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MIDDLE TO UPPER DEVONIAN OSTRACODA FROM THE SOUTHERN HOLY CROSS MOUNTAINS, POLAND

(plates 11-32)

Abstract. — The paper presents investigations on the Givetian, Frasnian, and Famennian ostracodes of the southern Holy Cross Mountains, Poland. 110 species are described of the orders Palaeocopida, Platycopida, Metacopida, Podocopida, and Myodocopida, 21 species are new; these are: *Coryellina tenuisulcata*, *C. sanctacrucensis*, *Kegelites polonicus*, *Cavellina czarnockii*, *Marginohealdia sobolewi*, *Bairdia (Bairdia) nidensis*, *B. (Rectobairdia) soblekurowiensis*, *Processobairdia beckeri*, *Bairdiacypris samsonowiczi*, *B. polenovae*, *Praepilatina adamczaki*, *Healdianella budensis*, *H. kielcensis*, *H. ? compressa*, *Ampuloides pumillus*, *Newsomites bleissi*, *Baschkirina microspina*, *Rectonaria kowalensis*, *Orthonaria gruendell*, *Aurigerites blumenstengeli*, and *Richterina (Richterina) unispinosa*. The Givetian ostracode assemblage resembles ecologically shallow-water West European assemblages of the "Eifeler Ökotyp" sensu BECKER in: BANDEL and BECKER, 1975. The Frasnian ostracodes also represent the "Eifeler Ökotyp" and a mixed association consisting of benthic ostracodes and pelagic entomozoids. The Famennian ostracodes form a mixed association with spiny podocopids ("Thuringer Ökotyp" sensu BECKER in: BANDEL and BECKER, 1975) and pelagic entomozoids ("Entomozoan Ökotyp" sensu BECKER in: BANDEL and BECKER, 1975). The Givetian ostracodes of Poland are related to those of the Russian Platform and West Europe. The Frasnian ostracodes resemble somewhat those of the Russian Platform. The Famennian ostracodes are related to Upper Devonian assemblages of GDR (Thuringia) and Spain (Cantabrian Mountains). The Upper Devonian entomozoids of the southern Holy Cross Mountains indicate the ostracode zones: *cicatricosa*, *serratostriata-nehdensis*, *intercostata*, Lower and Upper *hemisphaerica-dichotoma* Zones.

Streszczenie. — Praca zawiera rezultaty badań nad żyweckimi, frańskimi i fameńskimi małżoraczkami południowej części Gór Świętokrzyskich. Opisano 110 gatunków należących do rzędów Palaeocopida, Platycopida, Metacopida, Podocopida i Myodocopida, w tym następujące gatunki nowe: *Coryellina tenuisulcata*, *C. sanctacrucensis*, *Kegelites polonicus*, *Cavellina czarnockii*, *Marginohealdia sobolewi*, *Bairdia (Bairdia) nidensis*, *B. (Rectobairdia) soblekurowiensis*, *Processobairdia beckeri*, *Bairdiacypris samsonowiczi*, *B. polenovae*, *Praepilatina adamczaki*, *Healdianella budensis*, *H. kielcensis*, *H. ? compressa*, *Ampuloides pumillus*, *Newsomites bleissi*, *Baschkirina microspina*, *Rectonaria kowalensis*, *Orthonaria gruendell*, *Aurigerites blumenstengeli*, *Richterina (Richterina) unispinosa*. Ekologicznie małżoraczki żyweckie bliskie są płytkowodnym zespołom zachodniej Europy („Eifeler Ökotyp” sensu BECKER in: BANDEL and BECKER, 1975). Do tego samego ekotypu należą także małżoraczki frańskie oraz mieszany frański zespół zawierający małżoraczki bentoniczne i pelagiczne entomozoidy. Małżoraczki fameńskie reprezentują mieszany zespół charakteryzujący się kolczastymi podokopidami („Thuringer Ökotyp” sensu BECKER in: BANDEL and BECKER, 1975) oraz pelagicznymi entomozoidami („Entomozoan Ökotyp” sensu BECKER in: BANDEL and BECKER, 1975). Żyweckie małżoraczki z Polski pokrewne są małżoraczkom tego wieku z Platformy Rosyjskiej oraz zachodniej Europy. Małżoraczki frańskie wykazują pewne podobieństwo do małżoraczków frańskich Platformy Rosyjskiej, zaś małżoraczki fameńskie zbliżone są do zespołu małżoraczków z górnego dewonu Turynii (NRD) i Gór Kantabryjskich (Hiszpania). W górnym dewonie południowej części Gór Świętokrzyskich stwierdzono występowanie entomozoidów dokumentujących następujące poziomy małżoraczkowe: *cicatricosa*, *serratostriata-nehdensis*, *intercostata* oraz *hemisphaerica-dichotoma* (dolnego i górnego). Stratygraficzne zasięgi małżoraczków w zbadanych profilach skorelowano z istniejącymi podziałami konodontowymi.

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INTRODUCTION

Although modern studies of the ostracode fauna of the northern Holy Cross Mountains have been made (see ADAMCZAK 1968 and 1976 for a review) no such study has been made of the southern part of the region. In the present paper ostracodes from the Givetian, Frasnian and Famennian strata of the southern Holy Cross Mountains have now been investigated. The material was collected mostly by myself between 1973 and 1976. Some samples from Jurkowice-Budy were offered by Dr. A. BALIŃSKI; those from Łagów-Dule, by Dr. J. DZIK (both from Institute of Paleobiology in Warsaw); and the material from the borehole and trenches at Jabłonna, by Dr. H. ŻAKOWA, Holy Cross Branch of the Geological Institute.

The ostracode fauna includes 110 species, 21 of which are new. Several species are described in open nomenclature because of the insufficient material or poor preservation state.

The work was carried out in the Institute of Paleobiology of the Polish Academy of Sciences, Warsaw (abbreviated ZPAL), where the material is housed (coll. nos. OXII and OXV).

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The photographs were taken by Mrs. M. RADZIKOWSKA and the figures drawn by Mrs. D. SŁAWIK.

GENERAL PART

REVIEW OF PREVIOUS STUDIES

The monograph by GÜRICH (1896) was the first study of Middle to Upper Devonian ostracodes from the Holy Cross Mountains. 26 species were described and only 11 illustrated; two species were from the Middle Devonian section of Śniadka and Skały (northern Holy Cross Mountains), the others come from the southern Holy Cross area. More recently the present author described four species from the Givetian of Jurkowiec-Budy quarry, southern Holy Cross Mountains (OLEMPKA 1974).

Only one of the species described by GÜRICH (1896) has been found in the present material. Other species reported by GÜRICH are either from lost exposures or being unillustrated and incompletely described, are unrecognizable.

As mentioned above, modern studies on the Holy Cross ostracode faunas have dealt only with the Devonian of the northern part of the area. Thus, PŘIBYL (1953) reported 14 species from the Middle Devonian (Givetian) section of Grzegorzowice-Skały, in the so-called brachiopod shale. The brachiopod shale corresponds to the unit XIV forming part of the Skały Beds (PAJCHŁOWA 1957). KOŚCIELNIAKOWSKA (1967) recorded some Upper Devonian entomozoid species from Wzdół-Trzcianka, northern Holy Cross Mountains. The ostracodes from the Bodzentyn syncline were studied in detail by ADAMCZAK (1956, 1958, 1959, 1961*a*, *b*, 1968, 1971*a*, *b*, 1976) and ADAMCZAK and WEYANT (1973). Apart from the description of many species, ADAMCZAK (1971*b*) included a comparison with contemporaneous ostracode assemblages abroad. ADAMCZAK (1968) assigned units XIV to XXVIII of PAJCHŁOWA (1957) to the Upper Eifelian, considering their relationship to the ostracode fauna of the Eifel Mountains. However, BECKER (1964, 1965*a*, *b*, 1969) and BECKER and BLESS (1974) demonstrated that some species attributed by ADAMCZAK (1968) to the Upper Eifelian also occur in the Givetian of the Eifel Mountains. Thus, the age attribution of the Skały Beds appears doubtful (ADAMCZAK 1976).

MATERIAL

The material described comes from 11 exposures and one borehole (fig. 1). The geological documentation of the borehole and trench at Jabłonna is housed at IG, Kielce (rock samples nos. 1058-1839 in table 3), and will be presented in a separate paper (ŻAKOWA, in preparation). Mostly soft lithologies containing considerable amounts of clay, were macerated. Hard limestones yielded few ostracodes. Some samples yielded silicified carapaces. The collection totals some 6.000 specimens. The richest assemblages were found in Givetian strata at Jurkowiec-Budy and in Upper Famennian deposits at Kowala and Jabłonna, whilst the Frasnian and Lower Famennian deposits are much poorer. The material includes benthic ostracodes of the orders Palaeocopida, Platycopida, Metacopida, and Podocopida, and pelagic myodocopids of the family Entomozoidae. The benthic ostracodes are most commonly preserved as complete carapaces, but rare single valves occur, usually filled with sediment. Juveniles are very scarce. Many specimens are preserved as internal moulds. The entomozoids are most commonly preserved as internal and external moulds or as single valves. Such valves are usually fractured and hence, not separable from the rock matrix. Only in the Łągów-Dule exposure do the entomozoids occur as silicified carapaces and isolated valves.

GEOLOGICAL AND GEOGRAPHICAL SETTING

Devonian deposits of the southern Holy Cross Mountains form part of a folded tectonic unit with a WNW-ESE axial trend. The northern part of the area is occupied by the Kielce-

-Łagów synclinorium; the southern part, by the Chęciny-Klimontów anticlinorium. Devonian and Carboniferous strata fill the synclines, whilst early Paleozoic sediments form the syncline limbs. Middle to Upper Devonian deposits are exposed mostly in the western parts of Kielce-Łagów synclinorium and Chęciny-Klimontów anticlinorium. In the east, the Devonian is poorly exposed.

Upper Givetian ostracodes have been found only at the Jurkowiec-Budy exposure. Frasnian ostracodes occur in 4 exposures, and Famennian ostracodes at 6 localities. Some of the exposures (e. g. Psiarnia and Cmentarna Hills) mentioned by GÜRICH (1896) are now inaccessible.

Givetian exposures

Jurkowiec-Budy

The Givetian limestones at Jurkowiec-Budy were first described by SAMSONOWICZ (1930) with short list of fossils and assigned to the Upper Givetian. The lithology and fauna are given in PAJCHŁOWA and STASIŃSKA (1965). KAŹMIERCZAK (1971) investigated the stromatoporoids

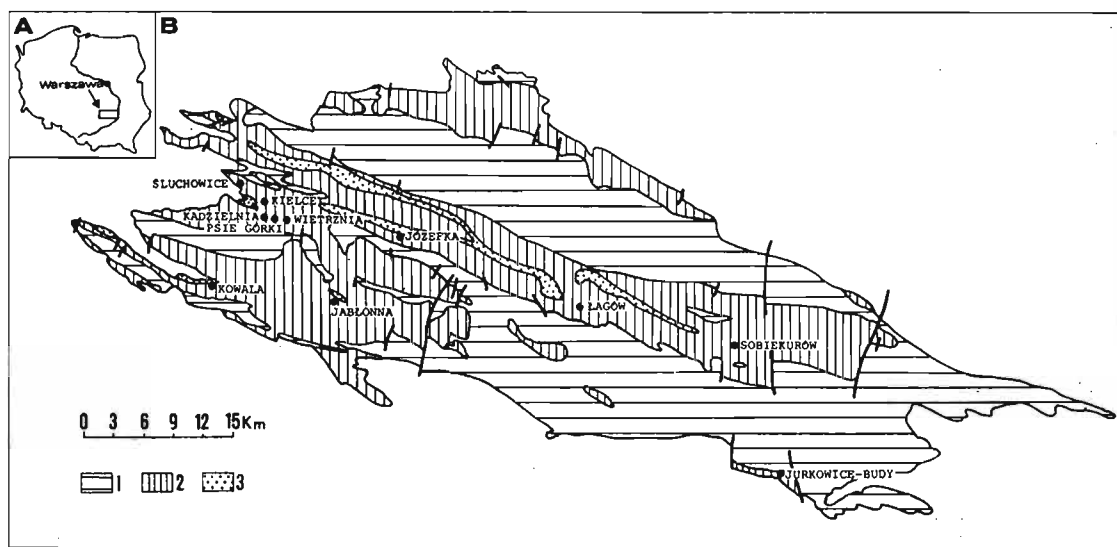


Fig. 1

Geological map of the Holy Cross Mountains (after CZARNOCKI 1953) with location of the sections.
1 — Cambrian, Ordovician, and Silurian, 2 — Devonian, 3 — Lower Carboniferous

and commented on their biostratigraphy and paleoecology. The tetracorals were partly studied by RÓŹKOWSKA (1960), and the brachiopods by BALIŃSKI (1973). There are also abundant gastropods, tabulates, trilobites, bryozoans, scolecodonts, and rare charophyte oogonia.

Some 30 m of grey and dark limestones interbedded with marls are exposed in Jurkowiec-Budy quarry. *Stringocephalus burtini* DEFRANCE occurs abundantly. The stromatoporoid assemblage indicated to KAŹMIERCZAK (1971) an Upper Givetian age. The brachiopod fauna recorded by BALIŃSKI (1973) also indicates the Upper Givetian. BALIŃSKI pointed out the resemblance of the Jurkowiec-Budy assemblage to the fauna of the upper Rodert-Schichten (Korallen-Brachiopoden Kalk) of the Eifel Mountains.

There is a rich ostracods assemblage (tab. 1) at Jurkowiec-Budy, including 4 species of the superfamily Beyrichiacea (OLEMPKA 1974). The present investigation supports the Late Givetian age (see p. 70).

Frasnian exposures

Józefka Hill

Marly micritic limestones are exposed on the southern slope of Józefka Hill, by the road between Daleszyce and Górnó. The conodonts investigated by MAŁKOWSKI (1971) indicate the lower and middle *P. asymmetricus* Zone (I α). The brachiopod *Phlogioderhynchus polonicus* (ROEMER), the local stratigraphical range of which appears restricted to the lower and middle *P. asymmetricus* Zone (BIERNAT and SZULCZEWSKI 1975) has also been recorded at Józefka Hill. Corals, brachiopods, gastropods, receptaculitids, and foraminifers occur commonly.

The ostracode assemblage (fig. 2, samples 4-5) includes 6 species (tabl. 1). The ostracodes are relatively uncommon and poorly preserved.

Śluchowice quarry

The Frasnian deposits of Śluchowice quarry were studied by CZARNOCKI (1948). The corals were described by RÓŻKOWSKA (1953). The stratigraphy and lithology were studied in detail by SZULCZEWSKI (1971). Shales and marls are overlain by calcirudites interbedded with intraformational breccias; they represent the lower or middle *P. asymmetricus* Zone (SZULCZEWSKI 1971). Higher in the section, are thin-bedded limestones of the upper *P. asymmetricus* and *P. gigas* Zones interbedded with coarse-grained deposits: calcarenites, calcirudites, intraformational breccias. Still higher in the section are intraformational conglomerates of the *P. triangularis* or even *P. crepida* Zones (see SZULCZEWSKI *l. c.*).

A sparse and poorly preserved ostracode fauna (table 1) has been extracted from the samples taken from the western part of the quarry. The samples come from thin clay intercalations between the hard limestones. No ostracodes have been found in the limestones. Ostracodes have been recorded in samples 1, 4, 7, 8, 9 (see fig. 2) but identifiable ones only in samples 4, 7, 8. Thus, the identifiable ostracodes come from the upper *P. asymmetricus* Zone (fig. 2, sample 4) and lower *P. gigas* Zone (fig. 2, samples 7, 8).

Wietrznia quarries

An ostracode fauna has been found in samples 14, 15 (fig. 2) from SZULCZEWSKI's unit "E" in Wietrznia II quarry. This unit is 3 m thick and consists of micritic and marly limestones interbedded with marly shales. Unit "E" is assigned to the lower *P. gigas* zone (SZULCZEWSKI 1971). Only one species of ostracode is present, *Entomozoe (Nehdentomis) tenera* (GÜRICH), occurring in very large numbers, and preserved as external and internal impressions. In addition there are goniatites and rare tentaculites.

Sobiekurów

SAMSONOWICZ (1917) attributed the beds at Sobiekurów to the Lower Frasnian on the basis of their rich brachiopod fauna. In more detailed investigations OLKOWICZ-PAPROCKA and OZONKOWA (1968, 1970) recognized 14 distinct lithological and faunal units in the Devonian in the eastern part of the Kielce-Łagów synclinorium. Units 12a and 12b were assigned to the Lower Frasnian and attain some 145 m in thickness. The beds at Sobiekurów represent unit 12a. There are grey, fine-grained, fossiliferous limestones, intercalated with marls 5-10 cm thick in the top part of the section. OLKOWICZ-PAPROCKA and OZONKOWA (1970) reported a rich fossil assemblage including brachiopods, gastropods, foraminifers, and calcispheres. In general, corals are rare but in a few beds *Hexagonaria* becomes abundant. A fairly abundant ostracode fauna (table 1) has been recorded in grey weathered limestones at the top of Sobiekurów quarry (fig. 2, samples 10-12). No specimens of the genus *Entomis* mentioned by SAMSONOWICZ (1917) have been found.

Famennian exposures

Psie Górki Hill

On the northern slope of Psie Górki Hill, suburb of Kielce, Famennian deposits are represented by interbedded marly limestones and shales intercalated with intraformational conglomerates and crinoidal limestones (SZULCZEWSKI 1971). They are attributed to the upper *P. crepida* Zone (SZULCZEWSKI 1971). A few poorly preserved ostracodes (table 1) have been found in both the limestones and shales. Unidentifiable ostracodes occur also in the intraformational conglomerates. The entomozoids indicate the ostracode *serratostrata-nehdensis* Zone.

Kadzielnia quarry

This large quarry situated in the southeastern part of Kielce is a national monument. The stratigraphy was studied in detail by SZULCZEWSKI (1971, figs 4, 7). The Frasnian is represented by thick sets of stromatoporoid-coral, detritic, and cephalopod-bearing limestones. Thick-bedded micritic limestones of the *Cheiloceras* stage and marly-shales are attributed to the Famennian. Rare and unidentifiable ostracodes have been recorded in the *Manticoceras* Limestones underlying strata of the *Cheiloceras* stage. In the *Cheiloceras* Limestones, fairly abundant but poorly preserved specimens of *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH) and unidentifiable ostracode fragments have been found (fig. 2, samples 15, 17, 18, and table 1). WOLSKA (1967) and SZULCZEWSKI (1971) demonstrated that deposition of the *Cheiloceras* Limestones began in the middle or late *P. crepida* times. The conodonts recorded in the upper part of *Cheiloceras* Limestones indicate the *P. rhomboidea* Zone.

A poor ostracode assemblage (table 1) occurs in the marly shales, overlying the *Cheiloceras* Limestones (fig. 2, samples 23-24) and assigned to the *P. marginifera* Zone (WOLSKA 1967).

Apart from *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH), none of the entomozoid species mentioned by GÜRICH (1896) have been found in the Upper Devonian of Kadzielnia.

Łagów

Devonian sediments are well exposed in the Łagów area. Ostracodes have been found at the Łagów-Dule section and in the clayey shales behind the buildings by Słupecka street starting at the road between Łagów and Nowa Słupia.

GÜRICH (1896) and SOBOLÉW (1911) described the cephalopods from Łagów-Dule and assigned them to the *Cheiloceras* and Lower *Platyclymenia* stages. A conodont study by Wolska (1967) demonstrated the occurrence of a mixed fauna of the upper *P. rhomboidea* and upper *P. marginifera* Zones. Silicified ostracodes of the species *Richterina* (*Richterina*) *striatula* (RICHTER), *Richterina* (*Richterina*) *costata* (RICHTER), *Richterina* (*Richterina*) *unispinosa* sp. n., *Entomozoe* (*Nehdentomis*?) sp., and fragments of some other unidentifiable entomozoids and benthic ostracodes have been found in the bed with calcareous-concretions within the *Cheiloceras* beds (fig. 2, sample Ł-04). The ostracode species recorded range from the ostracode *intercostata* to Upper *hemisphaerica-dichotoma* Zones. Conodonts derived from the same sample represent the *P. marginifera* or *S. velifer* Zones (Dr. H. MATYJA, oral communication), that is they are equivalent to the ostracode *intercostata* Zone.

In a calcareous concretion from the base of the *Platyclymenia* beds (fig. 2, sample Ł-10), some silicified specimens of *Richterina* (*Fossirichterina*) sp. were found together with some poorly preserved individuals assigned to *Bairdia* aff. *kelleri* EGOROV.

Some benthic species and a few fragments of entomozoid imprints have been recorded in the section by Słupecka street (table 1); *Richterina* (*Richterina*) *striatula* (RICHTER) and *Richterina* (*Maternella*) *hemisphaerica* (RICHTER) are doubtfully identified. The same species occur also at Kielce and Kowala (table 1). They indicate that the strata may be assigned to the ostracode *hemisphaerica-dichotoma* Zone.

Table 1

Ostracode distribution in the Middle to Upper Devonian of the southern Holy Cross Mountains

Stratigraphy		Location	No. of sample	FRASNIAN										FAMENNIAN					
				JURKOWICZE	JOZEFKA	SLUCHOWICE	WIETRZNA	SOBIEKURÓW	PSIE GÓRKI	KADZIELNIA	ŁĄCÓW	KIELCE	KOWALA	JABLONNA					
				4-5	4	7	8	14-15	10-12	7-9	15-16	23-24	2-4	5-10	3	3-4	see tab. 2	see tab. 3	
PALEOCOPIIDA	<i>Kozłowskiella jurkowicensis</i> OLEMPKA		•																
	<i>Reversoscapha sandmiriensis</i> OLEMPKA		•																
	<i>Welleria aequiconvexa</i> OLEMPKA		•																
	<i>Welleriella rakoviensis</i> OLEMPKA		•																
	<i>Hollinella (Kesslingella) ? sp.</i>		•																
	<i>Parabolhinella cf. vomis</i> BECKER and BLESS		•	•															
	<i>Pribylites ? sp.</i>		•																
	<i>Coryellina tenuisulcata sp. n.</i>		•																
	<i>Coryellina sanctacrucensis sp. n.</i>		•											•		•	•	•	•
	<i>Coryellina sp.</i>		•																
	<i>Rozhdestvenskayites tuimazensis</i> (ROZHDESTVENSKAYA)		•																
	<i>Coeloenellina minima</i> (KUMMEROW)		•																
	<i>Coeloenellina cf. parva</i> POLENOVA		•																
	<i>Nezamyslia eifeliensis</i> (ADAMCZAK)		•																
	<i>Amphissites (Ectodemitis) janischewskyi</i> POLENOVA		•																
	<i>Amphissites pulcher</i> POLENOVA		•																
	<i>Amphissites cf. parvulus</i> (PAECKELMAN)		•	•															
<i>Amphissites sp.</i>		•		•															
<i>Kegelites polonicus sp. n.</i>		•																	
<i>Faegnium ? sp.</i>		•																	
<i>Reticostus sp.</i>		•																	
PLATYCOPIIDA	<i>Kloedencilitina sp.</i>		•																
	<i>Sulcella aff. speculata</i> BECKER		•																
	<i>Murginia suzranensis</i> POLENOVA		•																
	<i>Murginia ? sp.</i>		•																
	<i>Knoxia ? sp.</i>		•																
METACOPIIDA	<i>Buregia jivensis</i> SHISKINSKAYA		•																
	<i>Cavellina czarnockii sp. n.</i>		•																
METACOPIIDA	<i>Favulella sp.</i>		•																
	<i>Healdia anterodepressa</i> BLUMENSTENGEL		•																
	<i>Marginohealdia sobolewi sp. n.</i>		•																
	<i>Marginohealdia sp.</i>		•																
PODOCOPIDA	<i>Bairdia (Bairdia) hypsela</i> ROME		•																
	<i>Bairdia (B.) plicatula</i> POLENOVA		•																
	<i>Bairdia (B.) nidensis sp. n.</i>		•																
	<i>Bairdia (B.) aff. kelleri</i> EGOROV		•																
	<i>Bairdia (B.) aff. galinae</i> EGOROV		•																
	<i>Bairdia (B.) naliwkini</i> EGOROV		•																
	<i>Bairdia (B.) aff. naliwkini</i> EGOROV		•																
	<i>Bairdia sp.</i>		•																
	<i>Bairdia (Rectobairdia) guarziana</i> EGOROV		•																
	<i>Bairdia (R.) hexagona</i> POLENOVA		•																
	<i>Bairdia (R.) aff. paffrathensis</i> KUMMEROW		•																
	<i>Bairdia (R.) sobiekuroviensis sp. n.</i>		•																
	<i>Bairdia (R.) sp.</i>		•																
	<i>Bairdia (Aptobairdia) cf. singularis</i> KROMMELBEIN		•																
	<i>Bairdia (C.) aff. birinae</i> EGOROV		•																
	<i>Processobairdia spinomarginata</i> BLUMENSTENGEL		•																
	<i>Processobairdia beckeri sp. n.</i>		•																
	<i>Bairdiacypris samsonowiczi sp. n.</i>		•																
	<i>Bairdiacypris polenovae sp. n.</i>		•																
	<i>Acratia (Acratia) clinata</i> BLUMENSTENGEL		•																
	<i>Acratia (Cooperuna) rostrataformis</i> SCHEVTSOV		•																
	<i>Acratia (Cooperuna) tichonovitchi</i> EGOROV		•																
	<i>Ceratocratia cerata</i> BLUMENSTENGEL		•																
	<i>Bairdiocypris vastus</i> POLENOVA		•																
	<i>Bairdiocypris livnensis</i> POLENOVA		•																
	<i>Bairdiocypris aff. ovata</i> ROZHDESTVENSKAYA		•																
	<i>Bairdiocypris sp.</i>		•																
	<i>Praeplatina adamczaki sp. n.</i>		•																
	<i>Fabalitypris holuschurmensis</i> (POLENOVA)		•																
	<i>Cytherellina dubia</i> (KUMMEROV)		•																
	<i>Healdianella budensis sp. n.</i>		•																
	<i>Healdianella ? compressa sp. n.</i>		•																
	<i>Healdianella aff. bispinosa</i> GRUNDEL		•																
	<i>Healdianella sp.</i>		•																
	<i>Healdianella kielcensis sp. n.</i>		•																
	<i>Orthocypris sp.</i>		•																
	<i>Ampuloides pumillus sp. n.</i>		•																
	<i>Newsomites blessi sp. n.</i>		•																
	<i>Microcheilinella mandelstami</i> POLENOVA		•																
	<i>Microcheilinella peculiaris</i> ROZHDESTVENSKAYA		•																
	<i>Microcheilinella sp.</i>		•																
	<i>Cerodia weyeri</i> GRUNDEL		•																
<i>Easchkirina microspina sp. n.</i>		•																	
<i>Samarella levinodosa</i> BECKER		•																	
<i>Samarella aff. crassa</i> POLENOVA		•																	
<i>Tricornina (Bohemina) sp.</i>		•																	
<i>Rectonaria inclinata</i> GRUNDEL		•																	
<i>Rectonaria muelleri</i> GRUNDEL		•																	
<i>Rectonaria kowalensis sp. n.</i>		•																	
<i>Orthonaria rectagona</i> (GRUNDEL)		•																	
<i>Orthonaria gruendeli sp. n.</i>		•																	
<i>Rectoplacera elongata</i> BLUMENSTENGEL		•																	
<i>Rectoplacera elliptica</i> BLUMENSTENGEL		•																	
<i>Rectoplacera aff. robusta</i> BLUMENSTENGEL		•																	
<i>Triplacera triquetra</i> GRUNDEL		•																	
<i>Aurigerites blumenstengeli sp. n.</i>		•																	
<i>Aurigerites aff. texanus</i> ROUNDY		•																	
<i>Ostracoda gen. et sp. indet.</i>		•																	
<i>Cryptophyllus sp.</i>		•																	
MYDOCOPIDA	<i>Bertilonella (Waldeckella) erecta</i> (RABTEN)		•																
	<i>Richterina (Volkina) zimmermanni</i> (VOLK)		•																
	<i>Entomozoe (Richterina) serratostrata</i> (SANDBERGER)		•																
	<i>Entomozoe (Nehdentomis) nehdensis</i> (MATERN)		•																
	<i>Entomozoe (N.) tenera</i> (GURICH)		•																
	<i>Entomozoe (N.) cf. pseudorichterina</i> (MATERN)		•																
	<i>Entomozoe (N.) ? sp.</i>		•																
	<i>Richterina (Fossilrichterina) moravica</i> (RZEHAJ)		•																
	<i>Richterina (F.) semen</i> (JONES)		•																
	<i>Richterina (F.) sp.</i>		•																
	<i>Richterina (Richterina) striatula</i> (RICHTER)		•																
	<i>Richterina (R.) costata</i> (RICHTER)		•																
	<i>Richterina (R.) unispin</i>																		

Kielce

Black marly limestones interbedded with shales and assigned to the Famennian are exposed in a pit by Spacerowa Street. There are abundant but poorly preserved trilobites, and less common brachiopods, clymenids, crinoids, and fish teeth. The conodont assemblage indicates the middle *S. velifer* to upper *S. styriacus* Zones (Dr. H. MATYJA, oral communication).

The ostracode assemblage (fig. 2, samples 3, 4) consists of benthic forms, and rare entomozoids (table 1) mostly as imprints.

Kowala

Geological investigations of the Famennian deposits in the Kowala area started with CZARNOCKI (1928, 1933) who demonstrated the sedimentary continuity into the Carboniferous. The trilobites studied by OSMÓLSKA (1962) indicate the *Goniclymenia* (V), *Wocklumeria* (VI), and *Gattendorfia* (VII) stages. The stratigraphy and lithology were studied by ŻAKOWA (1967). The conodont fauna (WOLSKA 1967) indicates the middle *S. costatus* Zone. Corals obtained from the trenches investigated by WOLSKA (1967), were described by RÓŻKOWSKA (1969). The cephalopod fauna identified by MAKOWSKI (in RÓŻKOWSKA 1969) indicates the *Goniclymenia* and *Wocklumeria* stages.

Ostracodes have been found in two trenches dug by the school building at Kowala, one by Dr. M. SZULCZEWSKI in 1973 (trench I) to the north, and the other (trench II) to the south by the present author in 1974. Both were aligned in N-S direction. Red and grey limestones are intercalated with red and green shales. The conodont fauna (Dr. M. SZULCZEWSKI, oral communication) indicates the *S. costatus* Zone. Some Carboniferous conodont species also occur in trench II. Abundant benthic ostracodes and entomozoids (table 1) have been found in both trenches. Entomozoids typical of the uppermost Famennian zones, i. e. upper *hemisphaerica-dichotoma* Zone (table 5) occur in trench I, samples 121-133 (table 2). In trench II, samples 100-112 (table 2), some Carboniferous benthic ostracodes and *Richterina* (*Richterina*) *latior* RABIEN are present in addition to ostracodes of the Upper *hemisphaerica-dichotoma* Zone. Nearby, an abundant ostracode fauna of the lower *hemisphaerica-dichotoma* Zone with benthic and, very common entomozoid ostracodes, occurs in grey, light-grey, and rose marly limestones exposed in the road and on nearby waste grounds. Apart from some unidentifiable fragments, no ostracodes have been recorded in the Devonian (I α -I γ after SZULCZEWSKI 1971) deposits exposed in the Kowala railroad cutting.

Jabłonna

The trenches dug in the Famennian deposits at Jabłonna, some 10 km SE to Kielce, yielded a trilobite fauna (OSMÓLSKA 1962) indicating the *Cheiloceras* (II) to *Gattendorfia* (VII) stages. The conodont study (WOLSKA 1967) demonstrated the occurrence of *P. triangularis* and *P. crepida* Zones, absence of *P. rhomboidea* Zone, mixed faunas of *P. marginifera* and *S. velifer* Zones, and the occurrence of the *P. styriacus* and *S. costatus* Zones. The corals obtained were studied by RÓŻKOWSKA (1969).

About 11 m of Famennian deposits have been found in the Jabłonna IG-1 borehole, between 65.50-73.30 m. The Lower Famennian comprises some 9 m. There are fossiliferous crystalline limestones at the base and nodular limestones at the top of the sequence. There are also some intercalations of marly mudstones and limestones (ŻAKOWA 1975).

Identifiable entomozoid and benthic ostracodes have been found in 66 samples of the 105 samples studied (table 1, 3). The fauna permits recognition of the ostracode *serratostriatanehdensis* to Upper *hemisphaerica-dichotoma* Zones (table 5).

Benthic ostracodes are abundant only in the *hemisphaerica-dichotoma* Zone where they are represented mostly by the families Ractonariidae and Bairdiidae, while other families occur in minor amounts. The assemblage resembles closely that of the Famennian of Kowala; in fact, most species are present in both areas (table 1).

PALAEOECOLOGY OF THE OSTRACODE ASSEMBLAGES

Givetian assemblages

33 ostracode species occur in the Upper Givetian marly limestones at Jurkowiec-Budy. There are 13 paleocopid, 6 platycopid, 13 podocopid, and 1 eridostracan species. 20 species are ornamented, while 13 possess smooth carapaces. 9 species are large-sized (over 1.40 mm in length), 20 species are medium-sized, and 4 species are small-sized (less than 0.95 mm). Compared with the data obtained by BECKER (1969, 1971a) for the Middle Devonian ostracodes of the Eifel Mountains, the ostracode fauna of Jurkowiec-Budy represents probably an off shore shallow-water assemblage but not typical of a reef habitat. It may be assigned to the "Eifeler Ökotyp" of BECKER (*in* BANDEL and BECKER 1975) including shallow-water, mostly ornamented benthic ostracodes. One may suppose that the Jurkowiec-Budy assemblage lived in a shallow- and quiet-water environment below wave base. This conclusion supports the inference (KAŹMIERCZAK 1971) made on the stromatoporoid assemblage for quiet-water biostromal banks rather than a reef, as claimed by PAJCHŁOWA and STASIŃSKA (1965).

The Givetian ostracode assemblage of Jurkowiec-Budy resembles closely in carapace-length and ornamentation frequency-distribution biotopes 5 and 6 (i. e., Zone der solitären Korallen und Brachiopoden-Zone) recognized in the Middle Devonian of the Eifel Mountains, based upon the macrofauna (STRUVE 1961, 1963) and ostracodes (BECKER 1969, 1971a). In analysing the ostracode distribution, BECKER (1969) considered water salinity, temperature, depth, turbulence, oxygen content, pH, deposit nature, and food supply. He concluded that water turbulence was the most important factor controlling ostracode distribution; other ecological factors playing but subordinate roles. The Devonian ostracodes, increased both indiversity and frequency when water turbulence and turbidity decreased. As turbidity decreased, large- and small-sized forms with thin and smooth carapaces appeared, especially diverse species of the genus *Bairdia*. Studies on modern ostracodes confirm this interpretation (GRÜNDEL 1969, MCKENZIE 1964, PURI *et al.* 1965).

The taxonomic composition, in terms of orders, of the Jurkowiec-Budy assemblage resembles that recognized in the Frasnian of Belgium (BECKER 1971b, 1973) for biotope 6 (i. e., Brachiopoden-Zone). The absence of metacopids from the assemblage is probably due to the age difference between the assemblages.

Frasnian assemblages

The Frasnian ostracode fauna of the Holy Cross Mountains is fairly poor and often poorly preserved. Two distinct assemblages can be recognized.

The Frasnian ostracode assemblages of Józefka and Sobiekurów differ from those recorded at Śluchowice and Wietrznia in that the former consist entirely of benthic palaeocopids, platycopids, podocopids, and metacopids. At Śluchowice, mydocopids (Entomozoidae) occur together with benthic ostracodes. Most studies of ostracodes recognize that entomozoids are typical of offshore conditions because of their pelagic or pseudopelagic mode of life (RABIEN 1954; GRÜNDEL 1962, TUCKER 1974). The exclusively pelagic entomozoid life habits have, however, been questioned by BLUMENSTENGEL (1965, 1973) and KOZUR (1972), while BECKER (1977) claims that some entomozoid species were benthic. Assemblages composed exclusively of entomozoids were recognized by BECKER (*in* BANDEL and BECKER 1975) for the "Entomozoan Ökotyp", typical of the deepest basins, relative to other ostracode faunas. In the Holy Cross Frasnian, such a purely entomozoid fauna has been recorded only in Wietrznia II quarry which represents probably a fairly deep part of the basin.

Many students of Paleozoic ostracodes (TSCHIGOVA 1971, ROZHDESTVENSKAYA 1971, BANDEL and BECKER 1975) conceive purely benthic ostracode assemblages as indicative of shallow-water conditions, while mixed entomozoid-benthic ostracode assemblages are regarded as related to fairly deep basins.

Investigations on the ostracode relationship to facies are hampered by the difficulty in extracting specimens from hard rocks. Reworking may also affect interpretation. Nevertheless one may recognize relationship between ostracode assemblages and facies in the Holy Cross area whilst ostracodes can be seen in thin sections of the Detrital Facies (Śluchowice), *Manticoceras* Limestone (Kadzielnia), and Basin Facies (Wietrznia); no ostracodes have been found in deposits assigned by SZULCZEWSKI (1971) to the Stromatoporoid-Coral Facies which he considers represent the most turbulent conditions. Apart from unsuitable ecological factors, the absence of ostracodes may result from current action subsequently removing light carapaces. The absence of ostracodes from the most turbulent environments is confirmed by the investigations of ostracode distribution in the Middle and Upper Devonian and Lower Carboniferous of Belgium (BECKER 1969, 1971a, 1973, BECKER *et al.* 1974).

Famennian assemblages

Spiny rectionariid genera such as *Rectonaria*, *Rectoplacera*, *Orthonaria*, and *Triplacera* are the most characteristic Famennian forms at Kielce, Kowala, and Jabłonna. There are also other podocopids, including *Coryellina*, *Processobairdia*, *Ceratacratia* and palaeocopids, all with spiny carapaces.

Ostracode assemblages with a considerable proportion of smooth and spiny podocopids have been recognized by BECKER (*in* BANDEL and BECKER 1975) for "Thuringer Ökotyp". BECKER claimed that such assemblages occupied offshore, quiet, probably deep and cold-water areas. Similar benthic ostracode assemblages have been reported from the Devonian and Lower Carboniferous of Thuringia (BLUMENSTENGEL 1965, 1969, GRÜNDEL 1961, 1962), Harz (MÜLLER-STEFFEN 1965), Carnian Alps (BANDEL and BECKER 1975), and Cantabrian Mountains (BLESS and MITCHEL 1967, BECKER *et al.* 1976, BECKER 1977). Related assemblages have also been noted in the Upper Devonian of Moravia (BLUMENSTENGEL 1968) and Permian of Timor (GRÜNDEL and KOZUR 1975). GRÜNDEL (1961, 1962), who first described an ostracode assemblage of "Thuringer Ökotyp", considered it to be related to deeper basins. KOZUR (1972) and GRÜNDEL and KOZUR (1975) recognized assemblages of "Thuringer Ökotyp" for psychrosferic ostracode fauna typical of the relatively deepest basins. This conclusion follows mainly from a comparison of the assemblages dominated by spiny podocopids with present-day deep-water ostracode faunas (BENSON and SYLVESTER-BRADLEY 1971). I am of the opinion that morphological differences between modern and almost entirely extinct Paleozoic ostracode taxa are too large to permit recognition of psychrosferic faunas in the Paleozoic. Moreover, GRÜNDEL and KOZUR (1975) did not consider the fauna associated with the ostracodes.

The Upper Devonian ostracodes of Kielce, Kowala, and Jabłonna represent a mixed association composed of both benthic spiny podocopids ("Thuringer Ökotyp") and entomozoids ("Entomozoan Ökotyp"). The spiny podocopids of the family Tricorninidae form only a minor proportion whereas they are usually fairly abundant in such assemblages. Besides spiny rectionariids, some smooth podocopids of the genus *Bairdia* are also present. Thus, the assemblage may indicate somewhat shallower marine area than in Thuringia or the Cantabrian Mountains.

OSMÓLSKA (1962) found blind trilobites of the family Phacopidae in the Upper Famennian of Kowala and Jabłonna but few proetids with normally developed eyes. She argued that blind trilobites lived in deep poorly-lit water. The present study confirms this inference.

