

Pliensbachian ostracod fauna from condensed limestones of the Bakony Mts. (Transdanubian Central Range, Hungary)

by

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Abstract: This work contains the description and paleoecological evaluation of ostracoda fauna from some condensed limestone sections of the Bakony Mts., Transdanubian Central Range, Hungary. From 17 species determined in this fauna 10 are new species or subspecies. Further 7 species are well known from the epicontinental European seas. The material of 10 more species is not suitable for their description and correct determination. The distribution of specimens shows, that the most frequent species have Inner Tethyan origin and they are descendants of local Triassic forms. During the submersion of the Late Triassic carbonate platforms in the Early Jurassic some of their characteristic faunal elements could survive on the seamounts (e. g. some ornate Bairdiidae). The sediments were accumulated on or around the seamounts mainly below the sublittoral zone and the seamount forms were mixed with the basin forms.

INTRODUCTION

In the literature of the Jurassic ostracods we have a lot of works about the fauna of epicontinental seas, on the other hand, there are only a few works about the true "Tethys-forms", (FARINACCI et al. 1979, LORD 1988, LORD & BOOMER 1990, LORD & LAMBOURNE 1991).

The new method of preparation by concentrated acetic acid made possible extracting carbonate microfossils from hard limestones and marls (LETHIERS & CRASQUIN-SOLEAU 1988).

In the Transdanubian Central Range the most important Jurassic formations are limestones and marls, sometimes in reduced and condensed sections. Because of the condensation the specimen number of the macro- and microfauna is higher than in a normal deep-water sediment. We have chosen some Pliensbachian beds from these condensed sequences to investigate their microfauna. The first result of this work is the paper about Pliensbachian foraminifers from Szentgál (GÖRÖG 1995).

LOCALITIES

The samples were collected from the following sections of the Bakony Mts:

1. Szentgál, Tüzköves Hill (Fig. 1) and Gombáspuszta,
2. Hárskút, Közöskút-Ravine (Fig. 2),
3. Kericsér Hill (Fig. 3)
4. Hamuháza (Fig. 4)

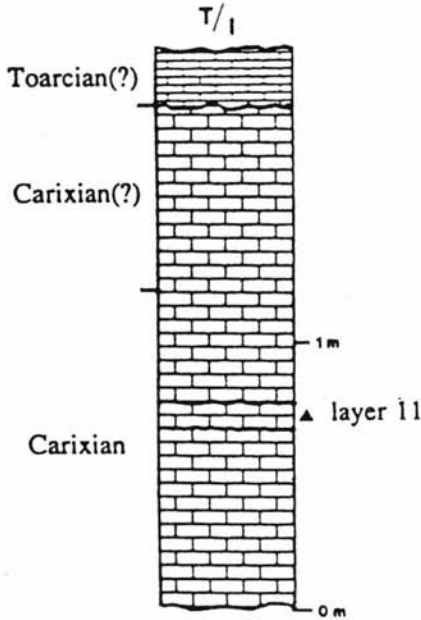


Fig. 1. Lithological profile of the Szentgál, Tüzköves-Hill section (after GÖRÖG, 1995)

1. The investigated sample of Szentgál, Tüzköves-Hill (T/I, layer N° 11) is the same from which GÖRÖG (1995) has published the foraminifera fauna. This bed is Carixian in age, and consists of thin-bedded, brownish-red "ammonitico rosso" limestones with rich macrofauna (ammonites, brachiopoda, bivalves) often bearing ferromanganese encrusting. The Gombás-puszta material is obtained also from Carixian limestone.

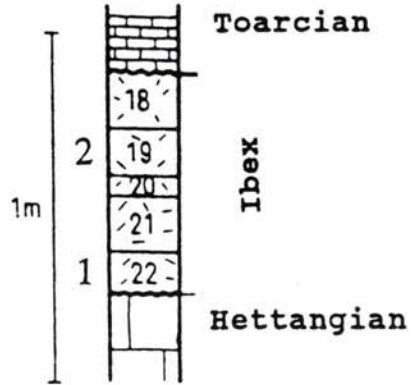


Fig. 2. Lithological profile of the Hárskút, Közöskút-Ravine section (after GÉCZY, 1976) 1, 2 = samples

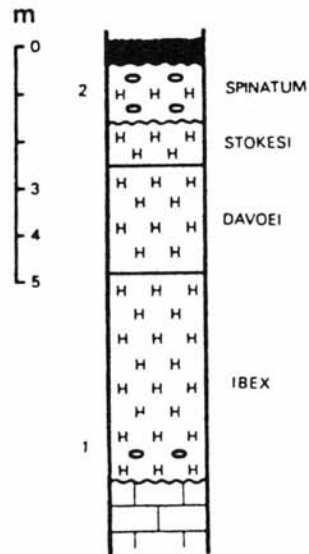


Fig. 3. Lithological profile of the Kericsér-section (after VÖRÖS, 1983). 1, 2 = samples

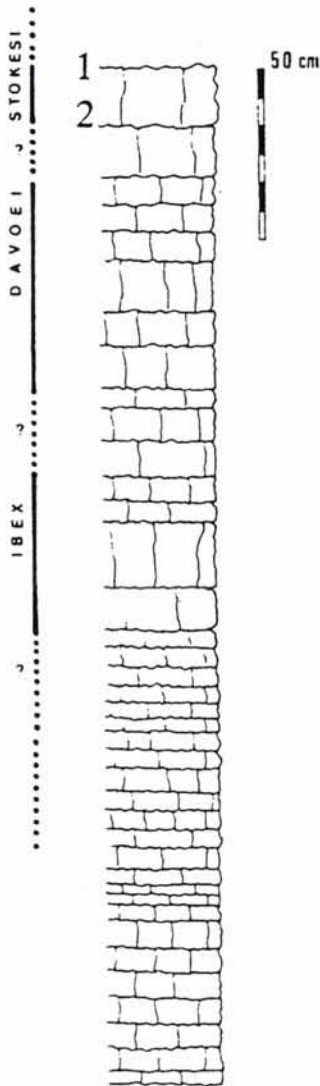


Fig. 4. Lithological profile of the Hamuháza section (after GÉCZY, 1983)
1, 2 = samples

2. The Carixian (Ibex Zone) pink limestone with manganese nodules has a "Hierlatz character" according to GÉCZY (1976). In the opinion of VÖRÖS (1983) this is not "Hierlatzkalk" but red ferro-manganiferous biomicrite. Its macrofauna contains ammonites, brachiopods, crinoids and corals. The very thin Carixian limestone rests on the Earliest Jurassic (Hettangian) limestone and is covered by Toarcian beds.

3. According to GÉCZY (1971) the Kericser section contains two "ammonitico rosso limestone" parts: a lower one in the Ibex zone (Carixian) and an upper one in the Spinatum zone (Domerian). In the view of VÖRÖS (1983) the whole Pliensbachian section is a "Hierlatz-type" limestone. The "lower red limestone" contains in its macrofauna ammonites, nautiloids, belemnitoids, brachiopods, crinoids, bivalves, gastropods. The "upper red limestone" (Domerian) contains ammonites, brachiopods, crinoids, siliceous sponges

4. The upper part of the Hamuháza section (Domerian, Stokesi zone) composed of "ammonitico rosso limestone" with ammonites, bivalves, gastropods, brachiopods, crinoids (GÉCZY, 1983).

The elaboration of the microfauna, especially the ostracods and bivalves (*Bositra*), have been financially supported by the Hungarian National Research Fund (OTKA) project No. T 4431 of J. SZABÓ.

SYSTEMATICAL PART

Classis OSTRACODA Latreille, 1806

Ordo *Myodocopida* Sars, 1866

Subordo **Cladocopa** Sars, 1866

Familia ***Polycopidae*** Sars, 1866

Genus *Polycope* G. O. Sars, 1866

Polycope sp.

(Pl. I: 1)

Remarks: The specimens are generally smooth molts without distinct species character ("*Polycope pelta*" auct.).

Dimensions: L = 0,37 - 0,56.

Material: 72 specimens.

Ordo *Podocopida* G. W. Müller, 1894

Subordo **Metacopa** Sylvester-Bradley, 1967

Superfamilia Healdiacea Harlton, 1933

Familia ***Healidae*** Harlton, 1933

Genus *Ledahia* Gründel, 1964

Ledahia bispinosa (Gründel, 1964)

(Pl. I: 2)

1964. *Pseudohealdia? bispinosa* n. sp. - GRÜNDEL, pp. 472-473, Pl. f. 13-15.

1975. *Ogmoconchella bispinosa* (Gründel, 1964) - MICHELSEN, p. 243, Pl. 31., f. 455., Pl. 33., f. 472-475.

1980. *Ogmoconchella bispinosa* (Gründel, 1964) - SIVHED, pp. 54-55, Pl. IX., f. 87., Pl. X., f. 94, 97.

1981. *Ogmoconchella bispinosa* (Gründel, 1964) - HERRIG, pp. 564-565, Pl. I., f. 3-5.

1993. *Ledahia bispinosa* (Gründel, 1964) - HARLOFF, pp. 122-124, Pl. 11., f. 7-8.

1994. *Ledahia bispinosa* (Gründel, 1964) - HARLOFF & JÄGER, 1994, p. 36., Pl. 7., f. 7.

Remarks: This material contains elongated forms without distinct break on dorsal outline.

Dimensions: L = 0.55 - 0.58 mm, H = 0.27 - 0.35 mm, L/H = 1.66 - 2.11

Material: 6 specimens.

Stratigraphical and geographical distribution: Sinemurian-Pliensbachian, Germany, England, France, Denmark, Sweden.

