AP-SV-71). × 46. 6. Paratype (AP-SV-74). × 46. Loděnice near Beroun, Černidla hill. Motol Member, Liteň Formation, Monograptus flexilis Biozone.

7, 8. *Aitilia kosoviana* sp. n. 7. Left lateral view of a heteromorphic valve. Holotype (AP-SV-01). × 28. 8. Left lateral view of a tecnomorphic valve. Paratype (AP-SV-02). × 28. Kosov quarry near Beroun. Kopanina Formation, beds underlying the Saetograptus linearis Biozone.

Occurrence: *Cystomatochilina elegans* sp. n. has been found at many localities, e.g. in Praha - Malá Chuchle (Vyskočilka locality), high up the slope above the diabase body, in Velká Chuchle, in the grove at the road leading to the Church of St. John, and in Loděnice (Černidla). Motol Member, Liteň Formation, in layers equivalent to the biozone with *Testograptus testis* or *Pristiograptus ? ludensis*, together with *Monograptus flemmingi*, *Pristiograptus dubius*, *Aulacopleura konincki*, *Nitidocare nitidum*, *Scharyia wenlockiana* etc.

Genus *Laccochilina* HESSLAND, 1949

Type species: By original designation; *Eurychilina estonula* ÖPIK, 1935, from the Lower Ordovician of Estonia.

Subgenus *Laccochilina* (*Laccochilina*) HESSLAND, 1949

Type species: *Eurychilina estonula* ÖPIK, 1935. Lower Ordovician of Estonia.

Laccochilina (*Laccochilina*) *reporyjensis* sp. n.

Pl. V, figs. 1, 3; text-fig. 2/3

Name: The species is named after the type locality – Řeporyje.

Holotype: Left tecnomorphic valve figured here on pl. V, fig. 1 (AP-SV-07).

Type stratum and type locality: Kopanina Formation, Ananaspis fecunda Horizon, "Na Požárech" quarry near Řeporyje.

Material: Holotype and four tecnomorphs embedded in the rock. Preservation is fairly good.

Description: Only tecnomorphs are known. Valves of medium-size, moderately convex, with dorsal margin long and straight. Cardinal angles obtuse, subequal, larger than 95°. Anterior and posterior margins broadly rounded; ventral margin convex. The only lobal structure is a comparatively ovate preadductorial node (L_2) anterior to S_2. This sulcus relatively deep, slit-like, slightly curved near midvalve. Velum complete, rather broad, slightly concave, and finely striate, extending along free margin, widest midventrally, occupying about 1/5 of the valve height. Surface smooth. Hinge structure unknown.

Dimensions of holotype: Length 1.27 mm; height 0.89 mm. Length of hinge line 1.07 mm. Length of paratype 1.15 mm; height of paratype 0.75 mm (AP-SV-18). Length of hinge line 1.01 mm. L/H ratio: 1.42—1.53; ⌀ 1.47. The specimens from Kozolupy are 1.35—1.42 mm long and 0.79—0.90 mm high.

Discussion: *L.* (*Laccochilina*) *reporyjensis* sp. n. is the first representative of *Laccochilina* HESSLAND, 1949, from the Upper Silurian of Bohemia. It differs from the other known species of this genus by the amplete shape of valves, the width of the slightly concave, finely striate velum, and the deep, slit-like adductorial sulcus (S_2) situated in the middle part of the valve. Lateral surface is smooth.

Occurrence: Upper layers of the Kopanina Formation, grey flaggy limestone of the Ananaspis fecunda Horizon (= ostracode biozone with *Microcheilinella kolednikensis*). Localities: Praha - Řeporyje, "Na Požárech" locality, Kozolupy "Kouřící" lom, and Velký vrch (hill) near Koněprusy.

Laccochilina (*Laccochilina*) sp., aff. *reporyjensis* sp. n.

Text-fig. 2/4

Remarks: A specimen of *Laccochilina* (*Laccochilina*) from the lower beds of the Přídolí Formation resembles broadly *L.* (*L.*) *reporyjensis* sp. n. but differs from it by a narrower velum, a longer adductorial sulcus and scarce punctae on the lateral surface. This specimen may belong to a new species of *L.* (*Laccochilina*).

Occurrence: Very rare in the lower layers of the Přídolí Formation, Pseudomonoclimacis (?) ultima Biozone. Praha - Jinonice, at the "Na butovickém hradišti" locality, together with *Cryptophyllus butovicensis* and *Kolednikella insolita*.

Suborder *Binodicopa* SCHALLREUTER, 1972

Superfamily *Aechminacea* BOUČEK, 1936

Family *Aechminidae* BOUČEK, 1936

Genus *Aechmina* JONES and HOLL, 1869

Type species: *Aechmina cuspidata* JONES and HOLL, 1869. Silurian (Wenlock) of England.

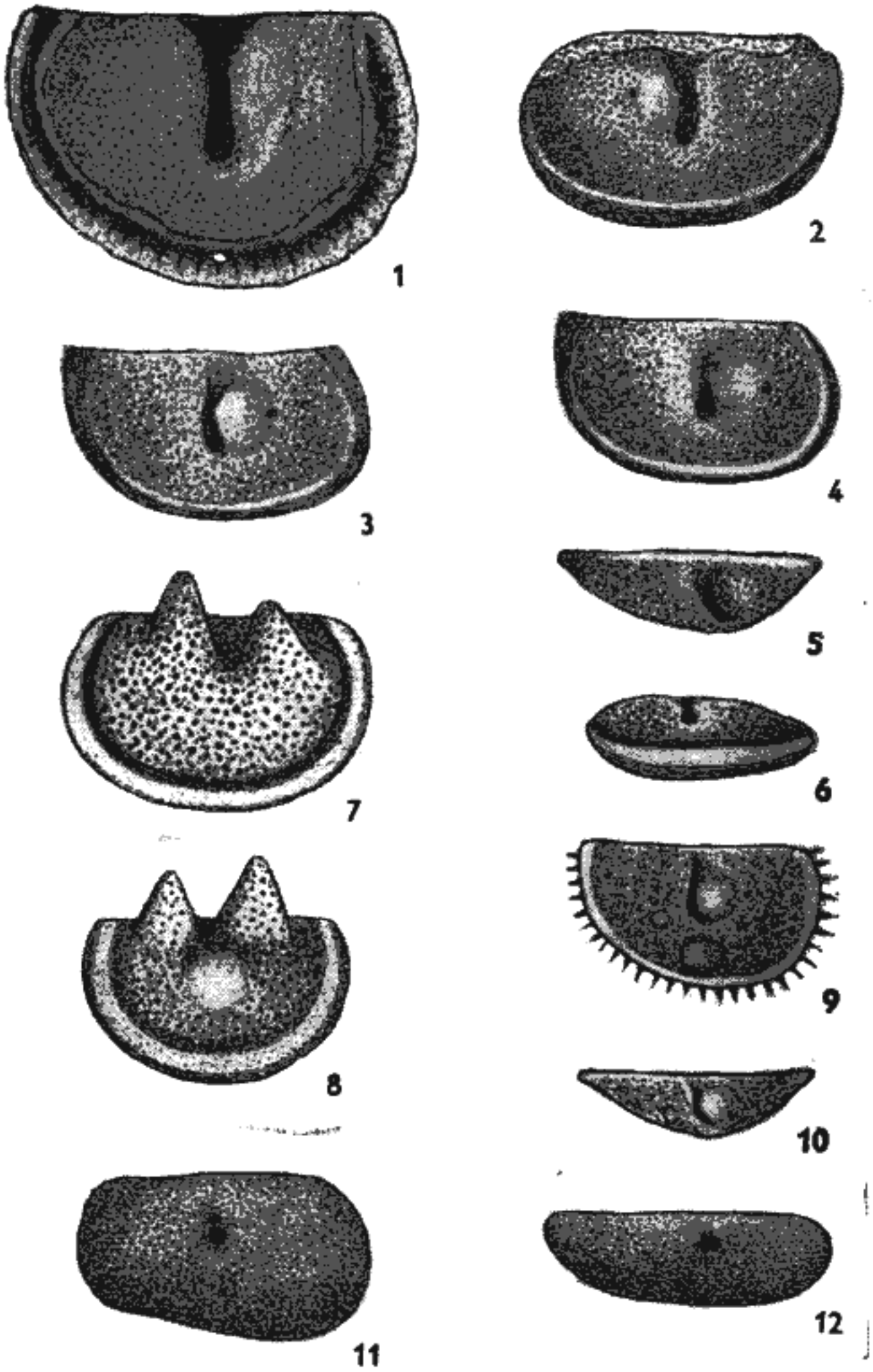
Aechmina subvexa sp. n.

Pl. VII, ?fig. 8; pl. XII, fig. 2; text-fig. 4/17, 18; ?6/10

1936a *Aechmina cuspidata* JONES and HOLL; BOUČEK, p. 7.
1936b *Aechmina cuspidata* JONES and HOLL; BOUČEK, p. 54, pl. 2, figs. 11a, b, 12, 13.

Name: Latin *subvexus*, directed obliquely upwards.
Holotype: Right valve figured here in text-fig. 4/17, 18 (AP-SV-50).
Type stratum and type locality: Lower part of the Přídolí Formation. Kosov quarry near Beroun.
Material: Apart from the holotype and Bouček's types, seven specimens embedded in the rock.

Description: Valves small, amplete, with ovate to subelongate lateral outline, one-and-half to twice as long as high. Dorsal margin short and straight. Anterior and posterior cardinal angles rounded, larger than 90°. Anterior and posterior margin subrounded, ventral margin gently and evenly curved. Very long, thin, obliquely backwards to nearly vertically directed dorsal spine (at 45—80°), greater than maximum height. Lateral surface smooth or finely punctate.



3.1. *Craspedobolbina* (*Artiocraspedon*) *morinensis* sp. n. Right tecnomorphic valve in lateral view. Holotype (AP-SV-12). × 49. "Amerika" quarry near Mořina. Kopanina Formation, Lobograptus scanicus Biozone.

2–6. *Kosovobolbina inflata* (Bouč. and Přib.). One left (2) and two right (3, 4) lateral views of three tecnomorphic valves (AP-SV-76, 81 and 80). 2. × 28; 3. × 30; 4. × 24. 5, 6. Dorsal and ventral views of right valve (4). × 24. Kosov quarry near Beroun. Kopanina Formation, Koledníkella inexspectata and Cryptophyllus copelandi Biozone.

Dimensions: Length of holotype 0.51 mm; height of holotype 0.25 mm (without dorsal spine) and 0.90 mm (including dorsal spine). L/H ratio: 2.04. Length of paratypes and other specimens: 0.42—0.53 mm; height 0.25—0.32 mm (without dorsal spine), 0.55—0.96 mm (including spine). (NM-L 14 006 and NM-L 14 007.) The maximal length of dorsal spine is 0.65—0.71 mm.

Discussion: The diagnostic features noted above serve to distinguish the species *Aechmina subvexa* sp. n. from the Silurian species of *Aechmina*. Compared with *A. cuspidata* JONES and HOLL, 1869, from the upper Homerian and lower Eltonian of England to which BOUČEK (1936b) assigned the specimens of this species, *A. subvexa* sp. n. differs in having much smaller valves (only 0.42—0.53 mm in length), a thinner dorsal spine directed obliquely upwards to nearly vertical, and almost smooth or very finely punctate lateral surface of valves. On the other hand, the lateral surface of *A. cuspidata* is smooth, the valves are more than twice or three times larger than those of *A. subvexa*, the broad-based dorsal spine is also larger, straighter and practically vertical. From the other Silurian species of *Aechmina* this species (*A. subvexa*) is distinguished by smaller dimensions of the valve and very long, thin, obliquely backwards to nearly vertically directed dorsal spine, and often punctate lateral surface.

Occurrence: Very rare in the upper part of the Kopanina Formation with *Koledníkella inexspectata* and *Cryptophyllus copelandi*. Fairly common in the lower layers of the Přídolí Formation, together with *Pseudomonoclimacis* (?) *ultima* and with the characteristic assemblage of the ostracode biozone of these layers. Kosov and Koledník quarries near Beroun (specimens NM-L 14 006 and L-14 007), further Lochkov ("Mramorový" lom) and Praha - Jinonice, the field at the locality "Na butovickém hradišti".

Superfamily *Drepanellacea* ULRICH and BASSLER, 1923

Family *Bollidae* BOUČEK, 1936

Genus *Klonkina* KRŮTA, 1986

Type species: By original designation; *Klonkina cornigera* KRŮTA, 1986, from the uppermost Silurian of Bohemia.

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7. *Klonkina praecornigera* sp. n. Right valve in lateral view. Holotype (AP-SV-70). × 86. Kosov quarry. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

8. *Klonkina uninodosa* sp. n. Left valve in lateral view. Holotype (AP-SV-65). Kosov quarry. Kopanina Formation, biozone as fig. 2 on text-fig. 3.

9, 10. *Ziva havliceki* sp. n. 9. Right tecnomorphic valve in lateral view. 10. The same valve in dorsal view. Holotype (AP-SV-61). × 36. Kosov quarry. Kopanina Formation, the layers with *Diacanthaspis* (*Acanthalomina*) *minuta*.

11, 12. *Neokloedenella* ? *polenovae* sp. n. 11. Right heteromorphic (?) valve in lateral view. × 30. 12. The same valve in oblique dorsal view. × 30. Holotype (AP-SV-49). "Kouřící" lom near Kozolupy. Kopanina Formation, Ananaspis fecunda Biozone.

Included species: *Klonkina cornigera* KRŮTA, 1986, *K. praecornigera* sp. n., *K. uninodosa* sp. n. and *K.* (?) *amabilis* (NECKAJA, 1960) and *K.* (?) *chekiangensis* (HOU, 1956).

Stratigraphic range and geographical distribution: ? Upper Ordovician of China, Lower Silurian of Podolia (Ukraine) and Upper Silurian of Bohemia.

Diagnosis: Valves small, subovate, amplete to slightly preplete, with prominent pointed dorsal lobes (L_2 and L_3) protruding above dorsal margin. L_3 larger and longer than L_2. S_2 relatively broad, forming a letter V or U. Complete marginal rim along free margin, slightly rounded. Lateral surface punctate; the pointed lobes punctate. Simetimes a circular knob is developed in the midvalve below L_2 and L_3. Hinge and adductor muscle scar unknown.

Discussion: KRŮTA (1986) described in detail the genus *Klonkina* in his study having established it on the species *Klonkina cornigera*. At the present time two other species have been ascertained in the Upper Silurian of Bohemia (*Klonkina praecornigera* sp. n. and *K. uninodosa* sp. n.). This genus is very similar to *Ulrichia* JONES, 1890 from which it differs expecially in having two prominent larger and longer pointed dorsal lobes protruding even above hinge line. Lateral surface of *Klonkina* is punctate and one species (*K. uninodosa*) has a circular knob in the midvalve, below L_2 and L_3. *Klonkina* resembles *Crescentilla* BARRANDE, 1872 in general appearance, but it differs from it in a much smaller size of valves with punctate lateral surface, and in having the complete rim along free margin. *Crescentilla* derives from the Middle and Upper Ordovician of Bohemia and England (see: SIVETER, 1978, pl. 3, fig. 5) and *Klonkina* has been found in the Upper Silurian of Bohemia. Also *Klimphores* SCHALLREUTER, 1966 resembles *Klonkina* in the form of valves and the position of dorsal lobes but differs from it, above all, by the absence of a marked rim along free margin, and by shorter and broader rounded, not pointed dorsal lobes. The Devonian genus *Ogilvites* BERDAN and COPELAND, 1973 is somewhat similar to *Klonkina* but differs from it by well developed striae parallel to free margin, coarsely reticulated lobes, and the absence of marginal rim.

Klonkina praecornigera sp. n.

Text-fig. 3/7

Name: Latin *prae* – before, and *corniger* – provided with horns.

Holotype: The right valve figured here as text-fig. 3/7 (AP-SV-70).

Type stratum and type locality: Lower layers of the Přídolí Formation, Pseudomonoclimacis (?) ultima Biozone. Large quarry on Kosov hill near Beroun.

Material: Twenty-seven (right and left) valves embedded in the rock. Relatively good preservation.

Description: Valves small, subovate in lateral outline, slightly amplete, with a straight dorsal margin occupying five-sevenths maximum length. Cardinal angles obtuse; anterior angle approximately 110—115° and posterior angle about 120

to 130°. Anterior and posterior margins rounded; ventral margin convex. Free margin normally curved. The pointed dorsal lobes are protruding above hinge line. L_3 larger than L_2, nearly vertical. The lobes are separated by a short S_2, in the form of V letter. Pronounced, slightly rounded smooth marginal rim along free margin of nearly equal with throughout, extending from the anterior cardinal angle to the posterior angle of valve. Marginal depression well developed. Lateral surface punctate to subreticulate with numerous small pits on L_2 and L_3. Hinge unknown.

Dimensions: Length of holotype (AP-SV-70) 0.42 mm (probable mature specimen — 1st instar); height of holotype 0.28 mm. L/H ratio: ⌀ 1.50. Length of other specimens 0.25—0.39 mm (including dorsal lobes). L/H ratio: ⌀ 1.65.

Discussion: This species bears a close resemblance to *Klonkina cornigera* KRŮTA, 1986 from the upper Přídolian of Bohemia. Our species, however, has relatively denser punctae, straighter and longer pointed dorsal lobes, narrower S_2 than *K. cornigera*, and the marginal rim is more outstanding. The stratigraphically earlier species *K. uninodosa* sp. n. has a characteristic circular knob in the midvalve which is lacking in *K. praecornigera* and *K. cornigera*.

Occurrence: Kosov quarry near Beroun. Relatively common in the lower beds of the Přídolí Formation (0.3 to 2.3 m above the base). Praha - Jinonice, "Na butovickém hradišti" locality and Praha - Lochkov, "Mramorový" lom, together with *Acanthoscapha decurtata*, *Kosoviellina silurica pusilla*, *Mirochilina jarovensis*, *Primitiella ? kolednikensis etc.*, mainly in the graptolite biozone with *Pseudomonoclimacis (?) ultima*.

Klonkina uninodosa sp. n.

Pl. IV, figs. 4, 5; text-fig. 3/8

Name: Latin *unicus* — sole, and *nodosus* — nodose, after the prominent knob in midvalve.
Holotype: Left valve figured here as text-fig. 3/8 and on pl. IV, figs. 4, 5 (AP-SV-65).
Type stratum and type locality: Kopanina Formation, ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.
Material: Two well preserved left valves embedded in the rock.

Description: Valves small, amplete, subovate in lateral view. Hinge line straight, slightly sunken. Approximately five-sixths of the length. Maximum length and height near midvalve. Anterior and posterior margins broadly rounded, ventral margin very curved. Cardinal angles obtuse, anterior angle about 110°, and the posterior c. 125—130°. Free margin regularly curved. Of the two stout, well developed pointed dorsal lobes (L_2 and L_3) on each valve, L_2 is rather shorter than the posterior (L_3), which is larger and subconical. S_2 short, slit-like, extending from dorsal margin to circular knob. This characteristic circular knob lies in the midvalve below both lobes. Complete smooth marginal rim along free margin, slightly narrowing anteriorly and posteriorly. Marginal furrow or depression de-

veloped. Lateral surface of valves punctate, with numerous small pits (or punctae), L_2 and L_3 less markedly so. Hingement and muscle scar unknown.

Dimensions of holotype: Length 0.39 mm; height 0.26 mm (without dorsal lobes), 0.33 mm (including dorsal lobes). L/H ratio: 1.50 (without dorsal lobes) and 1.18 (including dorsal lobes).

Discussion: *Klonkina uninodosa* sp. n. is easily separable from other species of *Klonkina* by the presence of a distinct circular knob in the midvalve and larger dorsal lobes more projecting above the dorsal margin.

Occurrence: Rare in the lower part of the upper layers of the Kopanina Formation in the Kosov quarry near Beroun. The ostracode biozone with *Koledni-kella inexspectata* and *Cryptophyllus copelandi*.

Family *Richinidae* SOHN, 1961

Genus *Richina* CORYELL and MALKIN, 1936

Synonym: *Soinella* KRANDIJEVSKY, 1963.
Type species: *Richina truncata* CORYELL and MALKIN, 1936. Middle Devonian (Hamilton stage) of New York.

Richina hornyi PŘIBYL, 1987

1960 *Pseudoulrichia hornyi* sp. n. (nomen nudum); PŘIBYL, pp. 163, 168, tab. 1.
1987 *Richina hornyi* sp. n.; PŘIBYL, 361, 363, text-fig. 2/5–8.

Holotype: Left valve figured by PŘIBYL (1987) in text-figs. 2/6; paratypes 2/5, 7, 8 (AP-B 502-503 = NM-L 23734 and 23732).
Type stratum and type locality: Lower part of the Kopanina Formation, Lobograptus scanicus Biozone. Podskalský (Štětecký) mlýn (mill) near Tmáň.
Material: Apart from the holotype and paratypes fourteen well preserved valves.

Description: The reader is referred to the detailed description recently published by PŘIBYL (1987). Hingement by simple tongue and groove.

Dimensions: Length of holotype 0.59 mm; height of holotype 0.42 mm. L/H ratio: 1.37—1.45; ⌀ 1.41.

Discussion: *Richina hornyi* PŘIBYL, 1987 is distinguished from the other Silurian and Devonian species of *Richina* in that the dorsomedian nodes are less distinct, but L_2 is slightly protruding above dorsal margin, and lateral surface of the valves is finely reticulate. The valves of this species are much smaller than those of various species of *Richina*.

Occurrence: Podskalský (Štětecký) mlýn near Tmáň, fairly abundant in the lower layers of the Kopanina Formation (upper part of the Lobograptus scanicus Biozone), together with *Microcheilinella praekolednikensis*, *Cytherellina kopaninensis*, *Hemiaechminoides monstratus* and *Cryptophyllus* cf. *copelandi*.

Suborder *Binodicopa* SCHALLREUTER, 1972

Superfamily *Aparchitacea* JONES, 1901

Family *Aparchitidae* JONES, 1901

Genus *Aparchites* JONES, 1889

Type species: *Aparchites whiteavesi* JONES, 1889. SD MILLER, 1889. Middle Ordovician of Canada.

Aparchites (*?*) *subcentralis* (BOUČEK, 1936)

1936b *Laccoprimitia subcentralis* sp. n.; BOUČEK, p. 43, pl. 2, fig. 8a, b.

Holotype: Right valve figured by BOUČEK (1936b) on pl. 2, fig. 8a, b. The holotype is probably lost, as I have not found it in the National Museum, Praha.

Type stratum and type locality: Lower layers of the Přídolí Formation, Pseudomonoclimacis (?) ultima Biozone. Koledník quarry near Beroun.

Material: No specimen was available for study.

Description: I refer to the detailed description introduced by BOUČEK (1936b, p. 43).

Dimensions: According to BOUČEK (1936b, p. 43): length of holotype 1.02 mm; height of holotype 0.70 mm; width of valve 0.26 mm. L/H ratio: 1.45.

Discussion: Orientation of the valve was inferred from the relative proximity of the muscle scar spot to the anteromedian part of valve. It differs from all known species of *Laccoprimitia* ULRICH and BASSLER, 1923, where it was placed by BOUČEK (1936b), in the different outline of valve, the absence of adductorial sulcus (S_2), and in having the muscle scar spot situated in the anteromedian part of valve. Therefore I suppose with some hesitation that the species "*L.*" *subcentralis* belongs rather to *Aparchites* than to *Laccoprimitia*.

Occurrence: Very rare in the lower layers of the Přídolí Formation. Koledník quarry near Beroun.

Aparchites (*?*) sp.

Text-fig. 6/8

Material: Only two valves.

Description: Valves subovate to subquadrate in lateral view. Maximum length in dorsal half, maximum height midvalve. Dorsal margin straight, long, slightly shorter than the greatest length. Cardinal angles obtuse. Anterior and posterior margins broadly curved. Ventral margin convex. Free margin evenly convex. Lateral surface smooth.

Dimensions: Length 1.16—1.18 mm; height 0.76—0.77 mm. L/H ratio: 1.52—1.53.

Occurrence: Very rare in the lower beds of the upper part of the Kopanina Formation, ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.

Suborder unknown

Family *Karlsteinellidae* PŘIBYL, 1952

Diagnosis: As for the genus.

Genus *Karlsteinella* BOUČEK, 1936

Type species: *Karlsteinella reticulata* BOUČEK, 1936, from the Upper Silurian of Bohemia.

Diagnosis: Unisulcate ostracode with large, equivalved carapace. Dorsal margin straight. Adductorial sulcus (S_2) long and deep. Anterior (L_1) and posterior (L_2) lobes broad. Anterior and posterior cardinal angles obtuse. Anterior margin more bluntly pointed than the posterior. In dorsal view the carapace is oblong subtriangular with largest width in the posterior part; anterior part of carapace bluntly pointed. Lateral surface reticulate.

Remarks: This genus is distinguishable at first sight from all palaeocopid ostracodes by the characteristic shape of its reticulate valves.

Karlsteinella reticulata BOUČEK, 1936

1936a *Karlsteinella reticulata* sp. n.; BOUČEK, p. 7 (nomen nudum).
1936b *Karlsteinella reticulata* sp. n.; BOUČEK, pp. 67 – 68, text-fig. 5a – e.
1961 *Karlsteinella reticulata* BOUČEK; SCOTT *in* Treatise, pt. Q, Q 195.
1965 *Karlsteinella reticulata* BOUČEK; PŘIBYL, *in* ŠPINAR, p. 688, text-fig. X-118Aa, b.

Holotype: Carapace figured by BOUČEK (1936b) as text-fig. 5A – E (NM-L 14017).
Type stratum and type locality: Lower layers of the Kopanina Formation. "Amerika" quarry near Mořina.
Material: Holotype only.

Description: As for the genus. I refer the reader to BOUČEK's detailed description (1936b, pp. 67—68).

Dimensions of holotype: Length 5.32 mm; height 3.28 mm; width 2.55 mm. L/H ratio: 1.62.

Occurrence: Very rare in the green-brown tuffaceous layers of the lower part of the Kopanina Formation (= lower Ludlow). The abandoned "Amerika" quarry near Mořina.

Family unknown

Genus *Kosoviellina* Bouček and Přibyl, 1955

Type species: By original designation; *Kosoviellina silurica* Bouček - Přibyl, 1955, from the Upper Silurian of Bohemia.

Diagnosis: See Bouček - Přibyl (1955). Palaeocopid ostracode characterized by a marked bar in the anterior part of valves; this bar runs on the surface of valves almost vertically from the dorsocentral margin and at its end bends knee-like backwards. Between the bar and the anterior margin rim is a broad and deep interspace. In the dorsal part of valves there is a perceptible circular depression or slit-like pit. Free margin is bordered by a distinct rim.

Kosoviellina silurica silurica Bouček and Přibyl, 1955

Pl. III, fig. 4; pl. XII, fig. 4; text-fig. 1/10

1955 *Kosoviellina silurica* sp. n.; Bouček - Přibyl, pp. 595, 623, 648, pl. 2, figs. 11, 12; pl. 3, figs. 5, 6.

Holotype: The specimen figured by Bouček - Přibyl (1955) on pl. 2, fig. 11 (NM-L 23747b).
Type stratum and type locality: Kopanina Formation. Kosov quarry near Beroun.
Material: Over one hundred specimens (left and right valves) embedded in the rock.

Diagnosis and description: See Bouček - Přibyl (1955, pp. 596, 623 and 648).

Dimensions: Length of holotype (NM-L 23 747b), 0.68 mm; height of holotype 0.39 mm. Length of other specimens: 0.60—0.76 mm; height 0.39—0.42 mm. L/H ratio: 1.53—1.80; ⌀ 1.69.

Discussion: *Kosoviellina silurica silurica* Bouček and Přibyl, 1955 differs from *K. silurica pusilla* subsp. n. in having larger valves, which are relatively shorter and higher and have a different L/H ratio (⌀ 1.69).

Occurrence: Fairly common in the lower layers of the upper part of the Kopanina Formation, in the ostracode biozone with *Koledníkella inexspectata* and *Cryptophyllus copelandi*. The quarries Kosov and Koledník near Beroun. It has also been found in the Ananaspis fecunda Horizon; Velký vrch (hill) near Koněprusy.

Kosoviellina silurica pusilla subsp. n.

Pl. III, fig. 8; pl. V, fig. 8; text-fig. 1/11, 12

Name: From Latin *pusillus* = small.
Holotype: Left valve figured here on text-fig. 1/11 (AP-SV-37) and pl. III, fig. 8.
Type stratum and type locality: Lower part of the Přídolí Formation, Pseudomonoclimacis (?) ultima Biozone. Kosov quarry.

Material: Sixteen specimens (left and right valves) embedded in the rock. Relatively good preservation.

Description: A subspecies of *Kosoviellina silurica* is very similar and closely related to the nominate subspecies but differs from it in having smaller and more elongate valves, slit-like pit above the midvalve, and a different L/H ratio: ⌀ 2.01.

Dimensions: Length of holotype (left valve) 0.54 mm; height of holotype 0.28 mm. L/H ratio: 1.92. The paratype and other specimens; length 0.48 to 0.59 mm; height 0.25—0.28 mm. L/H ratio: 0.92—2.10; ⌀ 2.01.

Occurrence: Basal beds of the Přídolí Formation, in the graptolite biozone with *Pseudomonoclimacis (?) ultima*, together with *Acanthoscapha decurtata*, *Primitiella ? kolednikensis*, *Mirochilina jarovensis*, *Klonkina praecornigera* and other ostracodes. Kosov quarry and Koledník quarry near Beroun, and "Mramorový" lom ("Marble" quarry) near Lochkov etc.

Superfamily *Primitiopsacea* SWARTZ, 1936

Family *Pribylitidae* POKORNÝ, 1958

Genus *Mirochilina* BOUČEK, 1936

Type species: By original designation; *Mirochilina jarovensis* BOUČEK, 1936, from the Upper Silurian of Bohemia.

Stratigraphic range and geographical distribution. Middle Silurian to Lower Devonian of Europe (Bohemia, Sweden) and North America (Canada).

Mirochilina jarovensis BOUČEK, 1936

Pl. VII, fig. 4

1936a *Mirochilina jarovensis* sp. n.; BOUČEK, p. 7 (nomen nudum).
1936b *Mirochilina jarovensis* sp. n.; BOUČEK, p. 52, pl. 3, figs. 5–7.
1941 *Mirochilina jarovensis* BOUČEK, 1936; SCHMIDT, p. 28.
1954 *Mirochilina jarovensis* BOUČEK; POKORNÝ, pp. 383–384, text-fig. 487.
1955 *Mirochilina jarovensis* BOUČEK; BOUČEK - PŘIBYL, p. 589.
1958 *Mirochilina jarovensis* BOUČEK; POKORNÝ, p. 148, text-fig. 693.
1960 *Mirochilina jarovensis* BOUČEK; ZANINA - POLENOVA, p. 302, fig. 685.
1961 *Mirochilina jarovensis* BOUČEK; JAANUSSON *in* Treatise, pt. Q, p. Q 173, fig. 106/2.
1980 *Mirochilina jarovensis* BOUČEK; KRŮTA, pp. 50–66, pl. 8, figs. 1–8; text-fig. 18.

Holotype: By original designation; right valve figured by BOUČEK (1936b) on pl. 3, fig. 6 (NM-L 13 998).

Type stratum and type locality: Lower part of the Přídolí Formation, biozone with *Pseudomonoclimacis (?) ultima*. Koledník quarry near Beroun.

Material: Apart from the holotype over two hundred right and left valves embedded in the rock. Good preservation.

The description of this species has been introduced by BOUČEK (1936b, p. 52) and later by KRŮTA (1980, pp. 50—53). The latter author described and illustrated this species in some detail. He has discovered it also in the uppermost layers of the Přídolí Formation, in the graptolite biozone with *Colonograptus transgrediens*. I can but confirm the correctness of his finding, because I found this species in the entire Přídolian.