OSTRACODE ZONATION

The high ostracode diversity of the Devonian of the Holy Cross Mountains appears to be indicative of rapid evolution. Thus, the ostracodes should be very useful in stratigraphy, but

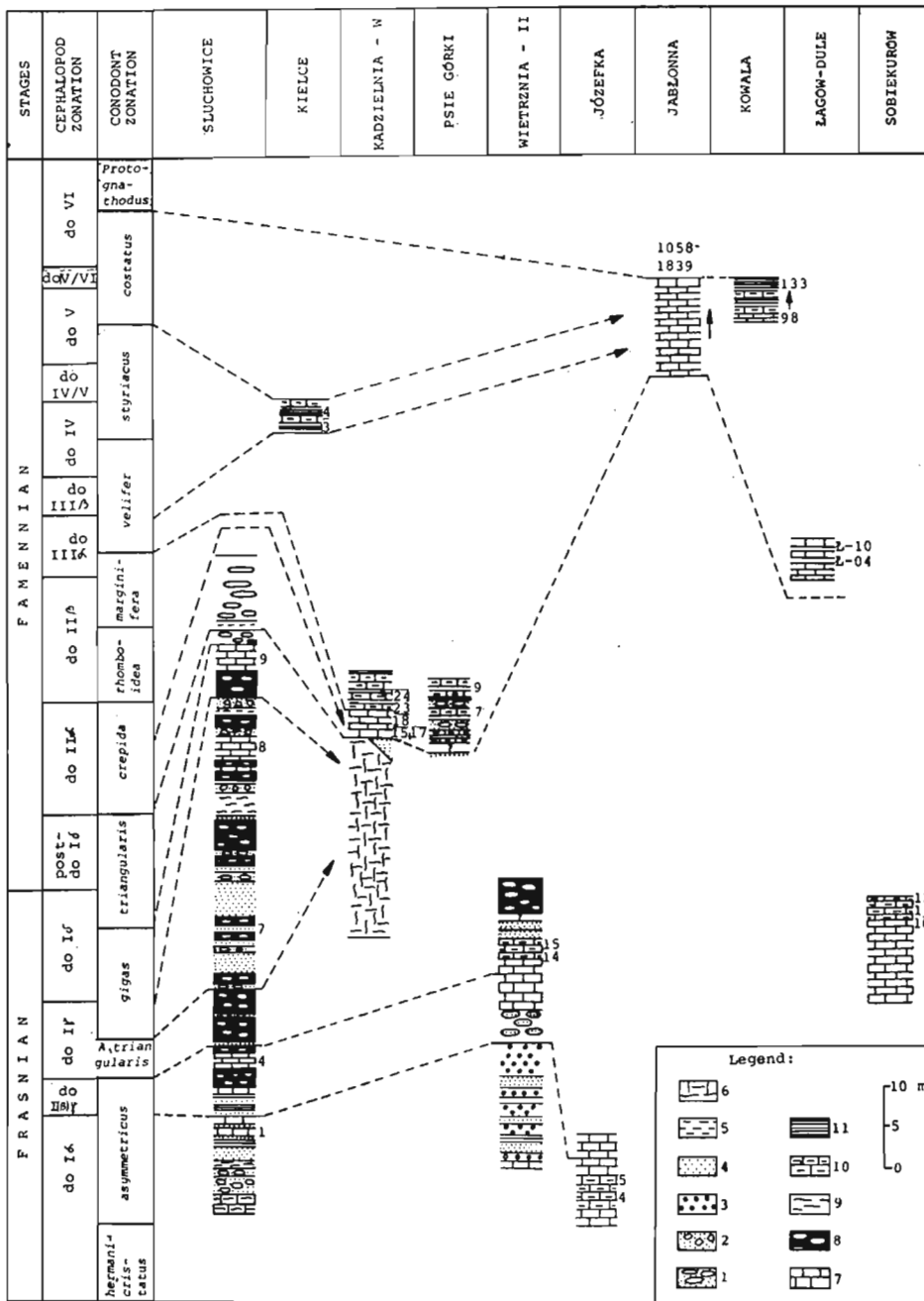


Fig. 2

Upper Devonian ostracode-bearing sections of the Holy Cross Mountains correlated with the conodont zones after SZULCZEWSKI (1971 and oral communication). Sections: Śluchowice, Kadzielnia, Psie Górkki, Wietrzna II — after SZULCZEWSKI (1971, fig. 7); Józefka — after MAŁKOWSKI (1971); Łagów-Dule — after DZIK (oral communication); Jabłonna — after the data of ŻAKOWA (1975); Kielce, Kowala, Sobiekurów — original.

1, 2..... ostracode samples.

Legend: 1 — flat-pebble intraformational conglomerates, 2 — irregular-pebble intraformational breccias, 3 — calcirudites, 4 — calcarenites, 5 — brachiopod limestones, 6 — non-bedded or poorly bedded stromatoporoid coral limestones, 7 — well-bedded micritic limestones, 8 — nodular limestones, 9 — wavy bedded micritic limestones, 10 — regularly bedded marly limestones, 11 — marly shales.

the stratigraphical value of the benthic ostracodes is reduced by the large proportion of endemic species. However, the endemism claimed for some species may be an artifact or our incomplete knowledge of Devonian ostracode faunas generally.

The pelagic entomozoids appear to be more useful for stratigraphical purposes in the Devonian, especially in the Upper Devonian, since many species are so widespread geographically.

STRATIGRAPHICAL SIGNIFICANCE OF BENTHIC OSTRACODES

Givetian

The ostracodes found at Jurkowice-Budy (table 1) confirm the generally accepted late Givetian age, even though *Nezamyslia eifeliensis* and *Fabalicypriis holuschurmensis* are known from both the Eifelian and Givetian, while the latter species has also been reported from the Frasnian. The stratigraphical range of the other species is restricted to the Givetian both in the Holy Cross Mountains and abroad. Most species occur exclusively in the Upper Givetian.

Amphissites (*Amphissites*) *pulcher*, *A.* (*Ectodemites*) *janischewskyi*, *Bairdia* (*Bairdia*) *plicatula*, *B.* (*Rectobairdia*) *hexagona*, *Bairdiocypris vastus*, *Microcheilina mandelstami*, and *Marginia syzranensis* occur in the Starooskolsk Beds, assigned to the Upper Givetian of the Russian Platform. *A.* (*A.*) *pulcher* and *Buregia jivensis* occur in the so-called "upper ostracode horizon" distinguished by SHISHKINSKAYA (1959) in the Volgian region near Saratov, Russian Platform. Both species have also been recorded at Jurkowice-Budy. *M. syzranensis* and *B. vastus* are also present in the Saratov-region (SHISHKINSKAYA 1959), in the so-called "middle ostracode horizon", at the boundary between Middle and Upper Givetian.

Many species recorded at Jurkowice-Budy are also reported from the southern Uralian and Fore-Uralian Deep (see ROZHDESTVENSKAYA 1962). In the Starooskolsk beds (Upper Givetian) species known from Jurkowice-Budy assemblage are: *A.* (*A.*) *pulcher*, *A.* (*E.*) *janischewskyi*, *M. syzranensis*, *F. holuschurmensis*, *M. mandelstami*, *B. vastus*, and *B.* (*B.*) *plicatula*. The last species occurs in Givetian strata throughout the Urals.

A. (*A.*) *pulcher* and *B. vastus* occur also in the Pelchinskiye Beds (Volhynia-Podolia margin of the Russian Platform) equivalent to the lower part of Starooskolsk Beds, i. e. Upper Givetian (LJUTKEVITCH and KRYLOVA 1973).

Six ostracode species are common to the Middle Devonian of Rheinland (Bergisches Land, Sauerland): *Coeloenellina minima*, *N. eifeliensis*, *B.* (*B.*) *plicatula*, *B.* (*C.*) cf. *singularis*, *Cytherellina dubia*, and *F. holuschurmensis*. In the Rheinland, *N. eifeliensis* ranges from unit I to VI recognized by GROOS (1969) in the Eifelian and Givetian; *B.* (*C.*) cf. *singularis* and *C. dubia* occur in unit V (Middle Givetian according to GROOS); *F. holuschurmensis* occurs in units V and VI (Middle and Upper Givetian); *C. minima* and *B.* (*B.*) *plicatula* occur exclusively in unit VI (Upper Givetian).

In the Givetian of Jurkowice-Budy, there are also some species recorded from the Eifel Mountains: *C. minima*, *N. eifeliensis*, *B.* (*C.*) cf. *singularis*, and *C. dubia*. *N. eifeliensis* occurs in the Eifel Mountains in both the Eifelian and Givetian though the other species are restricted to intervals of the Givetian (BECKER 1964, 1965a, b).

Frasnian

There are 6 ostracode species (table 1) in the lowermost Frasnian at Józefka Hill, the beds there being assigned to the conodont *P. asymmetricus* Zone. Of those, *Amphissites* cf. *parvulus* occurs in the Middle Frasnian (F2b-i/j) of the Ardennes and the Rhenish Schiefergebirge (MAGNE 1964, LETHIERS 1970b, BECKER 1971b, BECKER and BLESS 1974); *Parabolbinella vomis*, which is related to *P.* cf. *vomis*, occurs in the upper Middle Frasnian (F2i) of the Dinant Basin

(BECKER 1971*b*, BECKER and BLESS 1971). At Józefka Hill the considered ostracode species have apparently different range than in the Ardennes and the Rhenish Schiefergebirge. The other four species are only known from Józefka Hill.

The ostracode assemblage of Sobiekurów (table 1), has some species in common with the assemblage reported by POLENOVA (1955) from the Medymsk horizon (uppermost Lower Frasnian) of the Volga and Ural regions. *Bairdia* ex gr. *quarziana* EGOROV, *B.* ex gr. *zigulensis* POLENOVA, *B.* (?) *irregularis* POLENOVA, *Bairdiocypris* aff. *livensis* POLENOVA, and *Acratia tichonovitchi* EGOROV are identical or very similar to those present at Sobiekurów. All are typical of the Upper Frasnian of the Russian Platform, i. e. central Devonian Field and middle Volga (POLENOVA 1953, EGOROV 1950). *Microcheilinella peculiaris* has been identified by ROZHDESTVENSKAYA (1972) in the Sargajevskiye and Semilukskiye Beds (lowermost Frasnian) of the Southern Uralian and in the Petinskiye and Alatysrkiye Beds equivalent to the upper Lower Frasnian. In the Russian Platform, *F. holuschurmensis* occurs only in the Givetian; however, a closely related species, *Bairdia* aff. *holuschurmensis*, has been recorded by BLUMENSTENGEL (1969) in the Frasnian (*P. gigas* Zone) of Harz.

There are no species common to Sobiekurów and the Frasnian of Thuringia and the Ardennes with the Rhenish Schiefergebirge (BECKER and BLESS 1971, 1974, LETHIERS 1970*a, b*, MAGNE 1964, MATERN 1929, BLUMENSTENGEL 1965).

One may conclude that the ostracode fauna of Sobiekurów appears related to those typical of the upper Lower Frasnian or Upper Frasnian, while the strata were attributed to the Lower Frasnian on the basis of the macrofauna (OLKOWICZ-PAPROCKA and OZONKOWA 1970).

Famennian

The succession of benthic ostracodes recognized by BLUMENSTENGEL (1965, table 8) in the Upper Devonian of Thuringia, with 8 ostracode zones and 3 subzones is not confirmed in the Holy Cross Mountains.

When determining the ostracode zonation, BLUMENSTENGEL (1965) considered the vertical ranges of 36 species. Only 8 of the species are present in the Holy Cross Mountains: *Rectopla-cera elongata*, *R. elliptica*, *Orthonaria rectagona*, *Triplacera triquetra*, *Ceratacratia cerata*, *Processobairdia spinomarginata*, *Healdia anterodepressa*, and *Acratia (A.) clinata*. Benthic ostracodes resembling "Thuringer Ökotyp" are abundant in the Holy Cross Mountains but only in the Upper Famennian (IV to VI stages). Below, benthic ostracodes form markedly different assemblages from those of Thuringia, or are absent. Species typical of BLUMENSTENGEL's zones 6 to 8, viz. *P. spinomarginata*, *H. anterodepressa*, and *T. triquetra*, have been recorded at Kowala and Jabłonna. According to BLUMENSTENGEL, zone 6 is equivalent to the conodont upper *S. velifer* and *P. styriacus* Zones; zone 7 is equivalent to the lower *S. costatus* Zone; and zone 8 is equivalent to the middle and upper *S. costatus* Zone. In Kowala trench II, *Acratia (A.) clinata* which BLUMENSTENGEL claims to be restricted to the zone 7 occurs together with the above species. Zone 8 cannot be recognized in the Holy Cross Mountains, since it is based on the disappearance of species unknown in the area. Samples from Kowala and Jabłonna corresponding probably to zones 7 and 8 contain *R. elongata* and *R. elliptica*, both species recognized by BLUMENSTENGEL as restricted to zone 4 (equivalent to the conodont upper *P. crepida* and *P. rhomboidea* Zones).

Entomozoid zones

Ostracodes of the family Entomozoidae were recognized by MATERN (1929) and KUMMEROW (1939) to be useful for stratigraphical purposes. RABIEN (1954, 1956, 1960, RABITZ and RABIEN 1958, KREBS and RABIEN (1964) introduced an entomozoid zonation for the Upper Devonian and distinguished 8 zones with an additional zone in the *Gattendorfia* stage. This zonation pattern has been confirmed, with minor refinements, (BLUMENSTENGEL 1959, GRÜN-

DEL 1962, 1963, GOODAY 1974) and it is now generally accepted. The entomozoid zones have also been correlated (see table 4) with both the cephalopod and conodont stratigraphical schemes (RABIEN 1970 in: GOODAY 1974, KOCH *et al.* 1970, GROOS-UFFENORDE and UFFENORDE 1974, BECKER and BLESS 1974, TSCHIGOVA and BOUCKAERT 1977).

Four of the standard entomozoid zones have been recognized in the Upper Devonian of the southern Holy Cross Mountains (see table 5). No entomozoids typical of the *torleyi* and *variostrata* Zones have been recorded. The zone described by RABIEN (1954) and BECKER and BLESS (1974) as "Jüngere *Fossirichterina-Maternella* Zone" is referred to here as the Lower *hemisphaerica-dichotoma* Zone, following RABIEN (1970 in GOODAY 1974).

The entomozoid stratigraphical ranges found in the Upper Devonian of the Holy Cross Mountains are entirely consistent with the standard zonation pattern. Furthermore, their correlation with the conodont zones is also confirmed by the present study of the Holy Cross Mountains fauna.

Frasnian

Bertilionella cicatricosa Zone

Species of this zone have been found in Śluchowice quarry (see tables 1 and 5): *Bertilionella* (*Waldeckella*) *erecta* (RABIEN), *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH), *Richterina* (*Volckina*) cf. *zimmermanni* VOLK. They are associated with benthic ostracodes assigned to *Amphissites* sp. and *Bairdiacypris samsonowiczi* sp. n. This fauna occurs in beds of the conodont upper *P. asymmetricus* to lower *P. gigas* Zones.

B. (W.) erecta in Rhenish-Schiefergebirge is known exclusively from the *cicatricosa* Zone, equivalent to the conodont upper *P. asymmetricus* to lower *P. gigas* Zones (see table 4); while *R. (V.) zimmermanni* ranges from the *cicatricosa* up to *variostrata* Zones, the uppermost part of the latter zone comprising also the lowermost Famennian up to the top of Adorf stage (after RABIEN 1954). The stratigraphical range of *E. (N.) tenera* is also large, as it comprises the ostracode *cicatricosa-torleyi* interregnum, *cicatricosa*, *variostrata*, and *serratostrata-nehdensis* Zones. This is also the only entomozoid species present in the Frasnian deposits (unit "E") of Wietrzna II quarry representing the conodont lower *P. gigas* Zone. Presumably, this unit at Wietrzna is to be correlated with the ostracode upper *cicatricosa* or *cicatricosa-materni* interregnum Zones.

Famennian

Entomozoe (R.) serratostrata-Entomozoe (R.) nehdensis Zone

Species typical of this zone have been found in the Famennian of Jabłonna, Kadzielnia quarry, and Psie Górki Hill (see tables 1 and 5): *Entomozoe* (*Richteria*) *serratostrata* (SANDBERGER), *E. (Nehdentomis) nehdensis* (MATERN), *E. (Nehdentomis) tenera* (GÜRICH), *E. (Nehdentomis)* aff. *pseudorichterina* (VOLK). These species occur together only in samples taken at Jabłonna (see table 3). The stratigraphical ranges of *R. (N.) tenera* and *E. (N.) pseudorichterina* in Western Europe are large and cover not only the Lower Famennian but also a considerable part of the Frasnian. In contrast, *E. (R.) serratostrata* and *E. (N.) nehdensis* are restricted to the Nehden stage, equivalent to the ostracode *serratostrata-nehdensis* Zone (MATERN 1929, RABIEN 1954, 1960, BLUMENSTENGEL 1959, BECKER and BLESS 1974). The entomozoid species have been found in the following samples from Jabłonna: samples 1516, 1584, 1773, 1768, 1771, 1772, 1716, 1609, 1612, 1745, 1058, 1763, 1764, 1696, 1778, 1779, 1780, 1795, and 1817. Some samples did not contain the guide species. Then, the associated conodonts were useful; the samples cover the conodont *P. crepida*, *P. rhomboidea*, and lower *P. marginifera* Zones (SZULCZEWSKI, oral communication) equivalent jointly to the ostracode *serratostrata-nehdensis* Zone. Only *E. (N.)* aff. *pseudorichterina* occurs in samples 1774 and 1775 and hence, the stratigraphical position of both samples cannot be determined with certainty.

Table 4

Correlation of the cephalopod and conodont zones (after ZIEGLER 1971) with the entomozoid zonation (after RABIEN 1970 in GOODAY 1974)

Ammonoid Zones		Conodont Zones		Ostracod Zones	
GONIOCLY- MENIA	do VI	Protogna- thodus	costa- tus	U	hemisphaerica latior Interregnum
	do VI			M	
	do V/VI ?	L		hemisphaerica U	
	do V	styria- cus		U	dichotoma- Zone L
	do IV/V ?			M	
				L	
PLATYCLY- MENIA	do IV	velifer	U	intercostata - Zone	
	do III β		M		
	do III γ		L		
CHEILO-CERAS	do II β	mar- gini- fera	U	serratostrata -nehdensis-Zone	
	do II β		L		
	do II β	rhom- boidea	U		
	do II β		L		
	do II δ	crepida	U		
			M		
		L			
MANTICOCERAS	post-do I δ	trian- gularis	U	vario- striata	splendens-SZ.
	do I δ		M		
	do I δ		L		
	do I γ/δ	gigas	U	reichi-S.Z.	
	do I γ		U	materni-S.Z.	
	do I γ	L	cicatric-materni		
	do I γ	A. triangular.		cicatricosa-Zone	
	do I(β) γ	asym- metricus	U	cicatricosa-torleyi Interregnum	
			M		
			L		
			L		
	do I δ	hermani- cristatus	U	torleyi-Zone	
	L				

FRASNIAN			FAMENNIAN								STAGES	
MANTIOCERAS			CHEILOCERAS			PLATYCLYMENIA		GONIOCLYMENIA	WOCKLUMERIA		CEPHALOPOD ZONATION	
<i>asymmetricus</i>	<i>A. triangularis</i>	<i>gigas</i>	<i>triangularis</i>	<i>crepida</i>	<i>rhomboida</i>	<i>marginalifera</i>	<i>velifer</i>	<i>styriacus</i>	<i>costatus</i>	<i>Protognathodus</i>	CONODONT ZONATION	
<i>cicatricosa</i>		<i>variostrata</i>	<i>serratostrata-nehdensis</i>			<i>intercostata</i>		<i>hemisphaerica-dichotoma</i> Lower : Upper		<i>hemisphaerica/latior</i>	ENTOMOZOAN ZONATION	
											<i>B. (W.) erecta</i> (RABIEN) <i>R. (V.) zimmermanni</i> (VOLK) <i>E. (N.) tenera</i> (GURICH) <i>E. (N.) nehdensis</i> (MATERN) <i>E. (N.) cf. pseudorichterina</i> (MATERN) <i>E. (N.)</i> sp. <i>E. (N.) serratostrata</i> (SANDBERGER) <i>R. (F.) moravica</i> (RZEHAK) <i>R. (F.) semen</i> (JONES) <i>R. (F.)</i> sp. <i>R. (R.) striatula</i> (RICHTER) <i>R. (R.) costata</i> (RICHTER) <i>R. (R.) unispinosa</i> sp. n. <i>R. (R.) cf. tenuistriata</i> (KUMMEROW) <i>R. (M.) ? aff. exornata</i> (MATERN) <i>R. (M.) dichotoma</i> (PAECKELMANN) <i>R. (M.) hemisphaerica</i> (RICHTER)	

Table 5
Entomozoid stratigraphical ranges in the Upper Devonian of the Holy Cross Mountains

Besides entomozoids, some samples also contain poorly preserved individuals of *Coryellina sanctacrucensis* sp. n. In the borehole Jabłonna IG-1, the ostracode *serratostrata-nehdensis* Zone has been recorded at the depth interval 69.55-66.65 m (samples 1361, 1375, 1264, 1374, 1369, and 1371). *E. (N.) tenera* is the only entomozoid present. Its stratigraphical range is fairly large but the species never occurs in strata younger than the *serratostrata-nehdensis* Zone. In fact, the associated conodont fauna (SZULCZEWSKI, oral communication) indicates the conodont upper *P. rhomboides* Zone equivalent to the upper *serratostrata-nehdensis* Zone.

Only *E. (E.) tenera* has been found in the *Cheiloceras* Limestone of Kadzielnia quarry. *E. (R.) serratostrata* and *E. (N.) tenera* occur also in the exposure at Psie Górki Hill in deposits of the conodont *P. crepida* Zone equivalent to the ostracode *serratostrata-nehdensis* Zone.

Richterina (Fossirichterina) intercostata Zone

The following entomozoid species of this zone have been recorded (see table 5): *Richterina (Fossirichterina) moravica* (RŽEHAK), *R. (Fossirichterina) semen* (JONES), *R. (Fossirichterina) sp.*, *R. (Richterina) striatula* (RICHTER), *R. (Maternella)? aff. exornata* (MATERN). In the Rhenish Schiefergebirge, Thuringia, and Great Britain, those species occur also in the ostracode lower *hemisphaericadichotoma* Zone (RABIEN 1954, BLUMENSTENGEL 1959, BECKER and BLESS 1974, GOODAY 1974). However, the absence of species indicative of the base of the higher ostracode zone, i. e. *R. (R.) costata*, *R. (M.) dichotoma*, and *R. (M.) hemisphaerica*, permits assignment to the *intercostata* Zone. This is confirmed by the occurrence of a conodont fauna typical of the *S. velifer* Zone (SZULCZEWSKI, oral communication). The above species have been found in samples 1679, 1835, 1680, 1836, 1837 and 1838 from Jabłonna; the samples contain also the benthic species *Rectoplacera aff. robusta*. Only *R. (F.) moravica* occurs in sample 1838 and hence, that sample can probably be assigned to the ostracode *intercostata* Zone.

R. (R.) unispinosa and the benthic species *Rectoplacera aff. robusta* and *Bairdia (B.) aff. kelleri* occur in samples 1740 and 1741. These samples represent the conodont *S. velifer* Zone equivalent to the ostracode *intercostata* Zone. Thus, one may claim that they are to be attributed to the *intercostata* Zone.

The following benthic ostracode species have been recorded in the samples of *intercostata* Zone: *Coryellina sanctacrucensis*, *Bairdia (B.) hypsela*, *Bairdia (B.) aff. kelleri*, *Microcheilina sp.*, *Rectoplacera aff. robusta*.

B. (B.) aff. kelleri occurs in the lower *intercostata* Zone in Ardennes and the Rhenish Schiefergebirge (BECKER and BLESS 1974). The stratigraphic range of *B. (B.) hypsela* is large; in fact, it has also been reported from the Lower Carboniferous (LETHIERS 1975).

In the borehole Jabłonna IG-1, only poorly preserved specimens assigned questionably to *R. (R.) striatula* have been found in the sample 1369 taken at the depth interval 65.10-65.80 m. The sample represents the conodont lower *P. marginifera* Zone. As noted by RABIEN (1954) and BLUMENSTENGEL (1959), *R. (R.) striatula* does occur in the ostracode *intercostata* Zone: then, the investigated sample may be attributed to the latter zone.

Richterina (Maternella) hemisphaerica — *Richterina (Maternella) dichotoma* Zone

Lower hemisphaerica-dichotoma Zone

Entomozoids typical of this zone have been recorded at Kowala and Jabłonna, and possibly Kielce (see table 5). There are: *Richterina (Fossirichterina) moravica* (RŽEHAK), *R. (Richterina) costata* (RICHTER), *R. (Richterina) unispinosa* sp. n., *R. (Richterina) striatula* (RICHTER), *R. (Maternella) hemisphaerica* (RICHTER), *R. (Maternella) dichotoma* (PAECKELMAN), *R. (Maternella) ? aff. exornata* (MATERN), *Entomozoe (Nehdentomis) ? sp.* Most have been recorded from samples 1833, 1677, and 1834 taken at Jabłonna. The co-occurrence of *Richterina (Maternella)* and *R. (Fossirichterina)* as well as the presence of *R. (R.) costata* re-

stricted to the *hemisphaerica-dichotoma* Zone indicate that these are to be correlated with the ostracode lower *hemisphaerica-dichotoma* Zone (= Jüngere *Fossirichterina-Maternella* Zeit in BECKER and BLESS 1974). The samples represent the conodont lower to middle *P. styriacus* Zone (SZULCZEWSKI, oral communication). They are dominated by *R. (R.) costata* and *R. (M.)* ? aff. *exornata*. Only doubtful representatives of *R. (R.) unispinosa* have been found in sample 1727 and hence, that sample cannot be attributed to any ostracode zone.

At Jabłonna, the entomozoid of lower *hemisphaerica-dichotoma* Zone are associated with the following benthic ostracodes: *Bairdia (B.) hypsela*, *B. (B.) galinae*, *B. (R.)* sp., *Newsomites blessi*, *Microcheilinella* sp., and *Orthonaria rectagona*. No entomozoids of the lower *hemisphaerica-dichotoma* Zone have been found in borehole Jabłonna IG-1.

All the above entomozoids, associated with the 9 benthic ostracode species (see table 2) have been found in samples 98 and 99 taken in the trench II at Kowala and therefore also indicate the lower *hemisphaerica-dichotoma* Zone. The ostracode fauna from Kielce is probably correlatable to the same zone. It includes *R. (R.) striatula* and *R. (M.)* ? aff. *exornata*, the latter species never recorded in the ostracode upper *hemisphaerica-dichotoma* Zone. The associated conodont fauna represents the *S. velifer* to *P. styriacus* Zones corresponding to the ostracode upper *intercostata* and lower *hemisphaerica-dichotoma* Zones.

Upper hemisphaerica-dichotoma Zone

Entomozoids of this zone have been found at Jabłonna and in both trenches of Kowala. There are the following entomozoid species (see table 5): *Richterina (Richterina) costata* (RICHTER), *R. (Richterina) striatula* (RICHTER), *R. (Richterina) cf. tenuistriata* (KUMMEROW), *R. (Maternella) dichotoma* (PAECKELMAN), *R. (Maternella) hemisphaerica* (RICHTER). In Thuringia and the Rhenish Schiefergebirge, these entomozoids exceed in stratigraphical range of the upper *hemisphaerica-dichotoma* Zone, as they occur also lower in the section. However, the absence of *Richterina (Fossirichterina)* and the associated conodonts indicating the *S. costatus* Zone (Dr. M. SZULCZEWSKI and Dr. H. MATYJA — oral communications) demonstrates that the strata are to be attributed to the ostracode upper *hemisphaerica-dichotoma* Zone. Furthermore, *R. (R.) tenuistriata* was reported by BLUMENSTENGEL (1959) from the upper *hemisphaerica-dichotoma* Zone ("Schicht" 10) from Thuringia, while it has never been found in older strata.

R. (R.) striatula and *R. (M.) dichotoma* are the only entomozoid species found in this zone from samples taken from trench II at Jabłonna; they are associated with a rich (19 species) assemblage of benthic ostracodes (see table 3). In general, ostracodes are rather uncommon at Jabłonna. This is probably due to the acid preparation methods. The benthic ostracodes are preserved as moulds or silicified carapaces, while entomozoids have probably been dissolved. No entomozoids of the upper *hemisphaerica-dichotoma* Zone have been found in borehole Jabłonna IG-1, except for *R. (M.) dichotoma*, recorded in sample 1366 from the depth interval 62.50–62.60 m. This species is present through *hemisphaerica-dichotoma* Zone in the Holy Cross Mountains.

All these entomozoids typical of the upper *hemisphaerica-dichotoma* Zone have also been found in the *Wocklumeria* stage in the trenches at Kowala (samples 100–112, 121–133 — see table 2). The most abundant is *R. (R.) striatula*. There is also a very rich (40 species) assemblage of benthic ostracodes (see tables 2 and 3).

PALEOGEOGRAPHICAL DISTRIBUTION

Givetian

The ostracode assemblage of Jurkowiec-Budy includes many species known from other areas of Poland as well as from the Givetian of the Russian Platform and Western Europe. This indicates the wide connections between the Upper Givetian marine basins. The Givetian

ostracodes of Jurkowiec-Budy appear closely related to the contemporaneous fauna of Western Pomerania, Poland (see fig. 3) (under study by Dr. B. ŻBIKOWSKA and described by NEHRING, 1971 from the borehole Jamno, Pomerania). Of 33 species recorded at Jurkowiec-Budy, 9 species occur also in western Pomerania: *R. tuimazensis*, *A. (A.) pulcher*, *N. eifeliensis*, *B. (R.) hexagona*, *B. (B.) plicatula*, *B. (C.) cf. singularis*, *M. syzranensis*, *M. mandelstami*, and *S. aff. crassa*.

Similarly, some 33% of the Givetian ostracode fauna of the Holy Cross Mountains has been reported from areas of the Russian Platform (POLENOVA 1952, ROZHDESTVENSKAYA 1962, SHISH-

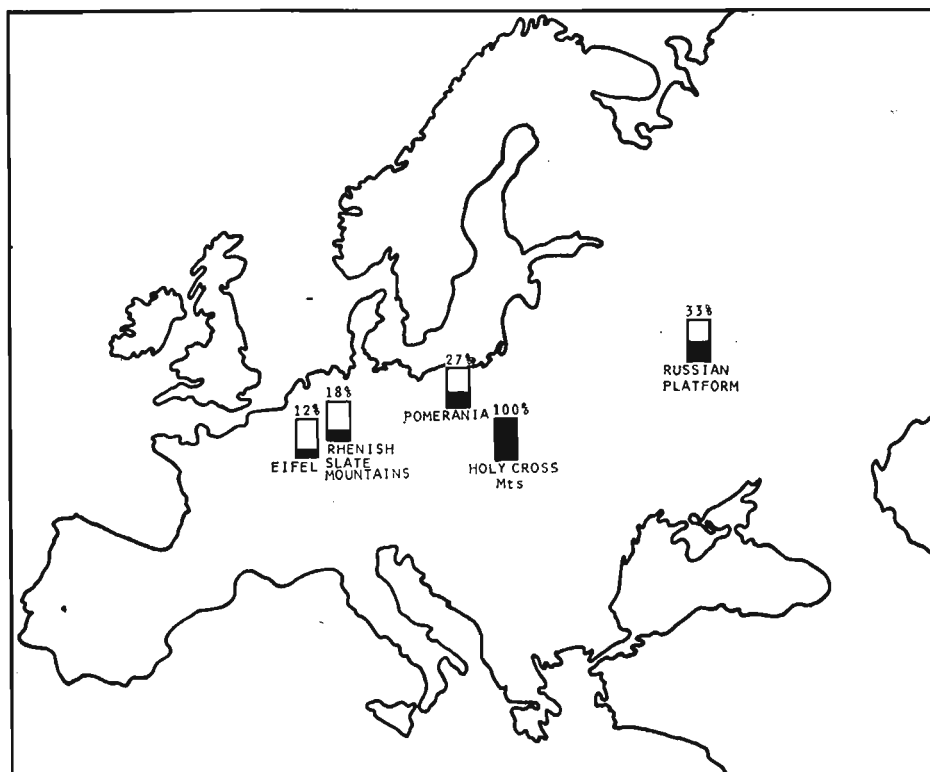


Fig. 3

Geographical distribution of the Givetian ostracode fauna of Jurkowiec-Budy in Europe.

KINSKAYA 1959). The following species are in common: *R. tuimazensis*, *A. (A.) pulcher*, *A. (E.) janischewskyi*, *N. eifeliensis*, *M. syzranensis*, *B. (B.) plicatula*, *B. (R.) hexagona*, *B. vastus*, *F. holuschurmensis*, *B. jivensis*, and *M. mandelstami*.

Only 18% of the Givetian ostracodes of Sauerland-Bergisches Land are common to the Polish fauna. Six species of the Jurkowiec-Budy assemblage have been recorded by GROOS (1969): *C. minima*, *N. eifeliensis*, *C. dubia*, *B. (B.) plicatula*, *B. (C.) cf. singularis*, and *F. holuschurmensis*.

The assemblage of Jurkowiec-Budy appears least similar to that of Eifel Mountains; only 4 species 12% are in common, namely *C. minima*, *N. eifeliensis*, *B. (C.) cf. singularis*, and *C. dubia*. No species have been found in common between the Givetian of Jurkowiec-Budy and Thuringia and Harz Mountains.

Frasnian

Paleogeographical relationships of the Frasnian ostracode fauna of the Holy Cross Mountains can hardly be determined because of the small number of Frasnian ostracode species recorded in the Holy Cross area.

No benthic ostracodes have been found common to Western Pomerania. The only species

in common between both these areas is the pelagic *E. (N.) tenera*. In contrast to the Holy Cross Mountains, Upper Devonian entomozoids are very rare in Western Pomerania (Dr. B. ŻBIKOWSKA — oral communication).

Frasnian benthic ostracodes of the Holy Cross Mountains resemble somewhat those of the Russian Platform. Five species of the Sobiekurów assemblage are common to the Russian fauna. In contrast, most entomozoids recorded in the Frasnian of the Russian Platform (POLENOVA 1955) are unknown in Poland and Western Europe. The entomozoids recorded in Wietrznia and Śluchowice quarries have also been reported from Western European countries.

Famennian

The rich entomozoid assemblage present in the Famennian of the southern Holy Cross Mountains includes many species common to the northern Holy Cross Mountains (KOŚCIELNIAKOWSKA 1967). Moreover, *E. (R.) serratostrinata* and *E. (N.) tenera* have been noted by

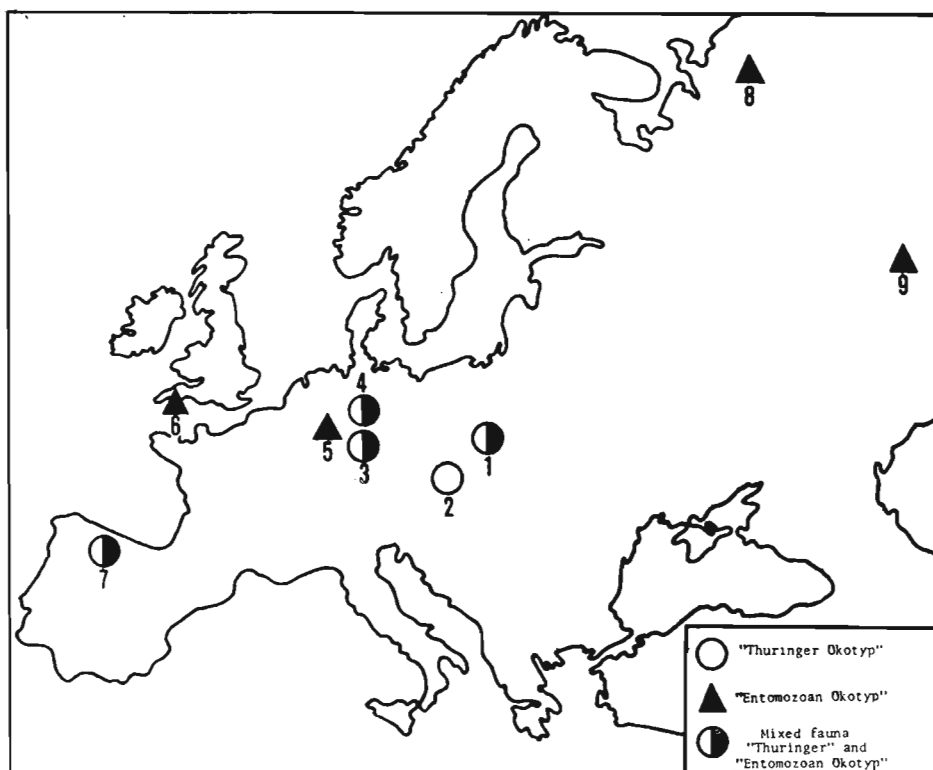


Fig. 4

Geographical distribution of the ostracode faunas of "Thuringer Ökotyp", "Entomozoan Ökotyp", and mixed type in the Famennian of Europe.

1 — Holy Cross Mountains, 2 — Moravia, 3 — Thuringia, 4 — Harz Mountains, 5 — the Rhenish Schiefergebirge, 6 — southwestern Great Britain, 7 — Cantabrian Mountains, 8 — Timan-Pechora region, 9 — Bashkiria.

GUNIA (1968) in Świebodzice depression, Sudeten region. In contrast to the Holy Cross Mountains, Upper Famennian entomozoids are absent from the latter area due probably to a decrease in basin depth (GUNIA *l.c.*).

The Famennian entomozoids present in the Holy Cross Mountains have also been reported from the Upper Devonian of China, Soviet Union, Thuringia, the Rhenish Schiefergebirge, Harz Mountains, Armorican Massif, Ardennes, Cantabrian Mountains, and southwestern Great Britain. They occurred in fairly deep basins. Their distribution indicates the wide connections among the Famennian marine basins all over the Europe and Asia (fig. 4).

The Famennian benthic ostracoda fauna of "Thuringer Ökotyp" recorded in the Holy Cross Mountains consists mostly of spiny podocopids of the family Rectonariidae. It includes many species in common with its contemporaneous faunas of Moravia, Thuringia (11 species), and the Cantabrian Mountains (9 species), and species common to the Harz Mountains and Bulgaria. This supports the possible migration proposed for Famennian ostracodes.

SYSTEMATIC PART

Terminological remarks

The morphological terminology used is mostly after KESLING (1951) with several terms introduced later by other authors. The outlines of carapaces with straight dorsal margins are determined according to JAANUSSON'S (1957) definition, while the terminology of areas of the lateral surface and the names of marginal parts of carapaces are adopted after KESLING (1951) and POKORNÝ (1950) and those concerning the morphology of paleocopid carapaces — after JAANUSSON (1957), MARTINSSON (1955, 1962) and SCOTT (1961). The morphological elements of the platycopid carapaces are named according to GUBER and JAANUSSON (1964) and ADAMCZAK (1966). The types of dimorphic structures are called in conformity with HENNINGSMOEN'S (1965) terminology. The terminology of marginal areas, abbreviations of measurements and morphological elements of podocopid valves are adopted after SOHN (1960), GROOS (1969) and ADAMCZAK (1976) and the morphology of entomozoid valves — according to RABIEN'S (1954) definitions.

Abbreviations used

C — carapace	♀ — heteromorph
RV — right valve	♂ — tecnomorph
LV — left valve	L — length of carapace
juv — juvenile form	H — height of carapace
	W — width of carapace

Order **Palaeocopida** HENNINGSMOEN, 1953
 Suborder **Beyrichiomorpha** HENNINGSMOEN, 1965
 Superfamily **Beyrichiacea** MATTHEW, 1886
 Family **Beyrichiidae** MATTHEW, 1886
 Genus *Kozłowskiella* (PŘIBYL, 1953)

Type species: Ulrichia (Kozłowskiella) kozłowskii PŘIBYL, 1953

Kozłowskiella jurkowicensis OLEMPSKA, 1974

(pl. 11:1)

1974. *Kozłowskiella jurkowicensis* OLEMPSKA: 521, pl. 22: 1-4.

Material. — One carapace of heteromorph and one juvenile carapace, four valves of heteromorphs and four damaged valves of tecnomorphs.

Dimensions (in mm):

	L	H	W
C ♀ ZPAL 0.XII/1	1.54	1.01	0.84

Description and remarks. — See OLEMPKA, 1974.

Occurrence. — Poland (Holy Cross Mountains): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Genus *Reversoscapha* ROZHDESTVENSKAYA, 1972

Type species: Reversoscapha martinsoni ROZHDESTVENSKAYA, 1972

Reversoscapha sandomiriensis OLEMPKA, 1974

(pl. 11: 2)

1974. *Reversoscapha? sandomiriensis* OLEMPKA: 522, pl. 23: 1-3.

Material. — Nine well preserved carapaces of tecnomorphs and three damaged carapaces of heteromorphs.

Dimensions (in mm):

	L	H	W
C ♂ ZPAL O.XII/14	1.01	0.70	0.60

Description and remarks. — See OLEMPKA, 1974.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Family *Welleriellidae* ABUSHIK, 1971

Genus *Welleria* ULRICH and BASSLER, 1923

Type species: Welleria obliqua ULRICH and BASSLER, 1923

Welleria aequiconvexa OLEMPKA, 1974

(pl. 11: 3)

1974. *Welleria aequiconvexa* OLEMPKA: 524, pl. 24: 1-2.

Material. — Nineteen well preserved carapaces of tecnomorphs and two of heteromorphs.

Dimensions (in mm):

	L	H	W
C ♀ ZPAL O.XII/23	1.46	0.92	0.87

Description and remarks. — See OLEMPKA, 1974.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Genus *Welleriella* ABUSHIK, 1971

Type species: Welleriella prostrata ABUSHIK, 1971

Welleriella rakoviensis OLEMPKA, 1974

(pl. 11: 4)

1974. *Welleriella rakoviensis* OLEMPKA: 525, pl. 25: 1-2.

Material. — Twentynine carapaces of tecnomorphs, two of heteromorphs and two valves of heteromorphs, mostly well preserved.

Dimensions (in mm):

	L	H	W
C♀ ZPAL 0.XII/44	1.65	1.04	0.98

Description and remarks. — See OLEMPKA, 1974.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Suborder **Hollinomorpha** HENNINGSMOEN, 1965
 Superfamily **Hollinacea** SWARTZ, 1936
 Family **Hollinellidae** BLESS and JORDAN, 1971
 Genus *Hollinella* CORYELL, 1928 emend. KELLET, 1929

Type species: *Hollinella dentata* CORYELL, 1928

Subgenus *Keslingella* BLESS and JORDAN, 1970

Type species: *Hollinella pumila* KESLING, 1952

Hollinella (Keslingella)? sp.

(pl. 11: 5-6)

Material. — One internal mould of a juvenile form and a fragmentary valve of an adult tecnomorph.

Dimensions (in mm):

	L	H	W
C juv ZPAL 0.XV/1	1.26	0.67	0.48
LV ZPAL 0.XV/2	1.09	0.80	—

Description. — Adult tecnomorph. Carapace gently preplete in lateral outline. Maximum length in midheight. Preadductorial lobe (L_2) in the form of a small node and postadductorial node — a large node projecting over the dorsal margin; adductorial sulcus (S_2) deep, short. Adventral structure wide in the anterior and marginal parts of the free margin and terminating in a spiny process pointing posteriorly. Surface of valves smooth.