Genus *Ogmoconcha* Triebel, 1941

Ogmoconcha amalthei (Quenstedt, 1858)
(Pl. I: 3-4)

1858. *Cypris amalthei* n. sp. - QUENSTENDT, p. 164., 200., Pl. 24., f. 37a.
1959. "*Ogmoconcha*" *amalthei* (Quenstedt) - APOSTOLESCU, p. 805., Pl. I., f. 12-13.
1975. *Ogmoconcha amalthei amalthei* (Quenstedt, 1858) - MICHELSEN, pp. 225-227, Pl. 25., f. 391-394., Pl. 26., f. 397-399.
1975. *Ogmoconcha amalthei* form A - MICHELSEN, pp. 228-229., Pl. 27., f. 409-413., Pl. 28., f. 417-418.
1980. *Ogmoconcha amalthei amalthei* (Quenstedt, 1858) - SIVHED, p. 53-54., Pl. IX., f. 86., 89., 91.
1981. *Ogmoconcha amalthei amalthei* (Quenstedt, 1858) - HERRIG, p. 208., Pl. I., f. 1-8.
1981. *Ogmoconcha amalthei forma A* Michelsen, 1975 - HERRIG, pp. 208-209., Pl. II., f. 3-4.
non 1985. *Ogmoconcha amalthei* (Quenstedt, 1856) - RIEGRAF, pp. 72-73., Pl. 1., f. 20.
1993. *Ogmoconcha (Ogmoconcha) amalthei* (Quenstedt, 1858) - HARLOFF, pp. 132-136., Pl. 8., f. 9-12., Pl. 9., f. 2-7.
1993. *Ogmoconcha* form A Michelsen, 1975 - HARLOFF, pp. 136-137., Pl. 9., f. 8-10.
1994. *Ogmoconcha amalthei* (Quenstedt, 1858) - HARLOFF & JÄGER, pp. 36-37., Pl. 7., f. 11.

Remarks: The material contains forms both of the nominat subspecies and the Michelsen's forma A with transitions.

Dimensions: L = 0.75 - 1.06 mm, H = 0.5 - 0.77 mm, L/H = 1.38 - 1.56, (juv.: L = 0.46 mm, H = 0.31 mm, L/H = 1.48)

Material: 7 specimens

Stratigraphical and geographical distribution: Sinemurian - L. Toarcian, Germany, France, Denmark, Sweden.

Ogmoconcha sp.
(Pl. I: 5)

Remark: The form is less "triangular", the left valve is more oval.

Dimensions: L = 0.77 mm, H = 0.51 mm, L/H = 1.51

Material: 8 specimens.

Genus *Ogmoconchella* Gründel, 1964

Ogmoconchella ? spp.

Remarks: Elongated oval forms similar to several species of this genera.

Material: 4 specimens.

Genus *Pseudohealdia* Gründel, 1964

Pseudohealdia acuticauda sp. n.

(Pl. I: 6)

Derivatio nominis: After its acute posterior end.

Locus typicus: Hárskút, Közöskút Ravine

Stratum typicum: Carixian, Ibex Zone, sample No. 1.

Diagnosis: Both valves terminate posteroventrally in a short but strong acute cauda.

Description: The anterior outline is very asymmetrical, its upper part is fairly, lower part is considerably rounded. The dorsal arch is nearly symmetrical, its posterior part is suddenly curved to the straight posterior outline running at right angles to the ventral one. There is a short and strong caudal process at the connection of the posterior and ventral outlines. The ventral outline is fairly convex. On the right valve the upper part of the anterior outline, the dorsal outline and the posterior outline are less rounded, they are somewhat "trapezoidal". There is a short cauda at the posteroventral corner, the ventral outline is fairly sinuous. The anteroventral part of both valves are fairly projected. The left valve overlaps the right one except its posteroventral and anteroventral ends.

Comparison: *Pseudohealdia nasuta* (Drexler, 1958) is similar in shape. Its anteroventral projection is more distinct, the posterocentral spine is smaller and not cauda-like.

Dimensions: L = 0.77 mm, H = 0.53 mm, L/H = 1.45

Material: 2 specimens.

Familia *Saipanettidae* McKenzie, 1968

Genus *Cardobairdia* van den Bold, 1960

Cardobairdia harskutensis sp.n.

(Pl. I: 7-8, Pl. II: 1-2)

Derivatio nominis: After the locality Hárskút.

Locus typicus: Hárskút, Közöskút Ravine.

Stratum typicum: Carixian, Ibex Zone, sample No. 1.

Diagnosis: Stubby form with posterodorsal depression and a very fine reticulation on the lateral surface.

Description: The anterior outline of the left valve is broadly and somewhat asymmetrically rounded, the dorsal outline is from 0.1 to 0.7 of the length broadly rounded, than it is straight. After a break the posterior outline is asymmetrical, with a break at the level of the 2/3 height. The ventral outline is broadly rounded. Some large specimens have more symmetrical and narrower anterior and posterior outlines and also more symmetrical and very broadly rounded dorsal and ventral outlines. There is a strong depression on posterodorsal part and a weak at the anterodorsal corner. In case of very fine preservation there is a fine reticulation visible on the lateral surface. The anterior and posterior outlines of the right valve is nearly symmetrically rounded, the dorsal arch is very low, the ventral outline is straight.

There are small anterior and posterior marginal depressions. The surfaces of the well preserved specimens are reticulated. The left valve overlaps the right one throughout with a ventral maximum.

Comparison: This species similar to *C. liassica* (Drexler, 1958) except the depressions and reticulation.

Dimensions: L = 0.53 - 0.69 mm, H = 0.38 - 0.43 mm, L/H = 1.39 - 1.64 (juv?: L = 0.38 mm, H = 0.28 mm, L/H = 1.36)

Material: 92 specimens.

Cardobairdia liassica (Drexler, 1958)

(Pl. II: 3)

1958. *Krausella* ? *liassica* n. sp. - DREXLER, p. 517., Pl. 23., f. 3.

1979. *Cardobairdia liassica* (Drexler, 1958) - HERRIG, 1979c, pp. 1343-1344., Abb. 1., Pl. 1., f. 1-2.

1993. *Cardobairdia liassica* (Drexler, 1958) - HARLOFF, pp. 151-152., Pl. 13., f. 6-8.

1994. *Cardobairdia liassica* (Drexler, 1958) - HARLOFF & JÄGER, p. 40., Pl. 8., f. 8.

Remarks: Besides the typical forms there are more elongate ones in these material.

Dimensions: L = 0.43 - 0.51 mm, H = 0.27 - 0.32 mm, L/H = 1.55 - 1.61

Material: 54 specimens.

Stratigraphical and geological distribution: Sinemurian - L.Toarcian, Germany, France, Denmark.

Cardobairdia sp. 1

(Pl. II: 4)

Remarks: The right valve reach posteriorly beyond the left one, its dorsal outline is straight or gently arched, the anterior outline asymmetrical, the ventral outline is fairly arched and posteriorly converge to the dorsal outline, the posterior outline is broken and acute. The outline of the left valve is more angulate as that of *liassica*.

Dimensions: L = 0.51 - 0.61 mm, H = 0.34 - 0.41 mm, L/H = 1.49 - 1.60

Material: 22 specimens.

Cardobairdia sp. 2

(Pl. II: 5)

Remarks: The anterior outline of the left valve is asymmetrically rounded, the dorsal arch is very high, the upper part of the posterior outline is concave, the ventral part is convex, the ventral outline is fairly and symmetrically arched. The distinctly acute posterior end reaches beyond the right valve. The anterior outline of the right valve is nearly symmetrically rounded, the dorsal outline is nearly straight, the posterior outline is truncated, the ventral outline is nearly straight. The left valve overlaps the right one except the posterodorsal corner.

Dimensions: L = 0.68 mm, H = 0.44 mm, L/H = 1.55

Material: 1 specimen.

Cardobairdia sp. 3

(Pl. II: 6)

Remarks: Elongated form with small overlap. The right valve has a strong posterovental cauda.

Dimensions: L = 0.50 mm, H = 0.26 mm, L/H = 1.92

Material: 3 specimens.

Subordo **Podocopa** Sars, 1866
Superfamilia Bairdiacea Sars, 1866
Familia **Bairdiidae** Sars, 1888
Genus *Bairdia* McCoy, 1844

Bairdia guttulae Herrig, 1979

(Pl. II: 7)

1979. *Bairdia guttulae* n. sp. - HERRIG 1979a, pp. 765-767., fig. 3., pl. f. 4-6.

Remarks: The shape and the nearly median situation of the pointed rostral end is characteristic for that species. The rostrum of the type material is somewhat more upward directed.

Dimensions: L = 0.69 - 0.73 mm, H = 0.42 - 0.44 mm, L/H = 1.64 - 1.66

Material: 5 specimens.

Stratigraphical and geographical distribution: Sinemurian - Pliensbachian, Germany.

Bairdia herrigi sp. n.

(Pl. II: 8, Pl. III: 1)

Derivatio nominis: In honour of the ostracodologist Dr. E HERRIG.

Locus typicus: Hárskút, Közöskút Ravine.

Stratum typicum: Carixian, Ibex Zone, sample No. 2..

Diagnosis: Somewhat triangular, very high form.

Description: The anterior outline of the left valve is slightly asymmetrical, the dorsal arch is nearly symmetrical and somewhat broken at the midlength. The posterior outline is asymmetrical with concave or straight upper part and convex lower part, so the posterior end is somewhat pointed. The ventral outline is slightly convex. The posteromarginal rim somewhat depressed. The right valve generally has a typical "*Bairdia*" shape with trapezoidal dorsal outline, pointed posterior end, asymmetrical anterior and concave ventral outlines. Narrow antero- and posteroventral areas are slightly depressed. The overlap is dorsal and ventral.

Remarks: *Bairdia donzei* Herrig, 1979 is somewhat similar, but it is more elongate and not triangular. There is a little depression below the mid-dorsal part on some specimens having less different dorsal arch on left and right valves.

Dimensions: L = 0.69 - 0.92 mm, H = 0.53 - 0.67 mm, L/H = 1.30 - 1.61

Material: 94 specimens.

Bairdia longoarcuata sp. n.
(Pl. III: 2-3)

Derivatio nominis: From its large ventral arch.

Locus typicus: Kericser.

Stratum typicum: Domerian, Spinatum Zone.