Dimensions of holotype: Length 0.79 mm; height of holotype 0.51 mm; width of holotype (one valve) 0.20 mm. Length and height of specimens from the lower layers of the Přídolí Formation: Length 0.56—0.76 mm; height 0.34—0.45 mm; width 0.14—0.28 (only after individual valves). L/H ratio: 1.54—1.68; ⌀ 1.62. Length and height of specimens from the uppermost layers of the Přídolian. Length 0.42—0.96 mm; height 0.25—0.58 mm. L/H ratio: 1.65—1.68; ⌀ 1.66.

Occurrence: The stratigraphic range of *Mirochilina jarovensis* BOUČ. has a great extent; it is the index fossil of the entire Přídolian (= superbiozone with *Mirochilina jarovensis*). It occurs in the lower layers of the Přídolí Formation, where it is relatively common, up to the uppermost beds of it (i.e. to the Colonograptus transgrediens Biozone). Localities: Lower layers of the Přídolí Formation: Koledník and Kosov quarries near Beroun, "Mušlovka" and "Na Požárech" quarries near Řeporyje, "Mramorový" lom near Lochkov etc. Uppermost layers of the Přídolí Formation: Klonk Hill near Suchomasty (upper part of the slope) and the "U topolů" locality near Praha - Radotín.

Order *Platycopa* SARS, 1886

Suborder *Kloedenellocopina* SCOTT, 1961

(= according to SCHALLREUTER, 1980, p. 22, *Cytherelliformes* SKOGSBERG, 1920)

Superfamily *Kloedenellacea* ULRICH and BASSLER, 1908

Family *Kloedenellidae* ULRICH and BASSLER, 1908

Genus *Kloedenella* ULRICH and BASSLER, 1908

Type species: *Kloedenia pennsylvanica* JONES, 1889. Lower Devonian (Helderbergian) of USA.

Kloedenella (*?*) sp.

Pl. VI, fig. 8; text-fig. 6/1

Material: Two valves in the rock.

Description: Relatively large valves, subrectangular to subrhomboidal in lateral view. Dorsal margin slightly arcuate (right valve). Left valve unknown.

Anterior cardinal angle rounded, posterior cardinal angle more distinct but obtuse. Anterior margin regularly convex, bending gradually into slightly concave ventral margin. Posterior margin comparatively truncate, a little convex. Median sulcus or depression distinct, located in front of midlength of valve, extends to about two-fifths of the distance from dorsal to ventral margin. Anterior depression (?) obscure or lacking. Lateral surface of valves probably smooth or very nearly so, the preservation imperfect.

Dimensions: Length 1.02—1.27; height 0.59—0.78 mm. L/H ratio: 1.62 to 1.72. Figured specimen is 1.27 mm long and 0.78 mm high.

Discussion: Both valves resemble in general shape *Kloedenella nitida* ULRICH and BASSLER, 1923 and *K. immersa* ULRICH and BASSLER, 1923, from the McKenzie Formation of the Silurian of Maryland (USA), but is distinguished from them by a slightly distinct sulcus and a more convex dorsal margin. Therefore the present specimens are only questionably assigned to the genus *Kloedenella*.

Occurrence: Kosov quarry near Beroun, relatively rare in the lower layers of the upper part of the Kopanina Formation, in the ostracode assemblage with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Genus *Eukloedenella* ULRICH and BASSLER, 1923

Type species: By original designation; *Eukloedenella umbilicata* ULRICH and BASSLER, 1923, from the Middle Silurian of Maryland.

Eukloedenella perrara sp. n.

Text-fig. 4/10–13

Name: From Latin *perrarus*, very rare, referring to the rare occurrence in the Kopanina Formation.
Holotype: Left tecnomorphic valve figured here in text-fig. 4/12, 13 (AP-SV-25).
Type stratum and type locality: Kopanina Formation, ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.
Material: Holotype and one other valve embedded in the rock.

Description: Valves of medium-size, postplete, transversely elongate in lateral view. Dorsal margin nearly straight, occupying about four-sevenths the maximum length. Anterior cardinal angle approximately 150—155°, posterior cardinal angle around 140°. Posterior margin higher and more broadly curved than narrower anterior margin. Ventral margin almost straight to slightly concave with a little projecting anteroventral flange. Maximum length in the midvalve; maximum height in posterior half of valve. Central and posterior parts of valve are evenly slightly inflated; in the anterior part of valve is a distinct depression. One deep median sulcus, almost vertical, lies in anterodorsal half of valve, extending nearly to midvalve. Rim along free margin, narrowing in the middle of ventral margin. In the posterodorsal part the rim passes into dorsal margin. Lateral surface smooth. Hinge unknown.

Dimensions: Length of holotype 1.19 mm; height of holotype 0.68 mm in posterior part of valve and 0.54 mm in the anterior part. L/H ratio: 1.75.

Discussion: Unlike other species of *Eukloedenella* ULRICH and BASSLER, 1923 the Bohemian species *E. perrara* sp. n. possesses a distinct depression in the anterior part of valve, and the central and posterior parts of valve are inflated. In the lateral view and in the position of sulcus it is somewhat similar to *E. sinuata* ULRICH and BASSLER, 1923, from the McKenzie Formation of the Silurian of Maryland but differs from it in having more elongate valve in lateral view, and a distinct depression in the anterior part of valve. The marginal rim is more distinct than in the American species.

Occurrence: It is the first representative of *Eukloedenella* in Bohemia; it has been found in the lower layers of the upper part of the Kopanina Formation, where it is very rare in the ostracode assemblage with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.

Genus *Neokloedenella* CRONEIS and FUNKHAUSER, 1939

Type species: By original designation; *Neokloedenella prima* CRONEIS and FUNKHAUSER, 1939, from the Lower Carboniferous of Illinois (USA).

Non: *Oliganiscus* GEIS, 1932.

Neokloedenella ? polenovae sp. n.

Pl. VII, figs. 5, 6; text-fig. 3/11, 12

Name: This species has been named in honour of late Dr. E. N. Polenova of Moskva (Moscow), the well known Russian ostracodologist.

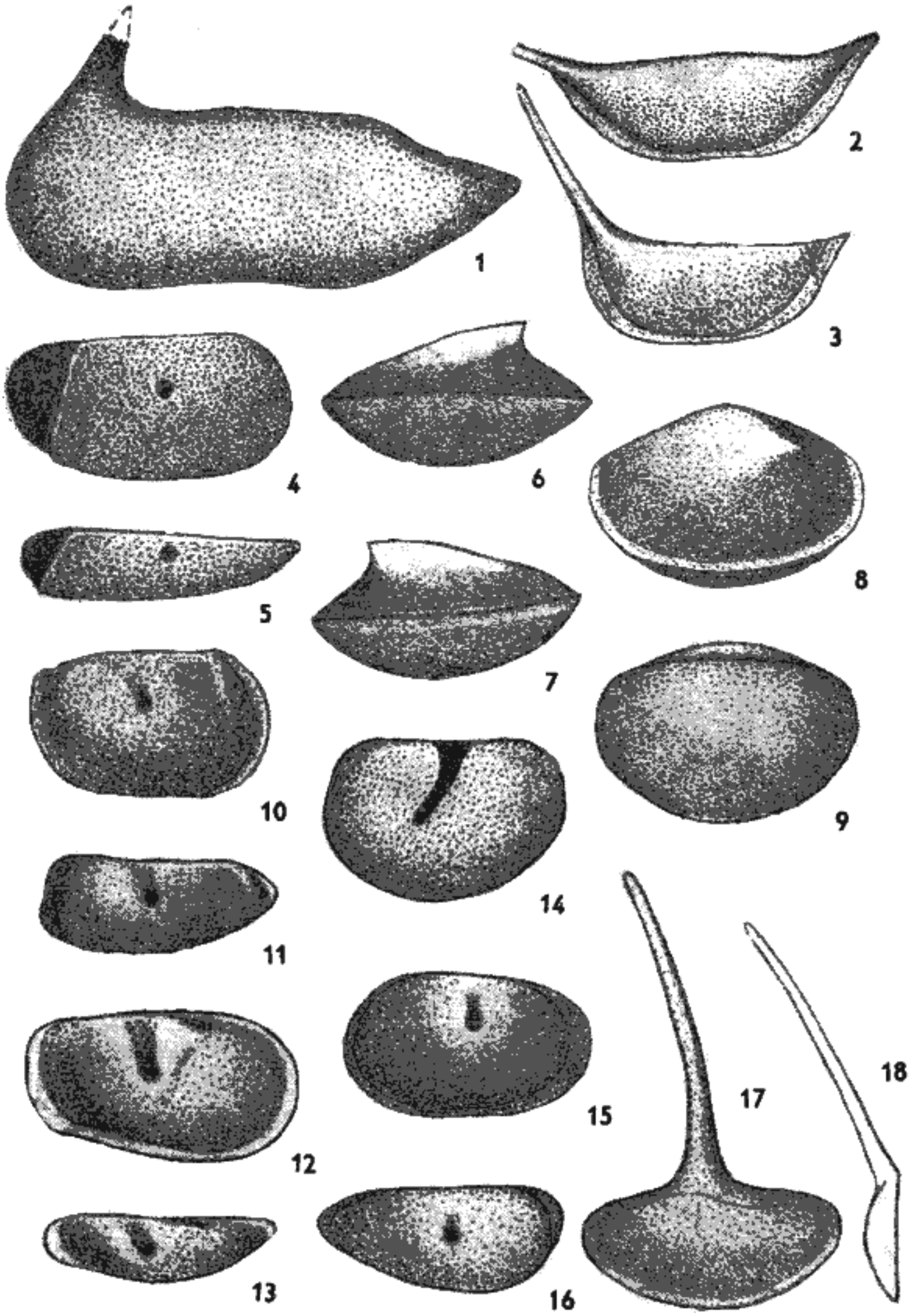
Holotype: Right valve figured here on pl. VII, fig. 6 and text-fig. 3/11, 12. (AP-SV-49.)

Type stratum and type locality: Upper layers of the Kopanina Formation. "Koufící" lom near Kozolupy.

Material: Twelve right and left valves embedded in the rock. Good preservation.

Description: Valves of medium-size, preplete, elongate, subelliptical to subrectangular in lateral view. Dorsal margin long and straight. Anterior cardinal angle approximately 115—120°; there is a considerable variation in the posterior cardinal angle, measuring from 115 to 140°. Anterior margin more broadly rounded than the posterior margin. Posterior part of valves lies lower than the anterior part. Ventral margin slightly convex, passing over into the narrowly rounded posterior margin. Maximum length in dorsal half of valve, maximum height near median or before the median. The pronounced adductorial pit ovate, deep, located anteriorly to midlength and dorsally to midheight. Lateral surface smooth. Hinge unknown.

Dimensions of holotype (AP-SV-49): Length 1.24 mm; height 0.56 mm (in the anterior part of valve) and 0.48 mm (in the posterior part). L/H ratio: 2.21.



4.1. *Shiderelites bouceki* sp. n. Left lateral view of a valve. Holotype (AP-SV-39). × 49. Loděnice near Beroun, Černidla hill. Motol Member, Liteň Formation, Monograptus flexilis Biozone.

Length of other specimens 0.82—1.18 mm; height 0.37—0.62 mm. L/H ratio: 1.90—2.21; ○ 2.05.

Discussion: This Silurian species is easily distinguished from the other species of *Neokloedenella* in that the lateral outline of valves is unusually long, preplete, and the ovate adductorial pit is located anteriorly to midlength of the valves.

Occurrence: Type locality only. Fairly common in the Ananaspis fecunda Horizon of the upper part of the Kopanina Formation. This species has been found in the ostracode assemblage with *Bairdiocypris berounensis*, *L. (L.) reporyjensis*, *Microcheilinella kolednikensis*, *Orthocypris novaki* etc.

Genus *Uchtovia* EGOROV, 1950

Type species: By original designation; *Uchtovia polenovae* EGOROV, 1950, from the Upper Devonian of Russia.

Uchtovia (?) josefi sp. n.

Text-fig. 4/4, 5

Name: This species is named in honour of my late grandfather Mr. Josef Votýpka (1852 – 1926), who was a great lover of nature, especially astronomy.

Holotype: Right valve figured here in text-fig. 4/4, 5 (AP-SV-58).

Type stratum and type locality: Lower layers of the upper part of the Kopanina Formation. Kosov quarry near Beroun.

Material: Apart from the holotype one specimen embedded in the rock.

2, 3. *Acanthoscapha decurtata* (Bouček). Two right lateral views of two valves (syntypes). 2. (AP-SV-62/2). × 30. 3. (AP-SV-62/1). × 32. "Mramorový" lom near Lochkov. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

4, 5. *Uchtovia ? josefi* sp. n. 4. Right lateral view of a valve. Holotype (AP-SV-58). 5. The same valve in oblique dorsal view. All × 30. Kosov quarry. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone.

6 – 9. *Hemiachminoides monstratus* sp. n. Ventral (6), dorsal (7), left (8) and right (9) views of a carapace. Holotype (NM-L 23 745). All × 79. Podskalský (Štětecký) mlýn (mill) near Tmáň. Lower layers of the Kopanina Formation, Lobograptus scanicus Biozone.

10, 11. *Eukloedenella* cf. *perrara* sp. n. Left lateral view (10) and oblique dorsal view (11) of a female (?) valve (AP-SV-24). × 44. Kosov quarry. Kopanina Formation, the same biozone as in fig. 4, 5.

12, 13. *Eukloedenella perrara* sp. n. Left lateral view (12) and oblique dorsal view (13) of a heteromorphic valve. Holotype (AP-SV-25). × 30. Kosov quarry. Kopanina Formation, ibid. ostracode biozone as figs. 10, 11.

14. Gen. et spec. undet. Left valve in lateral view, internal mould. × 50 (AP-SV-26). Kosov quarry. Přídolí Formation, Pseudomonoclimacis ? ultima biozone.

15, 16. *Admirabilinella arcana* g. n. et sp. n. Left lateral view (15) and oblique dorsal view (16) of a female valve. Holotype (AP-SV-37). × 31. Kosov quarry. Kopanina Formation, the layers with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

17, 18. *Aechmina subvexa* sp. n. 17. Right lateral view of a valve. 18. The same valve, anterior view. Holotype (AP-SV-50). × 67. Kosov quarry. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

Description: Tecnomorphic valve of medium-size, elongate in lateral view, slightly preplete, dorsally truncate. Dorsal margin and hinge line almost straight. Anterior margin rounded, higher than the posterior. Ventral margin slightly convex. Maximum lenght in the dorsal half of valve, maximum height midvalve. Posterior end of valve sharply indented, so that there appears to be an oblique to almost vertical ridge or keel, and behind the keel lies a depression. In dorsal view the posterior part of valve appears compressed. A distint adductorial circular pit, not reaching the dorsal margin, is situated slightly anterior to the midpoint in length, slightly dorsal of midheight of valve. Dorsal outline cuneata. Lateral surface smooth except for adductorial pit.

Dimensions of holotype: Length 1.27 mm; height 0.62 mm, and width of valve 0.30. L/H ratio: 2.04.

Discussion: This species is questionably assigned to *Uchtovia*, because it differs from most species of this genus in having the nearly central location of adductorial pit-like sulcus, and by the presence of sharply indented posterior end of valve. It superficially appears similar to *Uchtovia refrathensis* (KRÖMMELBEIN, 1954) and U. *rozhdestvenskayae* ŻBIKOWSKA, 1983, from the Middle Devonian of Poland, the USSR and western part of Germany, and also resembles various species of *Sulcella* CORYELL and SAMPLE, 1932. From all these species it differs in having more elongate valves with a distinct ridge or keel obliquely downwards direcred in the posterior part of valves, and by the characteristic circular adductorial pit situated slightly anterior to the midpoint in length.

Occurrence: Very rare in the Kopanina Formation, in the ostracode assemblage with *Kolednikella inexspectata*, *Cryptophyllus copelandi*, *Kosoviellina silurica* etc. Kosov quarry near Beroun.

Family unknown (? *Lichvinidae* or ? *Beyrichiopsidae*)

Genus *Admirabilinella* gen. n.

Type species: *Admirabilinella orcana* sp. n. Upper Silurian of Bohemia.
Name: From Latin *admirabilis*, admirable, strange.
Included species: Only type species.

Diagnosis: Unisulcate valves of medium-size, elongate, subovate in lateral outline. Dorsal margin slightly convex, slopes posteriorly from midpoint. Hinge line straight and long. Anterior margin broadly rounded, higher than the posterior margin, prominently narrowly rounded. Ventral margin almost straight. Greatest length and height in the midvalve. Maximum width in the posterior half of valve. Adductorial sulcus is situated below the mid-dorsal part of valve, slightly reaching the dorsal margin and extending to the dorsomedian part of each valve. Anterior lobe larger than posterior lobe. Along free margin there is a narrow depression, widest in the posterior part of valves. Overlap ? Lateral surface of valves smooth.

Discussion: The taxonomic position of this genus within the superfamily *Kloedenellacea* is uncertain. Whether or not it is equivalved was not ascertainable since only separate valves were observed. Based on the whole elongate subovate lateral outline of valve, distinct adductorial sulcus and the depression along free margin this taxon resembles some species of *Kloedenellitina* EGOROV, 1950, *Sargentina* CORYELL and JOHNSON, 1939, and *Savagellites* PŘIBYL, 1953, but differs from these three genera by the diagnostic features.

Admirabilinella arcana sp. n.

Text-fig. 4/15, 16

Name: Latin, *arcanus*, referring to its uncertain systematic position.
Holotype: Left valve figured here in text-fig. 4/15, 16 (AP-SV-37).
Type stratum and type locality: Kopanina Formation. Kosov quarry.
Material: Only two valves embedded in the rock. Good preservation.

Description: As for the genus.

Dimensions of holotype: Length 1.07 mm; height 0.62 mm. Length of hinge line 0.82 mm. Length of syntype 0.99 mm; height 0.65 mm. L/H ratio: 1.52—1.72; ⌀ 1.62.

Occurrence: Rare in the lower layers of the upper part of the Kopanina Formation, in the biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.

Family *Monotiopleuridae* GUBER and JAANUSSON, 1964

Genus *Primitiella* ULRICH, 1894

Type species: *Primitiella constricta* ULRICH, 1894. Middle Ordovician of Minnesota (USA).

Primitiella ? kolednikensis BOUČEK, 1936

1936a *Primitiella (?) kolednikensis* n. n.; BOUČEK, p. 6 (sep.).
1936b *Primitiella (?) kolednikensis* sp. n.; BOUČEK, pp. 42–43, pl. 2, figs. 6a–c, 7a, b.

Holotype: Left valve figured by BOUČEK (1936b) on pl. 2, fig. 6a–c (NM-L 14031b).
Paratype: Left valve figured by BOUČEK (1936b) on pl. 2, fig. 7a, b (NM-L 14003).
Type stratum and type locality: Přídolí Formation, ostracode biozone with *Primitiella ? kolednikensis*. The abandoned Koledník quarry near Beroun.
Material: Apart from the holotype and paratype over fifty valves (left and right) embedded in the rock. Good preservation.

Description: A small species of *Primitiella* with subovate to subelongate postplete valves, almost completely smooth. Dorsal margin relatively long and straight. Anterior cardinal angle approximately 140—145°, posterior angle less

obtuse, around 120—125°. Anterior margin evenly rounded, more convex than the broadly curved posterior margin. Ventral margin nearly straight, inclined posteriorly. Maximum length in midvalve; maximum height in the posterior part of valve. A small, faint, shallow depression is located in dorsocentral part.

Dimensions of holotype: Length 0.79 mm; height 0.45 mm. L/H ratio: 1.75. Length of paratype 0.76 mm; height of paratype 0.40 mm. L/H ratio: 1.90. The specimens in the author's collection are 0.47—0.82 mm long and 0.25 to 0.37 mm high. L/H ratio: 1.88—2.21; ⌀ 2.04.

Discussion: The species is rather similar to *Primitiella constricta* ULRICH, 1894, from the Middle Ordovician of Minnesota; therefore I follow Bouček's opinion and place this species provisionally in that genus. *P.? kolednikensis* BOUČEK, 1936 differs from all known Silurian species of *Primitiella* in having a different outline of valves in lateral view and the anterior margin more convex and abruptly bent.

Occurrence: Relatively frequent in the lower layers of the Přídolí Formation, in the graptolite biozone with *Pseudomonoclimacis* (?) *ultima*, together with many ostracode species of the ostracode biozone *Primitiella ? kolednikensis*. The quarries Koledník and Kosov near Beroun, "Mušlovka" quarry and "Na Požárech" quarry near Řeporyje, and Praha - Jinonice, at the "Na butovickém hradišti" locality.

Superfamily *Leperditellacea* ULRICH and BASSLER, 1906

Family uncertain

Genus *Ectoprimitia* BOUČEK, 1936

Type species: By original designation; *Primitia corrugata* KRAUSE, 1892, from the Ordovician of eastern part of Germany.

Ectoprimitia ? latilimbata (PŘIBYL and ŠNAJDR, 1950)

1950 *Primitiella latilimbata* sp. n.; PŘIBYL - ŠNAJDR, pp. 132, 175—176, pl. 1, figs. 17, 18.
1960 *Primitiella latilimbata* PŘIBYL and ŠNAJDR; ZANINA - ZASPELOVA - POLENOVA, p. 303, text-fig 691.
1965 *Primitiella latilimbata* PŘIBYL and ŠNAJDR; PŘIBYL *in* ŠPINAR et al., p. 688.

Holotype: Right valve figured by PŘIBYL and ŠNAJDR (1950) on pl. 1, fig. 18. [The holotype is probably lost; it has not been found in the National Museum (Nat. Hist.) in Praha.]
Type stratum and type locality: Lower layers of the Kopanina Formation. "Amerika" quarry near Mořina.
Material: Seven well preserved valves embedded in the rock.

Description: Valves elongate in lateral view, amplete to slightly preplete, with a straight and long dorsal margin, which has a shallow, rather broad depression in about the middle. Hinge line straight. Anterior margin more curved than the

posterior. Ventral margin almost straight. Cardinal angles obtuse. Along anterior, ventral and posterior margins there is a fairly broad, slightly raised complete marginal rim, in the anterior part of valves a little broader than in the posterior part. Lateral surface smooth. Hinge unknown.

Dimensions of holotype: Length 1.10 mm; height 0.58 mm. L/H ratio: 1.89.

Discussion: This species is tentatively placed in *Ectoprimitia*. It is easily distinguished from all known representatives of *Ectoprimitia* by the fairly broad complete marginal rim, which in the anterior part of valves is a little broader than in the posterior part.

Occurrence: The abandoned "Amerika" quarry (field XVIII) near Mořina, "Kouřící" lom near Kozolupy. Lower layers of the Kopanina Formation (= lower Ludlow), Lobograptus scanicus Biozone.

?Superfamily *Leperditellacea* Ulrich and Bassler, 1906

Family uncertain

Genus *Parahippa* Sethi, 1979

Type species: By original designation; *Parahippa visbyensis* Sethi, 1979, from the Silurian of Gotland.

Parahippa lodenicensis (Bouček and Přibyl, MS) sp. n.

Pl. VIII, figs. 2, 3, 5, 7; text-fig. 2/5, 6

1955 *Trubinella lodenicensis* sp. n.; Bouček - Přibyl, pp. 598, 651 (nomen nudum).

Name: After the Loděnice locality (Černidla hill).

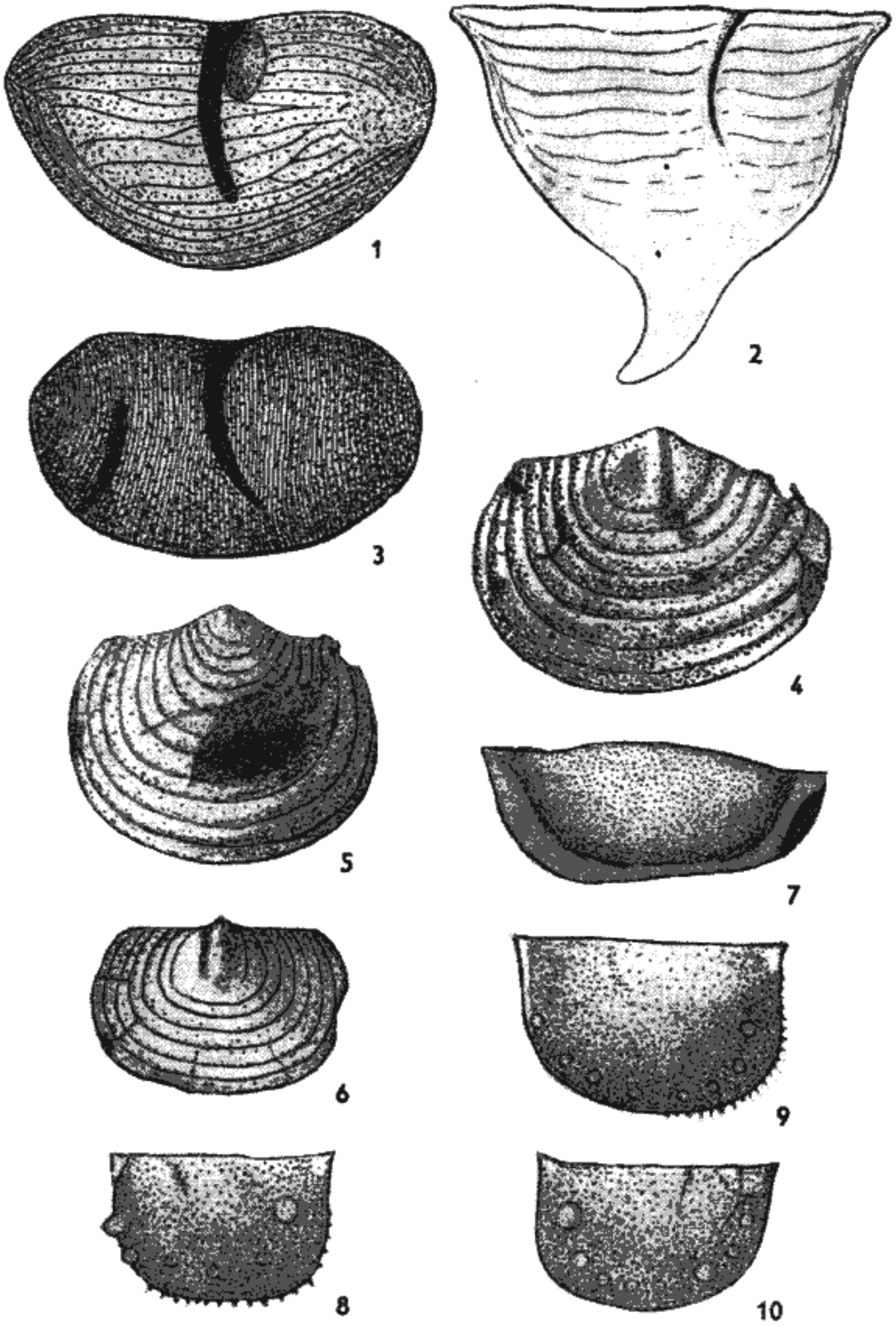
Holotype: Right valve figured here on pl. VIII, fig. 2 and in text-fig. 2/5 (AP-SV-71).

Type stratum and type locality: Motol Member, Liteň Formation, Monograptus flexilis Biozone. Černidla hill near Loděnice, at the road from Loděnice to Bubovice.

Material: Apart from the holotype and paratypes, thirty-two specimens embedded in the rock. Preservation poor to fairly good.

Description: Valves of medium-size, subquadrate to subovate in lateral outline, truncated dorsally by a long, straight hinge line. Anterodorsal and posterodorsal cardinal corners (angles) projecting in long acroidal processes (spines). Maximum length in dorsal half, maximum height near the middle. Anterior margin more broadly rounded than the posterior. Free margin regularly curved, evenly convex. The number of adventral spines or nodes varies from 7 to 9. Lateral surface smooth or with very fine small scattered granules, but not reticulate.

Dimension of holotype: Length 1.07 mm; height 0.71 mm. L/H ratio: 1.50. Length of paratypes and other specimens: 0.82—1.27 mm; height 0.51—0.73 mm. L/H ratio: 1.60—1.73; ⌀ 1.66. Some instars have been found (0.80—0.90 mm long and 0.51—0.65 mm high).



5.1. *Richteria migrans* (BARRANDE). Right lateral view of a valve. Lectotype figured by BARRANDE (1872) on pl. 24, figs. 12, 13, (NM-L 22 944), a little completed. After BOUČEK (1936b), text-fig.

Discussion: *Parahippa lodenicensis* sp. n. bears a number of characteristics between *Parahippa visbyensis* SETHI, 1979 and *Parahippa rediviva* (BARRANDE, 1872). *P. visbyensis*, the type species of *Parahippa*, has a sulcal depression, a small, rounded adductorial scar, the very finely reticulate lateral surface of valves with scattered small granules, and a different L/H ratio. In these features *P. visbyensis* SETHI differs from *P. lodenicensis* sp. n. *P. rediviva* (BARRANDE), on the other hand, has a pronounced narrow sulcus, shorter acroidal processes, and the lateral surface is finely randomly granulated. *P. lodenicensis* sp. n. is easily distinguished from the closely related species *P. droseron* sp. n. in having a relatively smooth lateral surface of valves, whereas *P. droseron* sp. n. has prominent tubercles on the lateral surface of valves.

Occurrence: Fairly abundant in the grey platy limestones and brownish-grey calcareous shales of the Motol Member of the Liteň Formation, with *Monograptus flexilis*, *Monoclimacis hemipristis*, *Miraspis mira mira*, *Cheirurus insignis* etc. Loděnice (Černidla hill), the outcrop in the bend of the road from Loděnice to Bubovice. Further, Praha - Velká Chuchle, in the grove at the road to the Church of St. John; upper layers of the Motol Member, above Cyrtograptus lundgreni Biozone, together with *Aulacopleura konincki*, *Scharyia wenlockiana*, *Cystomatochilina elegans* etc.

Parahippa droseron sp. n.

Pl. VIII, fig. 1, 4; text-fig. 2/1

Name: Greek *droseros* meaning dewy.

Holotype: Left valve figured here on pl. VIII, fig. 1 (AP-SV-77).

Type stratum and type locality: Motol Member, Liteň Formation. Loděnice (Černidla hill) near Beroun.

Material: Holotype and six left and right valves in grey limestones. Preservation is fairly good.

Description: Valves of medium-size, subovate to subquadrate in lateral view.

2a. × 21. Praha - Podolí (formerly Dvorce quarry, today a swimming pool). Kopanina Formation, "Cromus" beaumonti trilobite Horizon.

2. *Rhomboentomozoe rhomboidea* (BARRANDE). Right lateral view of a valve. After PŘIBYL (1951), pl. 1, fig. 2. × 23. Kozel (Lištice near Beroun.) Kopanina Formation, "Cromus" beaumonti Horizon.

3. *Boucia ornatissima* (BOUČEK). Right valve in lateral view. After PŘIBYL (1951), pl. 1, fig. 5, partly completed. Holotype (NM-L 14 041). × 25. Praha - Velká Chuchle. Přídolí Formation, Colonograptus transgrediens Biozone (= ostracode biozone with *Vltavina bohemica*).

4–6. *Cryptophyllus copelandi* sp. n. Two left and one right lateral views of three valves. 4. Paratype (AP-SV-53). × 18. 5. Paratype (AP-SV-51). × 16. 6. Paratype (AP-SV-54). × 15. Kosov quarry. Kopanina Formation, biozone with *Koledníkella inexspectata* and *Cryptophyllus copelandi*.

7. *Acanthoscapha ockerieusis* BLUMENSTENGEL. Left valve in lateral view (AP-SV-83). × 26. Kosov quarry. Kopanina Formation, ibid. biozone as fig. 6.