Juvenile form. — Adventral structure composed of a pair of poorly visible adventral spurs connected by an indistinct ridge.

Remarks. — A more detailed identification of the specimen is precluded by a very poor state of preservation, in particular of the adventral structure on the tecnomorph valve and by poorly visible spurs in the anteroventral part of carapace of the juvenile form. The outline of carapace and development of L_2 and L_3 display similarities to those in *Hollinella (Keslingella) sufflata* (BECKER) and *Hollinella antri* ADAMCZAK.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Family **Hollinidae** SWARTZ, 1936
 Subfamily **Falsipollicinae** BLESS and JORDAN, 1971
 Genus *Parabolbinella* ADAMCZAK, 1968

Type species: Parabolbinella postaculeata ADAMCZAK, 1968

Parabolbinella cf. *vomis* BECKER and BLESS, 1971

(pl. 12: 1)

Material. — Three poorly preserved heteromorph carapaces and one tecnomorph carapace.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/3	0.96	0.51

Description. — Heteromorph: carapace preplete in lateral outline. Maximum length in midheight of carapace and maximum height in midlength. Dorsal margin long, straight. Anterior margin rounded, posterior truncate in its ventral part. Preadductorial lobe (L_2) in the form of a small node, postadductorial lobe (L_3) — a large node, adductorial sulcus (S_2) relatively deep and limited to the area between L_2 and L_3 . Adventral structure running along the anterior and, partly, ventral margin and reaching the adventral spur in the posterior part of carapace. Surface of carapace indistinctly granulose.

Tecnomorph having two spurs, one occurring in the ventral part of the anterior end of carapace and the other near the ventral margin under L_3 .

Remarks. — The specimens from Józefka Hill differ from typical representatives of *P. vomis* in a slightly smaller postadductorial lobe (L_3) and a deeper adductorial sulcus (S_2). These differences seem to result from a poor state of preservation of the specimens, mostly from their compression. The adventral spur in the posteroventral part of the carapace of *P. cf. vomis* is situated identically as the spines of *Parabolbinella postaculeata* ADAMCZAK. The differences concern the length of carapaces and size of their postadductorial lobes. Carapaces assigned to *P. cf. vomis* are longer than those of *P. postaculeata* and have considerably smaller postadductorial lobes.

Occurrence. — Poland (Holy Cross Mts.): Józefka Hill, L. Frasnian (L. *Polygnathus asymmetricus* Zone, do I α).

Superfamily **Primitiopsacea** SWARTZ, 1936
 Family **Pribylitiidae** POKORNÝ, 1958
 Genus *Pribylites* POKORNÝ, 1950

Type species: Pribylites moravicus POKORNÝ, 1950

Pribylites? sp.

(pl. 12: 2-3)

Material. — Ten carapaces corroded on the surface.

Dimensions (in mm):

	L	H	W
C. juv. ZPAL 0.XV/4	0.96	0.48	0.64
C juv. ZPAL 0.XV/5	0.75	0.46	0.51

Description. — Carapace sub-preplete in lateral outline. Dorsal margin long, straight; ventral gently rounded. Carapace strongly and rather equally swollen. Maximum length in midheight, maximum height in the posterior half of carapace and maximum width somewhat further than midlength. Carapace flattened on the ventral side. Median sulcus deep, rounded in outline. Velar structure in the form of a small, winglike spine in the posterior part of carapace close to the ventral margin and of a poorly visible ridge stretching along the ventral margin. Marginal tubercles are poorly visible along the free margin. Surface of valves smooth.

Remarks. — *Pribylites* sp. displays a certain similarity, in its lateral outline and ventral compression of its carapace, to *Selebratina? petaliformis* ROZHDESTVENSKAYA. The lateral outline of its carapace and development of its median sulcus and velar structure are also similar to those of species of the genus *Sulcatiella* POLENOVA, from which the specimens from Jurkowie-Budy differ, however, in the absence of inflation along the free margin of their carapaces.

Occurrence. — Poland (Holy Cross Mts.): Jurkowie-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Genus *Coryellina* BRADFIELD, 1936

Type species: Coryellina capax BRADFIELD, 1936

Remarks. — Most morphological characters of the representatives of the genus *Coryellina* BRADFIELD are identical with those of the species assigned to the *Selebratina* POLENOVA. An equally developed sulcus or, less frequently, an adductorial spot, a spine in the posteroventral part and three nodes at the posterior termination of the heteromorph valves occur in the two genera. According to SOHN (1962), *Selebratina* may be a synonym of *Coryellina*. Also, in my opinion, the differences between species of the genera mentioned above are too small and, therefore, insufficient to justify their separation. Thus, *Selebratina* POLENOVA has been considered in the present paper as a junior synonym of *Coryellina* BRADFIELD.

Coryellina tenuisulcata sp. n.

(pl. 12: 4-5)

Holotype: ZPAL 0.XVI/6; pl. 12: 4.

Type horizon: Upper Devonian, Famennian, *Wocklumeria* Stage.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: *tenuis* — thin, *sulcus* — a furrow, the name indicates a species with a slightly outlined median sulcus.

Diagnosis. — A *Coryellina* with a slightly outlined median sulcus and finely reticulate surface of valves.

Material. — Six carapaces and nine valves of tecnomorphs, and one carapace and one valve of heteromorphs. In most specimens, the posteroventral spines are broken off at the base.

Dimensions (in mm):

	L	H	W
C ♀ ZPAL 0.XV/6	0.80	0.57	0.55
C ♂ ZPAL 0.XV/7	0.78	0.50	0.56

Description. — Heteromorph: carapace preplete in lateral outline. Dorsal margin long, straight, terminating at the ends in small, auriculate processes. Hinge margin slightly depressed. Maximum height occurring in the anterior part of carapace, maximum width in the posteroventral part. Anterior margin wide, equally rounded; posterior margin gently truncate in the ventral part. A shallow, wide sulcus, not reaching the dorsal margin, is located in the

middle of valve. A posteriorly pointing spine occurs in the posteroventral part of each valve. Marginal tubercles are observed along the free margin. Valves finely reticulate. The surface of valves adjoining the free margin smooth. Three nodes on each valve occur in the posterior end of carapace.

Tecnomorph differs from the carapaces of heteromorph only in the lack of nodes in the posterior end of carapace.

Remarks. — The species described differs from other known species of the genus *Coryellina* in a considerably shallower and slightly outlined median sulcus.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

Coryellina sanctacrucensis sp. n.

(pl. 12: 6-8)

Holotype: ZPAL 0.XV/10; pl. 12: 8.

Type horizon: Upper Devonian, Famennian, *Wocklumeria* Stage.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: a Latinized name of the Holy Cross Mountains.

Diagnosis. — Lateral surface reticulate; S_2 narrow and deep; carapace strongly swollen.

Material. — Thirteen carapaces and five valves of tecnomorphs and eleven carapaces and one valve of heteromorphs, all of them on the whole well preserved.

Dimensions (in mm):

	L	H	W
C ♀ ZPAL 0.XV/8	0.72	0.56	0.48
C ♀ ZPAL 0.XV/9	0.84	0.56	0.56
ZPAL 0.XV/10	1.09	0.74	—

Description. — Heteromorph: carapace preplete in lateral outline, strongly swollen. Dorsal margin long, straight, terminating in a small spine in the posterior end of the right valve. Hinge margin slightly depressed. Maximum length in midheight, maximum height in the anterior part, maximum width in the posteroventral part. A narrow and deep sulcus occurs in the median part of valve above the midheight. A posteriorly pointing spine is situated in the posteroventral part of each valve. Marginal tubercles are present along the free margin. Except for its parts near the dorsal and ventral margins, sulcus and the surface adjoining the anterior margin which are smooth, the lateral surfaces of valves are reticulate. On each valve, three nodes occur at the posterior end of carapace.

Tecnomorphs differ from the carapaces of heteromorphs only in the lack of nodes at the posterior end of carapace.

Remarks. — The species described above is very similar in shape and ornamentation to *Coryellina obesa* GREEN, differing from it only in the presence of spines in the posteroventral part of carapace. It also displays a certain similarity to *Selebratina spinosa* ROZHDESTVENSKAYA, differing from it in a larger convexity of carapace in dorsal view and a deeper sulcus.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Kielce, Łagów, Jabłonna; Famennian (*Platyclymenia-Wocklumeria* Stage).

Coryellina sp.

(pl. 12: 9-10)

Material. — One carapace and two valves of heteromorphs and two valves of tecnomorphs, partly damaged, with spines broken off at the base.

Dimensions (in mm):

	L	H	W
RV ♂ ZPAL 0.XV/11	0.70	0.48	—
C ♂ ZPAL 0.XV/12	0.78	0.53	0.54

Description. — Heteromorph: carapace preplete in lateral outline. Dorsal margin long, straight, terminating in the posterior part of right valve in an auriculate process. Hinge margin somewhat depressed. Maximum length in midheight, maximum height in the anterior part of carapace, maximum width in its posteroventral part. A posteriorly pointing spine occurs in the posteroventral part of each valve. A small, round adductor spot is situated in the median part of valve. Marginal tubercles are observed along the free margin. Lateral surface pitted. At the posterior end of carapace, three nodes occur on each valve.

Tecomorph differs from heteromorph in the lack of nodes at the posterior end of carapace.

Remarks. — This species differs from other *Coryellina* in the lack of S_2 . At the same time, it displays a general similarity to *Selebratina foveolata* ROZHDESTVENSKAYA, from which it differs in a lower situation of its spine and in the lack of sulcus in the median part of valve.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

Family *Rozhdestvenskayitidae* MCGILL, 1966

Genus *Rozhdestvenskayites* MCGILL, 1966

Type species: Rozhdestvenskayites diuturna MCGILL, 1966.

Rozhdestvenskayites tuimazensis (ROZHDESTVENSKAYA, 1959)

(pl. 13: 1)

1959. *Aparchites tuimazensis*: ROZHDESTVENSKAYA: 132, pl. 1: 1-4.

Material. — A hundred and thirty carapaces of adult and juvenile forms, mostly well preserved.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/13	1.51	1.15	0.75

Description. — Carapace equivalved, regularly convex in dorsal view. Dorsal margin straight, relatively long, terminating in the posterior and anterior end with small auricles slightly turned posteriorly. Maximum length in midheight, maximum width in the median part of carapace. Anterior margin slightly truncate in the ventral part, posterior regularly rounded. An adductor spot in the form of an oval, darker speck is visible in many specimens in midheight of carapace and somewhat towards the anterior part.

Remarks. — This species displays a considerable similarity to *Aparchites speciosus* PŘIBYL, from which it differs in a longer dorsal margin. From *A. chuchlensis* PŘIBYL, similar in lateral outline, *R. tuimazensis* differs in the occurrence of auriculate projections on the ends of the dorsal margin and in a larger length of this margin. It also displays a general similarity to *A. auriculiferus* ROZHDESTVENSKAYA, from which it differs in a smaller width of carapace and resembles *A. rozhdestvenskayae* POLENOVA, from which it differs slightly in a higher carapace. From *A. koneprusiensis* PŘIBYL and ŠNAJDR it differs in the auriculate ends of the dorsal margin and smaller dimensions. *R. tuimazensis* also displays a certain similarity to *A. crumena* (KUMMEROW), but differs from it in the presence of auricles. The occurrence of auricles and their

outline relate the species described to *Rozhdestvenskayites diuturna* MCGILL, from which it differs in a smooth surface of carapace.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds); USSR, Bashkir ASSR, Eifelian (Biya Beds).

Family **Aparchitidae** JONES, 1901
Genus *Coeloenellina* POLENOVA, 1952

Type species: Coeloenellina parva POLENOVA, 1952.

Remarks. — The question whether or not the genera *Coeloenellina* POLENOVA, 1952 and *Coeloenella* STEWART, 1936 are synonyms was solved by SOHN (1972) who found that the toptype of the carapace of *Coeloenella scapha* (STEWART) had dorsal margins of carapaces tucked up to the inside of carapace and not contacting each other. They have neither grooves nor lists on the dorsal margin and thus they would have to be connected by means of ligament, whose operation manner and attachment place are unknown. This manner of connecting valves has not so far been known in the Ostracoda (SOHN, 1972). The occurrence of a groove running along the hinge of the right valve and serving for connection with the dorsal margin of the left valve was found by POLENOVA (1952) in the representatives of the genus *Coeloenellina*. Thus, in her revision of *Coeloenellina*, POLENOVA (1968) assigned it to the family Aparchitidae. The species *Coeloenellina minima* (KUMMEROW) has a groove on the right and a list on the left valve.

Coeloenellina minima (KUMMEROW, 1953)

(pl. 13: 2-3)

1953. *Schmidtella minima* KUMMEROW: 24, pl. 2: 12.

1965. *Coeloenellina minima* (KUMMEROW); BECKER: 173, pl. 5: 3-4.

1969. *Coeloenellina minima* (KUMMEROW); GROSS: 30, fig. 14.

Material. — More than 500 variously preserved carapaces of adult and juvenile specimens.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/14	0.90	0.56	0.46
C ZPAL 0.XV/15	0.64	0.48	0.46

Description. — Carapace suboval in lateral outline. Hinge margin straight, ventral margin rounded. Right valve larger, overlaps the left valve along the entire free margin. Hinge margin situated in a V-shaped depression, which extends posteriorly not reaching the end of carapace and which results from a distinct convexity of the valves, mostly in their anterodorsal part projecting over the hinge margin. The elevation disappears rather suddenly in the posterior one-sixth of the length of carapace. The posterior end of carapace is considerably higher than the anterior one and forms a "backward swing". Halfway the height, small spines pointing posteriorly occur on the posterior end of carapace in both valves.

Variability. — The specimens from Jurkowice include two quite different forms and many others which display transitional characters. One of these two forms (pl. 13 : 3) is marked by carapaces of considerable width and devoid of spines on the posterior end, while the other (pl. 13 : 2) has more elongate and on the whole larger carapaces with two small spines on each valve.

Remarks. — *C. minima* Kummerow is similar to *C. ima* BECKER in its lateral outline and differs from it in a more projecting elevation and the presence of spines. From *Coeloenellina*?

sp. (cf. GROOS 1969) *C. minima* differs in a higher elevation of the valves above their hinge margin.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds); Federal Republic of Germany: Eifelian, Givetian (Büchler Beds.).

Coeloenellina cf. *parva* POLENOVA, 1952

(pl. 13: 4)

Material. — Fifteen variously preserved carapaces of adult specimens.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/16	0.42	0.30	0.22

Description. — Carapace small, suboval in lateral outline, with a truncate dorsal margin. Maximum height occurring in the posterior half of carapace, maximum width — behind the middle of carapace, symmetrically on both valves. Hinge margin straight, situated in the depression. Ventral margin gently rounded. Both ends rounded, the posterior one slightly higher. Cardinal angles rounded. Right valve overlaps left along the entire free margin. Surface smooth.

Remarks. — The form described differs very slightly from *Coeloenellina parva* POLENOVA in more symmetrically convex valves in dorsal view and a larger carapace.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds.).

Suborder **Kirkbyocopina** GRÜNDEL, 1969
Superfamily **Kirkbyacea** ULRICH and BASSLER, 1906
Family **Kirkbyidae** ULRICH and BASSLER, 1906
Genus *Nezamyslia* PŘIBYL, 1954

Type species: *Kirkbya* (?) *bohemica* PŘIBYL and ŠNAJDR, 1950.

Nezamyslia eifeliensis (ADAMCZAK, 1968)

(pl. 13: 5)

1962. *Nezamyslia bohemica* (PŘIBYL and ŠNAJDR; ROZHDESTVENSKAYA: 192, pl. 6: 7.

1964. *Ostracodarium* g. indet. sp. A; BECKER: 89, pl. 6: 5.

1968. *Obotritia eifeliensis* ADAMCZAK: 85, pl. 38: 1-3.

1969. *Nezamyslia eifeliensis* (ADAMCZAK); GROSS: 39, pl. 19: 14.

1969. *Obotritia eifeliensis* ADAMCZAK; BECKER: 262, pl. 1: 6.

Material. — One well-preserved valve of a juvenile form.
Dimensions (in mm):

	L	H
LV ZPAL 0.XV/17	1.32	0.78

Description. — Valve subamplete in lateral outline. Dorsal margin long, straight, ventral rounded. Except for upper parts, both ends equally rounded. Lateral surface bordered by an adventral ridge parallel to free margin. In the dorsal part, this ridge is connected with the dorsal ridge, forming a sort of a ring-like structure. In the anterior part of valve, dorsal ridge approaches hinge margin. A small depression occurs in the anteroventral part of valve and an irregular adductorial spot in the anteromedian part of valve. The anterior end of the dorsal margin

of valve terminates in a small, conical, upturned spine. A smaller spine is visible in its posterior part near the end of dorsal margin. Surface reticulate.

Remarks. — The specimen described differs from those, assigned by ADAMCZAK (1968) to *Obotritia eifeliensis*, in smaller dimensions. Presumably, it is a juvenile form. The *N. eifeliensis* specimen from Jurkowice-Budy locality has a distinctly developed small spine on the posterior end of dorsal margin, which may be the result of a better state of preservation. As follows from the illustrations of holotype and juvenile forms of *N. eifeliensis* (ADAMCZAK 1968, pl. 38 : 1-3), the posterior parts of these specimens are slightly damaged and, therefore, it is impossible to state whether or not such a spine occurs in them at all.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds); Wydryszów, Eifelian (Grzegorzowice Beds). Federal Republic of Germany: Eifel Mts., Bergisches Land, Sauerland, Eifelian, Givetian. USSR: Bashkir ASSR, Ural Mountains, Eifelian (Biya Beds); Ural Mts., Givetian (Afonino Beds).

Family **Amphissitidae** KNIGHT, 1928

Genus *Amphissites* GIRTY, 1910

Type species: Amphissites rugosus GIRTY, 1910.

Amphissites pulcher POLENOVA, 1952

(pl. 13: 8; pl. 14: 1-2)

1952. *Amphissites (Amphissites) pulcher* POLENOVA: 115, pl. 9: 2, 3; pl. 10: 1.

1961. *Amphissites pulcher* POLENOVA; SOHN: 121.

Material. — Seven carapaces of adult and three of juvenile specimens, some with a damaged surface, three left valves and one right.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/20	1.54	0.90	0.84
C ZPAL 0.XV/21	1.60	0.87	0.95
C juv. ZPAL 0.XV/22	0.95	0.55	0.52

Description. — Carapace postplete in lateral outline. Hinge margin long, straight. Maximum length occurring somewhat below the midheight, maximum height — in the posterior half of carapace. A small, gently rounded median node, with a kirkbyian pit surrounded by a thin ridge occurring at its base somewhat anteriorly, is visible in the median part of valve nearer the dorsal margin. A ventral carina, parallel to the free margin, approaches the adventral structure in the antero- and posterodorsal part. An inner carina, parallel to the anterior and posterior margins, is developed in the form of two isolated ridges reaching about one-third of the height of valve. It is connected with the dorsal ridge and a slight elevation, somewhat larger in juvenile forms, occurs at a point of their connection. Dorsal area in the form of an irregular hexagon extending posteriorly. Surface reticulate.

Remarks. — *A. pulcher* differs from *A. remesi* POKORNÝ in finer carinae less projecting over the surface of valve and in a large “swing” observed in adult forms. In *A. remesi*, a small “swing” occurs only in some specimens (PŘIBYL 1950). *A. pulcher* differs from *Amphissites* sp. A., described by ADAMCZAK (1968) in a considerably wider carapace, particularly so in its anterior part, and a more extensive median node. *A. pulcher* also displays a similarity to *Amphissites irinae* GLEBOVSKAYA and ZASPELOVA (in EGOROV 1953), from which it differs in a smaller median node.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds). USSR: Russian Platform, U. Givetian.

Amphissites cf. parvulus (PÆCKELMAN, 1913)

(pl. 14: 3)

1964. *Amphissites* sp. F; MAGNE: pl. 25: 190-193.1970. *Amphissites irinae* EGOROV; LETHIERS: 114, pl. 11: 1.1971b. *Amphissites cf. parvulus* (PÆCKELMAN); BECKER: 18, pl. 1: 1-6.

Material. — Eleven well preserved carapaces and three poorly preserved valves of adult forms.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/29	0.79	0.48	0.56

Description. — See BECKER (1971 b).

Remarks. — Specimens occurring in Frasnian at Śluchowice are similar to *A. parvulus* in the outline of carapace and in the development of their median nodes and carinae. Specimens from Józefka Hill are better preserved and display a concordance in all morphological characters with *A. cf. parvulus* described by BECKER (1971 b).

Occurrence. — Poland (Holy Cross Mts.): Józefka Hill (do II); Śluchowice, Frasnian, U. *Polygnathus asymmetricus* Zone, do I (β) (γ). Belgium: Mulde von Dinant, Middle and Upper Frasnian (F2a-i). France: Boulonnais, Frasnian (Fr 1-3).

Amphissites sp.

(pl. 14: 4)

Material. — Four carapaces and 5 valves of adult specimens with a corroded surface.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/24	0.88	0.48

Description. — Carapace subamplete in lateral outline. Dorsal margin straight. Maximum height in midlength of carapace. Ventral margin gently rounded. Median node small but strongly projecting over the surface of carapace. A gentle depression is outlined around the median node. A kirkbyian pit occurs below the median node, somewhat anteriorly. A ventral carina, reaching the adventral structure at the anterior and posterior ends, stretches parallel to the ventral margin. Inner carina in the form of two short ridges parallel to the anterior and posterior margins at which it is connected with the dorsal ridge. Due to a poor state of preservation, it is difficult to trace the outline of dorsal area. Lateral surface reticulate.

Remarks. — The presence of two carinae, ventral and inner, the latter developed in the form of two isolated ridges connected with the dorsal ridge, relates the specimens from the Holy Cross Mts. with those described by BLUMENSTENGEL (1965, 1969) as *Amphissites* sp. aff. *irinae* GLEBOVSKAYA and ZASPELOVA (in EGOROV 1953). The described specimens display also a considerable similarity to *Amphissites cf. parvulus* (PÆCKELMANN), from which they differ slightly in less distinctly outlined ridges of inner carina.

Occurrence. — Poland (Holy Cross Mts.): Śluchowice, Frasnian, U. *Polygnathus asymmetricus* Zone, do I (β) (γ); Kadzielnia, Famennian (*Palmatolepis marginifera* Zone, do II β-III α); Kowala, Famennian (*Spathognathodus costatus* Zone, do VI).

Subgenus *Amphissites* (*Ectodemites*) COOPER, 1941

Type species: Amphissites (Ectodemites) primus COOPER, 1941.

Amphissites (Ectodemites) janischewskyi POLENOVA, 1952

(pl. 13: 6-7)

1952. *Amphissites (Ectodemites) janischewskyi* POLENOVA: 118, pl. 10: 2:3.

1961. "*Ectodemites*" *janischewskyi* POLENOVA; SOHN: 127.

Material. — Thirty carapaces with a corroded surface and one right valve, all of adult forms.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/18	2.00	1.20	1.00
RV ZPAL 0.XV/19	1.76	1.04	—

Description. — Carapace gently postplete in lateral outline. Dorsal margin straight, terminating in auriculate projections, ventral gently rounded. Anterior and posterior ends almost symmetrically rounded. Median node occurring somewhat behind the midlength and nearer the dorsal margin. Small convexities are observed near the dorsal margin in the anterior and posterior one-third of the length of valve. The valves are bordered by an adventral structure and a ventral carina parallel to it. Ventral carina approaches, but not contacts the adventral structure. Kirkbyian pit large, situated before the lower part of median node and surrounded by a ridge. Lateral surface reticulate.

Remarks. — This species displays a similarity to *A. formosus* ZANINA, from which it differs in a more distinctly developed ventral carina and larger median node.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds); USSR: Russian Platform (Central Devonian Field), Givetian.

Genus *Kegelites* CORYELL and BOOTH, 1933

Type species: Girtyites spinosus CORYELL and BOOTH, 1933.

Kegelites polonicus sp. n.

(pl. 14: 5-6)

Holotype: ZPAL 0.XV/25; pl. 14: 5.

Type horizon: Upper Givetian, *Stringocephalus burtini* Beds.

Type locality: Jurkowiec-Budy, Holy Cross Mts., Poland.

Derivation of the name: *polonicus* — occurring in Poland.

Diagnosis — A representative of *Kegelites* with a large median node. Ventral carina terminating posteroventrally in a spine. Dorsal ridge in the form of a swelling in the anterior and of a process in the posterior part.

Material. — A hundred and ten partly destroyed adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/25	1.22	0.64	0.75
C ZPAL 0.XV/26	1.22	0.64	0.72

Description. — Carapace gently postplete in lateral outline. Dorsal margin long, straight. Posterior part of carapace somewhat higher than anterior. Ends almost symmetrically rounded. Ventral margin substraight. A median node, horizontally elongate and higher in the posterior

part occurs in the middle of carapace. At its base, a kirkbyian pit occurs somewhat anteriorly. Ventral carina, disappearing near the anterior and posterior margins of carapace at two-thirds of the height of valves, stretches almost parallel to the ventral margin and does not contact the adventral structure. This carina terminates posteriorly in a projecting spine and anteriorly has the form of a ridgelike swelling. In the ventromedian part, the carina is very poorly visible under the median node. A short dorsal ridge, shaped like a spiny process, occurs in the postero-dorsal part. In the anterior part, where it is less developed than in the posterior part, it has the form of a swelling. Dorsal area is not separated. Left valve somewhat larger. Surface finely reticulate.

Ontogeny. — The dorsal ridge is more distinctly outlined in juvenile than in adult forms. In the posterior part it is formed like a distinct swelling and in the anterior part it is poorly visible. Ventral carina is also more distinctly outlined in juvenile specimens.

Remarks. — The species described differs from the known representatives of *Kegelites* in a spiny posterior termination of carina and in the presence of a ridgelike swelling in the postero-dorsal part.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds.).

Family *Arcyzonidae* KESLING, 1961
Genus *Reticestus* KESLING and WEISS, 1953

Type species: Reticestus acclivitatus KESLING and WEISS, 1953.

Reticestus sp.

(pl. 14: 8)

Material. — Three well preserved adult carapaces.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/28	0.32	0.22	0.17

Description. — Carapace very small, suboval in lateral outline. Dorsal margin straight, ventral, anterior and posterior margins rounded. Maximum height in midlength, maximum width in the median part of carapace. A small, shallow sulcus, perpendicular to dorsal margin, occurs in the median part of valve. A nodular elevation is situated in the posterodorsal part of valve. Lateral surface reticulate.

Remarks. — The form described is most similar in its lateral outline and ornamentation of carapace to *Reticestus* sp. 1, described by BANDEL and BECKER (1975) from the Lower Carboniferous (cu II β/γ) of the Carnic Alps. From other species of this genus it differs in the presence of a sulcus instead of an adductor pit and in very small dimensions of carapace.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

Genus *Paegnum* KESLING, 1957

Type species: Paegnum tanaum KESLING, 1957.

Paegnium? sp.

(pl. 14: 7)

Material. — Twenty poorly preserved valves of adult specimens.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/27	0.83	0.77

Description. — Carapace subelliptical in lateral outline, with a truncate dorsal margin. Dorsal margin straight. Maximum height occurring in the median part of valve. A velar ridge stretches along the free margin. A narrow dorsal ridge occurs along the dorsal margin in the median part of valve and an adductorial pit is seen somewhat more anteriorly. Surface reticulate.

Remarks. — The presence of the velar ridge, narrow dorsal ridge and adductorial pit in the specimens described, with a simultaneous lack of other morphological characters such as convexities or ridges indicate that they probably are of the genus *Paegnium*. In their lateral outline and morphology they are related to *Paegnium* sp. A (LETHIERS 1972, pl. 23: 1-2) from the Famennian of the Ardennes.

Occurrence. — Poland (Holy Cross Mts.): Kadzielnia quarry, Famennian (*Palmatolepis marginifera* Zone, do II β —III α).

Order **Platycopida** SARS, 1866 (*sensu* ADAMCZAK, 1966)Suborder **Kloedenellocopina** SCOTT, 1961Superfamily **Kloedenellacea** ULRICH and BASSLER, 1923Family **Kloedenellidae** ULRICH and BASSLER, 1923Genus *Kloedenellitina* EGOROV, 1950*Type species: Beyrichia (?) sygmaeformis* BATALINA, 1941.*Kloedenellitina* sp.

(pl. 15: 1-2)

Material. — Five heteromorph and two tecnomorph carapaces, with a partly corroded surface.

Dimensions (in mm):

	L	H	W
C♀ ZPAL 0.XV/31	1.18	0.56	0.48
C♀ ZPAL 0.XV/32	1.01	0.48	0.45

Description. — Heteromorph: carapace preplete in lateral outline. Maximum length in midheight of valve, maximum height in the anterior part of carapace. Dorsal margin long, straight, ventral gently concave in the median part. Anterior margin rounded, posterior sharply truncate in the ventral part. The right, larger valve overlaps the left along the entire free margin. Valves are flattened along the free margin except at their posterior ends. A sulcus in the form of an elongate depression considerable shallowing near the dorsal margin occurs before the midlength point. A brood pouch, separated from the rest of carapace by a depression running from the ventral margin upwards and reaching halfway the height of carapace, is situated in its posteroventral part. A convexity occurs under the sulcus in the ventromedian part of valve. Surface pitted.

Tecnomorph differs from the female carapace in the lack of brood pouch and inflation of valves along the entire free margin.

Remarks. — The specimens described are very similar in the outline of convexity to *Kloedenellina sigmaformis* (BATALINA), from which they differ in a narrower and less distinctly outlined marginal inflation and shallower sulci, that is, both the adductor sulcus and that bordering the brood pouch.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Genus *Sulcella* CORYELL and SAMPLE, 1932

Type species: Sulcella sulcata CORYELL and SAMPLE, 1932.

Sulcella aff. *speculaea* BECKER, 1965a

(pl. 15: 3)

Material. — Two heteromorph and 7 tecnomorph carapaces, including five of juvenile individuals, poorly preserved.

Dimensions (in mm):

	L	H	W
C ♀ ZPAL 0.XV/33	1.09	0.58	0.48

Description. — Heteromorph: carapace similar in outline to a rounded rectangle. Dorsal margin substraight. Maximum length in midheight, maximum width at the posterior end of carapace. Ventral margin slightly concave in the median part and subparallel to the dorsal one. Anterior margin rounded, posterior diagonally truncate in the lower part. Stragulum long, rather narrow. Adductor pit small, round, situated before the middle and somewhat upwards of the midheight of valve. The convex part at the posterior end is bordered by a fine, oblique depression. The plication appears along the ventral margin of right valve which is larger. Surface finely reticulate.

Tecnomorphs differ from female carapaces in a slenderer outline of carapace and the situation of maximum width which occurs nearer the middle of valve.

Remarks. — The specimens described differ from typical representatives of *S. speculaea* in a finely reticulate surface of carapace. The surface of the holotype of *S. speculaea*, illustrated by BECKER (1965a) is strongly damaged, but in his description of the species BECKER (*l.c.*) mentions that it is probably smooth. It seems that the *S. aff. speculaea* is identical with the form determined by GROOS (1969) as *Sulcella* sp. group *S. refrathensis* — *speculaea* from the Givetian of Bergisches Land. *S. aff. speculaea* is also similar to specimens representing *Sulcella* (*Sulcella*) *kloedenellides* ADAMCZAK, from which it differs in the lack of a ridge in the posterior part of carapace and in the reticulate surface (ADAMCZAK 1968).

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Genus *Marginia* POLENOVA, 1952

Type species: Marginia sculpta POLENOVA, 1952.

Marginia syzranensis POLENOVA, 1952

(pl. 15: 4-5)

Material. — Two carapaces of heteromorphs and 6 of tecnomorphs, all with a partly corroded surface.

Dimensions (in mm):

		L	H	W
C ♀	ZPAL 0.XV/34	1.09	0.64	0.51
C juv.	ZPAL 0.XV/35	0.88	0.51	0.32

Description. — Heteromorph: carapace oval-rectangular in lateral outline. Dorsal margin substraight, almost parallel to the ventral one, which is slightly concave in the median part. An auriculate projection occurs in the posterior part of dorsal margin of the right, poorly preserved, valve. Both ends of the carapace rounded, posterior somewhat truncate in the ventral part. The right valve slightly larger. The posteroventral part of carapace more swollen than the rest of it. Hinge margin in the posterodorsal part is situated in a depression which does not reach the midlength of carapace. Stragulum narrow, occupying a half of the length of hinge margin. An admarginal flange stretches along the ventral margin on both valves and, in this connection, the ventral margin is situated within a wide and deep depression. Adductorial sulcus narrow. Surface of valves smooth.

Tecnomorphs differ from heteromorphs in the lack of a swelling in the posterior part of carapace.

Remarks. — In its lateral outline, this species resembles *Marginia tuberculata* ROZHDESTVENSKAYA, from which it differs, however, in a smooth surface and the lack of a nodular L₂. It also displays a similarity in the outline of valves to *Marginia selebratis* POLENOVA, from which it differs in a sharply outlined admarginal flange along the whole ventral margin of both valves and in a smooth surface of carapace.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds). USSR: Russian Platform (Central Devonian Field), U. Givetian.

Marginia ? sp.

(pl. 15: 6-7)

Material. — Two heteromorph and 4 tecnomorph carapaces partly corroded on the surface.

Dimensions (in mm):

		L	H	W
C ♀	ZPAL 0.XV/36	1.32	0.75	0.51
C ♂	ZPAL 0.XV/37	1.12	0.67	0.38

Description. — Heteromorph: carapace oval-rectangular in lateral outline. Dorsal and ventral margins straight and parallel. Anterior and posterior ends rounded, the posterior one more widely rounded. Right valve slightly overlaps the left. A narrow sulcus occurs in the anterior half of carapace near the middle and upwards of the midheight of valve. This sulcus gently turns posteriorly near the dorsal margin. The surface of carapace is covered with very fine costae slightly converging towards both ends of carapace. A fine, poorly visible ridge occurs along the ventral margin of the right valve. The posterior part of carapace, containing the brood pouch, is considerably more convex than the rest of it.

Tecnomorphs differ from female carapaces in the lack of convexity in the posterior part of carapace and in the presence, in the posteroventral part, of a fine, short depression in valves, which stretches anteriorly, running diagonally from the ventral margin.

Remarks. — This species differs from others of the genus *Marginia* in the lack of distinct admarginal flanges along the ventral margin. In addition, it is very similar to *Marginia sculpta multicostata* POLENOVA, particularly so in its lateral outline and costae occurring on the surface

of its valves, but differs from it in finer costae. The presence of oblique costae and the absence of a distinct admarginal flange along the ventral margin relates this species to *Marginia* (?) *decorata* ROZHDESTVENSKAYA from the Upper Famennian of the Bashkir ASSR, from which it differs in a smoother surface between costae, which in *M.* (?) *decorata* is finely pitted.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Genus *Knoxiella* EGOROV, 1950

Type species: Knoxiella semilukiana EGOROV, 1950.

Knoxiella? sp.

(pl. 15: 8)

Material. — Three valves of heteromorphs and 4 valves and 2 carapaces of tecnomorphs, all partly damaged.

Dimensions (in mm):

	L	H	W
C ♂ ZPAL 0.XV/38	0.70	0.38	0.29

Description. — Heteromorph: carapace suboval in lateral outline. Dorsal margin straight. Maximum height before the midlength of valve, maximum length in midheight, maximum width in the posterior part of carapace. Ventral margin gently rounded. Posterior end rounded, slightly truncate in the ventral part, anterior end uniformly rounded. Right valve somewhat larger overlaps left valve along the entire free margin and the greatest overlap is along the ventral margin. A sulcus occurs somewhat before the middle of valve upwards of the midheight. A round node occurs before the sulcus near the dorsal margin. Behind the sulcus, the posterior part of valve has the form of an extensive convexity. On each valve, two tiny nodular processes occur at the posterior end of carapace near both margins. Surface finely reticulate.

Tecnomorph differs from heteromorph in a flatter posterior part of carapace.

Remarks. — The specimens described differ from other known species of *Knoxiella* in the presence of two tiny nodes in the posterior part of carapace.

Occurrence. — Poland (Holy Cross Mts.): Kielce, Famennian (*Platyclymenia* Stage, do III); Kowala, Famennian (*Wocklumeria* Stage, do VI).

Family *Buregiidae* POLENOVA, 1953

Genus *Buregia* ZASPELOVA in: POLENOVA, 1953

Type species: Buregia bispinosa ZASPELOVA in: POLENOVA, 1953.

Buregia jivensis SHISHKINSKAYA, 1959

(pl. 15: 9)

1959. *Buregia jivensis* SHISHKINSKAYA: 38, pl. 10: 7:8.

Material. — Ten variously preserved carapaces of tecnomorphs and one poorly preserved carapace probably of a heteromorph.

Dimensions (in mm):

	L	H	W
C ♂ ZPAL 0.XV/39	1.12	0.73	0.66

Description. — Tecnomorph: carapace elongate, subpreplete. Dorsal margin straight, ventral rounded. Anterior cardinal angle more rounded than posterior angle. Both ends rounded. Left valve slightly overlapped by right. A fine ridge, whose ends display single small spiny processes, occurs along the ventral margin on both valves. At the anterior end of carapace, the processes are situated symmetrically on both valves and at the posterior ends they are slightly displaced in relation to each other. Maximum width occurs in the median part. Surface smooth.

? Heteromorph: Maximum width of a carapace, presumably belonging to a female individual, is somewhat more shifted towards the posterior end.

Remarks. — The specimens described are similar to those of *B. bispinosa* ZASPELOVA (*in*: POLENOVA 1953), but differs from them in larger dimensions of carapace and smaller size of processes at the ends of carapace and to *B. zadonica* POLENOVA from which they differ in a smaller degree of overlapping the valves along the ventral margin. From *B. truncata* POLENOVA they differ in the lack of sulcus in the median part of valve.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds). USSR: Russian Platform (Saratov region), Givetian.

Suborder **Platycopina** SARS, 1866
Superfamily **Cytherellacea** SARS, 1866
Family **Cavellinidae** EGOROV, 1950
Genus *Cavellina* CORYELL, 1928

Type species: Cavellina pulchella CORYELL, 1928.

Cavellina czarnockii sp. n.

(pl. 16: 1-2)

Holotype: ZPAL 0.XV/40; pl. 16: 1.

Type horizon: Upper Givetian, *Stringocephalus burtini* Beds.

Type locality: Jurkowiec-Budy, Holy Cross Mts., Poland.

Derivation of the name: In honour of the late Jan CZARNOCKI, a geologist and explorer of the Holy Cross Mountains.

Diagnosis. — Carapace suboval in lateral outline with a maximum height in the posterior part. Left valve is very slightly overlapped by the right along the entire free margin.

Material. — Eighty six tecno- and ninety four heteromorph carapaces, well preserved on the whole.

Dimensions (in mm):

	L	H	W
C ♀ ZPAL 0.XV/40	1.09	0.64	0.40
C ♂ ZPAL 0.XV/41	1.02	0.58	0.37

Description. — Heteromorph: carapace suboval in lateral outline. Dorsal margin straight. Maximum height in the posterior one-third of the length, maximum width in the posterior end of carapace. Anterior end uniformly rounded, posterior slightly truncate in the ventral part. Ventral margin straight or slightly concave before the midlength. A slight overlapping of valves is uniform along the entire free margin. The posterior, most convex part of carapace is separated from the rest of it by a poorly visible, shallow depression. Surface smooth.

Tecnomorph: As compared with heteromorphs, the carapaces of males and juvenile individuals are more flattened in the posterior part, with a maximum convexity in dorsal view occurring near the middle of carapace. Male carapaces have a gently convex dorsal margin.

Remarks. — In its lateral and dorsal outline, *C. czarnockii* sp. n. displays a considerable similarity to *C. aff. coela* ROME, illustrated by BECKER *et al.* (1974) and BECKER and BLESS

(1974) and identified by these authors as *Cavellina* sp. 36 from the Famennian of the Ardennes — Rhenish Massif. *C. czarnockii* sp. n. differs from it in a considerably smaller degree of overlapping the valves. *C. czarnockii* sp. n. displays a similarity, in the lateral outline of carapace, to *C. accurata* POLENOVA, but differs from it in straight dorsal margin and a maximum height occurring nearer the posterior end, while in *C. accurata* carapace is the highest in the median part. A certain similarity in outline and in the manner of overlapping the valves is also observed between *C. czarnockii* sp. n. and *C. explicata* EGOROVA, but the former has a dorsal margin which is straight all over its length.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Order **Metacopida** SYLVESTER-BRADLEY, 1961

Superfamily **Thlipsuracea** ULRICH, 1894

Family **Thlipsuridae** ULRICH, 1894

Genus *Favulella* SWARTZ and SWAIN, 1941

Type species: Bythocypris favulosa JONES, 1889.

Favulella sp.

(pl. 16: 3-4)

Material. — Ten poorly preserved adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/42	0.64	0.40	0.31
C ZPAL 0.XV/43	0.64	0.37	0.28

Description. — Carapace suboval in outline. Dorsal margin substraight or slightly convex. Maximum length occurs in midheight of carapace, maximum height — in its anterior part and maximum width — in the median part. Ventral margin straight. Both ends rounded. A submarginal ridge stretches along the anterior, posterior and ventral margin. It is parallel to the margins of carapace, except for the median part of ventral margin where it is slightly bent upwards at some distance from the margin. A slight convexity is outlined in the posterodorsal part of carapace. Lateral surface reticulate.

