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# MIDDLE TO UPPER DEVONIAN OSTRACODS FROM NORTHWESTERN POLAND AND THEIR STRATIGRAPHIC SIGNIFICANCE

(Plates 1–26)

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The results of the studies on the Devonian ostracods from three deep test drillings (Chojnice 5, Koczała 1 and Miastko 2) situated in the vicinities of Chojnice, Western Pomerania, Poland are reported. The presence of Upper Givetian, Frasnian and Lower Fammenian deposits in these boreholes is documented on the basis of ostracods. The deposits are correlated with the Devonian deposits in different regions of Europe. The age of the Skały Formation in the Holy Cross Mountains (Góry Świętokrzyskie) is also discussed. The author believes that the upper part of this formation is of Givetian age. The diachronic character of some lithological complexes distinguished by R. DADLEZ (1978) in the studied area, in particular the sandy top of the Chojnice and Wyszebórz complexes, is indicated. A paleogeographical and lithological analysis of the Devonian of the Chojnice environs revealed the inexpediency to distinguish two lithofacial zones of the Devonian deposits in this area. A paleoecological analysis, based on the Upper Givetian assemblage of ostracods, allowed the author to reconstruct the environmental conditions. The sedimentation of the Upper Givetian deposits under study took place in a sublittoral zone at a depth not exceeding 200 m. The Upper Givetian ostracod assemblage corresponds to "Eifeler Ökotyp" in BECKER's meaning (*in*: BANDEL and BECKER 1975). The paper includes descriptions of 103 ostracod species assigned to 61 genera and subgenera representing orders: Palaeocopida, Platycopida, Metacopida, Podocopida and Myodocopida. 56 new species of 37 genera have been distinguished, 16 of these species being left in an open nomenclature. One new genus, *Gerbeckites* (Metacopida, Healdiacea) and one new family, Nezamysliidae (Palaeocopida, superfamily unknown) are erected. The systematic position of many known taxa is revised.

Key words: Biostratigraphy, Middle and Upper Devonian, Ostracoda, NW Poland.

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MAŁŻORACZKI Z DEWONU ŚRODKOWEGO I GÓRNEGO PÓŁNOCNO-ZACHODNIEJ POLSKI I ICH ZNACZENIE STRATYGRAFICZNE

*Streszczenie.* — W pracy przedstawiono rezultaty badań nad małżoraczkami dewońskimi z trzech głębokich wierceń z rejonu Chojnic na Pomorzu Zachodnim: Chojnice 5, Koczała 1 i Miastko 2. Na podstawie małżoraczków udokumentowano w tych profilach obecność osadów górnego żywetu, franu i dolnego famenu. Osady te skorelowano z osadami dewonu innych regionów Europy. Przedyskutowano problem wieku formacji skalskiej w Górach Świętokrzyskich. Górne partie tej formacji są, zdaniem autorki, wieku żyweckiego. Wykazano

diachroniczność niektórych kompleksów litologicznych wyróżnionych na badanym obszarze przez R. DADLEZA (1978), a zwłaszcza stropu piaszczystych kompleksów Chojnic i Wyszeborza. Przeprowadzono analizę paleogeograficzno-facjalną dla dewonu rejonu Chojnic, wykazując niecelowość wyróżniania dwóch stref litofacjalnych dla całego dewonu tego obszaru. Analiza paleoekologiczna, oparta o górnożywecki zespół małżoraczków, pozwoliła na odtworzenie warunków środowiska. Sedymentacja badanych osadów górnożyweckich odbywała się w strefie sublitoralnej na głębokości nie przekraczającej 200 m. Górnożywecki zespół małżoraczków reprezentuje "Eifeler Ökotyp" *sensu* BECKER (*in*: BANDEL and BECKER 1975). Opisano 103 gatunki małżoraczków należące do 61 rodzajów i podrodzajów reprezentujących rzędy: Palaeocopida, Platycopida, Metacopida, Podocopida i Myodocopida. Wyróżniono 56 nowych gatunków należących do 37 rodzajów. 16 z tych gatunków pozostawiono w nomenklaturze otwartej. Utworzono nowy rodzaj *Gerbeckites* (Metacopida, Healdiacea) i nową rodzinę Nezamysliidae (Palaeocopida, nadrodzina nieznana). Zrewidowano pozycję systematyczną szeregu opisanych taksonów.

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CONTENTS

## INTRODUCTION

Several oil and gas prospecting deep borings by which, among other deposits, Devonian formations were discovered have been made since 1958 in the Koszalin-Chojnice area, northwestern Poland. Despite numerous geological investigations the biostratigraphy of the Devonian in this region is as yet incomplete, in particular in regard to the Middle Devonian and Frasnian deposits.

Thus, the author described the ostracods occurring in the Devonian deposits of several selected boreholes, mostly in order to determine the age of those deposits.

Information on the occurrence of ostracods in the Polish Devonian outside the Holy Cross Mts. area has so far been very scanty. Several species from the Givetian and Frasnian

deposits of Jamno IG-1 borehole in Western Pomerania (NEHRING 1971) and twenty species from the Lower Devonian deposits of Krowie Bagno IG-1 borehole in the Radom — Lublin area (NEHRING 1974) were so far described.

Samples were taken from the deposits drilled in three boreholes near Chojnice, that is, Chojnice 5, Koczała 1, and Miastko 2, made by the Oil Prospecting Enterprise at Piła in 1968—1971 (fig. 1).

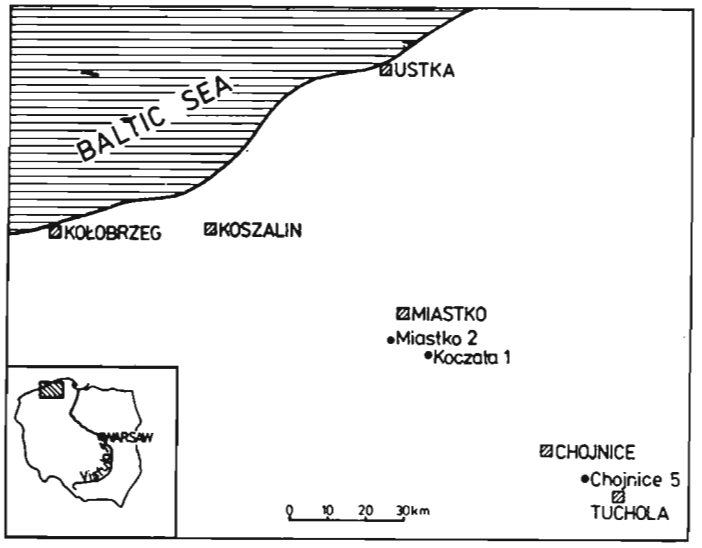


Fig. 1
Distribution of the studied boreholes in Western Pomerania.

Altogether, 90 samples were macerated in $Na_2SO_4$ and ostracods were found in 45 of them. The ostracods are preserved as non-silicified carapaces and single valves with pyritized specimens occurring very rarely. The presence of three Devonian stages, that is, Givetian, Frasnian and Famennian, in the deposits under study was documented on the basis of a rich and differentiated microfauna. Only the Givetian and Frasnian ostracods were studied in detail while the Famennian ones from Chojnice 5 and Koczała 1 boreholes were left for later studies.

The collection of ostracods discussed in the present paper consists of about 10,000 specimens. The author described and illustrated 103 species, including 56 new ones. The latter number includes sixteen species described in an open nomenclature. A new genus, *Gerbeckites* (Metacopida, Healdiacea) and a new family, Nezamysliidae (Palaeocopida, superfamily unknown) have also been erected.

All holotypes, as well as the remaining specimens illustrated in this paper, are stored in the Institute of Geological Sciences of the Polish Academy of Sciences abbreviated as ING.

The report was prepared in the Institute of Geological Sciences of the Polish Academy of Sciences in Warsaw in 1973—1978. The work was done under the supervision of Professor L. TELLER.

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Several persons and institutions exerted their influence on the ultimate form of the presented paper, written at Professor LECH TELLER's (Warsaw) suggestion, to whom the author is indebted for advice and stimulating discussions. The samples together with archival data were rendered accessible by the Oil Prospecting Enterprise at Piła. Dr. HENRYK ŁOBANOWSKI's (Warsaw) experience was of great importance in regard to the selection of particular boreholes

and his descriptions of their lithology offered to the author were very helpful in her paleoecological analysis. Dr. FRANCISZEK ADAMCZAK's (Stockholm) criticism contributed to the abridgement of the original manuscript and a more precise form of the final text. Comparative materials, which had a decisive effect on reducing the number of new taxa were rendered available to the author by Dr. FRANCISZEK ADAMCZAK (Stockholm), Dr. GERHARD BECKER (Frankfurt a/Main), Dr. KLARA GUREVICH (Lvov), Professor VALDAR JAANUSSON (Stockholm), Professor ANDERS MARTINSSON (Uppsala), Dr. EWA OLEMPSKA (Warsaw), Dr. ELENA POLENOVA (Novosibirsk) and Dr. ANNA ROZHDESTVENSKAYA (Ufa). Several valuable papers on the Devonian ostracods were lent to the author by Dr. JEAN Le FEVRE (Pau). Photographs were taken by Mrs. LIDIA ŁUSZCZEWSKA and Ms. MAŁGORZATA RADZIKOWSKA.

The author's heartfelt thanks are extended to all the persons and institutions mentioned above.

## DEVONIAN BIOSTRATIGRAPHY IN THE ENVIRONS OF CHOJNICE

The Devonian deposits in the environs of Chojnice have been discovered quite recently. The deposits of this age, overlaid by Permian rocks, were reached for the first time in the Chojnice 2 borehole (TOKARSKI 1959). Until now, the Devonian deposits in this area have been drilled or pierced by several boreholes, but an insufficient coring prevented more accurate studies of their stratigraphy. Preliminary data on the Devonian stratigraphy in the structural zone of Chojnice were published by ŁOBANOWSKI (1968). The presence of the Middle Devonian deposits was suggested by this author on the basis of brachiopods found in the cores of the Miastko 1 and Chojnice 5 boreholes.

The stratigraphy of the Devonian deposits described from the profile of the Człuchów IG-1 borehole (PAJCHLOWA 1977, OZONKOWA 1977) was based on fossils only to a small extent. The presence of the Givetian, Frasnian and Famennian deposits was determined, not very accurately, on the basis of macrofauna determined only to the level of genus. The Frasnian deposits were determined on the basis of the presence of *Buchiola* pelecypods, impressions of indeterminate goniatites and the algae *Girvanella*, while the Famennian was documented by the occurrence of foraminifers of the family Endothyridae. These stratigraphic estimations, although based on an insufficient amount of paleontological data, seem — in the light of the author's studies on the Devonian of the nearby profile of the Chojnice 5 borehole — not to arouse any major reservations.

The biostratigraphy of the Famennian in the environs of Chojnice was the object of studies by MATYJA (1972, 1975, 1976) who, on the basis of brachiopods and conodonts, documented the occurrence of Famennian deposits in the profiles of the Chojnice 2, Chojnice 4 and Babilon 1 boreholes.

Ostracods whose presence in some profiles was mentioned for the first time by ŁOBANOWSKI (1968), occur also fairly abundantly among other fossils from the drilled Devonian profiles of the environs of Chojnice. The author's studies revealed as well the presence of ostracods in the Devonian deposits from the Chojnice 5, Koczała 1 and Miastko 2 boreholes and their investigation enabled her to determine the stratigraphy of those deposits.

## DEVONIAN LITHOLOGY IN THE ENVIRONS OF CHOJNICE

The simplified lithological profiles of the deposits under study are presented in fig. 2.

### *Chojnice 5 borehole*

The data concerning the lithology of the Chojnice 5 profile come from ŁOBANOWSKI (1968) and J. DADLEZ (1975).

J. DADLEZ (1975) distinguished three following groups of deposits occurring in the Devo-

nian of the Chojnice 5 profile which is 2,039 m in thickness and ranges between depths 4,890 and 2,851 m:

(1) clastics, subordinately marly or carbonate, transgressive deposits;
(2) marly, subordinately clayey deposits marking the period of the largest overdeepening of the basin;
(3) carbonate, subordinately marly, regressive deposits.

The first of these groups of deposits is composed at first of mutually intercalating, mostly non-calcareous or only slightly calcareous, dark-gray mudstones and claystones, subordinately with thin intercalations of gray, fine-grained sandstones, sandy limestones and dolomites (corresponding to the Tuchola and Silno complexes of R. DADLEZ 1978). Starting at the depth of 4,385 m, they pass into gray, fine-grained sandstones with muddy-clayey streaks and bands and sandy dolomites occurring at the top (= Chojnice complex of R. DADLEZ 1978).

The second group of deposits occurs at the depth of about 4,000 m and is represented by black, campact, calcareous claystones with goniatites and intercalations of light-gray, detrital limestones (corresponding to a lower marly subcomplex of Człuchów complex of R. DADLEZ), changing gradually (= transitional subcomplex of Człuchów complex of R. DADLEZ 1978) into the deposits of the third group, that is, that with a predominant occurrence of nodular limestones (= calcareous subcomplex of Człuchów complex of R. DADLEZ 1978).

*Koczała 1 borehole*

The lithological profile of the Devonian of the Koczała 1 borehole (according to Łobanowski's archival report of 1970), which is 1,015 m thick (between 3,127·4 and 2,112·3 m in depth), begins with intercalating, light-gray, very fine-grained sandstones, dark-gray claystones and siltstones and marly, locally fine-grained, gray limestones abounding in macrofauna (= Jamno complex plus Sianów complex of R. DADLEZ 1978). Upwards, beginning at the depth of 2,942 m, predominate dark-gray, fine-grained, clayey sandstones, locally cherry-red, with laminae and intercalations of dark-gray siltstones and mudstones (= Wyszebórz complex of R. DADLEZ 1978). In their top, at the depth of 2,734 m, there appear intercalations of marly and sandy limestones and dark-gray mudstones occurring within brown sandstones. Above the depth of 2,706·5 m, grayish limestones with intercalations of conglomerates, composed of gray and dark-gray pebbles of limestones, variegated and brown dolomites with few layers of breccia consisting of sharp-edged fragments of grayish limestones with a carbonate-marly cement are predominant deposits (= Koczała complex of R. DADLEZ 1978). Intercalations of grayish-green sandstones, mudstones and siltstones occur in the top of those limestones, beginning at the depth of 2, 635 m. Between depths 2,610 and 3,310 m (= lower marly subcomplex of Człuchów complex of R. DADLEZ 1978), dark-gray siltstones occur, at first with intercalations and thin layers of gray marly limestones and, subsequently, dark-gray calcareous siltstones with intercalations of gray nodular limestones occurring in the top. At the depth of 2,310—2,164 m, there occur dark-gray and, locally, grayish nodular, marly limestones overlaid, up to the top of the Devonian deposits (that is, up to the depth of 2,112.3 m) by a 50 m thick patch of grayish, fine-grained, cavernous dolomites (= transitional subcomplex plus calcareous subcomplex of Człuchów complex of R. DADLEZ (1978).

*Miastko 2 borehole*

In the Miastko 2 borehole, Devonian deposits 120 m thick, were drilled at the depths of 2,200 to 2,080 m. The lithological profile of this borehole (according to ŁOBANOWSKI'S and PAJCHLOWA'S 1968, unpublished data) is represented by intercalating greenish-gray and variegated calcareous mudstones, light-olive siltstones locally slightly calcareous and with intercalations of fine-grained, dark-gray limestones containing remains of brachiopods and corals. The intercalations of brown dolomites containing a recrystallized macrofauna occur in the top. All the Devonian deposits of this profile were included by R. DADLEZ (1978) in the Sianów complex.