Diagnosis: The lower side of the outline is like a symmetrical arch because of the form of the lower part of anterior and posterior outlines.

Description: The anterior outline of left valve is very asymmetrical, its lower part broadly rounded, upper part somewhat concave. The dorsal outline is symmetrically arched, sometimes has trapezoidal shape. The upper part of the posterior outline is concave, the lower part is nearly straight, the caudal end is pointed and upward directed. The ventral outline is straight or fairly convex. There is a weak depression below the mid-dorsal part of the outline.

Comparison: *B. aselfingensis* Lord & Moorley, 1974 has a similar shape, but its lower anterior outline part is more abrupt, the caudal process is narrower and less upward directed, and there is a circum-marginal depressed area.

Dimensions: L = 0.52 - 0.73 mm, H = 0.31 - 0.41 mm, L/H = 1.66 - 1.82

Material: 18 specimens.

Bairdia michelseni arcuatocauda ssp. n.
(Pl. III: 4-7)

Derivatio nominis: After its caudal process directed more upwards than that of the nominate subspecies.

Locus typicus: Hárskút, Közöskút Ravine.

Stratum typicum: Carixian, Ibex Zone, sample No. 2..

Comparison: The caudal process is generally smaller and more upward directed, the anterior outline is more narrowly rounded as compared to the type material. The shape variation is large similarly to the nominate subspecies.

Dimensions: L = 0.75 - 1.67 mm, H = 0.43 - 0.93 mm, L/H = 1.50 - 1.93.

Material: 267 specimens.

Bairdia trigonosymmetrica sp. n.
(Pl. III: 8)

Derivatio nominis: After its triangle shape.

Locus typicus: Kericser.

Stratum typicum: Domerian, Stokesi Zone.

Diagnosis: Nearly symmetrical triangular form.

Description: The anterior outline of the left valve is fairly asymmetrical and narrowly rounded. The dorsal outline is a high arch. The posterior outline is somewhat asymmetrical and narrowly rounded similarly to the anterior one. The ventral outline is straight. The right valve has a trapezoidal dorsal outline with short median part, the posterior end is more pointed, the posterior outline asymmetric, its upper part is fairly concave, the lower part is convex, the ventral outline has a shallow asymmetrical sinus. The surface is smooth, there is a narrow and fair depression near the antero- and posteroventral margins.

Comparison: *B.?* *appenninica* Oertli, 1967 has a similar outline, but its ends are more stubby and the right valve has not an obviously trapezoidal character.

Dimensions: L = 0.91 - 1.10 mm, H = 0.59 - 0.66 mm, L/H = 1.54 - 1.67

Material: 2 specimens.

Bairdia ? sp. 1.

(Pl. IV: 1)

Remarks: A fragmentary and relatively high form with distinct, dense pits on the lateral surface.

Material: 4 specimens.

Genus *Lobobairdia* Kollmann, 1963

Lobobairdia rotunda sp. n.

(Pl. IV: 2-8)

Derivatio nominis: After its circular form .

Locus typicus: Hárskút, Közöskút-Ravine.

Stratum typicum: Carixian, Ibex Zone, sample No. 2..

Diagnosis: Very highly rounded form with a break between the anterior/posterior parts and the other part of the valve. There is a weak remnant of the typical near-marginal rim.

Description: The anterior outline of the left valve is broad and nearly symmetrical, the dorsal arch is wider and also symmetrical. The posterior outline is asymmetrical, its upper part is nearly straight, the lower part is rounded. The ventral outline is straight or slightly convex. The posterior end is rather obtuse. The anterior and posterior parts of the valve are depressed, the inflated main part of the valve emerges from those. The weak remains of the characteristic circular swelling are sometimes visible anteriorly and posteriorly.

The right valve is overlapped by the left one throughout, its shape is typical of "*Bairdia*", with trapezoidal dorsal outline, more asymmetrical anterior and posterior outline, concave ventral outline and more acute posterior end. The ornamental remains are similar to those of the left valve.

Comparison: The shape and outline is very similar to *Bairdia fortis* Seilacher-Drexler, 1968 in Harloff, 1993, the *Lobobairdia* ornamentation remains are typical for the Hungarian material.

Dimensions: L = 0.77 - 1.39 mm, H = 0.61 - 1.05 mm, L/H = 1.26 - 1.38 (juv.? L = 0.50 - 0.63 mm, H = 0.39 - 0.50 mm, L/H = 1.22 - 1.39).

Material: 228 specimens.

Genus *Ptychobairdia* Kollmann, 1960

Ptychobairdia lordi sp. n.

(Pl. V: 1-2)

? 1991. *Ptychobairdia* cf. *kuepperi* (Kollmann, 1960) - LORD & LAMBOURNE, Pl. 2., f. 13., 16.

Derivatio nominis: In honour of the ostracodologist Dr. A. R. LORD.

Locus typicus: Hárskút, Közöskút-Ravine.

Stratum typicum: Carixian, Ibex-zone, 2. sample.

Diagnosis: A form with shape similar to *P. kuepperi* (Kollmann, 1960), but the distinct ventral swelling is longer and nearly straight with short perpendicular parts on its ends.

Description: The anterior outline of both valves is very asymmetrical, its lower part is hardly rounded, the upper part is somewhat acute. The dorsal outline is somewhat asymmetrically rounded. The posterior end is acute and more or less upward directed, the ventral outline is straight or concave on the right valve. There is a sharp, nearly straight ventral swelling on both valves between 0.1 and 0.9 of the total length with perpendicular ending. The dorsal swelling is short and indistinct. A fair reticulation is visible on several specimens.

Comparison: The shape is similar to *P. kuepperi*, but the lateral swelling has another character. Most similar is the *P. cf. kuepperi* (Kollmann, 1960) in LORD & LAMBOURNE 1991 with somewhat another shape of the lateral swelling.

Dimensions: L = 0.68 - 1.2 mm, H = 0.41 - 0.78 mm, L/H = 1.54 - 1.82

Material: 52 specimens.

Ptychobairdia szentgalensis sp. n.

(Pl. I: 3-4)

Derivatio nominis: After the locality Szentgál in Bakony Mts.

Locus typicus: Szentgál, Gombáspuszta.

Stratum typicum: Carixian.

Diagnosis: Nearly oval form with three longitudinal swellings (a sharp ventral, a short and wide medial and a less pronounced dorsal). There is a rough polygonal network on the lateral surface.

Description: The anterior outline of the left valve is broadly and symmetrically rounded. The dorsal outline is also nearly symmetrically rounded. Between the dorsal outline and the posterior outline as well as between the posterior outline and the ventral outline there is no break. The dorsal part of the posterior outline is nearly straight, after a distinct break the ventral part is rounded. The ventral outline is slightly convex. The ventral swelling is sharp, more arched as the ventral outline and extends from 0.15 to 0.8 of total valve length. The median swelling is short, wide and flat, it has a central position. The dorsal swelling is indistinct. There is a rough polygonal network on the lateral surface which is lacking on the edge of the ventral swelling and it is weak anteriorly, posteriorly and on the top of the median swelling.

There is no complete right valve in the material. The posterior outline is very acute, the ventral swelling is shorter and sharper. The reticulation is similar as on the left valve. The dorsal swelling is long and distinct without reticulation on its edge.

Comparison: The *P. schaubergeri* Kollmann, 1963 is a similar form, but *P. szentgalensis* is shorter, the lateral network is rough, the median swelling is more wide.

Dimensions: L = 1.10 mm, H = 0.79 mm, L/H = 1.39

Material: 5 specimens.

Ptychobairdia sp. 1.

(Pl. V: 5)

Remarks: Specimen with broken posterior end. The ventral swelling is similar to *P. lordi* sp. n., but the outline is quite different, the shape is very long, the dorsal outline of the left valve is trapezoidal and very low, the anterior and posterior ends are very truncated. The lateral surface is covered by rough reticulation.

Dimensions: L = 0.64 mm, H = 0.38 mm, L/H = 1.68

Material: 2 specimens.

Ptychobairdia sp. 2.

(Pl. V: 6)

Remarks: Fragmentary specimen similar to *P. neokristanae* Kristan-Tollmann, 1990 and *P. kuepperi* (Kollmann, 1960).

Material: 2 fragmentary right valves.

Ptychobairdia sp. 3.

(Pl. V: 7)

Remarks: Typical "*Bairdia*" shape with acute posterior end. There is a fair ventral and dorsal swelling, the ventral one has a distinct posterior part near the ventral outline and fades into the lateral surface at 0.25 of the total length far off the ventral outline. There is no similar Jurassic form.

Dimensions: L = 0.53 - 0.62 mm, H = 0.35 - 0.36 mm, L/H = 1.51 - 1.72

Material: 48 specimens.

Ptychobairdia ? sp.

(Pl. V: 8)

Remarks: Only the ventral swelling is distinctly sharp, long and straight. It is moved from the ventral position to ~ 0.25 of the total height. Some remains of reticulation are visible. There is no similar Jurassic form.

Dimensions: L = 0.69 - 0.88 mm, H = 0.44 - 0.47 mm, L/H = 1.51 - 1.87

Material: 13 specimens.

Familia *Bythocyprididae* Maddocks, 1969

Genus *Bythocypris* Brady, 1880

Bythocypris ? *faba* Knitter, 1983

(Pl. VI: 1)

1983. *Bythocypris faba* n. sp. - KNITTER, pp. 217-218., Pl. 35., f. 6-7.

1985. *Bythocypris faba* Knitter, 1983 - RIEGRAF, p. 76., Pl. 2., f. 7-8.

Remarks: Somewhat less acute as the type.

Dimensions: L = 0.63mm, H = 0.32 mm, L/H = 1.97

Material: 24 specimens.

Stratigraphical and geographical distribution: L. Toarcian, Germany.

Bythocypris symmetrica sp. n.
(Pl. VI: 2)

Derivatio nominis: After its nearly symmetrical form.

Locus typicus: Hamuháza.

Stratum typicum: Domerian, Stokesi Zone.

Diagnosis: Narrowly rounded anterior and posterior, very broadly and symmetrically rounded dorsal, straight ventral outline.