Remarks. — The specimens of *Favulella* sp. from Józefka Hill display a similarity to *F. lecomptei* BECKER, from which they differ in a more oval outline of carapace, substraight dorsal margin and less distinct reticulation of the lateral surface of valve. Due to a poor state of preservation of the specimens, it is impossible to state whether or not the submedian spot occurs in them.

Occurrence. — Poland (Holy Cross Mts.): Józefka Hill, Frasnian (L. *Polygnathus asymmetricus* Zone, do I α).

Superfamily **Healdicea** HARLTON, 1933

Family **Healdiidae** HARLTON, 1933

Genus *Healdia* ROUNDY, 1926

Type species: Healdia simplex ROUNDY, 1926.

Healdia anterodepressa BLUMENSTENGEL, 1965?

(pl. 16: 5)

Material. — Two poorly preserved carapaces and 4 internal moulds of adult forms. Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/44	0.98	0.59	0.48

Description. — Carapace elongate-oval to triangular in lateral outline. Dorsal margin rounded, ventral straight or slightly concave. Anterior and posterior margins rounded, the posterior more so. Maximum height in the median part of carapace or somewhat posteriorly, maximum width in the posterior part of carapace. Left valve larger, slightly overlapping the right, in particular in the central part. Two spines on each valve occur in the posterior part of carapace: the posteroventral one is situated in the extension of the ventral margin and the posterodorsal one near the dorsal margin and somewhat anteriorly of the former. An indistinct depression of valves is observed along the anterior margin. Surface smooth.

Remarks. — Due to a poor preservation it is impossible to trace accurately the depression of valves running along the anterior margin; in *A. anterodepressa* it makes up a diagnostic character. The specimens from the Holy Cross Mts. are similar to *Healdiopsis thuringensis* GRÜNDEL, from which they differ only in the presence of the indistinct depression along the anterior margin.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (*Platyclymenia-Wocklumeria* Stage, do IV—do VI).

Genus *Marginohealdia* BLUMENSTENGEL, 1965

Type species: Marginohealdia marginata BLUMENSTENGEL, 1965.

Marginohealdia sobolevi sp. n.

(pl. 16: 6-8)

Holotype: ZPAL 0.XV/47; pl. 16: 8.

Type horizon: Famennian, *Clymenia* Stage.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: In honour of the late Dymitr SOBOLEV, a geologist and explorer of the Holy Cross Mts.

Diagnosis. — This is a representative of the *Marginohealdia*, having a very indistinct ridge with a small spine in its posteroventral part, occurring in the posterior part of carapace.

Material. — Thirty variously preserved adult carapaces.

Dimensions (in mm):

	L	H	W
ZPAL 0.XV/47	0.98	0.58	0.42
ZPAL 0.XV/46	1.06	0.67	—
ZPAL 0.XV/45	0.92	0.57	0.42

Description. — Carapace diagonally oval in lateral outline. Dorsal and ventral margins gently rounded. Anterior and posterior ends rounded, the anterior one lower. Maximum length occurs almost midheight, maximum height — in midlength or somewhat behind. Carapace almost uniformly convex in dorsal view, with a maximum width in the median part. Left valve overlaps the right one along the entire free margin. A very indistinctly outlined vertical ridge, terminating in a small spine in the posteroventral part, occurs at the posterior end of carapace. Surface smooth.

Remarks. — The species described is related to *M. marginata* BLUMENSTENGEL, differing from it in a less distinct ridge, smaller spine in the posteroventral part and a maximum width

of carapace in its median part, while in *M. marginata* the carapace is the widest where the ridge occurs, that is, in the posterior part.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Łagów, Kielce, Psie Górki — Famennian (*Platyclymenia-Wocklumeria* Stage, do III—do VI).

Marginohealdia sp.

(pl. 16: 9)

Material. — Nine variously preserved adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/48	0.700	0.336	0.352

Description. — Carapace elongate oval-rectangular in lateral outline. Left, larger valve shallowly overlaps the right one along the free margin. Dorsal margin gently rounded, ventral substraight. Anterior and posterior ends rounded. Spines, connected with each other by a narrow, vertical ridge, occur in the posterodorsal and posteroventral parts. A flattening of valves, wider at the anterior end, is outlined along the anterior and posterior margins of carapace. Carapace flattened ventrally. Surface smooth.

Remarks. — This form displays considerable similarity in the lateral outline of carapace to *M. marginata* BLUMENSTENGEL, from which it differs in the presence of spine in the posterodorsal part.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna — Famennian (*Wocklumeria* Stage, do VI).

Order **Podocopida** MÜLLER, 1894
 Suborder **Cypridocopina** JONES, 1901
 Superfamily **Bairdiacea** SARS, 1888
 Family **Bairdiidae** SARS, 1888
 Genus *Bairdia* MCCOY, 1844

Type species: Bairdia curta MCCOY, 1844.

Remarks. — The revision of Paleozoic forms of *Bairdia* and related genera was conducted by SOHN (1960). Taking into account differences in carapace outlines and valve overlapping, he distinguished, among the known species of *Bairdia*, four new genera. SOHN'S (1960) new genera were considered by BECKER (1965) as subgenera of *Bairdia*. BECKER'S view was accepted by many other later authors, although according to ADAMCZAK (1976) the outline of carapace was not a sufficient character for erecting new genera or subgenera. He pointed out the necessity of investigating differences in the internal structure of valves. The subgenera of *Bairdia* are marked by the following characters:

- *Bairdia s.s.*: dorsal margin arcuate, ventral curved to straight, antero- and posterodorsal margin straight or gently curved; ends narrow, posterior one is pointed.
- *Cryptobairdia*: differs from *Bairdia s.s.* in its dorsal margin which imperceptibly turns into the anterodorsal one.
- *Orthobairdia*: differs from *Bairdia s.s.* in that the sides are parallel in dorsal outline.
- *Rectobairdia*: differs from *Bairdia s.s.* in a straight or very gently curved dorsal margin.

Due to a very small number of data on the internal structure of the Devonian species of *Bairdia* and the suitability of the classification presented above for distinguishing *Bairdia*-like forms, the above subgeneric names have been made use of in the present paper.

Subgenus *Bairdia* (*Bairdia*) MCCOY, 1844

Type species: Bairdia curta MCCOY, 1844.

Bairdia (*Bairdia*) *hypsel*a ROME, 1971

(pl. 17: 1-2)

1961. *Bairdia* sp.; GRÜNDEL: 106, pl. 6: 6-8.

1965. *Bairdia* sp. Type C; BLUMENSTENGEL: 31, pl. 11: 11.

1971. *Bairdia hypsel*a ROME: 21, figs. 25, 26.

1975. *Bairdia* (*Orthobairdia* ?) *hypsel*a ROME; LETHIERS: 71, pl. 7: 1-8 (here older synonymy).

Material. — Several hundred adult and juvenile carapaces, well preserved on the whole.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/49	1.036	0.560	0.416
C ZPAL 0.XV/50	0.980	0.512	0.400

Description. — Carapace irregularly hexagonal and rounded in lateral outline. Maximum length below the midheight, maximum height before the midlength and maximum width in the median part of carapace. Dorsal margin gently curved, posterodorsal slope steeper than anterodorsal. Ventral margin straight. Posterior margin pointed below the midheight, anterior rounded and slightly truncate anteroventrally. Left valve overlaps the right one in the antero- and posterodorsal and ventral parts along a small bow-shaped projection occurring before the midlength. In the median part, the surface of valves is pitted and along the margins smooth.

Remarks. — A revision of several species of *Bairdia* and *Orthobairdia*, described by ROME (1971) from the Devonian-Carboniferous transitional beds was done by LETHIERS (1975), who found them conspecific with *B. (O. ?) hypsel*a ROME, which displays a considerable similarity in carapace outline to *O. ordensis* JONES, *B. hypsoconcha* GIBSON and *B. turgida* BŁASZYK and NATUSIEWICZ and resembles several species of *Bairdia* from the Upper Devonian of Russian Platform. It differs from them slightly in the lateral and dorsal outline.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Kowala — Famennian (*Clymenia-Wocklumeria* Stage, do V-VI); German Democratic Republic: Thuringia, Famennian (do IV — cu I); Belgium: Dinant Basin, L. Carboniferous (Tn 1 a); France: Dinant Basin, Famennian (Fa 2c—Fa 2d).

Bairdia (*Bairdia*) *nidensis* sp. n.

(pl. 17: 3-4)

Holotype: ZPAL 0.XV/51; pl. 17: 3.

Type horizon: Upper Devonian, Famennian, *Wocklumeria* Stage.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: Latin: *nidensis*, after the Nida River in the Holy Cross Mts.

Diagnosis. — Carapace elongate, low, somewhat lenticular in lateral outline. Dorsal margin gently curved. The postero- and anteroventral parts of carapace flattened. The postero- and anterodorsal slopes are almost equal.

Material. — A hundred and fifty well preserved adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/51	1.120	0.528	0.400
C ZPAL 0.XV/52	1.148	0.528	0.416

Description. — Carapace lenticular in lateral outline. Maximum length in midheight, maximum height and width in the median part of carapace. Dorsal margin curved, ventral substraight or gently rounded. Postero- and anterodorsal slopes mildly and almost equally inclined. Anterior margin rounded, somewhat truncate anteroventrally, posterior margin pointed. Posterior point in midheight. Left, somewhat larger, valve slightly overlaps the right one along the antero- and posterodorsal and ventral margin. Both valves flattened along the antero- and posteroventral margins. In the median part, the surface of valves finely punctate.

Remarks. — This species differs from others of the genus *Bairdia* in a fairly regular, lenticular, lateral outline of carapace and flattening of valves in the antero- and posteroventral part.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna — Famennian (*Wocklumeria* Stage, do VI).

Bairdia (Bairdia) aff. kelleri EGOROV *in*: POLENOVA 1953

(pl. 17: 5)

1953. *Bairdia aff. kelleri* EGOROV; POLENOVA: 74, pl. 11: 4.

1974. *Bairdia aff. kelleri* EGOROV *in*: POLENOVA; BECKER and BLESS: pl. 11: 1-3.

Material. — Five well preserved adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/53	1.089	0.640	0.464

Description. — Carapace irregularly hexagonal in lateral outline. Maximum length in midheight, maximum height before the midlength of carapace, maximum width in the median part of carapace. Dorsal margin slightly sloping posteriorly. Posterodorsal slope steeper than the anterodorsal one. Ventral margin substraight. Posterior margin pointed, anterior rounded. Posterior point below the midheight. Left valve overlaps the right one to the greatest extent along the ventral and antero- and posterodorsal margin. Small depressions occur in the antero- and posteroventral parts of the right valve. Left valve flattened along the antero- and posteroventral margins. Except for the areas adjacent to the margin, the surface of valves is pitted.

Remarks. — In the specimens from Jabłonna, the posterior point occurs slightly higher up and is less tapering than in those described by POLENOVA (1953). In addition, Polish specimens display a flattening of the left valve along its anterior margin, which was not described by POLENOVA (1953). Specimens of *B. (B.) aff. kelleri* EGOROV (*in*: POLENOVA 1953), illustrated by BECKER and BLESS (1974) have flattened right valves.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Famennian (*Platyclymenia* Stage, do III); USSR: Russian Platform (Central Devonian Field), U. Frasnian (Liven Beds); Belgium: Famennian (Fa 2a α —Fa 2a β).

Bairdia (Bairdia) aff. galinae EGOROV, 1953

(pls. 17: 7 and 18: 1)

1961. *Bairdia compressa* GEIS; GRÜNDEL: 104, pl. 6: 1-3.

1965. *Bairdia galinae* EGOROV; BLUMENSTENGEL: 32, pl. 11: 16-20.

1970. *Bairdia (Bairdia) galinae* EGOROV; BLUMENSTENGEL: 15, pl. 4: 17.

Material. — Seventy variously preserved adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/55	0.70	0.29	0.24
C ZPAL 0.XV/56	0.560	0.256	0.192

Description. — Carapace irregularly beanlike in lateral outline. Maximum length below the midheight of valves, maximum width in the median part of carapace. Dorsal margin rounded. Posterodorsal slope much steeper than the anterodorsal one. Ventral margin concave in the median part. Anterior margin rounded, posterior sharply pointed. Posterior point below midheight. Left valve slightly overlaps the right one along the ventral and antero- and posterodorsal margins. Surface smooth.

Remarks. — *Bairdia* (*Bairdia*) aff. *galinae* and the species named in the synonymy differ from the holotype of *B. galinae* EGOROV in a more strongly inclined anterodorsal slope. According to EGOROV (1953), the dorsal margin of this species is very slightly curved and its sloping towards the anterior end is almost imperceptible. Maximum height of carapace in the species described occurs in the posterior part where the line of dorsal margin bends, while in *B. galinae* it is larger in the anterior part of carapace. A difference is also observed in the outline of the posterior end of the forms compared. In *B. aff. galinae* its maximum elongation occurs somewhat above the ventral margin and in *B. galinae* at one-third of the height of carapace.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Kowala, Spacerowa Street in Kielce — Famennian (*Clymenia-Wocklumeria* Stage, do V-VI); Spain: Gildar-Monto Region, Famennian (do III α/β).

Bairdia (*Bairdia*) *plicatula* POLENOVA, 1952

(pl. 19: 2)

1952. *Bairdia plicatula* POLENOVA: pl. 13: 1-2.

1953. *Bairdia plicatula* POLENOVA; EGOROV: 26, pl. 9: 1-7.

1960. *Bekena? plicatula* (POLENOVA); SOHN: 45, 82.

1961. *Bairdia plicatula* POLENOVA; ROZHDESTVENSKAYA: 256, pl. 32: 3.

1969. *Bairdia* (*Bairdia*) *plicatula* POLENOVA; GROSS: 72, pl. 15: 5-8; pl. 20: 8.

Material. — Twenty-five variously preserved (some damaged) adult and juvenile carapaces. Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/63	1.51	0.90	0.67

Description. — Carapace irregularly hexagonal in lateral outline. Maximum height and width in the median part of carapace. Dorsal margin substraight. Hinge margin situated in a small depression. Posterodorsal slope more inclined than the anterodorsal one. Ventral margin slightly concave in the median part. Anterior margin rounded, posterior slightly pointed. Posterior point above midheight. Left valve overlaps the right one to the greatest extent in the median part of ventral margin and in the anterior and posterior parts of dorsal margin; in the median part of dorsal margin the left valve overreaches the right. A small bow-shaped projection occurs in the ventral part of left valve. Both valves are flattened along their anterior and posterior margins. In the median part, surface is punctate.

Remarks. — In its outline, *B. plicatula* POLENOVA is very similar to *B. siliklensis* ROZHDESTVENSKAYA, from which it differs in the flattenings occurring along the anterior and posterior parts. The outer outline of carapace in the species described above is also similar to that of *B. lepidocentri* KRÖMMELBEIN and *B. stictica* KRÖMMELBEIN. These species can, however, be distinguished from each other due to other morphological characters.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds); USSR: Russian Platform, Southern Ural Mts., Volga-Ural Region, U. Givetian; Federal Republic of Germany: Bergisches Land, Sauerland, Givetian.

Bairdia (Bairdia) nalivkini EGOROV, 1953

(pl. 18: 2-3)

1953. *Bairdia nalivkini* EGOROV: 8, pl. 4: 4.**Material.** — Twenty well preserved adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/57	1.41	0.72	0.51
C ZPAL 0.XV/58	1.6	0.77	0.56

Description. — Carapace irregularly trapezoidal in lateral outline. Maximum length below the midheight, maximum height in the posterior part of carapace, maximum width in its median part. Dorsal margin gently sloping towards the anterior end, slightly concave in the median part. Anterodorsal slope gently inclined, posterodorsal steep. Ventral margin slightly concave in the median part. Posterior margin sharply pointed. Posterior point below midheight near the ventral margin. Anterior margin rounded. Left valve overlapping the right one in the ventral part, where there occurs a small bow-shaped projection, and in the antero- and posterodorsal parts. Surface smooth.

Remarks. — The specimens coming from the Holy Cross Mts. differ from the holotype in a slight concavity of the median part of dorsal margin.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian; USSR: Russian Platform, Frasnian (Syrachoy Beds), German Democratic Republic: Harz Mts., Frasnian (*Palmatolepis gigas* Zone).

Bairdia (Bairdia) aff. nalivkini EGOROV, 1953

(pl. 19: 6)

Material. — Two partly damaged, adult specimens.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/67	1.12	0.57	0.50

Description. — Carapace subtrapezoidal in lateral outline. Maximum length below the midheight, maximum height where the dorsal margin bends posteriorly. Dorsal margin gently sloping towards the anterior end. Anterodorsal slope only slightly inclined, posterodorsal fairly steep. Anterior margin rounded, posterior pointed; posterior point below midheight. Left valve overlaps the right to the greatest extent along the ventral margin. Valves are flattened along the anterior and posterior margins. Convexities occur on the left valve near the posterodorsal slope and in the posteroventral part. Median part of surface pitted.

Remarks. — The species described is most similar in the lateral outline of its carapace to *B. nalivkini* EGOROV, from which it differs in a considerably wider carapace, the occurrence of a concavity on the left valve and a pitted surface. The same characters differ it from specimens of *B. sp. cf. nalivkini* EGOROV from the Frasnian of Australia (JONES 1968, pl. 7: 3).

Occurrence. — Poland (Holy Cross Mts.): Spacerowa Street in Kielce, Famennian (*Platyclymenia* Stage, do III).

Bairdia (Bairdia) sp.

(pl. 17: 6)

Material. — One partly destroyed carapace.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/54	1.40	0.73	0.48

Description. — Carapace triangular with rounded angles in lateral outline. Maximum length below the midheight, maximum height and width in midlength of carapace. Dorsal margin rounded. Posterodorsal slope more inclined than the anterior one. Ventral margin substraight. Anterior margin rounded, posterior pointed: posterior point below the midheight of carapace. Left valve strongly overlaps the right one, in particular along the entire dorsal and ventral margins. Surface smooth.

Remarks. — The form described differs from the known species of *Bairdia* in a larger degree of overlapping valves, which is particularly distinct along the dorsal margin.

Occurrence. — Poland (Holy Cross Mts.): Spacerowa Street in Kielce, Famennian (*Platyclymenia* Stage, do III).

Subgenus *Bairdia (Cryptobairdia)* SOHN, 1960

Type species: Bairdia coryelli ROTH and SKINNER, 1931 (= *Bairdia ventricosa* ROTH and SKINNER, 1930).

Bairdia (Cryptobairdia) cf. singularis KRÖMMELBEIN, 1954

(pl. 19: 5)

1965. *Bairdia (Cryptobairdia) cf. singularis* KRÖMMELBEIN; BECKER: 421, pl. 35: 6.

1969. *Bairdia (Cryptobairdia) cf. singularis* KRÖMMELBEIN; GROSS: 74, pl. 16: 3.

Material. — A hundred variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/66	1.09	0.48	0.35

Description. — Carapace irregularly lenticular in lateral outline. Maximum length in midheight, maximum height in midlength of carapace. Carapace uniformly convex in dorsal view. Dorsal margin gently rounded. Antero- and posterodorsal slopes almost equally gently inclined. Ventral margin concave in median part. Anterior margin rounded, posterior rather sharp; posterior point — halfway the height. Left valve overlapping the right along the dorsal margin and in the median part of ventral margin. Surface smooth.

Remarks. — Polish specimens are identical with those described by BECKER (1965) and GROSS (1969). They also closely resemble the representatives of the species *B. volatilis* ROZHDESTVENSKAYA, from which they differ slightly in the lateral outline of carapace.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds); Federal Republic of Germany: Eifel-Sötenicher Mulde; Bergisches Land, Sauerland, Givetian (Cürten-Schichten, Rodert-Schichten).

Bairdia (*Cryptobairdia*) aff. *birinae* EGOROV, 1953

(pl. 19: 7)

Material. — Three adult carapaces with a strongly damaged surface.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/68	0.88	0.41	0.30

Description. — Carapace slightly beanlike in lateral outline. Maximum height in midlength, maximum width in the median part of carapace. Dorsal margin gently rounded. Anterodorsal slope gently inclined, posterodorsal somewhat steeper. Ventral margin concave in the median part. Anterior margin rounded, truncate in the ventral part, posterior margin pointed. Left valve overlaps the right along the entire free margin, particularly so on the ventral side. Surface smooth.

Remarks. — The specimens described differ from typical representatives of *Bairdia* (*Cryptobairdia*) *birinae* EGOROV in a slightly steeper posterodorsal slope. In the outline of their carapace, they display a similarity to those of *B. fabaeformis* POLENOVA, from which they differ, however, in a deeper concavity in the median part of the ventral margin and somewhat more strongly sloping anterior part of the dorsal margin. In outline and valve overlapping, they also resemble specimens of *B. naumovae* Egorov and representatives of *B. sp. cf. naumovae* EGOROV from the Frasnian of Australia (JONES, 1968, pl. 7: 2). According to JONES (*l.c.*), *B. birinae* may be a juvenile form of A-2, *B. naumovae*. Carapaces of the specimens, described from Józefka Hill, are also similar in outline to those assigned by the present writer to *B. cf. singularis* KRÖMMELEIN, from Jurkowice-Budy, but, in the former species, its posterodorsal slope is more strongly inclined.

Occurrence. — Poland (Holy Cross Mts.): Józefka Hill, Frasnian (L. *Polygnathus asymmetricus* Zone, do I α).

Subgenus *Bairdia* (*Rectobairdia*) SOHN, 1960

Type species: Bairdia depressa GEIS, 1932.

Bairdia (*Rectobairdia*) *hexagona* POLENOVA, 1952

(pl. 19: 3)

1952. *Bairdia hexagona* POLENOVA: 128, pl. 13: 5 and 6.

Material. — Twenty-two carapaces and three valves of adult and juvenile specimens, some with damaged margins of valves.

Dimensions (in mm):

	L	H	W
C-ZPAL 0.XV/64	0.90	0.45	0.34

Description. — Carapace irregularly hexagonal in lateral outline. Maximum length below midheight, maximum height in the anterior part of carapace, maximum width in the median part of carapace. Dorsal margin substraight. Posterodorsal slope steeper than the anterodorsal one. Ventral margin substraight, very slightly concave in the middle. Anterior margin rounded, slightly truncate in the ventral part, posterior pointed. Posterior point situated below midheight. Left valve overlaps the right, particularly in the median part of ventral and anterior part of dorsal margin and less so along the posterodorsal margin. Surface smooth.

Remarks. — *B. hexagona* POLENOVA is very similar in the lateral outline of its carapaces

to *B. paffrathensis* KUMMEROW, from which it differs in not so sharp posterior margin and in the outline of carapace in dorsal view.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian, (*Stringocephalus burtini* Beds); USSR: Russian Platform, U. Givetian.

Bairdia (Rectobairdia) aff. paffrathensis KUMMEROV, 1953

(pl. 19: 4)

Material. — Four adult, partly damaged, carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/65	0.90	0.45	0.24

Description. — Carapace subrectangular in lateral outline. Maximum length below mid-height, maximum height in midlength, maximum width in the median part of carapace. Dorsal margin long, straight. Anterodorsal slope gently inclined, posterodorsal steeper. Ventral margin slightly concave in the middle. Anterior margin rounded, posterior pointed; posterior point below midheight. Left valve slightly overlaps the right one along the ventral margin. Surface smooth.

Remarks. — The specimens described differ from *B. paffrathensis* KUMMEROW in a less pointed end and narrower carapace.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Bairdia (Rectobairdia) sobiekurowiensis sp.n.

(pls 18: 5 and 19: 1)

Holotype: ZPAL 0.XV/60; pl. 18: 5.

Type horizon: Upper Devonian, Frasnian.

Type locality: Sobiekurów, Holy Cross Mts., Poland.

Derivation of the name: *sobiekurowiensis* — after the locality Sobiekurów.

Diagnosis. — Left valve flattened along the dorsal margin, the flatness being bordered by a laterodorsal ridge.

Material. — Eight well preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/60	0.99	0.43	0.32
C ZPAL 0.XV/62	1.06	0.51	0.40

Description. — Carapace subrectangular in lateral outline. Maximum length below mid-height, maximum height in the posterior part of carapace. Dorsal margin long, straight. Anterodorsal slope gently inclined, posterodorsal steep. Ventral margin slightly concave in the middle. Anterior margin rounded, posterior sharply pointed; posterior point below the midheight of carapace. Left valve overlaps the right one along ventral margin and anterior and posterior parts of dorsal margin. Carapace flattened in the ventral part near anterior and posterior ends. Surface of left valve distinctly flattened along dorsal margin, bordered by laterodorsal ridge variously developed in particular specimens. Surface of valves smooth.

Remarks. — The presence of the laterodorsal ridge and the flattening of the dorsal surface of left valve of the species described make it similar to *B. aff. povorinensis* SAMOILOVA, illustrated

by BECKER and BLESS (1974) from the Famennian of the Ardennes — Rhenish Massif. *B. (R.) sobiekurowiensis* sp.n. differs from it, however, in the outline of the anterior and posterior margin and a deeper concavity of the ventral margin. The specimens described differ from *B. povorinensis* in a characteristic laterodorsal ridge on the left valve and in a less oval lateral outline of carapace.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian.

Bairdia (Rectobairdia) quarziana EGOROV, 1953

(pl. 18: 4)

1953. *Bairdia quarziana* EGOROV: 22, pl. 13: 1-6; pl. 14: 1-4, 8.

1953. *Bairdia quarziana* EGOROV; POLENOVA: 68, pl. 9: 1.

1972. *Bairdia quarziana* EGOROV; ROZHDESTVENSKAYA: 87, pl. 31: 4.

Material. — Ten well preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/59	1.68	0.75	0.56

Description. — Carapace elongate, subrectangular in lateral outline. Maximum length of carapace somewhat below its midheight, maximum height in its midlength and maximum width in its middle. Dorsal margin straight in the median part. Anterodorsal slope gently inclined, posterodorsal steeper. Ventral margin slightly concave in the median part. Anterior margin rounded, slightly truncate in the ventral part; posterior rather pointed with posterior point below midheight. Left valve overlaps the right one along the ventral and anterior and posterior parts of the dorsal margin. Surface smooth.

Remarks. — Specimens from Sobiekurów differ from that illustrated by ROZHDESTVENSKAYA (1972) in the lack of swellings on valves. Describing this species, ROZHDESTVENSKAYA maintains, however, that these swellings are a strongly varying character, which sometimes does not occur at all. In addition, specimens from Sobiekurów are longer than those from the USSR. A specimen similar to those from Sobiekurów, assigned as *Bairdiacypris* cf. *quarziana* (EGOROV *in*: POLENOVA, 1953), was illustrated by BECKER *et al.* (1974). It differs from the Polish specimens in a milder anterodorsal slope and a more rounded posterior margin, but its distinctly pointed posterior margin is indicative of its being a species of the genus *Bairdia*.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian. USSR: Southern Ural, Frasnian (Askyn Beds), Russian Platform, Frasnian (Voronezh, Evlan, Liven Beds).

Bairdia (Rectobairdia) sp.

(pl. 18: 6)

Material. — Seven adult carapaces, some of them damaged.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/61	1.136	0.480	0.400

Description. — Carapace subrectangular in lateral outline. Maximum length in midheight, maximum height in the anterior part of carapace. Dorsal margin long, straight. Posterodorsal slope somewhat steeper than the anterodorsal one. Ventral margin slightly concave before midlength. Anterior margin rounded, posterior pointed; posterior point in midheight. Left valve overlaps the right one, in particular along the ventral margin, where a small bow-shaped

projection is visible. Carapace flattened along the anterior and posterior margins. Surface smooth.

Remarks. — In the shape of carapace, in particular in its elongation and a straight and long dorsal margin, the form described is similar to *Bairdia (Rectobairdia)* sp. n. 127, BECKER, 1974 (in BECKER *et al.*, 1974) from the Lower Carboniferous of Belgium. The two forms are very likely to belong to one and the same species. Since BECKER (*l.c.*) illustrated *B. (R.)* sp. n. 127, presenting it unilaterally only and giving neither diagnosis, nor description, it is impossible to compare accurately the two forms mentioned above.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Kowala, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI).

Genus *Processobairdia* (BLUMENSTENGEL), 1965

Type species: Processobairdia anteroerata BLUMENSTENGEL, 1965.

Processobairdia spinomarginata BLUMENSTENGEL, 1965

(pls. 19: 8 and 20: 1)

1965. *Processobairdia spinomarginata* BLUMENSTENGEL: 37, pl. 10: 3-4; 12-13; pl. 28: 1-3.

1972. *Processobairdia spinomarginata* BLUMENSTENGEL; GRÜNDEL: 859, fig. 1a.

Material. — One carapace and two internal moulds, all poorly preserved, with an obliterated ornamentation.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/69	0.64	0.28	0.22
C ZPAL 0.XV/70	0.83	0.42	0.32

Description. — Carapace subrectangular in lateral outline. Maximum length below mid-height, maximum height in the anterior part of carapace. Dorsal margin straight to gently rounded. Posterodorsal slope considerably steeper than the anterodorsal one. Ventral margin concave in the median part. Anterior margin obliquely rounded, posterior pointed, with the posterior point below the midheight. Left valve shallow, overlapping the right one along the entire free margin. In both valves, a spine occurs in the posterodorsal part. A swelling, separated from the rest of valve by a furrowlike depression, occurs on anteroventral, ventral and posteroventral margins. Several small spines are visible on this swelling. Surface smooth.

Remarks. — The specimen assigned to *P. spinomarginata* from Kowala I trench is almost identical with those illustrated and described under the same name by BLUMENSTENGEL (1965), but it has poorly preserved spines in the ventral part of the anterior and posterior margin. The internal moulds from Kowala I trench, assigned to the species described above, have carapaces more similar in outline to those of *B. aff. galinae* EGOROV, but, like *P. spinomarginata*, have spines in the posterodorsal part. In the central part of the anterior and posterior margins, spines are invisible.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI); German Democratic Republic, Bl. Balve, Famennian (*Platyclymenia-Wocklumeria* Stage, do IV-do VI).

Processobairdia beckeri sp.n.

(pl. 20: 2-3)

Holotype: ZPAL 0.XV/71; pl. 20: 2.

Type horizon: Famennian, *Wocklumeria* Stage, do VI.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: In honour of Dr. GERHARD BECKER, a researcher of Paleozoic Ostracoda.

Diagnosis. — A species of the genus *Processobairdia* with a spine in the anterodorsal part of the left valve and in the posterodorsal part of the right valve and with a semicircular ridge parallel to the anterior margin on the right valve.

Material. — Five adult carapaces with spines broken off at the base.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/71	1.15	0.56	0.48
C ZPAL 0.XV/72	1.20	0.59	0.43

Description. — Carapace irregularly lenticular in lateral outline. Maximum length at midheight, maximum height at midlength, maximum width in the median part of carapace. Dorsal margin substraight. Antero- and posterodorsal slopes gently inclined, posterior slightly steeper. Ventral margin substraight. Anterior margin rounded, posterior pointed. Posterior point at midheight. Left valve overlaps the right one along the entire free margin, most so in the ventral part, where also a small, bow-shaped projection occurs. Carapace strongly flattened along the anterior and posterior margins. An erect spine is situated on the anterodorsal part of left valve. On the right valve, it occurs in the posterodorsal part near the dorsal margin. A small, circular ridge, parallel to the anterior margin is visible on the right valve. Very small, nodular denticles occur along the antero- and posteroventral margins of the right valve. Surface coarsely pitted, except for an area adjacent to margins, which is smooth. Pits about 0.02 mm in diameter.

Remarks. — The species described differs from the known *Processobairdia* species in an asymmetrical position of spines on valves and in the presence of the ridge on the right valve.

Occurrence. — Poland (Holy Cross Mts.): Spacerowa Street in Kielce, Kowala, Famennian (*Platyclymenia-Wocklumeria* Stage, do III-do VI).

Genus *Bairdiacypris* BRADFIELD, 1935

Type species: *Bairdiacypris deloi* BRADFIELD, 1935

Bairdiacypris samsonowiczi sp. n.

(pl. 20: 4-5)

Holotype: ZPAL 0.XV/73; pl. 20: 4.

Type horizon: Upper Devonian, Frasnian.

Type locality: Sobiekurów, Holy Cross Mts., Poland

Derivation of the name: In honour of the late Professor JAN SAMSONOWICZ, a geologist and explorer of the Holy Cross Mts.

Diagnosis. — Dorsal margin concave in the median part. A swelling occurs on the surface of the right valve in the anterodorsal part. The posterodorsal slope steep, anterodorsal gently inclined.

Material. — Seventy well preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/73	1.36	0.72	0.64
C ZPAL 0.XV/74	1.36	0.72	0.56

Description. — Carapace trapezoidal in lateral outline. Maximum length below midheight, maximum height in the posterior part of carapace, maximum width in its middle. Dorsal margin gently concave in the median part. Posterodorsal slope steep, anterodorsal mildly inclined.

Ventral margin substraight or slightly concave in the median part. Anterior margin curved, posterior blunt. Left valve overlaps the right one along the free margin. Right valve swollen in the posterodorsal part, left uniformly convex over the entire length. Surface smooth.

Remarks. — This species differs from other *Bairdiacypris* species in a concavity occurring in the median part of dorsal margin and a swelling of right valve in the posterodorsal part. It also displays a certain similarity in the outline of carapace to *B. irregularis* (POLENOVA), from which it differs in the characters mentioned above and in a more narrow rounded posterior end. As compared with *B. zigulensis* (POLENOVA), it has a concavity on the dorsal margin and the posterior end of its carapace is situated lower.

Occurrence. — Poland (Holy Cross Mts.): Śluchowice, Frasnian (L. *Palmatolepis gigas* Zone, do I γ), Sobiekurów, Frasnian.

Bairdiacypris polenovae sp. n.

(pl. 21: 1)

Holotype: ZPAL 0.XV/75; pl. 21: 1.

Type horizon: Upper Devonian, Frasnian.

Type locality: Sobiekurów, Holy Cross Mts., Poland.

Derivation of the name: In honour of Dr. ELENA N. POLENOVA, a researcher of Paleozoic Ostracoda.

Diagnosis. — Carapace subtriangular and rounded in lateral outline. Posterior end of carapace narrow, rounded.

Material. — Eight well-preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/75	1.76	0.93	0.67

Description. — Carapace high, subtriangular and rounded in lateral outline. Maximum length much below midheight, maximum height slightly behind midlength, maximum width in the median part of carapace. Dorsal margin strongly curved. Posterodorsal slope steep, anterodorsal somewhat more gently inclined. Anterior margin fairly widely rounded, posterior narrowly rounded, considerably lower than midheight. Ventral margin straight, with a small depression in the median part. Left valve overlaps the right one, mostly along the dorsal and the median part of ventral margin. Surface smooth.

Remarks. — This species differs from almost all known representatives of *Bairdiacypris* in a very narrowly rounded posterior end of carapace like in some species of *Bairdia*. It displays a similarity in the lateral outline to *Bairdia subeleziana* POLENOVA, from which it differs, however, in a more rounded posterior margin of carapace, milder inclination of dorsal margin in its anterior part and larger dimensions.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian.

Subfamily *Acratiinae* GRÜNDEL, 1962
 Genus *Acratia* DELO, 1930
 Subgenus *Acratia* (*Acratia*) DELO, 1930

Type species: *Acratia typica*, DELO, 1930.

Acratia (Acratia) clinata BLUMENSTENGEL, 1965

(pl. 21: 2-3)

1965. *Acratia clinata* BLUMENSTENGEL: 39, pl. 9: 15-16.1865. *Bairdia acris* MÜLLER-STEFFEN: 283, fig. 5.**Material.** — Eighteen adult carapaces, some of them with broken ends.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/76	0.87	0.38	0.22
C ZPAL 0.XV/77	0.92	0.35	0.25

Description. — Carapace fusiform in lateral outline. Maximum height of carapace in its anterior part, maximum width close behind the middle in its posterior part. Dorsal and ventral margins rounded, the ventral to a greater extent. Anterior end pointed. Posterior end tapering in the form of a long spine. Anterior and posterior ends, as seen dorsally, curved to the left, posterior to a lesser extent. Right valve, more convex, is slightly overlapped by the left along the ventral margin. Surface smooth.

Remarks. — *Bairdia acris* MÜLLER-STEFFEN, described from the *Wocklumeria* Stage (MÜLLER-STEFFEN, 1965) of the Harz Mountains, is identical with *Acratia (Acratia) clinata*, described formerly, which was also found by BLUMENSTENGEL (1968).

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI); German Democratic Republic: Thuringia, Famennian (*Clymenia* Stage, do V); Harz Mountains (*Wocklumeria* Stage, do VI).

Subgenus *Acratia (Cooperuna)* GRÜNDEL, 1962*Type species: Acratia (Cooperuna) cooperi* GRÜNDEL, 1962.*Acratia (Cooperuna) rostrataformis* SHEVTSOV, 1964

(pl. 21: 4-5)

1964. *Acratia rostrataformis* SHEVTSOV: 118, pl. 13: 4.1965. *Acratia (Cooperuna)* sp.; BLUMENSTENGEL: 39, pl. 9: 1-14.1970. *Acratia (Cooperuna) rostrataformis* SHEVTSOV; BLUMENSTENGEL: 18, pl. 13: 4:8.**Material.** — Eighty adult and juvenile carapaces, with partly corroded surface.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/78	0.88	0.33	0.31
C ZPAL 0.XV/79	0.87	0.34	0.32

Description. — Carapace fusiform in lateral outline. Maximum length below midheight, maximum height at midlength, maximum width in the median part of carapace. Dorsal margin gently curved, gradually turning into the anterior and posterior ends. Ventral margin in the median part straight or slightly convex. Anterior margin terminating in a process downwards close above the line of ventral margin, posterior pointed, slightly below the midheight of valve. Left valve overlaps the right one along the ventral margin. Surface smooth.

Remarks. — This species displays a very close similarity in the lateral carapace outline to *Acratia ventriosa* GRÜNDEL, 1961, from which it differs in a lower carapace. In lateral outline, it is similar to *Acratia* sp. (No 272), illustrated by BRAUN (1967) from the Frasnian of Canada. The Canadian specimens also seem to belong to *A. (C.) rostrataformis* SHEVTSOV, 1964.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Kowala, Famennian (*Platyclymenia-Wocklumeria* Stage, do III-do VI). German Democratic Republic: Thuringia, Harz Mts., Frasnian-Carboniferous (do I/β/γ-cu I). USSR: Kamsk-Kinel Depression, Famennian-Carboniferous (Zavolzhsk horizon).

Acratia (Cooperuna) tichonowitchi EGOROV, 1953

(pl. 21: 6)

1953. *Acratia tichonovitchi* EGOROV: 39, pl. 19: 5.

Material. — Five adult carapaces, some of them with damaged ends.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/80	1.04	0.48	0.35

Description. — Carapace elongate, fusiform in lateral outline. Maximum length slightly below midheight, maximum height at the midlength, maximum width in the median part of carapace. Dorsal and ventral margins substraight and subparallel. Ends pointed. Anterior end flattened and deflected downwards, posterior pointed at midheight. Left valve overlaps the right one along the entire free margin. Surface smooth.

Remarks. — This species closely resembles in the outline of carapace, a form identified by BLUMENSTENGEL (1970) as *Acratia (Cooperuna) rostrataformis* SHEVTSOV, from which it differs however, in a very slightly more parallel dorsal and ventral margins and a somewhat higher situated elongation of the posterior end.

Occurrence. — Poland (Holy Cross Mts.): Sobiękurów, Frasnian. USSR: Volga-Ural Region, L. Frasnian (Medyn horizon); Russian Platform, U. Frasnian.

Genus *Ceratacratia* BLUMENSTENGEL, 1965

Type species: Ceratacratia cerata BLUMENSTENGEL, 1965.

Ceratacratia cerata BLUMENSTENGEL, 1965

(pl. 21: 7-8)

1965. *Ceratacratia cerata* BLUMENSTENGEL: 40, pl. 9: 17-20; pl. 28: 7-11.

1967. *Ceratacratia cerata* BLUMENSTENGEL; BLESS and MICHEL: 269.

Material. — One carapace and the internal moulds, with spines broken-off at bases.
Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/81	0.70	0.40	0.32
C ZPAL 0.XV/82	0.59	0.35	0.27

Description. — Carapace irregularly fusiform in lateral outline. Maximum height in the anterior half of carapace, maximum width in the middle. Dorsal margin steep in the anterodorsal and gently inclined in the posterodorsal part. Ventral margin strongly rounded, slightly truncate posteriorly. The right and left valves terminate anteriorly in upturned spines. In the posterior end, the spine occurs only on the right valve, the left being smooth. Left valve overlaps the right one along the ventral and the anterior part of dorsal margin. Surface smooth.

Remarks. — Specimens of *C. cerata* from the Holy Cross Mts. differ from the holotype of *C. cerata* in a more irregular lateral outline of carapace. Maximum height occurs in them in the

anterior part of carapace, while in those from Thuringia it is observed in its median part and, consequently, their lateral outline is more oval. In addition, specimens from the Holy Cross Mts. are smaller than those described by BLUMENSTENGEL (1965). These differences seem to result from the intra-specific variability.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (do II α -do VI). Spain: Cantabrian Mts., Gildar Monto Region, Famennian (do III α/β).

Superfamily **Bairdiocypridacea** SHAVER, 1961

Family **Bairdiocyprididae** SHAVER, 1961

Genus *Bairdiocypris* KEGEL, 1932

Type species: Bythocypris (Bairdiocypris) gerolsteinensis KEGEL, 1932.

Remarks. — Species in which a flattening occurs in particular on the right valve near its end margins and which are assigned by many authors to the genus *Bekena* GIBSON. Following earlier opinions, expressed by BECKER (1965*a*) and ADAMCZAK (1976), they have been included in the present paper in the genus *Bairdiocypris*. The flattening of valves is considered by the present writer as an insufficient generic character. *Bekena* is treated here as a junior synonym of the *Bairdiocypris*.