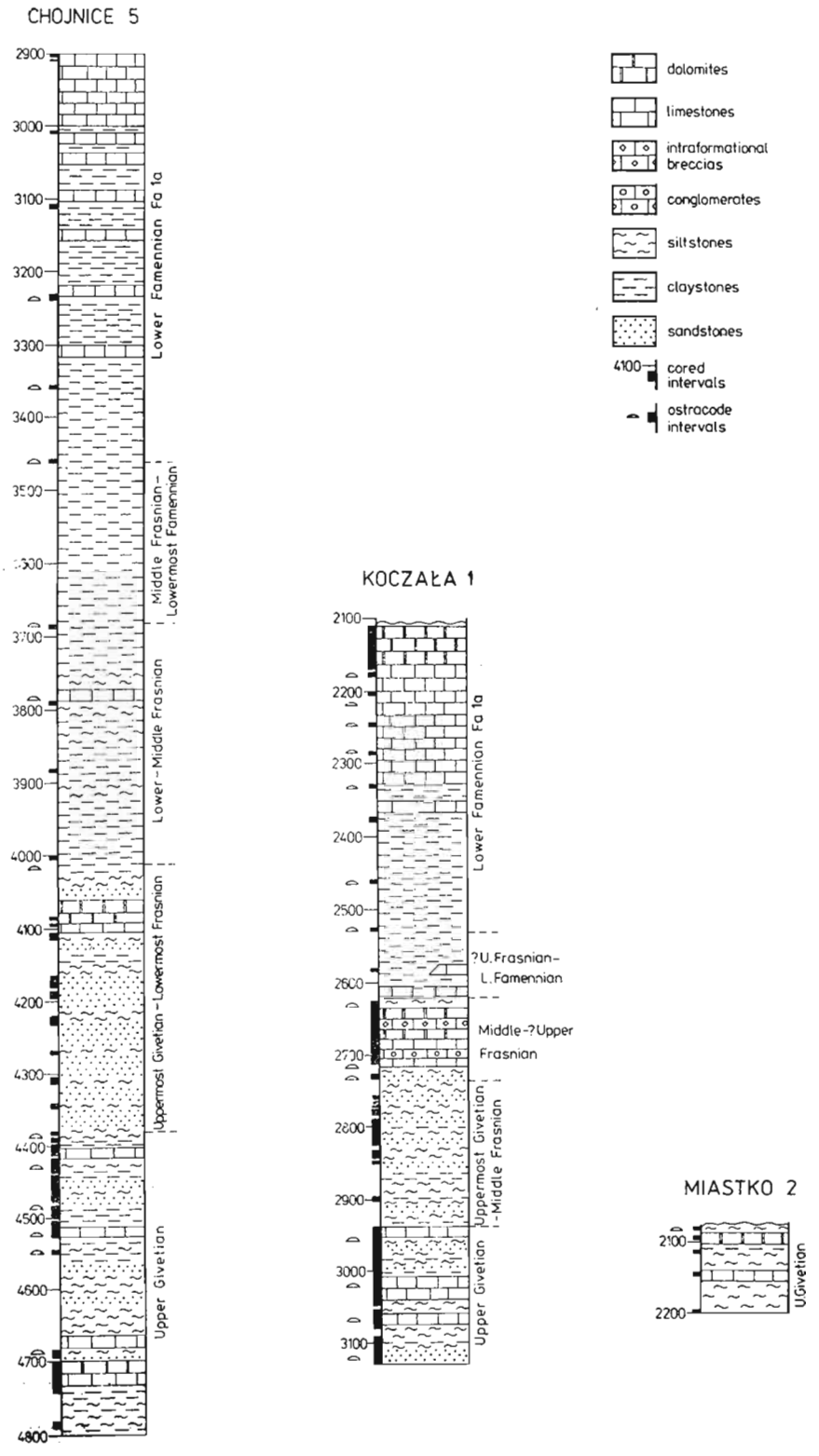



**Fig. 2**
**Profiles of the studied boreholes.**

Table 1

Distribution of ostracods in the Chojnice 5 borehole

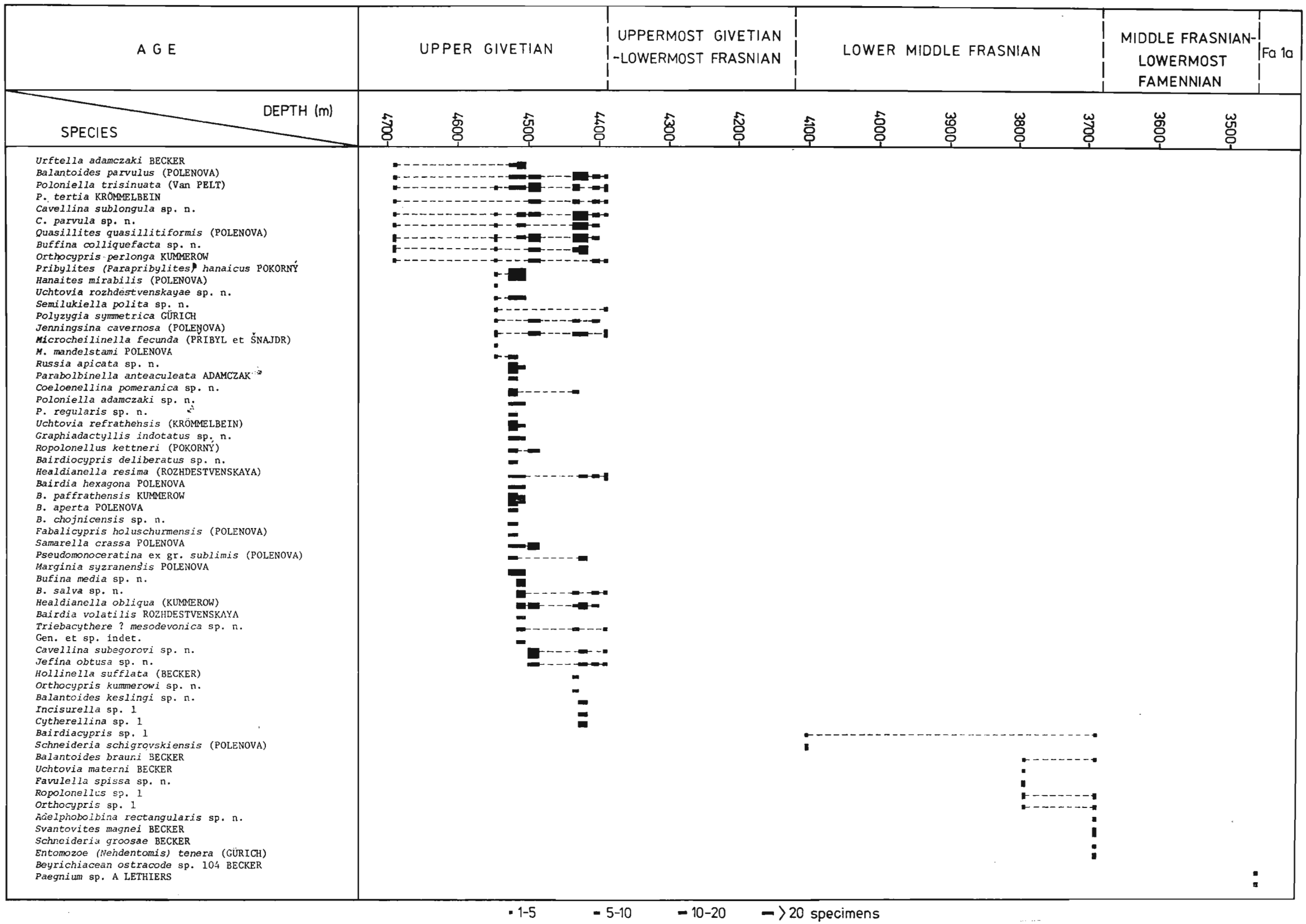
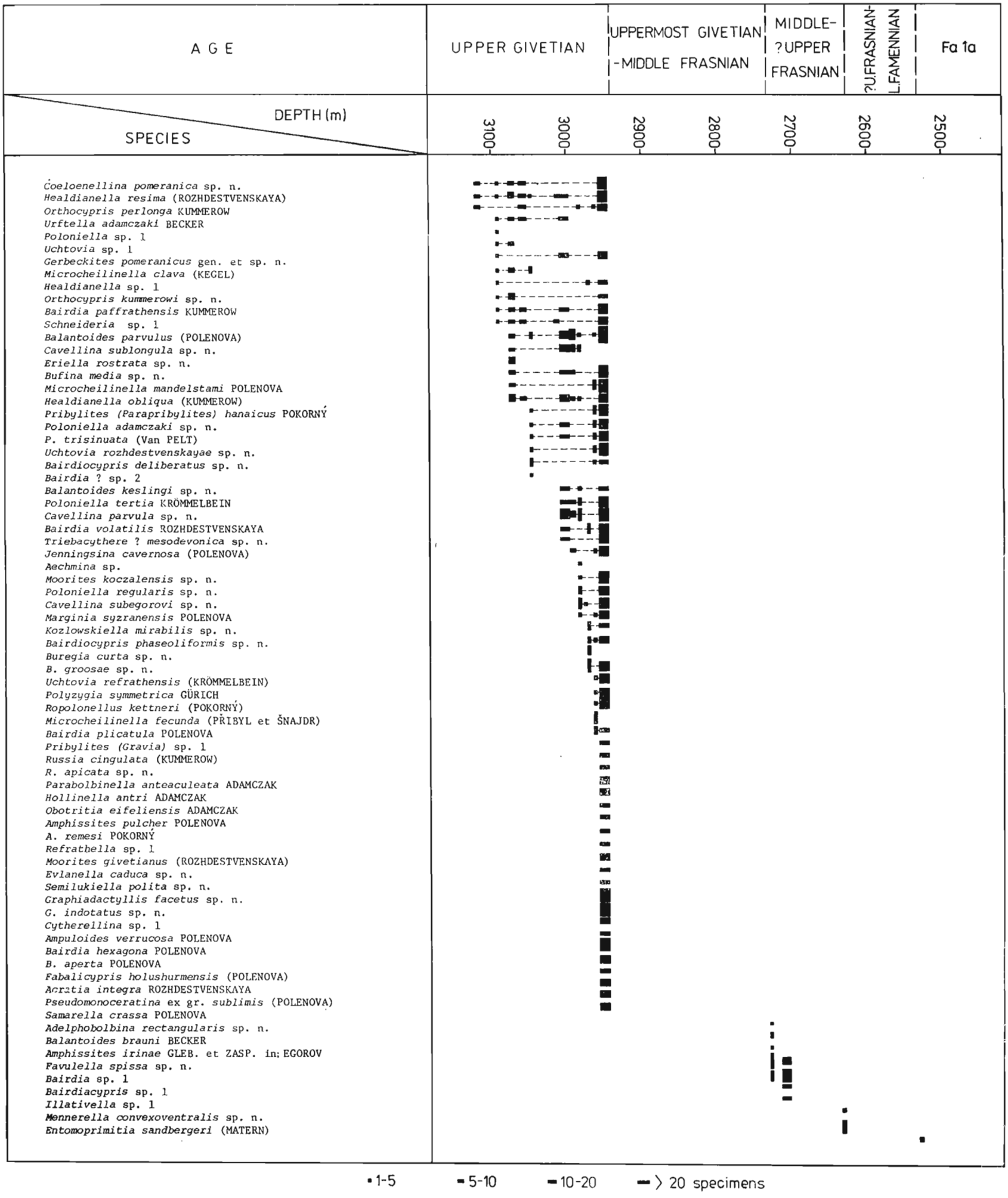


Table 2

Distribution of ostracods in the Koczała 1 borehole



## THE DISTRIBUTION OF OSTRACODS IN THE DEVONIAN PROFILES OF THE ENVIRONS OF CHOJNICE AND THEIR STRATIGRAPHIC SIGNIFICANCE

### The Givetian

The deposits of this age occur in the lowermost parts of the profiles of the Chojnice 5 (at depths of 4,691 to 4,390·1 m) and Koczała 1 (at depths of 3,119 to 2,938·3 m) boreholes, as well as at the depths of 2,085 to 2,080 m in the profile of the Miastko 2 borehole.

*Chojnice 5 borehole.* — A sector situated between the depths of 4,691.7 to 4,290.1 m is the lowermost sampled part of the profile in which ostracods were found. There occur only nine species represented mostly by single specimens (Tables 1 and 3). A considerably diversified assemblage of ostracods composed of 43 species, including all occurring in the previous sector of the profile, was found in samples taken betweeen the depths of 4,545·1 to 4,482 m (Tables 1 and 3). No ostracods were found at 4,482—4,436·4 m, while an assemblage of 24 species, including 19 from the previous parts of the profile discussed above was recorded between 4,436·4 to 4,398·2 m (Tables 1 and 3). An assemblage, consisting of a total of 48 species of ostracods, occurs in the Chojnice 5 profile in the deposits at the depths of 4,691·7 to 4,390·1 m which, on the basis of the ostracods, are assigned to the Givetian (see below).

*Koczała 1 borehole.* — The Givetian of the profile of the Koczała 1 borehole is marked by a yet more abundant and richer assemblage of ostracods than that of the profile of the Chojnice 5 borehole, as it is composed of 66 species (Tables 2 and 3).

24 species, including five whose range is limited only to this part of the profile, were found in the lowermost sector of the core between depths 3,119 and 3,041.8 m. The remaining 19 species also occur higher up. The presence of only 17 species, partly continuing their occurrence from lower parts of the profile, were recorded in an interval of 3,019 and 2,990.3 m. 7 species appeared for the first time at this depth. On the other hand, between the depths of 2,984.6—2,938.3 m, the most numerous ostracod assemblage occurs. It consists of 61 species (Tables 2 and 3), including 25 whose occurrence is continued from underlying deposits.

*Miastko 2 borehole.* — In the profile of this borehole, ostracods were presented only in samples coming from the depths between 2,085 to 2,080 m. 43 species (Table 3) were identified from this sector, including only 11 not recorded in the remaining profiles.

**Discussion.** — There occurs a considerable coincidence of the sections of three profiles discussed above. It is expressed in the similarity of facies and in considerable number of common species. The latter include 34 in the profiles of the Koczała 1 and Miastko 2 boreholes, 37 in those of the Koczała 1 and Chojnice 5 boreholes, 23 in those of the Chojnice 5 and Miastko 2 boreholes and, finally, 23 species common to all the three profiles (Table 3). This may suggest an equal age of deposits from the depth of 4,691.7 to 4,390.1 m of the Chojnice 5 borehole, from the depth of 3,119 to 2,938.3 m of the Koczała 1 borehole and from the depth of 2,085 to 2,080 m from the Miastko 2 borehole.

A total number of all species occurring in the parts of profiles discussed amounts to 87. This assemblage includes 43 species also known from other areas of Europe. The occurrence and stratigraphic ranges of those forms are given in Table 4. Twenty-one of them are known only from the Upper Givetian, 19 from the Upper Givetian and older deposits and only 3 species of this assemblage, that is, *Urftella adamczaki* BECKER, *Microcheilinella clava* (KEGEL) and *M. fecunda* (PŘIBYL and ŠNAJDR) did not so far been mentioned from younger deposits than the Lower or Middle Givetian. The whole assemblage studied indicates, therefore, the Upper Givetian age, since it displays a decisive predominance of the species known in other areas from the deposits of that age. Amounting to a total of 40, those species allow one to correlate the Givetian deposits of Western Pomerania with those of Southern Poland and adjacent count-

ries (Table 5). The largest number of common species (26) are situated in the deposits of Staro-oskol horizon of the central and south-eastern regions of the East-European Platform, considered to be of the Upper Givetian age. Nine common species occur in the Upper Givetian Pelcha Beds, Volhynia, USSR. A total number of 21 species known from the Upper Givetian (the Starooskol horizon and its time equivalents) and two species known from the Lower Givetian (the Afonin horizon) deposits of the East-European Platform were identified in the Upper Givetian deposits of Western Pomerania.