8–10. *Parahippa rediviva* (BARRANDE). Two right (8, 9) and one left (10) lateral views of three valves (AP-SV-31-33). 8. × 40; 9. × 23; 10. × 36. Kosov quarry. Kopanina Formation, ibid. biozone as figs. 4–6.

Dorsal margin straight and long. Anterior cardinal angle (corner) projecting in a short acroidal spine; posterior cardinal angle (corner) near 90°, sometimes indistinct spine. Maximum length in dorsal half of valves, maximum height near midvalve. Free margin regularly curved. Anterior margin less convex than the posterior margin. Ventral margin slightly convex. The number of adventral spines or pointed nodes varies between 7—8. Lateral surface of valves is covered with prominent tubercles, which are scattered on the entire surface.

Dimensions of holotype: Length 1.24 mm; height 0.78 mm. L/H ratio: 1.58. Length of paratype (AP-SV-78) and other specimens (AP-SV-37-38), 0.88—1.19 mm; height 0.55—0.80 mm. L/H ratio: 1.48—1.60; ⌀ 1.54.

Discussion: This new species closely agrees with the associated species *Parahippa lodenicensis* sp. n. but has a lateral surface of valves covered with prominent tubercles, and shorter acroidal processes. By these features *P. droseron* sp. n. differs from all known species of *Parahippa*.

Occurrence: In the same layers of the Motol Member as *P. lodenicensis*. Loděnice (Černidla hill), in the bend of the road to Bubovice. Monograptus flexilis Biozone (= upper Wenlock).

Parahippa rediviva (Barrande, 1872)

Pl. VIII, figs. 6, 8; text-fig. 5/8–10

1872 *Hippa rediviva* sp. n.; BARRANDE, p. 518, pl. 26, fig. 3a–h.
1936b *Hippa rediviva* BARRANDE; BOUČEK, pp. 46, 47, pl. 3, figs. 17–20.
1955 *Trubinella rediviva* (BARRANDE); BOUČEK - PŘIBYL, pp. 598, 626–627, 651–652, pl. 1, figs. 1–3; pl. 3, fig. 12.
1958 *Trubinella rediviva* (BARRANDE); POKORNÝ, p. 148; text-fig. 694.
1979 *Parahippa rediviva* (BARRANDE); SETHI, pp. 151, 153.
1980 *Parahippa rediviva* (BARRANDE); KRŮTA, pp. 67–70, pl. 5, figs. 5, 6; text-fig. 29 (= ? *Parahippa* sp. n.).

Lectotype: SD BOUČEK (1936b, p. 46). Left valve figured by BARRANDE (1872) on pl. 26, fig. 3f–h (NM-L 8943).

Type stratum and type locality: Lower part of the Přídolí Formation. Dlouhá hora (= Kosov hill) near Beroun.

Material: Apart from the holotype over fifty left and right valves in the rock. Poor and good preservation.

The description of *Parahippa rediviva* (Barrande, 1872) was given first by Barrande (1872, p. 518). The detailed description of the species has been submitted by Bouček (1936b, p. 47). Here I add to his description that both dorsal corners (anterior and posterior) jutt out in short acroidal processes, and a row of 7—8 prominent adventral short spines or large spine granules is developed. The first adventral granule or spine, which lies in the midanterior part of valve is often the largest. Along anterior and ventral free margins of many valves there is

a row of short spines of identical size. Lateral surface of both valves finely randomly granulated.

Dimensions: Length of lectotype (NM-L 8 943) 0.71 mm; height of lectotype 0.42 mm; width of lectotype (one valve) 0.18 mm. L/H ratio: 1.69. Length of other specimens 0.75—1.08 mm; height of other specimens 0.45—0.60 mm. L/H ratio: 1.66—1.80; ⌀ 1.73.

Discussion: *Parahippa rediviva* (BARRANDE) is very similar in the general shape of valves to *P. visbyensis* SETHI and *P. lodenicensis* sp. n. but differs from both these species in the presence of a row of short spines along anteroventral free margin, and in having shorter acroidal processes in the dorsal corners. The lateral surface of *P. rediviva* (BARR.) is finely randomly granulated; also, a narrow sulcus or depression is often indistinct. Another related species *P. droseron* sp. n. is distinguished from *P. rediviva* (BARR.) mainly by prominent scattered tubercles on the entire lateral surface of valves.

Occurrence: The stratigraphic range of this species has a great extent. It occurs in the upper part of the Kopanina Formation (from the ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*) up to upper layers of the Přídolí Formation. It is relatively common in the upper layers of the Kopanina Formation and in the basal beds of the Přídolí Formation. It has been found in many Bohemian localities, e.g. Kosov and Koledník quarries near Beroun, "Mramorový" lom near Lochkov, Praha - Jinonice, at the "Na butovickém hradišti" locality, Klonk near Suchomasty etc.

Order ? *Podocopida* SARS, 1866

Suborder *Paraparchitocopina* GRAMM, 1975

Superfamily *Paraparchitacea* SCOTT, 1959

Family *Jaanussonidae* SCHALLREUTER, 1971

Genus *Hemiaechminoides* MORRIS and HILL, 1952

Type species: By original designation; *Hemiaechminoides nonospinosus* MORRIS and HILL, 1952, from the Middle Silurian of Tennessee (USA).

Hemiaechminoides monstratus sp. n.

Pl. X, figs. 4—6; text-fig. 4/6—9

Name: Latin *monstratus*, conspicuous, prominent.

Holotype: The carapace figured here on pl. X, figs. 4—6 and text-fig. 4/6—9. (NM-L 23745).

Type stratum and type locality: Lower layers of the Kopanina Formation, Lobograptus scanicus Biozone. Podskalský (Štětecký) mlýn near Tmáň.

Material: Holotype (free carapace), well preserved, and one valve.

Description: Carapace small, nonsulcate, subtriangular in lateral view, with maximum height in midvalve. Maximum length slightly above midheight. Hinge line straight, about three-quarters the greatest length. Anterior and posterior margins rounded; ventral margin convex. Cardinal angles obtuse, c. 145—155°. Valves unequal; right valve overlapping left valve along entire free margin, most at the ventral margin. Left valve expands dorsally above hinge line and forms subtriangular outline of the valve. In the posterior part of left valve (below the dorsal margin) lies a prominent spine directed laterally-backward. Right valve bears neither dorsal expansion nor spine. Oval to elongate oval in dorsal view, with the largest thickness behind the middle (across the spine); ends narrowly rounded; sides evenly convex. Lateral surface smooth. Hingement and adductor muscle spot not observed.

Dimensions of holotype: Length 0.44 mm; height of left valve 0.25 mm, height of right valve 0.30 mm. Width 0.23 mm across the middle part of carapace; width (across the spine) 0.28 mm. L/H ratio: 1.46 (right valve) and 1.76 (left valve). L/H ratio: 1.91 (across the middle of carapace).

Discussion: *Hemiaechminoides monstratus* sp. n. is very similar to *H. monospinosus* MORRIS and HILL, 1952, from the Middle Silurian of Tennessee but is distinguished from it by a different subtriangular outline of the carapace, and by the location and backward inclination of the spine in the posterior part of left valve. In addition, the valves of *H. monstratus* sp. n. are somewhat smaller than the valves of *H. monospinosus* and RV overlap over LV is more pronounced.

Occurrence: Lower part of the Kopanina Formation (= lower Ludlow), in the upper part of the Lobograptus scanicus Biozone. Characteristic ostracode assemblage with *Richina hornyi* and *Cytherellina kopaninensis*. Podskalský (Štětecký) mlýn (mill) near Tmáň.

Order *Podocopida* SARS, 1866

Suborder *Metacopina* SYLVESTER-BRADLEY, 1961

Superfamily *Healdiacea* HARLTON, 1933

Family *Healdiidae* HARLTON, 1933

Genus *Cytherellina* JONES and HOLL, 1869

Type species: *Beyrichia siliqua* JONES, 1855. Silurian of Scandinavia.

Remarks: This genus has been recorded by BOUČEK (1937) from the Middle Silurian and by PŘIBYL and ŠNAJDR (1950) from the Devonian of Bohemia. Now it has been ascertained in the Bohemian Upper Silurian.

According to KOZUR (1972, p. 13) the suborder *Metacopina* SYLVESTER-BRADLEY, 1961 is a younger synonym of *Cypridicopina* JONES in CHAPMAN, 1901.

Cytherellina cf. *siliqua* (JONES, 1855)

Pl. X, figs. 7, 8; text-fig. 6/2

Material: Two well preserved free carapaces and twenty-three valves embedded in the rock.

Dimensions: Carapaces: Length 1.84—1.95 mm; height 1.05—0.99 mm; width 0.41—0.43 mm. L/H ratio: 1.75—1.95; ⌀ 1.86. Valves in the rock: Length 1.69—2.18 mm; height 0.85—0.99 mm. L/H ratio: 1.98—2.20; ⌀ 2.09.

Discussion: The species *Cytherellina siliqua* (JONES) has been reported from the Middle Silurian of Great Britain and northern Europe. BOUČEK (1937) recorded it from the Middle Silurian of central Bohemia, and COPELAND (1960) from the Upper Silurian of Nova Scotia (Canada). Some years ago ABUSHIK (1970) found this species in the Upper Silurian of the Waigatsh Island (USSR). Recently I have found some specimens of *Cytherellina* cf. *siliqua* (JONES) in the lower layers of the Kopanina Formation.

The general shape of valves is the same as in *C. siliqua* (JON.) but the internal sulcation is different. Our specimens are longer and narrower. Therefore, for the present time, I designate these specimens as *C.* cf. *siliqua* (JONES).

Occurrence: "Amerika" quarry near Mořina and "Kouřící" lom near Kozolupy. Kopanina Formation, fairly common in the tuffaceous layers and light-brown to reddish limestones with "*Cromus*" *beaumonti*, *Proetus morinensis*, *Sphaerexochus paramirus*, further the layers with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Cytherellina grandis JONES and HOLL, 1869

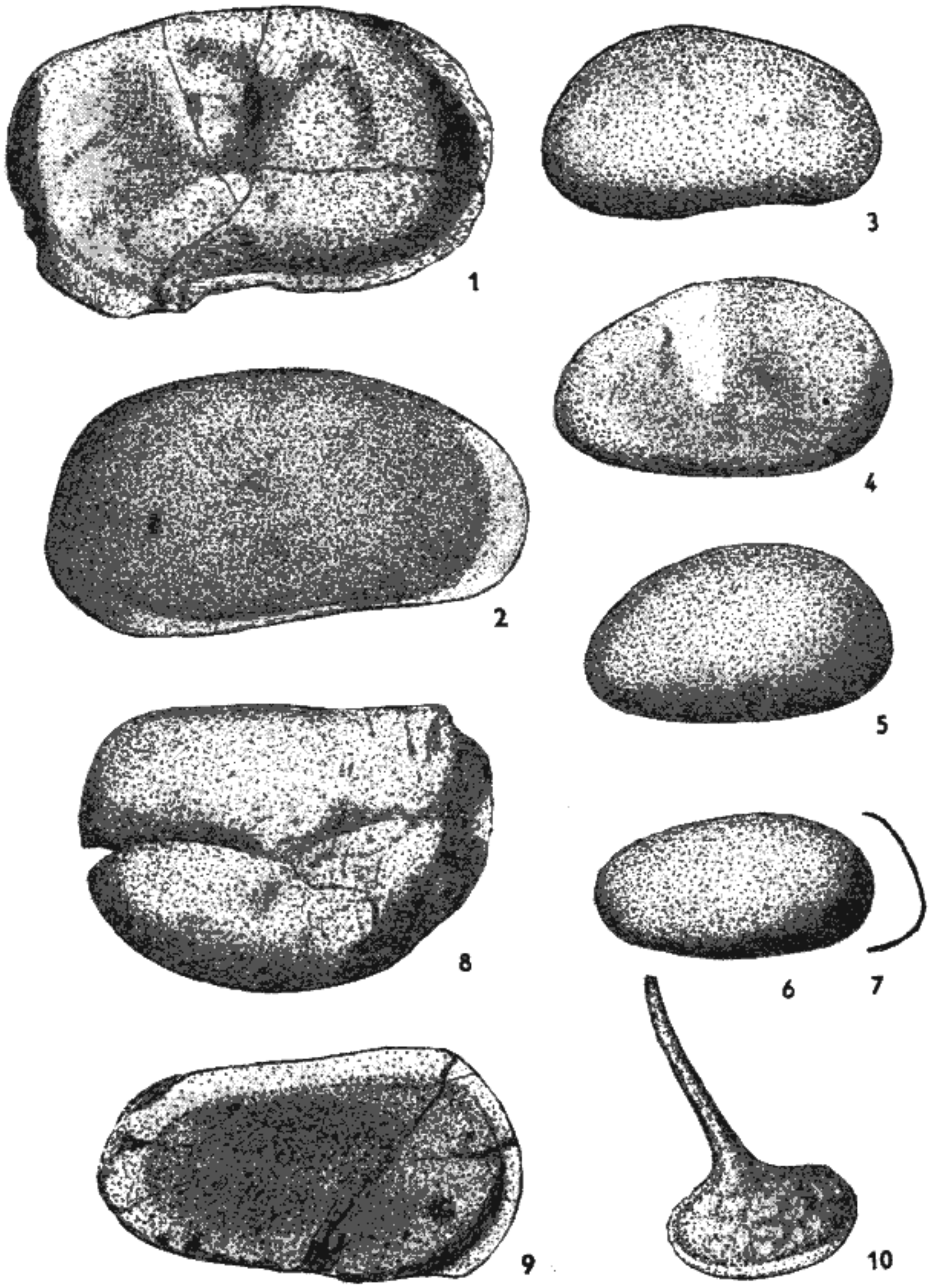
1869 *Cytherellina siliqua grandis* subsp. n.; JONES - HOLL, pp. 217, 227, pl. 14, fig. 1.
1887 *Bythocypris grandis* (JONES and HOLL); JONES, pp. 5, 19, 185.
1934 *Bythocypris grandis* (JONES and HOLL); BASSLER - KELLETT, p. 227.
1937 *Cytherellina siliqua* (JONES); BOUČEK, p. 2 (sep.), text-fig. 1a–e.

Type species: The specimen figured by JONES and HOLL (1869) on pl. 14, fig. 1. Silurian of England.

Remarks: BOUČEK (1937) described and figured two specimens of this species under the specific name *Cytherellina siliqua* (JONES) from the Motol Member of Bohemia. In the collections of the National Museum (Natural History) of Praha (Prague) only one specimen is preserved (see BOUČEK, 1937, text-fig. 1a,b) (NM-L 23 364). The second Bouček's specimen is probably lost.

Dimensions: Length of the specimen figured by BOUČEK (1937) in text-fig. 1a,b is 2.07 mm and height 0.98 mm. L/H ratio: 2.11. Additional specimens are 1.90—2.10 mm long and 0.85—1.02 mm high. L/H ratio: 2.05—2.23.

Occurrence: Relatively common in the Motol Member (Liteň Formation), especially in the vicinity of the Truneček mill, Praha - Řeporyje, Cyrtograptus



6.1. *Kloedenella* sp. Right valve in lateral view. Internal mould (AP-SV-42). × 61. Kosov quarry. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

murchisoni Biozone. They are preserved as individual valves in the rock, often with the external surface.

Cytherellina kopaninensis PŘIBYL, 1987

1960 *Cytherellina kopaninensis* sp. n.; PŘIBYL, pp. 163, 168 (table 1), 170. (Nomen nudum.)
1987 *Cytherellina kolednikensis* sp. n.; PŘIBYL, 365, text-fig. 3/1–10.

Holotype: Well preserved carapace figured by PŘIBYL (1987) in text-fig. 3/1–5 (NM-L 23731). Paratype. Carapace figured by PŘIBYL (1987) in text-fig. 3/6–10 (NM-L 23736).
Type stratum and type locality: Lower part of the Kopanina Formation, Lobograptus scanicus Biozone. Podskalský (Štětecký) mlýn (mill) near Tmáň.
Material: More than fifty well preserved carapaces and some free valves.

Description: The description of this species has recently been given by PŘIBYL (1987) to which I refer the reader. Adductor muscle scars are composed of a group of eleven to twelve nearly concentric scars in the middle of valve.

Dimensions of holotype: Length 0.76 mm; height 0.51 mm; width 0.39 mm. L/H ratio: 1.49. Paratype. Length 0.82 mm; height 0.51 mm; width 0.39 mm. L/H ratio: 1.60. Length of other specimens: 0.82—0.85 mm; height 0.51—0.56 mm; width 0.38—0.39 mm. L/H ratio: 1.51—1.60; ⌀ 1.55.

Discussion: This species differs from other species of *Cytherellina* in having a conspicuously different lateral outline of the carapace which attains its maximum height in the posterior part of valves. Also the dorsal margin is convex with the apex near the posterior part and shoulders sloping to posterior margin abruptly downwards and to narrowly curved anterior margin very gently.

Occurrence: Typical specimens of this species were obtained from one locality only. They have been found in the tuffaceous intercalations of the lower part of the Kopanina Formation (= Lobograptus scanicus Biozone), where they are among the most common ostracodes. Podskalský (Štětecký) mlýn (mill) near Tmáň, in the outcrop at the road to Suchomasty.

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2. *Cytherellina* cf. *siliqua* (JONES]). Right valve in lateral view. Internal mould (AP-SV-43). × 50. Kosov quarry. Kopanina Formation, ibid. biozone as fig. 1.

3. *Cytherellina* sp. Right valve in lateral view. Internal mould (AP-SV-44). × 58. Kosov quarry, ibidem formation and biozone.

4, 5. *Cytherellina* sp., ex gruppe *C. siliqua* (JONES). Two left valves in lateral views. Internal moulds (NM-L 23 741 and AP-SV-35a). 4. × 50; 5. × 49. Kosov quarry, ibidem formation and biozone as fig. 1.

6, 7. *Microcheilinella* sp. 6. Left valve in lateral view. 7. The same valve in anterior view (AP-SV-36). × 47. The specimen was lost. Kosov quarry, ibidem formation and biozone as fig. 1.

8. *Aparchites* ? sp. Right valve in lateral view. Internal mould (AP-SV-28). Kosov quarry. Kopanina Formation, ibid. biozone as fig. 6.

9. *Ostracode* gen. et spec. undet. - B. Right valve in lateral view. Internal mould (AP-SV-20). × 46. Kosov quarry, ibidem formation and biozone as fig. 1.

10. *Aechmina* cf. *subvexa* sp. n. Right valve in lateral view (AP-SV-21). × 50. Kosov quarry. Kopanina Formation, ibid. biozone as fig. 1.

Cytherellina rozhdestvenskajae sp. n.

Text-fig. 7/1–6

Name: This species has been named in honour of Dr. Anna A. Rozhdestvenskaja of Ufa, a well known Russian ostracodologist.

Holotype: Carapace figured here in text-fig. 7/1–4 (AP-SV-106).

Type stratum and type locality: Lower part of the upper layers of the Kopanina Formation. Kosov quarry near Beroun.

Material: Two well preserved carapaces and some valves embedded in the rock.

Description: A small species of *Cytherellina* with subovate valves in lateral view. Dorsal margin arched, especially in the posterior part of valve and slowly sloping to narrowly rounded anterior margin. Ventral margin almost straight. Posterior part of the valve more arched, higher than the anterior. Maximum length near midvalve, maximum height and width near posterior part of carapace. Left valve larger, overlapping the right along all margins; the overlap is largest along posterodorsal shoulder, and the smallest along anterodorsal and anteroventral shoulders. Seen in dorsal view, the carapace is elongate oval with the largest thickness in the posterior part. Lateral surface smooth. Hinge and adductor muscle scars unknown.

Dimensions of holotype (AP-SV-106): Length 0.72 mm; height 0.42 mm; width 0.39 mm. Length of paratype (AP-SV-107) 0.71 mm; height 0.42 mm; width 0.36 mm. L/H ratio: 1.69—1.71; ⌀ 1.70. H/W ratio: 1.84—1.97; ⌀ 1.90.

Discussion: *Cytherellina rozhdestvenskajae* sp. n. is somewhat similar in lateral outline to *C. inornata* COPELAND, 1974 and *C. subovata* CORYELL and WILLIAMSON, 1936, from the Silurian of North America. Both American species are relatively larger, regularly ovate to subovate with arched dorsal margin near midheight. Their greatest height and width are near or behind midvalve and not in the posterior part of valves as indicated for *C. rozhdestvenskajae* sp. n. In lateral view, this species is also somewhat similar to *C. kopaninensis* PŘIBYL, 1987, from the lower layers of the Kopanina Formation. This latter species shows a more pronounced overlap of the left valve over the right valve and the lateral outline of valves is rather different. Likewise the L/H ratio of the two mentioned species is different (1.49—1.60) in *C. kopaninensis* PŘIB. and 1.69—1.71 in *C. rozhdestvenskajae* sp. n.

Occurrence: Rare in the lower layers of the upper part of the Kopanina Formation, in the ostracode assemblage with *Acanthoscapha ockeriensis*, *Cryptophyllus copelandi*, *Kolednikella inexspectata* etc. Up to now the Kosov quarry near Beroun.

Cytherellina sp. [ex gruppe *C. siliqua* (JONES, 1855)]

Text-fig. 6/4, 5

Material: Fifteen valves in the rock.

Description: Under the designation *Cytherellina* sp. (ex gruppe *C. siliqua*)

I present some valves from the lower layers of the upper part of the Kopanina Formation. They are elongate subovate to subtriangular in lateral outline, maximum length near the median or median-ventral part of valves, maximum height posteriorly. Dorsal margin smoothly arched, anterior and posterior shoulders slightly convex. Anterodorsal shoulder sloping to rounded anterior margin. Posterior margin nearly rounded, higher than anterior margin. Ventral margin straight or anteriorly concave, posteriorly slightly convex. Lateral surface smooth. Only two specimens have broad sulcation and two low lobes on internal mould.

Dimensions: Length 0.84—0.90 mm; height 0.48—0.54 mm. L/H ratio: 1.66—1.75; ⌀ 1.70.

Occurrence: Relatively common in the lower layers of the upper part of the Kopanina Formation, in a rich ostracode assemblage with *Kolednikella inexspectata*, *Cryptophyllus copelandi*, *Kosoviellina silurica silurica* etc. Kosov and Koledník quarries near Beroun.

Genus *Healdianella* POSNER, 1951

Type species: By original designation; *Healdianella darwinuloides* POSNER, 1951, from the Lower Carboniferous of Russia.

Healdianella ? krausei (BOUČEK, 1937)

1937 *Pontocypris krausei* sp. n.; BOUČEK, pp. 3–4 (sep.), text-fig. 1f–i.

Holotype: Carapace figured by BOUČEK (1937) in text-fig. 1f–i (NM-L 23365).
Type stratum and type locality: Motol Member of the Liteň Formation. Praha - Řeporyje.
Material: Two carapaces.

Remarks: The species has been described in detail by BOUČEK (1937) and placed to *Pontocypris* SARS, 1866. The holotype and paratype are well preserved and deposited in the collections of the National Museum (Natural History) in Praha (Prague). I refer the reader to BOUČEK's description.

Dimensions: Length of holotype 0.79 mm; height of holotype 0.46 mm (left valve) and 0.42 mm (right valve); width of holotype 0.34 mm. L/H ratio: 1.71. Paratype. Length 1.13 mm; height 0.46 mm. L/H ratio: 2.45.

Discussion: I assign this genus to *Healdianella* POSNER, 1951 only with some hesitation. It may also belong to *Cytherellina* JONES and HOLL, 1869 but it has some features very similar to many species of *Healdianella*. *H. ? krausei* (BOUČ.) is distinguished from all known representatives of *Healdianella* by a striking short overlapping of valves; the left valve overlaps the right one only on the dorsal and anterior margins. No overlapping is seen on the ventral and posterior margins.

Occurrence: Relatively rare in the Motol Member of the Liteň Formation, in the layers with *Cyrtograptus murchisoni*. Praha - Řeporyje, in the Daleje valley, near the Truneček mill.

? Superfamily *Healdiacea* HARLTON, 1933

Family unknown

Genus *Daleiella* BOUČEK, 1937

Type species: *Cythere corbuloides* JONES and HOLL, 1869. Silurian of England.
Synonym: *Altibairdia* MIKHAILOVA, 1977

Daleiella triangularis BOUČEK, 1937

1937 *Daleiella triangularis* sp. n.; BOUČEK, pp. 8–9 (sep.), text-fig. 5a–e.
1960 *Daleiella triangularis* BOUČEK; PŘIBYL, pp. 162, 168 (table 1).

Holotype: Carapace figured by BOUČEK (1937) in text-fig. 5a–e. [The holotype of this species is probably lost; it has not been found in the collections of the National Museum (Natural History) in Praha, where it was deposited].

Description: See BOUČEK (1937), pp. 8—9 (sep.).

Dimensions of holotype (after BOUČEK, 1937, p. 9). Length 1.00 mm; height 0.70 mm; width 0.72 mm. L/H ratio: 1.42.

Discussion: *Daleiella triangularis* BOUČEK, 1937 is most closely related to *D. corbuloides* (JONES and HOLL, 1869) from the Wenlockian of England. The main differences between these two species concern the asymmetrical outline of valves and the carapace of the Bohemian species, which attains its maximum height and width in the middle part of valves.

Occurrence: Very rare in the tuffaceous layers of the Motol Member (= Wenlock) of the Liteň Formation. For the time being only Praha - Řeporyje, Daleje valley, near the Truneček mill. Ostracode biozone with *Daleiella triangularis*, together with *Healdianella (?) krausei*, *Bairdiocypris phillipsiana*, *Microcheilinella bohemica*, *Cytherellina grandis* etc.

Superfamily *Bairdiocypridacea* SHAVER, 1961

Family *Bairdiocyprididae* SHAVER, 1961

Genus *Bairdiocypris* KEGEL, 1932

Type species: *Bythocypris (Bairdiocypris) gerolsteinensis* KEGEL, 1932, from the Middle Devonian of Germany.

Bairdiocypris phillipsiana (JONES and HOLL, 1869)

1869 *Bairdia phillipsiana* sp. n.; JONES - HOLL, 4, 3, p. 213, pl. 14, fig. 7a–c.
1934 *Bythocypris phillipsiana* (JONES and HOLL); BASSLER - KELLETT, pp. 230–231. (See: Further synonymy).

1937 *Bythocypris phillipsiana* (JONES and HOLL); BOUČEK, pp. 6–7 (sep.), text-fig. 4a–e; ? 4f.
1963 *Bairdiocypris phillipsiana* (JONES and HOLL); KRANDIJEVSKY, p. 114, pl. 11, figs. 1–4.
1971 *Bairdiocypris phillipsiana* (JONES and HOLL); ABUSHIK, pp. 117–118, pl. 42, figs. 3–6. (See: Further synonymy.)
non 1891 *Bythocypris phillipsiana* KRAUSE (non JONES and HOLL, 1869); KRAUSE, p. 510, pl. 33, fig. 4a–c.
non ? 1960 *Bythocypris phillipsiana* (JONES and HOLL); COPELAND, 3, 1, p. 101, pl. 23, figs. 19, 20.

Holotype: The specimen figured by JONES and HOLL (1869) on pl. 14, fig. 7a–c.

Remarks: Detailed description of this species was given by JONES and HOLL (1869, p. 213) and later by JONES (1887, p. 187); it agrees with the description of the Bohemian specimens, which have been figured by BOUČEK (1937) in text-fig. 4a—e. It is an incomplete carapace very similar to the holotype of *B. phillipsiana* (JON. and HOLL), which has been reported by many writers from the Wenlockian of England, Gotland and drift of northern Germany, from Ukraine (Podolia), Bohemia, etc.

Dimensions of Bohemian specimens: Length (estimate) 1.30—1.35 mm; height 0.79 mm (left valve) and 0.73 mm (right valve); width 0.50 mm (NM-L 23 366). L/H ratio: 1.64.

Occurrence: Relatively rare in the Motol Member of the Liteň Formation, in the Cyrtograptus murchisoni Biozone. Praha - Řeporyje, in the Daleje valley, near the Truneček mill.

Bairdiocypris berounensis (BOUČEK and PŘIBYL, 1955)

Pl. XI, figs. 1–3

1955 *Bythocypris berounensis* sp. n.; BOUČEK - PŘIBYL, pp. 599–600, 628–629, 652–653, pl. 2 figs. 14–17; pl. 4, figs. 1–8.
1960 *Cytherellina berounensis* (BOUČEK and PŘIBYL); PŘIBYL, pp. 164, 168 (table 1).

Holotype: Carapace figured by BOUČEK and PŘIBYL (1955) on pl. 4, figs. 5–8 (NM-L 23726).
Paratypes: Carapaces figured by BOUČEK and PŘIBYL (1955) on pl. 2, figs. 14–17 (NM-L 23727) and pl. 4, figs. 1–4 (NM-L 23728).
Type stratum and type locality: Upper layers of the Kopanina Formation, Ananaspis fecunda Horizon. Koledník quarry near Beroun.
Material: More than thirty whole carapaces, several free valves, and many specimens embedded in the rock. Mostly good preservation.

Description: See BOUČEK and PŘIBYL (1955, p. 653). Carapace in lateral outline of elongated reniform shape. Dorsal margin convex, regularly arcuate, passing gradually into the anterior and posterior margins. Maximum height posteriorly to the middle part of valves. Anterior margin is convex, anteriorly somewhat slightly flattened, and lies lower than the posterior margin. Ventral margin of the right valve is slightly bent inwards, anterior to the middle, whereas the left valve is in the place

considerably bent and overhanging to straight. Left valve is larger than the right one and overlaps it on all sides, most at the dorsal, ventral and posterior margins. Hinge line approximately straight. Also contact line in the ventral part is straight. Seen from above the carapace is broadest in the anterior part of the posterior half and narrows in anterior and posterior halves and in anterior and posterior direction. The anterior part of the carapace is slightly flattened so that the whole outline is fusiform. Surface smooth. Adductor muscle spot unknown.

Dimensions of holotype: Length 1.38 mm (left valve); 1.32 mm (right valve); height 0.85 mm (left valve) and 0.71 mm (right valve); width 0.67 mm. Length of other specimens: 1.05—1.38 mm; height 0.61—0.75 mm, and width 0.56 to 0.67 mm. L/H ratio: 1.62—1.84; ⌀ 1.73.

Discussion: In its outline, the species *Bairdiocypris berounensis* (BOUČEK and PŘIBYL) resembles *B. phillipsiana* (JONES and HOLL), and *B. symmetrica* (JONES) but it differs from them by the regular curvature of the anterior, dorsal and posterior margins and an elongate reniform shape of the carapace. By these features it can be distinguished from various Silurian species of *Bairdiocypris*.

Occurrence: Koledník and Kosov quarries near Beroun. Fairly abundant in the upper layers of the Kopanina Formation (Ananaspis fecunda Horizon), in the ostracode assemblage with *Microcheilinella kolednikensis*, *Orthocypris novaki*, *Moierina* cf. *simplex* etc.

Genus *Orthocypris* KUMMEROW, 1953

Type species: *Bythocypris recta* KUMMEROW, 1943. Upper Silurian of Germany.

Orthocypris novaki (BOUČEK and PŘIBYL, 1955)

Pl. II, figs. 5, 6

1955 *Macrocypris ? novaki* sp. n.; BOUČEK - PŘIBYL, pp. 601, 629, 654, pl. 5, figs. 14–17.

Holotype: Carapace figured by BOUČEK and PŘIBYL (1955) on pl. 5, figs. 14–17 (NM-L 23725).
Type stratum and type locality: Kopanina Formation. Koledník quarry near Beroun.
Material: Apart from the holotype three carapaces and six valves in the rock.

Description: See BOUČEK - PŘIBYL (1955, pp. 601, 654).

Dimensions of holotype: Length 1.05 mm; height 0.50 mm; width 0.48 mm. L/H ratio: 2.10. Other carapaces. Length 0.73—0.82 mm; height 0.39—0.42 mm. L/H ratio: 1.87—1.99; ⌀ 1.93.