Bairdiocypris vastus POLENOVA, 1952

(pl. 22: 1-2)

1952. *Bairdiocypris vastus* POLENOVA: 135, pl. 14: 1-2.

Material. — Twenty five variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/83	1.82	1.36	0.88
C juv. ZPAL 0.XV/84	0.98	0.74	0.48

Description. — Carapace subtriangular in lateral outline. Maximum height and width in the median part of carapace. Dorsal margin of left valve strongly arcuate. Ventral margin straight. Anterior margin widely rounded, posterior slightly elongate. Valves, in particular the right one, are slightly flattened along the anterior and posterior margin. Left valve, very distinctly overlaps the right one, particularly in the ventral part, where a fairly wide and long bow-shaped projection occurs on the left valve. In the dorsal part, the left valve considerably overreaches the right. Surface smooth.

Remarks. — The specimens of *B. vastus* here described are similar in the outline of carapace to *B. moravica* (KEGEL), but differ from them in the length-height ratio and a more narrowly rounded posterior margin. The outline of carapace in *B. vastus* is also similar to that in *B. livnensis* POLENOVA, but the former has less flattened ends of the right valve.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds); USSR: Russian Platform, U. Givetian.

Bairdiocypris livnensis POLENOVA, 1953

(pl. 23: 1)

1953. *Bairdiocypris livnensis* POLENOVA: 77, pl. 12: 6.

Material. — Ten variously preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/88	1.61	1.04	0.72

Description. — Carapace ovate in lateral outline. Maximum length slightly below mid-height, maximum height at midlength, maximum width in the median part of carapace. Dorsal margin arcuate. Posterodorsal slope more inclined than the anterodorsal one. Ventral margin substraight. Anterior margin rounded, posterior slightly elongate. Left valve very distinctly overlaps the right one, particularly so along the ventral margin, where a narrow and short, bow-shaped projection occurs on the left valve. Both valves, particularly the right one, are flattened along the antero- and posteroventral margins. Surface smooth.

Remarks. — *B. livnensis* is similar in lateral outline and, particularly, in the inclination of dorsal margin to *B. vastus* POLENOVA, but differs from it in a greater extent to which its right valve is flattened along both ends.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian; USSR: Russian Platform, Frasnian (Liven Beds).

Bairdiocypris aff. *ovata* (ROZHDESTVENSKAYA, 1972)

(pl. 22: 4)

Material. — Five well preserved adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/86	1.60	1.07	0.80

Description. — Carapace elongate, suboval in lateral outline. Maximum length of carapace below its midheight, maximum width in its median part. Dorsal margin widely rounded, gently inclined towards the anterior and more steeply towards the posterior end. Ventral margin straight. Anterior margin uniformly and fairly widely rounded, posterior somewhat elongate. Left, larger, valve gently overlaps the right one. A small, bow-shaped projection occurs in the median part of the ventral margin of left valve. Both valves, in particular the right one, are strongly flattened along the antero- and posteroventral margins. Surface smooth.

Remarks. — The specimens described display the greatest similarity in the outline of carapace to the representatives of *Bairdiocypris ovata* (ROZHD.) from the Frasnian of the Bashkir ASSR (ROZHDESTVENSKAYA 1972, pl. 33: 4), from which they differ in shallower depressions along the anterior and posterior margins of the right valve and a smooth surface of carapace.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian.

Bairdiocypris sp.

(pl. 22: 3)

Material. — Two poorly preserved carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/85	0.53	0.35	0.32

Description. — Carapace suboval in lateral outline. Dorsal margin strongly arcuate, posteriorly steeper. Ventral margin straight. Anterior margin widely rounded, posterior somewhat elongate. Left valve overlaps the right one in the dorsal part. Surface smooth.

Remarks. — In the carapace outline, this form displays a certain general similarity to *Bairdiocypris symmetrica* (KUMMEROW).

Occurrence. — Poland (Holy Cross Mts.): Józefka Hill, Frasnian (*Polygnathus asymmetricus* Zone, do I α).

Genus *Praepilatina* POLENOVA, 1970

Type species: Bairdiocypris praepilatus POLENOVA, 1960.

Praepilatina adamczaki sp.n.

(pl. 22: 5)

Holotype: ZPAL 0.XV/87; pl. 22: 5.

Type horizon: Upper Devonian, Famennian, *Wocklumeria* Stage.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: in honour of Dr. FRANCISZEK ADAMCZAK, a student of Paleozoic Ostracoda.

Diagnosis. — A representative of the *Praepilatina* having a straight ventral margin and the right valve flattened at the anterior end.

Material. — Ten well preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/42	0.90	0.64	0.40

Description. — Carapace triangular and rounded in lateral outline. Maximum length of carapace below its midheight, maximum height in the anterior part, close to midlength, and maximum width in the median part. Dorsal margin strongly arcuate. Antero- and postero-dorsal margins almost equally inclined. Anterior and posterior margins widely rounded. Ventral margin straight or slightly concave in the median part. Valves almost uniform. Left valve slightly overlaps the right one along the anterodorsal and ventral margins. Right valve flattened along the anterior margin. Surface smooth.

Remarks. — The specimens described are similar in the carapace outline to those of *P. truncata* (COOPER), from which they differ in a less asymmetrical lateral carapace outline and a somewhat smaller concavity of the ventral margin. They are also similar to the representatives of *P. truncatiformis* (ZANINA and BUSHMINA, in BUSHMINA 1968), from which they differ in a flattened anterior end of carapace. *P. adamczaki* sp.n. also resembles *P. praepilata* (POLENOVA 1955), from which it differs in a more widely rounded posterior end.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

Genus *Fabalitypris* COOPER, 1946

Type species: Fabalitypris wileyensis COOPER, 1946.

Fabalitypris holuschurmensis (POLENOVA, 1955)

(pl. 23: 2-3)

1955. *Bairdia* (?) *holuschurmensis* var. *holuschurmensis* POLENOVA: 235, pl. 12: 1.

1955. *Bairdia* (?) *holuschurmensis* var. *angulata* POLENOVA: 236, pl. 12: 4.

1962. *Fabalitypris holuschurmensis* var. *holuschurmensis* (POLENOVA); ROZHDESTVENSKAYA: 257, pl. 31: 4.

1962. *Fabalitypris holuschurmensis* var. *angulata* (POLENOVA); ROZHDESTVENSKAYA: 258, pl. 31: 3.

1969. *Fabalitypris* cf. *holuschurmensis* (POLENOVA); GROOSS: 74, pl. 16: 7.

Material. — Forty six well preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/89	1.28	0.56	0.48
C ZPAL 0.XV/90	0.88	0.50	0.32

Description. — Carapace irregularly beanlike in lateral outline. Maximum length almost at midheight, maximum height in the posterior part of carapace, and maximum width in its middle. Dorsal margin gently sloping towards the anterior end, posteriorly fairly steep. Ventral margin sinusoidal. Anterior margin obtusely rounded, slightly truncate in the lower part; posterior slightly pointed, with its posterior point below midheight near the ventral margin. Left valve overlaps the right one along the dorsal and the median part of ventral margin. Surface smooth.

Remarks. — In the lateral and dorsal outline of the posterior end, the specimens described resemble more *F. holuschurmensis angulata* than *F. holuschurmensis holuschurmensis*, but the differences between the two subspecies are so insignificant that the present writer does not consider necessary to separate them. The genus *Silus* was erected by POLENOVA (1968) for several species, formerly assigned to the *Fabaliocypris*. It seems, however, that the differences between the genera mentioned above are too small and insufficient to separate this genus. In the present paper, *Silus* has, therefore, been treated as a junior synonym of the *Fabaliocypris*.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds); Sobiekurów, Frasnian; USSR: the Volga-Ural Region, Eifelian (Biya Beds); Southern Ural Mountains, Givetian (Afonino Beds); Bashkir ASSR, Givetian (Staryi Oskol Beds); Federal Republic of Germany: Bergisches Land, Sauerland, Givetian.

Genus *Cytherellina* JONES and HALL, 1869

Type species: Beyrichia siliqua JONES, 1855.

Cytherellina dubia (KUMMEROW, 1953)

(pl. 23: 4-5)

1953. *Orthocypris dubia* KUMMEROW: 56, pl. 7: 8.

1965a. *Cytherellina dubia* (KUMMEROW); BECKER: 389, pl. 31: 1-2.

1965b. *Cytherellina dubia* (KUMMEROW); BECKER: 174, pl. 6: 2.

1969. *Cytherellina dubia* (KUMMEROW); GROOS: 63, pl. 12: 1-2.

Material. — Seven adult carapaces with a partly corroded surface.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/91	1.48	0.89	0.88
C ZPAL 0.XV/92	1.48	0.88	0.72

Description. — Carapace trapezoidal in lateral outline. Maximum length below midheight, maximum height and width in the posterior part of carapace. Dorsal margin slightly rounded, ventral substraight. Anterior margin rounded, posterior truncate in its upper part, rounded near the ventral margin. Left valve overlaps the right one along the entire free margin. Surface smooth.

Remarks. — Two sulci are visible on the surface of specimens (preserved in the form of internal moulds), illustrated by KUMMEROW (1953), BECKER (1965a, b) and GROOS (1969), but BECKER (1965a) states, with a reservation, that the surface of carapace of *Cytherellina dubia*

is smooth. In GROSS' illustration (1969), the sulci are also invisible. The specimens from Jurkowiec, having slightly corroded carapaces, do not display sulci on their surface.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds). Federal Republic of Germany: Eifel Mts. — Sötenicher Mulde, Givetian (Gürten, Spickberg Beds); Bergisches Land, M. Givetian.

Genus *Healdianella* POSNER, 1951

Type species: Healdianella darwinuloides POSNER, 1951.

Healdianella budensis sp.n.

(pl. 24: 1)

Holotype: ZPAL 0.XV/94; pl. 24: 1.

Type horizon: Upper Givetian, *Stringocephalus burtini* Beds.

Type locality: Jurkowiec-Budy, Eastern Holy Cross Mts., Poland.

Derivation of the name: After the locality Budy.

Diagnosis. — A species of the *Healdianella*, with maximum height and width occurring in the posterior part of carapace and with a gently concave ventral margin in its anterior part.

Material. — Twenty three, well preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/94	1.12	0.59	0.56

Description. — Carapace beanlike in lateral outline. Maximum height and width in the posterior end of carapace. Dorsal margin gently rounded. Hinge margin situated in a narrow depression. Ventral margin concave in its anterior part. Anterior and posterior margins rounded, posterior more widely rounded. Left valve overlaps the right one, particularly in the anterior and posterior parts of the dorsal margin and along the ventral margin. Surface smooth.

Remarks. — In the outline of carapace, this species resembles to the greatest extent *Healdianella obliqua* (KUMMEROW), from which it differs in a larger width and in maximum width occurring in the posterior end.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Healdianella kielcensis sp.n.

(pl. 24: 6-7)

Holotype: ZPAL 0.XV/100; pl. 24: 7.

Type horizon: Famennian, *Wocklumeria* Stage, do VI.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: after the town Kielce in the Holy Cross Mts.

Diagnosis. — Carapace trapezoidal in lateral and oval in dorsal outline. Dorsal and ventral margins straight. Posterior margin strongly truncate in the upper part.

Material — Forty-seven, variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C juv. ZPAL 0.XV/99	0.56	0.38	0.34
C ZPAL 0.XV/100	0.90	0.59	0.48

Description. — Carapace trapezoidal in lateral and oval in dorsal outline. Maximum length of carapace below its midheight, maximum height in its posterior part. Dorsal margin straight.

Hinge margin situated in a narrow depression. Ventral margin straight. Anterior margin rounded, posterior strongly truncate in the upper part and rounded near the ventral margin. Left, larger valve overlaps the right one equally along the entire free margin. Surface smooth.

Remarks. — *Healdianella kielcensis* sp.n. differs from other species of this genus in a more oval dorsal outline of carapace and a strongly truncate upper part of posterior margin.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

Healdianella? compressa sp.n.

(pl. 23: 6)

Holotype: ZPAL 0.XV/93; pl. 23: 6.

Type horizon: Upper Givetian, *Stringocephalus burtini* Beds.

Type locality: Jurkowie-Budy, Eastern Holy Cross Mts., Poland.

Derivation of the name: Lat. *compressus* — compressed, the name denoting a small width of the carapace.

Diagnosis. — Carapace symmetrical in lateral outline, narrow. Right valve only very slightly overlapped by the left one.

Material. — Eight well preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/93	1.04	0.72	0.45

Description. — Carapace sub-symmetrical and oval in lateral outline. Maximum height of carapace at its midlength, maximum width close behind it middle. Dorsal margin gently arcuate, ventral straight. Ends widely rounded, the posterior one more so. Left valve slightly flattened in the median part near dorsal margin. Carapace slightly convex in dorsal view. Left valve very slightly overlaps the right one along the entire free margin. Surface smooth.

Remarks. — This species differs from other *Healdianella* in a sub-symmetrical lateral outline, very small width of carapace and a small degree to which the left valve overlaps the right one. The shape of carapaces, assigned to *H.? compressa* sp.n., displays a similarity to that of the representatives of *Bairdiocypris*, but the former is marked by a smaller degree of overlapping the valves.

Occurrence. — Poland (Holy Cross Mts.): Jurkowie-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Healdianella aff. *bispinosa* GRÜNDEL, 1961

(pl. 24: 2)

Material. — Twenty variously preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/95	0.88	0.51	0.40

Description. — Carapace *Bythocypris*-like in lateral outline. Maximum length of carapace at its midheight, maximum height at its midlength. Dorsal margin rounded, steeper in the postero- than in the anterodorsal part. Ventral margin straight. Anterior and posterior margins rounded, the anterior one slightly more elongate than the posterior. A small, nodular spine occurs in the posterior part of each valve near the ventral margin. The spines are slightly displaced in relation to each other. Left valve overlaps the right one along the entire free margin. Surface smooth.

Remarks. — The species described differs from *Healdianella bispinosa* GRÜNDEL in the situation of its spines, which, in the specimens from Poland occur near the ventral margin and are displaced in relation to each other, while in *H. bispinosa* they are situated at a certain distance from the margin, symmetrically on both valves.

Occurrence. — Poland (Holy Cross Mountains): Jabłonna, Kowala, Famennian (*Wocklumeria* Stage, do VI).

Healdianella sp.

(pl. 24: 3-4)

Material. — Twenty variously preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/96	0.92	0.56	0.51
C ZPAL 0.XV/97	0.75	0.46	0.40

Description. — Carapace angularly ovate in lateral outline. Maximum length of carapace below its midheight, maximum height and width in its median part. Dorsal margin substraight, ventral straight. Anterior margin rounded, posterior gently pointed closely above the line of the ventral margin. Left valve overlaps the right one along the entire free margin, particularly in the ventral part. Surface smooth.

Remarks. — *Healdianella* sp. differs from other species of this genus in a substraight dorsal and rather pointed posterior margin.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Genus *Orthocypris* KUMMEROW, 1953

Type species: Bythocypris recta KUMMEROW, 1943.

Orthocypris sp.

(pl. 24: 5)

Material. — Five, variously preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/98	0.67	0.37	0.31

Description. — Carapace elongate, suboval in lateral outline. Maximum length, height and width almost in the middle of carapace. Dorsal margin gently curved, ventral straight; both margins subparallel. Anterior and posterior margins rounded, posterior slightly blunted. Left valve only slightly overlaps the right one along the entire free margin. Surface smooth.

Remarks. — This species is similar in the outline of carapace to *Orthocypris* sp. A from the Frasnian of Belgium (BECKER 1971) and to *Kummerowia prima* ADAMCZAK (cf. ADAMCZAK 1976) from Grzegorzowice Formation in the Holy Cross Mts. It differs from the last-named species in a very gently curved dorsal margin.

Occurrence. — Poland (Holy Cross Mts.): Józefka Hill, Frasnian (*Polygnathus asymmetricus* Zone, do I α).

Family **Pachydomellidae** BERDAN and SOHN, 1961
Genus *Ampuloides* POLENOVA, 1952

Type species: Ampuloides verrucosa POLENOVA, 1952.

Ampuloides pumillus sp.n.

(pl. 25: 1-2)

Holotype: ZPAL 0.XV/101; pl. 25: 1.

Type horizon: Upper Devonian, Famennian, *Wocklumeria* Stage, do VI.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: Lat. *pumillus* — dwarfish, the name indicates a small size of its specimens.

Diagnosis. — *Ampuloides* species having strongly asymmetrical valves; the left one terminating anteriorly in a straight margin, with a nodular process occurring in the anterodorsal part and with a ridge running along the ventral margin.

Material. — Seventy carapaces and 100 valves of adult and juvenile individuals, all of them well preserved.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/101	0.57	0.33	0.42
C ZPAL 0.XV/102	0.48	0.30	0.35

Description. — Carapace suboval in lateral outline. Maximum height in the anterior, maximum width in the posterior part, close behind the midlength of carapace. Valves strongly asymmetrical, very convex. Dorsal margin straight, hinge margin situated in a deep depression, ventral margin substraight, somewhat concave before its midlength. Anterior margin of the right valve rather widely rounded and of the left vertically truncate in the median part. A nodular upturned spine occurs on the anterior end of dorsal margin of left valve. Posterior margin of both valves rounded, of the left one slightly truncate in the posteroventral part. Left valve overlaps the right one to a considerable extent along the entire free margin. A distinct ridge occurs along the ventral margin of left valve; on the right valve it is less distinct. Surface warty. In younger ontogenetic stages, the valves are less asymmetrical and the nodular spine in the anterodorsal part of the left valve is only slightly developed.

Remarks. — *A. pumillus* sp.n. differs from *A. verrucosa* POLENOVA in a less rounded anterior margin of the left valve, in the occurrence of a process in the anterodorsal part of the margin of this valve and in a considerably larger overlap of valves along the ventral margin.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Genus *Newsomites* MORRIS and HILL, 1952

Type species: Newsomites pertumidus MORRIS and HILL, 1952.

Newsomites blessi sp.n.

(pl. 25: 3-4)

Holotype: ZPAL 0.XV/103; pl. 25: 3,

Type horizon: Famennian, *Wocklumeria* Stage, do VI

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: In honour of Dr. MARTIN J.M. BLESS, a student of Paleozoic Ostracoda.

Diagnosis. — Carapace suboval in lateral outline. Valves asymmetrical; left valve strongly overlaps the right one in the ventral part. Surface finely pitted.

Material. — Two hundred well preserved carapaces and 100 valves of adult and juvenile specimens.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/103	0.616	0.352	0.320
C ZPAL 0.XV/104	0.560	0.352	0.304

Description. — Carapace small, irregularly suboval in lateral outline. Maximum length somewhat above the midheight, maximum height in the anterior half. Hinge margin situated in a wide, fairly deep depression. Dorsal margin substraight. Anterior margin rounded, slightly truncate in the lower part, posterior rounded, strongly truncate in the lower part. Valves flattened along the anterior and posterior margins. Left valve strongly overlaps the right one, in particular in the ventral part. The median part of surface pitted. A series of fine denticles are visible in well preserved specimens along the posterior margin of both valves; on the right valve they occur close to the margin.

Remarks. — *N. blessi* sp.n. is very similar to *N. multicavus* ROZHDESTVENSKAYA, from which it differs only in its size and more asymmetrical valves. In the outline and ornamentation of carapace the new species described is also related to *Microcheilinella laudata* ROZHDESTVENSKAYA, from which it differs in a smaller truncation of the lower part of posterior end, a wider carapace and the presence of tiny denticles occurring along the posterior margin of both valves.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Clymenia-Wocklumeria* Stage, do V-do VI).

Genus *Microcheilinella* GEIS, 1933

Type species: Microcheilus distortus GEIS, 1932.

Microcheilinella mandelstami POLENOVA, 1952

(pl. 25: 6)

1952. *Microcheilinella mandelstami* POLENOVA: 126, pl. 12: 3.

Material. — A hundred well preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/106	0.80	0.40	0.48

Description. — Carapace ovals elongate in lateral outline. Maximum length of carapace in its midheight, height almost uniform over its entire length, maximum width in its median part. Dorsal and ventral margins straight, subparallel. Both ends of valve similarly rounded. Valves asymmetrical; left valve overlaps the right one along the entire free margin, in particular in the ventral part. In the ventral part of the anterior end, left valve gently deflects from the right one, forming a small "pocket". Surface smooth.

Remarks. — The specimens described differ from the typical ones in somewhat larger dimensions. The lateral outline of carapace in the species described above displays a considerable similarity to those of the representatives of *M. seminalis* KUMMEROW, from which it differs in the outline of the anterior end and in the presence of the "pocket" on the left valve.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds). USSR: Russian Platform, U. Givetian (Staryi Oskol Beds).

Microcheilinella peculiaris ROZHDESTVENSKAYA and
NETCHAEVA, in: ROZHDESTVENSKAYA 1972
(pl. 25: 7)

1972. *Microcheilinella peculiaris* ROZHDESTVENSKAYA et NETCHAEVA; ROZHDESTVENSKAYA: 70, pl. 29: 4.

Material. — Six adult carapaces, some of them damaged.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/107	0.80	0.40	0.56

Description. — Carapace irregularly suboval in lateral outline, strongly convex. Valves considerably asymmetrical. Dorsal margin slightly rounded, gradually turning into the anterior and posterior margin. Hinge margin relatively short, situated in a narrow depression. Both ends narrowly rounded. Ventral margin gently convex. Left valve overlaps the right one, particularly strongly in the median part of ventral margin. Maximum length of carapace slightly below its midheight, maximum height in its midlength, maximum width in its posterior half. A ridge parallel to ventral margin and reaching as far as one-third of the length of valve occurs in the posteroventral part of the left valve. Surface smooth.

Remarks. — The presence of a wedgelike ridge in the posteroventral part of the left valve considerably relates the species described to a specimen illustrated and identified by BRAUN (1967) as *Microcheilinella* sp. No 228 from Hay River Formation (D Fr 5 lower horizon), U. Frasnian from Northern Canada.

Occurrence. — Poland (Holy Cross Mts.): Sobiekurów, Frasnian. USSR: Southern Ural, Bashkirian ASSR, Frasnian (Sargayav horizon); Volgograd area, Frasnian (Semiluks horizon); Orenburg area, Frasnian (Kynovsk horizon). ? Northern Canada, Upper Frasnian (Hay River Formation, D Fr 5 horizon).

Microcheilinella sp.

(pl. 25: 5)

Material. — Ten adult carapaces and 1 valve, all well preserved.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/105	0.56	0.30	0.30

Description. — Carapace suboval and elongate in lateral outline. Valves strongly asymmetrical. Dorsal and ventral margins substraight, subparallel. Hinge margin situated in a narrow depression. Ends rounded, the posterior one gently truncate in the lower part. Left valve strongly overlaps the right one along the entire free margin, particularly so along the ventral margin. Maximum length of carapace in its midheight, height almost uniform over its entire length, maximum width in its posterior part. Surface smooth.

Remarks. — The specimens described are similar to *Microcheilinella subcorbuloides* (JONES and KIRBY) from the Carboniferous of England and Ireland, but are less convex.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Łagów, Kielce, Famennian (*Platyclymenia-Wocklumeria* Stage, do III-do VI).

Family **Gerodiidae** GRÜNDEL, 1962
Genus *Gerodia* GRÜNDEL, 1962

Type species: Gerodia ratina GRÜNDEL, 1962.

Gerodia weyeri GRÜNDEL, 1972

(pl. 25: 8-9)

1972. *Gerodia weyeri* GRÜNDEL: 860, fig. 2.**Material.** — A hundred variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/108	1.20	0.656	0.800
C ZPAL 0.XV/109	0.756	0.480	0.512

Description. — Carapace suboval in lateral outline, truncate along ventral margin and sub-spherical in dorsal outline. Maximum length near ventral margin, maximum height in the posterior and maximum width in the median part of carapace. Dorsal margin gently rounded in the median and steep in the posterodorsal part. Hinge margin short, situated in a small depression. Ventral margin substraight. Anterior margin slightly obliquely rounded, posterior strongly truncate. Left valve overlaps the right one along the entire free margin. Right valve has, in its posteroventral part, a small spiny process with a strongly extended base. A small marginal rim occurs in the anteroventral part of right valve. Surface smooth.

Remarks. — The specimens described differ from the holotype of *G. weyeri* in a less distinctly outlined process in the posteroventral part of right valve, which probably results from corrosion and, in addition, their carapaces are somewhat wider than high. Perhaps, they should be assigned to the separate subspecies *G. weyeri*.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Bl. Balve, Sauerland, Famennian (*Wocklumeria* Stage, do VI).

Genus *Baschkirina* ROZHDESTVENSAYA, 1959*Type species: Baschkirina memorabilis* ROZHDESTVENSAYA, 1959.*Baschkirina microspina* sp.n.

(pl. 26: 1-2)

Holotype: ZPAL 0.XV/111; pl. 26: 2.*Type horizon:* Famennian, *Wocklumeria* Stage, do VI.*Type locality:* Kowala, Holy Cross Mts., Poland.*Derivation of the name:* Lat. *microspina* — after a small spine occurring in the posteroventral part of the right valve.

Diagnosis. — A species representing the genus *Baschkirina*, marked by a small spine in the posteroventral part of the right valve and a strongly flattened ventral side of carapace.

Material. — Fifty variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/110	0.700	0.336	0.336
C ZPAL 0.XV/111	0.700	0.352	0.368

Description. — Carapace suboval in lateral outline. Maximum length of carapace below its midheight, maximum height behind its midlength. Dorsal margin gently rounded, ventral straight. Anterior and posterior margins rounded, the posterior one more truncate in the dorsal part than the anterior. Left, larger valve overlaps the right one along the entire free margin. A small, posteriorly deflected, spine occurs in the posteroventral part of right valve. Surface smooth.

Remarks. — *B. microspina* sp.n. differs from other species of the genus *Baschkirina* in a considerably smaller spine in the posteroventral part of the right valve, more distinctly rounded anterior and posterior margins and its lateral outline, resembling the representative of *Healdianella*.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Suborder **Paraparchitocopina** GRAMM, 1975
 ?Superfamily **Paraparchitacea** SCOTT, 1959
 Family **Paraparchitidae** SCOTT, 1959
 Genus *Samarella* POLENOVA, 1952

Type species: Samarella crassa POLENOVA, 1952.

Samarella aff. *crassa* POLENOVA, 1952

(pl. 14: 10)

Material. — Nine well preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
ZPAL 0.XV/30	0.67	0.43	0.32

Description. — Carapace trapezoidal in lateral outline. Both ends rounded. Dorsal margin straight, ventral rounded and, in its anterior part, truncate. Right valve overlaps the left one along the ventral margin, while the left strongly overlaps the right in the dorsal part. Maximum width of carapace in its median part. Surface smooth.

Remarks. — *Samarella* aff. *crassa* POLENOVA differs from *S. crassa* from the Russian Platform in a more rounded outline of carapace and its smooth surface, which in the latter is in part punctate. In the lateral outline, *S. aff. crassa* from the Holy Cross Mts. displays a considerable similarity to specimens from the Givetian of Bergisches Land assigned by GROOS (1962) to *S. crassa*, differing from them in a smooth surface of carapace. In their outline of carapace and its smooth surface, the specimens from Jurkowice, assigned to *S. aff. crassa*, resemble those from the Givetian of Southern Ural, assigned by ROZHDESTVENSKAYA (1972) to *S. crassa*.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Samarella levinodosa BECKER, 1964

(pl. 14: 9)

1964. *Samarella levinodosa* BECKER: 85, pl. 14: 6.

Material. — Twenty-two variously preserved, adult carapaces and 5 valves.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/29	0.98	0.56	0.56

Description. — Carapace suboval in lateral and lenticular in dorsal outline. Dorsal margin straight, cardinal angles rounded. Maximum width in the median part of carapace. Ventral margin gently rounded and slightly truncate in the anterior part. Anterior and posterior margins rounded, the anterior lower. Maximum height in the posterior one-third of the length of carapace. Right valve overlaps the left one along the ventral and the latter overlaps the former in

the dorsal part. A small node occurs in the posterodorsal part of left valve. Surface smooth.

Remarks. — As compared with specimens representing *S. levinodosa* illustrated by BECKER (1964), those from Jurkowice-Budy have a somewhat more convex carapace and, in addition, this convexity is more uniform. This species displays a considerable similarity in lateral and dorsal outline to *S. corpulenta* ROZHDESTVENSKAYA, from which it differs in the lack of a node on the left valve.

Occurrence. — Poland (Holy Cross Mts.): Jurkowice-Budy, U. Givetian (*Stringocephalus burtini* Beds). Federal Republic of Germany: Eifel Mts. — Sötenicher Mulde, Givetian (Cürten Beds).

Suborder **Cytherocopina** GRÜNDEL, 1967
 Superfamily **Cytheracea** BAIRD, 1850
 Family **Tricorninidae** BLUMENSTENGEL, 1965
 Genus *Tricornina* BOUČEK, 1936
 Subgenus *Tricornina (Bohemina)* ŠNAJDR, 1951

Type species: Tricornina (Bohemina) prantli ŠNAJDR, 1951.

Tricornina (Bohemina) sp.

(pl. 26: 3)

Material. — Two, partly damaged, valves, with posterior ends and spines broken-off. Dimensions (in mm):

	L	H
RV ZPAL 0.XV/112	0.56	0.32

Description. — Dorsal margin long, straight, ventral obliquely rounded. Anterior end rounded in the lower part, posterior extended and pointed (partly damaged). A spine, deflected downwards, occurs in the ventromedian part. Surface of valves reticulate in the median part.

Remarks. — The specimens described are similar in their lateral outline and situation of the spine to *T. (Bohemina) extrema* BLUMENSTENGEL and to the considerably related *T. (B.) styliolata* BLUMENSTENGEL (cf. BLUMENSTENGEL 1965).

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Clymenia* Stage, do V).

Family **Rectonariidae** GRÜNDEL, 1962
 Subfamily **Rectonariinae** GRÜNDEL, 1962
 Genus *Rectonaria* GRÜNDEL, 1961

Type species: Rectonaria muelleri GRÜNDEL, 1961.

Rectonaria inclinata GRÜNDEL, 1961

(pl. 26: 4-5)

1961. *Rectonaria inclinata* GRÜNDEL: 115, pl. 9: 6; pl. 10: 1-2.

1965. *Rectonaria inclinata* GRÜNDEL; BLUMENSTENGEL: 49.

Material. — Thirty-one adult and juvenile carapaces, mostly with broken-off dorsal and ventral spines.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/113	0.50	0.35	0.30
C ZPAL 0.XV/114	0.56	0.37	0.32

Description. — Carapace suboval in lateral outline. Maximum length of carapace in its midheight, maximum height in its anterior part and maximum width in its median part. Dorsal margin straight, hinge margin rather short, situated in a shallow depression. Ventral margin straight, parallel to dorsal. Anterior margin rounded, posterior truncate in the upper part. Left, slightly larger, valve overlaps the right one along the entire free margin. Two spines occur on each valve; one of them, deflected posteriorly, is situated in the posteroventral part and the other, directed outwards and somewhat posteriorly, in the dorsal part, nearer the posterior margin. The ventral spine is shorter and thinner than the dorsal. Surface smooth.

Remarks. — In the presence and localization of the two spines on each valve, the specimens of *R. inclinata* GRÜNDEL described above are related to *Rectonaria* sp. 2 GRÜNDEL from the Visean of the Harz Mts. (GRÜNDEL 1963). *R. inclinata* differs, however, from the latter in its lateral outline and situation of the dorsal spines, which occur nearer the posterior margin of carapace and are distinctly pointing posteriorly.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (*Clymenia -Gattendorfia* Stage, do V-cu I). Spain: Cantabrian Mts., Famennian (Montó Beds).

Rectonaria muelleri GRÜNDEL, 1961

(pl. 26: 6)

1961. *Rectonaria muelleri* GRÜNDEL: 112, pl. 8: 4-5; pl. 9: 1-2; pl. 14: 1.

1965. *Rectonaria muelleri* GRÜNDEL; BLUMENSTENGEL: 48, pl. 7: 26-29.

1970. *Rectonaria muelleri* GRÜNDEL; PŘIBYL: 123, pl. 2: 7; pl. 3: 4.

Material. — Six poorly preserved, adult carapaces, with partly corroded surface and broken-off spines.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/116	0.84	0.50	0.38

Description. — Carapace subtrapezoidal in lateral outline. Maximum length of carapace somewhat below its midheight, height almost uniform over its entire length, maximum width in its median part. Dorsal margin long and straight; hinge margin situated in a small depression; ventral margin slightly rounded, substraight; anterior margin rounded, posterior truncate in the upper part and gently prolonged in the extension of ventral margin. Left, larger valve overlaps the right one along the entire free margin. Right valve is flattened along the ventral and, partly, anterior margin. Carapace has three spines: two of them, long and thick, occur in the dorsal part close behind the midlength, symmetrically situated one on each valve. The third, pointing posteriorly, occurs in the posteroventral part of left valve. It is considerably thinner and shorter than the dorsal spines. Surface smooth.

Remarks. — In the specimens described, the dorsal spine is situated nearer the midlength of valve than in those illustrated by GRÜNDEL (1961) in pl. 8: 4-5, but similarly as in those he illustrated in pl. 9: 1.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (do I α -cu I). Bulgaria: Vointsi (Dalboki Dol), Famennian. Spain: Cantabrian Mts., Famennian (Montó Beds).

Rectonaria kowalensis sp.n.

(pl. 26: 7)

Holotype: ZPAL 0.XV/116; pl. 26: 7.*Type horizon*: U. Devonian, Famennian, *Wocklumeria* Stage, do VI.*Type locality*: Kowala, Holy Cross Mts., Poland.*Derivation of the name*: after the locality Kowala.

Diagnosis. — A species of *Rectonaria*, having small dorsal spines in the posterior part of the dorsal margin.

Material. — Forty adult and juvenile carapaces, mostly with broken-off spines.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/116	0.70	0.43	0.32

Description. — Carapace resembling in lateral outline a rounded rectangle. Maximum length of carapace in its midheight, maximum width close behind its midlength, height uniform over its entire length. Dorsal margin substraight; hinge margin situated in a small depression. Ventral margin straight, subparallel to dorsal. Anterior margin rounded, slightly truncate in the lower part, posterior rounded. Left, larger valve overlaps the right one along the entire free margin and considerably overreaches it along the posterior part of dorsal margin. Carapace with three spines: the first of them occurs in the posterodorsal part of right valve close to the dorsal margin and near the posterior margin; the second is situated in the posterodorsal part of left valve, but is more distant than the first from both the dorsal and posterior margin; the first two spines are pointing posteriorly. The third spine, slightly pointing downwards, occurs in the posteroventral part of left valve. Surface smooth.

Remarks. — *R. kowalensis* sp.n. is similar to *R. muelleri* GRÜNDEL, from which it differs in a considerably smaller length and diameter of dorsal spines, their situation near the dorsal margin and a smaller truncation of the posterior margin of carapace. In addition, in *R. kowalensis* sp.n. the dorsal margin of left valve more strongly overreaches the right valve.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Genus *Orthonaria* BLUMENSTENGEL, 1965

Type species: *Orthonaria quadricera* BLUMENSTENGEL, 1965.

Orthonaria rectagona (GRÜNDEL, 1962)

(pl. 26: 8)

1962. *Triplacera (Necrateria)? rectagona* GRÜNDEL: 84, pl. 3: 9-11.

1965. *Orthonaria rectagona* GRÜNDEL; BLUMENSTENGEL: 50.

Material. — Eighty adult and juvenile carapaces, mostly with broken-off spines.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/117	0.62	0.35	0.32

Description. — Carapace oval-rectangular in lateral outline. Maximum length of carapace in its midheight; maximum width almost in its midlength; height uniform over its entire length. Dorsal margin straight, long. Hinge margin situated in a narrow depression. Ventral margin straight, parallel to dorsal. Posterior and anterior margins regularly rounded. Left valve slightly

overlaps the right one along the entire free margin. A posteriorly pointing spine occurs on each valve in the posterior part of carapace somewhat below its midheight. Surface smooth.

Remarks. — The specimens described differ from the holotype of *O. rectagona* in a somewhat lower situation of the spines, which occur below the midheight of carapace. The remaining morphological characters are identical.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI). German Democratic Republic: Thuringia, Famennian-Carboniferous (*Platyclymenia-Gattendorfia* Stage, do VI-cu I). Spain: Cantabrian Mts., Famennian (Montó Beds).

Orthonaria gruendeli sp.n.

(pl. 26: 9)

Holotype: ZPAL 0.XV/118; pl. 26: 9.

Type horizon: Famennian, *Wocklumeria* stage, do VI.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: In honour of Dr. JOACHIM GRÜNDEL, a student of Paleozoic Ostracoda.

Diagnosis. — Carapace oval-rectangular in lateral outline, with two short spines in the posterior part of each valve.

Material. — Eleven adult carapaces with partly corroded surfaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/118	0.56	0.34	0.30

Description. — Carapace oval-rectangular in lateral outline. Maximum length of carapace in its midheight; height almost uniform over its entire length; maximum width slightly behind its midlength. Dorsal margin long, straight. Hinge margin situated in a narrow depression. Ventral margin straight, parallel to dorsal. Anterior margin regularly rounded, posterior also rounded, but slightly truncate in the upper part. Left, larger valve slightly overlaps the right one along the entire free margin. Two short, posteriorly pointing, spines, one below and the other above the midheight, occur on each valve in the posterior part of carapace. Surface smooth.

Remarks. — This species is similar to *Orthonaria berna* (*recte Waylandella? berna* GRÜNDEL), from which it differs in the presence of two spines on each valve, while *O. berna* has only one spine on the left valve. The two species differ in turn from the representatives of *Waylandella* CORYELL et BILLINGS in the oval-rectangular lateral outline of their carapaces, straight dorsal margin and situation of the hinge margin occurring in a depression. For these reasons, it seems right to assign them to the genus *Orthonaria*, marked by an oval-rectangular lateral outline of valves as its diagnostic character. *O. gruendeli* sp.n. also differs from other species of this genus in the presence of two spines at the posterior end of each valve.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

Subfamily **Rectoplacerinae** BLUMENSTENGEL, 1965

Genus *Rectoplacera* BLUMENSTENGEL, 1965

Type species: *Rectoplacera elongata* BLUMENSTENGEL, 1965.

Rectoplacera elongata BLUMENSTENGEL, 1965

(pl. 27: 1-2)

Material. — Twenty adult carapaces with partly corroded valve surfaces.

Dimensions (in mm):

	L	H	W
LV ZPAL 0.XV/119	0.70	0.38	—
C ZPAL 0.XV/120	0.80	0.42	0.37

Description. — Carapace elongate, rectangular and rounded in lateral outline. Maximum length of carapace in its midheight, maximum width somewhat behind its midlength, height uniform over its entire length. Dorsal margin long, straight; ventral substraight and parallel to dorsal. Anterior and posterior margins rather widely rounded, posterior somewhat narrower. Left, larger valve overlaps the right one along the entire free margin, particularly strongly along the ventral margin. Short, single, slightly posteriorly pointing spines, symmetrically distributed in the posteroventral part, occur on both valves. A short spine, pointing upwards and somewhat posteriorly, occurs in the posterodorsal part of the left valve. Surface smooth.

Remarks. — The specimens described differ from the holotype of *R. elongata* BLUMENSTENGEL in somewhat thinner posteroventral spines and very slightly shorter carapace.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (*Cheiloceras* Stage, do II α -II β). Spain: Cantabrian Mts., Famennian (Montó Beds).

Rectoplacera elliptica BLUMENSTENGEL, 1965

(pl. 27: 3-5)

1965. *Rectoplacera elliptica* BLUMENSTENGEL: 52, pl. 7: 7-12; pl. 23: 9-15.

Material. — Thirty adult and juvenile carapaces, mostly with broken-off spines.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/121	0.80	0.52	0.43
LV ZPAL 0.XV/122	0.70	0.48	—
C juv. ZPAL 0.XV/123	0.50	0.35	0.29

Description. — Carapace suboval in lateral outline. Maximum length of carapace in its midheight; height somewhat larger in its posterior than anterior end; maximum width slightly behind its midlength. Dorsal and ventral margins substraight. Hinge margin situated in a narrow depression. Anterior and posterior margins rounded, anterior somewhat truncate in the lower part. Left, larger valve slightly overlaps the right one along the entire free margin and more so along the ventral margin. A posteriorly pointing spine occurs on each valve below the midheight in the posterior part of carapace. In addition, another spine, pointing upwards and slightly posteriorly, is situated on the right valve at the posterior end of dorsal margin. Surface smooth.

Ontogeny. — In juvenile forms, the dorsal spine is more deflected posteriorly and reaching nearer the posterior end of dorsal margin.

Remarks. — The specimens from Kowala are smaller than those described by BLUMENSTENGEL (1965).

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (*Cheiloceras* Stage, do II α -II β).

Rectoplacera aff. *robusta* BLUMENSTENGEL, 1965

(pl. 27: 6-9)

Material. — Sixty variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/124	0.84	0.45	0.64
C ZPAL 0.XV/125	0.67	0.32	0.45
C ZPAL 0.XV/126	0.53	0.29	0.32
C ZPAL 0.XV/127	0.64	0.37	0.43

Description. — Carapace oval-rectangular in lateral outline. Maximum length of carapace in its midheight, height uniform over its entire length and width, strongly increasing posteriorly, reaches its maximum in the posteroventral part. Ventral side flattened. Transverse section subtriangular. Dorsal margin straight. Hinge margin situated in a narrow depression. Ventral margin straight or very slightly rounded. Anterior and posterior margins rounded, anterior more narrowly rounded than posterior, posterior slightly truncate in the lower part. Left, larger valve overlaps to a considerable extent the right one in the median part of ventral margin and less so along the rest of free margin. Single spines, symmetrically situated on both valves, occur in the posteroventral part. A thin spine, pointing upwards also occurs in the postero-dorsal part of left valve. Surface smooth.