The Holy Cross Mountains in central Poland are the area, nearest to Pomerania, in which the Middle Devonian ostracods were already studied (ADAMCZAK 1968, 1976; OLEMPSKA 1979). In the Upper Givetian ostracod assemblage of Pomerania, there occur 23 species common also for the assemblages of the Holy Cross Mts., including the following 13 species which occur in the Upper Givetian *Stringocephalus burtini* Beds of the Kielce Region: *Sulcatiella olempskae* sp. n., *Obotritia eifeliensis* ADAMCZAK, *Amphissites pulcher* POLENOVA, *Fellerites tuimazensis* (ROZHDESTVENSKAYA), *Microcheilinella mandelstami* POLENOVA, *Bairdiocypris vastus* POLENOVA, *Bairdia hexagona* POLENOVA, *B. paffrathensis* KUMMEROW, *B. plicatula* POLENOVA, *Fabalicypris holushurmensis* (POLENOVA), *Samarella crassa* POLENOVA, *Marginia syzranensis* POLENOVA and gen. et sp. indet. (Table 4).

In the Łysogóry Region of the Holy Cross Mts., there occur, on the other hand, 11 species common also to Pomerania, 4 of which, that is, *Obotritia eifeliensis* ADAMCZAK, *Poloniella trisinuata* (VAN PELT), *P. tertia* KRÖMMELBEIN and *Microcheilinella fecunda* (PIŘBYL and ŠNAJDR) occur in the Grzegorzowice Formation and 8 of which, that is, *Parabolbinella anteaculeata* ADAMCZAK, *Hollinella antri* ADAMCZAK, *H. sufflata* (BECKER), *Poloniella adamczaki* sp. n., *Polyzygia symmetrica* GÜRICH, *Ropolonellus kettneri* (POKORNÝ), *Microcheillinella clava* (KEGEL) and *M. fecunda* (PŘIBYL and ŠNAJDR) — in the Skały Formation. The deposits of the Grzegorzowice Formation are generally assigned to the Eifelian, while the age of the Skały Formation has not so far been determined accurately. According to ADAMCZAK (1968, 1976), the whole assemblage he described from the Skały Formation should be considered as Eifelian. His supposition is grounded on the fact that this ostracod assemblage displays the presence of species known from the Eifel Mountains from deposits which are exclusively of Eifelian age. In his opinion, their age is also confirmed here by several species of brachiopods known only from the Eifelian, but, at the same time, he does not preclude the possibility that the uppermost parts of the Skały Formation are of the lowermost Givetian age (ADAMCZAK 1976). Twenty-five out of the 54 species cited by ADAMCZAK (1976) from the Skały Formation are known at present from other areas than the Holy Cross Mts. In the uppermost part of this formation named by ADAMCZAK (1976) as the *H. antri — P. reticulata* Zone of the Skały and Świętomarz-Śniadka profiles and, in his opinion, corresponding to complexes XIV—XIX and XXI—XXIV (PAJCHLOWA 1957), there occur 21 ostracod species also known from other areas such as the Eifel Mountains and Rhenish Slate Mountains, the Bohemian Massif, the East-European Platform, and finally, West Pomerania. Only 4 species, *Tetrasacculus semireticulatus* ADAMCZAK, *Bufina europaea* PŘIBYL, *Ponderodictya aggeriana* GROOS and *Bairdiocypris biesenbachii* KRÖMMELBEIN have never been mentioned from younger deposits than the Eifelian. The remaining 17 of them have been cited from both the Eifelian and Givetian (10 species) or only from the Givetian (7 species). Five out of these 17 species have their stratigraphic range limited only to the lowermost Givetian, 5 — to the Middle Givetian and 7 (including one known also from the Frasnian) reach the uppermost Givetian. The above proportions of typically Eifelian to Givetian forms (4:17) are in the author's opinion the evidence that the upper parts of the Skały Formation are of Givetian age.

Relatively many (18) species of the Givetian ostracod assemblages of Pomerania are also known from the Middle Devonian, mostly Givetian, deposits of the Eifel Mts. and the Rhenish Slate Mts. (Table 4). Forms whose stratigraphic range reaches the uppermost Givetian (that

Table 3

Comparison of the occurrences of ostracods in the columns studied

| OSTRACODA \ borehole / age / depth (in m) / number of specimens | number of specimens | MIAST-KO 2 | CHOJNICE 5 | | | | | KOCZAŁA 1 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Givetian | Givetian | | | Frasnian | | Givetian | | | Frasnian | | |
| | | Upper | Upper | | | Lower | Middle | Upper | | | Middle | ?Upper | |
| | | 2085.0–2080.0 | 4691.7–4683.7 | 4545.1–4482.0 | 4436.4–4398.2 | 4002.4–3999.6 | 3790.6–3685.4 | 3119.0–3041.8 | 3019.0–2990.3 | 2984.6–2938.3 | 2734.0–2705–0 | 2636.6–2633.3 | |
| PALAEOCOPIDA | | | | | | | | | | | | | |
| *Pribylites* (*Gravia*) sp. 1 | 1 | | | | | | | | | + | | | |
| *P.* (*Paraprybylites*) *hanaicus* POKORNÝ | 150 | + | | + | | | | + | | + | | | |
| *Selebratina accommoda* sp. n. | 2 | + | | | | | | | | | | | |
| *Russia cingulata* (KUMMEROW) | 2 | | | | | | | | | + | | | |
| *R. apicata sp.* n. | 36 | | | + | | | | | | | | | |
| *Urfiella adamczaki* BECKER | 31 | | | + | | | | + | + | + | | | |
| *Sulcatiella olempskae* sp. n. | 11 | + | + | | | | | | | | | | |
| *Hanaites mirabilis* (POLENOVA) | 2 | + | | + | | | | | | | | | |
| *Parabolbinella anteaculeata* ADAMCZAK | 16 | + | | + | | | | | | + | | | |
| *Hollinella antri* ADAMCZAK | 6 | + | | | | | | | | + | | | |
| *H. sufflata* (BECKER) | 1 | | | | + | | | | | | | | |
| *Adelphobolbina rectangularis* sp. n. | 5 | | | | | | + | | | | + | | |
| *Kozlowskiella moderabilis* sp. n. | 19 | | | | | | | | | + | | | |
| *Illativella* sp. 1 | 4 | | | | | | | | | | | + | |
| *Aechmina* sp. | 1 | | | | | | | | | + | | | |
| *Amphissites irinae* GLEB. et ZASP. *in*: EGOROV | 1 | | | | | | | | | | + | | |
| *A. pulcher* POLENOVA | 6 | + | | | | | | | | | | | |
| *A. remesi* POKORNÝ | 2 | | | | | | | | | + | | | |
| *A. multicarinatus* sp. n. | 100 | + | | | | | | | | | | | |
| *Refrathella* sp. 1 | 2 | | | | | | | | | + | | | |
| *Moorites givetianus* (ROZHDESTVENSKAYA) | 5 | | | | | | | | | + | | | |
| *M. koczalensis* sp. n. | 50 | | | | | | | | | + | | | |
| *Balantoides brauni* BECKER | 10 | | | | | | + | | | | + | | |
| *B. parvulus* (POLENOVA) | 1550 | + | + | + | + | | | + | + | + | | | |
| *B. keslingi* sp. n. | 6 | | | | + | | | + | + | + | | | |
| *Nezamyslia bicornuta* sp. n. | 1 | + | | | | | | | | | | | |
| *Obotritia eifeliensis* ADAMCZAK | 2 | + | | | | | | | | + | | | |
| *Fellerites tuimazensis* (ROZHDESTVENSKAYA) | 20 | + | | | | | | | | | | | |
| *Evlanovia* sp. 1 | 1 | + | | | | | | | | | | | |
| *Coeloenellina pomeranica* sp. n. | 120 | + | | + | + | | | + | | + | | | |
| PLATYCOPIDA | | | | | | | | | | | | | |
| *Poloniella tertia* KRÖMMELBEIN | 61 | + | + | + | + | | | | + | + | | | |
| *P. trisinuata* (VAN PELT) | 100 | + | + | + | + | | | + | + | + | | | |
| *P. adamczaki* sp. n. | 36 | + | + | | | | | | + | + | | | |
| *P. regularis* sp. n. | 100 | + | | + | | | | | | + | | | |
| *P.* sp. 1 | 1 | | | | | | | + | | | | | |
| *P.* sp. 2 | 1 | + | | | | | | | | | | | |
| *Uchtovia materni* BECKER | 2 | | | | | | + | | | | | | |
| *U. refrathensis* (KRÖMMELBEIN) | 76 | | | + | | | | | | + | | | |
| *U. rozhdestvenskayae* sp. n. | 77 | + | | + | | | | | | + | | | |
| *U.* sp. 1 | 5 | | | | | | | + | | | | | |
| *Evlanella caduca* sp. n. | 5 | | | | | | | | | + | | | |
| *Cavellina parvula* sp. n. | 2300 | + | + | + | + | | | + | + | + | | | |
| *C. subegorovi* sp. n. | 250 | | | + | + | | | | + | | | | |
| *C. sublongula* sp. n. | 65 | | + | + | + | | | + | + | | | | |
| *Mennerella convexoventralis* sp. n. | 50 | | | | | | | | | | | + | |
| *Semilukiella polita* sp. n. | 14 | | | + | + | | | | | + | | | |
| METACOPIDA | | | | | | | | | | | | | |
| *Polyzygia symmetrica* GÜRICH | 15 | + | | + | + | | | | | + | | | |
| *Favulella spissa* sp. n. | 450 | | | | | | + | | | | + | | |
| *Quasillites quasillitiformis* (POLENOVA) | 72 | | + | + | + | | | | | | | | |
| *Jenningsina cavernosa* (POLENOVA) | 44 | + | | + | + | | | | + | + | | | |
| *Svantovites magnei* BECKER | 11 | | | | | | | | | | | | |
| *Jefina obtusa* sp. n. | 31 | | | + | + | | | | | | | | |
| *Eriella rostrata* sp. n. | 10 | | | | | | | + | | | + | | |
| *Ponderodictya querula* sp. n. | 75 | | | | | | | | | | | | |
| *Graphiadactyllis facetus* sp. n. | 50 | + | | | | | | | | + | | | |
| *G. indotatus* sp. n. | 50 | + | | | | | | | | + | | | |
| *Ropolonellus kettneri* (POKORNÝ) | 80 | + | | + | | | | | | + | | | |
| *R.* sp. 1 | 3 | | | | | | + | | | | | | |
| *Bufina colliquefacta* sp. n. | 33 | | + | + | + | | | | | | | | |
| *B. intermedia* sp. n. | 50 | | | + | | | | + | + | + | | | |
| *B. salva* sp. n. | 15 | | | + | + | | | | | | | | |
| *Cytherellina* sp. 1 | 29 | + | | | + | | | | | + | | | |
| *Incisurella* sp. 1 | 1 | | | | + | | | | | | | | |
| *Gerbeckites pomeranicus* gen. et sp. n. | 27 | + | | | | | | + | + | + | | | |
| PODOCOPIDA | | | | | | | | | | | | | |
| *Microcheilinella clava* (KEGEL) | 12 | | | | | | | + | | | | | |
| *M. fecunda* (PŘIBYL et ŠNAJDR) | 67 | | | + | | | | | | + | | | |
| *M. mandelstami* POLENOVA | 700 | + | | + | | | | + | | + | | | |
| *M. insignita* sp. n. | 10 | + | | | | | | | | | | | |
| *Ampuloides verrucosa* POLENOVA | 17 | + | | | | | | | | + | | | |
| *Bairdiocypris vastus* POLENOVA | 50 | + | | | | | | | | | | | |
| *B. deliberatus* sp. n. | 9 | | | + | | | | + | | + | | | |
| *B. phaseoliformis* sp. n. | 13 | | | | | | | | | + | | | |
| *Healdianella obliqua* (KUMMEROW) | 185 | + | | + | + | | | + | + | + | | | |
| *H. resima* (ROZHDESTVENSKAYA) | 92 | + | | + | + | | | + | + | + | | | |
| *H.* sp. 1 | 6 | | | | | | | + | | + | | | |
| *Orthocypris perlonga* KUMMEROW | 54 | + | + | + | + | | | + | | + | | | |
| *O. kummerowi* sp. n. | 13 | | | | | | | + | | + | | | |
| *O.* sp. 1 | 1 | | | | | | + | | | | | | |
| *Baschkirina miastkoensis* sp. n. | 4 | + | | | | | | | | | | | |
| *Rectella telleri* sp. n. | 200 | + | | | | | | | | | | | |
| *Bairdia aperta* POLENOVA | 16 | | | + | | | | | | + | | | |
| *B. hexagona* POLENOVA | 56 | + | | + | + | | | | | + | | | |
| *B. paffrathensis* KUMMEROW | 75 | | | + | | | | + | | + | | | |
| *B. plicatula* POLENOVA | 300 | + | | | | | | | | + | | | |
| *B. volatilis* ROZHDESTVENSKAYA | 65 | | | + | | | | | + | + | | | |
| *B. chojnicensis* sp. n. | 5 | | | + | | | | | | | | | |
| *B.* sp. 1 | 1 | | | | | | | | | | + | | |
| *B.* ? sp. 2 | 4 | - | | | | | | + | | | | | |
| *Bairdiacypris* sp. 1 | 2 | | | | | + | | | | | + | | |
| *Fabalicypris holushurmensis* (POLENOVA) | 29 | + | | + | | | | | | + | | | |
| *Acratia integra* ROZHDESTVENSKAYA | 13 | + | | | | | | | | + | | | |
| *Acanthoscapha* vel *Beecherella* sp. 1 | 1 | + | | | | | | | | | | | |
| *Schneideria groosae* BECKER | 4 | | | | | | + | | | | | | |
| *S. schigrovskiensis* (POLENOVA) | 15 | | | | | + | | | | | | | |
| *S.* sp. 1 | 16 | | | | | | | + | | + | | | |
| *Pseudomonoceratina* ex gr. *sublimis* (POLENOVA) | 12 | | | + | + | | | | | + | | | |
| *Triebacythere* ? *mesodevonica* sp. n. | 100 | + | | + | + | | | | + | + | | | |
| *Samarella crassa* POLENOVA | 15 | | | + | | | | | | + | | | |
| ?PODOCOPIDA | | | | | | | | | | | | | |
| *Marginia syzranensis* POLENOVA | 40 | + | | + | | | | | | + | | | |
| MYODOCOPIDA | | | | | | | | | | | | | |
| *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH) | 4 | | | | | | + | | | | | | |
| INCERTAE ORDINIS | | | | | | | | | | | | | |
| *Buregia curta* sp. n. | 20 | | | | | | | | | + | | | |
| *B. groosae* sp. n. | 550 | | | | | | | | | + | | | |
| Gen. et sp. indet. | 1 | | | + | | | | | | | | | |