Discussion: This species is somewhat similar to *Orthocypris recta* (KUMMEROW), from the Upper Silurian (Graptolithengesteine) of eastern part of Germany but it differs from it by the ovate-elongate valves with straight ventral margin in lateral view. Also *O. tschumyschensis* (POLENOVA) and *C. mundi* (SHI) from the Devonian of Salair (USSR) and China bear some similarities to *O. novaki* (BOUČ.

and PŘIB.), but the latter is wider in the posterior part of valves and the anterior margin is obtusely pointed. In the original description of this species the right valve is said to overlap the left but, according to new finds, the left valve is larger and overlaps the right along the free margin.

Occurrence: Up to now this species has been found in the upper layers of the Kopanina Formation, in the trilobite horizon with *Ananaspis fecunda*, together with *Microcheilinella kolednikensis* and *Bairdiocypris berounensis*. Koledník and Kosov quarries near Beroun.

Genus *Samarella* POLENOVA, 1952

Type species: *Samarella crassa* POLENOVA, 1952. Middle Devonian of Syzran.

Samarella jarovensis sp. n.

Pl. IX, figs. 5–8

Name: After the settlement Jarov (the suburb of the town Beroun).
Holotype: Carapace figured here on pl. IX, figs. 5–8 (NM-L 23738).
Type stratum and type locality: Kopanina Formation. Koledník quarry near Beroun.
Material: Apart from the holotype some valves (6) embedded in the rock.

Description: Carapace small, subovate in lateral view; fusiform in dorsal view. Dorsal margin broadly arched, higher in posterior half, sloping to narrowly rounded anterior margin. Ventral margin convex. Left valve overreaches the right near dorsum and right valve overlaps the left in the middle of the ventral margin and near the posteroventral part. Hinge line straight; hingement not observed. Lateral surface smooth.

Dimensions of holotype: Length 0.45 mm; height 0.28 mm; width 0.25 mm. L/H ratio: 1.60.

Discussion: This Silurian species is very similar to *Samarella regularis* (PŘIB.), from the Lower Devonian of Bohemia but differs from it in having more elongate valves and a quite different stratigraphical range.

Occurrence: Koledník quarry near Beroun - Jarov. Kopanina Formation, ostracode biozone with *Microcheilinella kolednikensis* and *Bairdiocypris berounensis*.

Family *Microcheilinellidae* GRAMM, 1975

Genus *Microcheilinella* GEIS, 1933

Type species: *Microcheilus distortus* GEIS, 1932. Lower Carboniferous of Indiana (USA).

Microcheilinella bohemica (BOUČEK, 1937)

? 1891 *Bythocypris phillipsiana* KRAUSE (non JONES and HOLL, 1869); KRAUSE, p. 510, pl. 33, fig. 4a–c.
1937 *Bythocypris bohemica* sp. n.; BOUČEK, pp. 5–6 (sep.), text-fig. 3a–f.

Synonym: ? *Microcheilinella paradoxa* KUMMEROW, 1943.
Holotype: Carapace figured by BOUČEK (1937) in text-fig. 3a–f. (NM-L 23367.)
Type stratum and type locality: Motol Member of the Liteň Formation. Praha - Řeporyje, near the Truneček mill.
Material: Only holotype.

Revised description: Carapace of medium-size, vaulted, ovate—elongate in lateral view. Hinge line running in a small depression. Anterior and posterior margins of right valve nearly equal in height, rounded to slightly obtusely pointed. Dorsal margin of the right valve convex. Maximum height before midvalve. Ventral margin nearly straight to slightly convex. Left valve large, overlapping the right along all margins. Dorsal margin of the left valve arched, much higher in posterior half, slowly sloping to obtusely pointed anterior margin. In dorsal view the carapace is broad and inflated, especially in the posterior half, and anteriorly narrows relatively slowly. In the anterior view both valves show a striking vaulting and protrude sphaerically outwards. Lateral surface smooth. Hingement and adductor muscle spot not observed.

Dimensions of holotype: Length of left valve 0.96 mm; length of right valve 0.92 mm; height of left valve 0.59 mm and height of right valve 0.45 mm. Width in the posterior half of carapace 0.62 mm. L/H ratio: Left valve 1.62; right valve 2.04.

Discussion: *Microcheilinella bohemica* (BOUČEK) is distinguishable from other species of *Microcheilinella* by a characteristic ovato-elongate outline of carapace. It is similar to *M. kolednikensis* (BOUČ. and PŘIB.) but differs from it in a more elongated carapace, more arched dorsal margin in the posterior half of valves, and regularly rounded anterior and posterior margins. L/H ratio is different in the two species discussed.

Occurrence: Rarely in the Motol Member (= Wenlock) of the Liteň Formation, in the grey-green limestones and tuffaceous layers of the Cyrtograptus murchisoni Biozone. Praha - Řeporyje, in the Daleje valley, near the Truneček mill.

Microcheilinella kolednikensis BOUČEK and PŘIBYL, 1955

This species is here divided into two subspecies:

Microcheilinella kolednikensis kolednikensis BOUČEK and PŘIBYL, 1955

1955 *Microcheilinella kolednikensis* sp. n.; BOUČEK - PŘIBYL, pp. 603–605, 633–634, 657–658, pl. 2, figs. 6–10; pl. 5, figs. 1–13.

Holotype: Carapace figured by BOUČEK and PŘIBYL (1955) on pl. 5, figs. 1–5 (NM-L 23729).
Paratypes: Carapaces figured by BOUČEK and PŘIBYL (1955) on pl. 5, figs. 6–9 (NM-L 23723) and on pl. 5, figs. 10–13 (NM-L 23724).
Type stratum and type locality: Kopanina Formation, Ananaspis fecunda Horizon. Koledník quarry near Beroun - Jarov.

Material: Several dozens of whole, well preserved carapaces and isolated valves. Some valves are preserved in the rock (from Kosov quarry).

Short description (after BOUČEK and PŘIBYL, 1955, p. 657): Subspecies of *M. kolednikensis* BOUČ. and PŘIB., characterized by the oval outline of valves, a strikingly broad and inflated carapace, and almost straight course of the hinge line, especially in the middle. From the dorsal view of carapace it is remarkably broad and oval. Both valves are strikingly inflated, especially in the posterior half; anteriorly they narrow gradually. Hinge and adductor muscle scars not observed.

Dimensions of holotype: Length 1.02 mm; height 0.66 mm; width 0.65 mm. L/H ratio: 1.54. Length of other specimens 0.83—0.92 mm; height 0.57 to 0.66 mm; width 0.57—0.66 mm. L/H ratio: 1.39—1.45; ⌀ 1.42.

Discussion: The differences between *Microcheilinella kolednikensis kolednikensis* BOUČ. and PŘIB. and *M. kolednikensis globosa* subsp. n. are given with the latter subspecies.

Occurrence: Relatively frequent in the grey to grey-brown massive limestones of the upper part of the Kopanina Formation (in the *Ananaspis fecunda* Horizon). Ostracode biozone with *Microcheilinella kolednikensis* and *Bairdiocypris berounensis*. Koledník quarry and Kosov quarry near Beroun, "Na Požárech" quarry near Praha - Řeporyje.

Microcheilinella kolednikensis globosa subsp. n.

Pl. X, figs. 1–3

Name: Latin *globosus*, sphaerical, referring to the sphaerical shape of carapaces seen in dorsal view.
Holotype: Carapace figured here on pl. X, figs. 1–3 (NM-L 23739).
Type stratum and type locality: Kopanina Formation (Ananaspis fecunda Horizon). Koledník quarry near Beroun.
Material: Only two free carapaces and some valves embedded in the rock.

Description: Valves very vaulted, inflated, subovate in lateral view. Left valve larger, overlapping the right along the whole margin. Dorsal margin broadly arched, much higher in posterior half, slowly sloping to rounded anterior margin. Posterior margin broadly rounded with posterodorsal shoulder, abruptly sloping posteriorly. Ventral margin straight to slightly convex. The course of the hinge line is nearly straight in the middle part, but anteriorly and posteriorly it is slightly undulate. Maximum length near midvalve, maximum height behind the middle. In dorsal view the carapace is strikingly broad and inflated, especially in the posterior half, narrowing anteriorly rather abruptly. In anterior view both valves show a very striking vaulting and protrude sphaerically outwards. Hinge and adductor muscle spot unknown.

Dimensions of holotype: Length 0.90 mm; height 0.62 mm; width 0.65 mm. L/H ratio: 1.45.

Discussion: This subspecies is very similar in shape and dimensions to *Microcheilinella kolednikensis kolednikensis* BOUČ. and PŘIB. but is proportionately broader and more inflated posteriorly, and the lateral outline of valves is considerably different.

Occurrence: Relatively rare in the upper layers of the Kopanina Formation (Ananaspis fecunda Horizon). Large abandoned Koledník quarry near Beroun - Jarov and Velký vrch (hill) near Koněprusy, east of the hill top.

Microcheilinella praekolednikensis PŘIBYL, 1987

Pl. XII, fig. 1

1960 *Pachydomella* sp.; PŘIBYL, pp. 163, 168 (table 1).
1987 *Microcheilinella praekolednikensis* sp. n.; PŘIBYL, 363—364, text-fig. 2/1—4.

Holotype: Carapace figured by PŘIBYL (1987) in text-fig. 2/1—4 (AP-B 506 = NM-L 23737).
Syntype: Non-figured carapace (NM-L 23735).
Type stratum and type locality: Lower part of the Kopanina Formation, Lobograptus scanicus Biozone. Podskalský (Štětecký) mlýn (mill) near Tmáň.
Material: Several hundreds of carapaces and free valves. Preservation good to excellent.

A detailed description of this species has been recently given by PŘIBYL (1987) to which I refer the reader.

Dimensions of holotype: Length 1.07 mm; height 0.68 mm; width 0.65 mm. L/H ratio: 1.57. The paratypes and other specimens are 1.06—1.24 mm long and 0.66—0.80 mm high (left valves), 0.60—0.64 mm (right valves). Width 0.66 to 0.67 mm. L/H ratio: 1.55—1.60; ⌀ 1.57.

Discussion: This species is closely allied to *M. kolednikensis* BOUČ. and PŘIB., which is widespread in the upper beds of the Kopanina Formation but may be distinguished from it by larger dimensions of carapaces, the left valve overlapping the right along free margins, and by the broader and more rounded margin of the posterior part of valve. *M. bohemica* (BOUČ.) from the Motol Member (Wenlock) can be distinguished from *M. praekolednikensis* PŘIB. on the basis of its elongate shape of carapace, and smaller dimensions of valves.

Occurrence: Very abundant in the lower layers of the Kopanina Formation, in the upper part of the Lobograptus scanicus Biozone. Podskalský (Štětecký) mlýn (mill) near Tmáň, in the outcrop at the road to Suchomasty.

Family *Krausellidae* BERDAN, 1961

Genus *Krausella* ULRICH, 1894

Type species: *Krausella inaequalis* ULRICH, 1894. Middle Ordovician of Illinois (USA).

Krausella sp. n., aff. *K. spinata* KUMMEROW, 1924

? 1936 *Krausella spinata* sp. n.; KUMMEROW, p. 73, pl. 5, fig. 4a, b.

Description: See BOUČEK (1936b), p. 73.

Dimensions of BOUČEK's specimen (NM-L 14 031c). Left valve-length 0.85 mm; height 0.42 mm. L/H ratio: 2.02.

Discussion: This species has been misinterpreted by BOUČEK (1936b) who referred it to *Krausella spinata* KUMMEROW, 1924. Typical species *K. spinata* KUM. is very similar and perhaps closely related to *K.* sp. n., aff. *K. spinata* KUM., but in the Bohemian specimen the valve is smaller and more elongated, the posterior spine is longer and lies higher than in typical specimens of *K. spinata* (see KUMMEROW, 1924, pl. 21, fig. 5; and 1943, pl. 2, figs. 3, 3a). Because this taxon is very rare and the material for the determination of a new species is insufficient, I designate it as *Krausella* sp. n., aff. *K. spinata* KUM.

Occurrence: The abandoned Koledník quarry near Beroun. Very rare in the ostracode biozone with *Primitiella ? kolednikensis* and *Mirochilina jarovensis* in the lower layers of the Přídolí Formation.

Krausella sp. n.?

Pl. VII, fig. 7

Remarks: A single specimen (left valve) can be referred to *Krausella*. Its shape of valve indicates that it is similar to *Krausella inaequalis* ULRICH and *K. spinata* KUM., although in the absence of more complete material a definite assignment cannot be made.

Dimensions: Length 0.89 mm; height 0.48 mm. L/H ratio: 1.85.

Occurrence: Kosov quarry near Beroun. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Suborder *Bairdiomorpha* KOZUR, 1972

Superfamily *Bairdiacea* SARS, 1888

Family *Beecherellidae* ULRICH, 1894

Genus *Shiderelites* MORRIS and HILL, 1951

Type species: By original designation; *Shiderelites typus* MORRIS and HILL, 1951, from the Middle Silurian (Waldron shale) of Indiana (USA).

Included species, stratigraphic range and geographical distribution: Five species of *Shiderelites* (*S. typus* MORRIS and HILL, 1951, *S. nathaensis* COPELAND, 1977, *S.*(*?*) sp. COPELAND, 1977, *S. yukonensis* BERDAN and COPELAND, 1973 and *S. berdaniana* GROSS-UFFENORDE, 1979) have been described from the Middle and Upper Silurian and Lower Devonian of North

America (USA, Canada) and Europe (France). *Shiderelites* (*?*) *ambiquus* POLENOVA, 1960 from the Upper Siluria of Kuznetsk basin (USSR) does not belong to this genus. I have recently found this genus also in the Middle Silurian of Bohemia.

Shiderelites bouceki sp. n.

Pl. IX, fig. 3; text-fig. 4/1

Name: This species is named in honour of the late Prof. Dr. Bedřich Bouček, who found the type specimen of this species.

Holotype: Left valve figured here on pl. IX, fig. 3 (AP-SV-39).

Type stratum and type locality: Motol Member of the Liteň Formation, Monograptus flexilis Biozone. Loděnice near Beroun (Černidla hill).

Material: Only holotype.

Description: Valve of medium size, elongate in lateral view, acuminate at each end, three-times as long as high. Dorsal margin straight, occupying nearly four-eighths of the valve length. Maximum length in the middle, maximum height in the midvalve, excepting anterior spine. Anterior margin broadly rounded. Posterodorsal margin concavely sloping ventrally to the acuminate posterior cardinal corner, which lies in the mid-length. Ventral margin slightly concave in mid-length, curving smoothly into anteroventral and posteroventral margins. Anteroventral margin curved to meet broadly rounded anterior margin. Anterior cardinal angle of left valve produced into strong (0.25 mm long), slightly posterodorsally directed spine. Anteroventral and posteroventral marginal areas are laterally compressed. Lateral surface smooth. Inner characters unknown.

Dimensions of holotype: Length 1.36 mm; height 0.45 mm. L/H ratio: 3.02.

Discussion: *Shiderelites bouceki* sp. n. is the first species of *Shiderelites* which has been found in the Silurian of Bohemia. It is very closely related to *S. typus* Morris and Hill, from the Middle Silurian of Indiana (USA), but differs from it in having a different L/H ratio (3.02), a shorter and higher valve, and the posterodorsal margin sloping ventrally in greater concave curve to acuminate posterior cardinal corner, which lies lower than in *S. typus*. The L/H ratio of the American species ranges from 2.60 to 2.86. Topotype (carapace) of *S. typus* from the Waldron shale (Hartsville, Indiana) is 1.52 mm long, 0.53 mm high and 0.39 mm wide (here: pl. IX, fig. 2).

Occurrence: Middle Silurian, Motol Member of the Liteň Formation, Monograptus flexilis Biozone. Loděnice near Beroun, Černidla hill.

Genus *Acanthoscapha* ULRICH and BASSLER, 1923

Synonym: *Alanella* BOUČEK, 1936.

Type species: *Beecherella navicula* ULRICH, 1891. Lower Devonian of Albany, New York (USA).

Remarks: According to BERDAN (1960, p. 469), the genus *Alanella* BOUČEK,

1936 is considered a junior subjective synonym of *Acanthoscapha* ULRICH and BASSLER, 1923, and the family *Alanellidae* BOUČEK, 1936, a junior synonym of the family *Beecherellidae* ULRICH, 1894. I agree with this correct opinion.

Acanthoscapha ockeriensis BLUMENSTENGEL, 1967

Pl. IX, fig. 1; text-fig. 5/7

1955 *Allanella decurtata* BOUČEK; BOUČEK - PŘIBYL, pp. 588, 640–641, 645, pl. 2, figs. 18, 19; pl. 3, fig. 11. (Non: *A. bohemica decurtata* BOUČEK, 1936b, pl. 5, fig. 1a, b.)
?1958 *Alanella* sp. A.; KESLING - SOHN, p. 522.
1967 *Acanthoscapha ockeriensis* sp. n.; BLUMENSTENGEL, pp. 151–152, pl. 1, figs. 3–5, 13, 14.
?1977 *Acanthoscapha* sp. A. (KESLING and SOHN); COPELAND, p. 41, pl. 11, figs. 20, 21.
?1978 *Acanthoscapha* sp. cf. *A. decurtata* (BOUČEK); COPELAND, p. 97, pl. 2, fig. 13.

Holotype: Carapace figured by BLUMENSTENGEL (1967) on pl. 1, fig. 5.
Material of Bohemia: Five valves (left and right) embedded in the rock. Poor preservation.

Description: A species of *Acanthoscapha* with valves elongate subovate, spindle-shaped, dorsal margin somewhat arched. Anterior margin more narrowly curved than posterior. Both margins compressed ventrally, constricted, drawn-out into somewhat dorsally directed sharply pointed spines; anterior spine is shorter than the posterior. Ventral margin nearly straight. Lateral surface smooth. Hinge unknown.

Dimensions of Bohemian specimens: Length 1.05—1.60 mm; height 0.45 to 0.80 mm. L/H ratio: 2.33—2.00. Length of holotype (after BLUMENSTENGEL 1967) 1.56 mm; height of holotype 0.76 mm. L/H ratio: 2.05.

Discussion: This species may be confused on first examination with *Acanthoscapha decurtata* (BOUČEK, 1936). The general outline of valves of the Bohemian specimens is identical with the lateral outline of *A. ockeriensis* BLUM., from the Upper Silurian of the German Democratic Republic; it is very similar to the specimens figured by COPELAND (1977, p. 41, pl. 11, figs. 20, 21) from the Ludlovian of the south-western district of Mackenzie (Canada). *A. ockeriensis* BLUM. differs from *A. decurtata* (BOUČ.) in the length and height of the valves, more vaulted dorsal margin, and both cardinal ends produced into sharply pointed terminal spines directed somewhat obliquely upwards dorsally.

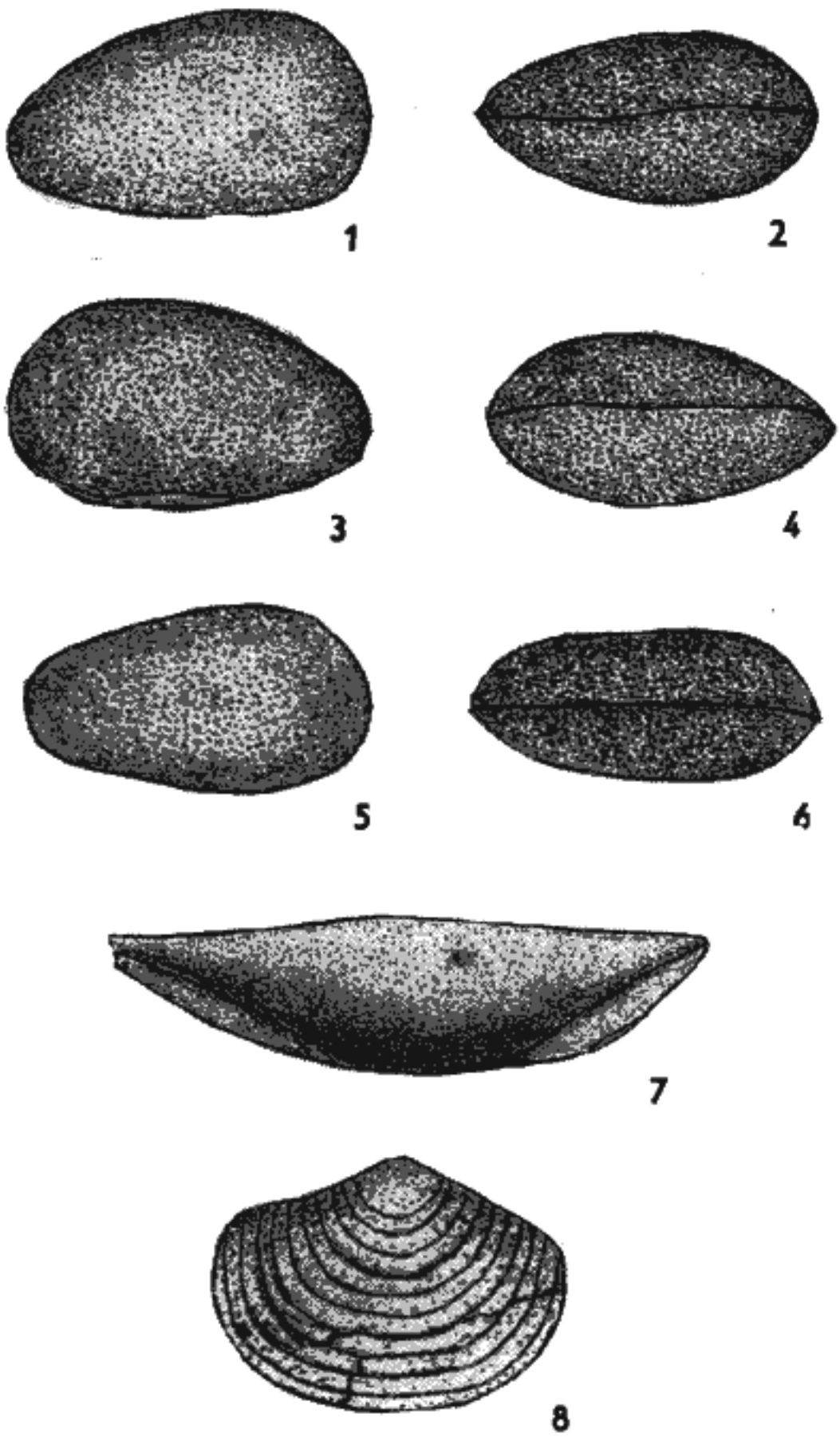
Occurrence (in Bohemia): Relatively rare in the lower layers of the upper part of the Kopanina Formation, in the ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. The quarries Kosov and Koledník near Beroun. Very rare in the Ananaspis fecunda Horizon — Velký vrch (hill) near Koněprusy, further Germany, the borehole Beulwitz-15, at depth of 45.6 m, near Beulwitz, and the borehole Rudolstadt-23. Middle Ockerkalk, Upper Silurian. ?Road River Formation (= Ludlow) in Canada, District of Mackenzie.

Acanthoscapha decurtata (BOUČEK, 1936)

Text-fig. 4/2, 3

1936a *Alanella bohemica decurtata* subsp. n.; BOUČEK, pp. 5, 8 (sep.) (Nomen nudum).
1936b *Alanella bohemica decurtata* subsp. n.; BOUČEK, p. 72, pl. 5, fig. 1a, b.
1958 *Alanella bohemica decurtata* BOUČEK; POKORNÝ, p. 186, text-fig. 787.
?1977 *Acanthoscapha* sp. cf. *A. decurtata* (BOUČEK); COPELAND, pp. 40–41, pl. 3, figs. 10–12; pl. 15, fig. 6.
non 1955 *Alanella decurtata* BOUČEK; BOUČEK - PŘIBYL, pp. 588, 614, 640, pl. 2, figs. 18, 19; pl. 3, fig. 11 (= *Acanthoscapha ockeriensis* BLUMENSTENGEL, 1967).

Holotype: Left valve figured by BOUČEK (1936b) on pl. 5, fig. 1a, b. (NM-L 14031).



7. 1–6. *Cytherellina rozhdestvenskajae* sp. n. 1–4. Left, dorsal, right and ventral views of a carapace. Holotype (AP-SV-106). × 47. 5, 6. Left, lateral and dorsal views of a carapace. Paratype (AP-SV-107). × 47. Kosov quarry. Kopanina Formation, ibid. biozone as fig. 1 on text-fig. 6.

7. *Acanthoscapha* sp. n. aff. *A. bohemica* (BOUČEK). Right lateral view of a valve (AP-SV-105). × 40. Kosov quarry. Kopanina Formation, Ananaspis fecunda trilobite Biozone.

8. *Cryptophyllus copelandi* sp. n. Left lateral view of a valve. Negative (Impression). Holotype (NM-L 23748). × 21. Kosov quarry. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Type stratum and type locality: Lower layers of the Přídolí Formation, Pseudomonoclimacis (?) ultima Biozone. Koledník quarry near Beroun.

Material: Thirty-seven valves (left and right) embedded in the rock; they are preserved as internal moulds.

A good description of this species was published by BOUČEK (1936b). I refer the reader to this description.

Dimensions of holotype: Length 1.27 mm; height 0.42 mm. L/H ratio: 3.00. Length of other specimens 0.99—1.19 mm; height of other specimens 0.29 to 0.42 mm. L/H ratio: 3.30—3.41; ⌀ 3.35. The largest specimen is 1.47 mm long and 0.57 mm high. Mature stages are 1.20—1.47 mm long.

Discussion: This species is very similar to *Acanthoscapha ockeriensis* BLUMENSTENGEL, 1967, from the Upper Silurian of the GDR but is distinguishable from it by having a longer dorsal margin, which is almost straight or very lowly arched, and both cardinal ends of the dorsal margin produced into almost horizontal long spines. Only posterior spine is somewhat dorsally directed. Ventral margin is straight to slightly concave in the middle part of venter. On the other hand, *A. ockeriensis* BLUM. bears a more arched dorsal margin than *A. decurtata* (BOUČ.), and the anterior and posterior pointed corners are dorsally directed obliquely upwards. *A. decurtata* bears certain resemblance to *A. bohemica* (BOUČ.) from the Lower Devonian (Lochkovian) of Bohemia. The latter species differs from *A. decurtata* by its very long, spindle-shaped valves produced into a long, nearly horizontal terminal spines, and by a concave notch on the ventral margin.

Occurrence: Relatively common in the lower layers of the Přídolí Formation, in the graptolite biozone with *Pseudomonoclimacis (?)ultima* (= ostracode biozone with *Primitiella ? kolednikensis*). Kosov and Koledník quarries near Beroun, "Mušlovka" quarry and "Na Požárech" quarry near Praha - Řeporyje, Praha - Jinonice, at the "Na butovickém hradišti" locality, "Mramorový" lom (quarry) near Praha - Lochkov, etc.

Acanthoscapha sp. n., *A.* aff. *bohemica* (BOUČEK, 1936)

Text-fig. 7/7

Material: Seven well preserved valves embedded in the rock.

Description: Valves long, in lateral view nearly fusiform. Dorsal margin long, straight to slightly arched, terminating in spines. Hinge line more than half length of valve. Posterior terminal spine (cardinal angle) nearly parallel to hinge line, anterior terminal spine nearly straight to inclined very slightly upwards. Anterior margin more sharply curved than the long, broadly curved posterior margin. Ventral margin straight to slightly concave in the middle. Lateral surface of valves smooth, compressed antero- and posteroventrally.

Dimensions: Length 0.81—1.49 mm; height 0.25—0.39 mm. Mature speci-

mens are 1.27—1.49 mm long and 0.34—0.39 mm high. L/H ratio: 3.73—3.82. The figured specimen (AP-SV-105) is 1.49 mm long and 0.39 mm high.

Discussion: The valves of this species are similar to *Acanthoscapha bohemica* (BOUČEK, 1936) and *A. oblonga* JORDAN, 1964. Our specimens differ from both these species in having higher median part of valves and a different L/H ratio 3.73 to 3.82. Therefore I designate them as *Acanthoscapha* sp. n., *A.* aff. *bohemica* (BOUČ.).

Occurrence: Kosov quarry near Beroun. Kopanina Formation, middle part of the horizon with *Ananaspis fecunda*, 5.5—6.0 m above the layers with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Family *Bairdiidae* SARS, 1888

Genus *Bairdiacypris* BRADFIELD, 1935

Type species: *Bairdiacypris deloi* Bradfield, 1935. Pennsylvanian of Oklahoma (USA).

Bairdiacypris (?) *anomala* (BOUČEK, 1937)

1937- *Macrocypris* (?) *anomala* sp. n.; BOUČEK, pp. 4–5 (sep.), text-fig. 2a–e.

Holotype: Carapace figured by BOUČEK (1937) in text-fig. 2a–e (NM-L 23368).

Type stratum and type locality: Motol Member (Wenlock), Liteň Formation. Praha - Řeporyje near the Truneček mill.

Material: Only holotype.

Dimensions of holotype: Length 0.90 mm; height 0.45 mm; width 0.34 mm. L/H ratio: 2.00.

Description: See BOUČEK (1937, pp. 4—5).

Discussion: In my opinion the species *Macrocypris* (?) *anomala* BOUČEK, from the Middle Silurian of Bohemia belongs more probably to *Bairdiacypris* BRADFIELD, 1935 than to *Macrocypris* BRADY, 1867, to which it has been assigned by BOUČEK (1937, p. 4). Because on the lateral surface of the valve there are two longitudinal furrows on the left valve and three on the right valve, I assign this species to *Bairdiacypris* only tentatively.

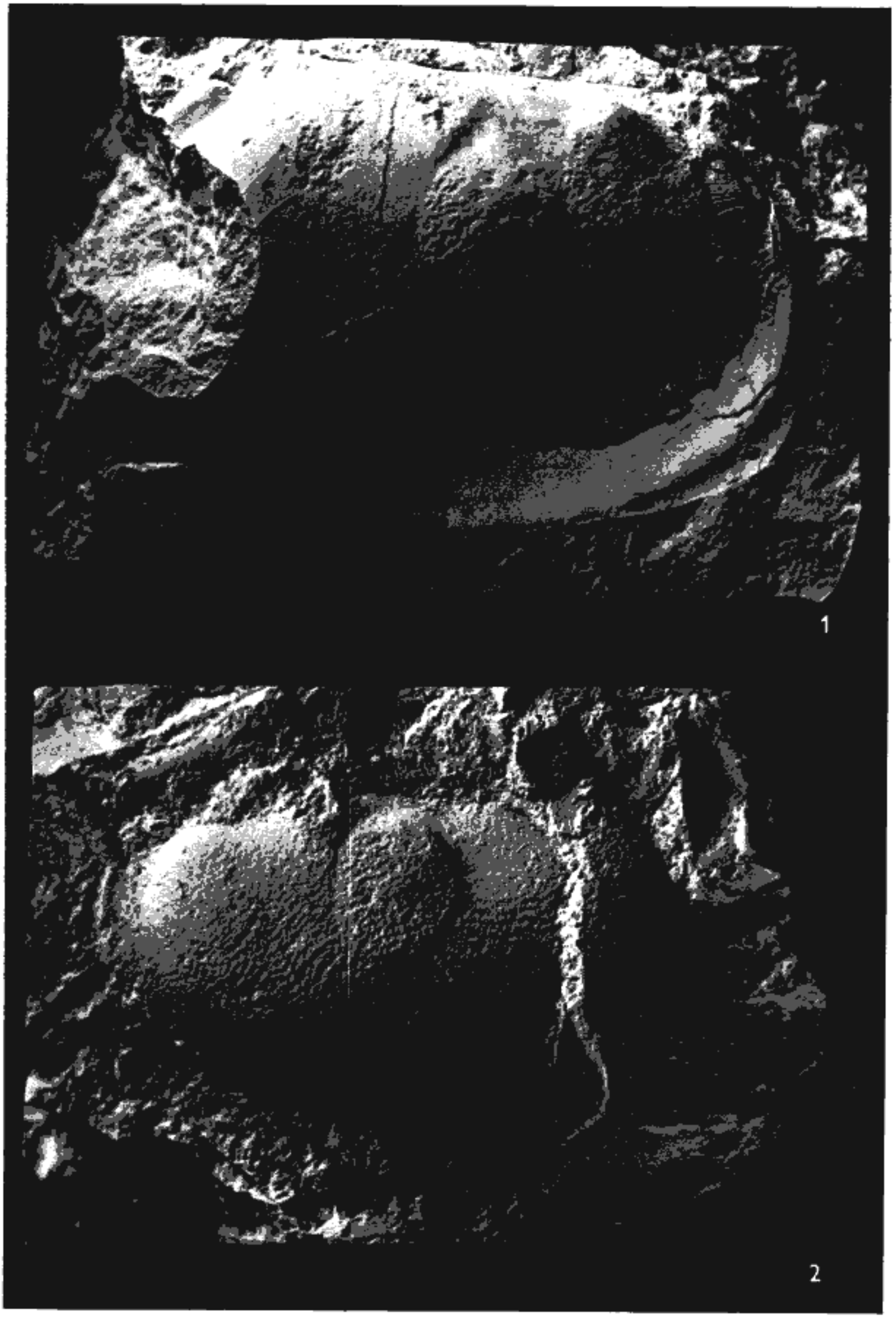
Occurrence: Very rare in the tuffaceous intercalations in the calcareous layers of the Motol Member (= Wenlock) of the Liteň Formation, which belong to the graptolite biozone with *Cyrtograptus murchisoni*. Praha - Řeporyje, Daleje valley, near the Truneček mill.