Description: The anterior outline of the left valve is rather narrowly and symmetrically rounded, the dorsal arch is nearly symmetrical and very broad, the posterior outline is somewhat asymmetrical, its lower part has a shorter radius, the posterior end is narrower as the anterior one, the ventral outline is straight. On the right valve the anterior, median and posterior parts of the dorsal outline are straight, the ventral outline is fairly and symmetrically concave. The overlap is dorsal and medioventral. The surface of the valves is smooth.

Comparison: Somewhat similar are *Bythocypris?* sp. in BRAND (1990, pp. 147-148., Pl. 1., f.10.), *Bythocypris* sp. in ROSENFELD & HONIGSTEIN (1991, p. 137., Pl. 1., f. 6-7).

Dimensions: L = 0.55 - 0.97 mm, H = 0.26 - 0.42 mm, L/H = 2.12 - 2.31

Material: 10 specimens.

Genus *Isobythocypris* Apostolescu, 1959

Isobythocypris ? postera Herrig, 1979
(Pl. VI: 3-4)

1959. *?Isobythocypris elongata* (Tate et Blake, 1876) - APOSTOLESCU, p. 808., Pl. II., f. 24-25.

1979. *Bairdiacypris traissica postera* n. sp. - HERRIG 1979a, pp. 776-778., Abb. 11-12., Pl. f. 15-18 pars.

1979. *Bythocypris? cylindrica* n. sp. - HERRIG 1979c, pp. 1345-1347, Abb. 4 (pars).

1989. *Isobythocypris* cf. *cylindrica* Herrig, 1979 - RUTHERFORD & AINSWORTH, Pl. 1. f. 5.

1993. *Bythocypris postera* (Herrig, 1979) - HARLOFF, pp. 62-63., Pl. 3., f. 6.

1994. *Bythocypris postera* (Herrig, 1979) - HARLOFF & JÄGER, p. 20., Pl. 4. f. 7.

Remarks: There are no specimens in this material with inner features visible. On the basis of the outline some "young forms" of *Bythocypris cylindrica* in HERRIG (1979) belong to *postera*. The *postera* specimens figured in HARLOFF (1993) and HARLOFF & JÄGER (1994) are somewhat longer and more acute posteriorly, but similar forms are present in the Pliensbachian material of the Bakony Mts. with a transition to the typical form.

Dimensions: L = 0.65 - 0.93 mm, H = 0.34 - 0.46 mm, L/H = 1.85 - 2.03

Material: 39 specimens.

Stratigraphical and geographical distribution: Hettangian-Pliensbachian, Germany, France, Ireland.

Superfamilia Cypridacea Baird, 1845
Familia *Candonidae* Kaufmann, 1900
Subfamilia **Paracypridinae** Sars, 1923
Genus *Paracypris* Sars, 1866

Paracypris redcarensis (Blake in Tate & Blake, 1876)
(Pl. VI: 5-7)

1876. *Bairdia redcarensis* n. sp. - BLAKE in TATE & BLAKE, p. 431., Pl. 17., f. 4.
1959. ?*Paracypris redcarensis* (Tate et Blake, 1876) - APOSTOLESCU, p. 806., Pl. II. f. 32.
? 1967. *Paracypris procerus* n. sp. - BŁASZYK, pp. 22-23., Pl. IV., f. 4-6.
1975. *Paracypris?* *redcarensis* (Blake, 1876) - MICHELSEN, pp. 134-135., Pl. 4., f. 48-49.
? 1978. *Paracypris procerus* Błaszyk, 1967 - PIATKOVA & PERMIAKOVA, p. 126., Pl. 46. f. 8.
1980. *Paracypris?* *redcarensis* (Blake, 1876) - SIVHED, p. 43., Pl. III., f. 23., 26., 28.
1982. *Paracypris?* *redcarensis* (Blake, 1876) - HERRIG, p. 239, Pl. f. 10.
1985. *Paracypris liassica* (Bate et Coleman, 1975) - RIEGRAF, p. 77., Pl. 2., f. 10.
1990. *Paracypris procerus* Błaszyk, 1967 - BRAND, p. 148., Pl. 1., f. 11.
1993. *Paracypris?* *redcarensis* (Blake, 1876) - HARLOFF, pp. 70-73, Pl. 3., f. 5., 13.
1994. *Paracypris?* *redcarensis* (Blake, 1876) - HARLOFF & JÄGER, p. 26., Pl. 7., f. 13.
1995. *Paracypris redcarensis* (Blake, 1867) . MONOSTORI, pp. 158-159., Pl. 24., f. 8-9.

Remarks: The type figure of BLAKE is equivalent to the stubby specimens of the material cited in the list of synonymy. The Pliensbachian specimens of the Bakony Mts. are very variable in shape with transitions between the forms. Distinct characters are the two breaks on the dorsal side. At the type material of *procerus* (Błaszyk, 1967) and its Ukrainian material (PIATKOVA & PERMIAKOVA 1978) there is no clear anterior break, so they may belong to another taxon (species or subspecies).

Dimensions: L = 0.42 - 0.67mm, H = 0.25 - 0.36 mm, L/H = 1.67 - 2.31

Material: 38 specimens.

Stratigraphical and geographical distribution: Pliensbachian to Bajocian: England, Germany, Denmark, Sweden, Hungary, ? Ukraine, ? Poland.

Paracypris sp. 1
(Pl. VI: 8)

Remarks: A very narrow form with wide symmetrical dorsal arch, with shallow symmetrical ventral concavity, with nearly ventral and rather pointed posterior end. The most similar form is *Paracypris* sp. in ROSENFELD et al. (1987) Pl. 1., f. 5.

Dimensions: L = 0.70 mm, H = 0.29 mm, L/H = 2.41

Material: 4 specimens.

CONCLUSIONS

On the basis of 1450 specimens discernible on species level we can imagine the main character of the Pliensbachian ostracoda fauna of the localities treated in the introduction (Fig. 5).

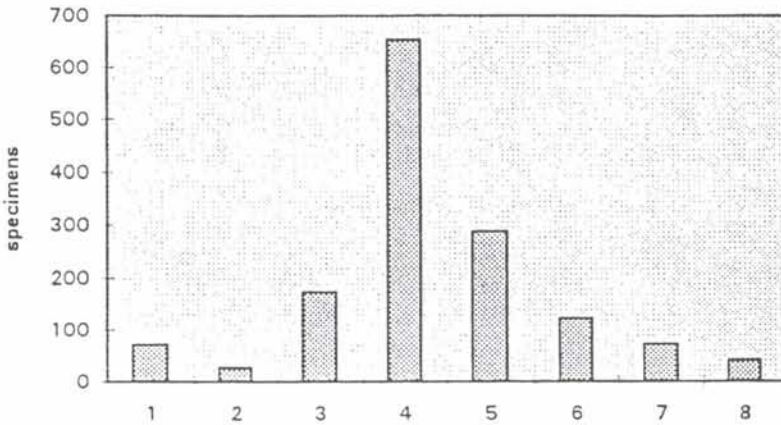


Fig. 5. Distribution of ostracods in the investigated Pliensbachian samples. Legend: 1. *Polycope*, 2. Healdidae, 3. *Cardobairdia*, 4. *Bairdia*, 5. *Lobobairdia*, 6. *Ptychobairdia*, 7. Bythocypridae, 8. *Paracypris*

The high specimen number of genera reminds of the faunas of Triassic carbonate platforms and their surroundings: the amount of *Lodobairdia* and *Ptychobairdia* is conspicuous. They consist of 28% of all specimens. This character is similar to the Pliensbachian fauna of the Pontids (Turkey) (LORD & LAMBOURNE 1991).

From the 17 species described in this work 10 are new and 7 are known. The 7 known species are inhabitants of the epicontinental seas of Europa and their participation in the specimen number is far less (~ 17 %) than in species number. A very significant character is the total absence of the cytherids dominant in the epicontinental Jurassic fauna.

On the basis of frequent *Lodobairdia-Ptychobairdia*, the investigated materials came from the submerged "highs" (seamounts) of the Pliensbachian inner Tethys. These

seamounts were usually below the sublittoral zone (there are no calcareous algae in the material). The relatively high amount of *Cardobairdia* (12 %) indicates also a rather deep site of accumulation of sediments.

Comparing the Carixian and Domerian fauna the decrease of the ornate Bairdids is visible (from 35 to 22 %) possibly caused by the further subsidence of the seamounts (Figs. 6-7).

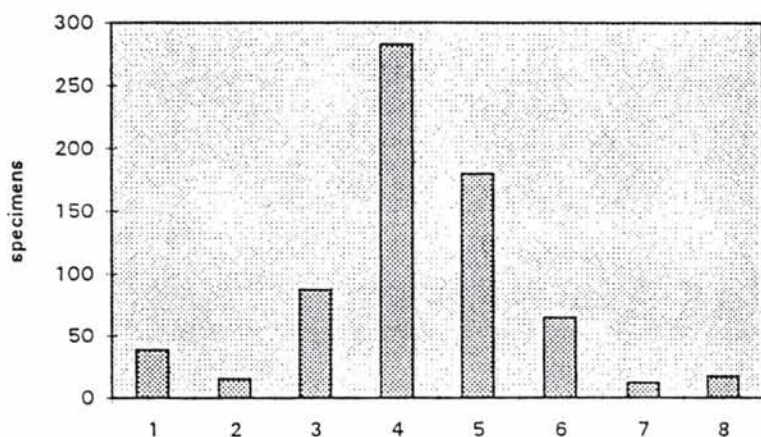


Fig. 6. Distribution of ostracods in the investigated Carixian samples.
Legend: see in Fig. 5

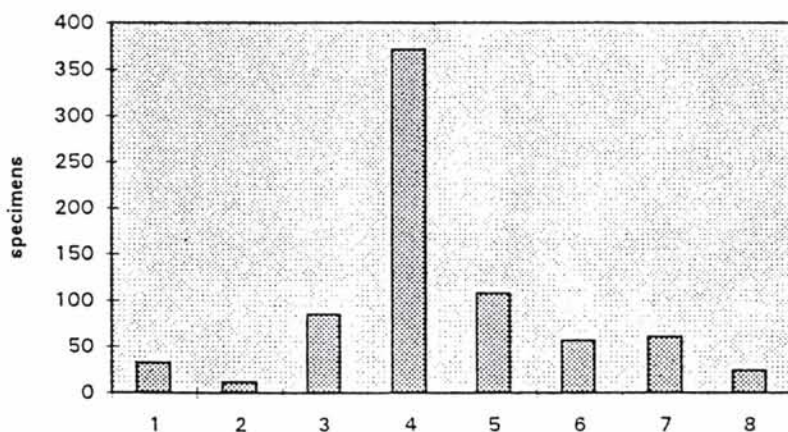


Fig. 7. Distribution of ostracods in the investigated Domerian samples.
Legend: see in Fig. 5

The Healdidae, which is one of the dominant groups of epicontinental fauna, are subordinate both in Carixian and Domerian samples.