Table 4

Distribution and stratigraphic ranges of Devonian ostracods in Western Pomerania and other areas

| | ALGERIA (SAHARA) Le Fevre 1971 | SPAIN Michel 1973 | BELGIUM and FRANCE (ARDENNES) Becker 1974*b*, Becker and Bless 1974*a*, Casier1975, Lethiers 1972, Magne 1965 | WEST GERMANY (RHENISH MASSIF) Becker 1969*a*, Becker and Bless 1974*b*, Groos 1969 | ČSR Pokorny 1950, Přibyl and Šnajdr 1950 | POLAND Holy Cross Mts Łysogóry region Adamczak 1976 | POLAND Holy Cross Mts Kielce region Olempska 1979 | POLAND WEST POMERANIA | EAST EUROPEAN PLATFORM Gurevich 1973, Polenova 1952, 1955, Rozhdestvenskaya 1962 VOLHYNIA | EAST EUROPEAN PLATFORM Gurevich 1973, Polenova 1952, 1955, Rozhdestvenskaya 1962 CENTRAL PARTS & BASHKIRIA |
|---|---|---|---|---|---|---|---|---|---|---|
| | U. Eifelian<br>Givetian | Eifelian<br>Givetian<br>Frasninan | Lower<br>Middle<br>Upper<br>Givetian<br>F1 Fromelennes<br>F2 Frasnes<br>F3 Matagne<br>Frasnian<br>Fala Lower<br>Famennian | Ahbach<br>Eifelian<br>Loogh-Cürten<br>Spickberg-Roder<br>Kerpen-Bolsdorf<br>Givetian<br>O. Plattenkalk<br>Refrath<br>Tonschiefer<br>Frasnian<br>Nehden<br>L. Famennian | Choteč Lmst<br>Eifelian<br>Red Coral Lmst.<br>Givetian | Eifelian — Givetian<br>B. cultrijugati -B. lamellaris<br>A. magna<br>P. abnormis<br>K. kozlowskii -P. trigonata<br>H. antri -P. reticulata<br>Grzegorzowice fm<br>Skały Fm | U. Givetian<br>Stringocephalus burtini Beds<br>Frasnian<br>Famennian | U. Givetian<br>Frasnian<br>Lower<br>Middle<br>?Upper<br>L. Famennian | U. Givetian<br>Pelcha | Givetian<br>L. Frasnian<br>Afonin<br>Starooskol<br>Kynov |
| *Pribylites (Parapribylites) hanaicus* Pokorny | | | | + + + | + | | | + | | |
| *Russia cingulata* (Kummerow) | | | | + + + | | | | + | | |
| *Urftella adamczaki* Becker | | | | + | | | | + | | |
| *Sulcatiella olempskae* sp. n. | | | | | | | + | + | | |
| *Hanaites mirabilis* (Polenova) | | | | | | | | + | | + + |
| *Parabolbinella anteaculeata* Adamczak | | | | + | | | | + | | |
| *Hollinella antri* Adamczak | | | | + + | | | | + | | |
| *H. sufflata* (Becker) | | | | + + + | | | | + | | |
| *Obotritia eifeliensis* Adamczak | | | | + + + + | | + + + | + | + | | + |
| *Amphissites pulcher* Polenova | | | | | | | + | + | + | + |
| *A. remesi* Pokorny | | | | + + | + | | | + | | |
| *Moorites givetianus* (Rozhdestvenskaya) | | | | | | | | + | + | + |
| *Balantoides parvulus* (Polenova) | | | | | | | | + | + | + |
| *Fellerites tuimazensis* (Rozhdestvenskaya) | | | | | | | + | + | | + |
| *Poloniella trisinuata* (Van Pelt) | | | | | | + + + | | + | + | + |
| *P. adamczaki* sp. n. | | | | | | + | | + | | + |
| *P. tertia* Krömmelbein | | | | + + + + | | + + + | | + | + | |
| *Uchtovia refrathensis* (Krömmelbein) | | | | + + + + | | | | + | | + |
| *U. rozhdestvenskayae* sp. n. | | | | | | | | + | | + |
| *Polyzygia symmetrica* Gürich | + + | + + + | + | + + + + | | + + | | + | | + |
| *Quasillites quasillitiformis* (Polenova) | | | | | | | | + | + | + |
| *Jenningsina cavernosa* (Polenova) | | | | | | | | + | + | + |
| *Ropolonellus kettneri* (Pokorný) | | | | + + | + | + + | | + | | + |
| *Gerbeckites pomeranicus* gen. et sp. n. | | | | | | | | + | | + |
| *Microcheilinella clava* (Kegel) | | | | + + | | + + + | | + | | |
| *M. fecunda* (Přibyl et Šnajdr) | | | | | + | + + | | + | | |
| *M. mandelstami* Polenova | | | | | | | + | + | | + + |
| *Ampuloides verrucosa* Polenova | | | | | | | | + | | + |
| *Bairdiocypris vastus* Polenova | | | | | | | + | + | + | + |
| *Healdianella obliqua* (Kummerow) | | | | + + + + | | | | + | | |
| *H. resima* (Rozhdestvenskaya) | | | | | | | | + | + | + |
| *Orthocypris perlonga* Kummerow | + | | | + + + | | | | + | | |
| *Bairdia aperta* Polenova | | | | | | | | + | | + |
| *B. hexagona* Polenova | | | | | | | + | + | | + + |
| *B. paffrathensis* Kummerow | | | + | + + + + + | | | + | + | | + |
| *B. plicatula* Polenova | | | | + + | | | + | + | | + + |
| *B. volatilis* Rozhdestvenskaya | | | | | | | | + | | + |
| *Fabalicypris holushurmensis* (Polenova) | | | | + + | | | + | + | | + |
| *Acratia integra* Rozhdestvenskaya | | | | | | | | + | | + |
| *Pseudomonoceratina* ex. gr. *sublimis* Polenova | | | | | | | | + | | + |
| *Samarella crassa* Polenova | | | | | | | + | + | | + |
| *Marginia syzranensis* Polenova | | | | | | | + | + | | + |
| Gen. et sp. indet. | | | | | | | + | + | | |
| *Schneideria schigrovskiensis* (Polenova) | | | | | | | | + | | + |
| *Amphissites irinae* Gleb. et Zasp. *in* Egorov | | | + | | | | | + | | |
| *Balantoides brauni* (Becker) | | | | + | | | | + | | |
| *Uchtovia materni* Becker | | | + | | | | | + | | |
| *Svantovites magnei* Becker | | | + | | | | | + | | |
| *Schneideria groosae* Becker | | | + | | | | | + | | |
| *Entomozoe (Nehdentomis) tenera* (Gürich) | | | + | + + + + | | | + + | + | | |
| *Beyrichiacean* ostracode sp. 104 Becker | | | + | | | | | + | | |
| *Paegnium* sp. A Lethiers | | | + | | | | | + | | |
| *Entomoprimitia sandbergeri* (Matern) | | | + | + | | | | + | | |

is, up to the Kerpen Beds and Bolsdorf Beds of the Eifel Mts. and their time-equivalents from the Rhenish Slate Mts.) predominate among these species.

The uppermost Givetian deposits probably occur also above the depth of 4,398.2 m in the profile of the Chojnice 5 borehole, since the presence of the Frasnian (Lower) was documented in this profile only at the depth of 4,002.4 m. The boundary between the Middle and Upper Devonian runs, between those two depths, through terrigenous deposits with intercalations of sandy limestones and sandy dolomites occurring at the top. Unfortunately, due to a lack of paleontological documentation, its position cannot be determined precisely.

In the Koczała 1 borehole the Upper Givetian and Lower Frasnian and, possibly, also Middle Frasnian deposits occur in core depth between 2,938.3 and 2,734 m. Above 2,734 m there are already documented Middle Frasnian rocks.

And here, like in the profile of the Chojnice 5 borehole, despite a fairly proper sampling of the material, no fauna allowing one to localize the boundary between the Givetian and Frasnian terrigenous deposits could be found.

**The Frasnian**

Frasnian deposits in the profile of the Chojnice 5 borehole have been documented at the depth of 4,002.4—3,685.4 m; in the Koczała 1 borehole at the depth of 2,734—2,705 m and, with a certain reservation, of 2,636.6—2,633.3 m.

*Chojnice 5 borehole.* — Here the Frasnian ostracod assemblage, considerably smaller as compared to the Givetian, is represented only by 13 species (Tables 1 and 3).

A dozen or so carapaces of *Schneideria schigrovskiensis* (POLENOVA) and one carapace of *Bairdiacypris* sp. 1 were found at the depth of 4,002.4—3,999.6 m. The former of described species originated from the Lower Frasnian (Kynov Beds) of Bashkiria, USSR (POLENOVA 1955) suggests the Lower Frasnian age of this sector of the profile.

A somewhat more abundant assemblage composed of *Balantoides brauni* (BECKER), *Ropolonellus* sp. 1, *Orthocypris* sp. 1, *Uchtovia materni* BECKER and *Favulella spissa* sp. n. occurs at the depth of 3,790.6—3,780.3 m.

In the depth interval 3,688.2—3,685.4 m, in addition to the first three species named above, there occur *Adelphobolbina rectangularis* sp., n., *Svantovites magnei* BECKER, *Schneideria groosae* BECKER and *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH). *Balantoides brauni* (BECKER) is known from the Refrath Beds in the Rhine Massif (BECKER 1968) which correspond to the lower part of the Middle Frasnian, while *Uchtovia materni* BECKER, *Schneideria groosae* BECKER and *Svantovites magnei* BECKER occurred in the Middle Frasnian (the Frasne Formation) in the Dinant Basin (BECKER 1971 *b*). The latter form was also cited by LETHIERS (1974) from Calcaire de Ferque of the Namur Basin (Middle Frasnian). Those four species specify, in the profile of the Chojnice 5 borehole, the Middle Frasnian age of the sector at a depth of 3,688.2—3,685.4 m. *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH), the only entomozoid occurring here, known from the deposits ranging between the lowermost Frasnian (from the *cicatricosa-torleyi* interzone, according to RABIEN'S division of 1954) and the Lower Famennian (the *Entomozoe* Zone) is insufficient for any precise determination of the age.

Between the depths of 3,683.4 and 3,460.8 m, where the documented Lower Famennian begins, there occurs an unsampled series of probably clayey (logging data) deposits of the Middle (?) and Upper Frasnian and Lower (?) Famennian. Within the limits of this complex of deposits about 220 m thick, there probably runs the Frasnian-Famennian boundary.

*Koczala 1 borehole.* — The Frasnian ostracod assemblage was identified in samples coming from the depths of 2,734—2,727.8 m and 2,710.6—2,705 m (Tables 2 and 3). The following species were identified: *Balantoides brauni* (BECKER), *Adelphobolbina rectangularis* sp. n., *Amphissites irinae* GLEB. et ZASP. *in*: EGOROV, *Favulella spissa* sp. n., *Ponderodictya querula* sp. n. and

*Bairdia* sp. 1. *Balantoides brauni* (BECKER), discussed before which occurs here, as well as *Adelphobolbina rectangularis* sp. n. and *Favulella spissa* sp. n. found in the sector of Chojnice 5 borehole considered as Middle Frasnian also indicate that the interval of the profile of the Koczała 1 borehole discussed is of Middle Frasnian age.

Due to the occurrence of only two new species *Mennerella convexoventralis* sp. n. and *Illativella* sp. 1, the age of the deposits of the next core section from the depth of 2,636.6—2,633.3 m cannot be determined accurately. The range of the genus *Mennerella* EGOROV is limited to the Frasnian only (EGOROV 1950; POLENOVA 1952; ROZHDESTVENSKAYA 1972). On this basis, one can assume that the deposits coming from the depth of 2,636.6—2,633.3 m belong still to the Frasnian, perhaps to its upper part. This probability is confirmed by the fact that the deposits belonging to Famennian already begin occurring at the depth of 2,532 m, that is, about 100 m higher up. Thus, the deposits in transition between the Frasnian and Famennian can be expected between depths 2,633.5 and 2,532 m.

**The Famennian**

In the profile of the Chojnice 5 borehole, the deposits of this age were identified at the depth of 3,460.8—3,457.6 m and in that of the Koczała 1 borehole — at the depth of 2,532—2,527 m.

*Chojnice 5 borehole.* — The Famennian age of the deposits in this core is documented by two species: Beyrichiacean ostracode sp. 104 BECKER and *Paegnium* sp. A LETHIERS, found at the depth of 3,460.8—3,457.6 m, known from the Lower Famennian (Fa 1) and lower part of the Upper Famennian (Fa 2) of the Dinant Basin (BECKER and BLESS 1974*a*; LETHIERS 1972). At this depth, also the conodonts (identified by MATYJA) represented by *Palmatolepis* cf. *tenuipunctata* SANNEMANN and *P. quadrantinodosolobata* SANNEMANN vel *P. triangularis* SANNEMANN transitional to *P. quadrantinodosolobata* were found. They come from the *P. triangularis* to *P. crepida* zones (ZIEGLER 1971, 1973) and, therefore, indicate the Lower Famennian (Fa 1a) age of these deposits.

An assemblage of a dozen or so new and not yet described species, including also *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH) occurs above the depth of 3,457.6—3,255.1 m.

*Koczała 1 borehole.* — In this profile, the Famennian age of the deposits is documented at the depth of 2,532—2,527 m by the presence of *Entomoprimitia sandbergeri* (MATERN) know from the Lower Famennian (the *Entomozoe* Zone) of the Ardennes and the Rhenish Slate Mountains (BECKER and BLESS 1974*b*). In overlying deposits, that is, up to the depth of 2,202.3 m, there occurs an ostracod assemblage similar to that found in the Famennian deposits of the profile of the Chojnice 5 borehole which contains a dozen or so common species.

The two Famennian profiles of the Chojnice 5 borehole (about 235 m in thickness) and Koczała 1 borehole (about 330 m in thickness) probably belong as a whole to the Lower Famennian.

## STRATIGRAPHIC CORRELATION OF THE DEVONIAN OF THE ENVIRONS OF CHOJNICE, WITH REMARKS ON FACIES DEVELOPMENT

An informal lithostratigraphic division of the Devonian of Pomerania was presented by R. DADLEZ (1978), who separated several lithological complexes occurring in various drill profiles of the Devonian deposits in Pomerania and correlated them with each other. Due to the scarcity of paleontological data, the above mentioned author's correlation arouses certain doubts. A new light has been thrown on the age of the Middle and Upper Devonian litholo-

Table 5

Correlation of the Middle to Upper Devonian deposits in Western Pomerania with Central Poland and other regions of Europe

| SYSTEM | SERIES | STAGE | AMMONOID ZONES | CONODONT ZONES House and Ziegler 1977 | OSTRACOD ZONES Rabien 1954, 1960 | ARDENNES Becker and Bless 1974*a, b* | RHENISH MASSIF Becker and Bless 1974*b*, Groos 1969 | POLAND: Holy Cross Mts. ŁYSOGÓRY Region Adamczak 1976 | POLAND: Holy Cross Mts. KIELCE Region Olempska 1979 | POLAND: WEST POMERANIA | EAST-EUROPEAN PLATFORM Polenova 1952, 1953 Rozhdestvenskaya 1962 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DEVONIAN | UPPER | FAMENNIAN | *CHEILOCERAS* | *triangularis* | *Entomozoe* | Fa1a | no data | no data | no data | Lower Famennian | no data |
| | | FRASNIAN | *MANTICOCERAS* | *gigas* | *variostriata* | F3 Matagne | Tonschiefer | | | ?U. Frasnian | |
| | | | | *Anc. triangularis* | | | | | | | |
| | | | | | *cicatricosa* | F2 Frasnes | Refrath | | | | |
| | | | | *assymetricus* | *cicatricosa-torleyi* | | | | | | |
| | | | | *hermanni cristatus* | *torleyi* | F1 Fromelennes | Ob. Plattenkalk | | | M. Frasnian | Kynov |
| | | | | | | | | | | L. Frasnian | |
| | MIDDLE | GIVETIAN | *MAENIOCERAS* | *varcus* | ostracode zones not established | Givet | Bolsdorf Kerpen Rodert | -?-?-?-?-?-? Skały | Stringocephalus Beds | Upper Givetian | Starooskol |

gical complexes of the environs of Chojnice by the results of biostratigraphic studies based on the analyses of ostracod assemblages in the profiles of the Chojnice 5, Koczała 1 and Miastko 2 boreholes.