? Superfamily uncertain

Family uncertain

Genus *Elliptocyprites* SWAIN, 1962

Type species: By original designation; *Elliptocyprites parallela* SWAIN, 1962, from the Middle Ordovician of New York (Valcour Island), USA.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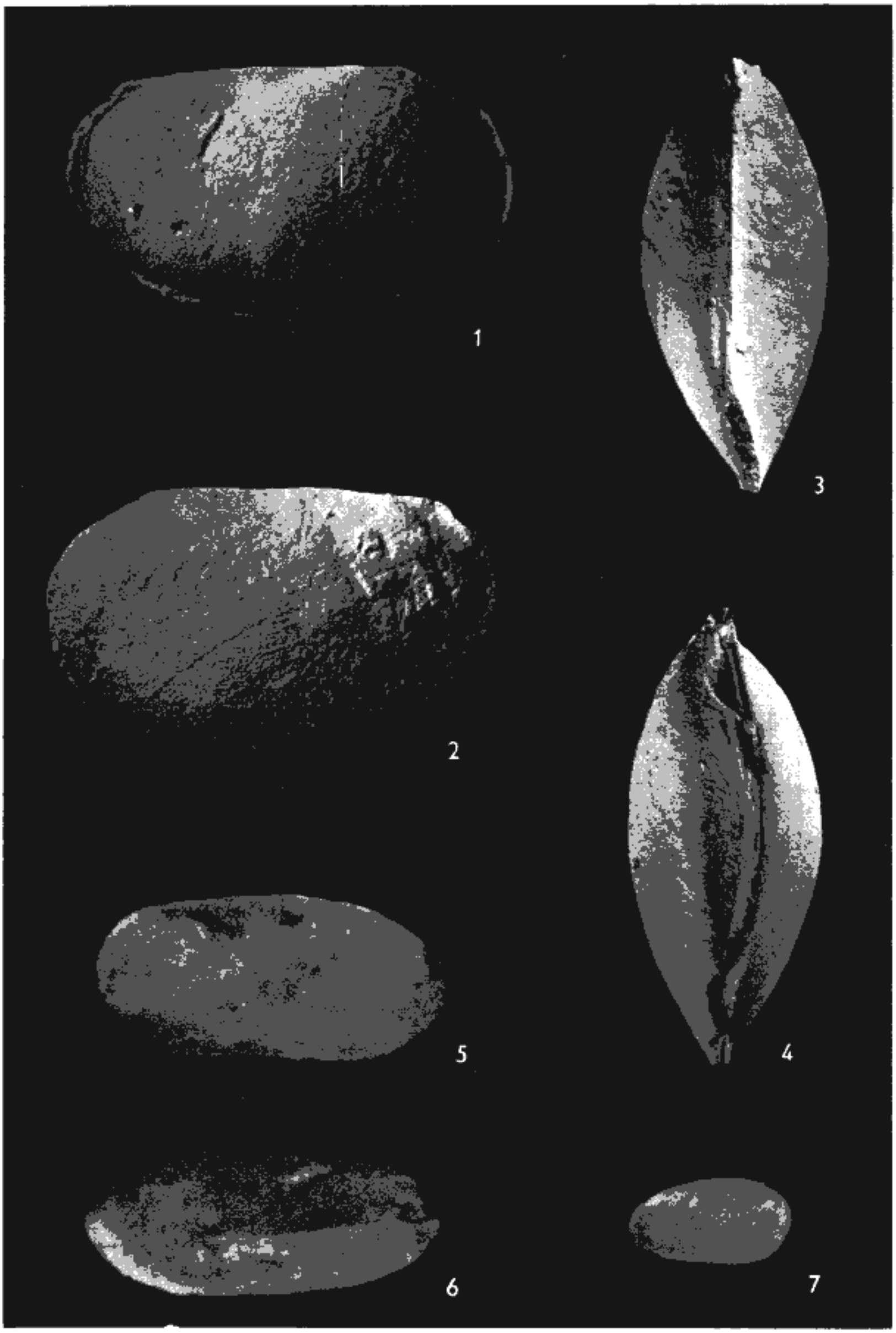
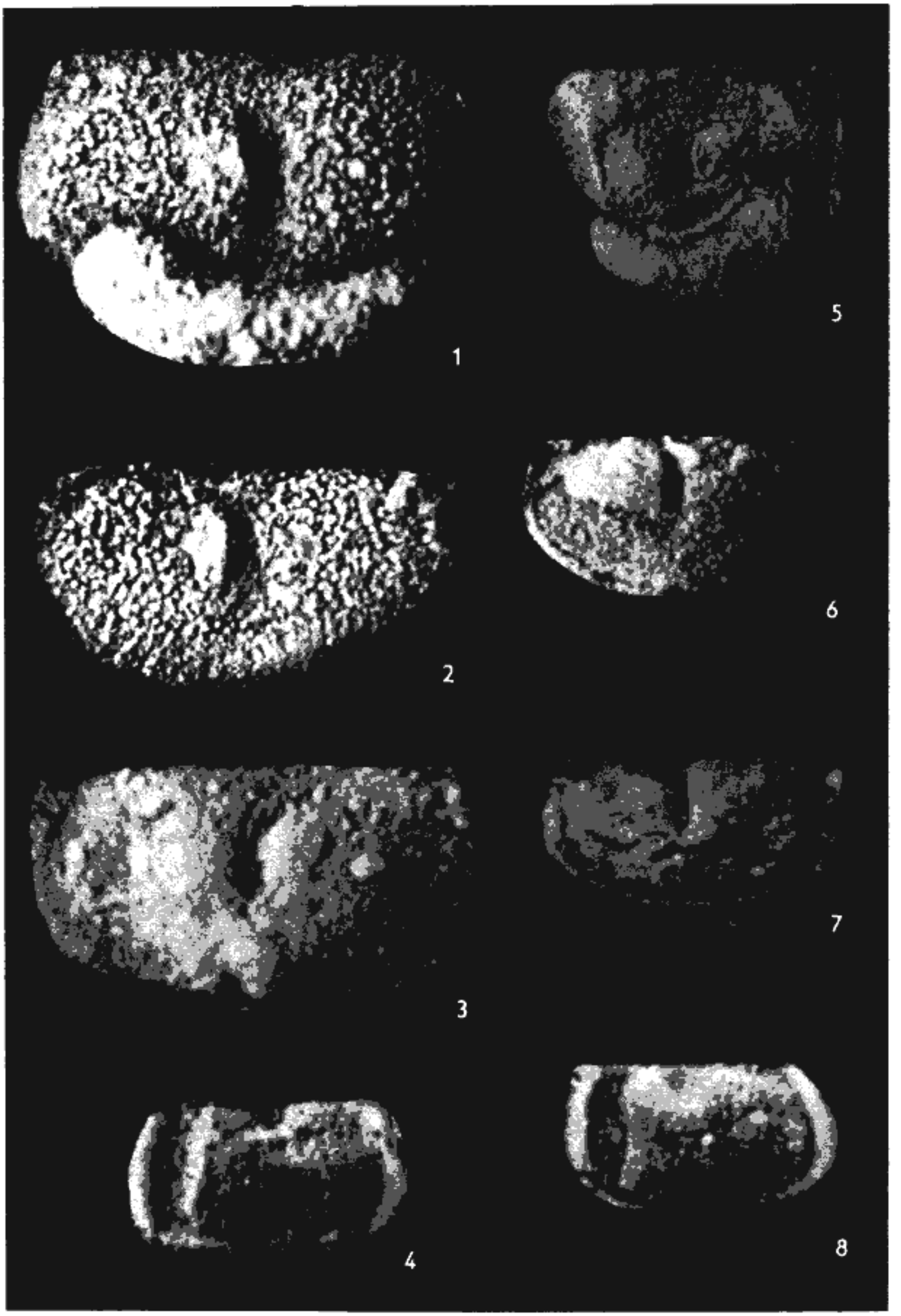
Pl. II

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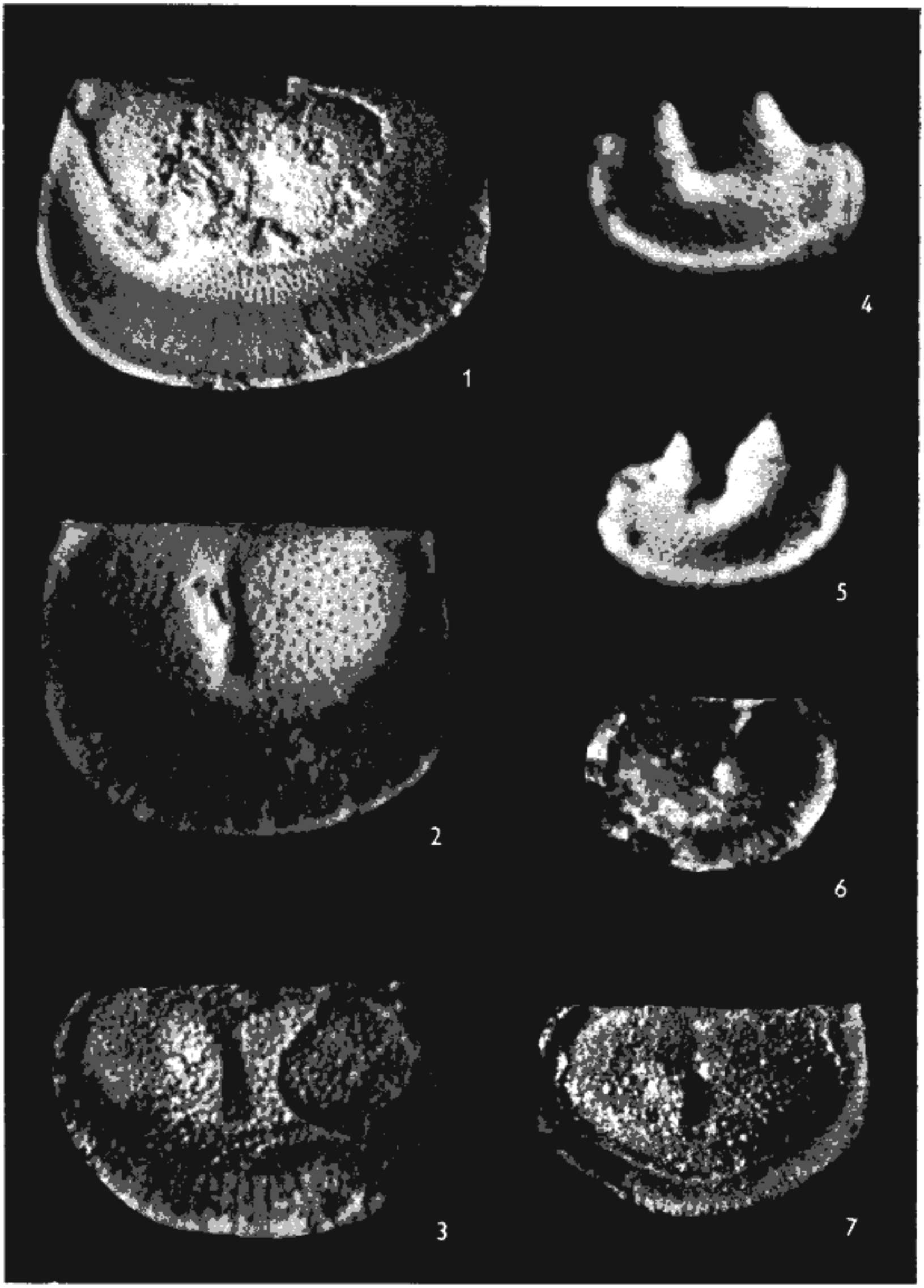
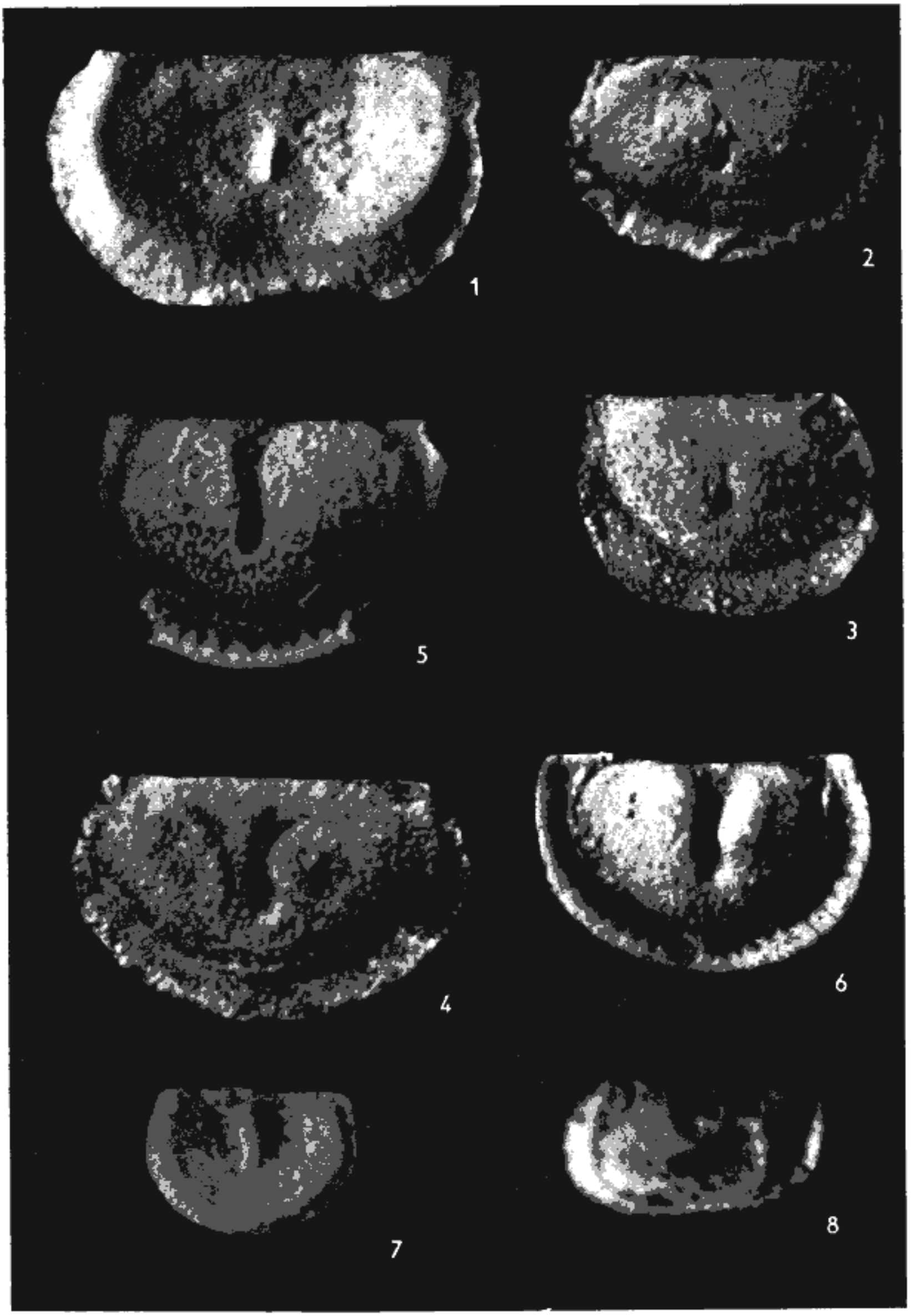
Pl. IV

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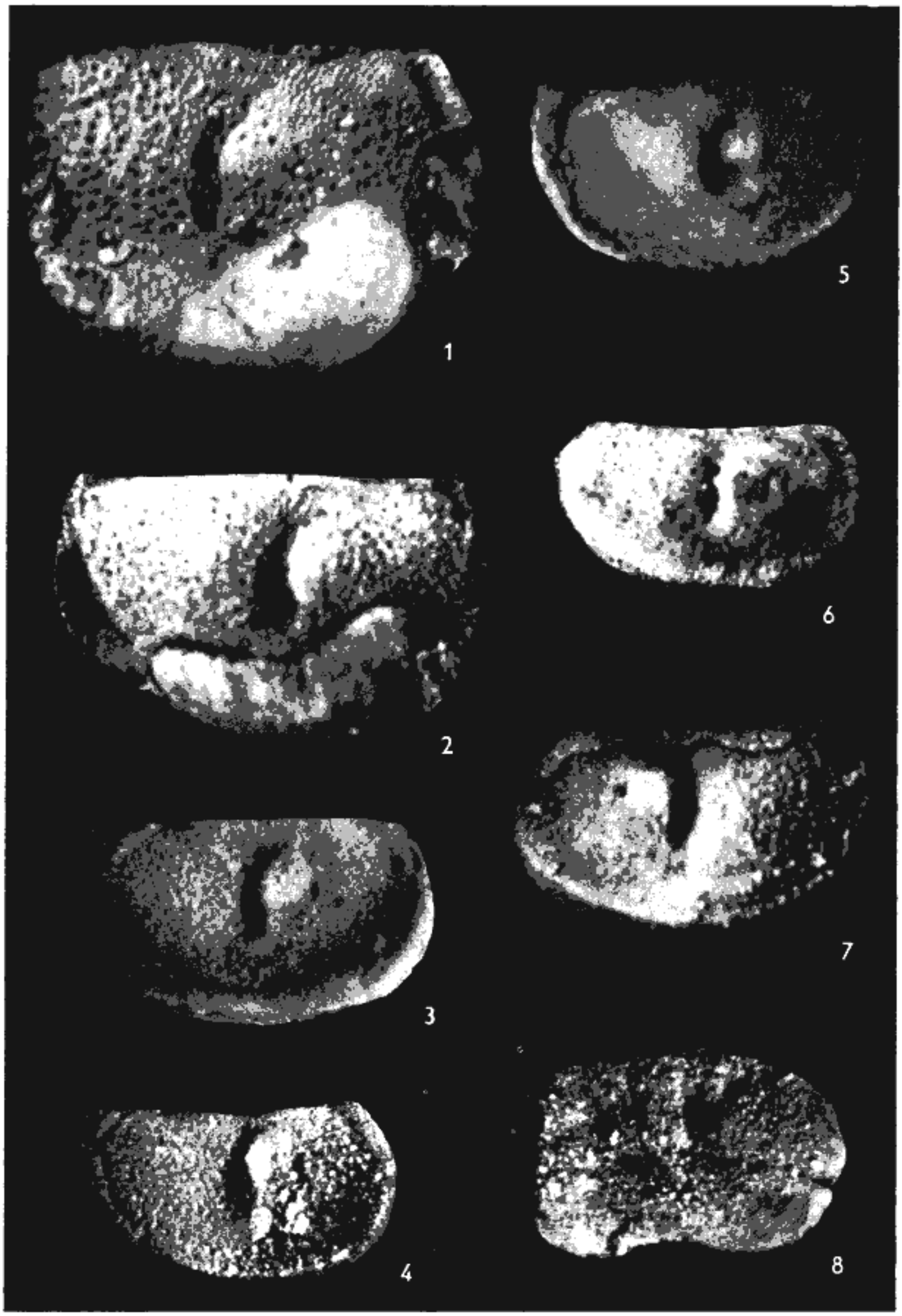
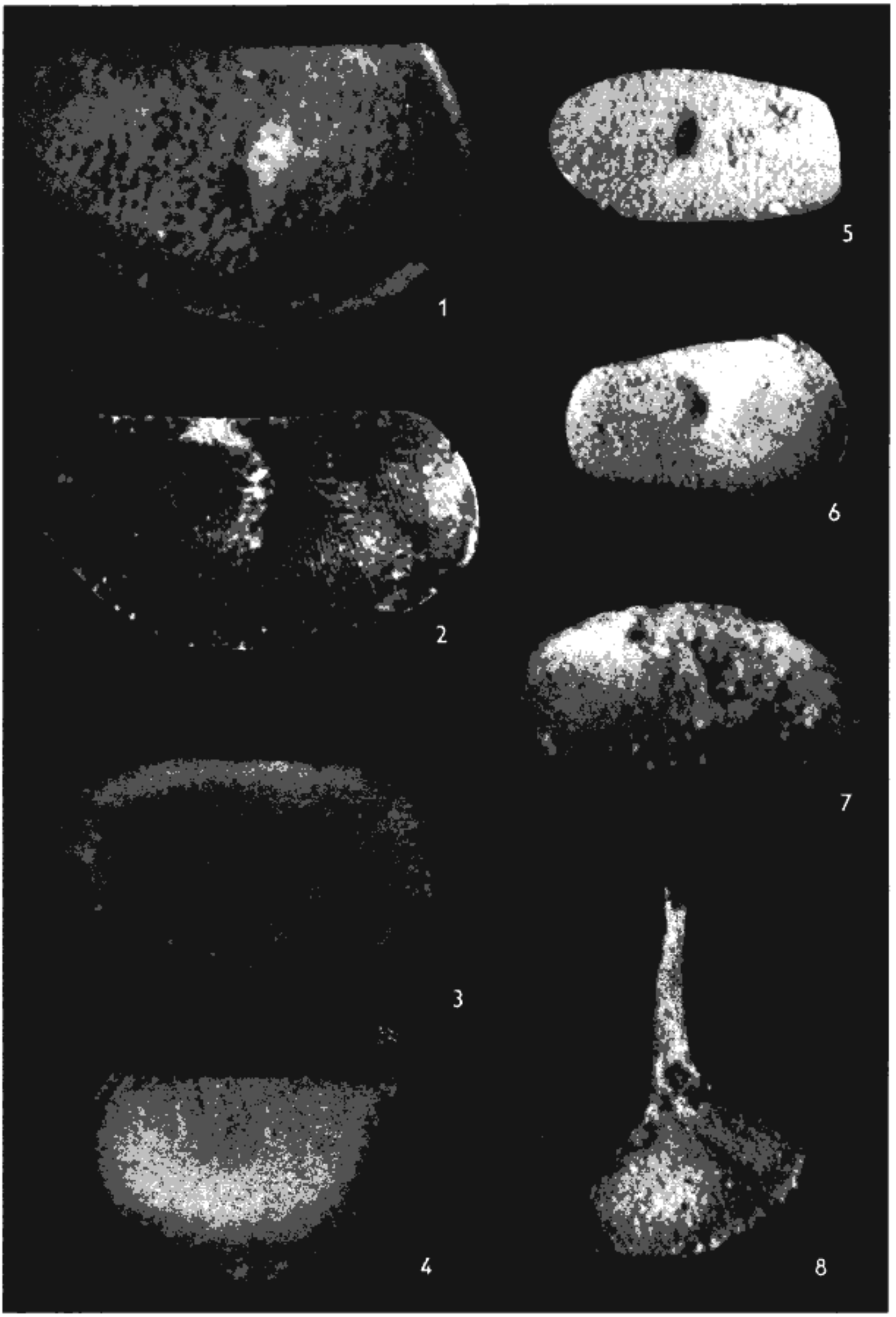
Pl. VI

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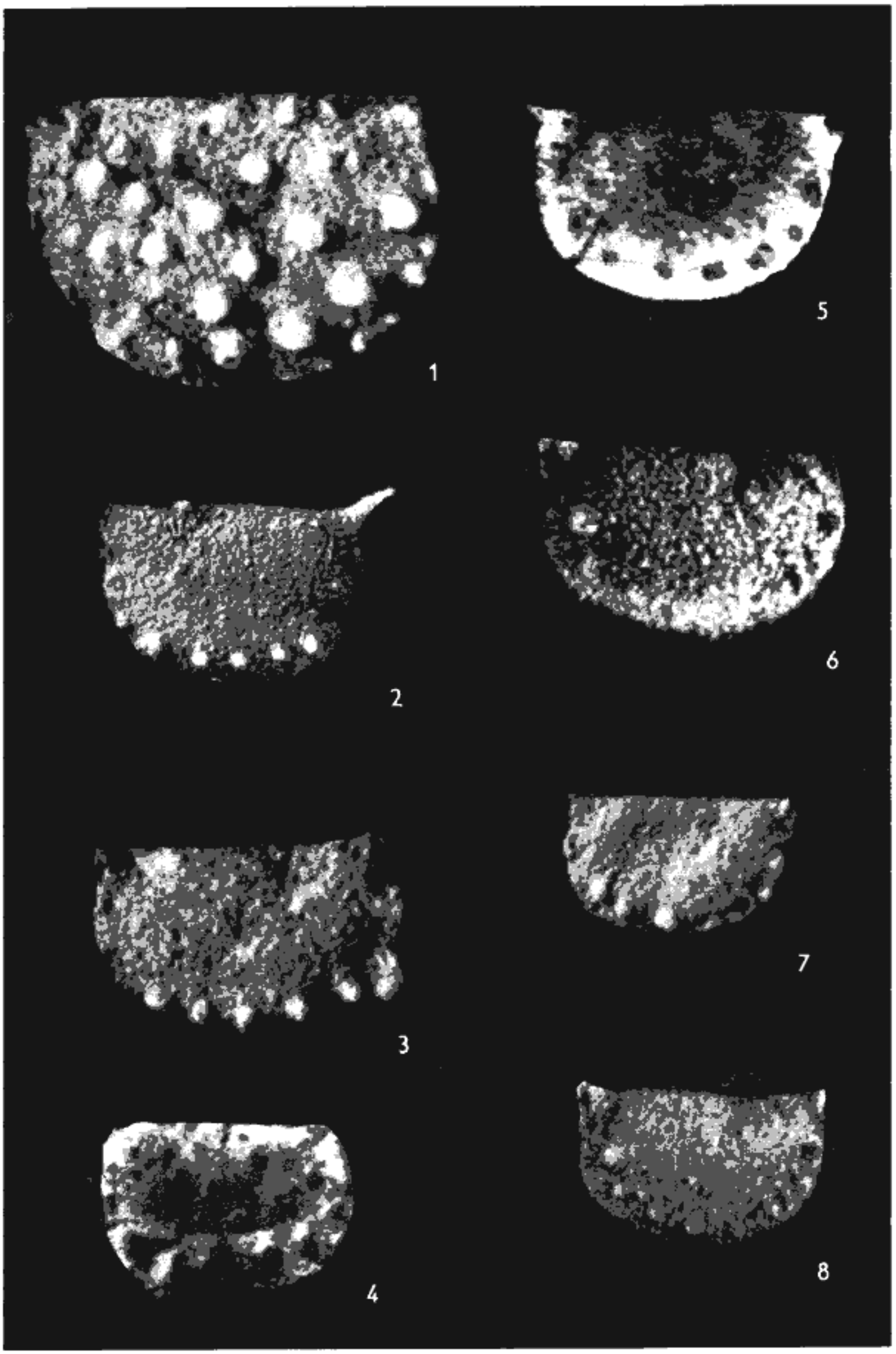
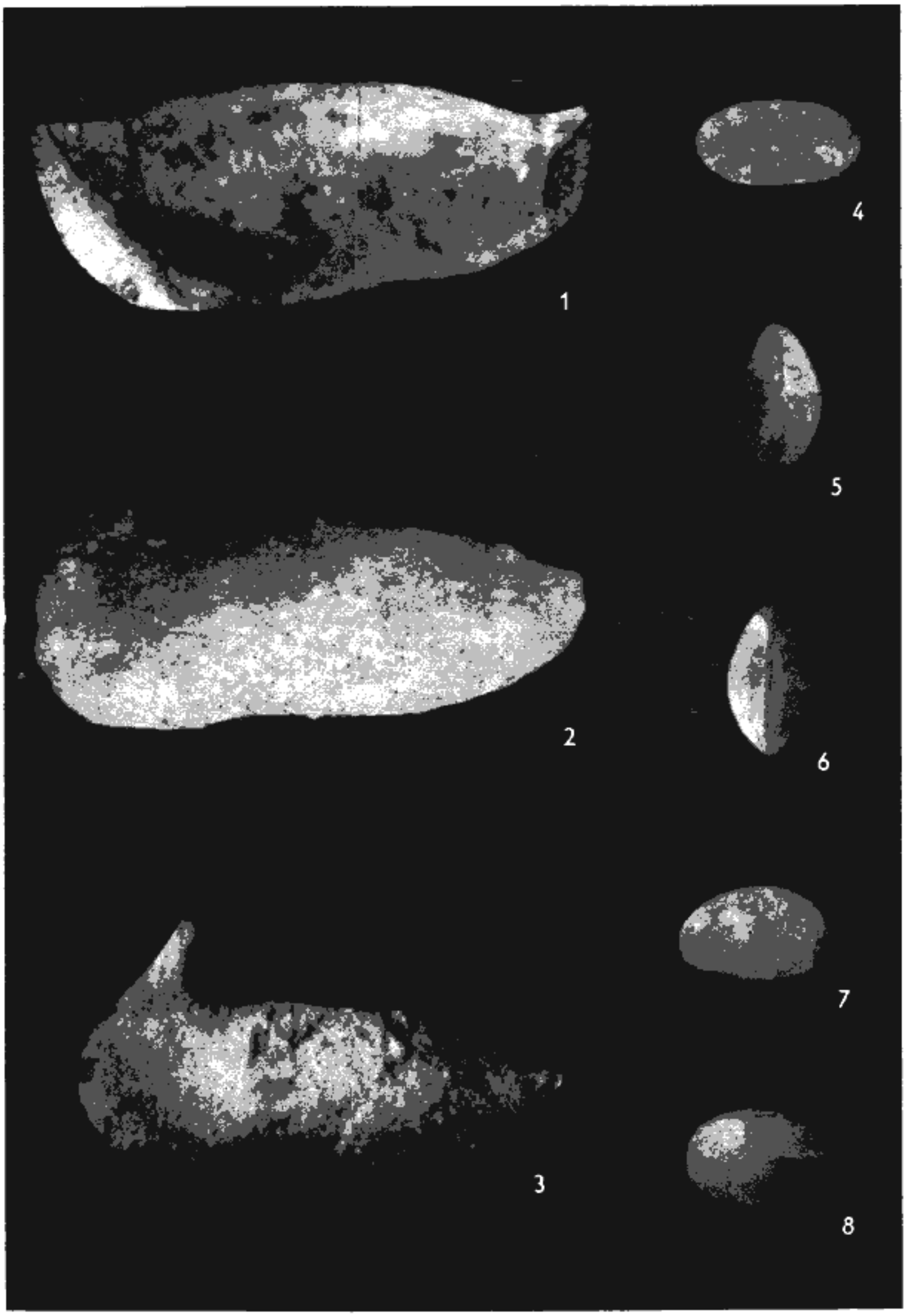
Pl. VIII