The most frequent genus is *Bairdia* (28-56 %).

There is a distinct difference between the fauna of several sections. In some beds the Myodocopid genus *Polycope* is frequent (12-28 %). The Kericser (Carixian and Domerian) samples and the Szentgál, Gombáspuszta samples are of this kind (Figs. 8-10). The first and second sample came from micritic limestones of a "Hierlatzkalk" section. This type of sediment was deposited on the slope or the foot of the seamounts (VÖRÖS, 1983, 1986). Similarly high percent of myodocopids is observable in the Bajocian "fissure-fauna" of Somhegy (Bakony Mts., Hungary) (MONOSTORI 1995b).

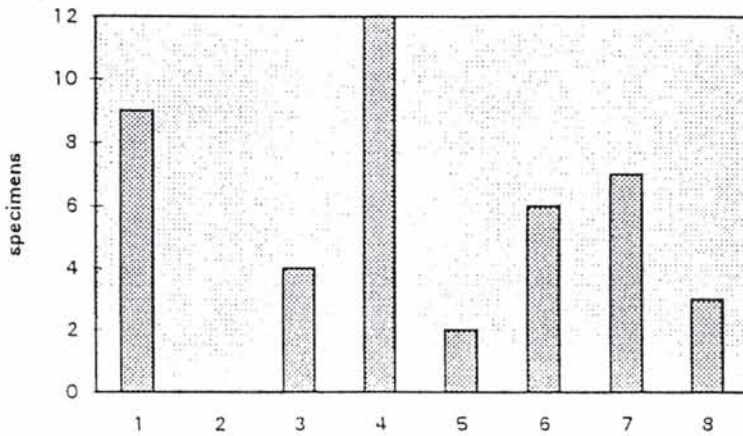


Fig. 8. Distribution of ostracods in the Carixian (Ibex Zone) sample of Kericser.
Legend: see in Fig. 5

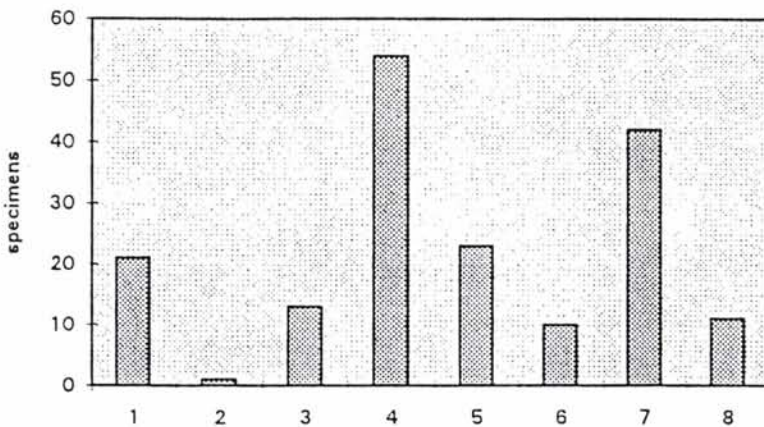


Fig. 9. Distribution of ostracods in the Domerian (Spinatum Zone) sample of Kericser.
Legend: see in Fig. 5

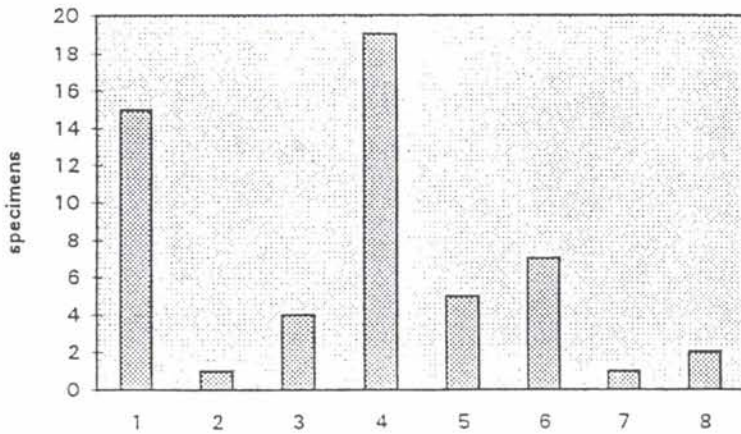


Fig. 10. Distribution of ostracods in the Carixian sample of Szentgál, Gombáspuszta.
Legend: see in Fig. 5

There are some different Bairdiacea and Cypridacea seemingly belonging to deep water communities (*Bythocypris*, *Isobythocypris*, *Paracypris*) and more frequent in the "Hierlatzkalk" fauna (Kericser, Carixian and Domerian). These forms verify the concept of deep (mainly bathyal) accumulation of "Hierlatzkalk" material.

The depositional environment of the red manganiferous limestone (Hárskút, Közöskút Ravine) was the top of the seamounts below the euphotic zone (deepest sublittoral-shallow bathyal) (VÖRÖS 1983, 1986). Characteristic is the high amount of the ornate Bairdiids (Figs. 12-13) as compared to that of the Carixian "Hierlatzkalk" (Kericser) (Fig. 8). The investigated layer of Szentgál, Tüzköves Hill, probably belongs to this type of sediment (Fig. 11).

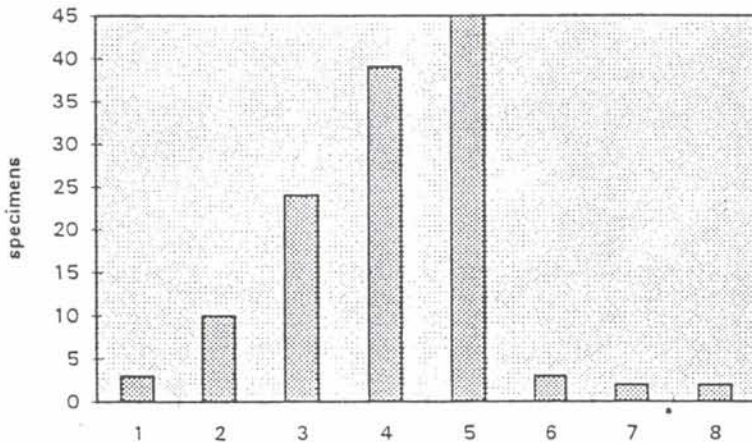


Fig. 11. Distribution of ostracods in the Carixian sample of Szentgál, Tüzköves-Hill, bed T I/11. Legend: see in Fig. 5

Lodobairdia is the most frequent form among the ornate bairdiids except the samples Szentgál, Gombáspuszta (Carixian) and Kericsér (Carixian, Ibex Zone). In the Szentgál, Tüzköveshegy (Carixian) T 1/11 bed, *Ptychobairdia* is extremely rare (Fig. 11).

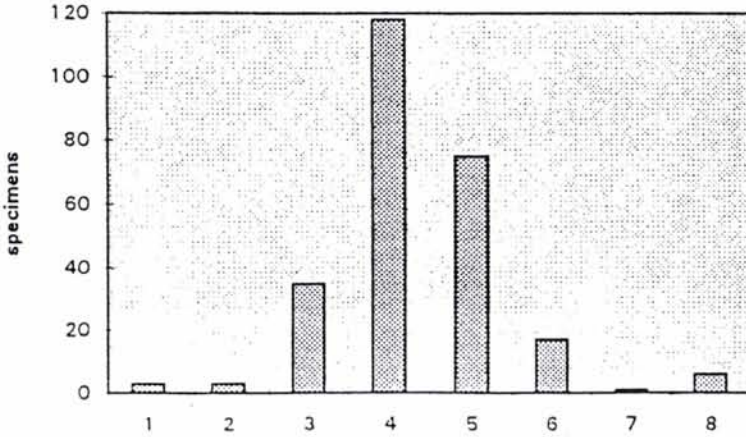


Fig. 12. Distribution of ostracods in the sample No. 1. of the Carixian (Ibex Zone) of Hárskút, Közöskút-Ravine. Legend: see in Fig. 5

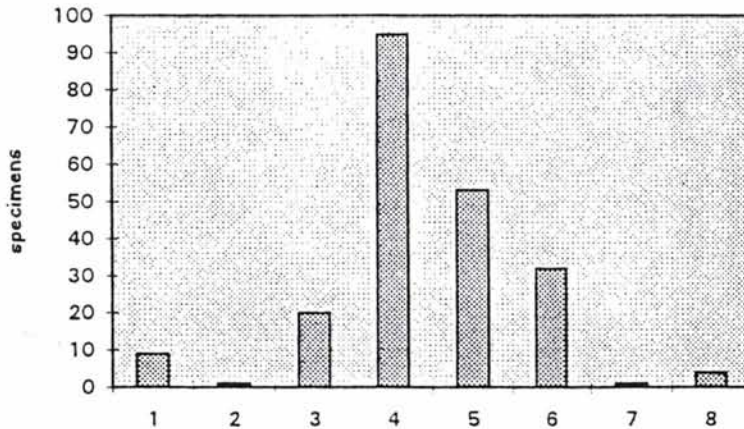


Fig. 13. Distribution of ostracods in the sample No. 2. of the Carixian (Ibex Zone) of Hárskút, Közöskút-Ravine. Legend: see in Fig. 5

The fauna of the subsequent and lithologically similar layers of the same section has only some little differences: Közöskút Ravine, bottom of the Ibex-limestone (Fig. 12) and 30 cm above (Fig. 13), Hamuháza, Stokesi-limestone, layers No. 1 and 2 (Figs. 14-15).