Tuchola and Silno complexes distinguished by R. DADLEZ (1978) in the profile of the Chojnice 5 borehole correspond in age to the Sianów complex in the profile of the Koczała 1 and Miastko 2 boreholes. The Upper Givetian age of these deposits is documented by ostracods. Overlying the Silno complex in the profile of the Chojnice 5 borehole, the sandy Chojnice complex dated indirectly, through the age of under-and overlying deposits, as probably Upper Givetian — Lower Frasnian, corresponds only to the part (lower) of the sandy Wyszebórz complex in the profile of the Koczała 1 borehole which in turn is dated indirectly to be Upper Givetian (?) — Middle Frasnian. If the basal parts of the sandy complexes in the profiles of the Chojnice 5 and Koczała 1 boreholes may be very roughly estimated as isochronous (in the two profiles the beginning of their sedimentation falls to the uppermost Givetian), their upper limit are distinctly diachronous (the Givetian-Frasnian boundary in the profile of the Chojnice 5 borehole and the Middle Frasnian in the profile of the Koczała 1 borehole). The upper part of the Wyszebórz complex and the Koczała complex in the profile of the Koczała 1 borehole correspond in a large extent to the lower marly subcomplex of Człuchów complex in the profile of the Chojnice 5 borehole. The age of the complex of Koczała is determined by the ostracods as Middle (?) to Upper Frasnian. Under these circumstances, the appearance of clayey deposits of the Człuchów complex in the profiles of the Chojnice 5 and Koczała 1 boreholes is distinctly diachronous. In the profile of the Chojnice 5 borehole, the base of this complex falls to the Lower Frasnian deposits, while in the profile of the Koczała 1 borehole to the Upper Frasnian ones. On the other hand, the limit of the lower marly subcomplex and of the transitional subcomplex of the Człuchów complex in the two profiles under study is approximately isochronous and falls within the limits of deposits dated by ostracods and, in part, by conodonts to be Lower Famennian (Fa 1a). The transitional subcomplex of the profile of the Chojnice 5 borehole may be correlated with that of the profile of the Koczała 1 borehole, since both of them are of Lower Famennian age as indicated by the occurrence of ostracods.

Sixty km apart, the Chojnice 5 and Koczała 1 boreholes are situated in two elevated structural zones (R. DADLEZ 1974), the former in the Jamno-Miastko and the latter in the Człuchów-Chojnice zone. The Upper Givetian deposits, documented by the presence of ostracods, are developed in the two profiles in a similar manner, forming dark-gray mudstones and siltstones intercalating each other, with subordinate bands of fine-grained sandstones and sandy or marly limestones. The ostracods occurring in the clayey and marly intercalations represent assemblages which are not only isochronous, but also quantitatively and qualitatively similar to each other. The good state of their preservation, as manifested by a pronounced predominance of entire carapaces with intact ornamentation and the presence of both adult and juvenile specimens, indicates that they were buried near their dwelling area. These are typical, thick-shelled benthonic forms indicating that the sedimentation took place in a shallow, near-shore part of a marine basin whose depth seems to be approximately 50 to 100 m, that is, the same as that characteristic for biotopes 5 and 6 (zones of solitary corals and brachiopods), distinguished by STRUVE (1963) in the Eifel Mts. and confirmed by BECKER'S (1969) studies on ostracods. The deposits of this type in the profile of the Chojnice 5 borehole are about 400 m, and in that of the Koczała 1 borehole — about 200 m thick. Above them, the sedimentation of very thick complexes of clastic deposits, composed mostly of fine-grained sandstones intercalated by mudstones and siltstones begins in the Upper Givetian in both the Człuchów-Chojnice and Jamno-Miastko zone. In the profile of the Chojnice 5 borehole, this complex includes a sector about 300 m thick covered with dark Lower Frasnian siltstones.

A distinct change in sedimentation is observed within the zones mentioned above, at the turn of the Middle to Upper Devonian. Part of the basin including Człuchów-Chojnice zone

was then a subject to a considerable deepening and was fairly distant from the shore, as indicated by the presence of dark siltstones with the remains of nectonic fauna (cephalopods). In the Jamno-Miastko zone, on the other hand, the sedimentation of shallow-water and at first (Upper Givetian-Middle Frasnian) clastic deposits, with a predominance of fine-grained sandstones (in the profile of the Koczała 1 borehole, this complex is about 200 m thick) took place up to the Upper Frasnian and later (Middle Frasnian-Upper Frasnian) it included limestones with intercalations of dolomites, conglomerates and intraformational breccias. The profile of the latter complex, 80 m thick (Koczała 1 borehole), contains, in addition to ostracods, numerous Stromatoporoidea, Tabulata and solitary Tetracoralla. It was probably formed in a shallow-water zone, marked by strong waving and diminishing influx of terrigenous material.

The stabilization of sedimentary conditions in the environs of Chojnice took place as late as in the Upper Frasnian, as indicates the fact that a clayey facies formed in the neritic zone of shelf was then predominant in the whole area.

Facies differences between the Chojnice-Człuchów and the Jamno-Miastko zones, which occurred in the Lower, Middle and, partly, Upper Frasnian, were the result of an increased distance between the former zone and the shore and its only slightly larger depth. This statement is confirmed by the fact that similar assemblages of benthonic ostracods occur in variously developed Middle Frasnian deposits of the profiles of the Chojnice 5 and Koczała 1 boreholes.

In the Lower Famennian deposits of the Chojnice 5 and Koczała 1 boreholes, there appears, in clayey sediments, at first calcareous intercalations and, subsequently, nodular limestones with an abundant fauna of benthonic brachiopods and ostracods, an evidence of the shallowing of this part of the basin.

The Devonian deposits of the environs of Chojnice are of exceptional thickness. In the profile of the Koczała 1 borehole they reach about 1,000 m and in that of the Chojnice 5 borehole — about 2,000 m. Considerable differences in thickness occurred during the period from the Upper Givetian up to the Middle Frasnian when in the profile of the Koczała 1 borehole an accumulation of sediment amounting to about 400 m and in that of the Chojnice 5 borehole — to about 1,100 m can be recorded. In the Upper Frasnian and Lower Famennian, the two boreholes reveal less discrepant thicknesses, for example, about 600 m at Koczała 1 and about 800 m at Chojnice 5.

In the light of the facts presented above, the separation of two lithofacial zones (PAJCHLOWA 1971) for the entire Devonian of this region seems to be insufficiently justified. For, such zones are limited in time only to the Lower, Middle and maybe partly, Upper Frasnian as well. Uniform, although somewhat different conditions are observed in the entire Koszalin-Chojnice zone in the Upper Givetian and Lower Famennian. In regard to the Lower Givetian, Eifelian and (?) Lower Devonian, there exist no data which could make possible the reconstruction of facies pattern of these stages in the western part of the Koszalin-Chojnice zone, provided, of course, that the sediments of that age were deposited here at all.

## PALEOECOLOGY OF THE UPPER GIVETIAN OSTRACODS OF NW POLAND

The assemblage of the Upper Givetian ostracods from the three boreholes of the environs of Chojnice here described may be considered as strongly differentiated. It is composed of 87 species of 52 genera and subgenera. Three species have been classified as *incertae ordinis* and the remaining 84 assigned to four orders. Among them, the most numerously represented are the Podocopida (30 species = 36 per cent) and Palaeocopida (26 species = 31 per cent). The orders Platycopida and Metacopida are represented by 14 species each (= 16.5 per cent).

The comparison of the taxonomic composition of this assemblage with those of other

assemblages known from the Middle Devonian of various areas could be interesting. Such a comparison was conducted by ADAMCZAK (1971 *a*) who analyzed the composition of various ostracod taxa in assemblages occurring in North Africa (the Sahara), the State of New York, the Eifel Mts., the Rhenish Slate Mts., Thuringia, the Holy Cross Mts., Poland, as well as central and eastern parts of the Russian Platform (Russian Platform I and II). His studies, supplemented by the observations of the material from Western Pomerania, Poland are graphically presented in figs. 3 to 5. As follows from the percentage of species assigned to the four orders mentioned above (fig. 3), the Eifel Mts. constitute an area most similar in this respect to Pomerania. On the other hand, as compared with the Holy Cross Mts., the Platycopida and Podocopida play a larger and the Palaeocopida and Metacopida a smaller role in the ostracod assemblage in Pomerania. In the case of the Rhenish Slate Mts., characteristic is in turn a much larger part of the Platycopida and a smaller part of the Podocopida than those observed in Pomerania.

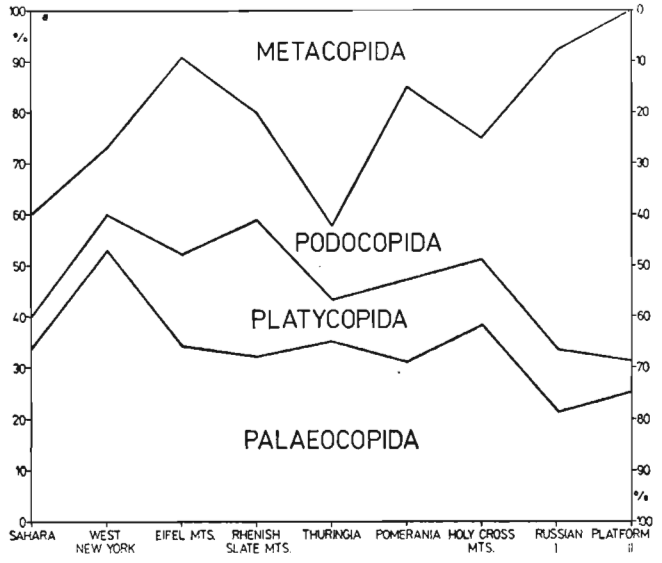



Fig. 3
Comparison of percentage distribution of 4 orders of Ostracoda in 9 regions (after ADAMCZAK 1971 *a* — supplemented).

A similar comparison was made by ADAMCZAK (1971 *a*) taking into account thirteen selected superfamilies (fig. 4). Comparing the assemblage of Pomerania with the Holy Cross Mts. and the Rhenish Slate Mts., the former is distinguished by a considerably smaller proportion of the Beyrichiacea and a larger one of the Kloedenellacea and Bairdiacea. Considerable discrepancies are observed as far as the number of individuals of particular species is concerned. Among 8,500 specimens from the Upper Givetian deposits excavated is Western Pomerania, a decisive majority, that is, about 80 per cent were carapaces and valves of only fourteen species (16 per cent of all taxa). The most numerously represented (by more than 100 specimens) are: *Pribylites* (*Parapribylites*) *hanaicus* POKORNÝ with 150 specimens; *Balantoides parvulus* (POLENOVA) — 1.550; *Amphissites multicarinatus* sp. n. — 100; *Coeloenellina pomeranica* sp. n. — 120 (Palaeocopida); *Poloniella trisinuata* (VAN PELT) — 100; *Poloniella regularis* sp. n. — 100; *Cavellina subegorovi* sp. n. — 250; *C. parvula* sp. n. — 2.300 (Platycopida); *Microcheilinella mandelstami* (POLENOVA) — 700; *Healdianella obliqua* (KUMMEROW) — 200; *Rectella telleri* sp. n. — 200; *Bairdia plicatula* POLENOVA — 300; *Triebacythere*? *mesodevonica* sp. n. — 100 (Podocopida); *Buregia groosae* sp. n. — 550 (*incertae ordinis*). Twenty five species (29 per cent) are represented by less than ten specimens each and the remaining 48 (55 per cent) occur in the number of several scores of specimens each.

Morphologically, the ostracod assemblage under study is predominated by ornamented form, in regard to the numbers of both species (55 = 63 per cent) and specimens (4,850 = 57 per cent). Among the ornamented forms, most species (33) are characterized by a coarse ornamentation composed of lobes, grooves, vela, etc. Species marked by a fine ornamentation composed of fine nodes, single spines, striae, reticulation, etc. constitute the minority. In regard to the part of those two most generally determined morphological types, the ostracod assemblage of Pomerania is almost identical with the Middle Devonian assemblage from the Eifel Mts. (fig. 5). The Rhenish Slate Mts. are marked by a considerably smaller and the Holy Cross Mts. by a somewhat larger amount of the ornamented species.

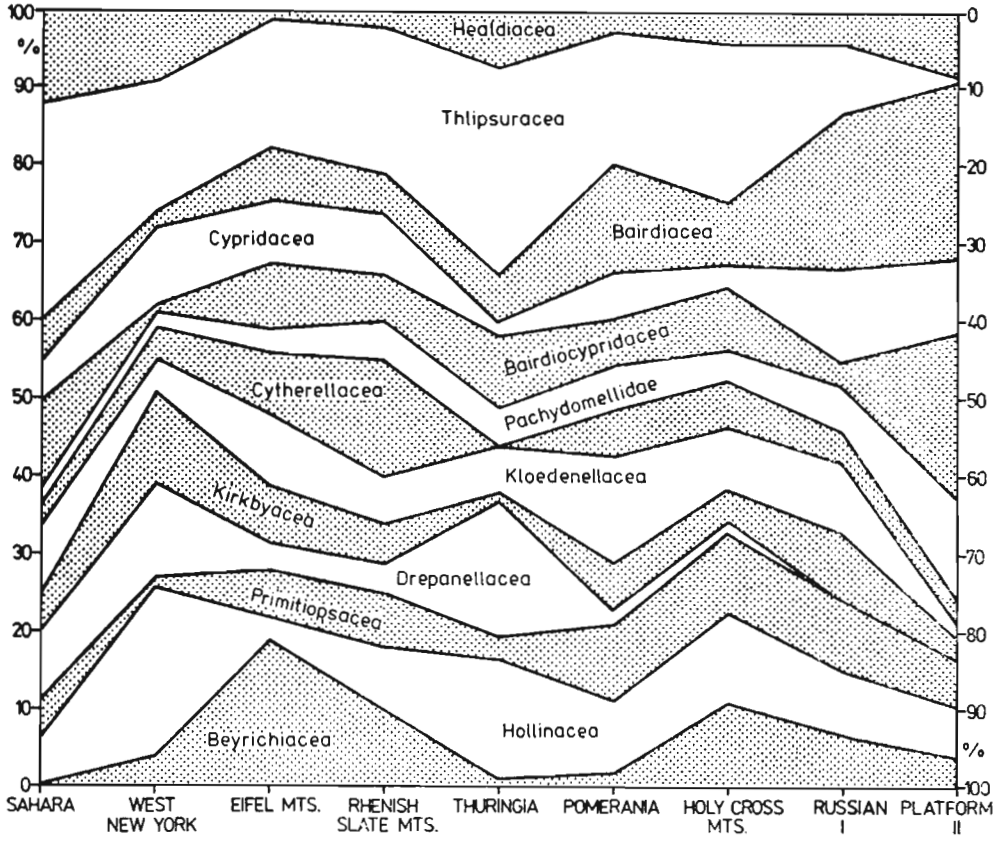



Fig. 4

Comparison of percentage distribution of 13 superfamilies of Ostracoda in 9 regions (after ADAMCZAK 1971*a* — supplemented).