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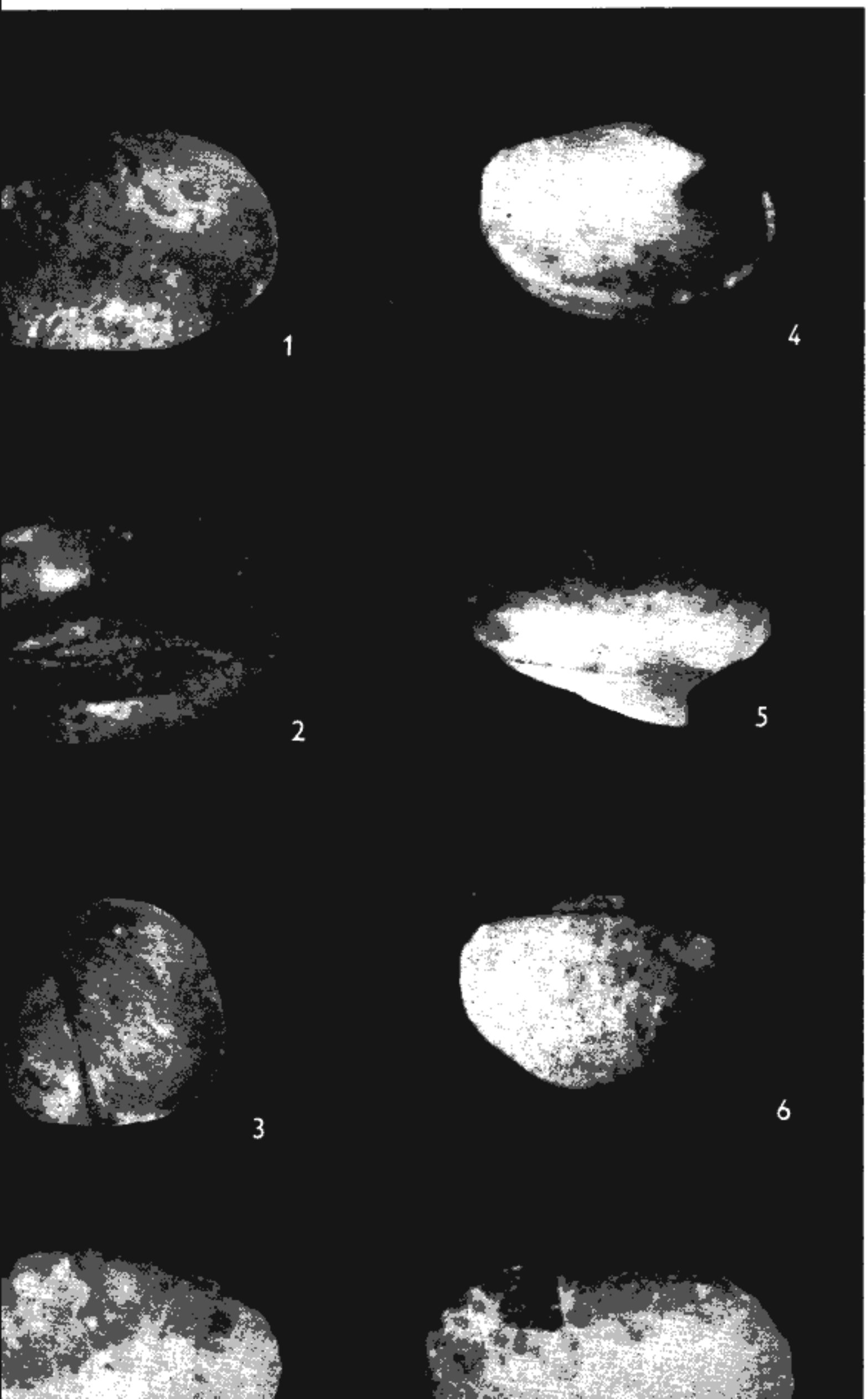
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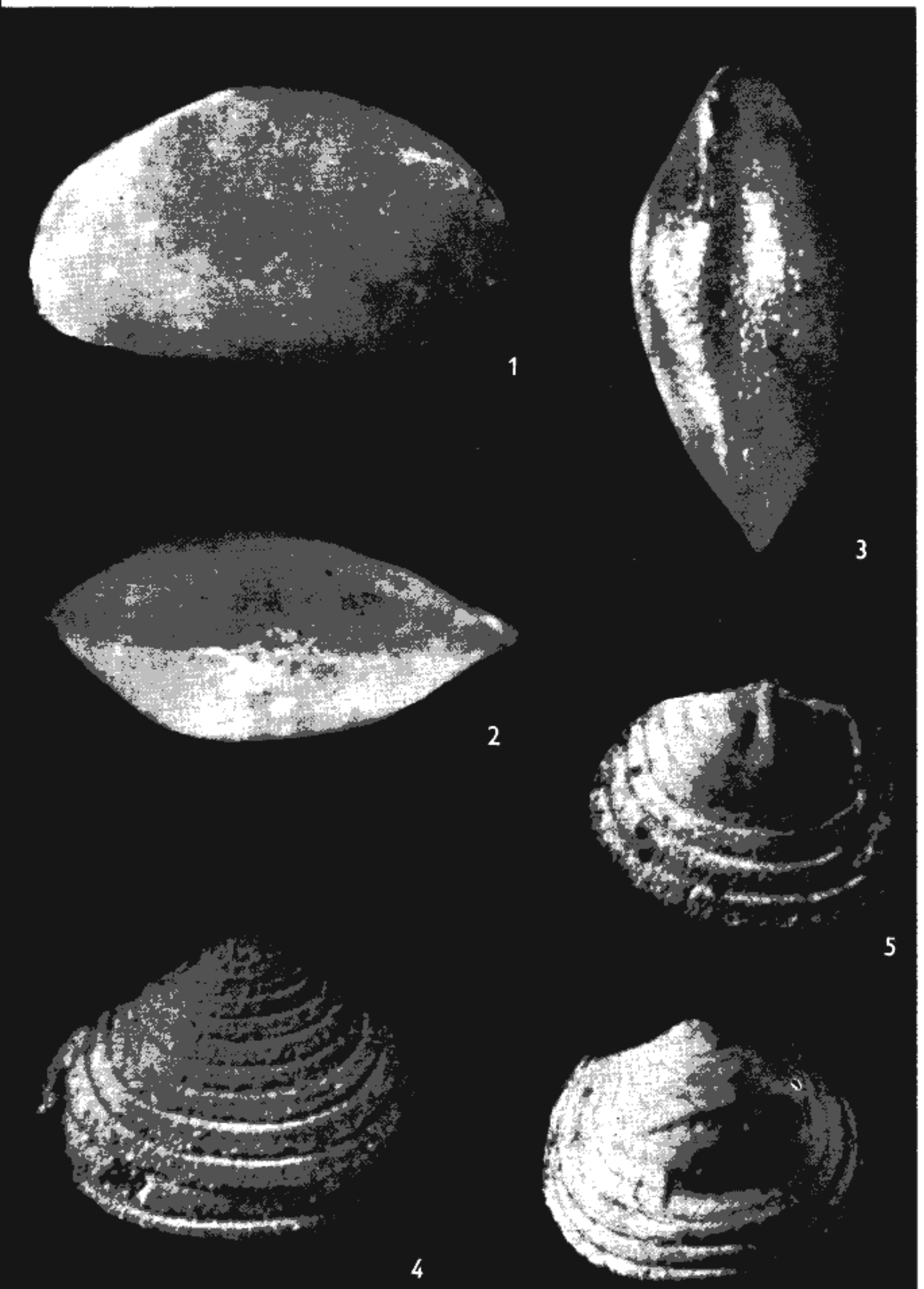
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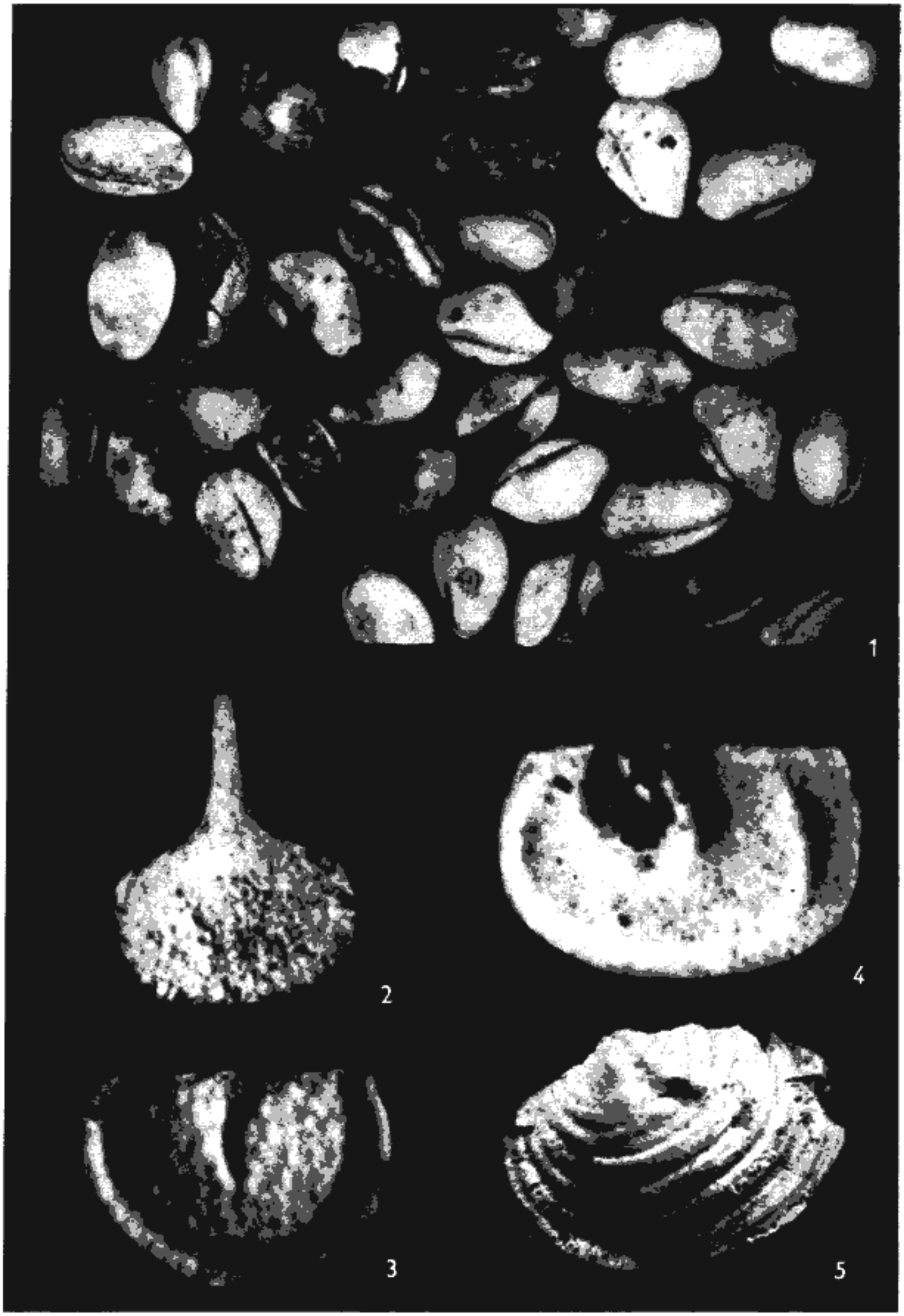
Pl. XII



Elliptocyprites (?) kegeli (BOUČEK, 1936)

1936b *Cytherella kegeli* sp. n.; BOUČEK, p. 81, pl. 5, figs. 11a, b, 12a, b.

Holotype: Right valve figured by BOUČEK (1936b) on pl. 5, fig. 12a–c. (NM-L 14030).

Type stratum and type locality: Lower layers of the Přídolí Formation. Koledník quarry near Beroun.

Material: Apart from the holotype and paratype, three valves embedded in the rock.

Description: See BOUČEK (1936b, p. 81). Diagnostic characters of the species are as follows: Valves elongate, subovate to subelliptical in lateral outline, slightly convex; maximum height anteromedian. Dorsal margin long, nearly straight, attaining four-fifths of valve length, with obtuse cardinal angles of which the posterior is larger. Anterior margin broadly rounded, posterior margin more narrowly rounded. Ventral margin nearly straight to slightly concave in the middle, subparallel with dorsum. Slight depression along free margin. Hinge unknown; adductor muscle scar not observed.

Dimensions of holotype: Length 0.60 mm (NM-L 14 030); height 0.24 mm; width 0.12 mm (only right valve). L/H ratio: 2.50. Length of paratype (NM-L 13 997) 0.65 mm; height of paratype 0.28 mm. L/H ratio: 2.32.

Discussion: *Elliptocyprites (?) kegeli* (BOUČEK, 1936) is characterized by a relatively small size and a slight depression along free margin. In these features it differs from all known representatives of *Elliptocyprites*. This species is referred to *Elliptocyprites* with considerable doubt.

Occurrence: Rare in the lower layers of the Přídolí Formation (in the graptolite biozone with *Pseudomonoclimacis ? ultima*), together with *Primitiella ? kolednikensis*, *Mirochilina jarovensis* and other ostracodes of this assemblage.

Order *Myodocopida* SARS, 1866

Suborder *Entomozocopina* GRÜNDEL, 1969

Superfamily *Entomozoacea* (JONES, 1873) PŘIBYL, 1951

Family *Entomozoidae* (JONES, 1873) PŘIBYL, 1951

Subfamily *Entomozoinae* (JONES, 1873) PŘIBYL, 1951

Genus *Richteria* JONES, 1874 emend. KEGEL, 1933

Type species: *Cypridina serratostriata* SANDBERGER, 1842; SD KEGEL, 1933. Upper Devonian of GDR.

Richteria migrans (BARRANDE, 1872)

Text-fig. 5/1

1872 *Entomis migrans* sp. n.; BARRANDE, pp. 514–515, pl. 24, figs. 10–14; pl. 27, fig. 22.
1873 *Entomis migrans* BARRANDE; JONES, p. 416.

1933 *Entomis* (*Richteria*) *migrans* BARRANDE; KEGEL, p. 413.
1934 *Entomis migrans* BARRANDE; BASSLER - KELLET, p. 304. (Here further synonymy is given.)
1936 *Entomis* (*Richteria*) *migrans* BARRANDE; BOUČEK, pp. 57–58, pl. 6, figs. 5, 6; text-fig. 2a, b.
1937 *Entomis* (*Richteria*) *migrans* BARRANDE; CHAUBET, p. 186, pl. 4, fig. 8a–8c.
1951 *Entomozoe* (*Richteria*) *migrans* (BARRANDE); PŘIBYL, p. 11.
1955 *Entomozoe* (*Richteria*) *migrans* (BARRANDE); BOUČEK - PŘIBYL, pp. 571, 607, 635, 659.
1958 *Entomozoe* (*Richteria*) *migrans* (BARRANDE); POKORNÝ, p. 311 (Vol. 2), text-fig. 1032.
non 1900 *Entomis migrans* BARRANDE; CANAVARI, p. 193, pl. 25, figs. 1, 2 (= *Richteria lamarmorai* CANAVARI, 1900).

Lectotype: (SD PŘIBYL, 1951, p. 11). Right valve figured by BARRANDE (1872) on pl. 24, figs. 12–14 (NM-L 22944), and refigured by BOUČEK (1936b) as text-fig. 2a.

Type stratum and type locality: Late lower and lower middle parts of the Kopanina Formation. Praha - Podolí (formerly Dvorce quarry, today the swimming pool in Podolí).

Material: Apart from BARRANDE's (1872) and BOUČEK's (1936b) types fifty-two valves (right and left valves) embedded in the rock. Relatively good preservation.

A detailed description of this species was first given by BARRANDE (1872) and later by BOUČEK (1936b) to which I refer the reader.

Dimensions: Length of lectotype (NM-L 22 944) 2.41 mm; height of lectotype 1.57 mm. L/H ratio: 1.53. Length of other specimens 1.73—3.41 mm; height 1.13—2.08 mm. L/H ratio: 1.53—1.63; ⌀ 1.58.

Discussion: This characteristic species can be recognized by the oblong-ovate to bean-shaped striate valves with a small anterodorsal tubercle or node, and a nuchal sulcus slightly bent forward. Lateral surface of valves is ornamented with striation which is usually longitudinal and a little concentric at the anterior and posterior margins. It has usually 15—16 longitudinal striate ribs. *Richteria lamarmorai* (CANAVARI, 1900) from the Upper Silurian of Sardinia is very similar to *R. migrans* (BARR.) except for the absence of anterodorsal tubercle.

Occurrence: Relatively common in the lower and lower middle part of the Kopanina Formation, in the "Cromus" beaumonti Horizon. The last occurrence of *R. migrans* has been ascertained in the Neocucullograptus inexpectatus Biozone. Localities: Praha - Podolí, Praha - Braník, Praha - Lochkov, "Mramorový" lom ("Marble" quarry), Lištice, Lounín, Tobolka etc., together with *Vltavina perneri*, *Rhomboentomozoe rhomboidea*, "*Cromus*" *beaumonti* and many various trilobites and brachiopods. From the Lobograptus scanicus Biozone to Neocucullograptus inexpectatus Biozone. Outside Bohemia, this species is known from the lower Ludlow of France (Montaigne Noire Mts.), Gotland (?), Kellerwald and Thuringia (GDR), Sardinia and Australia.

Subfamily *Rhomboentomozoinae* GRÜNDEL, 1962

Genus *Rhomboentomozoe* PŘIBYL, 1951

Type species: By original designation; *Cryptocaris ? rhomboidea* BARRANDE, 1872, from the Upper Silurian of Bohemia.

Rhomboentomozoe rhomboidea (BARRANDE, 1872)

Text-fig. 5/2

1872 *Cryptocaris ? rhomboidea* sp. n.; BARRANDE, p. 464, pl. 31, figs. 14, 15.
1936 *Entomis (Richteria) rhomboidea* (BARRANDE); BOUČEK, pp. 58–70, pl. 6, figs. 3, 4.
1951 *Rhomboentomozoe rhomboidea* (BARRANDE); PŘIBYL, pp. 15–16, pl. 1, fig. 2; pl. 2, fig. 5.
1954 *Rhomboentomozoe rhomboidea* (BARRANDE); POKORNÝ, p. 462, text-fig. 680.
1958 *Rhomboentomozoe rhomboidea* (BARRANDE); POKORNÝ, p. 311, text-fig. 1035.
1960 *Rhomboentomozoe rhomboidea* (BARRANDE); ZANINA - POLENOVA, Osnovy paleont., p. 331, text-fig. 834.
1961 *Rhomboentomozoe rhomboidea* (BARRANDE); SYLVESTER-BRADLEY, Treatise, pt. Q, p. Q 390, text-fig. 315e.

Holotype: Two open valves figured by BARRANDE (1872) on pl. 31, figs. 14, 15 (NM-L 23322; ČE 1222, Inv. No. 1648).

Type stratum and type locality: Lower part of the Kopanina Formation, "Cromus" beaumonti Horizon. According to BOUČEK (1936b), Kozel near Beroun.

Material: Only holotype and Bouček's specimen.

Description: As for the genus. A detailed description of this species was introduced by BARRANDE (1872, p. 464), later by BOUČEK (1936b, p. 59) and recently by PŘIBYL (1951, pp. 12—15) to which I refer the reader.

Dimensions of holotype (NM-L 23 322): Length 2.07 mm; height 1.67 mm. Length of other specimen 2.30 mm; height 1.80 mm. L/H ratio: 1.19—1.27; ⌀ 1.23.

Discussion: This species is distinguished at first glance from all representatives of the entomozoid genera by the characteristic shape of its valves, which are subtriangular in lateral view, striate, with pronounced mid-ventral spine. The submedial nuchal sulcus distinct, curved.

Occurrence: Rarely in the upper lower part of the Kopanina Formation, "Cromus" beaumonti Horizon, together with *Richteria migrans*, *Vltavina perneri* and other ostracodes and trilobites. Praha - Podolí (old quarry Dvorce, now the swimming pool) and Kozel (below Lištice) near Beroun.

? Subfamily *Entomozoinae* PŘIBYL, 1951

Genus *Vltavina* BOUČEK, 1936

Type species: By original designation; *Vltavina bohemica* BOUČEK, 1936, from the Upper Silurian of Bohemia.

Vltavina bohemica BOUČEK, 1936

1936a *Vltavina bohemica* n. n.; BOUČEK, p. 6 (sep.)
1936b *Vltavina bohemica* sp. n.; BOUČEK, pp. 48–49, pl. 4, figs. 3a,b, 4a,b, 5; pl. 5, fig. 1.
1954 *Vltavina bohemica* BOUČEK; POKORNÝ, p. 457, text-fig. 670.

1958 *Vltavina bohemica* BOUČEK; POKORNÝ, p. 187, text-fig. 789.
1961 *Vltavina bohemica* BOUČEK; SYLVESTER-BRADLEY, in Treatise, pt. Q, p. Q 390, text-fig. 313, 2.

Holotype: Left valve figured by BOUČEK (1936b) on pl. 4, fig. 3a, b (NM-L 14022).
Type stratum and type locality: Upper part of the Přídolí Formation. Praha - Velká Chuchle, the abandoned quarries above the village.
Material: Apart from the holotype and Bouček's types twenty-seven valves (left and right) embedded in the rock. Poor and partly good preservation.

Description: Valves large, striate, elongate to spindle-shaped in lateral view, two and one-half times as long as high. Hinge line straight. Cardinal angles prolonged into nearly horizontal spines; anterior spine longer than the posterior. Ventral margin curved. Maximum length near dorsal margin, maximum height near median. Nuchal sulcus distinct, relatively long and nearly straight, deepest ventrally. Lateral surface slightly convex, with longitudinal striation.

Dimensions of holotype: Length 1.05 mm; height 0.39 mm; width 0.13 mm (one valve only). L/H ratio: 2.69. Length of other specimens: 1.05—2.50 mm; height 0.52—1.05 mm. L/H ratio: 2.01—2.38; ⌀ 2.19.

Discussion: A detailed description of this species has been given by BOUČEK (1936b, pp. 48—49) to which I refer the reader. *Vltavina bohemica* Bouček is most similar to *V. perneri* BOUČEK, 1936 but differs from it in having a very distinct S_2 and straight dorsal margin. The stratigraphic range of these two species is different.

Occurrence: Relatively common in the middle and upper parts of the Přídolí Formation, in the ostracode assemblage with *Boucia ornatissima*, *Monograptus perneri* and *Colonograptus transgrediens*. Localities: Praha - Velká Chuchle, Praha - Podolí, Praha - Lochkov, "Mramorový" lom ("Marble" quarry), Nová Ves near Butovice, Radotín, Radotín valley etc.

Vltavina perneri BOUČEK, 1936

1936a *Vltavina perneri* n. n.; BOUČEK, p. 7 (sep.)
1936b *Vltavina perneri* sp. n.; BOUČEK, pp. 49—50, pl. 4, figs. 6a, b, 7.

Holotype: Left valve figured by BOUČEK (1936b) on pl. 4, fig. 6a, b. (NM-L 14009).
Type stratum and type locality: Lower layers of the Kopanina Formation, "Cromus" beaumonti Horizon. Kozel near Beroun (below Lištice).
Material: Holotype, paratype and twenty-one left and right valves embedded in the rock. Relatively good preservation.

Description: Valves straight, elongate in lateral view, acuminate at each end, about two or three times as long as high. Cardinal angles prolonged into horizontal spines; the anterior spine rather longer than the posterior. Below the anterior corner is a small (0.2 mm long) oblique edge. Ventral margin longer than in *V. bohemica*, slightly curved. Maximum length near dorsal margin, maximum height behind the midvalve. Lateral surface slightly convex. Nuchal sulcus developed as

a wide shallow depression before the midvalve, slightly curved ventrally. Anterodorsal margin obliquely curved; posteroventral margin curved to meet the nearly vertical posterior margin. Hinge unknown.

Dimensions of holotype (NM-L 14 009): Length 1.30 mm; height 0.45 mm; width 0.5 mm (only one valve). L/H ratio: 2.88.

Discussion: *Vltavina perneri* BOUČEK, 1936 is most closely allied to *V. bohemica* BOUČ. but has a more elongated valve with wide depression (nuchal sulcus) lying before the middle of dorsal margin. The anterior and posterior dorsal spines are shorter than in *V. bohemica*; the latter species is in all probability a descendent of *V. perneri*.

Occurrence: Relatively common in black to black-grey concretions of limestone and black shale in the lower part of the Kopanina Formation, especially with ostracode assemblage (biozone) with *Richteria migrans*, *Rhomboentomozoe rhomboidea*, *Cytherellina* sp., *C.* aff. *C. siliqua*, "*Cromus*" *beaumonti* and other fossils. Praha - Podolí (= old quarry Dvorce), Kozel (below Lištice) near Beroun and other localities.

Subfamily *Bouciinae* PŘIBYL, 1951

Genus *Boucia* AGNEW, 1942

Type species: *Basslerella ornatissima* BOUČEK, 1936; Upper Silurian of Bohemia.
Synonym: *Basslerella* BOUČEK, 1936; non *Basslerella* KELLETT, 1935; non *Basslerella* HOWE, 1935 (= *Basslerites* HOWE, 1937).

Remarks: The generic name *Boucia* was first used by AGNEW (1942, p. 757) instead of the invalid homonymic name *Basslerella* BOUČEK, 1936. Only one species (*B. ornatissima*) was placed in this genus, which thus became the type species, as was noted by BOUČEK (1936b). Later PŘIBYL (1951) established for this genus a new subfamily *Bouciinae* in the family *Entomozoidae*.

Boucia ornatissima (BOUČEK, 1936)

Text-fig. 5/3

1936a *Basslerella ornatissima* n. n.; BOUČEK, p. 7 (sep.).
1936b *Basslerella ornatissima* sp. n.; BOUČEK, pp. 61–62, pl. 6, fig. 1; text-fig. 3a, b.
1951 *Boucia ornatissima* (BOUČEK); PŘIBYL, p. 6, pl. 1, fig. 5. (Further synonymy is given.)
1958 *Boucia ornatissima* (BOUČEK); POKORNÝ, pp. 314–315, text-fig. 1043.
1960 *Boucia ornatissima* (BOUČEK); ZANINA - POLENOVA, p. 442, text-fig. 837.

Holotype: Right valve figured by BOUČEK (1936b) in text-fig. 3a (NM-L 14021). Paratype. Left valve figured by BOUČEK (1936b) in text-fig. 3b (NM-L 14041).
Type stratum and type locality: Upper layers of the Přídolí Formation. Praha - Velká Chuchle, old abandoned quarries above the village.

Material: Apart from the holotype and other Bouček's type over forty well preserved valves embedded in the rock.

Description: As for the genus. See: BOUČEK (1936b, pp. 61—62).

Dimensions of holotype (NM-L 14 021). Length 2.10 mm; height 1.24 mm. L/H ratio: 1.69. Length of other specimens 2.00—2.30 mm; height 1.00—1.25 mm. L/H ratio: 2.00—1.84; ⌀ 1.92.

Discussion: *Boucia ornatissima* (BOUČEK) differs from all known representatives of *Entomozoe* PŘIBYL, 1951 in having two distinct sulci (nuchal sulcus and ventral sulcus) and the lateral surface striated. Very similar is *Bisulcoentomozoe tuberculata* WAN SHANGQI and ZHANG YIAO-BIN, 1983, from the Devonian of China but it differs from *B. ornatissima* (BOUČ.) mainly in having three sulci (nuchal sulcus, posterior sulcus and anteroventral sulcus) and posterodorsal tubercle or spine.

Occurrence: Relatively common in the middle and upper parts of the Přídolí Formation, in the graptolite biozones with *Monograptus bouceki* to *Colonograptus transgrediens*. This species is distributed in the whole southeastern part of the Barrandian (central Bohemia). Localities: Praha - Lochkov, "Mramorový" lom, Nová Ves near Praha - Klukovice, Karlštejn, Vonoklasy, quarry west of the village, Praha - Radotín, Radotín valley ("Antipleura" gorge), Radotín valley — "U topolů" and many other outcrops.

Family *Bolbozoidae* BOUČEK, 1936

Genus *Bolbozoe* BARRANDE, 1872

Type species: *Bolbozoe anomala* BARRANDE, 1872. (SD BASSLER - KELLETT, 1934, p. 215.)

Remark: This genus is here divided into two subgenera [*Bolbozoe* (*Bolbozoe*) BARRANDE, 1872 and *Bolbozoe* (*Parabolbozoe*) subg. n.].

Bolbozoe (*Bolbozoe*) BARRANDE, 1872

Type species: *Bolbozoe* (*Bolbozoe*) *anomala* BARRANDE, 1872. Upper Silurian of Bohemia.

Included species: *Bolbozoe* (*Bolbozoe*) *anomala* BARRANDE, 1872, *B.* (*B.*) aff. *anomala* BARRANDE, 1872, *B.* (*B.*) *divisa* (JONES, 1861), *B.* (*B.*) *italica* CANAVARI, 1900, *B.* (*B.*) *jonesi* BARRANDE, 1872, *B.* (*B.*) *lanceolata* CANAVARI, 1900 etc.

Stratigraphic range and geographical distribution: Upper Silurian (Ludlow) to Lower Devonian (Pragian) of Europe (Bohemia, England, France, Sardinia etc.), Asia (USSR — Tien Shan) and China (Devonian).

Diagnosis: Unisulcate subgenus of *Bolbozoe* with large hemisphaerical anterodorsal swelling or node lying immediately in front of nuchal sulcus. Ventral sulcus absent. The nominate subgenus *B.* (*Bolbozoe*) BARR. differs from *B.* (*Parabolbozoe*)

subg. n. in having only nuchal sulcus behind the large, inflated anterodorsal node, and a smooth surface of valves. Ventral sulcus absent.

Bolbozoe (*Bolbozoe*) *anomala* BARRANDE, 1872

1872 *Bolbozoe anomala* sp. n.; BARRANDE, p. 501, pl. 24, figs. 27–30.
1934 *Bolbozoe anomala* BARRANDE; BASSLER - KELLETT, p. 215.
1936b *Bolbozoe anomala* BARRANDE; BOUČEK, pp. 62–63.
1954 *Bolbozoe anomala* BARRANDE; HUGHES, pp. 3, 8, 42.
1961 *Bolbozoe anomala* BARRANDE; SYLVESTER-BRADLEY, Treatise pt. Q, p. Q 396, text-fig. 316, 1c–f.

Lectotype (herein): Right valve figured by BARRANDE (1872) on pl. 25, figs. 29, 30 (NM-L 23572; ČE 1194). Paralectotype (herein), left valve figured by Barrande (1872) on pl. 24, figs. 27, 28 (NM-L 13993).

Type stratum and type locality: Přídolí Formation. Praha - Lochkov (exact locality and horizon unknown).

Material: Lectotype and paralectotype and two specimens. Preservation poor, mostly as internal moulds.

Description: As for the subgenus.

Dimensions of lectotype: Length 8.0 mm; height 6.0 mm. Length of paralectotype 7.1 mm; height of paralectotype 5.0 mm. L/H ratio: 1.33—1.42; ⌀ 1.37.

Discussion: This species resembles most *B.* (*B.*) *capellinii* CANAVARI, 1900, from the Upper Silurian (lower Ludlow) of Sardinia in having a similar shape of valves and a large hemispherical anterodorsal node, but differs from it in an ovate to oblong outline of valves, and a shallower nuchal sulcus. It is not excluded that *B.* (*B.*) *capellinii* CAN. may be conspecific with *B.* (*B.*) *anomala* BARR.