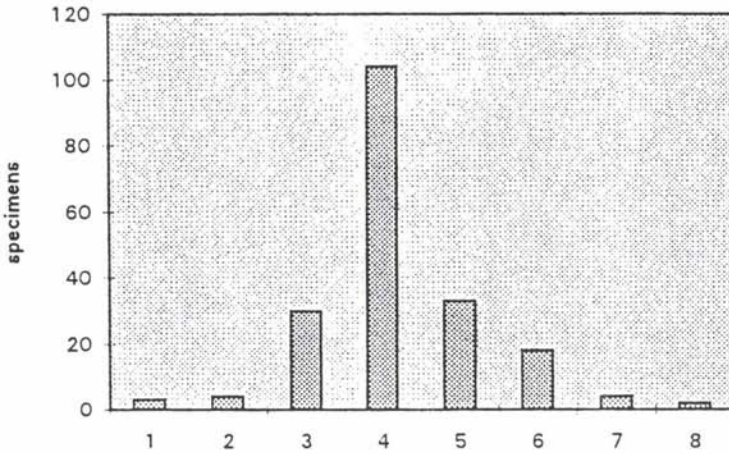


Fig. 14. Distribution of ostracods in the sample No. 1. of the Domerian (Stokesi Zone) of Hamuháza. Legend: see in Fig. 5

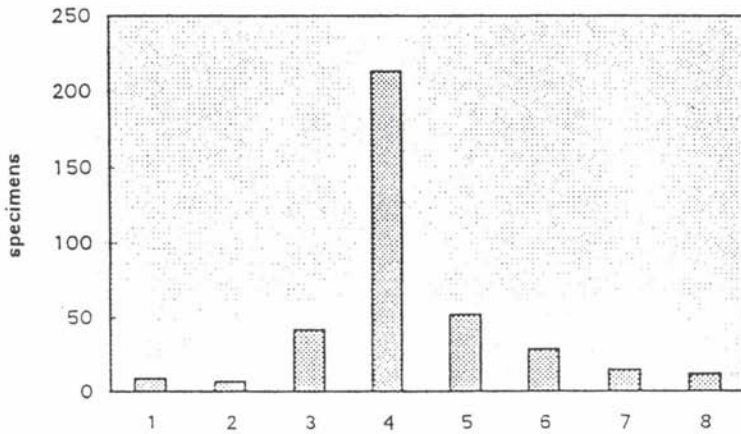


Fig. 15. Distribution of ostracods in the sample No. 2. of the Domerian (Stokesi Zone) of Hamuháza. Legend: see in Fig. 5

The exclusively high amount of *Cardobairdia* in Közöskút-Ravine harmonizes with the conclusion of VÖRÖS (1983) about the deposition of this limestone on deeper seamounts.

Summing up the results, the ostracod fauna of the Pliensbachian limestones of the condensed sections originated around or on the seamounts of the inner Tethys, mainly below the sublittoral depth. Some faunal elements of the Triassic carbonate platforms have adapted to this environment and survived to Toarcian age. The genus *Ptychobairdia* was accommodated to similar environments already in the Middle Triassic (MONOSTORI 1995c), the genus *Lobobairdia* occupied it in the Early Jurassic. Some

species of the fauna are common with the European epicontinental faunas, but their specimen number is rather low. The Cytherids, dominant in many parts of the epicontinental seas are fully absent; the healdids dominating another parts of the epicontinental seas are rare elements. Most of the common species belong to the ubiquitous *Bairdia* or to relatively deep-water genera (*Bythocypris*, *Isobythocypris*, *Paracypris*, *Cardobairdia*).

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EXPLANATION TO PLATES

PLATE I.

1. *Polycope* sp. Hárskút, Közöskút Ravine, Sample N° 2, Carixian, Ibex Zone. M = ×75
2. *Ledahia bispinosa* (Gründel, 1964). Left valve. Szentgál, Tüzköves Hill, Bed T I/11., Carixian. M = ×110
- 3-4. *Ogmoconcha amalthei* (Quenstedt, 1858).
 3. Inside of right valve. Szentgál. Tüzköves Hill, Bed T I/11., Carixian. M = ×80
 4. Left valve. Kericsér, Domerian, Stokesi Zone. M = ×48
5. *Ogmoconcha* sp. Carapace from right valve. Szentgál, Tüzköves Hill, Bed T I/11., Carixian. M = ×72
6. *Pseudohealdia acuticauda* sp. n. Carapace from right valve. Hárskút, Közöskút Ravine, sample N° 1., Carixian, Ibex Zone. M = ×70
- 7-8. *Cardobairdia harskutensis* sp. n.
 7. Left valve. Szentgál, Tüzköves Hill, Bed T I/11., Carixian. M = ×100
 8. Carapace from right valve. Hárskút, Közöskút Ravine, sample N° 1., Carixian, Ibex Zone. M = ×78

PLATE II.

- 1-2. *Cardobairdia harskutensis* sp. n., Hárskút, Közöskút Ravine, sample N° 1., Carixian, Ibex-zone.
 1. Left valve. M = ×89
 2. Left valve. M = ×85
3. *Cardobairdia liassica* (Drexler, 1958). Carapace from the right valve. Kericser, Domerian, Stokesi Zone. M = ×130
4. *Cardobairdia* sp. 1. Inside of left valve. Szentgál, Gombáspuszta, Carixian. M = ×95
5. *Cardobairdia* sp. 2. Carapace from right valve. Szentgál, Gombáspuszta, Carixian. M = ×80
6. *Cardobairdia* sp. 3. Carapace from right valve. Hamuháza, sample N° 2., Domerian, Spinatum Zone. M = ×90
7. *Bairdia guttulae* Herrig, 1979. Carapace from the right valve. Szentgál, Gombáspuszta, Carixian. M = ×92
8. *Bairdia herrigi* n. sp. Carapace from the right valve. Hárskút, Közöskút Ravine, sample N° 2., Carixian, Ibex Zone. M = ×55

PLATE III.

1. *Bairdia herrigi* sp. n. Carapace from the right valve. Hárskút, Közöskút-Ravine, sample N° 2., Carixian, Ibex Zone. M = ×60
- 2-3. *Bairdia longoarcuata* sp. n.
 2. Left valve. Hamuháza, sample N° 2., Domerian, Stokesi Zone. M = ×90
 3. Carapace from the right valve. Kericser, Domerian, Spinatum Zone. M = ×120
- 4-7. *Bairdia michelseni arcuatocauda* ssp. n.
 4. Carapace from the right valve. Hamuháza, sample N° 1., Domerian, Stokesi Zone. M = ×90
 - 5-7. Hárskút, Közöskút-Ravine, sample N° 2., Carixian, Ibex Zone.
 5. Carapace from the right valve. M = ×60
 6. Carapace from the right valve. M = ×52
 7. Carapace from the right valve. M = ×60
8. *Bairdia trigonosymmetrica* sp. n. Carapace from the right valve. Kericser, Domerian, Spinatum Zone. M = ×72

PLATE IV.

1. *Bairdia* sp. 1. Fragmentary carapace from the right valve. Hamuháza, sample N° 2., Domerian, Stokesi Zone. M = ×80
- 2-8. *Lobobairdia rotundata* sp. n.
 2. Left valve. Szentgál, Tüzköves Hill, Bed T I/11., Carixian. M = ×45
 - 3-5. Hárskút, Közöskút Ravine, sample N° 1., Carixian, Ibex Zone.
 3. Left valve. M = ×65
 4. Carapace from the right valve. M = ×60
 5. Carapace from the right valve. M = ×40

6. Left valve. Hárskút, Közöskút Ravine, sample N° 2., Carixian, Ibex Zone.
M = $\times 38$
- 7-8. Hamuháza, sample N° 2., Domerian, Stokesi Zone.
 7. Carapace from the right valve. M = $\times 62$
 8. Carapace from the right valve. M = $\times 41$

PLATE V.

- 1-2. *Ptychobairdia lordi* sp. n.
 1. Fragmentary left valve. Hárskút, Közöskút Ravine, sample N° 1., Carixian, Ibex Zone. M = $\times 72$
 2. Carapace from the left valve. Hárskút, Közöskút Ravine, sample N° 2., Carixian, Ibex Zone. M = $\times 70$
- 3-4. *Ptychobairdia szentgalensis* sp. n. Szentgál, Gombápuszta, Carixian.
 3. Left valve. M = $\times 60$
 4. Fragmentary carapace from the right valve. M = $\times 50$
5. *Ptychobairdia* sp. 1. Carapace from the left valve. Szentgál, Tűzköves Hill, bed T I/11., Carixian. M = $\times 100$
6. *Ptychobairdia* sp. 2. Fragmentary right valve. Hárskút, Közöskút Ravine, sample N° 1., Carixian, Ibex Zone. M = $\times 35$
7. *Ptychobairdia* sp. 3. Carapace from the right valve. Hamuháza, sample N° 2., Domerian, Stokesi Zone. M = $\times 110$
8. *Ptychobairdia?* sp. Carapace from the right valve. Hárskút, Közöskút Ravine. sample N° 2., Carixian, Ibex Zone, M = $\times 80$

PLATE VI.