The size of most carapaces examined varies within the limits of 0.3 and 2.3 mm. The largest dimensions (more than 1.4 mm) are reached by the genera: *Hollinella*, *Kozlowskiella*, *Amphissites*, *Fellerites*, *Poloniella*, *Cytherellina*, *Microcheilinella*, *Bairdiocypris* and *Bairdia*. There were twelve (14 per cent) large species (more than 1.4 mm), medium-sized (0.95—1.4 mm) — eighteen (20 per cent) and small (less than 0.95 mm) — fifty seven (66 per cent). The latter forms are also most numerous.

The entire Upper Givetian ostracod assemblage here described includes only benthonic forms, as indicated by thick carapaces of all species, usually very distinct ornamentation and, finally, the lack of forms having long lateral spines. The ostracods with strongly ornamented carapaces moved probably over the surface of substrate and were unable to swim or to bury

themselves in the bottom, similarly as recent strongly ornamented forms (ELOFSON 1941). The smooth or only slightly ornamented forms of such genera as *Bairdia*, *Bairdiocypris* and *Cavellina* could presumably like present-day ostracods with smooth carapaces, ascend actively to the near-bottom waters (GORAK 1977). Also, analogously to the modern species (KILENYI 1971), some smooth Podocopida could bury themselves under the surface of sediment (e.g., the *Orthocypris*).

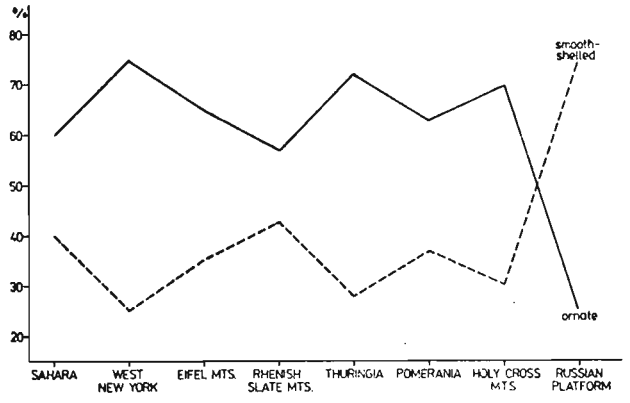



Fig. 5
Distribution of smooth-shelled and ornate Ostracoda in 9 regions (after ADAMCZAK 1971*a* — supplemented).

The good state of preservation of the studied ostracods represented by species with carapaces varying in size and, at the same time, the presence of individuals in various ontogenetic stages give evidence that we deal here with the autochthonous taphocenosis. A warm, shallow sea was probably the habitat of those ostracods. According to POKORNÝ (1971), the occurrence of ostracod assemblages abounding in both species and individuals is limited to shallow waters the depth of which probably does not exceed 200—300 m. The same author, as well as BECKER (1971*a*) indicate that the near-shore zone is marked by a small specific variability and that the diversification increases with the distance from the shore and the depth of water. As follows from BECKER'S (1971*a*) observations, also the zone of reefs is marked by such a small variability and a small number of individuals, which is probably due to an excessive turbulence of the water. The best conditions of living and development of the benthonic ostracods occurred in the fore-reef zone.

The frequency proportions of ornamented and smooth species, the predominance of small taxa and the presence of several identical species are indicative of the fact that the Upper Givetian ostracods of Pomerania lived in a zone similar to the biotopes separated by STRUVE (1963) in the Eifel Mts. and called a zone of solitary corals and a brachiopod zone. The ostracod assemblages of those biotopes were analyzed by BECKER (1969*b*, 1971*a*). It was a part of the sublittoral zone of the sea, stretching above the wave base what secured a proper oxygenation of water favourable for an exuberant development of benthos. The wave base in today's seas only very rarely reaches the depth of 200 m, mostly occurring at considerably smaller depths. Thus, we can assume that the depth of the part of the marine basin settled by the ostracod assemblage under study did not exceed 200 m.

The distinct predominance of complete carapaces over single valves observed in the material studied may give evidence of a rapid rate of sedimentation (OERTLI 1971; POKORNÝ 1965).

In regard to its taxonomic composition, morphological types and the character of the associated deposits, the ostracod assemblage here described corresponds closely to what is known as the Eifelian ecotype ("Eifeler Ökotyp") distinguished by BECKER (*in*: BANDEL and

BECKER 1975). Assemblages of this type were also found in the Devonian deposits in the Ardennes, the Eifel Mts., Rhenish Slate Mts., Harz Mts., Moravian Karst and the Holy Cross Mts. (both in their northern and southern parts).

## SYSTEMATIC PALEONTOLOGY

### General Remarks

Since the classifications given in "Treatise on Invertebrate Paleontology" (SCOTT 1961) and "Osnovy paleontologii" (ZANINA and POLENOVA 1960) were subject to essential changes during the last decade, the systematics of the species here described has mostly been based on the latest monographs of the Devonian ostracods by ADAMCZAK (1968, 1976) and BECKER and SANCHEZ de POSADA (1977).

The morphological terminology has been drawn from the following works: KESLING, 1951; SOHN, 1961*a*; MARTINSSON, 1962; ADAMCZAK, 1968, 1976); BECKER, 1964, 1965*a*, 1970*a*; BECKER and SANCHEZ de POSADA, 1977.

**Abbreviations used:**

C — carapace
LV — left valve
RV — right valve
juv. — juvenile form
L — lobe
S — sulcus
♀ — heteromorph
♂ — tecnomorph
l — length of carapace
h — height of carapace
w — width of carapace

**Ostracoda** LATREILLE, 1802
Order **Palaeocopida** HENNINGSMOEN, 1953
Superfamily **Primitiopsacea** SWARTZ, 1936
Family **Primitiopsidae** SWARTZ, 1936

**Remarks.** — The present writer does not accept any division applied so far to the Primitiopsacea (MARTINSSON 1960, 1961; BECKER 1970*a*; BECKER and SANCHEZ de POSADA 1977; GRÜNDEL 1977; WANG 1978; SCHALLREUTER 1979), since they do not explain phylogenetic relations within this superfamily and devaluate the rank of the family. For example, the divisions suggested by GRÜNDEL (1977) and SCHALLREUTER (1979) are based on conviction that only some genera are characterized by the presence of perimarginal structures occurring in heteromorphs. It seems, however, that all representatives of the Primitiopsacea have perimarginal structures (MARTINSSON, November 1979, personal communication), although they may be subject to a certain reduction, in extreme cases even to two perimarginal tubercles only (WANG 1978).

Until an indispensable revision of the systematics of the Primitiopsacea is conducted, the writer adopts ADAMCZAK's (1968) definition and, complying with this author's opinion on this group's considerable homogeny and, at the same time, its sharp delimitation from other Palaeocopida (ADAMCZAK 1968 and personal communication, September, 1979), she suggests for the time being to separate the only family Primitiopsidae with the following diagnosis.

**Diagnosis** (according to ADAMCZAK 1968 — supplemented). — Hinge margin long, straight. Hinges with distinct dents and dental sockets. Adventral structures present in both dimorphs, in one only or reduced. In heteromorphs, perimarginal structures occur always in the form of a ridge or two to five tubercles in the posterior part of valve. Right valve larger.

Genus *Pribylites* POKORNÝ, 1950

*Type species*: *Pribylites moravicus* POKORNÝ, 1950

Subgenus *Gravia* POLENOVA, 1952

*Type species*: *Gravia* (*Gravia*) *volgaensis* POLENOVA, 1952

*Pribylites* (*Gravia*) sp. 1

(pl. 1:8)

**Material.** — One damaged right valve, Koczała 1 borehole, depth 2,949.5—2,954.2 m. Dimensions (in mm):

| | l | h |
|---|---|---|
| RV ING O/8 | 0.69 | 0.47 |

**Remarks.** — The specimen probably represents a new species. It differs from *Pribylites* (*Gravia*) *aculeata* (POLENOVA) from the Frasnian of the Russian Platform (POLENOVA 1953) in a straight anterior margin and a cylindrical shape of spine, as well as in its more posterior situation.

**Occurrence.** — Poland, Western Pomerania, Upper Givetian.

Subgenus *Parapribylites* POKORNÝ, 1950

*Type species*: *Pribylites* (*Parapribylites*) *hanaicus* POKORNÝ, 1950

*Pribylites* (*Parapribylites*) *hanaicus* POKORNÝ, 1950

(pl. 1:1–7; pl. 2:1:–4)

1950. *Pribylites* (*Parapribylites*) *hanaicus* n. gen. n. sp.; POKORNÝ: 592-593, pl. 1:2-3.
1964. *Pribylites* (*Parapribylites hanaicus*; BECKER: 58-59, pl. 9:5.
1969. *Pribylites* (*Parapribylites*) *hanaicus*; GROOS: 26-27, pl. 5:2–3.
1970*a*. *Pribylites* (*Parapribylites*) *hanaicus*; BECKER: 52–53, pl. 1:3–8.

**Material.** — Chojnice 5 borehole: several scores of carapaces of hetero- and tecnomorphs, from the depth of 4,482–4,545.1 m; Koczała 1 borehole: two carapaces from the depth of 3,041.8–3,119 m and several scores of carapaces of hetero- and tecnomorphs from a depth of 2,938.3–2,984.6 m; Miastko 2 borehole: one carapace of a tecnomorph and two valves of heteromorphs from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♀ ING O/1 | 0.59 | 0.39 |
| C ♀ ING O/2 | 0.55 | 0.37 |
| C ♀ ING O/3 | 0.66 | 0.38 |
| C ♀ ING O/7 | 0.63 | 0.39 |
| C ♂ ING O/4 | 0.61 | 0.41 |
| C ♂ ING O/5 | 0.58 | 0.36 |
| C ♂ ING O/6 | 0.61 | 0.35 |
| C ♂ ING O/9 | 0.65 | 0.42 |
| C ♂ ING O/10 | 0.63 | 0.39 |
| C ♂ ING O/11 | 0.58 | 0.35 |
| C juv. ING O/12 | 0.48 | 0.31 |

**Remarks.** — The specimens under study are marked by a very slightly outlined ridge of the adventral structure in both hetero-and tecnomorphs. Mostly, only posteroventral nodes are visible. As follows from the present writer's observations, these nodes are similarly situated in both adult tecnomorphs and heteromorphs, which does not corroborate the dimorphism of adventral structures suggested by BECKER (1970*a*). The nodular termination of adventral

structure is situated slightly more anteriorly only in juvenile specimens. A certain variability in the situation of these nodes in relation to perimarginal tubercles is observed in heteromorphs. They may occur at the level of the lowermost perimarginal tubercle as well as somewhat above or below it.

**Occurrence.** — Poland: W. Pomerania — Upper Givetian; W. Germany: Eifel Mts. — Givetian (Loogh to Rodert Beds), Rhenish Slate Mts. — Upper Givetian (Honseler and Bücheler Beds); Bohemia — Givetian.

## Genus *Selebratina* POLENOVA, 1953

*Type species*: *Gravia* (*Selebratina*) *dentata* POLENOVA, 1953

### *Selebratina accommoda* sp. n.

(pl. 2:5–6)

*Holotype*: Heteromorph carapace, ING 0/14; pl. 2:6.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: Upper Givetian.
*Derivation of the name*: Lat. *accommodus* — appropriate, adequate.

**Material.** — One carapace of a heteromorph and one of a tecnomorph, Miastko 2 borehole, depth 2,080–2,085 m.

**Diagnosis.** — Carapace large, semicircular in lateral outline. Upper and lower perimarginal tubercles of heteromorphs situated nearer the margin than the middle ones. Posteroventral spine in heteromorphs at midheight and somewhat lower and nearer the margin of valve of tecnomorphs.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ holotype ING O/14 | 0.93 | 0.45 |
| C♂ ING O/13 | 0.93 | 0.40 |

**Description.** — Heteromorph: Carapace relatively large, semicircular in lateral outline. Anterior and posterior margin uniformly rounded, posterior somewhat lower. Dorsal and posterior margin form a right angle. Right valve larger than the left. Hinge line somewhat depressed. Three perimarginal tubercles occur on the posterior margin of each valve. Central tubercle more withdrawn from the margin than the upper and lower ones. Posteroventral spine fairly thick and massive, situated at midheight between the central and lower marginal tubercle. Tecnomorph: Its carapace differs from that of heteromorph in an almost equal height of anterior and posterior margin and a more delicate spine situated somewhat lower and nearer the posterior margin. Carapace convex, especially so in its posterior part. Lateral surface smooth. Marginal structure finely denticulate.

**Remarks.** — The form described resembles in outline *Selebratina tuimazensis* POLENOVA, from the Lower Frasnian of Bashkiria (POLENOVA 1953) from which it differs in larger dimensions and more massive and higher situated posteroventral spine.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

## Genus *Russia* POLENOVA, 1952

*Type species*: *Gravia* (*Russia*) *unicostata* POLENOVA, 1952

1968. *Kielciella* gen. n.: ADAMCZAK: 39–43, figs. 29–30; pl. 6:1–2; pl. 7:1–3.

**Diagnosis** (after ADAMCZAK 1968). — A medium-sized primitiopsid with a smooth carapace and adventral structure occurring along ventral margin in tecnomorphs and along ventral and

posterior margins in heteromorphs. Heteromorphs with a perimarginal ridge. Adductor muscle field displaying many scars.

**Remarks.** — A holotype of the type species of the genus *Russia* POLENOVA, reexamined by the present writer, displays all characteristic features of the genus *Kielciella* ADAMCZAK 1968, including perimarginal structures in the form of ridges. For this reason, the genus *Kielciella* ADAMCZAK should be treated as a junior synonym of the genus *Russia* POLENOVA. The latter includes the following species: *R. apicata* sp. n., *R. cingulata* (KUMMEROW), *R. fastigans* (BECKER) and *R. unicostata* POLENOVA.

## *Russia cingulata* (KUMMEROW, 1953)

(pl. 3:4)

1953. *Saccelatia cingulata* n. sp.; KUMMEROW: 26–27, pl. 2:14.
1964. *Pribylites* (*Parapribylites*) *cingulatus* (KUMMEROW); BECKER: 59–60, pl. 9:2–3.
1956*b*. *Pribylites* (*Parapribylites*) *cingulatus* (KUMMEROW); BECKER: 165, pl. 3:2.
1969. *Kielciella cingulata* (KUMMEROW); GROOS: 28, pl. 5:1.
1970*b*. *Kielciella cingulata* (KUMMEROW); BECKER: 379, pl. 1:1–3.

**Material.** — Koczała 1 borehole: one carapace of hetero- and tecnomorph each from the depth of 2,949.5–2,954.2 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ (specimen lost) | 0.76 | 0.48 |

**Remarks.** — Two specimens, rather poorly preserved but completely complying with BECKER's (1964) diagnosis of *R. cingulata* (KUMMEROW) make up the material available for studies. In its semicircular outline and long adventral structure, this species differs from both *R. apicata* sp. n. and *R. fastigans* (BECKER).

**Occurrence.** — Poland: W. Pomerania — U. Givetian; W. Germany: Eifel Mts. — Givetian (Cürten and Rodert Beds), Rhenish Slate Mts. — U. Eifelian and Givetian (lower Honseler to Bücheler Beds).

## *Russia apicata* sp. n.

(pl. 3:1–3)

*Holotype*: Heteromorph carapace; ING O/16; pl. 3:2.
*Type locality*: Chojnice 5 borehole, depth 4,517.4–4,526.1 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *apicatus* — having an apex.