Remarks. — The form described differs from types of *R. robusta* thinner and shorter ventral spines and in a more erect dorsal spine.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Genus *Triplacera* GRÜNDEL, 1961

Type species: Triplacera triquetra GRÜNDEL, 1961.

Triplacera triquetra GRÜNDEL, 1961

(pl. 27: 1-2)

1961. *Triplacera triquetra* GRÜNDEL: 116, pl. 10: 3-4; pl. 14: 3.

1972. *Triplacera triquetra* GRÜNDEL: 859, fig. 1b.

Material. — Thirty adult and juvenile carapaces, all of them with broken-off spines.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/128	0.90	0.50	0.48
C ZPAL 0.XV/129	0.70	0.45	0.43

Description. — Carapace oval-triangular in lateral outline. Maximum length of carapace in its midheight, maximum height in its posterior part, near posterior margin, maximum width in its posteroventral part. Ventral side flattened. Transverse section subtriangular. Dorsal margin straight, sloping towards the anterior end. Ventral margin straight or slightly rounded. Anterior margin regularly rounded, posterior vertically truncate. Left, larger valve overlaps the right one along the entire free margin, particularly so in the ventral part. Along the dorsal margin, left valve overreaches the right one, particularly so in the posterodorsal part at the base of spine. Carapace has three spines, that is, one each occurs on both valves in their postero-ventral parts and one more in the posterodorsal part of only left valve. Ventral spines are distributed symmetrically and directed posteriorly, while the dorsal spine points upwards and only slightly posteriorly. Surface smooth.

Ontogeny. — Juvenile forms have a more vertically truncate posterior margin of carapace and a more uniformly convex carapace in dorsal view, as opposed to adult specimens whose carapaces strongly extend posteriorly.

Remarks. — The ventral spine of the specimens from Kowala is situated in the extension of the ventral margin, while in the holotype of this species the base of the spine occurs somewhat higher than the ventral margin. In other specimens of this species, illustrated by Gründel (1961), this difference is less distinct and it may be treated as a character of the intraspecific variability.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic and Federal Republic of Germany: Thuringia, Famennian (*Platyclymenia-Gattendorfia* Stage, do IV-cu I); Bl. Balve-Sauerland, do VI. Spain: Cantabrian Mts., Famennian (Montó Beds).

Family unknown
Genus *Aurigerites* ROUNDY, 1926

Type species: Aurigerites texanus ROUNDY, 1926.

Aurigerites aff. *texanus* ROUNDY, 1926

(pl. 28: 3)

Material. — Fifteen variously preserved, adult carapaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/130	0.56	0.33	0.35

Description. — Carapace suboval in lateral outline. Maximum length of carapace in its midheight; height almost uniform over its entire length, slightly larger in the posterior end; maximum width in its median part. Dorsal margin long, straight. Hinge margin situated in a small depression. Ventral margin straight. Anterior and posterior margins rounded, posterior slightly more rounded than anterior and somewhat truncate in the lower part. Left, larger valve overlaps the right one along the entire free margin. A semicircular ridge, subparallel to the margin of valve and bordering its flattening occurs on each valve at the posterior end of carapace. Surface smooth.

Remarks. — In the lateral outline of carapace and general outline of ridge, the specimens described are similar to *Aurigerites texanus* ROUNDY. Specimens assigned to *A. aff. texanus* ROUNDY differ from *A. texanus* in a longer dorsal margin and a situation of the ridge. In addition, the ridge of *A. aff. texanus* is more arcuate, semicircular in outline. Specimens of *A. aff. texanus* also display a similarity in their lateral outline to those representing *A. obernitzenis* GRÜNDEL, from which they differ in the outline of ridge.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Aurigerites blumenstengeli sp.n.

(pl. 28: 4-5)

Holotype: ZPAL 0.XV/131: pl. 28: 4.

Type horizon: Famennian, *Wocklumeria* Stage, do VI.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: In honour of Dr. Horst BLUMENSTENGEL, a researcher of Paleozoic Ostracoda.

Diagnosis. — A ridge formed like an anteriorly open triangle or like an arch occurs in the posterior part of valve. It may extend forming a ring subparallel to the margins of valve.

Material. — Sixty variously preserved, adult and juvenile carapaces.

Dimensions (in mm):

		L	H	W
C ZPAL	0.XV/131	0.616	0.368	0.256
C ZPAL	0.XV/132	0.672	0.352	0.304

Description. — Carapace rectangular-rounded in lateral outline. Height of carapace uniform over its entire length, maximum length in its midheight. Dorsal margin long, straight, parallel to ventral. Ventral margin straight. Anterior and posterior margins almost equally rounded. Left, larger valve overlaps the right one along the entire free margin. A small spine occurs on the left valve at the posterior end of dorsal margin. A ridge shaped like an anteriorly open triangle occurs in the posteroventral part of each valve. In some specimens, this ridge stretches uninterrupted anteriorly, forming a ring subparallel to the margins of valve. In the anterior part, it may also occur in the vestigial form as a semicircular ridge. Sometimes, this ridge terminates in the posteroventral part in a small spine. Within the limits of this ridge, carapace is flattened. Surface smooth.

Variability. — A considerable variability is observed in the development of the ridge in particular carapaces and in the valves of one and the same carapace.

Remarks. — *A. blumenstengeli* sp.n. differs from other species of this genus in the triangular outline of the ridge at the posterior end of valve and in the presence of a ridge parallel to the margins in the remaining part of valve.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Wocklumeria* Stage, do VI).

Gen. et sp. indet.

(pl. 28: 7)

Material. — One partly damaged, valve.

Dimensions (in mm):

		L	H
RV ZPAL	0.XV/134	2.24	1.20

Description. — Valve large, suboval in lateral outline. Maximum length in midheight, maximum height in the posterior part. Dorsal margin long, straight, gradually turning into the anterior one. Ventral margin gently rounded, slightly truncate anteriorly. Anterior and posterior margins rounded, anterior more narrowly rounded than the posterior one. A slightly convex adductorial spot is visible in the median part of valve. Surface smooth.

Remarks. — Specimens very similar in outline and size were also found in the Givetian deposits of Western Pomerania, Poland (ŻBIKOWSKA, in preparation).

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Order *Eridostraca* ADAMCZAK, 1961
 Family *Cryptohyllidae* ADAMCZAK, 1961
 Genus *Cryptohyllus* LEVINSON, 1951

Type species: Eridoconcha oboloides ULRICH and BASSLER, 1923.

Cryptophyllus sp.

(pl. 28: 6)

Material. — Two partly damaged, right valves.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/133	0.96	0.80

Description. — Valves subround, almost symmetrical in lateral outline. Dorsal margin convex, ventral not very widely rounded. Eight lamellae present. Umbo before midlength, rounded.

Remarks. — The specimens described display a certain similarity to *Cryptophyllus trelonensis* LETHIERS, from which they differ in their rounded umbo.

Occurrence. — Poland (Holy Cross Mts.): Jurkowiec-Budy, U. Givetian (*Stringocephalus burtini* Beds).

Order *Myodocopida* SARS, 1866Suborder *Entomozocopina* GRÜNDEL, 1969Superfamily *Entomozoacea* PŘIBYL, 1951Family *Entomozoidae* PŘIBYL, 1951Subfamily *Entomozoinae* PŘIBYL, 1951Genus *Bertillonella* STEWART and HENDRIX, 1945

Type species: Bertillonella subcircularis STEWART and HENDRIX, 1945.

Subgenus *Bertillonella* (*Waldeckella*) RABIEN, 1954

Type species: Waldeckella erecta RABIEN, 1954

Bertillonella (*Waldeckella*) *erecta* (RABIEN, 1954)

(fig. 5)

1954. *Waldeckella erecta* RABIEN: 152, pl. 1: 10; pl. 5: 44.

Material. — One valve, damaged in its dorsal part.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/170	0.12	0.640

Description. — See RABIEN (1954).

Remarks. — The valve described displays fine, elliptical ribs extended perpendicularly to the longer axis of valve. They represent a diagnostic character of this species (RABIEN 1954).



Fig. 5

Bertillonella (*Waldeckella*) *erecta* (RABIEN, 1954) lateral view, $\times 50$.

Occurrence. — Poland (Holy Cross Mts.): Śluchowice, Frasnian (Lower *P. gigas* Zone). Federal Republic of Germany: Rhenish Schiefergebirge, Frasnian (Middle-Adorf-Stufe).

Genus *Entomozoe* PŘIBYL, 1950

Type species: Entomis tuberosa JONES, 1861.

Subgenus *Entomozoe (Richteria)* JONES, 1874

Type species: Cypridina serratostrata SANDBERGER, 1845.

Entomozoe (Richteria) serratostrata (SANDBERGER, 1845)

(pl. 29: 2)

1954. *Entomozoe (Richteria) serratostrata* (SANDBERGER 1845); RABIEN: 88, pl. 3: 30 (here older synonymy).

1959. *Entomozoe (Richteria) serratostrata* (SANDBERGER 1845); BLUMENSTENGEL: 63.

Material. — Twenty poorly preserved, internal moulds.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/136	1.40	1.08

Description and Remarks. — See RABIEN (1954, p. 88).

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Famennian (*Cheiloceras* Stage, do II). German Democratic Republic: Thuringia, Famennian (Nehden-Stufe, do II). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (Nehden-Stufe, do II).

Subgenus *Entomozoe (Nehdentomis)* MATERN, 1929

Type species: Entomozoe (Nehdentomis) nehdensis (MATERN, 1929).

Entomozoe (Nehdentomis) nehdensis (MATERN, 1929)

(pl. 29: 3)

1929. *Entomis (Nehdentomis) nehdensis* MATERN: 56, pl. 4: 45.

1954. *Entomozoe (Nehdentomis) nehdensis* (MATERN 1929); RABIEN: 94 (here older synonymy).

1959. *Entomozoe (Nehdentomis) nehdensis* (MATERN 1929); BLUMENSTENGEL: 65.

Material. — Ten poorly preserved, valves.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/137	1.15	0.87

Description. — See RABIEN (1954).

Remarks. — In some specimens, the adductor muscle scar is rather indistinctly outlined, which relates them to those of *E. (Richteria) serratostrata* (SANDBERGER) from Federal Republic of Germany. Specimens from Poland differ, however, from the last-named in the presence of transverse ribs.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Famennian (*Cheiloceras* Stage, do II). German Democratic Republic: Thuringia, Famennian (Nehden-Stufe, do II). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (Nehden-Stufe, do II).

Entomozoe (Nehdentomis) tenera (GÜRICH, 1896)

(pl. 29: 4-6)

1896. *Entomis tenera* GÜRICH: 375, pl. 10: 15.

1954. *Entomozoe (Nehdentomis) tenera* (GÜRICH, 1896); RABIEN: 98 (here older synonymy).

1976. *Entomozoe (Nehdentomis) tenera* (GÜRICH, 1896); CASIER: 18, pl. 2: 6 (here older synonymy).

Material — Sixty variously preserved, internal and external moulds of adult and juvenile valves.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/138	1.30	0.90
LV ZPAL 0.XV/139	0.96	0.83
LV ZPAL 0.XV/140	(specimen broken)	0.80

Description. — See RABIEN (1954) and CASIER (1976).

Variability. — Among the specimens from the Holy Cross Mts., a considerable variability is observed in the development of median sulcus. In some specimens, this sulcus is very distinct and deep, in some others — very shallow or even replaced by a certain disorder in the trace of longitudinal ribs.

Occurrence. — Poland (Holy Cross Mts.): Wietrznia, Śluchowice, Psie Górki, Kadzielnia, Jabłonna — Frasnian, Famennian (do I γ -do II). German Democratic Republic: Thuringia, Frasnian-Famennian (do I/ β / γ -do II). Federal Republic of Germany: Rhenish Schiefergebirge, Frasnian-Famennian (do I/ β / γ -do II). Belgium: Bouss-en-Fagne, Frasnian (do I α).

Entomozoe (Nehdentomis) aff. pseudorichterina (MATERN, 1929)

(pl. 30: 3-4)

Material. — Thirty variously preserved, internal and external moulds.

Dimensions (in mm):

	L	H
LV ZPAL 0.XV/144	1.18	0.78
LV ZPAL 0.XV/145	0.82	0.57
LV ZPAL 0.XV/146	0.77	0.58

Description. — Carapace ellipsoidal in lateral outline. Dorsal margin substraight, ventral rounded. Anterior and posterior margins rounded. Ornamentation in the form of 25 to 30 main ribs, which, in the lower and upper parts of valve run parallel to its margin, converging and contacting at an acute angle in its median part. In this part of valve, the ribs wedge out, that is, do not reach valve margins. There also occur irregular secondary ribs. The trace of ribs at the anterior end of carapace is very irregular. A small adductorial pit is situated in the median part. Sulcus shallow, indistinctly outlined and, in many specimens, it takes the form of a disorder in the trace of ribs.

Variability. — A considerable variability has been observed in lateral outline: from elongate, through elliptical to subround.

Remarks. — The species described is most similar in ornamentation to *E. (Nehdentomis) pseudorichterina* (MATERN), from which it differs, however, in the lack of a concentric rib and in a more irregular trace of horizontal ribs.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Famennian (*Cheiloceras* Stage, do II).

Entomozoe (Nehdentomis)? sp.

(pl. 29: 7-8 and 30: 1)

Material. — Five internal moulds of adult valves, partly damaged and one internal mould of carapace, probably belonging to a juvenile form.

Dimensions (in mm):

	L	H	W
RV ZPAL 0.XV/141	1.20	0.91	—
LV ZPAL 0.XV/142	1.04	0.75	—
C ZPAL 0.XV/143	0.80	0.60	0.48

Description. — Carapace elliptical in lateral outline. Ornamentation in the form of concentric ribs, parallel to valve margins. Some horizontal ribs occur in the median part. A deep sulcus, disappearing below the midheight of valve, stretches in the median part of valve, beginning at the dorsal margin.

Variability. — In two specimens, the sulcus becomes more and more shallow near the middle of valve and terminates in a fairly deep adductorial spot, which is not visible in other specimens.

Remarks. — The occurrence of a distinct adductorial spot in two of the specimens described relates them to the subgenus *Entomozoe* (*Nehdentomis*), while those with a less distinctly outlined adductorial spot display a similarity to the representatives of the subgenus *Entomozoe* (*Richteria*).

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (Lower *hemisphaerica-dichtoma* Zone).

Genus *Richteria* GÜRICH, 1896

Type species: Cytherina costata RICHTER, 1869.

Subgenus *Richteria* (*Volkina*) RABIEN, 1954

Type species: Entomis (*Nehdentomis*) *zimmermanni* VOLK, 1939.

Richteria (*Volkina*) cf. *zimmermanni* (VOLK, 1939)

(pl. 29: 1)

1939. *Entomis* (*Nehdentomis*) *zimmermanni* VOLK: 250, pl. 1: 10.

1954. *Richteria* (*Volkina*) *zimmermanni* (VOLK, 1939); RABIEN: 110, pl. 2: 14; pl. 4: 33-34 (here older synonymy).

1959. *Richteria* (*Volkina*) *zimmermanni* (VOLK, 1939); BLUMENSTENGEL: 72.

1976. *Richteria* (*Volkina*) *zimmermanni* (VOLK, 1939); CASIER: 21, pl. 3: 2 (here remaining synonymy).

Material. — One, partly damaged, valve.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/135	1.44	0.91

Description. — See RABIEN (1954) and CASIER (1976).

Remarks. — In the character of its ornamentation this valve is most similar to those of *R.* (*Volkina*) *zimmermanni*. The damaged dorsal part of valve precludes the possibility of finding the dorsal depression, a character typical of the genus mentioned above.

Occurrence. — Poland (Holy Cross Mts.): Śluchowice, Frasnian (Lower *P. gigas* Zone). German Democratic Republic: Thuringia, Frasnian (do I β -do γ). Federal Republic of Germany: Rhenish Schiefergebirge, Frasnian (Middle-Upper Adorf-Stufe). Belgium: Boussu-en-Fagne, Frasnian (do I α).

Subgenus *Richteria* (*Fossirichteria*) MATERN, 1929

Type species: Richteria (*Fossirichteria*) *intercostata* MATERN, 1929.

Richterina (Fossirichterina) moravica (RŽEHAK, 1881)

(pl. 30: 5-7)

1954. *Richterina (Fossirichterina) moravica* (RŽEHAK, 1881); RABIEN: 131 (here older synonymy).1959. *Richterina (Fossirichterina) moravica* (RŽEHAK 1881); BLUMENSTENGEL: 74, pl. 1: 3.

Material. — Seventy variously preserved valves and internal and externals moulds of adult and juvenile specimens.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/147	0.75	0.50
RV ZPAL 0.XV/148	0.64	0.47
RV ZPAL 0.XV/149	0.62	0.40

Description. — See RABIEN (1954).

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (Clymenia Stage, do V). German Democratic Republic: Thuringia, Famennian (do III-do IV, do V?). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (do III-do IV-do V α).

Richterina (Fossirichterina) semen (JONES, 1895)?

(pl. 30: 9)

1954. *Richterina (Fossirichterina) semen* (JONES 1895); RABIEN: 130 (here older synonymy).

Material. — Twenty variously preserved, adult valves.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/151	0.80	0.65

Description. — See RABIEN (1954).

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Upper Famennian. Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (do III-do IV).

Richterina (Fossirichterina) sp.

(pl. 30: 8)

Material. — Five, partly destroyed, adult valves.

Dimensions (in mm):

	L	H
LV ZPAL 0.XV/150	1.12	0.84

Description. — Carapace elongate, elliptical in lateral outline. Dorsal margin slightly convex, ventral distinctly rounded. Anterior and posterior margins rounded. Ornamentation in the form of one to two concentric ribs, parallel to the free margin, and 17 to 20 longitudinal ribs situated within concentric ribs. Fairly widely spaced short transverse ribs occur between longitudinal ribs. A round adductorial pit is situated in the median part of valve.

Remarks. — The presence of transverse ribs in the specimens described makes them similar to *R. (Fossirichterina) semen* (JONES), from which they differ in considerably more widely spaced transverse ribs, as well as the occurrence of one or two concentric ribs on the valve periphery.

Occurrence. — Poland (Holy Cross Mts.): Jabłonna, Upper Famennian.

Subgenus *Richterina* (*Richterina*) GÜRICH, 1896

Type species: *Richterina* (*Richterina*) *costata* (RICHTER, 1869).

Richterina (*Richterina*) *costata* (RICHTER, 1869)

(pl. 31: 3-5)

1869. *Cytherina costata* Richter: 773, pl. 21: 8-9.

1954. *Richterina* (*Richterina*) *costata* (RICHTER 1869); RABIEN: 116 (here older synonymy).

1959. *Richterina* (*Richterina*) *costata* (RICHTER 1856); BLUMENSTENGEL: 69, pl. 1: 7-8, 10.

Material. — Thirty variously preserved valves and internal molds of adult specimens.
Dimensions (in mm):

	L	H
RV ZPAL 0.XV/155	1.76	0.85
RV ZPAL 0.XV/156	0.96	0.58
RV ZPAL 0.XV/157	0.96	0.60

Description. — See RABIEN (1954) and BLUMENSTENGEL (1959).

Variability. — Among the specimens from the Holy Cross Mts., which include those with elongate carapaces (pl. 31: 3) similar to those illustrated by RICHTER (1869, pl. 21: 8) and BLUMENSTENGEL (1959, pl. 1: 7-8), there are also specimens more elliptical in outline, with smaller, frequently destroyed, spines and more distinct main ribs (pl. 31: 4-5).

Occurrence. — Poland (Holy Cross Mts.): Wzdół, Kowala, Jabłonna, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI). German Democratic Republic: Thuringia, Famennian (do V-do VI). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (do IV-do VI)

Richterina (*Richterina*) *unispinosa* sp.n.

(pl. 31: 1-2)

Holotype: ZPAL 0.XV/153; pl. 31: 1.

Type horizon: Famennian, *Clymenia* Stage, do V.

Type locality: Kowala, Holy Cross Mts., Poland.

Derivation of the name: Lat. *unispinosa* — having one spine only.

Diagnosis. — A species of the genus *Richterina* having a single spine in the posterior part of valve, ornamentation in the form of longitudinal ribs and displaying a small dorsal depression.

Material. — Fifty variously preserved adult valves.

Dimensions (in mm):

	L	H
LV ZPAL 0.XV/153	0.87	0.50
RV ZPAL 0.XV/154	0.85	0.30

Description. — Carapace elongate, elliptical in lateral outline. Dorsal margin gently rounded or substraight, ventral rounded. Anterior and posterior ends rounded. Ornamentation in the form of 20 to 25 longitudinal ribs parallel to the dorsal and ventral margins. In some specimens, four ribs are thicker than the remaining ones. Three to four thinner ribs, each occur between particular thicker ribs. Short, fairly thick, single spines occur at the posterior end of carapace in the midheight of both valves at a small distance from margin. A small dorsal depression is visible near the dorsal margin at midlength of valve.

Remarks. — In its ornamentation, the species described is most similar to *R. (Richterina) costata* (RICHTER). *R. (R.) unispinosa* sp.n. differs, however, from this species in the lack of spine in the anterior part of carapace and in the presence of dorsal depression.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI).

Richterina (Richterina) striatula (RICHTER, 1848)

(pl. 30: 10)

1848. *Cytherina striatula* RICHTER: 19, pl. 2: 5-13.

1954. *Richterina (Richterina) striatula* (RICHTER 1848); RABIEN: 119, pl. 2: 15; pl. 4: 37 (here older synonymy).

1959. *Richterina (Richterina) striatula* (RICHTER); BLUMENSTENGEL: 67.

1961. *Richterina (Richterina) striatula* (RICHTER); GRÜNDEL: 120, pl. 11: 4.

Material. — Ten carapaces and about three thousand internal and external moulds of adult and juvenile specimens, on the whole poorly preserved.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/152	1.37	0.83

Description. — See RABIEN (1954).

Variability. — A considerable variability is here observed in the number (one to three) of outer concentric ribs parallel to the margins. The number of longitudinal ribs increases together with an increase in the size of specimens.

Occurrence. — Poland (Holy Cross Mts.): Wzdół, Kowala, Jabłonna, Kielce, Łagów, Famennian (*Platyclymenia-Wocklumeria* Stage, do III-do VI). German Democratic Republic: Thuringia, Famennian (do III-do VI). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian, Carboniferous (do III-cu I). Great Britain: Devonshire, U. Famennian. USSR: N—E Russian Platform, Famennian (Zelenez member).

Richterina (Richterina) cf. tenuistriata (KUMMEROW, 1939)

(pl. 31: 6)

1959. *Richterina (Richterina) cf. tenuistriata* (KUMMEROW, 1939); BLUMENSTENGEL: 72, pl. 1: 5-6.

Material. — Fifteen carapaces of adult specimens with partly destroyed surfaces.

Dimensions (in mm):

	L	H	W
C ZPAL 0.XV/158	1.38	0.80	0.70

Description. — Carapace gently asymmetrical and subelliptical in lateral outline. Dorsal margin straight, ventral convex. Anterior and posterior margins widely rounded. Height almost uniform over the entire length, maximum length in midheight. About 30 thin ribs run parallel to the dorsal and ventral margins, slightly converging at both ends.

Remarks. — The specimens described are most similar to those of *R. (R.) cf. tenuistriata* illustrated by BLUMENSTENGEL (1959, pl. 1: 5-6) from the Upper Famennian of Thuringia.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI). German Democratic Republic: Thuringia, Famennian (do V-do VI).

Subgenus *Richterina (Maternella)* RABIEN, 1954

Type species: Richterina (Maternella) dichotoma (PÄCKELMANN, 1913).

Richterina (Maternella) dichotoma (PAECKELMANN, 1913)

(pl. 31: 7-9)

1913. *Richterina* (?) *costata* Richter var. nov. *dichotoma* PAECKELMANN: 197, pl. 3: 10.1954. *Richterina (Maternella) dichotoma* (PAECKELMANN 1913); RABIEN: 135, pl. 1: 8-9; pl. 5: 41 (here older synonymy).1959. *Richterina (Maternella) dichotoma* (PAECKELMANN); BLUMENSTENGEL: 75, pl. 2: 11.

Material. — Thirty poorly preserved adult and juvenile valves and internal and external moulds.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/159	0.98	(specimen broken)
LV ZPAL 0.XV/160	1.04	(specimen broken)
LV ZPAL 0.XV/161	0.92	0.82

Description. — See RABIEN (1954) and BLUMENSTENGEL (1959).

Variability. — A considerable variability is here expressed in the thickness and number of longitudinal ribs which fill the median part of valve. It was also observed by RABIEN (1954), GOODAY (1973) and BECKER (1977).

Occurrence. — Poland (Holy Cross Mts.): Wzdół, Kowala, Jabłonna, Famennian (*Clymenia-Wocklumeria* Stage, do V-do VI). German Democratic Republic: Thuringia, Famennian (do V-do VI). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (do V-do VI). Spain: Eastern part of the Cantabrian Mts., Famennian (do V-do VI). Great Britain: Devonshire, Famennian (do V-do VI).

Richterina (Maternella) hemisphaerica (RICHTER, 1848)

(pl. 32: 1-4)

1848. *Cytherina hemisphaerica* RICHTER: 20, pl. 2: 14-15.1954. *Richterina (Maternella) hemisphaerica* (RICHTER 1848); RABIEN: 139, pl. 2: 16 (here older synonymy).1959. *Richterina (Maternella) hemisphaerica* (Richter); BLUMENSTENGEL: 77, pl. 1: 4.1961. *Richterina (Maternella) hemisphaerica* (RICHTER); GRÜNDEL: 127, pl. 11: 8.

Material. — Fifty variously preserved adult and juvenile valves and internal moulds.

Dimensions (in mm):

	L	H
LV ZPAL 0.XV/162	1.12	0.97
LV ZPAL 0.XV/163	1.09	1.00
LV ZPAL 0.XV/164	1.04	0.88
LV ZPAL 0.XV/165	0.88	0.75

Description. — See RABIEN (1954) and BLUMENSTENGEL (1959).

Variability. — A considerable variability is here observed particularly in the trace and number of horizontal ribs in the median part of valve. Three to five ribs run subhorizontally or along a slightly undulating line.

Occurrence. — Poland (Holy Cross Mts.): Wzdół, Kowala, Jabłonna, Famennian (*Clymenia-Wocklumeria* Stage, do V-do VI). German Democratic Republic: Thuringia, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI). Federal Republic of Germany: Rhenish Schiefergebirge, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI). Great Britain: Devonshire, Famennian (*Clymenia-Wocklumeria* Stage, do V-VI). USSR: N—E part of Russian Platform, Famennian (Zelenez member).

Richterina (Maternella)? aff. exornata (MATERN, 1929)

(pl. 32: 5-7)

Material. — Five hundred variously preserved, internal and external moulds of adult and juvenile specimens.

Dimensions (in mm):

	L	H
RV ZPAL 0.XV/166	1.20	1.00
LV ZPAL 0.XV/167	(specimen broken)	0.70
LV ZPAL 0.XV/168	1.35	1.07

Description. — Carapace subround in lateral outline. Two to three outer concentric ribs run parallel to valve margin. In the median part, ten to fifteen ribs run subhorizontally. Secondary ribs, not reaching the peripheral concentric ribs, occur sometimes between them. Irregularly situated, sometimes meandering, transverse ribs are distributed over the entire surface of valve. A large adductorial spot occurs in the median part of valve. A dorsal depression is situated near the dorsal margin.

Remarks. — Specimens from Poland differ from typical *R. (M.) exornata* in a smaller number of horizontal ribs and larger spaces between them, in a larger adductorial sport and the presence of dorsal depression. The presence of adductorial spot makes the form described also similar to species of the genus *R. (Fossirichterina)*, from which it differs in the presence of concentric ribs.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Jabłonna, Kielce, Famennian (*Clymenia* Stage, do V).

Entomozoidae gen. et sp. indet.

(pl. 32: 8)

Material. — Three poorly preserved internal moulds of carapaces.

Dimensions (in mm):

	L	H
ZPAL 0.XV/169	1.4	0.60

Description. — Carapace elliptical in lateral outline. Four to five thin ribs, obliquely reaching the dorsal and ventral margins, run parallel to the posterior margin. Ribs curved at an acute angle at midheight and obliquely reaching the dorsal and ventral margins occur towards the median part of valve. A few horizontally running ribs occur at the anterior end of valve in its midheight.

Remarks. — The ornamentation of the form described departs from its pattern observed in other known species of the family Entomozoidae.

Occurrence. — Poland (Holy Cross Mts.): Kowala, Famennian (*Wocklumeria* Stage, do VI).

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EXPLANATION OF THE PLATES

PLATE 11

Page

- Kozłowskiella jurkowicensis* OLEMPSKA 79
1. Heteromorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40, (ZPAL 0.XII/1).
- Reversoscapha sandomiriensis* OLEMPSKA 80
2. Tecnomorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XII/14).
- Welleria aequiconvexa* OLEMPSKA 80
3. Heteromorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XII/23).
- Welleriella rakoviensis* OLEMPSKA 80
4. Heteromorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XII/44).
- Hollinella (Keslingella)?* sp. 81
5. Juvenile carapace; *a* — right lateral view, *b* — ventral view, ×40; (ZPAL 0.XV/1).
6. Tecnomorph valve; left lateral view, ×40; (ZPAL 0.XV/2).

All from Jurkowie-Budy, Holy Cross Mts., Upper Givetian *Stringocephalus burtini* Beds

PLATE 12

- Parabolbinella* cf. *vomis* BECKER and BLESS 82

1. Heteromorph valve; right lateral view, ×60; (ZPAL 0.XV/3); Józefka Hill, Holy Cross Mts, Frasnian (do Ia).

Pribylites? sp. 82

2. Juvenile carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$; (ZPAL 0.XV/4).
3. Juvenile carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$; (ZPAL 0.XV/5).

Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds

Coryellina tenuisulcata sp. n. 83

4. Heteromorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, *d* — anterior view, $\times 60$, holotype; (ZPAL 0.XV/6).
5. Tecomorph carapace; right lateral view, $\times 60$; (ZPAL 0.XV/7). Kowala, Holy Cross Mts., Famennian (do VI).

Coryellina sanctacrucensis sp. n. 84

6. Heteromorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/8); Łagów-Holy Cross Mts., Upper Famennian.
7. Heteromorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/9); Kielce, Holy Cross Mts., Upper Famennian.
8. Heteromorph valve; right lateral view, $\times 60$, holotype; (ZPAL 0.XV/10); Kowala, Holy Cross Mts., Famennian (do VI).

Coryellina sp. 84

9. Tecomorph valve; right lateral view, $\times 60$; (ZPAL 0.XV/11).
10. Tecomorph carapace; *a* — left lateral view, *b* — dorsal view, $\times 60$; (ZPAL 0.XV/1 2). Kowala, Holy Cross Mts., Famennian (do VI).

PLATE 13

Rozhdestvenskayites tuimazensis (ROZHDESTVENSKAYA) 85

1. *a* — right lateral view, *b* — dorsal view, *c* — central view, $\times 40$; (ZPAL 0.XV/13).

Coeloenellina minima (KUMMEROW) 86

2. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, *d* — posterior view, $\times 40$; (ZPAL 0.XV/14).
3. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, *d* — anterior view, $\times 40$; (ZPAL 0.XV/15).

Coeloenellina cf. parva POLENOVA 87

4. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, *d* — anterior view, ×40; (ZPAL 0.XV/16).

Nezamyslia eifeliensis (ADAMCZAK) 87

5. Left lateral view, ×40; (ZPAL 0.XV/17).

Amphissites (Ectodemites) janischewskyi POLENOVA 90

6. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/18).

7. Right lateral view, ×40; (ZPAL 0.XV/19).

Amphissites pulcher POLENOVA 88

8. Right lateral view, ×40; (ZPAL 0.XV/20).

All from Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds

PLATE 14

Amphissites pulcher POLENOVA 88

1. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/21); Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

2. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/22); locality and age as above.

Amphissites cf. parvulus (PAECKELMANN) 89

3. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/23); Józefka Hill, Holy Cross Mts., Frasnian (do Iα).

Amphissites sp. 89

4. Right lateral view, ×60; (ZPAL 0.XV/24); Kowala, Holy Cross Mts., Famennian (do VI).

Kegelites polonicus sp. n. 90

5. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$, holotype; (ZPAL 0.XV/25); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
 6. Right lateral view, $\times 40$; (ZPAL 0.XV/26); locality and age as above.

Paegnium? sp. 92

7. Right lateral view, $\times 60$; (ZPAL 0.XV/27); Kadzielnia, Holy Cross Mts., Famennian (do II β -III α).

Reticestus sp. 91

8. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/28); Kowala, Holy Cross Mts., Famennian (do VI).

Samarella levinodosa BECKER 124

9. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 40$; (ZPAL 0.XV/29); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Samarella aff. *crassa* POLENOVA 124

10. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view; $\times 40$; (ZPAL 0.XV/30); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

PLATE 15

Kloedenellitina sp. 92

1. Heteromorph carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, $\times 40$; (ZPAL 0.XV/31), Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
 2. Heteromorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$; (ZPAL 0.XV/32), locality and age as above.

Sulcella aff. *speculaea* BECKER 93

3. Heteromorph carapace; *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 40$; (ZPAL 0.XV/33); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Marginia syzranensis POLENOVA 93

4. Heteromorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/34); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
5. Tecnomorph carapace; *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×40; (ZPAL 0.XV/35); locality and age as above.

Marginia? sp. 94

6. Heteromorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/36); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
7. Tecnomorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/37); locality and age as above.

Knoxiella? sp. 95

8. Tecnomorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/38); Kowala, Holy Cross Mts., Famennian (do VI).

Buregia jivensis SHISKINSKAYA 95

9. Tecnomorph carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, *d* — anterior view, *e* — posterior view, ×40; (ZPAL 0.XV/39); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

PLATE 16

Cavellina czarnockii sp. n. 96

1. Heteromorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×30, holotype; (ZPAL 0.XV/40); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
2. Tecnomorph carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/41); locality and age as above.

Favulella sp. 97

3. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/42); Józefka Hill, Holy Cross Mts., Frasnian (do Iα).
4. Left lateral view, ×60; (ZPAL 0.XV/43); locality and age as above.

Healdia anterodepressa BLUMENSTENGEL? 97

5. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/44); Kowala, Holy Cross Mts., Famennian, (do VI).

<i>Marginohealdia sobolewi</i> sp. n.	98
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6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, *d* — posterior view, $\times 60$; (ZPAL 0.XV/45); Psie Górki, Holy Cross Mts., Famennian (do II).
7. Left lateral view, $\times 60$; (ZPAL 0.XV/46); Kielce, Holy Cross Mts., Upper Famennian.
8. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$, holotype; (ZPAL 0.XV/47); Kowala, Holy Cross Mts., Upper Famennian.

<i>Marginohealdia</i> sp.	99
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9. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/48); Kowala, Holy Cross Mts., Famennian (do VI).

PLATE 17

<i>Bairdia (Bairdia) hypsela</i> ROME	100
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1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 60$; (ZPAL 0.XV/49); Kowala, Holy Cross Mts., Famennian (do VI).
2. Right lateral view, $\times 60$; (ZPAL 0.XV/50); locality and age as above.

<i>Bairdia (Bairdia) nidensis</i> sp. n.	100
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3. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 60$, holotype; (ZPAL 0.XV/51); Kowala, Holy Cross Mts., Famennian (do VI).
4. Right lateral view, $\times 60$; (ZPAL 0.XV/52); locality and age as above.

<i>Bairdia (Bairdia) aff. kelleri</i> EGOROV	101
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5. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/53); Jabłonna, Holy Cross Mts., Famennian (do III β).

<i>Bairdia (Bairdia)</i> sp.	104
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6. Right lateral view, $\times 60$; (ZPAL 0.XV/54); Kielce, Holy Cross Mts., Upper Famennian.

<i>Bairdia (Bairdia) aff. galinae</i> EGOROV	101
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7. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/55); Kowala, Holy Cross Mts., Famennian (do VI).

PLATE 18

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| <i>Bairdia</i> (<i>Bairdia</i>) <i>aff. galinae</i> EGOROV | 101 |
| 1. <i>a</i> — right lateral view, <i>b</i> — dorsal view, <i>c</i> — ventral view, ×60; (ZPAL 0.XV/56); Kowala, Holy Cross Mts., Famenian (do VI). | |
| <i>Bairdia</i> (<i>Bairdia</i>) <i>nalivkini</i> EGOROV | 103 |
| 2. <i>a</i> — right lateral view, <i>b</i> — left lateral view, <i>c</i> — dorsal view, <i>d</i> — ventral view, ×40; (ZPAL 0.XV/57); Sobiekurów, Holy Cross Mts., Frasnian. | |
| 3. Right lateral view, ×40; (ZPAL 0.XV/58); locality and age as above. | |
| <i>Bairdia</i> (<i>Rectobairdia</i>) <i>quarziana</i> EGOROV | 107 |
| 4. <i>a</i> — right lateral view, <i>b</i> — dorsal view, <i>c</i> — ventral view, ×40; (ZPAL 0.XV/59); Sobiekurów, Holy Cross Mts., Frasnian. | |
| <i>Bairdia</i> (<i>Rectobairdia</i>) <i>sobiekurowiensis</i> sp. n. | 106 |
| 5. <i>a</i> — right lateral view, <i>b</i> — left lateral view, <i>c</i> — dorsal view, <i>d</i> — ventral view, ×60, holotype; (ZPAL 0.XV/60); Sobiekurów, Holy Cross Mts., Frasnian. | |
| <i>Bairdia</i> (<i>Rectobairdia</i>) sp. | 107 |
| 6. <i>a</i> — right lateral view, <i>b</i> — dorsal view, <i>c</i> — ventral view, ×60; (ZPAL 0.XV/61); Jabłonna, Holy Cross Mts., Famenian (do V). | |

PLATE 19

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| <i>Bairdia</i> (<i>Rectobairdia</i>) <i>sobiekurowiensis</i> sp. n. | 106 |
| 1. <i>a</i> — right lateral view, <i>b</i> — dorsal view, <i>c</i> — ventral view, ×40; (ZPAL 0.XV/62); Sobiekurów, Holy Cross Mts., Frasnian. | |
| <i>Bairdia</i> (<i>Bairdia</i>) <i>plicatula</i> POLENOVA | 102 |
| 2. <i>a</i> — right lateral view, <i>b</i> — left lateral view, <i>c</i> — dorsal view, <i>d</i> — ventral view, ×40; (ZPAL 0.XV/63); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, <i>Stringocephalus burtini</i> Beds. | |

Bairdia (Rectobairdia) hexagona POLENOVA 105

3. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 40$; (ZPAL O.XV/64); Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Bairdia (Rectobairdia) aff. paffrathensis KUMMEROW 106

4. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$; (ZPAL O.XV/65); Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Bairdia (Cryptobairdia) cf. singularis KRÖMMELBEIN 104

5. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 40$; (ZPAL O.XV/66); Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Bairdia (Bairdia) aff. nalivkini EGOROV 103

6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL O.XV/67); Kielce, Holy Cross Mts., Upper Famennian.

Bairdia (Cryptobairdia) aff. birinae EGOROV 105

7. Left lateral view, $\times 60$; (ZPAL O.XV/68); Józefka Hill, Holy Cross Mts., Frasnian (do I α).

Processobairdia spinomarginata BLUMENSTENGEL 108

8. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL O.XV/69); Kowala, Holy Cross Mts., Famennian (do VI).

PLATE 20

Processobairdia spinomarginata BLUMENSTENGEL 108

1. *a* — right lateral view, *b* — left lateral view, $\times 60$; (ZPAL O.XV/70); Kowala, Holy Cross Mts., Famennian (do VI).

Processobairdia beckeri sp. n. 108

2. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, *e* — anterior view, *f* — posterior view, $\times 60$, holotype; (ZPAL O.XV/71); Kowala, Holy Cross Mts., Famennian (do VI).
3. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL O.XV/72); locality and age as above.

Bairdiocypris samsonowiczi sp. n. 109

4. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×50, holotype; (ZPAL 0.XV/73); Sobiekurów, Holy Cross Mts., Frasnian.
 5. *a* — right lateral view, *b* — dorsal view, ×50; (ZPAL 0.XV/74); locality and age as above.

PLATE 21

Bairdiocypris polenovae sp. n. 110

1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×40, holotype; (ZPAL 0.XV/75); Sobiekurów, Holy Cross Mts., Frasnian.

Acratia (Acratia) clinata BLUMENSTENGEL 111

2. *a* — left lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/76); Kowala, Holy Cross Mts., Famennian (do VI).
 3. *a* — left lateral view, *b* — ventral view, ×60; (ZPAL 0.XV/77); locality and age as above.

Acratia (Cooperuna) rostrataformis SHEVTSOV 111

4. Right lateral view, ×60; (ZPAL 0.XV/78); Kowala, Holy Cross Mts., Famennian (do VI).
 5. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×30; (ZPAL 0.XV/79); locality and age as above.

Acratia (Cooperuna) tichonovitchi EGOROV 112

6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×40; (ZPAL 0.XV/80); Sobiekurów, Holy Cross Mts., Frasnian.

Ceratacratia cerata BLUMENSTENGEL 112

7. *a* — right lateral view, *b* — left lateral view, ×60; (ZPAL 0.XV/81); Kowala, Holy Cross Mts., Famennian (do VI).
 8. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/82); locality and age as above.

PLATE 22

Bairdiocypris vastus POLENOVA 113

1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×40; (ZPAL 0.XV/83); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
 2. Juvenile carapace; right lateral view, ×40; (ZPAL 0.XV/84); locality and age as above.

<i>Bairdiocypris</i> sp.	114
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3. Right lateral view, $\times 60$; (ZPAL O.XV/85); Józefka Hill, Holy Cross Mts., Frasnian (do I α).