1. *Bythocypris? faba* Knitter, 1983. Carapace from the right valve. Kericser, Domerian, Spinatum Zone. M = $\times 100$
2. *Bythocypris symmetrica* sp. n. Carapace from the right valve. Hamuháza, sample N° 2., Domerian, Stokesi Zone. M = $\times 65$
- 3-4. *Isobythocypris? postera* Herrig, 1979
 3. Carapace from the right valve. Hamuháza, sample N° 2., Domerian, Stokesi Zone. M = $\times 90$
 4. Carapace from the right valve. Kericser, Domerian, Spinatum Zone. M = $\times 90$
- 5-7. *Paracypris redcarensis* (Blake in Tate et Blake, 1876).
 - 5-6. Hamuháza, sample N° 2., Domerian, Stokesi Zone.
 5. Carapace from the right valve. M = $\times 92$
 6. Carapace from the right valve. M = $\times 100$
 7. Carapace from the right valve. Hárskút, Közöskút Ravine, sample N° 2., Carixian, Ibex Zone. M = $\times 100$
8. *Paracypris* sp. 1. Carapace from the right valve. Hamuháza, sample N° 2., Domerian, Stokesi Zone. M = $\times 90$

PLATE I.

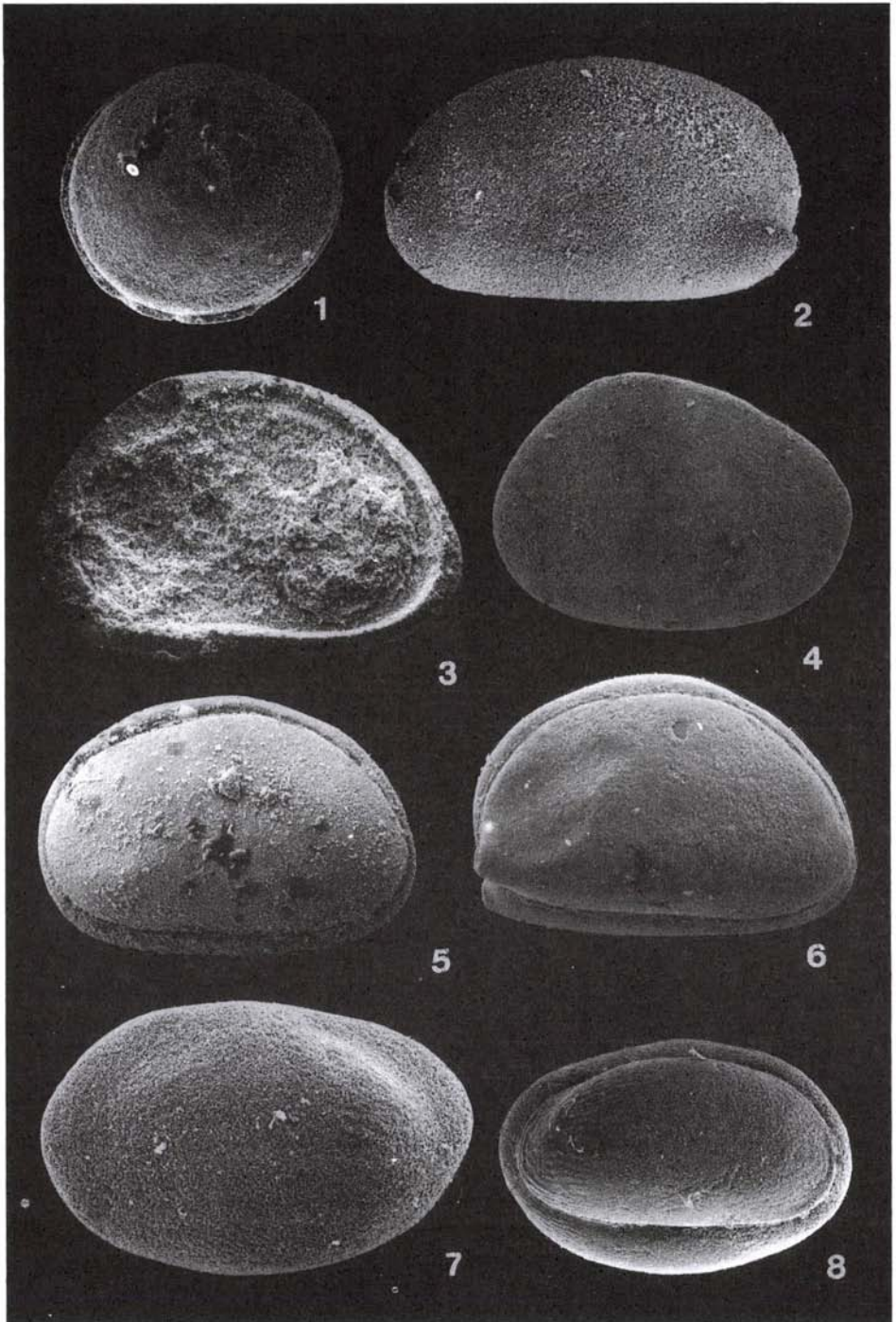


PLATE II.