**Material.** — Chojnice 5 borehole: several scores of carapaces of both tecno- and heteromorphs, from the depth of 4,482–4,545.1 m; Koczała 1 borehole: one heteromorph carapace from the depth of 2,945–2,949.5 m.

**Diagnosis.** — Carapace with a long dorsal margin and auriculate posterodorsal part. Adventral structures short, limited to ventral and posterior margins in heteromorphs and only to the central part of ventral margin in tecnomorphs.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ holotype ING O/16 | 0.84 | 0.48 |
| C♀ ING O/15 | 0.71 | 0.45 |
| C♂ ING O/17 | 0.74 | 0.52 |

**Description.** — Heteromorph: Carapace subelliptical in lateral outline. Dorsal margin long, straight. Anterior margin rounded, posterior straight. Anterior margin equal in height or somewhat lower than posterior. Posterior cardinal angle acute and the posterodorsal part of carapace extended in the form of a triangular auriculum. Adventral structure strongly developed, stretching along ventral and posterior margins. Its distance from the free margin is the smallest in the anterior part and the largest in the middle of the posterior margin. Perimarginal ridge occurs in posterior part of valve. Carapace is the widest in its middle part. Marginal structure finely denticulate. Surface smooth. Tecnomorph: Having its anterior margin higher than the posterior one, the carapace of tecnomorph is distinctly preplete as compared with that of heteromorph. Adventural structure very short, limited only to the anterior and median parts of ventral margin.

**Remarks.** — In the outline and course of its adventral structures, the form described resembles *Russia fastigans* (BECKER 1964) from the Eifelian of the Eifel Mts., but differs from it in a shorter adventral structure and a triangular process occurring in the posterodorsal part of its valve.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

## Genus *Urftella* BECKER, 1970

*Type species*: *Urftella adamczaki* BECKER, 1970

### *Urftella adamczaki* BECKER, 1970

(pl. 3:5–7)

1970*a*. *Urftella adamczaki* n. sp.; BECKER: 58–59, pl. 2:1–3.

**Material.** — Chojnice 5 borehole: one heteromorph carapace from the depth of 4,683.7–4,691.7 m. and eleven tecnomorph carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: seven tecnomorph carapaces from the depth of 3,041.8–3,119 m, one tecnomorph carapace from the depth of 2,990.3–3,019 m and nine tecnomorph carapaces from the depth of 2,938.8–2,984.6 m; Miastko 2 borehole: two tecnomorph carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ ING O/18 | 0.80 | 0.51 |
| C ♂ ING O/19 | 0.77 | 0.45 |
| C juv. ING O/20 | 0.34 | 0.21 |

**Remarks.** — The specimens under study fully correspond to BECKER's (1970*a*) diagnosis and illustrations of this species. *Urftella adamczaki* BECKER has so far been the only known species of the genus *Urftella* BECKER.

**Occurrence.** — Poland: W. Pomerania — U. Givetian; W. Germany: Eifel Mts. — L. Givetian (Loogh and Cürten Beds).

## Family? **Primitiopsidae** SWARTZ, 1936

## Genus *Sulcatiella* POLENOVA, 1968

*Type species*: *Sulcatiella crassa* POLENOVA, 1968

**Remarks.** — No dimorphism has so far been found in the studied specimens of *S. olempskae* sp. n. and representatives of other species of the genus (POLENOVA 1968; ROZHDESTVENSKAYA 1962). The present writer's supposition that this may be a genus of the family Primitiopsidae

is based on a considerable extent of similarity between the genera *Sulcatiella* POLENOVA and *Skalyella* ADAMCZAK. This similarity concerns the outline of the carapace, the presence of a bend and flattening of the posterior part, of a cylindrical swelling occurring along the ventral and posterior margins of valves and the presence of an adductorial sulcus. The differences consist in different marginal structures which in the *Skalyella* occur as a row of fine denticles and in the *Sulcatiella* as a smooth list, as well as in the presence of dimorphic structures in the form of thin perimarginal ridges situated on cylindrical swellings in posterior parts of heteromorphic carapaces which occur in *S. mesodevonica* (PŘIBYL) (ADAMCZAK 1968), so far the only representative of the genus *Skalyella*.

Genera marked by the occurrence of both the denticulate marginal structure, for example, the *Guerichiella* ADAMCZAK, *Clavofabellina* POLENOVA and *Skalyella* ADAMCZAK and marginal list, for example, *Urftella* BECKER are known within the range of the family Primitiopsidae. Thus, of decisive importance may be only the development of dimorphic characters which, however, have not so far been observed in the representatives of the genus *Sulcatiella* POLENOVA. Supposedly, this results only from the lack of heteromorphs in the material available for studies or from a rather poor state of preservation of specimens which precluded the identification of very delicate perimarginal ridges. Until this matter can be explained, the present writer suggests to include tentatively the genus *Sulcatiella* POLENOVA to the family Primitiopsidae.

## *Sulcatiella olempskae* sp. n.

(pl. 4:1–2)

1979. *Pribylites* ? sp.; *Olempska*: 82–83, pl. 12:2–3.
*Holotype*: Carapace ING O/21; pl. 4:1.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: After Dr. EWA OLEMPSKA, Polish ostracodologist.

**Material.** — Miastko 2 borehole: 14 carapaces and one valve from the depth of 2.080–2.085 m.

**Diagnosis.** — A species of *Sulcatiella* with median sulcus divided transversely into two smaller sulci the upper of which is small, shallow and round and the lower one is elongate and deep. Lateral surface finely punctate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/21 | 0.92 | 0.51 |
| C juv. ING O/22 | 0.55 | 0.30 |

**Description.** — Carapace semi-elliptical in lateral outline. Dorsal margin straight, somewhat shorter than the largest length of carapace. Anterior and posterior margins symmetrically rounded, equal in height or the anterior one somewhat higher. They join the dorsal margin at almost identical, slightly obtuse angles. Ventral margin subrectilinear or slightly convex. Adductorial sulcus, divided by a transverse partition, forms two smaller sulci the upper one of which is small, shallow and circular and the lower one deep and elongate. A characteristic bend of the surface of valve, especially distinct in juvenile specimens, occurs in the ventral and posteroventral parts.

Contact line situated in a depression formed by cylindrical swellings most strongly developed along the ventral and posterior margins. Marginal structure in the form of a thin list. The largest convexity of carapace occurs in its posteroventral part and hence the carapace is subtriangular in transverse section. Surface uniformly and densely punctate.

**Remarks.** — *S. olempskae* sp. n. differs from other species of *Sulcatiella* POLENOVA in the presence of two circular sulci situated one above another, instead of a single elongate sulcus. It is most similar to *S. zinchenkoensis* POLENOVA from the Lower Devonian in the NE Salair, (POLENOVA 1968), from which it differs in its bend occurring slightly higher up, less strongly developed marginal lists, punctate surface and presence of two sulci.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds); W. Pomerania — U. Givetian.

Superfamily **Hollinacea** SWARTZ, 1936
Family **Hollinidae** SWARTZ, 1936
Genus *Hanaites* POKORNÝ, 1950
*Type species*: *Haliella* (*Hanaites*) *givetiana* POKORNÝ, 1950

*Hanaites mirabilis* (POLENOVA, 1952)
(pl. 4:5)

1952. *Eurychilina mirabilis* sp. n.; POLENOVA: 74–76, pl. 1:5.
1962. *Eurychilina mirabilis* POLENOVA; ROZHDESTVENSKAYA: 186, pl. 6: 1–2.
1974. *Hanaites mirabilis* (POLENOVA); POLENOVA: 30.

**Material.** — Chojnice 5 borehole: two internal molds of left valves from the depth of 4,543.6–4,545.1 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| LV ING O/25 | 1.31 | 0.58 |

**Description.** — See POLENOVA (1952).

**Remarks.** — The present writer had at her disposal only two internal molds with a distinctly visible adductorial sulcus, traces of dorsal spines, a trace of an anterior spine and an adventral structure. These features, as well as a characteristic outline and sculpture of valves, allowed her to assign the specimens to *Hanaites mirabilis* (POLENOVA).

*H. mirabilis* (POLENOVA) is most similar in outline to *H. linearis* BERDAN et COPELAND from the Siegenian of the NW part of North America (Alaska and NW Canada) (BERDAN and COPELAND 1973; COPELAND 1977) from which it differs in a flat and more elongate carapace, spines occurring at the anterior and posterior ends of its hinge margin and a finer reticulation.

**Occurrence.** — Poland: W. Pomerania — U. Givetian; USSR: Russian Platform — U. Givetian (Starooskol Horizon), Bashkiria — Eifelian and Givetian (Biya and Afonin Beds).

Genus *Parabolbinella* ADAMCZAK, 1968
*Type species*: *Parabolbinella postaculeata* ADAMCZAK, 1968

*Parabolbinella anteaculeata* ADAMCZAK, 1968
(pl. 4:3–4)

1968. *Parabolbinella anteaculeata* sp. n.; ADAMCZAK: 55–56, fig. 38; pl. 15:2; pl. 16:3–4.
1969. *Parabolbinella anteaculeata* ADAMCZAK; GROOS: 25, Abb. 12, fig. 1.

**Material.** — Koczała 1 borehole: one carapace and five valves of tecnomorphs from the depth of 2,949.5–2,954.2 m; Miastko 2 borehole: 9 valves of tecnomorphs from a depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ ING O/24 | 0.90 | 0.53 |
| LV ♂ ING O/23 | 0.87 | 0.32 |

**Remarks.** — The species is very similar to *Parabolbinella postaculeata* ADAMCZAK from which it differs primarily in a more anterior situation of the posterior adventral spine.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; W. Germany: Rhenish Slate Mts. — U. Givetian.

## Family **Hollinellidae** BLESS et JORDAN, 1971

### Genus *Hollinella* CORYELL, 1928

*Type species*: *Hollinella dentata* CORYELL 1928

### *Holinella antri* ADAMCZAK, 1968

(pl. 4:6–7)

1968. *Holinella antri* sp. n.; ADAMCZAK: 58–59, fig. 16, 39A, 40; pl. 17:4–5; pl. 18:4–5.
1969. *Holinella antri* ADAMCZAK; GROOS: 24, Abb. 12, fig. 2.

**Material.** — Koczała 1 borehole: seven incomplete valves from the depth of 2,949.5–2,954.2 m; Miastko 2 borehole: three carapaces and a dozen or so damaged valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ ING O/26 | 1.58 | 0.90 |
| RV juv. ING O/27 | 1.17 | 0.64 |

**Description.** — See ADAMCZAK (1968).

**Remarks.** — *Hollinella antri* ADAMCZAK differs from the most closely related species *H. sufflata* (BECKER) in a smaller postadductorial lobe which does not protrude beyond the hinge line, in adventral structures converging in the anterior part and in marginal structures developed in the form of several rows of tubercles.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; W. Germany: Rhenish Slate Mts. — U. Givetian.

### *Hollinella sufflata* (BECKER, 1964)

(pl. 4:8)

1964. *Falsipollex sufflatus* sp. n.; BECKER: 65–66, pl. 10:4–5.
1968. *Hollinella sufflata* (BECKER); ADAMCZAK: 59–60, fig. 41; pl. 18:1–3.
1969*a*. *Hollinella sufflata* (BECKER); BECKER: 261–262, pl. 1:8.

**Material.** — Chojnice 5 borehole: one carapace from a depth of 4,429.4–4,436.4 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♂ ING O/28 | 1.21 | 0.68 |

**Description.** — See ADAMCZAK (1968).

**Remarks.** — The species is most closely related to *Hollinella antri* ADAMCZAK, differing from it in the features discussed in the latter's description.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; W. Germany: Eifel Mts. — U. Eifelian and Givetian.

Genus *Adelphobolbina* STOVER, 1956
*Type species*: *Ctenobolbina papillosa* ULRICH, 1891

*Adelphobolbina rectangularis*, sp. n.
(pl. 5:1–2)

*Holotype*: Tecnomorph carapace ING O/30; pl. 5:2.
*Type locality*: Koczała 1 borehole, depth 2,730–2,743 m, W. Pomerania.
*Type horizon*: M. Frasnian.
*Derivation of the name*: Lat. *rectangularis* — rectangular.

**Material.** — Chojnice 5 borehole: two carapaces and one valve of tecnomorphs from the depth of 3,685.4–3,688.2 m; Koczała 1 borehole: two carapaces of tecnomorphs from the depth of 2,730–2,734 m.

**Diagnosis.** — Carapace long, sub-elliptical in lateral outline. Postadductorial lobe flat, rectangular in outline, not projecting beyond the hinge line. Preadductorial lobe not marked. Lateral surface papillose. Adventral structure terminating in a spinelike swelling occurring in prolongation of the posterior border of postadductorial lobe.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ holotype ING O/30 | 1.05 | 0.59 |
| C ♂ ING O/29 | 0.97 | 0.48 |

**Description.** — Carapace elongate, preplete, sub-elliptical in lateral outline. Its height equals a half of its length. Anterior and posterior margins uniformly rounded. Preadductorial lobe fused with anterior lobe, hardly outlined at all. Postadductorial lobe wide, flat, rectangular, not projecting beyond the hinge line. Adductorial sulcus relatively narrow and short, reaching midheight of valve. In the lower part, the sulcus narrows and slightly bends anteriorly. Adventral structure begins halfway the height of anterior margin relatively close to it. It terminates in the posterior part with a spinelike thickenning located below the postadductorial lobe on the prolongation of its posterior border. Subadventral surface gradually extends posteriorly. Posterior part of the surface of valve elongate, its width equals or is somewhat larger than the width of the postadductorial lobe. Lateral surface papillose.

**Remarks.** — *A. rectangularis* sp. n. is most closely related with *A. europaea* BECKER et BLESS from the Middle Frasnian of the Dinant Basin, Belgium (BECKER and BLESS 1971). The main differences consist in a more elongate posterior part of valve, rectangular postadductorial lobe, not marked preadductorial lobe, narrow and short adductorial sulcus, shorter and divergently running adventral structure and papillose surface observed in *A. rectangularis*.

**Occurrence.** — Poland: W. Pomerania — M. Frasnian.

Superfamily **Beyrichiacea** MATHEW, 1886
Family **Treposellidae** HENNINGSMOEN, 1954
Genus *Kozlowskiella* PŘIBYL, 1953
*Type species*: *Ulrichia* (*Kozlowskiella*) *kozlowskii* PŘIBYL, 1953

*Kozlowskiella moderabilis* sp. n.
(pl. 5:6–7)

*Holotype*: Tecnomorph carapace ING O/34; pl. 5:7.
*Type locality*: Koczała 1 borehole, depth 2,966–2,969.3 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *moderabilis* — moderate.

**Material.** — Koczała 1 borehole: two carapaces of heteromorphs, 14 carapaces and five valves of tecnomorphs from the depth of 2,945–2,969.3 m.

**Diagnosis.** — Carapace relatively flat, amplete. Anterior and adductorial sulci perpendicular to hinge margin. Anterior lobe and syllobium provided with dorsal nodes, not projecting beyond hinge line. Preadductorial lobe subspherical in outline, strongly convex. Posterior cardinal angle = 90°. Subadventral surface narrow. Lateral surface delicately reticulate. The meshes of reticulation irregular and, in the ventral half of valve, horizontally elongate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ holotype ING O/34 | 1.14 | 0.68 |
| C ♀ ING O/35 | 1.45 | 1.0 |

**Description.** — Tecnomorph: Carapace semi-elliptical in lateral outline, relatively flat, amplete. Hinge margin long, straight. Anterior margin rounded. Posterior margin straight in the dorsal part, perpendicular to hinge margin. Anterior lobe and syllobium flat, not projecting beyond hinge line. Slightly outlined nodes occur in the dorsal part of these lobes. Preadductorial lobe strongly convex, subcircular. In its dorsal part, anterior sulcus perpendicular to hinge margin. It is relatively shallow and gradually narrowing downwards and bending around preadductorial lobe, reaches the midheight of valve. Adductorial sulcus, also perpendicular to hinge margin, reaches below midheight where it bends anteriorly in a hooklike manner. Syllobium relativelly flat, reaching the ridge of the adventral structure in the posterior part of the valve. Adventral structure runs along the entire free margin of valves. Subadventral surface narrow. Lateral surface delicately and irregularly reticulate. In the ventral part, the meshes of reticulation are horizontally elongate. Heteromorph: Preadductorial lobe ovally elongated. Crumina occurs in the ventral part of valves.