<i>Bairdiocypris</i> aff. <i>ovata</i> (ROZHDESTVENSKAYA)	114
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4. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 40$; (ZPAL O.XV/86); Sobiekurów, Holy Cross Mts., Frasnian.

<i>Praepilatina adameczaki</i> sp. n.	115
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5. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$, holotype; (ZPAL O.XV/87); Kowala, Holy Cross Mts., Famennian (do VI).

PLATE 23

<i>Bairdiocypris livnensis</i> POLENOVA	113
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1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, $\times 40$; (ZPAL O.XV/88); Sobiekurów, Holy Cross Mts., Frasnian.

<i>Fabalicypis holuschurmensis</i> (POLENOVA)	115
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2. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$; (ZPAL O.XV/89); Sobiekurów, Holy Cross Mts., Frasnian.
3. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$; (ZPAL O.XV/90); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

<i>Cytherellina dubia</i> (KUMMEROW)	116
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4. *a* — right lateral view, *b* — ventral view, $\times 40$; (ZPAL O.XV/91); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.
5. *a* — right lateral view, *b* — dorsal view, $\times 40$; (ZPAL O.XV/92); locality and age as above.

<i>Healdianella? compressa</i> sp. n.	118
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6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 40$, holotype; (ZPAL O.XV/93); Jurkowiec-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

PLATE 24

Healdianella budensis sp. n. 117

1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×40, holotype; (ZPAL 0.XV/94). Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Healdianella aff. *bispinosa* GRÜNDEL 118

2. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/95); Kowala, Holy Cross Mts., Famennian (do VI).

Healdianella sp. 119

3. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/96); Kowala, Holy Cross Mts., Famennian (do VI).
4. Right lateral view, ×60; (ZPAL 0.XV/97); locality and age as above.

Orthocypris sp. 119

5. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/98); Józefka Hill, Holy Cross Mts., Frasnian (do Iα).

Healdianella kielcensis sp. n. 117

6. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/99); Kowala, Holy Cross Mts., Famennian (do VI).
7. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60, holotype; (ZPAL 0.XV/100); locality and age as above.

PLATE 25

Ampuloides pumillus sp. n. 120

1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60, holotype; (ZPAL 0.XV/101); Kowala, Holy Cross Mts., Famennian (do VI).
2. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/102); locality and age as above.

- Page
- Newsomites blessi* sp. n. 120
3. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60, holotype; (ZPAL 0.XV/103); Kowala, Holy Cross Mts., Famennian (do VI).
4. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/104); locality and age as above.

Microcheillinella sp. 122

5. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/105); Kowala, Holy Cross Mts., Famennian (do VI).

Microcheilinella mandelstami POLENOVA 121

6. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, *e* — anterior view, *f* — posterior view, ×40; (ZPAL 0.XV/106); Jurkowice-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Microcheilinella peculiaris ROZHDESTVENSKAYA 122

7. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×40; (ZPAL 0.XV/107); Sobiekurów. Holy Cross Mts., Frasnian.

Gerodia weyeri GRÜNDEL 123

8. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/108); Kowala, Holy Cross Mts., Famennian (do VI).
9. Juvenile carapace; right lateral view, ×60; (ZPAL 0.XV/109); locality and age as above.

PLATE 26

Baschkirina microspina sp. n. 123

1. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/110); Kowala, Holy Cross Mts., Famennian (do VI).
2. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60, holotype; (ZPAL 0.XV/111); locality and age as above.

Tricornina (Bohemina) sp. 125

3. Left lateral view, ×60; (ZPAL 0.XV/112); Kowala, Holy Cross Mts., Famennian (do V).

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- Rectonaria inclinata* GRÜNDEL 125
4. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/113); Kowala, Holy Cross Mts., Famennian (do VI).
5. *a* — left lateral view, *b* — dorsal view, ×60; (ZPAL 0.XV/114); locality and age as above.

Rectonaria muelleri GRÜNDEL 126

6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/115); Kowala, Holy Cross Mts., Famennian (do VI).

Rectonaria kowalensis sp. n. 127

7. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60, holotype; (ZPAL 0.XV/116); Kowala, Holy Cross Mts., Famennian (do VI).

Orthonaria rectagona (GRÜNDEL) 127

8. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/117); Kowala, Holy Cross Mts., Famennian (do VI).

Orthonaria gruendeli sp. n. 128

9. *a* — right lateral view, *b* — left lateral view, *c* — ventral view, ×60, holotype; (ZPAL 0.XV/118); Kowala Holy Cross Mts., Famennian (do VI).

PLATE 27

Rectoplacera elongata BLUMENSTENGEL 128

1. Left lateral view, ×60; (ZPAL 0.XV/119); Kowala Holy Cross Mts., Famennian (do VI).
2. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/120); locality and age as above.

Rectoplacera elliptica BLUMENSTENGEL 129

3. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/121); Kowala, Holy Cross Mts., Famennian (do VI).
4. Left lateral view, ×60; (ZPAL 0.XV/122); locality and age as above.
5. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/123); locality and age as above.

Rectoplacera aff. *robusta* BLUMENSTENGEL 129

6. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/124); Kowala, Holy Cross Mts., Famennian (do VI).
7. Juvenile carapace; right lateral view, ×60; (ZPAL 0.XV/125); locality and age as above.
8. Juvenile carapace; right lateral view, ×60; (ZPAL 0.XV/126); locality and age as above.
9. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/127); Jabłonna, Holy Cross Mts., Famennian (do III).

PLATE 28

Triplacera triquetra GRÜNDEL 130

1. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, ×60; (ZPAL 0.XV/128); Kowala, Holy Cross Mts., Famennian (do VI).
2. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, ×60; (ZPAL 0.XV/129); locality and age as above.

Aurigerites aff. *texanus* ROUNDY 131

3. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60; (ZPAL 0.XV/130); Kowala, Holy Cross Mts., Famennian (do VI).

Aurigerites blumenstengeli sp. n. 131

4. *a* — right lateral view, *b* — left lateral view, *c* — dorsal view, *d* — ventral view, ×60, holotype; (ZPAL 0.XV/131); Kowala, Holy Cross Mts., Famennian (do VI).
5. Right lateral view, ×60; (ZPAL 0.XV/132); locality and age as above.

Cryptophyllus sp. 133

6. Lateral view, ×40; (ZPAL 0.XV/133); Jurkowie-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

Gen. et sp. indet. 132

7. Right lateral view, ×40; (ZPAL 0.XV/134); Jurkowie-Budy, Holy Cross Mts., Upper Givetian, *Stringocephalus burtini* Beds.

PLATE 29

Richterina (Volkina) cf. zimmermanni (VOLK) 136

1. Right lateral view, $\times 40$; (ZPAL 0.XV/135); Śluchowice, Holy Cross Mts., Frasnian (do Iγ).

Entomozoe (Richteria) serratostrata (SANDBERGER) 134

2. Right lateral view, $\times 50$; (ZPAL 0.XV/136); Jabłonna, Holy Cross Mts., Famennian (do II).

Entomozoe (Nehdentomis) nehdensis (MATERN) 134

3. Right lateral view, $\times 60$; (ZPAL 0.XV/137); Jabłonna, Holy Cross Mts., Famennian (do II).

Entomozoe (Nehdentomis) tenera (GÜRICH) 134

4. Right lateral view, $\times 50$; (ZPAL 0.XV/138); Jabłonna, Holy Cross Mts., Famennian (do II).
 5. Left lateral view, $\times 60$; (ZPAL 0.XV/139); Jabłonna, Holy Cross Mts., Famennian (do II).
 6. Left lateral view, $\times 50$; (ZPAL 0.XV/140); locality and age as above.

Entomozoe (Nehdentomis?) sp. 135

7. Right lateral view, $\times 60$; (ZPAL 0.XV/141); Kowala, Holy Cross Mts., Famennian (do V).
 8. Left lateral view, $\times 60$; (ZPAL 0.XV/142); locality and age as above.

PLATE 30

Entomozoe (Nehdentomis?) sp. 135

1. Juvenile carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/143); Kowala, Holy Cross Mts., Famennian (do V).

Entomozoe (Nehdentomis) aff. pseudorichterina (MATERN) 135

2. Left lateral view, $\times 50$; (ZPAL 0.XV/144); Jabłonna, Holy Cross Mts., Famennian (do II).
 3. Left lateral view, $\times 60$; (ZPAL 0.XV/145); locality and age as above.
 4. Left lateral view, $\times 60$; locality and age as above.

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- Richterina (Fossirichterina) moravica* (RŽEHAK) 137
5. Right lateral view, $\times 50$; (ZPAL 0.XV/147); Jabłonna, Holy Cross Mts., Famennian.
 6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 60$; (ZPAL 0.XV/148); Kowala, Holy Cross Mts., Famennian.
 7. Right lateral view, $\times 60$; (ZPAL 0.XV/149); locality and age as above.

Richterina (Fossirichterina) sp. 137

8. Left lateral view, $\times 50$; (ZPAL 0.XV/150); Jabłonna, Holy Cross Mts., Famennian.

Richterina (Fossirichterina) semen (JONES) 137

9. Right lateral view, $\times 60$; (ZPAL 0.XV/151); Jabłonna, Holy Cross Mts., Famennian.

Richterina (Richterina) striatula (RICHTER) 139

10. Right lateral view, $\times 60$; (ZPAL 0.XV/152); Kowala, Holy Cross Mts., Famennian (do VI).

PLATE 31

Richterina (Richterina) unispinosa sp. n. 138

1. Left lateral view, $\times 60$, holotype; (ZPAL 0.XV/153); Kowala, Holy Cross Mts., Famennian.
 2. Right lateral view, $\times 60$; (ZPAL 0.XV/154); Jabłonna, Holy Cross Mts., Famennian.

Richterina (Richterina) costata (RICHTER) 138

3. Right lateral view, $\times 40$; (ZPAL 0.XV/155); Kowala, Holy Cross Mts., Famennian (do V).
 4. *a* — right lateral view, *b* — ventral view, $\times 60$; (ZPAL 0.XV/156); locality and age as above.
 5. Right lateral view, $\times 60$; (ZPAL 0.XV/157); locality and age as above.

Richterina (Richterina) cf. tenuistriata (KUMMEROW) 139

6. *a* — right lateral view, *b* — dorsal view, *c* — ventral view, $\times 50$; (ZPAL 0.XV/158); Kowala, Holy Cross Mts., Famennian (do VI).

Richterina (Maternella) dichotoma (PAECKELMANN) 140

7. Right lateral view, $\times 60$; (ZPAL 0.XV/159); Kowala, Holy Cross Mts., Famennian (do VI).
 8. Left lateral view, $\times 60$; (ZPAL 0.XV/160); locality and age as above.
 9. Left lateral view, $\times 60$; (ZPAL 0.XV/161); locality and age as above.

PLATE 32

	Page
<i>Richterina (Maternella) hemisphaerica</i> (RICHTER)	140

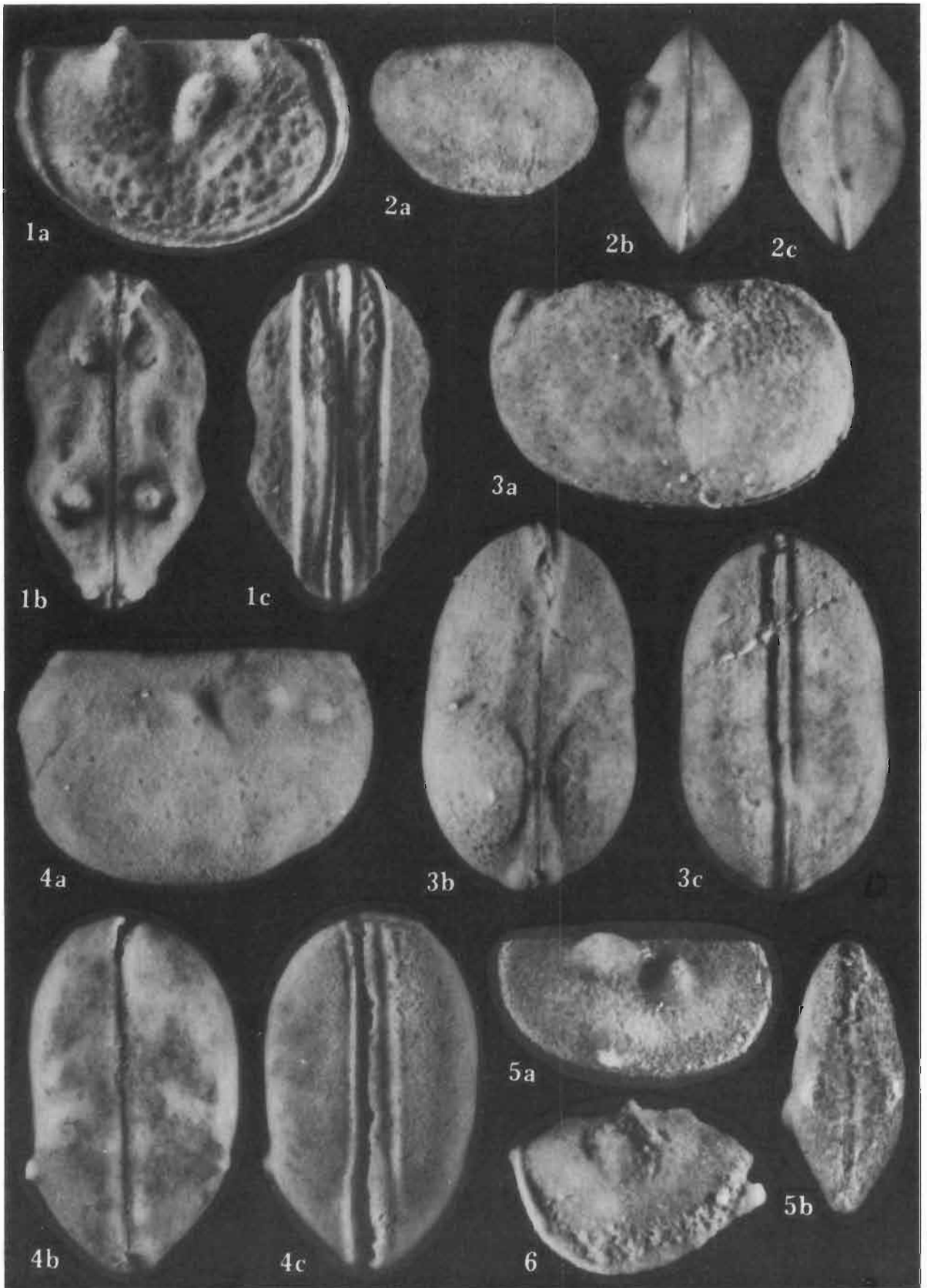
1. Left lateral view, ×60; (ZPAL 0.XV/162); Kowala, Holy Cross Mts., Famennian (do VI).
2. Left lateral view, ×60; (ZPAL 0.XV/163); locality and age as above.
3. Left lateral view, ×60; (ZPAL 0.XV/164); Kowala, Holy Cross Mts., Famennian (do V).
4. Left lateral view, ×60; (ZPAL 0.XV/165); locality and age as above.

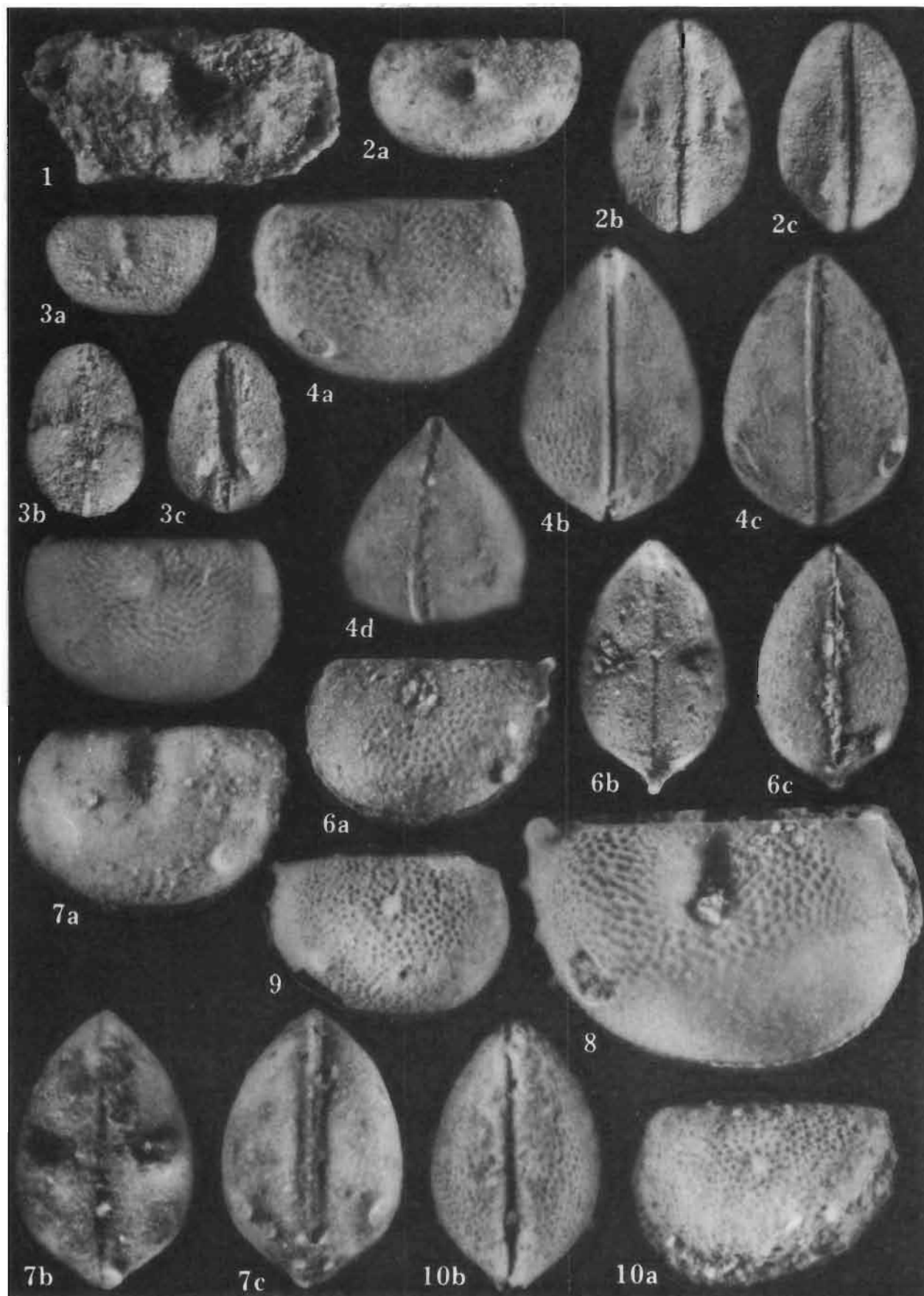
<i>Richterina (Maternella)? aff. exornata</i> (MATERN)	141
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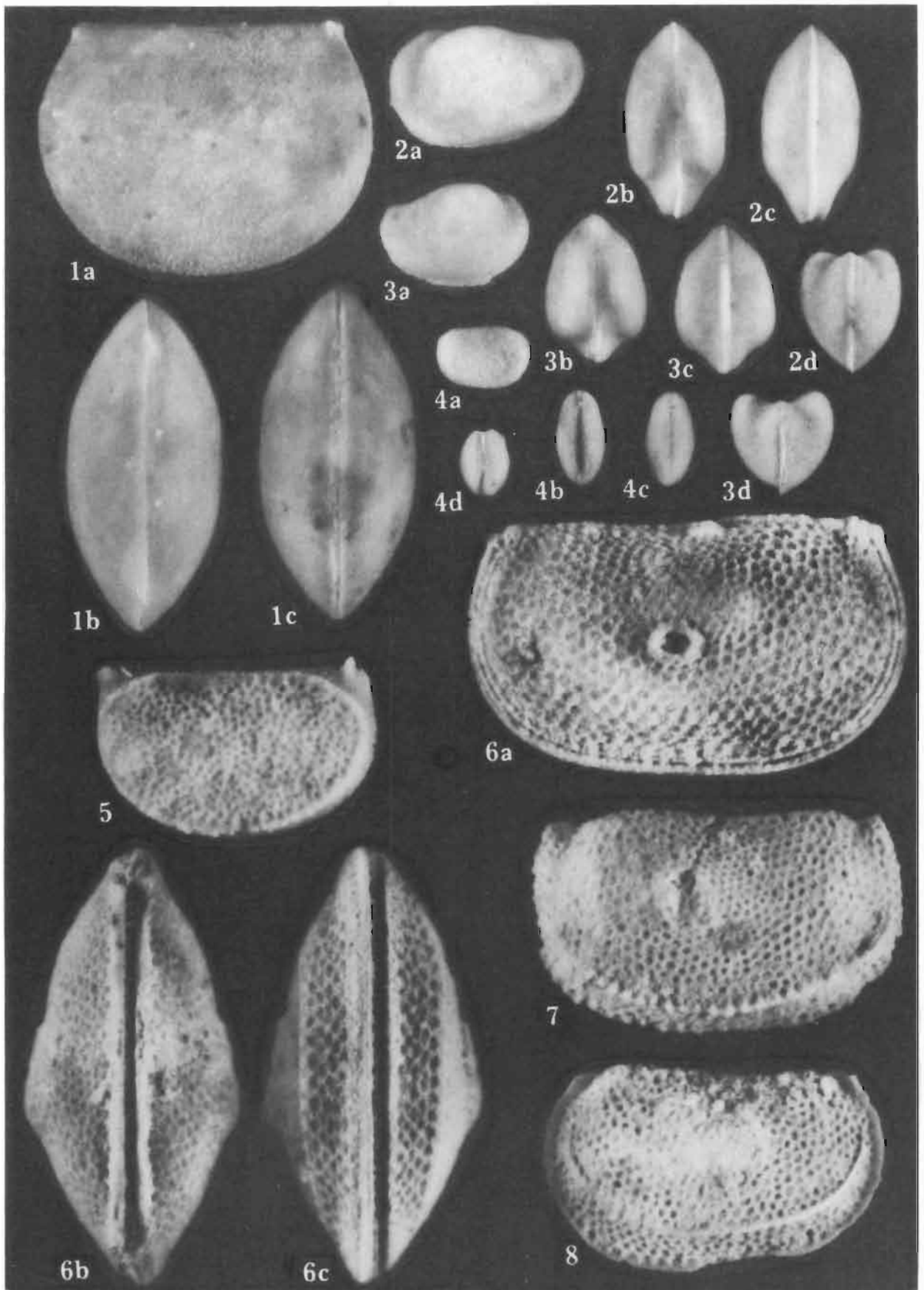
5. Right lateral view, ×60; (ZPAL 0.XV/166); Kowala, Holy Cross Mts., Famennian (do V).
6. Left lateral view, ×60; (ZPAL 0.XV/167); locality and age as above.
7. Left lateral view, ×60; (ZPAL 0.XV/168); locality and age as above.

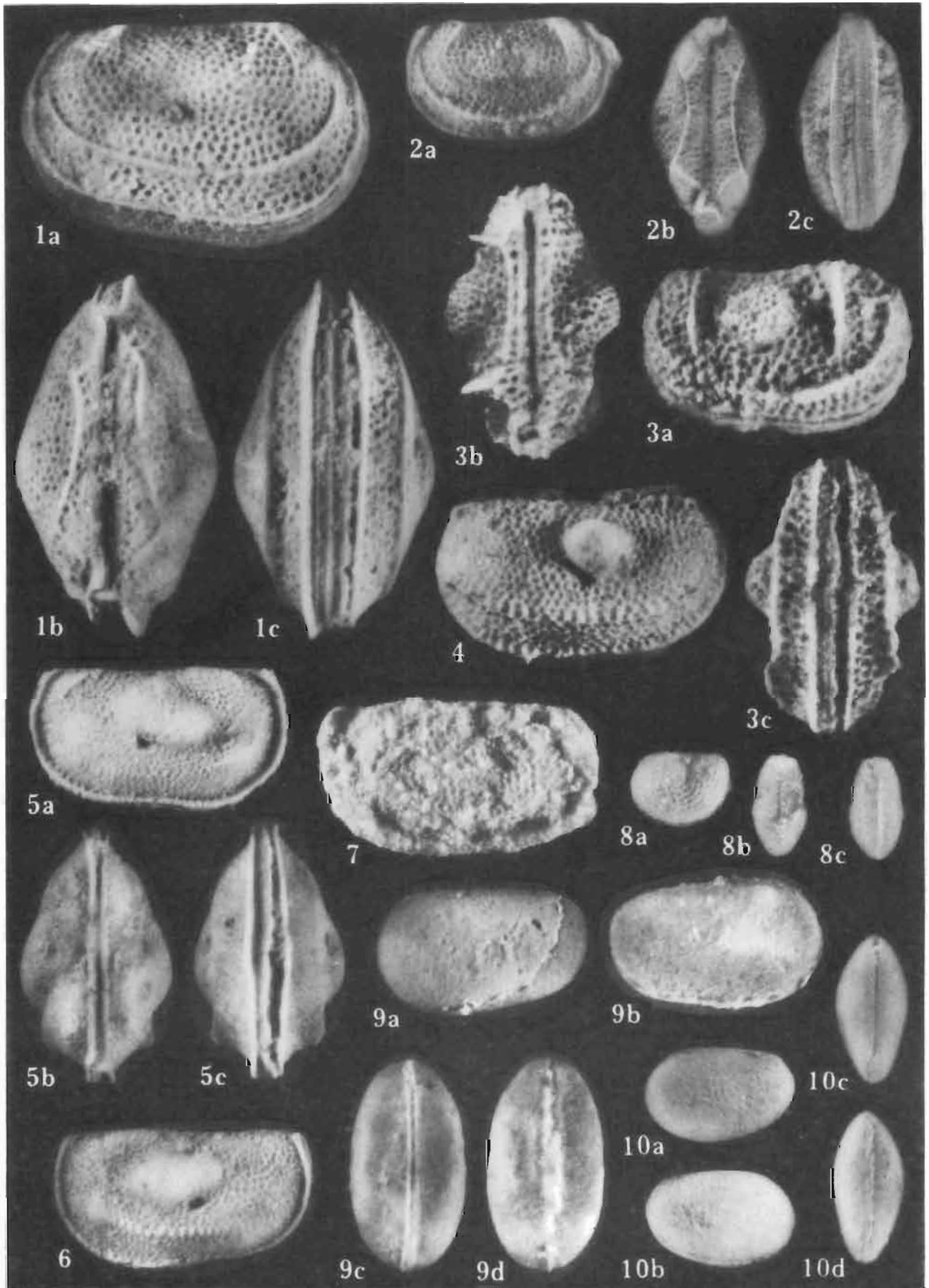
Entomozoidae gen. et sp. indet.	141
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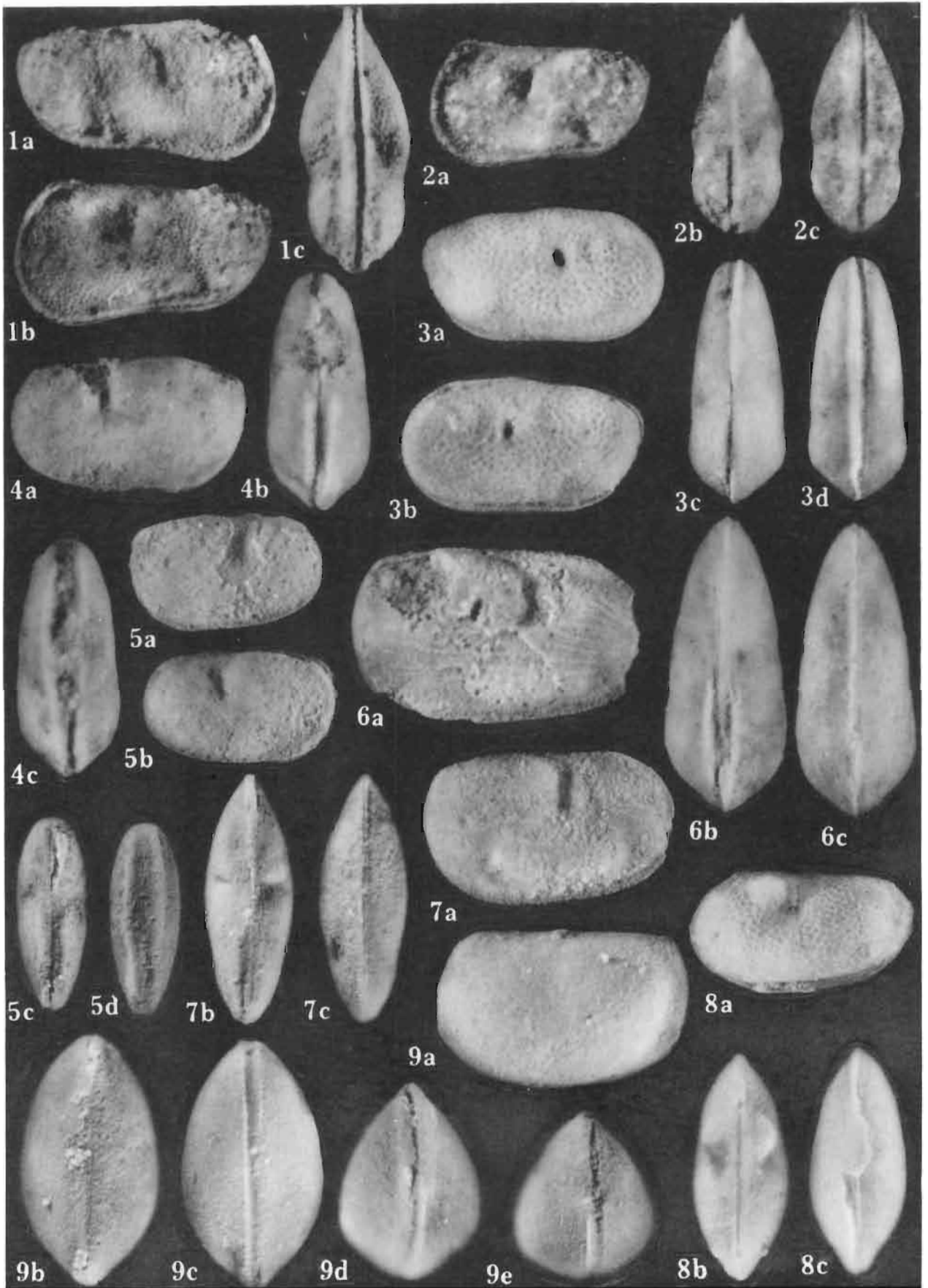
8. Left lateral view, ×50; (ZPAL 0.XV/169); Kowala, Holy Cross Mts., Famennian (do VI).