Occurrence: Relatively rare in the Přídolí Formation. Praha - Lochkov, (exact Barrande's locality and horizon are unknown). In Scyphocrinites horizon on the base of the Lochkov Formatian (Lochkovian) I have found several specimens of *B.* (*B.*) aff. *anomala* BARR. near Přídolí.

Bolbozoe (*Parabolbozoe*) subg. n.

Type species: *Bolbozoe bohemica* BARRANDE, 1872. Upper Silurian of Bohemia.

Included species: *Bolbozoe* (*Parabolbozoe*) *bohemica* BARRANDE, 1872, and *B.* (*P.*) sp. n., *B.* (*P.*) aff. *bohemica* BARRANDE, 1872. [See CANAVARI, 1900, pl. 26 (2), fig. 15a–c].

Stratigraphic range and geographical distribution: Upper Silurian (Ludlow) of Bohemia and Sardinia; ? France.

Diagnosis: Bisulcate subgenus of *Bolbozoe* very similar to *B.* (*Bolbozoe*) BARR. but distinguished from it in having two distinct and deep sulci; the first nuchal sulcus is developed immediately behind the large anterodorsal node, and the

second, narrow and deep ventral sulcus lies in the posteroventral part of valves and continues in the posteromedian part. Lateral surface usually coarse granulate.

Bolbozoe (*Parabolbozoe*) *bohemica* BARRANDE, 1872

1868 *Bolbozoe bohemica* n. n.; BARRANDE in BIGSBY, p. 199.
1872 *Bolbozoe bohemica* sp. n.; BARRANDE, p. 502, pl. 27, figs. 14–20.
1934 *Bolbozoe bohemica* BARRANDE; BASSLER - KELLETT, part., p. 215.
1936b *Bolbozoe bohemica* BARRANDE; BOUČEK, pp. 63–64, text-fig. 4.
?1937 *Bolbozoe bohemica* BARRANDE; CHAUBET, pp. 188–189, pl. 7, fig. 18a, b.
1954 *Bolbozoe bohemica* BARRANDE; HUGHES, 8, 3, p. 42.
1956 *Bolbozoe bohemica* BARRANDE; MATTHES, p. 138, text-fig. 72/26.
1958 *Bolbozoe bohemica* BARRANDE; POKORNÝ, p. 315, text-fig. 1044.
1961 *Bolbozoe bohemica* BARRANDE; SYLVESTER-BRADLEY, Treatise, pt. Q, p. Q 396, text-fig. 316, 1a,b. [Non text-fig. 316, 1g–1i = *B.* (*Parabolbozoe*) sp. n., *B.* (*P.*) aff. *bohemica*.]
non 1900 *Bolbozoe* (*?*) *bohemica* CANAVARI (non BARRANDE); CANAVARI, pp. 205–207, pl. 26 (1), fig. 15a–c [= *B.* (*P.*) sp. n., *B.* (*P.*) aff. *bohemica* BARR.].

Lectotype: SD BOUČEK (1936b, p. 63). He designated as lectotype the specimen (left valve) figured by BARRANDE (1872) on pl. 27, fig. 19 (NM-L 23 658).

Type stratum and type locality: Lower part of the Kopanina Formation, "Cromus" beaumonti Horizon. Praha - Malá Chuchle, Vyskočilka locality.

Material: Apart from the lectotype and paralectotype, five left and right valves embedded in the rock. Relatively poor preservation.

Description: As for the subgenus *B.* (*Parabolbozoe*). This species was described by BARRANDE (1872, p. 502) and later by BOUČEK (1936b, pp. 63—64) to whom I refer the readers.

Dimensions of lectotype: Length 11.50 mm; height 7.80 mm. L/H ratio: 1.47. Length of paralectotypes 6.00—12.10 mm; height 3.20—7.80 mm. L/H ratio: 1.55—1.87; ⌀ 1.71.

Discussion: The lectotype figured by BOUČEK (1936b, p. 63, text-fig. 4) has been oriented incorrectly and the orientation is actually reverse to that indicated in his description. *B.* (*P.*) *bohemica* BARR. differs from all known species of *Bolbozoe*, mainly *B.* (*B.*) *anomala* BARR. in having larger valves (11.50—12.10 mm long in mature specimens) with two distinct sulci, larger anterodorsal node, and coarse granulation on the lateral surface of valves.

Occurrence: Lower part of the Kopanina Formation, in the "Cromus" beaumonti Horizon. Praha - Malá Chuchle, Vyskočilka locality, Praha - Radotín, Lištice (= Kozel) near Beroun, Slavíky near Zdice and Zadní Kopanina. I have found one poor specimen of *B.* (*Parabolbozoe*) aff. *B.* (*P.*) *bohemica* BARR. in the Pseudomonoclimacis (?) ultima Biozone (lower Přídolian) in Praha - Jinonice, "Na butovickém hradišti" locality. Besides Bohemia also France (?) and Sardinia (Cardiola limestone).

Suborder *Myodocopina* SARS, 1866

Superfamily *Cypridinacea* BAIRD, 1850

Family *Cypridinidae* BAIRD, 1850

Subfamily *Cypridininae* BAIRD, 1850

Genus *Cypridina* MILNE-EDWARDS, 1840

Type species: *Cypridina reynaudi* MILNE-EDWARDS, 1840 (= *Cypridina inermis* G. W. MÜLLER, 1890). Recent, tropical seas, Malaya.

Stratigraphic range and geographical distribution: ?Ordovician up to Recent. In the Silurian and Lower Devonian of Bohemia two species (*C. bohemica* BOUČEK, 1936 and *C. pragensis* PŘIBYL, 1952) have been found.

Cypridina bohemica BOUČEK, 1936

1936a *Cypridina bohemica* n. n.; BOUČEK, p. 9 (sep.).
1936b *Cypridina bohemica* sp. n.; BOUČEK, pp. 84–85, text-figs. 8a–h.

Holotype: Carapace figured by BOUČEK (1936b) in text-fig. 8d–h (NM-L 14043).
Paratype: Carapace figured by BOUČEK (1936b) in text-fig. 8a–c (NM-L 14042).
Type stratum and type locality: Upper layers of the Přídolí Formation. Praha - Podolí (old abandoned quarry Dvorce, now the swimming pool).
Material: Holotype and paratype and seven free carapaces. Good preservation.

Description: See BOUČEK (1936b, pp. 84—85).

Dimensions of holotype (NM-L 14 043). Length 5.11 mm; height 4.30 mm; width 3.28 mm. L/H ratio: 1.18. Length of other specimens: 4.45—5.50 mm; height 3.86—4.81 mm; width 2.77—3.57 mm. L/H ratio: 1.15—1.14.

Discussion: *Cypridina bohemica* BOUČEK is somewhat similar in lateral view and shape and position of the anterior margin of rostrum to *Cypridina postsilurica* TSCHERNYSCHEW, 1893, *C. tyrrhenica* CANAVARI, 1900, *C. franklini* COPELAND, 1964, and *C. pera* POLENOVA, 1970, but it differs from these four species by rather elongate valves, and a more rounded posterior end of carapace. This Bohemian species is distinguishable from all Palaeozoie representatives of *Cypridina* by its ovate elongate shape of valves in lateral view and by a smaller down-curved anterior rostrum.

Occurrence: Upper layers of the Přídolí Formation, probably Colonograptus transgrediens Biozone. Praha - Přídolí (formerly Dvorce quarry, today the swimming pool). Relatively rare.

rder *Eridostraca* ADAMCZAK, 1961

uperfamily *Eridoconchacea* HENNINGSMOEN, 1953

amily *Cryptophyllidae* ADAMCZAK, 1961

enus *Cryptophyllus* LEVINSON, 1951

es: By original designation; *Eridoconcha oboloides* ULRICH and BASSLER, 1923, from e Ordovician of Minnesota (USA).

k: I agree with JONES (1968, p. 65) that the number of lamellae on the face of valves is an unstable feature for the generic division of the *dostraca*. I prefer to follow Levinson's definitions of the genera *Erido-* RICH and BASSLER, 1923 and *Cryptophyllus* LEVINSON, 1951. Recently, has been found in the Upper Silurian of Bohemia.

ryptophyllus butovicensis sp. n.

XI, fig. 4

s species is named after the Butovice locality.
Right valve figured here on pl. XI, fig. 4 (AP-SV-45e).
um and type locality: Basal layers of the Přídolí Formation, Pseudomonoclimacis Biozone. Praha - Jinonice.
Holotype and two valves (right and left) embedded in the rock.

ption: A relatively large species of *Cryptophyllus* with subtriangular htly bilaterally asymmetrical in lateral view. Length/height ratio: ⌀ 1.20. length and height in midvalve. Axis at right angle to height. Hinge t, sunken between dorsal umbos. Sulcus short. Posterior cardinal angle the anterior, rounded. Convexity of valve often merges these features outline. Ventral margin almost parallel to hinge line, curving abruptly e ends. Lateral surface smooth, with nine to ten flattened lamellae paral- margin, separated from each other by a narrow V-shaped groove. These idistantly spaced grooves are concentric about umbo. Lamellae converg- rdinal angles. Only first lamella is a little narrower than the others.
sions of holotype: Length 1.42 mm; height 1.12 mm. L/H ratio: 1.26. other specimens 1.30—1.36 mm; height 1.10—1.15 mm (AP-SV-43 /H ratio: 1.18—1.26; ⌀ 1.22.
sion: This Silurian species is most similar to *Cryptophyllus diatropus* 62 and *C. platyogmus* JONES, 1962, from the Lower Carboniferous of ustralia but can be distinguished by its larger size, and a smaller number

hyllus (e.g. *C. haleyi* COPELAND, 1974, *C. noelli* COPELAND, 1974 etc.) it differs ainly in having slightly elongate to subtriangular valves in lateral view, a larger umber of the lamellae and grooves (9—10), and greater dimensions of valves. Also /H ratio is different (⌀ 1.22).

Occurrence: Relatively rare in the lower layers of the Přídolí Formation, in ne flaggy limestones with *Koledníkella insolita* and other ostracodes. Upper layers f the Pseudomonoclimacis (?) ultima Biozone. Praha - Jinonice, the field at the Na butovickém hradišti" locality.

Cryptophyllus copelandi sp. n.

Pl. XI, figs. 5, 6; pl. XII, fig. 5; text-figs. 5/4, 6, ?5 and 7/8

ame: This species is named in honour of the Canadian palaeontologist Dr. M. J. Copeland, Ottawa, who contributed much to our knowledge of the Palaeozoic ostracodes.

olotype: Left valve figured here in text-fig. 7/8 (NM-L 23748).

ype stratum and type locality: Kopanina Formation, biozone with *Koledníkella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.

laterial: Several hundreds of valves, preserved mostly as exfoliated moulds embedded in the rock and some free valves.

Description: Slightly elongate to slightly subtriangular large valves, rather ilaterally asymmetrical in lateral view. L/H ratio 1.38. Umbo well developed, low nd broadly rounded, projecting above hinge line. Axis intersects height at an angle f 85—95°; outline highly variable (subtriangular to nearly elongate, sometimes lliptical, oval or subquadrate). Cardinal angles rounded. Anterior and posterior argins broadly convex, ventral margin almost parallel to hinge line, curving wards the ends. Lateral surface of each valve smooth, with short dorsal sulcus nd five to nine (mostly six to seven) lamellae parallel to free margin and separated om each other by V-shaped grooves concentric about the umbo. Lamellae con-erging near cardinal angles. The large exfoliated specimens reveal a broad, deep ulcus, dividing the umbo into two unequal lobes.

Dimensions of holotype: Length 1.70 mm; height 1.15 mm. Length of other pecimens 1.05—1.78 mm; height 0.85—1.15 mm. L/H ratio: 1.23—1.54; ⌀ 1.38—1.40.

Discussion: This relatively large species is rather similar to *Cryptophyllus pelli* COPELAND, 1974 and *C. butovicensis* sp. n. but differs from the former by larger size and a greater number of lamellae and grooves in the lateral surface 5—9), and from the latter by a smaller number of lamellae and an elongate to ightly subtriangular outline of valves in lateral view. Also the L/H ratio of the two pecies is different. ⌀ 1.38 in *C. copelandi* and ⌀ 1.21—1.22 in *C. butovicensis*.

Occurrence: Kosov and Koledník quarries near Beroun, Lounín etc. In the

Cryptophyllus cf. *copelandi* sp. n.

Material: Three free valves and two valves embedded in the rock.

Description: Valves of medium-size, subovate in lateral view, with five to six nearly equidistant lamellae on the smooth lateral surface, separated from each other by V-shaped grooves. Umbo low, projecting slightly above the hinge line; no sulcus. Hinge line straight, about five-eights of total length. Axis at right angle to height. Anterior and posterior margins convex; ventral margin slightly convex or nearly parallel to hinge line. Cardinal angles rounded.

Dimensions: Length 0.88—1.47 mm; height 0.65—1.07 mm. L/H ratio: ⌀ 1.36.

Discussion: The valves of *Cryptophyllus* cf. *copelandi* sp. n. are very similar to *C. copelandi* sp. n. from the ostracode biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi* in having the same size and a number of lamellae on the lateral surface, but they differ from the typical specimens of *C. copelandi* by the subovate shape of valves and by a lower umbo. Perhaps these valves belong to a stratigraphically younger subspecies of *C. copelandi*.

Occurrence: Rare in the grey to grey-brown limestones of the middle upper layers of the Kopanina Formation, in the Ananaspis fecunda Biozone (or Horizon). Koledník quarry near Beroun and the "Kouřící" lom ("Smoky" quarry) near Kozolupy.

Remark: Another free subovate valve of medium-size (length 0.96 mm and height 0.73 mm) with six lamellae has been found in the tuffaceous layers of the lower part of the Kopanina Formation near Podskalský (Štětecký) mlýn (mill) not far from Tmáň near Beroun - Králův Dvůr. This valve also resembles the species *C. copelandi*.

Ostracodes of unknown systematic position

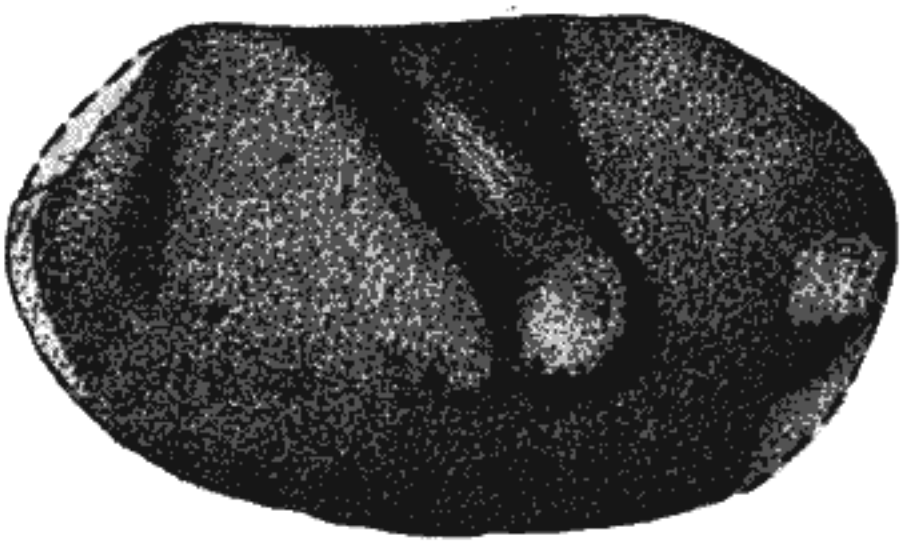
Genus and species undetermined – A
(*Guberella* sp.)

Text-fig. 8/1

At the Silurian locality Kozolupy near Mořina one right valve of ostracode (internal mould) has been found, which is slightly preplete, ovato-elongate in lateral view, dorsally truncated. Dorsal margin long and straight. Cardinal angles obtuse. Anterior margin broadly rounded, posterior margin convex but lower than the anterior one. Ventral margin gently convex. Maximum length near midvalve; maximum height in the posterior part of the anterior third. Anterior lobe (L_1) broad, slightly convex. S_1 deep and broad, extending obliquely from dorsum to below midvalve. L_2 obliquely elongate, long and distinct, inclined towards anteroventral margin; on its end there is a rounded node. S_2 deep and broad, obliquely inclined

towards anteroventral part. L_3 broad, slightly convex, convergent with the slightly inflated ventral lobe, separated from the posterior margin by a narrow depression. Lateral surface smooth (?), but uneven.

Dimensions: Length 1.30 mm; height 0.80 mm. L/H ratio: 1.62.



8. Genus and spec. undetermined A. (? *Guberella* sp.). Right valve in lateral view (AP-SV-109). × 50. „Kouřící" lom ("Smoky" quarry) near Kozolupy. Kopanina Formation, "Cromus" beaumonti Horizon. All drawings by the author.

Remarks: The generic determination of this specimen is difficult. Only some species of the genera *Guberella* SCHALLREUTER, 1975 and *Vania* KRŮTA, 1980 MS are somewhat similar to our specimen. For the present I designate it as "*genus and species undetermined*" (*Guberella ?* sp.).

Occurrence: Very rare in the lower part of the Kopanina Formation, with *Cytherellina* cf. *siliqua*, in the "Cromus" beaumonti Horizon. "Kouřící" lom near Kozolupy.

Genus and species undetermined – B

Pl. VII, fig. 3; text-fig. 6/9

Material: Three valves (internal moulds) embedded in the rock.

Remarks: Several poorly preserved ostracode valves have been found in the layers with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Valves are preplete, elongate in lateral view. Dorsal margin straight, long, occupying about four-sixths of the valve length. Cardinal angles obtuse. Anterior margin broadly curved, ventral margin long and obliquely inclined posteriorly to the curved posterior margin. Along free anterior margin there is a low ridge or rim, parallel to the contact edge. Surface smooth.

Dimensions: Length of the best preserved specimen is 1.22 mm; height 0.71 mm. L/H ratio: 1.71.

Occurrence: Kosov quarry near Beroun. Lower layers of the upper part of the Kopanina Formation, in the rich ostracode assemblage with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Genus and species undetermined – C

Text-fig. 4/14

Remarks: The generic and specific designation of the single specimen (left valve) is very difficult. For the time being I designate it as "genus and species undetermined-C".

Dimensions: Length 0.64 mm; height 0.42. L/H ratio: 1.52.

Occurrence: Kosov quarry near Beroun. Přídolí Formation, layers with *Pseudomonoclimacis ? ultima*.

The Silurian ostracode assemblages of Bohemia and their comparison with the Silurian ostracode faunas of Europe, North America and other parts of the world

To that present knowledge of the ostracode associations collected in the Middle and Upper Silurian of Bohemia, twelve ostracode assemblages corresponding to twelve local ostracode biozones can be established. The major part of these ostracodes belonged to vagrant benthos that found an appropriate chemophysical environment and suitable nutrition in the niches of the fine-grained sea bottom. The first Silurian ostracodes have been discovered in the Motol Member of the Liteň Formation (Wenlock age). No ostracode species has so far been recognized in the Bohemian Lower Silurian.

A) The Liteň Formation (Motol Member) has yielded three ostracode assemblages:

1) Assemblage with *Daleiella triangularis* with the following species: *Bairdiacypris ? anomala* (BOUČEK), *Bairdiocypris phillipsiana* (JONES and HOLL), *Cytherellina grandis* (JONES and HOLL), *Daleiella triangularis* BOUČEK, *Healdianella ? krausei* (BOUČEK), *Microcheilinella bohemica* (BOUČEK) and other, as yet not strictly defined podocopid species (cf. BOUČEK, 1937). Beds that contain these ostracodes closely overlie the layers of dark-grey limestone concretions and grey to greyish-green tuffite and limestone with *Cyrtograptus murchisoni bohemicus* BOUČEK, *Aulacopleura konincki konincki* (BARRANDE), *Sphaerexochus* cf. *mirus* BEYRICH, *Staurocephalus murchisoni* BARRANDE, *Radnoria humillima* (BARRANDE), *Monograptus priodon* (BRONN) etc. The total thickness of the bed complex where this ostracode fauna occurs is 14—15 m, but the individual ostracode-bearing interlayers in tuffs are usually only several cm or dm thick. In agreement with BOUČEK (1937) I consider this ostracode assemblage as well distinguishable local ostracode biozone of the Wenlock age.

2) The assemblage with *Parahippa lodenicensis* is characterized by the following species: *Cytherellina* sp., *Orthocypris* sp., *Microcheilinella* sp. aff. *M. bohemica* (BOUČEK), *Parahippa lodenicensis* sp. n., *P. droseron* sp. n. and *Shiderelites bouceki*

sp. n. It occurs mainly in the wider area of Loděnice and Sedlec, in grey to dark-grey platy limestones and calcareous shales of the biozone with *Monograptus flexilis*, the assemblage of the species *Monograptus flexilis* ELLES, *Rhodonograptus asteriscus* POČTA, *Leonaspis* (*Leonaspis*) *roemeri* (BARRANDE), *Miraspis mira mira* (BARRANDE) and other, both trilobite and non-trilobite fauna. The thickness of limestone beds containing the above ostracode taxa varies between 6 to 10 m at the individual localities.

3) Ostracode assemblage with *Cystomatochilina elegans*, consisting of two species: *Cystomatochilina elegans* sp. n. and *Parahippa* aff. *lodenicensis* sp. n. The layers in which the two species occur are exposed at several localities between Praha and Loděnice, in the uppermost part of the Motol Member, formed of very fine brown-grey to greenish platy limestones and calcareous shales. These layers correspond either to the graptolite biozone with *Testograptus testis* or to the higher biozone with *Pristiograptus ludensis*. The ostracode species are accompanied by trilobites as *Scharyia wenlockiana* PŘIBYL, *Aulacopleura konincki konincki* (BARRANDE) and other benthic forms. The thickness of this presumed local ostracode biozone which probably terminates the complex of the Motol Member, ranges from 1.0 to 2.5 m.

It is remarkable that in both ostracode assemblages of the Wenlock age (1 and 2) several identical or very closely related species appear, which are characteristic of both the Bohemian and Anglo-Scandinavian regions, of Gotland in particular.

B) The Kopanina Formation, corresponding to the Ludlow of England. Up to the present six ostracode assemblages have been identified in this unit.

1) Assemblage with *Richina hornyi* and *Cytherellina kopaninensis* was recorded by the author of this paper as early as in 1960 (PŘIBYL, p. 163) but described in detail only in 1987. It occurs in tuffite interlayers and tuffaceous shales of the lower part of the Kopanina Formation, which correspond to the upper part of the graptolite biozone with *Lobograptus scanicus*. In these sediments *Cytherellina kopaninensis* PŘIBYL, *Richina hornyi* PŘIBYL, *Hemiaechminoides monstratus* sp. n., *Microcheilinella praeekolednikensis* PŘIBYL and *Cryptophyllus* aff. *copelandi* sp. n. occur.

Cytherellina cf. *siliqua* (JONES) and *Karlsteinella reticulata* BOUČEK are very likely of the same age, as they occur in identical beds, which are exposed in the "Amerika" quarry near Mořina and higher up pass into tuffaceous-calcareous shales and platy limestones. Broadly coeval seem to be grey platy-limestone beds with *Craspedobolbina* (*Artiocraspedon*) *morinensis* sp. n., which were exposed in the western part of the quarry near Mořina. *Ectoprimitia ? latilimbata* (PŘIBYL and ŠNAJDR) is also derived from these layers. In the horizon with "*Cromus*" *beaumonti* the reddish bioclastic crinoidal limestones near Kozolupy ("Kouřící" lom) yielded *Aitilia* cf. *jaanussoni* Sethi and *Cytherellina* cf. *siliqua* (JONES). Only additional finds of this ostracode assemblage at various localities in the south-eastern part of the Barrandian will show whether a separate local biozone is here concerned or only a local

facies-ecological occurrence limited to the tuffaceous-calcareous facies of the štejn-Suchomasty region.

2) In the Kosov quarry near Beroun - Králův Dvůr, close beneath the grap biozone with *Saetograptus linearis* a new species of the ostracode genus *A* (*A. kosoviana* sp. n.) has been found. This species, which is the oldest repre tive of this genus in the Silurian of Bohemia is here rather abundant in gr brown tuffaceous shales or tuff-calcareous platy limestones along with scarce of *Microcheilinella*. *Aitilia kosoviana* sp. n. is accompanied by a very rich brach assemblage with "*Encrinurus*" *transiens* (BARRANDE), suggesting an ecol dependence on niches. The thickness of this complex varies between 1.8 and 2

3) Graptolite biozone with *Saetograptus linearis* and the immediately ove beds in the wider area of Beroun are formed of light-grey platy to thick-b limestone bearing trilobites [e.g. with "*Cromus*" *beaumonti* (BARRANDE), *Met mene baylei* (BARRANDE).] and brachiopods [*Atrypoidea linguata* (BARRANDE), *ria megaera* (BARRANDE) etc] in which the ostracode taxa: *Richteria migrans* RANDE), *Rhomboentomozoe rhomboidea* (BARRANDE), *Vltavina perneri* BOUČE *Microcheilinella* sp. have also been collected. Shale beds containing the s *Bolbozoe* (*Parabolbozoe*) *bohemica* (BARRANDE), e.g. from the vicinity of S near Koněprusy, belong to a horizon with *Saetograptus linearis* or to upper biozone with *Pristiograptus longus*. The species *Richteria migrans* (BARR.) ha been found in the still higher graptolite biozone with *Neocucullograptus inex tus*, composed of dark calcareous shales, where the occurrence of *Richteria m* (BARR.) probably terminates. Since the stratigraphic range of this species latively great, occupying the extent of four graptolite biozones (*Lobograp* to *Neocucullograptus inexpectatus*) I do not consider it as an index species separate ostracode horizon (biozone), as originally thought by BOUČEK (1936b later by BOUČEK and PŘIBYL (1955), but as a species of a great vertical range, v the whole lower part of the Kopanina Formation. In essence, its stratigr distribution agrees with the extent of the trilobite horizon with "*Cromus*" *monti*. *Richteria migrans* (BARR.) has also been recorded from the Upper Si (Ludlow) of southern France, Sardinia, Thuringia, Kellerwald, and probably land (see HEDE, 1921). Therefore it will be more appropriate to designat ostracode assemblage mentioned above as a local biozone with *Vltavina perm*

3a) In the layers with *Neocucullograptus inexpectatus* (BOUČ.) and *Diacant* (*Acanthalomina*) *minuta* (BARR.) the ostracodes are very scarce. For the time only *Ziva havliceki* sp. n., *Richteria migrans* (BARR.) and a smooth podocopid men not determined precisely are known to occur in them.

4) The dark-grey platy limestones and calcareous shales with *Scharyia micr* (BARR.) and *Kosovopeltis svobodai* ŠNAJDR, which constitute the immediate of beds rich in trilobite *D.* (*Acanthalomina*) *minuta* (BARR.) and simultaneous basal layers of the trilobite horizon with *Ananaspis fecunda*, yielded an abu ostracode assemblage. BOUČEK and PŘIBYL (1955) designated it as the ostr

horizon with *Eurychilina* (recte *Kolednikella*) *inexspectata*. This statement was proved correct by additional finds of identical ostracodes in several exposures between Praha - Lochkov and Kosov hill. The following species of ostracodes have been found there: *Acanthoscapha ockeriensis* BLUMENSTENGEL, *Aechmina* cf. *subvexa* sp. n. *Aparchites* sp., *Cryptophyllus copelandi* sp. n. (very abundant), *Kolednikella inexspectata* (BOUČEK and PŘIBYL) (abundant), *Kloedenella* sp., *Eokloedenella perrara* sp. n., *Klonkina uninodosa* sp. n., *Kosoviellina silurica silurica* BOUČEK and PŘIBYL, *Parahippa rediviva* (BARRANDE) and several more, for the most part smooth podocopid taxa. Of brachiopods, the genus *Protoshaleria*, represented by a new species, is here very frequent. The thickness of this sequence varies, from place to place, between 3.5 and 6.0 m. Therefore, I denote the layers with this rich ostracode assemblage as the ostracode local-range biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

5) Above this biozone appears another, younger ostracode association, called by BOUČEK and PŘIBYL (1955) the ostracode horizon (or biozone) with *Microcheilinella kolednikensis* and *Bairdiocypris berounensis*. It contains very abundant *Acanthoscapha* cf. *ockeriensis* BLUMENSTENGEL, *Bairdiocypris berounensis* (BOUČEK and PŘIBYL), *Cryptophyllus* cf. *copelandi* sp. n., *Laccochilina* (*Laccochilina*) *reporyjensis* sp. n., *Microcheilinella kolednikensis kolednikensis* (BOUČEK and PŘIBYL), *M. kolednikensis globosa* subsp. n., *Moierina* cf. *simplex* ABUSHIK, *Orthocypris novaki* (BOUČEK and PŘIBYL) and *Parahippa rediviva* (BARRANDE) etc. The total thickness of this sequence of grey platy to massive light-grey, yellowish to brownish limestones of the trilobite horizon with *Ananaspis fecunda*, is about 3.5—5.0 m on Kosov Hill, and 2.4 to 3.0 m in the Koledník quarry near Beroun and at other localities. In addition to the species named above, several as yet unidentified podocopid taxa occur here. In this ostracode local-range biozone the species *L.* (*Laccochilina*) *reporyjensis* sp. n. has been identified in the "Na Požárech" quarry near Řeporyje and in equivalent layers of the "Kouřící" lom near Kozolupy.

6) Ostracodes of the genera *Acanthoscapha* [*A.* cf. *decurtata* (BOUČEK)] and *Parahippa* [*P. rediviva* (BARRANDE)] with several as yet unidentified podocopid species have been found in grey to dark-grey platy to massive limestones of the trilobite horizon with *Prionopeltis archiaci*. This horizon has been little explored.

C) The Přídolí Formation with three ostracode assemblages.

1) The oldest ostracode assemblage in the lower layers of the Přídolí Formation is the biozone with *Primitiella ? kolednikensis*, which corresponds to BOUČEK's horizon no. 4, from 1936b. It is an equivalent of the graptolite biozone with *Pseudomonoclimacis ? ultima* (= *Monograptus tumescens* in Bouček, 1936b). This very rich ostracode assemblage includes the following species: *Acanthoscapha decurtata* (BOUČEK), in places very frequent, *Aechmina subvexa* sp. n., *Aitilia insolita* sp. n., *Aparchites ? subcentralis* (BOUČEK), *Cryptophyllus butovicensis* sp. n., *Klonkina praecornigera* sp. n., *Kosoviellina silurica pusilla* subsp. n., *Krausella* sp. n., *K.* cf. *spinata*

KUMMEROW, *Parahippa rediviva* (BARRANDE), *Primitiella ? kolednikensis* BOUČEK (abundant), *Mirochilina jarovensis* BOUČEK (very abundant), *Ziva bohemica* (BOUČEK) and other species recorded by BOUČEK (1936b). *Acanthoscapha decurtata*, *Primitiella ? kolednikensis*, *Aechmina subvexa* and *Mirochilina jarovensis* are the most characteristic species of this lower ostracode assemblage of the Přídolí Formation.

According to the results of KRŮTA (1980) and my studies, the species *Mirochilina jarovensis*, *Parahippa rediviva* and *Ziva bohemica* pass from this basal biozone of the Přídolí Formation into its highest beds; it was evidenced by finds in the top layers of the graptolite biozone with *Colonograptus transgrediens* at two characteristic localities (on Klonk near Suchomasty and at the locality "U topolů" in the Radotín valley). *Primitiella ? kolednikensis*, *Klonkina praecornigera* and other taxa occur mainly in the wider area of Kosov and Koledník, whereas *Kolednikella insolita* and *Cryptophyllus butovicensis* derive from the Prague area, chiefly from the locality "Na butovickém hradišti" at Jinonice - Butovice, jointly with a number of species such as *Acanthoscapha decurtata*, *Pseudomonoclimacis ? ultima* etc.