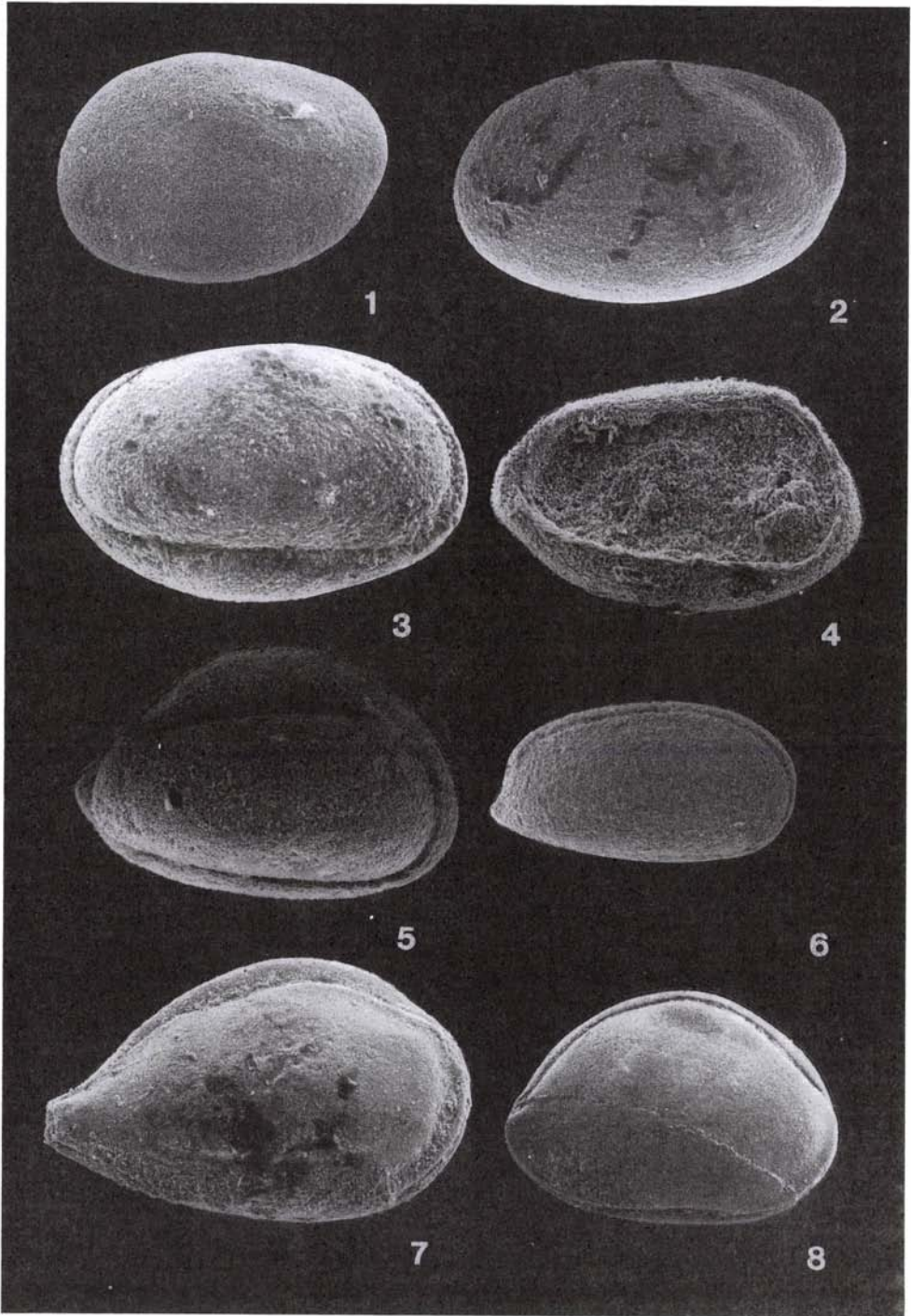


PLATE III

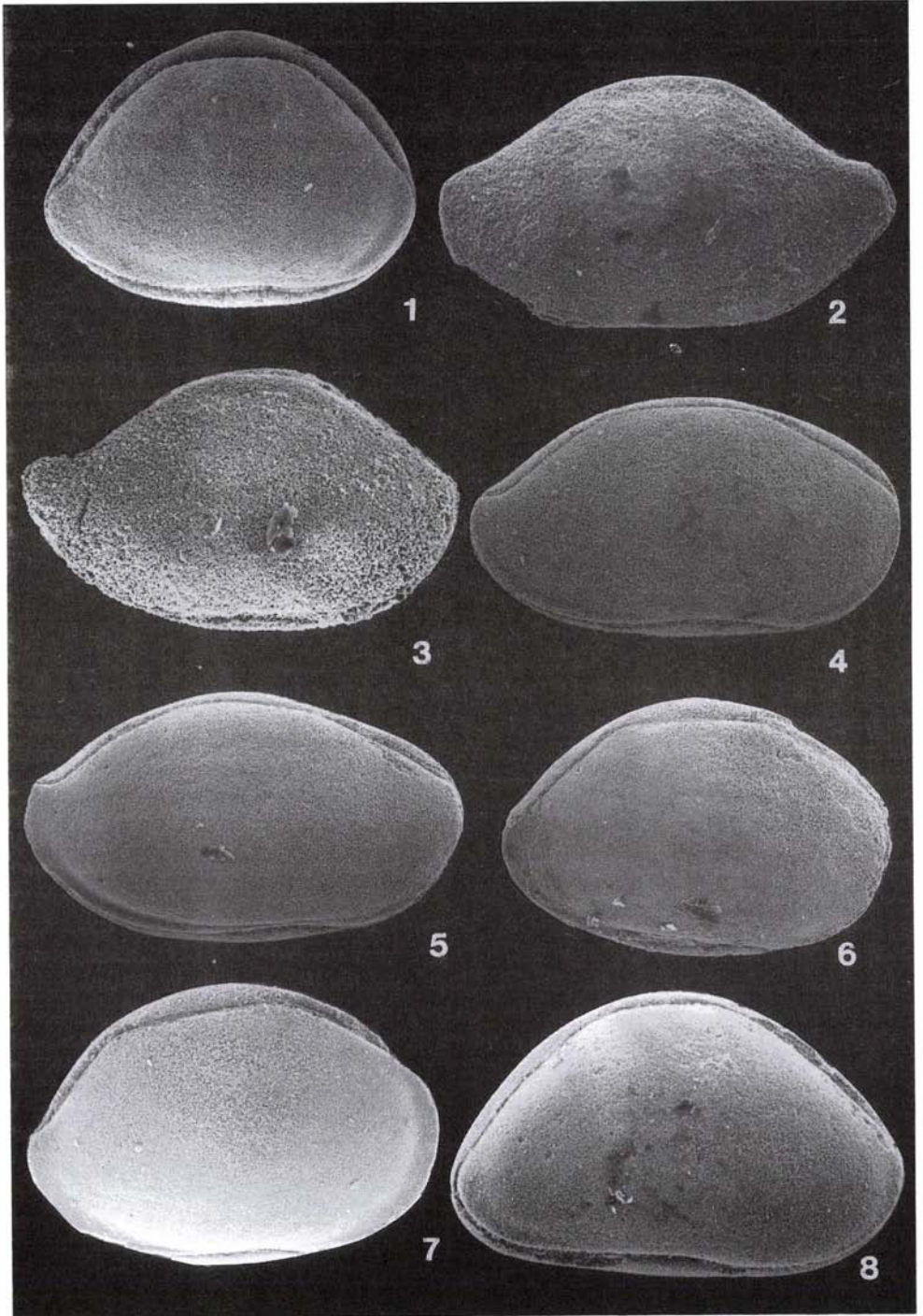


PLATE IV.

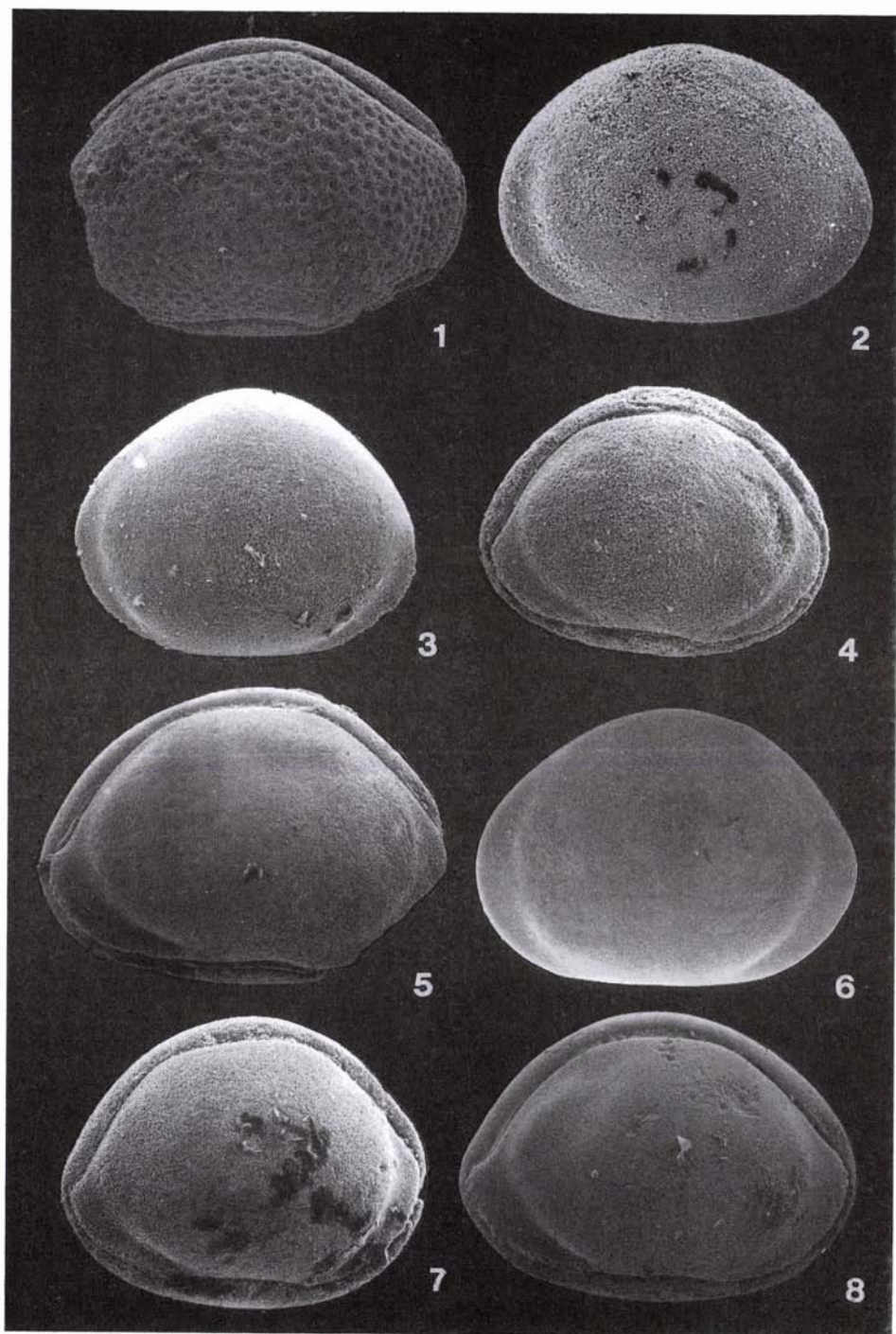


PLATE V.

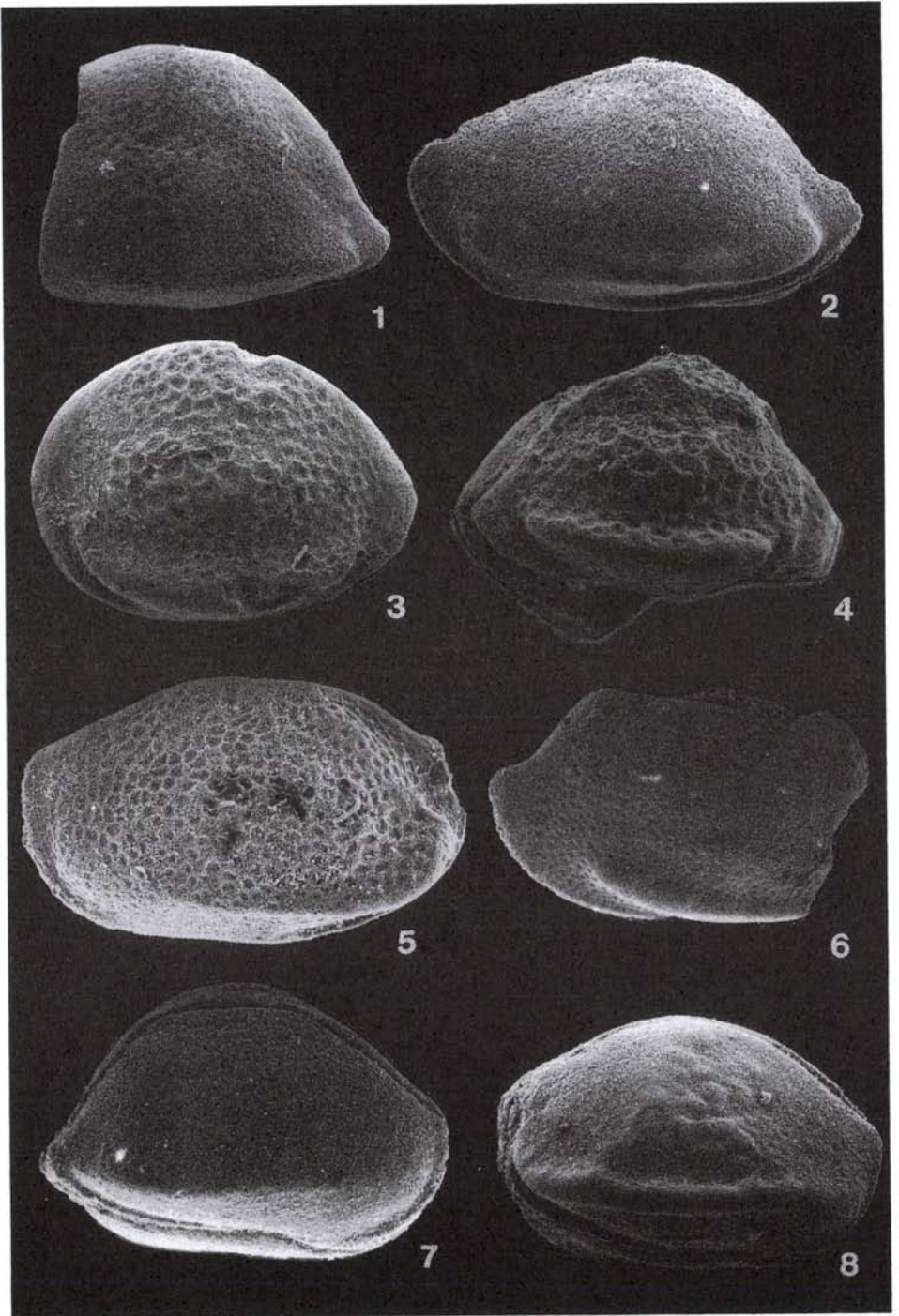


PLATE VI.