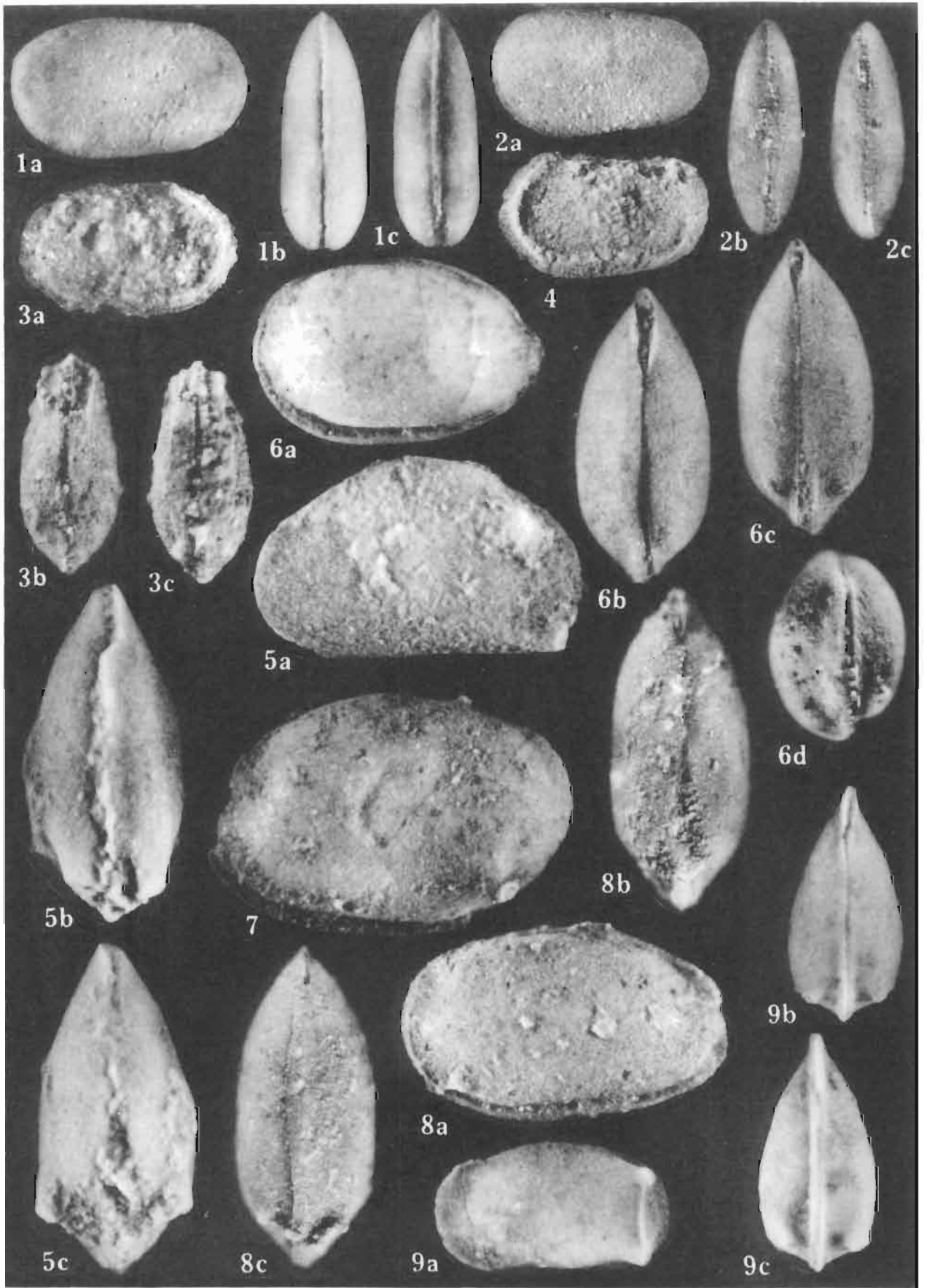


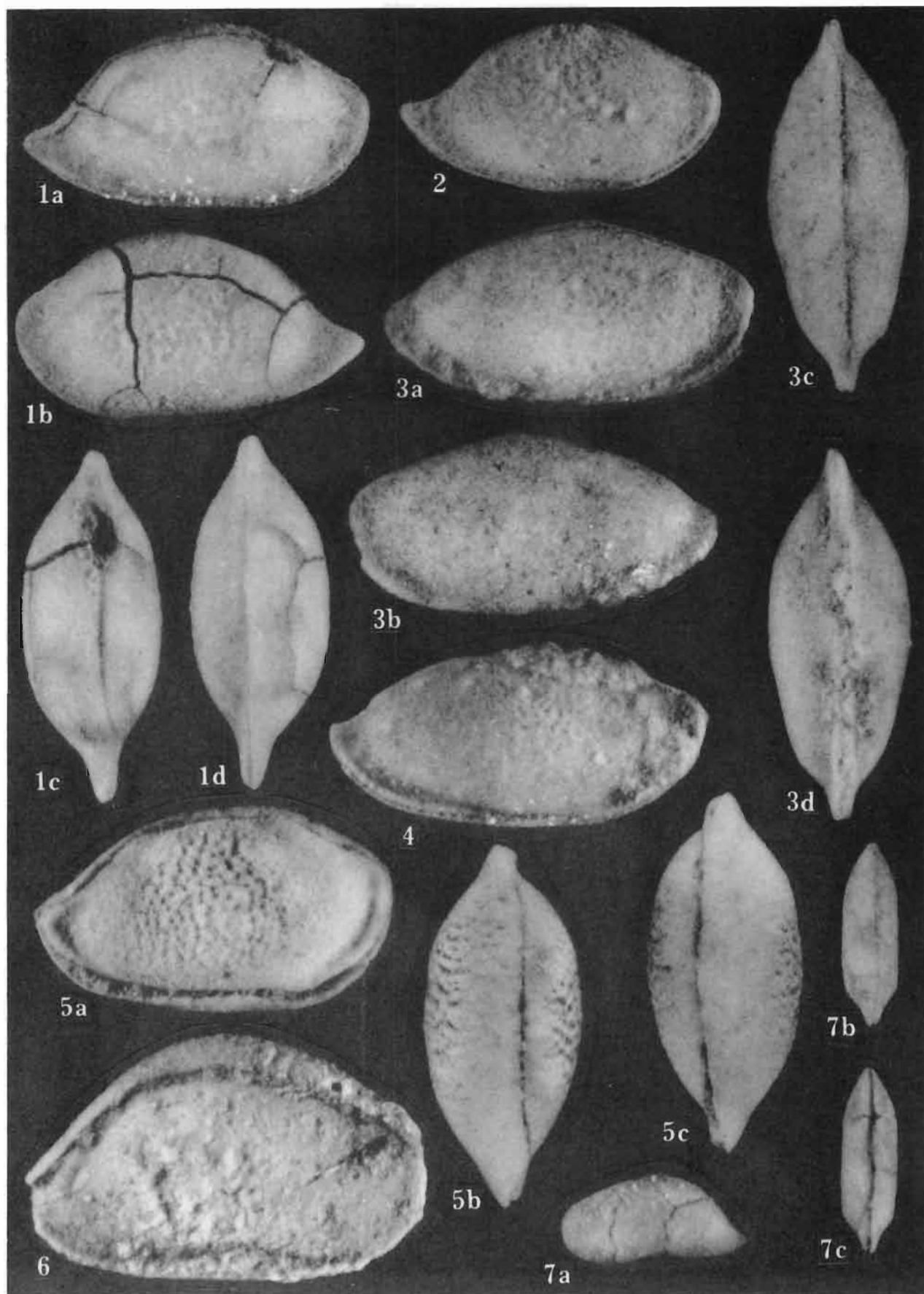




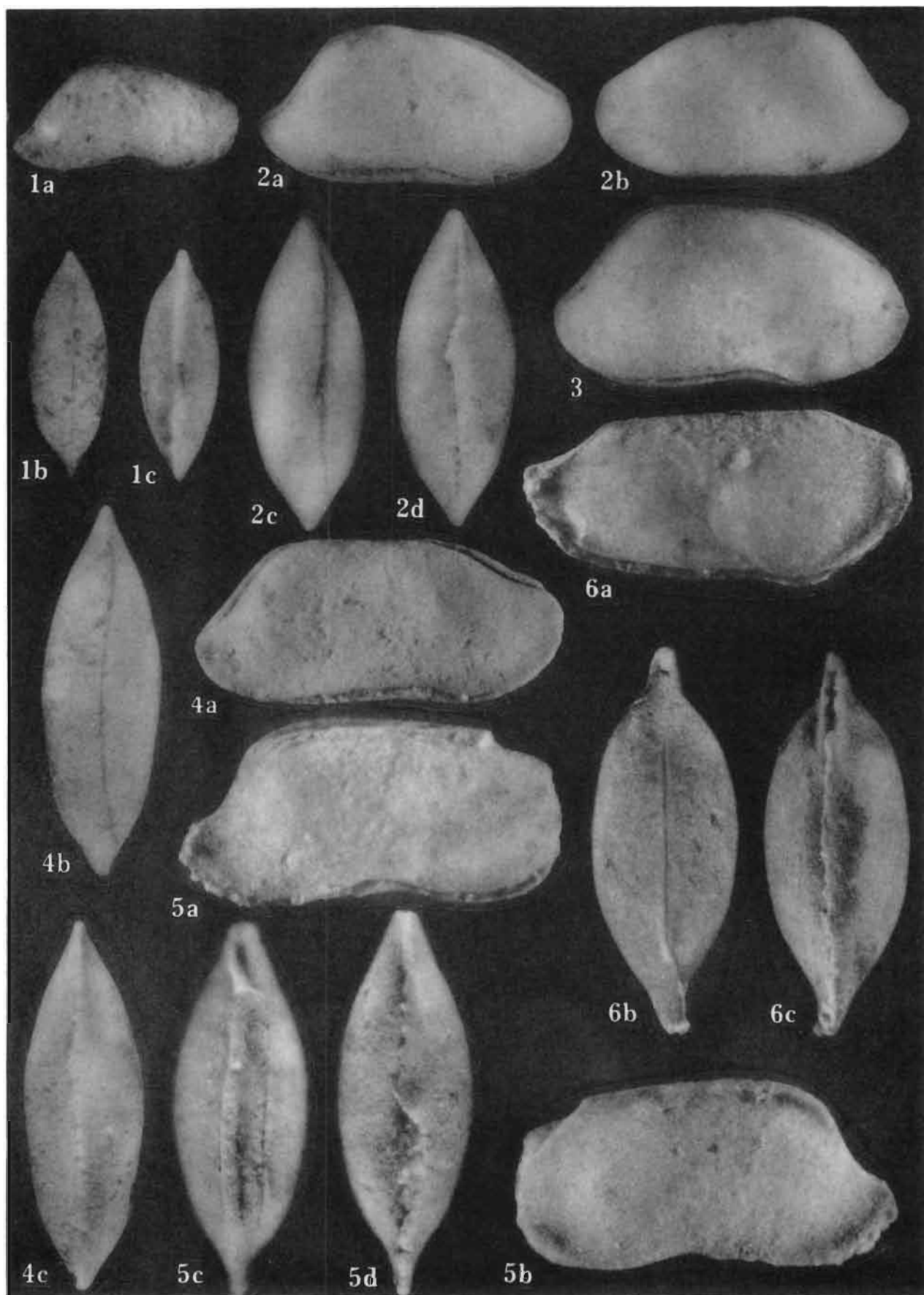




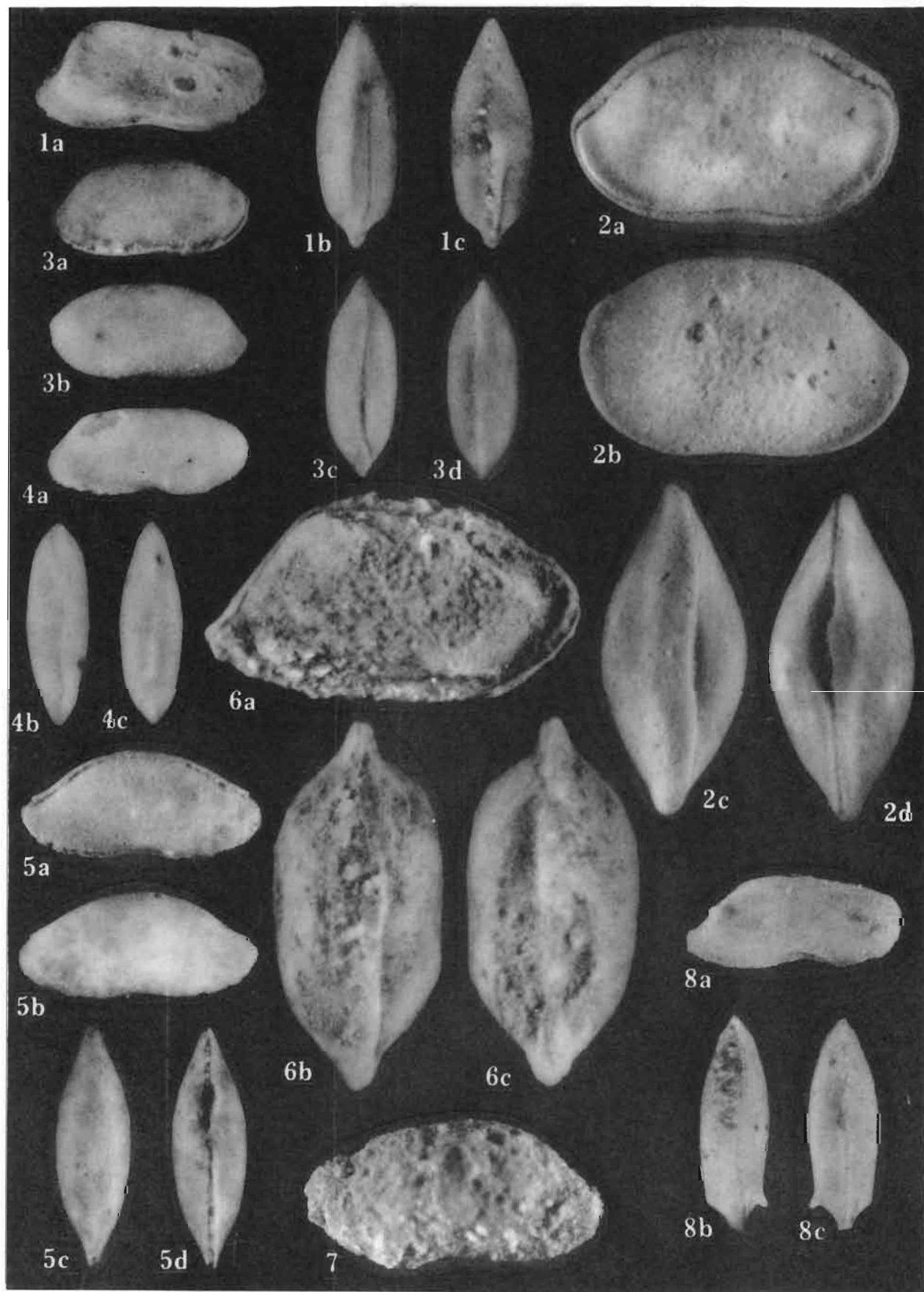


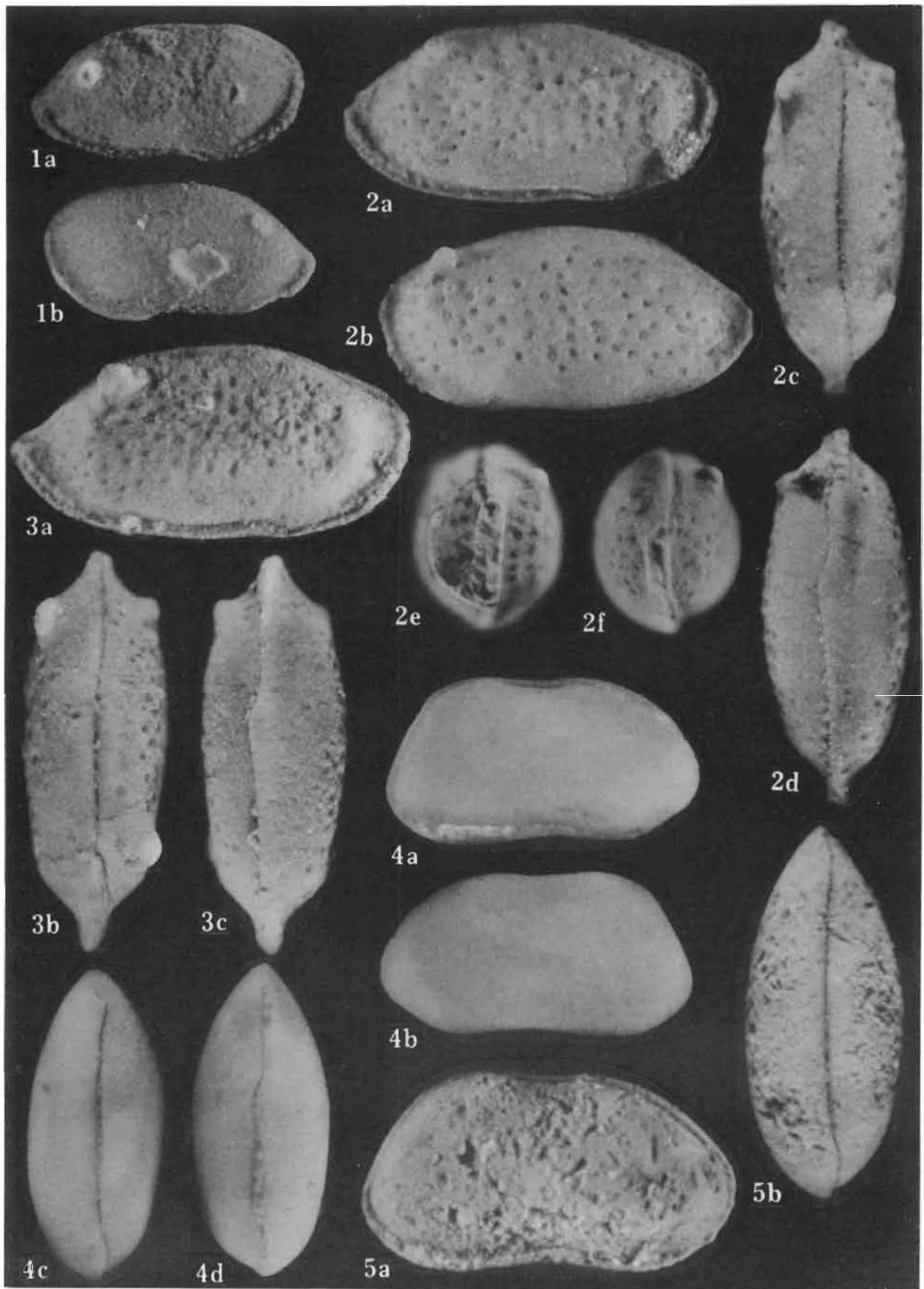


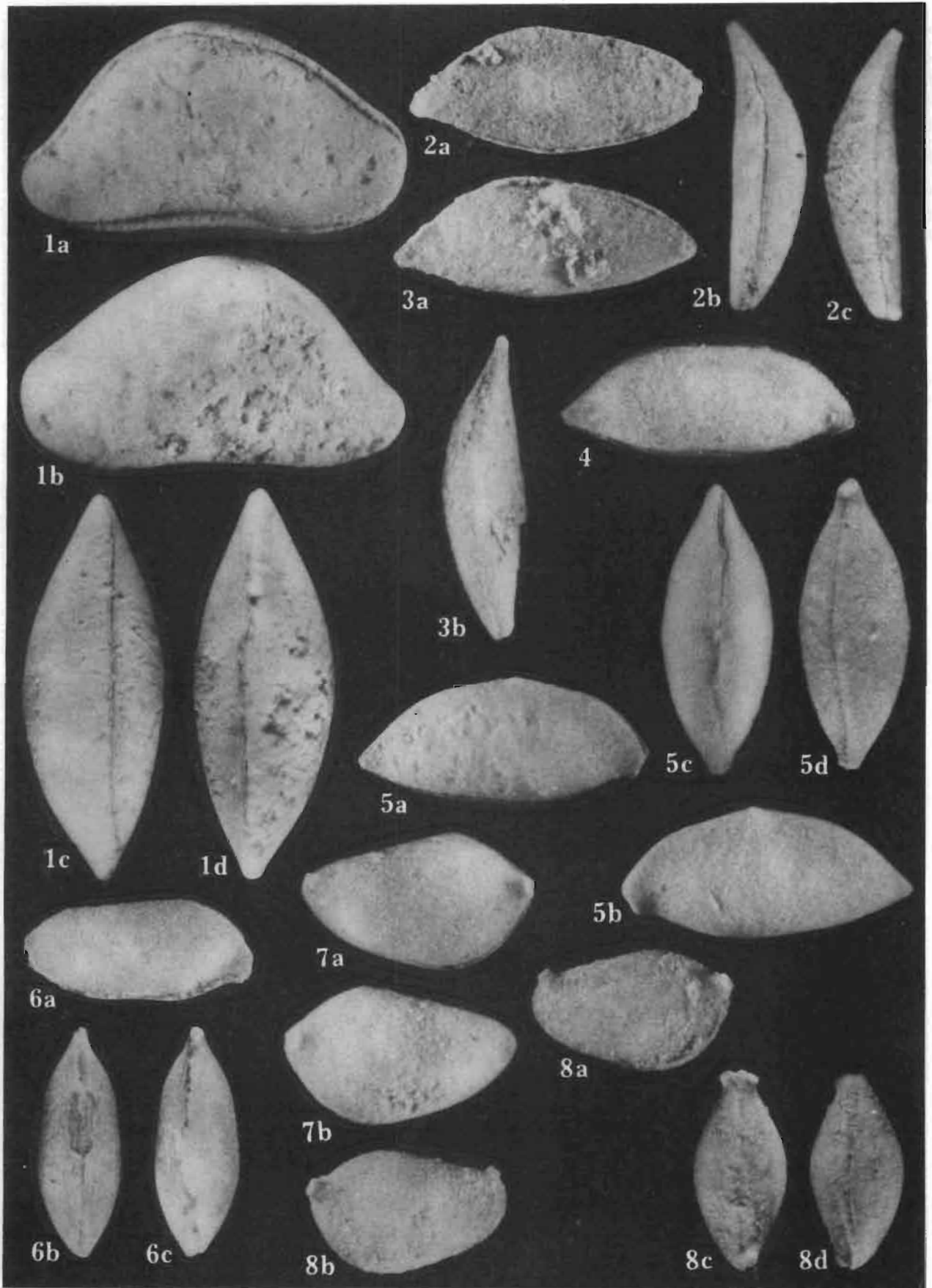
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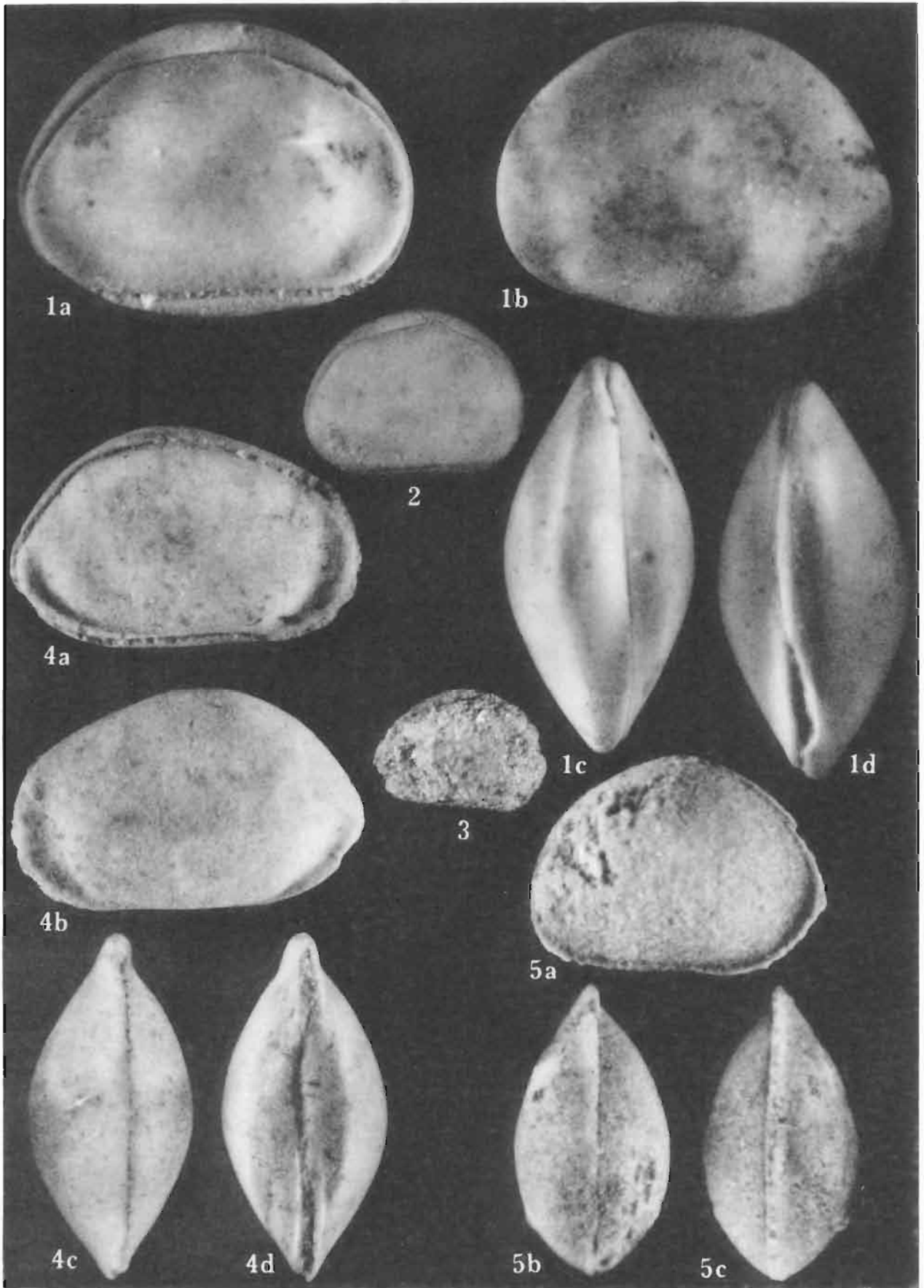


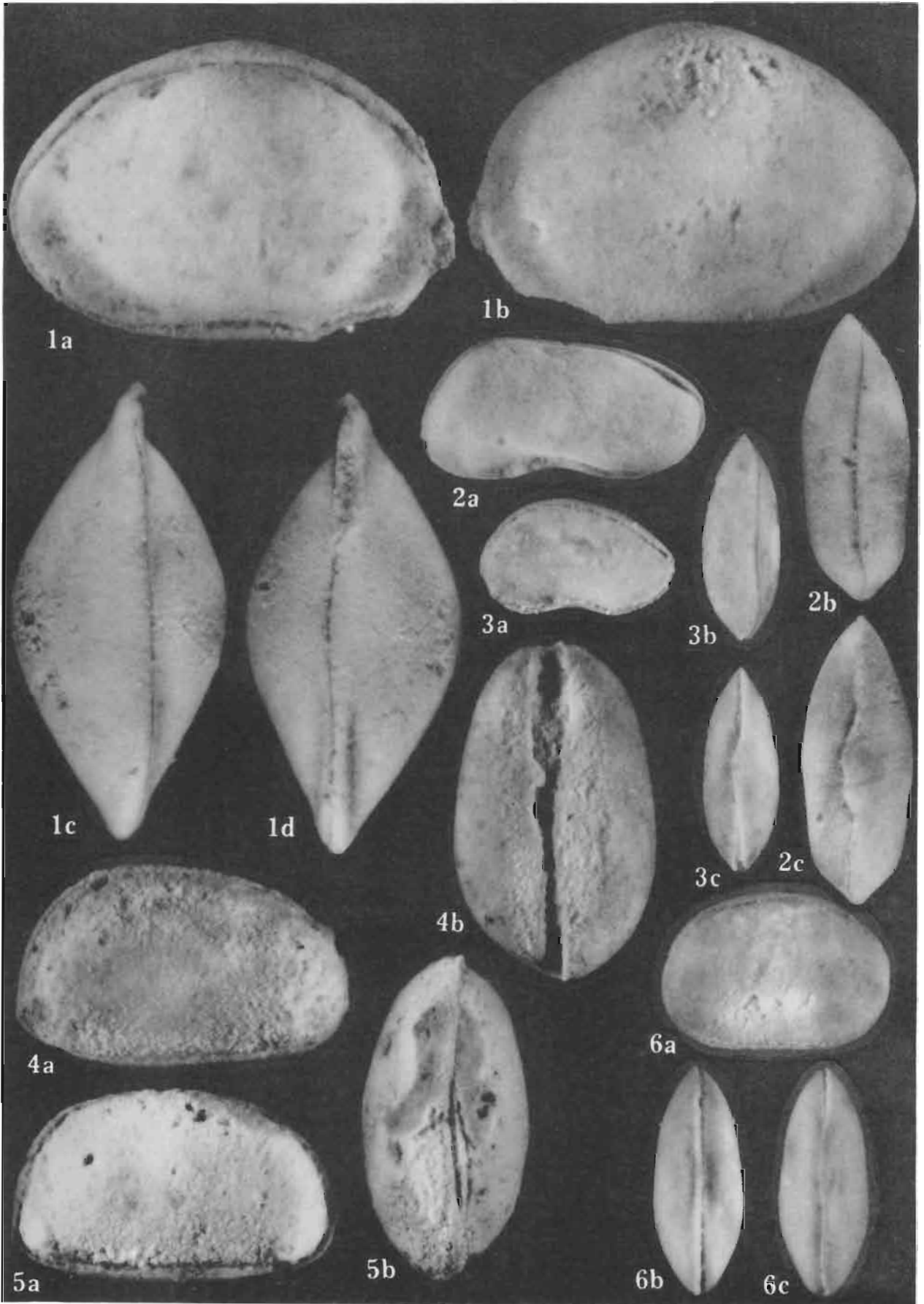
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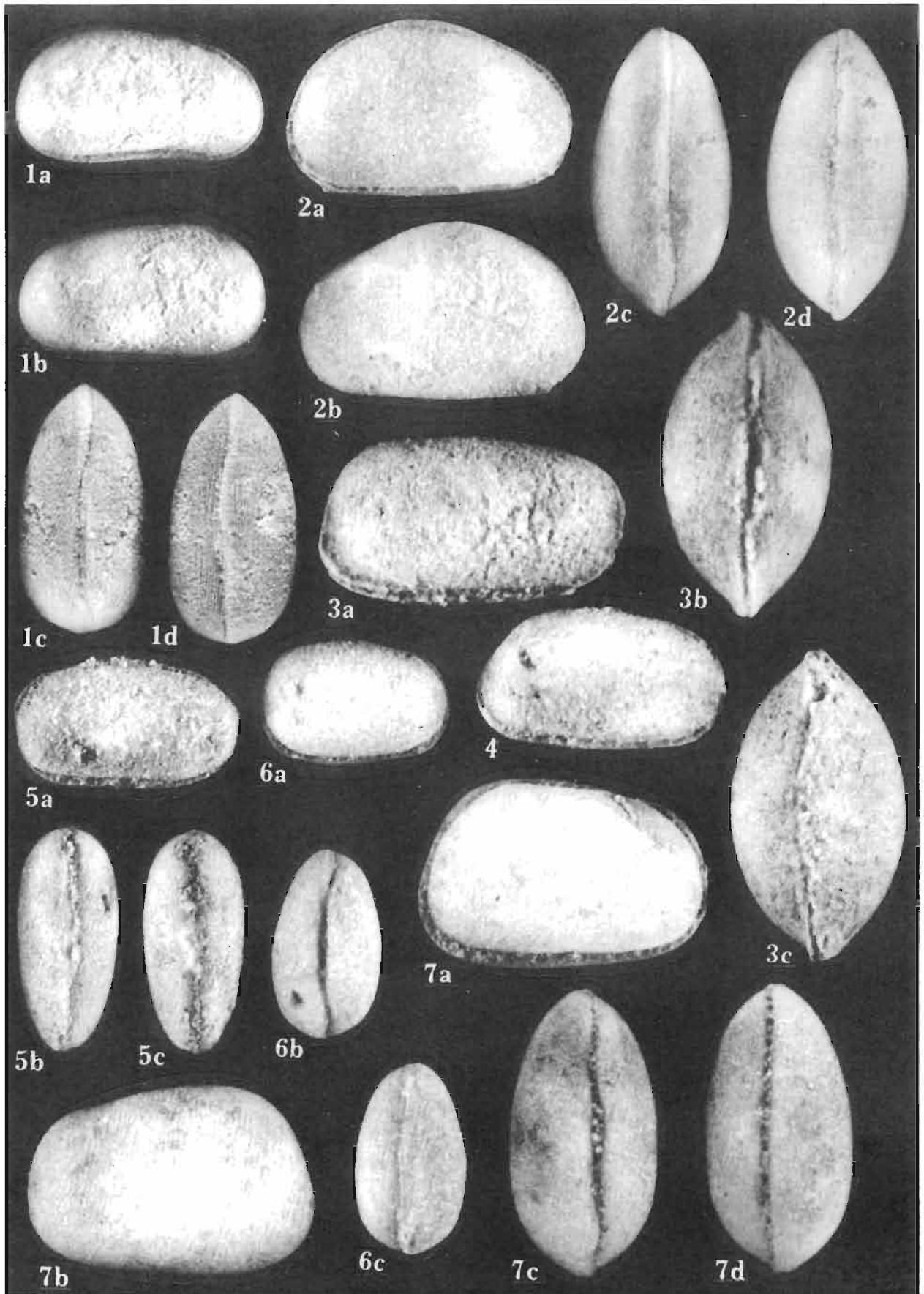


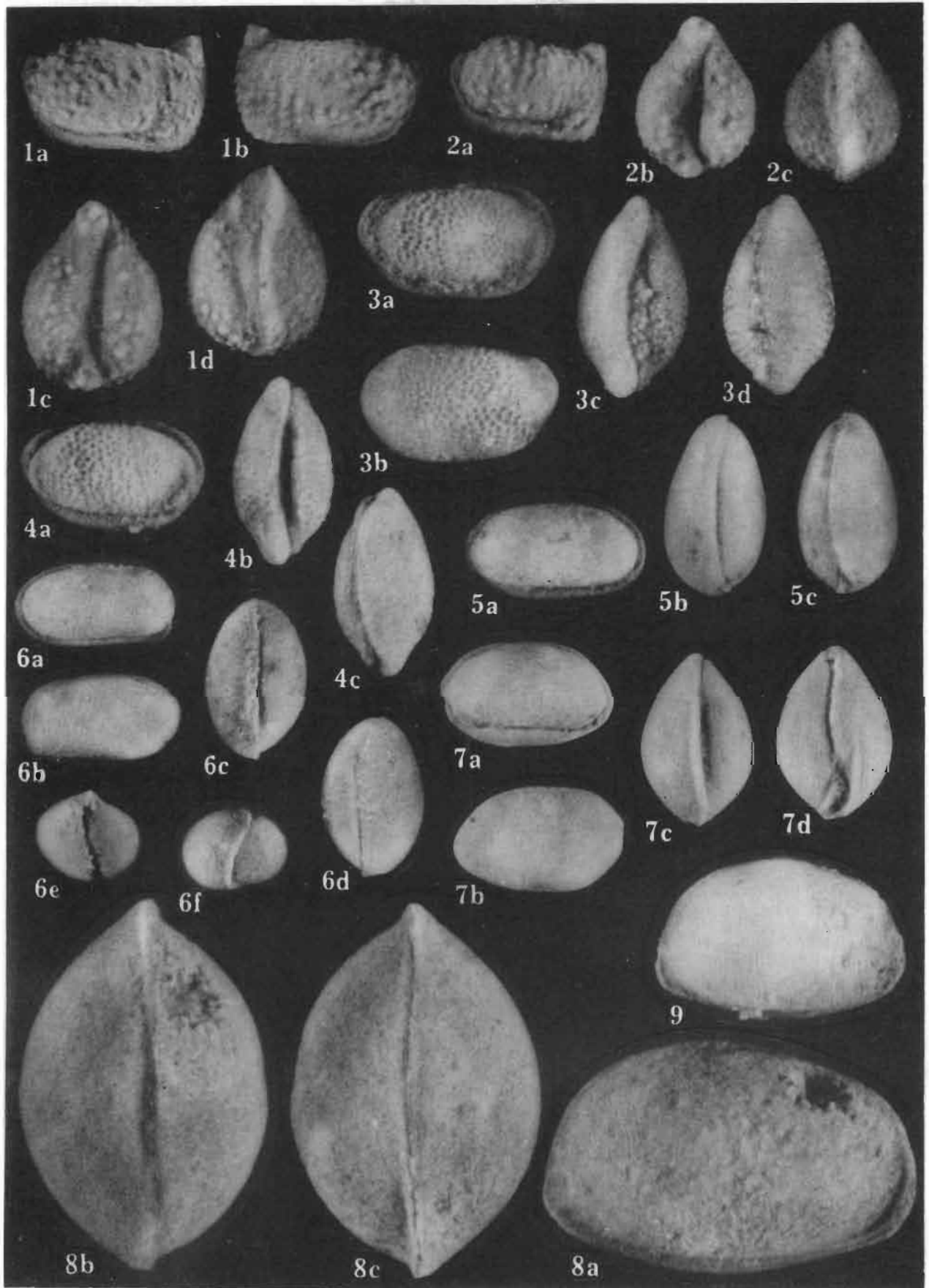


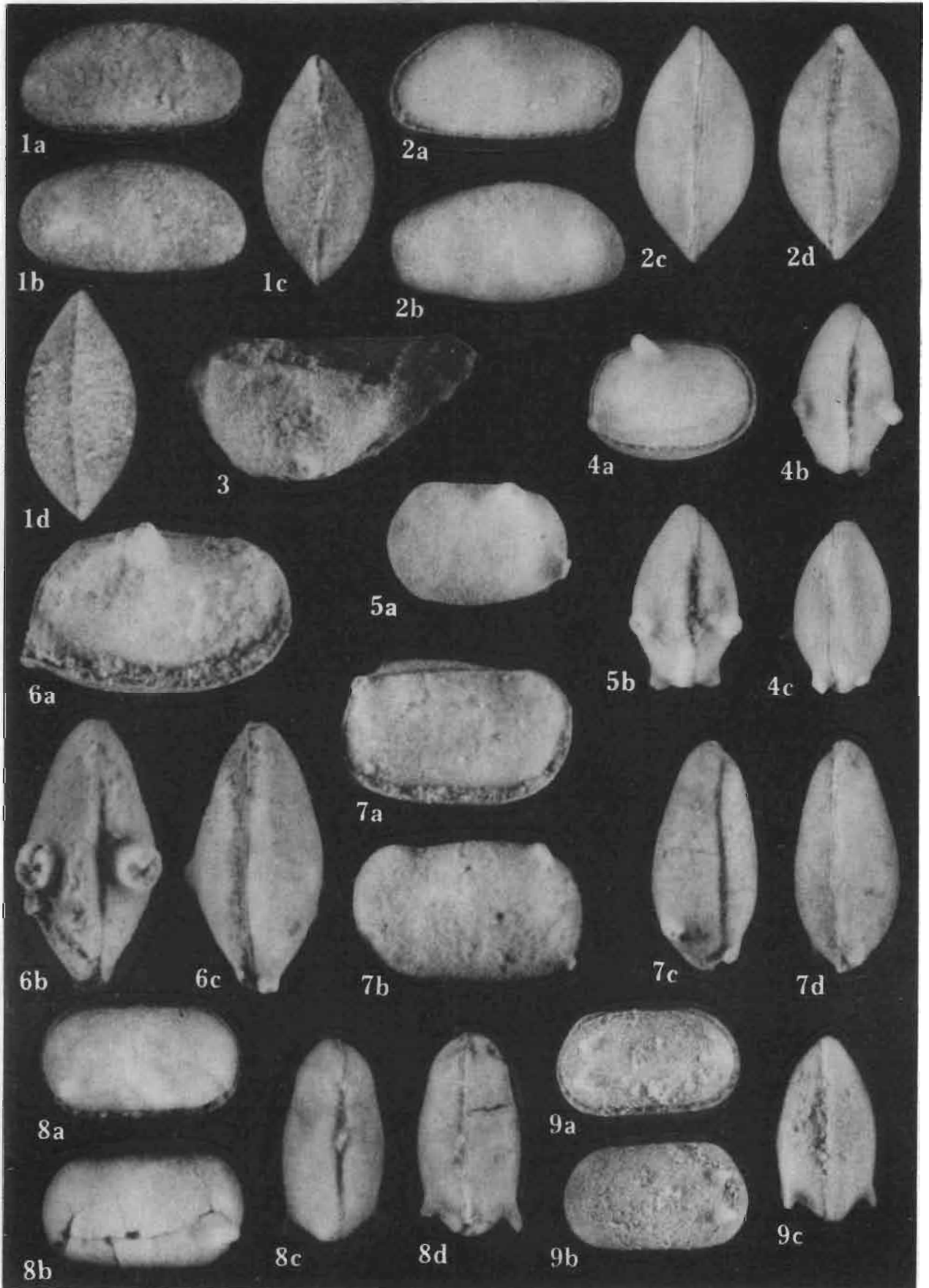


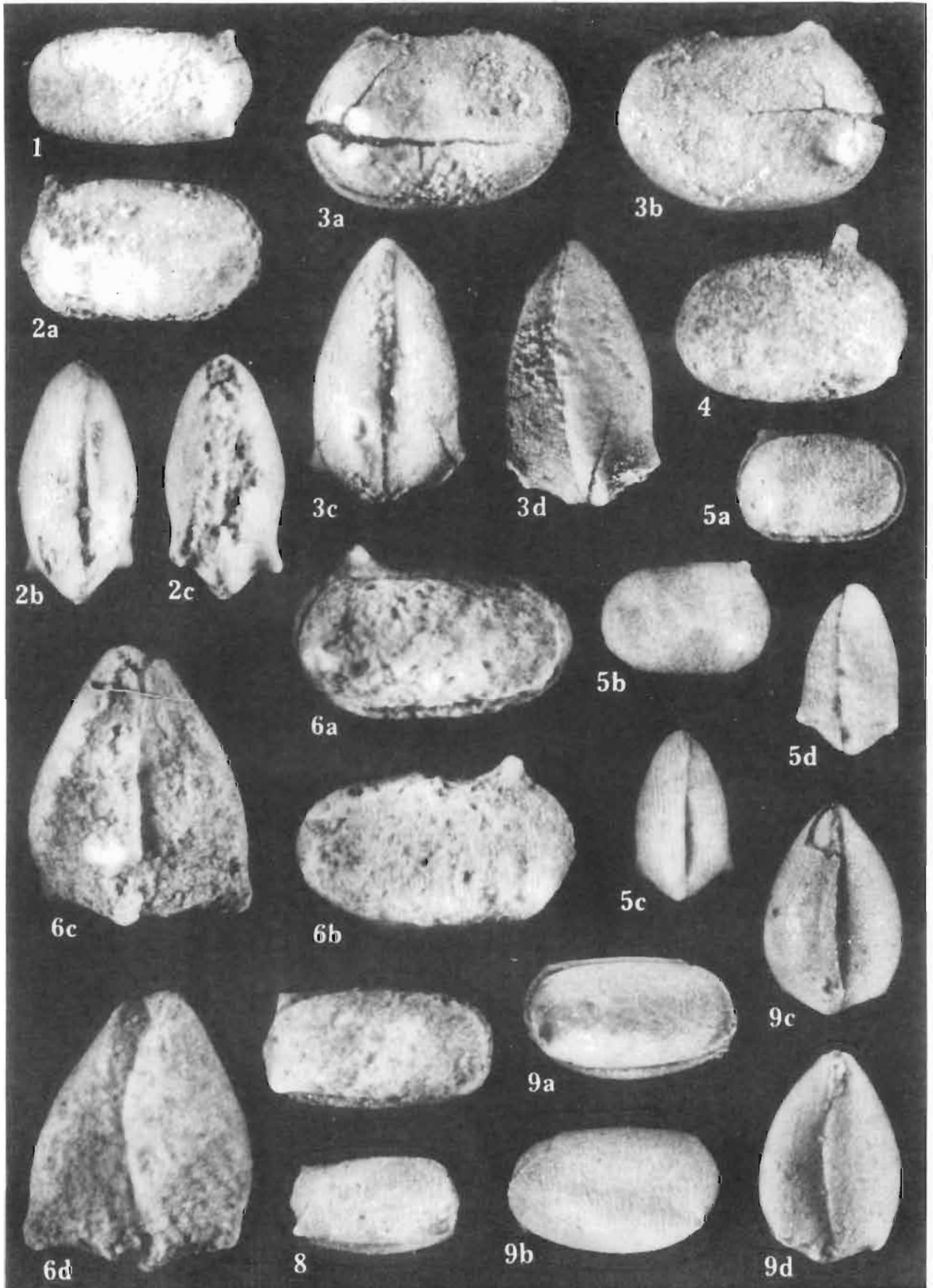




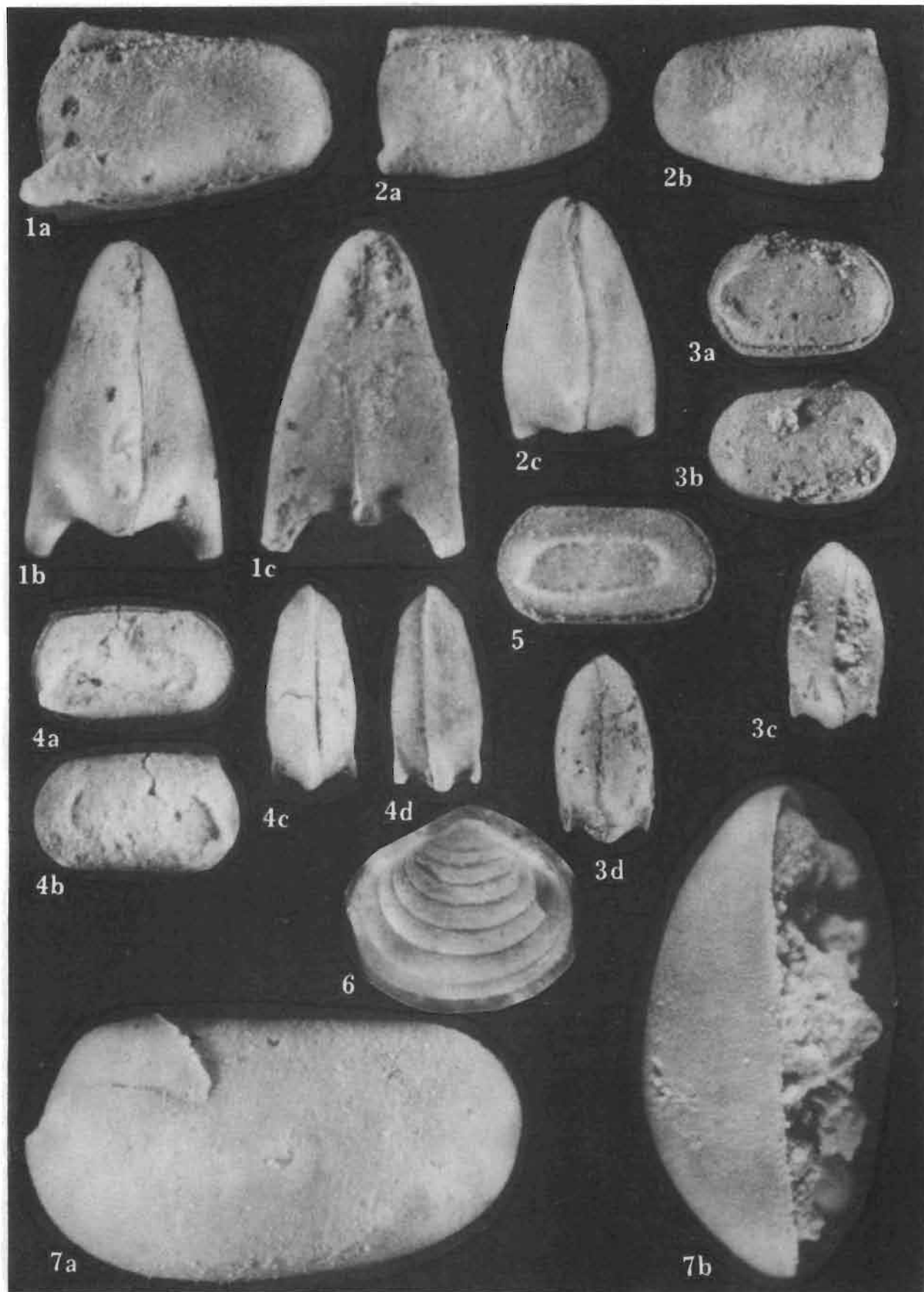


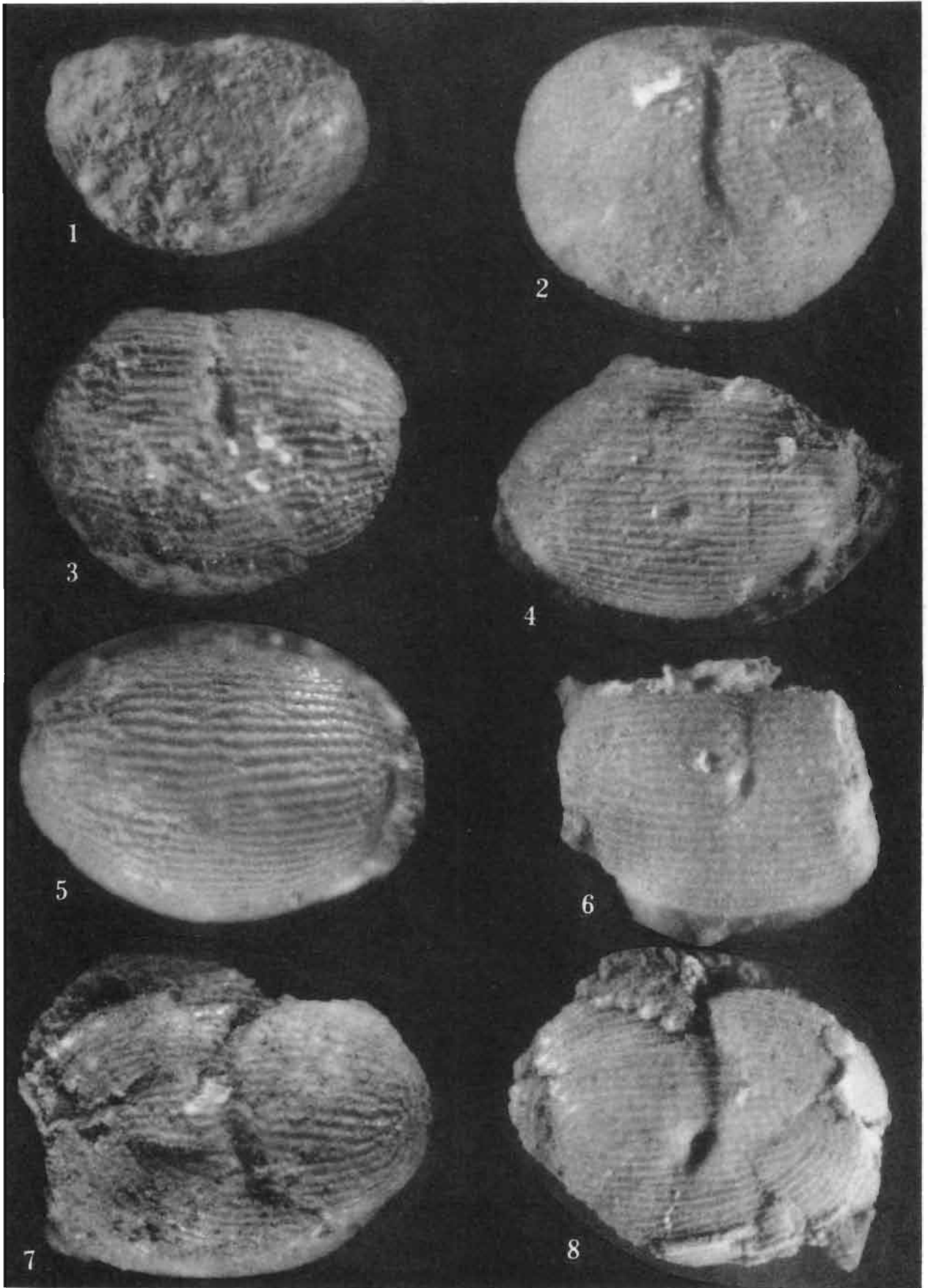






E. OLEMPKA: DEVONIAN OSTRACODA FROM THE HOLY CROSS MTS.





E. OLEMPKA: DEVONIAN OSTRACODA FROM THE HOLY CROSS MTS.