2) A biostratigraphically younger ostracode association of the Přídolian in the "horizon" (or rather local-range biozone) with *Vltavina bohemica* (cf. BOUČEK, 1936b, p. 88), known thus far from the area between Praha - Lochkov and Karlštejn. It corresponds broadly to the graptolite biozone with *Monograptus perneri*, to the lower and middle parts of the biozone with *Colonograptus transgrediens*. In blackish-grey concretions and dark platy limestones, 6—8 m thick, several ostracode species as *Vltavina bohemica* BOUČEK, *Boucia ornatissima* (BOUČEK) and *Cypridina bohemica* BOUČEK have been discovered. The species *Bolbozoe* (*Bolbozoe*) *anomala* BARRANDE, *Herrmannina solitaria* (BARRANDE) and *Isochilina formosa* (BARRANDE) found by BARRANDE (1872) near Lochkov, Karlštejn and Praha - Podolí (= formerly Dvorce) probably also derive from the Přídolí Formation.

3) The C.Sc. thesis of KRŮTA (1980) was devoted to the study of ostracodes he found at the localities Klonk near Suchomasty and "U topolů" in the Radotín valley. The assemblage discussed included the species *Aparchites bouceki* KRŮTA MS sp. n., *Craspedobolbina* aff. *glabra* (HARPER), *Ziva bohemica* (BOUČEK), *Klonkina cornigera* KRŮTA, *Mirochilina jarovensis* BOUČEK, *Parahippa rediviva* (BARRANDE), *Tricornina navicula* BOUČEK and *Vania perdita* KRŮTA g. n. et sp. n. (MS). This assemblage is probably somewhat younger than the ostracode assemblage with *Vltavina bohemica* BOUČ., very likely the youngest in the upper Přídolian. It shows close relations to the lower Přídolian ostracode assemblage, as it comprises three species known thus far only from the lower Přídolí Formation, from the graptolite biozone with *Pseudomonoclimacis (?) ultima* (*M. jarovensis*, *P. rediviva* and *Z. bohemica*). In addition to these three species this youngest ostracode biozone with *Klonkina cornigera* yields five more species. Of them, *Tricornina navicula* BOUČ. was found already before by BOUČEK (1936b) in basal beds of the Lower Devonian (Lochkovian) in the ostracode biozone with *Acanthoscapha bohemica* and *Ulrichella remesi*.

With respect to that the species *Mirochilina**) *jarovensis* Bouč. is the characteristic ostracode of the entire Přídolian. I call it the index species of the superbiozone with *Mirochilina jarovensis*. Typical of this superbiozone are also *Parahippa rediviva* (Barr.) and *Ziva bohemica* (Bouč.). It would also be possible to consider this superbiozone as a separate biozone and the ostracode assemblages of the lower and upper Přídolí Formation as its subbiozones. The absence of *Mirochilina jarovensis* and *Ziva bohemica* in the ostracode assemblage with *Vltavina bohemica* was probably caused by different facies-ecological conditions during the deposition of the so-called "mixed shaly-graptolitic facies", in which ostracodes such as *Vltavina bohemica* Bouč., *Boucia ornatissima* (Bouč.), *Cypridina bohemica* Bouč. and other species occur. The "mixed facies" developed presumably in deeper parts of the sedimentary area of the Barrandian (Prague basin) than the relatively shallow-water sediments with ostracode assemblage no. 3 at Klonk and "U topolů" locality. These comparatively fine-grained dark-grey platy limestones usually form several cm to dm thick interbeds in uppermost layers of the Přídolí Formation, several metres in thickness. They agree essentially with the lower Přídolian platy limestones and shales containing fairly rich fauna of the biozone with *Primitiella ? kolednikensis*. The two ostracode assemblages of the lower and upper Přídolí Formation obviously lived in similar facies-ecological niches as vagrant benthos on a not very deep bottom of the Upper Silurian sea providing appropriate nutrient and environmental conditions.

From these findings it follows that during the Wenlock there existed very close relations and migrations between allied or even identical ostracode genera and species of the Bohemian assemblages and those of the Anglo-Scandinavian (e.g. England, Gotland) region and even the remote North American regions (e.g. Indiana, Maryland etc.). This relates, for instance, to the genera *Aitilia*, *Cytherellina*, *Parahippa*, *Shiderelites* etc. It is of interest that the Bohemian ostracode fauna of the biozone with *Daleiella triangularis* of the Motol Member (= Wenlock age) shows relationship with the contemporaneous podocopid ostracode fauna of England and Gotland, but the beyrichid taxa very frequent in both extra-Bohemian regions are almost absent from our country. Such migration processes were already suggested by Bouček (1936b, 1937). He assumed that these relations between the Bohemian and Anglo-Scandinavian regions had been interrupted by a barrier (which he did not define in more detail) as early as in the (probable late) Wenlock. However, the new finds of identical ostracode genera in the Kopanina Formation prove that the connection between the two regions still existed in the early Ludlow. The ostracode fauna of the Upper Silurian (Ludlow) of southern France, Sardinia

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*) Sethi (1979) recorded a species (not determined more precisely) of the genus *Mirochilina* (*M.* sp. a) from the Högklint d Beds of Gotland, Copeland (1977) mentioned another representative of *Mirochilina* (*M.?* sp.) from the Ludlow of NW Canada, and Jordan (1964, 1970) introduced *Mirochilina* sp. from the Upper Silurian of Thuringia.

and Thuringia is also very near to the lower Ludlow ostracode fauna of Bohemia (see identical or closely related genera such as *Bolbozoe* or *Richteria*), which is another evidence for the interchange of the ostracode and other invertebrate faunas between the regions just mentioned.

In Wenlock times central Bohemia was invaded first by the representatives of the genera *Bardiocypris*, *Cytherellina*, *Daleiella*, *Microcheilinella*, *Parahippa*, *Shiderelites* and other generic taxa, then *Cystomatochilina*, later (in Ludlow) *Briartina*, *Craspedobolbina* (*Artiocraspedon*), *Cryptophyllus*, *Eokloedenella*, *Hemiaechminoides*, *Laccochilina* (*Laccochilina*), *Richina* and further genera that are unknown to occur in the earlier beds of the Bohemian Silurian.

The Anglo-Scandinavian regions have no species in common with the Bohemian region in the Late Silurian, although there are many common genera in some areas. Only the species *Acanthoscapha ockeriensis* BLUMENSTENGEL found near Rudolfstadt and Beulwitz in the German Democratic Republic in the upper Ludlow has also been assessed in the Kopanina Formation of Bohemia. The ostracode assemblages of the upper Ludlow and the entire Přídolian show an altogether different character and composition in the Bohemian, British, North and East European regions, although the representatives of many genera [e.g. *Aitilia*, *Aparchites*, *Craspedobolbina* (*Articraspedon*), *Cryptophyllus*, *Microcheilinella*], which had appeared in Bohemia in the Wenlock and late Ludlow, were still in existence. In the late Ludlow (i.e. in the upper layers of the Kopanina Formation) appeared additional genera, so far unknown from extra-Bohemian regions, such as *Kolednikella*, *Klonkina*, *Kosovobolbina* and *Kosoviellina*, some of which also occur in the Přídolian of Bohemia. On the other hand, in the Upper Silurian of the North European, East European and British regions many genera predominate (e.g. *Beyrichia*, *Calcibeyrichia*, *Calcarobeyrichia*, *Frostiella*, *Juviella*, *Hemsiella*, *Leiocyamus*, *Londinia*, *Neobeyrichia*, *Nodibeyrichia*, *Octonaria*, *Orcofabella*, *Sleia*, *Signatopsis*, *Thlipsura*, *Venzavella*) which have not been found in the Upper Silurian of Bohemia. This also holds for the representatives of the genera *Anticostibolbina*, *Anticostiella*, *Bolbibollia*, *Bolbineossia*, *Combathella*, *Jupiterella*, *Libumella*, *Zygobolba*, *Zygobursa* etc. from the Silurian of North America, and for many beyrichid and podocopid genera found in the Silurian of Australia and Asia (Siberia, China etc.). The explanation why the specimens of the superfamily *Beyrichiacea* are so rare in Bohemia is still lacking; it may be surmised that their larvae had no possibility to penetrate into this area.

In the Silurian some faunal palaeoprovinces are known which are separated by the various geographic, physical, and environmental palaeo-ecological barriers. I suppose that the dissimilarity in the generic composition of two different ostracode faunas in the late Upper Silurian of Bohemia and Baltic-British areas is not due to differences in environment, but rather to some sort of geographic and physical barriers between them. They may be either of dry land or a deep water marine type, together with lithofacies barrier. A geographic barrier created by a deep water trough can be traversed by most species of ostracodes (in our case by beyrichiacean species) only in the larval

stages, but the duration of the larval stages is too short (only several days or even weeks) to surmount necessary distance while drifting in sea currents. No cosmopolitan guide species are found among Silurian ostracodes.

The members of the superfamily *Leperditiacea*, which are very significant ostracodes for the extra-Bohemian regions (they are known almost in the entire Palaeozoic of Europe, North America, Asia and Australia) are also very scarce in the Upper Silurian of Bohemia. Up to now, only three species (*Briartina ? rarissima*, *Herrmannina solitaria* and *Isochilina formosa*) have been found in the Ludlow and Přídolian of the Barrandian basin.

These considerable differences in the composition of ostracode faunas of the Bohemian and extra-Bohemian regions during the late Ludlow and particularly throughout the Přídolian were caused most probably by different facies-ecological conditions of the palaeobiotopes of two differing subprovinces belonging to two palaeozooprovinces: the Pacific-Mediterranean including central Bohemia, and the Northern palaeozooprovince with Anglo-Scandinavian and North American regions. The representatives of the genera *Acanthoscapha* and *Tricornina* from the upper Ludlow of north-western Canada (COPELAND 1977) probably lived in analogous facies-ecological conditions (in thermophilous niches), as they show some relationships to the ostracode fauna of central Bohemia. The genus *Acanthoscapha* is localy fairly frequent in the Upper Silurian of Bohemia, being represented by two species: *A. ockeriensis* BLUM. and *A. decurtata* (BOUČ.). The genus *Tricornina* is represented by an only species, i.e. *T. navicula* BOUČ., occurring rarely in the uppermost layers of the Upper Silurian. It is relatively abundant later, in the Lower Devonian (Lochkovian) where *Acanthoscapha bohemica* (BOUČ.) has also been found. These finds indicate that the migration of these two genera in the Ludlow proceeded from the north-western area of the Northern palaeozooprovince (across NW Canada) into central Bohemia and not in opposite direction. Several related genera (e.g. *Cryptophyllus*, *Cystomatochilina*, *Cytherellina*, *Daleiella*, *Eukloedenella*, *Microcheilinella*, *Moierina*, *Richina*) indicate that there existed certain, although indirect relations between the Bohemian and Ukrainian (Podolian) regions, and mainly the eastern part of the Siberian platform in Ludlow time (ABUSHIK 1960). On the contrary, the Přídolian ostracode fauna of the southern Tien-Shan differs appreciably from that of the Přídolian of Bohemia (cf. MICHAJLOVA 1981), although they contain several genera in common which, however, have a worldwide distribution.

The Pacific-Mediterranean palaeozooprovince is also characterized by the occurrence of "*Cromus*" *beaumonti* and related taxa, of a rich invertebrate fauna, chiefly brachiopods, cephalopods, gastropods, pelecypods, trilobites and ostracodes with relatively frequent species *Richteria migrans* have been found. Tuffaceous and calcareous beds of the lower Upper Silurian, deposited in the rather shallow parts of central Bohemia (Prague basin), not very far from the shore but out of reach of the surf and waves contain a relatively rich ostracode fauna in places. Ostracodes occur in calcareous shaly mudstones but mainly in platy limestones of the so-called "Mixed shelly-graptolitic facies",

and locally in masive limestones of the Kopanina Formation. Their dependence on lithofacies was considerable. They are altogether absent from the graptolite black- and black-grey shales of the Bohemian Silurian.

Conclusion

The ostracode assemblages assessed in the Liteň, Kopanina and Přídolí Formations of central Bohemia often constitute regional horizons or biozones. For the time being twelve local-range biozones have been distinguished, which are here correlated with the approximately contemporaneous graptolite biozones of the Bohemian Middle and Upper Silurian, and thus with the extra-Bohemian Silurian beds of approximately the same age. Besides seventy-four Silurian species and subspecies here described, five other species [*Aparchites bouceki*, *Craspedobolbina* (*Artiocraspeden*) aff. *C. glabra*, *Klonkina cornigera*, *Tricornina navicula* and *Vania perdita*] have been identified in the uppermost Silurian (e.g. at the Klonk locality near Suchomasty), which were described and figured by KRŮTA (in 1980, 1986). The ostracode species and subspecies determined so far in the Silurian of Bohemia number seventy-nine. They occur in twelve well recognizable ostracode assemblages classed with twelve Bohemian local-range ostracode biozones.

K tisku doporučil I. Pek

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Explanation of plates

(Most of the figured specimens were lightly coated with NH_4Cl before being photographed. Abbrev. NM-L 00 000 = collections of the Department of Palaeontology of the National Museum (Natural History) in Praha (Prague); AP-SV-0000 types from the author's collection, which have been later deposited in the collections of the Geological Survey, Prague. All photographs by the author.

Pl. I

1. *Isochilina formosa* (BARRANDE). Right valve in lateral view. Internal mould with the remnants of the lateral surface of valve. Type specimen (holotype) figured by BARRANDE (1872) on pl. 23, figs. 22 – 25 and on pl. 34, figs. 1 – 3. (NM-L 23657, ČE 1197, Inv. No. 1694). × 3.8. Praha 4 - Podolí (formerly Dvorce quarry, today the swimming pool). Upper layers of the Přídolí Formation.
2. *Briartina ? rarissima* (BARRANDE). Left valve in lateral view. Internal mould. Type specimen (holotype) figured by BARRANDE (1872) on pl. 27, fig. 21. (NM-L 23659, ČE 1198). × 4.6. Kosoř near Radotín, exact locality unknown. Upper lower beds of the Kopanina Formation, horizon with "*Cromus*" *beaumonti*.

Pl. II

1 – 4. *Herrmannina solitaria* (BARRANDE). Left, right, dorsal and ventral views of a carapace. Holotype figured by BARRANDE (1872) on pl. 23, figs. 1 – 5 and on pl. 34, figs. 14 – 17. (NM-L 23656, ČE 1195, Inv. No. 1699). × 4.4. Karlštejn (= Budňany), exact locality unknown. Upper layers of the Přídolí Formation.
5 – 6. *Orthocypris novaki* (BOUČEK and PŘIBYL). Left and dorsal views of a carapace. The specimen figured by BOUČEK and PŘIBYL (1955) on pl. 5, figs. 15 and 17. (NM-L 23 725). × 47. Kolednik quarry near Beroun - Jarov. Kopanina Formation, Ananaspis fecunda Horizon.
7. *Cytherellina* sp. Lateral view of left valve of a carapace. (AP-SV-62). × 44. Kolednik quarry near Beroun - Jarov. Kopanina Formation, *Ananaspis fecunda* Horizon.

Pl. III

1, 2. *Aitilia kosoviana* sp. n. l. Left heteromorphic valve in lateral view. Internal mould. Holotype. (AP-SV-01). × 40. 2. Left tecnomorphic valve in lateral view. Paratype, internal mould. (AP-SV-02). × 43. Kosov quarry near Beroun. Kopanina Formation, underlying beds of the Saetograptus linearis Biozone.
3. *Aitilia* cf. *kosoviana* sp. n. Right valve in lateral view. Internal mould. (AP-SV-03). × 40. Kosov quarry. Ibidem as figs. 1, 2.
4. *Kosoviellina silurica silurica* BOUČEK and PŘIBYL. Left tecnomorphic valve in lateral view. Internal mould. (AP-SV-63). Kosov quarry near Beroun. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus cope'andi Biozone.

5. *Kolednikella inexspectata* (BOUČEK and PŘIBYL). Right heteromorphic valve in lateral view. Holotype of invalid species "*Beyrichis*" *inusitata* BOUČ. and PŘIB. figured by BOUČEK and PŘIBYL (1955) on pl. 1, fig. 8 and pl. 3, fig. 4. Internal mould. (NM-L 23748). × 32. Kosov quarry near Beroun. Kopanina Formation, ibidem.

6, 7. *Kosovobolbina* sp. Two left valves in lateral view. Internal mould. (AP-SV-45a). 6. × 31; 7. × 33. Praha - Jinonice (Butovice), Pseudomonoclimacis ? ultima Biozone, lower beds of the Přídolí Formation.

8. *Kosoviellina silurica pusilla* subsp. n. Left valve in lateral view. Internal mould. Holotype. (AP-SV-64). × 60. Kosov quarry. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

Pl. IV

1–3, 6. *Cystomatochilina elegans* sp. n. Two left heteromorphic valves (1, 2), one right tecnomorphic valve (3), and one immature valve (6) in lateral views. 1. Paratype. (AP-SV-67). × 44.2. Holotype (AP-SV-66). × 40. 3. Paratype (AP-SV-68). × 40. 6. Paratype (AP-SV-69/1). × 32. 1–3. Praha - Malá Chuchle (Vyskočilaka locality). 6. Praha - Velká Chuchle. Uppermost layers of the Motol Member (Liteň Formation) – Upper Wenlock.

4, 5. *Klonkina uninodosa* sp. n. Left valve in lateral view. Holotype (AP-SV-65). 4. × 88.5. The same valve in oblique lateral view. × 85. Kosov quarry. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

7. *Kolednikella* sp., aff. *K. inexspectata* (BOUČ. and PŘIB.). Left tecnomorphic valve in lateral view. Internal mould (AP-SV-22). × 40. The specimen was lost. Kosov quarry near Beroun. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

Pl. V

1, 3. *Laccochilina* (*Laccochilina*) *reporyjensis* sp. n. 1. Left tecnomorphic valve in lateral view. Holotype (AP-SV-07). × 50. Praha - Řeporyje, "Na Požárech" quarry. Ananaspis fecunda Horizon. 3. Right tecnomorphic valve in lateral view. Paratype (AP-SV-18). × 30. "Kouřící" lom ("Smoky" quarry) near Kozolupy. All Kopanina Formation, Ananaspis fecunda Horizon.

2. *Laccochilina* (*Laccochilina*) sp., aff. *L.* (*L.*) *reporyjensis* sp. n. Left tecnomorphic valve in lateral view. Internal mould (AP-SV-45d). × 35. Praha - Jinonice, "Na butovickém hradišti" locality. Lower beds of the Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

4. *Kolednikella* sp., aff. *K. inexspectata* (BOUČ. and PŘIB.). Right tecnomorphic valve in lateral view. Internal mould (AP-SV-23). × 39. Kosov quarry near Beroun. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.

5–7. *Craspedobolbina* (*Artiocraspedon*) *morinensis* sp. n. Three tecnomorphic valves in lateral views. 5. Left valve. Paratype (AP-SV-11). × 50. 6. Right valve. Holotype (AP-SV-12). × 49. 7. Right valve, external mould. Paratype (AP-SV-13). × 48. "Amerika" quarry near Mořina. Kopanina Formation, Lobograptus scanicus Biozone.

8. *Kosoviellina silurica pusilla* subsp. n. Right valve in lateral view. Internal mould (AP-SV-28). × 60. Kosov quarry near Beroun. Přídolí Formation, biozone with *Pseudomonoclimacis ? ultima*.

Pl. VI

1. *Kolednikella insolita* sp. n. Right heteromorphic valve in lateral view. Holotype (AP-SV-45c). × 41. Praha -Jinonice, "Na butovickém hradišti" locality. Upper layers of Pseudomonoclimacis ? ultima Biozone, Přídolí Formation, together with *Cryptophyllus butovicensis*.

2, 3. *Kolednikella inexspectata* (BOUČ. and PŘIB.). One right heteromorphic valve and one right tecnomorphic valve in lateral views. Two syntypes (AP-SV-46 and 47). 2. × 39; 3. × 40. Kosov quarry near Beroun. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone.

4–7. *Kosovobolbina inflata* (BOUČ. and PŘIB.). Three right and one left lateral views of four tecnomorphic valves. 4. (AP-SV-81). × 37. 5. (AP-SV-80). × 34. 6. (AP-SV-75). × 35, and 7. (AP-SV-76). × 38. Kosov quarry near Beroun. Kopanina Formation, ibidem biozone as figs. 2, 3.

8. *Kloedenella* ? sp. Right valve in lateral view (AP-SV-42). × 36. Kosov quarry near Beroun. Kopanina Formation, ibidem biozone as figs. 2, 3.

Pl. VII

1. *Aitilia* cf. *jaanussoni* SETHI. Right tecnomorphic valve in lateral view (AP-SV-29). × 43, "Kouřící" lom ("Smoky" quarry) near Kozolupy. Lower layers of the Kopanina Formation. "Cromus" beaumonti Horizon.
2. *Boucia ornatissima* (BOUČEK). Left valve in lateral view (AP-SV-16). × 28. The small quarry lying on the contact of the Daleje and Nová Ves valleys near Praha - Klukovice. Middle layers of the Přídolí Formation.
3. *Ostracode* gen. and sp. undet. B. Right valve in lateral view. Internal mould (AP-SV-20). × 46. Kosov quarry near Beroun. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone.
4. *Mirochilina jarovensis* BOUČEK. Left valve in lateral view; well preserved specimen (AP-SV-18). × 66. Kosov quarry near Beroun. Lower beds of the Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

5, 6. *Neokloedenella polenovae* sp. n. One left (6) and one right (6) lateral views of two specimens 5. Paratype (AP-SV-41). × 37. 6. Holotype (AP-SV-49). × 36. "Kouřící" lom near Kozolupy. Kopanina Formation, Ananaspis fecunda Horizon.

7. *Krausella* sp. n. (?). Left valve in lateral view. Internal mould (AP-SV-30). × 30. Kosov quarry. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*.
8. *Aechmina* cf. *subvexa* sp. n. Left valve in lateral view. Paratype (AP-SV-59). × 30. Kosov quarry. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.

Pl. VIII

1, 4. *Parahippa droseron* sp. n. 1. Right valve in lateral view. Holotype (AP-SV-77). × 45. 4. Right valve in lateral view. Paratype (AP-SV-78). × 26. Loděnice near Beroun, Černidla hill. Motol Member, Liteň Formation, Monograptus flexilis Biozone.

2, 3, 5, 7. *Parahippa lodenicensis* (BOUČ. and PŘIB. MS) sp. n. One right (2) and three left (3, 5, 7) lateral views of four valves. 2. Holotype (AP-SV-71). × 35. 3. Paratype (AP-SV-72). × 36. 5. Paratype (AP-SV-74). × 47. 7. Ibid. as fig. 5 (AP-SV-74). × 35. All Loděnice near Beroun, Černidla hill. Motol Member, Liteň Formation, Monograptus flexilis Biozone.

6, 8. *Parahippa rediviva* (BARRANDE). 6. Right valve in lateral view (AP-SV-33). × 47. 8. The same valve. × 38. Kosov quarry near Beroun. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone.

Pl. IX

1. *Acanthoscapha ockeriensis* BLUMENSTENGEL. Left valve in lateral view (NM-L 23744). × 73. This specimen was figured by BOUČEK and PŘIBYL (1955) on pl. 3, fig. 11, as *Alanella decurtata* BOUČ. Kosov quarry. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone.
2. *Shiderelites typus* MORRIS and HILL. Left lateral view of a carapace. Topotype (AP-SV-40). × 50. Hartsville locality, Indiana (USA), Waldron Shale, Middle Silurian.
3. *Shiderelites bouceki* sp. n. Left lateral view of a valve. Holotype, internal mould (AP-SV-39). × 49. Loděnice near Beroun, Černidla hill. Motol Member, Liteň Formation, Monograptus flexilis Biozone.

4. *Orthocypris* sp. Left lateral view of a carapace (AP-SV-34). × 55. Koledník quarry near Beroun. Kopanina Formation, Ananaspis fecunda Horizon.
5–8. *Samarella jarovensis* sp. n. Ventral (5), dorsal (6), left (7) and right (8) lateral views of a carapace. Holotype (NM-L 23738). × 47. Koledník quarry near Beroun. Kopanina Formation, Ananaspis fecunda Horizon.

Pl. X

1–3. *Microcheilinella kolednikensis globosa* subsp. n. Left, dorsal, and anterior views of a carapace. Holotype (NM-L 23739). × 38. Koledník quarry near Beroun. Kopanina Formation, ibid. horizon as pl. IX, figs. 5–8.
4–6. *Hemiaechminoides monstratus* sp. n. Left, dorsal, and right views of a carapace. Holotype (NM-L 23745). × 79. Podskalský mlýn (mill) near Tmáň. Lower layers of the Kopanina Formation, Lobograptus scanicus Biozone.
7, 8 *Cytherellina* cf. *siliqua* (JONES). Right and left lateral views of a carapace (NM-L 23746). × 23. Old abandoned "Amerika" quarry near Mořina. Lower layers of the Kopanina Formation, Lobograptus scanicus Biozone.

Pl. XI

1–3. *Batrdiocypris berounensis* (BOUČ. and PŘIB.). Left, dorsal, and ventral views of a carapace. Paratype (NM-L 23728). × 48. This carapace was figured by BOUČEK and PŘIBYL (1955) on pl. 4, figs. 1 and 2. Koledník quarry near Beroun. Kopanina Formation, horizon with *Ananaspis fecunda* (= ostracode biozone with *Microcheilinella kolednikensis*).
4. *Cryptophyllus butovicensis* sp. n. Right lateral view of a valve. Holotype (AP-SV-45e). × 35. Praha - Jinonice (Butovice), "Na butovickém hradišti" locality. Přídolí Formation, upper layers of the Pseudomonoclimacis ? ultima Biozone.
5. *Cryptophyllus copelandi* sp. n. Right lateral view of a valve. Paratype (AP-SV-52). × 24. Kosov quarry near Beroun. Kopanina Formation, Kolednikella inexspectata and Cryptophyllus copelandi Biozone.
6. *Cryptophyllus* cf. *copelandi* sp. n. Left lateral view of a valve (AP-SV-51). × 16. Kosov quarry, ibidem as fig. 5.

Pl. XII

1. *Microcheilinella praekolednikensis* PŘIBYL. Many well preserved carapaces (B 513-549 = NM-L 23 740). × 14. Podskalský (Štětecký) mlýn (mill) near Tmáň. Lower layers of the Kopanina Formation, Lobograptus scanicus Biozone.
2. *Aechmina subvexa* sp. n. Left valve in lateral view. Paratype (AP-SV-55), internal mould. × 69. Kosov quarry near Beroun. Přídolí Formation, Pseudomonoclimacis ? ultima Biozone.
3. *Craspedobolbina* (*Artiocraspedon*) *morinensis* sp. n. Right valve in lateral view (AP-SV-14). × 52. "Amerika" quarry near Mořina. Lower layers of the Kopanina Formation, Lobograptus scanicus Biozone.
4. *Kosoviellina silurica silurica* BOUČ. and PŘIB. The impression of left valve in lateral view (AP-SV-19). × 76. Kopanina Formation, biozone with *Kolednikella inexspectata* and *Cryptophyllus copelandi*. Kosov quarry near Beroun.
5. *Cryptophyllus copelandi* sp. n. Left lateral view of a valve. Paratype (AP-SV-53). × 18. Kosov quarry near Beroun. Kopanina Formation, biozone with *Kolednikella inexspectata* etc.

Ostrakodi středočeského siluru

(*Résumé anglického textu*)

Alois Přibyl

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V předložené studii je popsáno 74 ostrakodových taxonů náležejících 47 rodům ze 6 řádů, z nichž 3 rody (*Kolednikella*, *Kosovobolbina* a *Admirabilinella*), 1 podrod [*Bolbozoe* (*Parabolbozoe*)] a 25 druhů a subspecií je zcela nových. Současně byly zmíněny výskyty dalších 5 druhů, takže bylo v českém siluru zjištěno 79 ostrakodů pocházejících z liteňského, kopaninského a přídolského souvrství. Tyto ostrakodové taxony byly podrobně srovnány s podobnými nebo blízce příbuznými rody a druhy z mimočeských oblastí a současně byly sledovány vzájemné migrační vztahy mezi středočeskou silurskou oblastí a stejně starými oblastmi britsko-skandinávskými, východoevropskými, severoamerickými i asijskými. Mnoho zde nově zjištěných rodových taxonů pochází ponejvíce z britsko-skandinávské (gotlandské) oblasti, jak dokazuje řada společných rodů, dříve zjištěných jen v anglickém nebo gotlandském siluru. Rovněž byly prokázány vzájemné migrační vztahy mezi českou a severoamerickou silurskou oblastí (např. Indianou, Marylandem aj.), doložené rody *Acanthoscapha*, *Hemiaechminoides* a *Shiderelites*. Naproti tomu ostrakodová fauna nejvyššího kopaninu a přídolu je již zcela odlišná od stejně staré ostrakodové fauny všech výše zmíněných mimočeských oblastí. Vyskytuje se zde ještě několik společných rodů známých ze spodních vrstev českého siluru, ale i z oblastí cizích, k nimž přistupují mnohé rody nové [např. *Karlsteinella*, *Kolednikella*, *Kosovobolbina*, *Vania*, *Vltavina* a další], z mimočeských silurských oblastí zatím neznámé. Naproti tomu převážná většina druhů je zcela odlišná; výjimku tvoří pouze několik shodných nebo velmi blízce příbuzných druhů rodů (*Cytherellina*, *Bairdiocypris*, *Daleiella* a *Microcheilinella*), nalezených ve vrstvách motolských.

Velmi zajímavé jsou výskyty několika beyrichiidních a eurychillinidních rodů (např. *Aitilia*, *Craspedobolbina*, *Cystomatochilina* a dalších), zjištěných v českém wenlocku a spodním ludlowu, které jsou u nás poměrně vzácné, ale v mimočeském, především v anglo-gotlandském siluru jsou velmi hojné. Na základě několika charakteristických ostrakodových společenstev, které se od sebe značně liší, bylo vymezeno 12 lokálních ostrakodových biozón, zjištěných v motolských, kopaninských a přídolských vrstvách. Tyto ostrakodové biozóny byly korelovány s přibližně stejně starými graptolitovými biozónami. Tímto zjištěním byla poněkud rozhojněna

biostratigrafická tabulka českého siluru, takže dnes můžeme navzájem korelovat české graptolitové biozóny s obzory či biozónami trilobitovými a ostrakodovými.

Diagnostické znaky nově utvořených rodů a druhů, včetně lokalitních údajů, jsou uvedeny v anglické části práce.

Остракоды силура средней Чехии

В представленной статье описаны 74 таксона остракод, относящихся к 47 родам из 6 отрядов, из числа которых 3 рода, 1 подрод, 25 видов и подвидов являются совсем новыми. Одновременно упомянуты местонахождения дальнейших 5 видов, относящихся к наиболее верхним слоям силура Чехии, так что в настоящее время известно 79 видов остракод, установленных в литеньской, конанинской и пршидольской свитах. Эти остракоды происходят из области между городами Прагой и Бероуном. Одновременно проведено сравнение с подобными, нередко близкородственными родами и видами, установленными в силурийских областях вне Чехии, и прослежены их миграционные взаимоотношения в период между средним и верхним силуром.

До сих пор в силуре средней Чехии установлено 12 сообществ остракод, представляющих собой 12 местных остракодовых биозон, определенных на основании характеристических сообществ остракод, найденных на силурийских местонахождениях в Баррандиене (между городами Прагой и Бероуном). Эти местные остракодовые биозоны сопоставлены одновременно с граптолитовыми биозонами, определенными в силуре Чехии. Преобладающее большинство упомянутых остракодовых биозон было уже раньше определено Боучеком и Пршибылом (Boučeк 1936b, 1937; Boučeк – Přibyl 1955; Přibyl 1960), а теперь было подтверждено их биостратиграфическое значение.

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