**Remarks.** — *K. moderabilis* sp. n. slightly resembles *K. corbis* (DAHMER) from the Lower Eifelian of the Harz Mts., Eifel Mts. and Holy Cross Mts. (ADAMCZAK 1958; GROOS 1969; PŘIBYL 1962) from which it differs in a somewhat different outline of carapace and posterior cardinal angle = 90°, anterior sulcus perpendicular (and not oblique) to hinge margin, only one node occurring on syllobium and a more delicate ornamentation. In its lateral outline and trace of its anterior sulcus, *K. moderabilis* sp. n. also resembles *K. jurkowicensis* OLEMPSKA from the Upper Givetian of the Holy Cross Mts. (OLEMPSKA 1974), from which it differs, however, in a flattened and wide syllobium, flat ventral part of valve, single, obtuse nodes occurring on the anterior lobe and syllobium and, finally, in lobes which do not protrude above the hinge line.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

## Genus *Illativella* ZANINA, 1960

*Type species*: *Illativella clivosa* ZANINA, 1960

### *Illativella* sp. 1

(pl. 5:8–9)

**Material.** — Koczała 1 borehole: one damaged carapace and four incomplete valves from the depth of 2,633.3–2,636.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C juv. ING O/37 | 0.85 | 0.64 |
| LV ♀ ING O/36 | 1.32 | 1.28 |

**Description.** — Heteromorph: Valve subrectangular in lateral outline, very high. Dorsal margin straight, slightly convex. Anterior and posterior margins equal in height, subrectilinear. Anterior sulcus short, indistinct. Adductorial sulcus narrow, situated halfway the length. Pre-

adductorial lobe narrow, flat, only slightly outlined. Syllobium wide (occupying a half of the length of valve), flat, with a convex upper edge, slightly protruding beyond the hinge line and with a spine in its dorsal part. A small, narrow adventral ridge runs along the free margin close to the edge of valve. Ventral part of valve inflated, overhanging below contact line. The largest convexity observed in the posterior part of valve. Lateral surface finely granulated.

Tecnomorph: Lobes and sulci much less developed than those in the heteromorph. Spine robust, long.

**Remarks.** — The from described is most similar in outline to *Illativella alta* BUSHMINA from the Lower Tournaisian of the Kolyma Massif (BUSHMINA 1975) from which it differs in a half as large dimensions, syllobium protruding beyond hinge line, shorter and less strongly developed anterior sulcus, less rounded anterior margin and a longer spine on posterior lobe. The specimens available for studies are very poorly preserved which precludes the possibility of erecting a new taxon.

**Occurrence.** — Poland: W. Pomerania — ?U. Frasnian.

Superfamily **Drepanellacea** ULRICH et BASSLER, 1923
Family **Aechminidae** BOUČEK, 1936
Genus *Aechmina* JONES et HALL, 1869
*Type species*: *Aechmina cuspidata* Jones et Hall, 1869

*Aechmina* sp.
(pl. 6:1)

**Material.** — Koczała 1 borehole: one damaged and deformed carapace from the depth of 2,978.1–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/38 | 0.51 | 0.29 |

**Remarks.** — Due to a poor state of its preservation, it is impossible to compare it with other species of this genus.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

Superfamily **Kirkbyacea** ULRICH et BASSLER, 1906
Family **Amphissitidae** KNIGHT, 1928
Genus *Amphissites* GIRTY, 1910
*Type species*: *Amphissites rugosus* GIRTY, 1910

*Amphissites irinae* GLEB. et ZASP. *in*: EGOROV, 1953

(pl. 6:3)

1953. *Amphissites irinae* GLEB. et ZASP. (in litt.); EGOROV: 53–54, pl. 1: 1–8.
1964. *Amphissites* sp. F; MAGNE: 137, pl. 25:190.
1970*b*. *Amphissites irinae* EGOROV; LETHIERS: 114, pl. 11:1.

**Material.** — Koczała 1 borehole: one poorly preserved carapace from the depth of 2,730–2,734 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C juv. ING O/40 | 0.67 | 0.38 |

**Description.** — See EGOROV (1953).

**Remarks.** — The only specimen available for studies probably represents a juvenile form as indicated by its very fine reticulation. The surface of its valves is strongly corroded, the internal ridge almost completely broken off and inner carinae outlined only in the form of elongate convexities on the carapace. However, general proportions and an outline of carapace, in particular a strongly convex central node situated near the dorsal margin, allow one to assign this specimen to *Amphissites irinae* GLEB. et ZASP. in EGOROV.

**Occurrence.** — Poland: W. Pomerania — M. Frasnian; France: Dinant Basin — M. Frasnian (Matagne Beds); USSR: Russian Platform — M. Frasnian (Semiluka Beds).

## *Amphissites pulcher* POLENOVA, 1952
(pl. 6:4–5)

1952. *Amphissites pulcher* sp. n.; POLENOVA: 115–116, pl. 9:2–3; pl. 10:1.
1961. *Amphissites pulcher* POLENOVA; SOHN: 121.
1972. *Amphissites (Amphissites) pulcher* POLENOVA; GUREVICH: 314–315, pl. 7:1.
1979. *Amphissites pulcher* POLENOVA; OLEMPSKA: 88, pl. 13:8; pl. 14:1–2.

**Material.** — Miastko 2 borehole: two carapaces and five valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/41 | 1.48 | 0.81 |
| C juv. ING O/42 | 0.96 | 0.58 |

**Description.** — See POLENOVA (1952).

**Remarks.** — The specimens under study differ from the most similar species *Amphissites remesi* POKORNÝ from the Givetian of Bohemia (POKORNÝ 1950) in its less strongly developed central node, shorter outer carinae running parallel to the inner ridge and a more strongly bent dorsal carina.

**Occurrence.** — Poland: Holy Cross Mts. — U. Givetian (*Stringocephalus burtini* Beds W. Pomerania — U. Givetian; USSR: Russian Platform — U. Givetian (Starooskol Horizon), Volhynia — U. Givetian (Pelcha Beds).

## *Amphissites remesi* POKORNÝ, 1950
(pl. 6:6)

1950. *Amphissites remesi* sp. n.; POKORNÝ: 604–607, pl. 5:10.
1968. *Amphissites* sp. A; ADAMCZAK: 87, pl. 39:8.
1969. *Amphissites remesi* POKORNÝ; GROOS: 36–38, fig 20–21, pl. 19:1–6.
1974. *Amphissites remesi* POKORNÝ; BLUMENSTENGEL: 22, pl. 2:1–4.

**Material.** — Koczała 1 borehole: two valves from the depth of 2,949.5–2,954.2 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| LV ING O/43 | 1.09 | 0.56 |

**Description.** — See POKORNÝ (1950).

**Remarks.** — The material under study includes two single valves only. Their sharp, outwardly directing internal carinae and their distinct elongate central node allow one to assign them to *Amphissites remesi* POKORNÝ.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; W. Germany: Rhenish Slate Mts. — U. Eifelian to U. Givetian; E. Germany — Harz Mts. — U. Eifelian; Bohemia — Givetian.

*Amphissites multicarinatus* sp. n.
(pl. 6:2)

*Holotype*: Carapace ING O/39; pl. 6:2.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *multicarinatus* — having many carinae.

**Diagnosis.** — Lateral outline preplete. Inner carinae long, incurved. Many secondary carinae run obliquely downwards from inner carinae. One of them, the most strongly developed and angularly bent, runs from the antero-dorsal to antero-ventral part of the valve through the central node.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/39 | 0.98 | 0.64 |

**Description.** — Carapace semi-elliptical in lateral outline. Posterior margin higher than the anterior. Inner carinae long, perpendicular to hinge margin in their upper and incurved in their lower parts. The anterior inner carina less strongly developed than the posterior one. Many secondary carinae, directed obliquely downwards, run out- and inwards from inner carinae. The longest of them and most distinct starting from a corner formed by a dorsal and anterior inner carinae, runs towards the upper part of central node where it bends, intersects its middle and subsequently turns once again anteriorly along the anterior margin of the adductorial pit. Central node small and distinctly outlined. Dorsal carina distinct only in the anterior and posterior parts where it forms a V-shaped bend, sharper and higher in the posterior part. In the middle part, dorsum very narrow. Surface reticulate.

**Remarks.** — The variability of adult forms is expressed mostly in a varying degree of development of secondary carinae which may be either numerous and distinct, or almost invisible, except for an oblique carina, strating at the junction of an anterior inner carina and dorsal carina, running through the middle of the central node and remaining always distinctly visible. Also variable is the height of the anterior and posterior margins of valves; sometimes, they are almost symmetrical.

The juvenile forms are marked by an identical height of both anterior and posterior margins, central node more convex than that in adult forms and more robust, high inner carinae. Except for the carina described above, they are as a rule devoid of other secondary carinae.

*A. multicarinatus* sp. n. differs from other species of the genus *Amphissites*, having secondary carinae, in the fact that its carinae branch from inner carinae always obliquely downwards and never upwards.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

Family **Kirkbyellidae** SOHN, 1961
Genus *Refrathella* BECKER, 1967
*Type species*: *Refrathella struvei* BECKER, 1967

*Refrathella* sp. 1
(pl. 7:1)

**Material.** — Koczała 1 borehole: two damaged valves from the depth of 2,949.5–2,954.2 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| RV ING O/44 | 0.56 | 0.26 |

**Description.** — Valves strongly elongated, semi-elliptical in lateral outline. Dorsal margin long, straight. Anterior margin rounded. Ventral margin parallel to the dorsal, slightly concave in the middle part. Posterior margin lower than the anterior, in the dorsal part straight and perpendicular to hinge margin, in the ventral part obliquely truncate. An elongate, oval, distinct adductorial sulcus is situated in the dorsomedian part of valve. Ventral lobe elongate, terminating posteriorly in a blunt node. Two smooth lists can be distinguished — the longer upper and the shorter lower on the lobe surface. These parallel lists do not contact each other. A narrow depression occurs between them. A wide, smooth marginal ridge runs along the free margin. Lateral surface finely reticulate.

**Remarks.** — The distinctly outlined ventral lobe, with ornamentation in the form of smooth lists and the smooth marginal ridge allow one to assign the form under study to the genus *Refrathella* BECKER.

Its strongly elongated valve, long adductorial sulcus and the low situation of its ventral lobe having two separate, parallel lists, differ this form from all known species of the genus *Refrathella*. The scarcity of material, prevents one, however, from erecting a new species.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

Superfamily **Youngiellacea** KELLET, 1933
Family **Youngiellidae** KELLET, 1933
Genus *Moorites* CORYELL et BILLINGS, 1932

*Type species*: *Glyptopleurina* ? *minuta* WARTHIN, 1930 (= *Moorites hewetii* CORYELL et BILLINGS, 1932).

*Moorites givetianus* (ROZHDESTVENSKAYA, 1962)
(pl. 7:3)

1962. *Youngiella givetiana* sp. n.; ROZHDESTVENSKAYA: 192–193, pl. 6:9.

**Material.** — Koczała 1 borehole: five carapaces from the depth of 2,949.5–2,954.2 m. Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/46 | 0.35 | 0.19 |

**Description.** — Carapace strongly compressed, elongated, rectangular in lateral outline. Dorsal margin almost straight, anteriorly slightly concave, terminating in small auricles. Hinge line running in a small depression. Anterior margin rounded and higher than the posterior. Posterior margin subrectilinear, perpendicular to the ventral. Ventral margin slightly concave. A cylindrical marginal ridge runs along the free margin. A small, shallow pit surrounded ventrally and posteriorly by a small swelling occurs in the anterior half of valve somewhat above midheight. The largest width of carapace occurs in its anterior part. Surface smooth.

**Remarks.** — The Polish specimens are identical with those from Bashkiria.

**Occurrence.** — Poland: W. Pomerania — U. Givetian; USSR: Bashkiria — U. Givetian (Starooskol Horizon).

*Moorites koczalensis* sp. n.
(pl. 7:2)

*Holotype*: Carapace ING O/45; pl. 7:2.
*Type locality*: Koczała 1 borehole, depth 2,949.5–2,954.2 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: after the locality Koczała.

**Material.** — Koczała 1 borehole: ca 50 carapaces from the depth of 2,949.4–2,984.6 m.

**Diagnosis.** — Carapace small, subrectangular in lateral outline. Height equalling 0.6 of length. A very indistinct swelling present near the anterior and posterior margin. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/45 | 0.30 | 0.19 |

**Description.** — Carapace small, rectangular in lateral outline, with almost symmetrically rounded anterior and posterior margins. Anterior margin somewhat higher than the posterior. Dorsal and ventral margins slightly convex. Height of carapace equalling about 0.6 of its length. Indistinct, cylindrical swellings run along the anterior and posterior margin close to the edges of valves. Lateral surface smooth.

**Remarks.** — The variability of the specimens studied concerns mostly the degree of elongation of the carapace. The species under study is similar to *Moorites fallax* BECKER from the Middle Frasnian of the Dinant Basin, Belgium (BECKER 1971 b), from which it differs in a shorter carapace, less rounded anterior and posterior margin, less distinct marginal ridge and smaller cardinal angles.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

Superfamily uncertain
Family **Aechminellidae** SOHN, 1961
Genus *Balantoides* MOREY, 1935
*Type species*: *Balantoides quadrilobatus* MOREY, 1935

**Remarks.** — In his revision of the family Aechminellidae, SOHN (1975) included in *Balantoides* MOREY species which were formely assigned by himself (SOHN 1961 *a*) and BECKER (1968) to *Aechminella* HARLTON and by POLENOVA (1955) to *Pseudonodellina* POLENOVA.

The present writer's suggestion is to include in the synonymy of *Balantoides* MOREY also the genus *Stictobolbina* erected by KESLING and CHILMAN (1978), since its characters correspond to SOHN's (1975) diagnosis of the genus *Balantoides*. This diagnosis should be supplemented as follows: the species of the genus *Balantoides* MOREY may also have a smooth surface (for example, *B. minimus* (LETHIERS) and *B. parvulus* (POLENOVA)) and a central lobe not always projecting above the hinge line (for example, *B. allethaae* (COLEY)).

*Balantoides brauni* (BECKER, 1969)
(pl. 7:8)

1968. *Aechminella brauni* sp. n.; BECKER: 558–560, figs. 3–4; pl. 1:3–5.

**Material.** — Chojnice 5 borehole: seven carapaces and three valves from the depth of 3,685.4–3,688.2 m and one carapace from the depth of 3,768.3–3,790.6 m; Koczała 1 borehole: seven carapaces from the depth of 2,730–2,734 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/51 | 0.35 | 0.26 |

**Description,** — See BECKER (1968).

**Remarks.** — The specimens under study correspond to the description of *Balantoides brauni* presented by BECKER (1968). They are not very well preserved and this is probably the reason why no ornamentation was observed on their surface. In some specimens, the cusp of central lobe is not so strongly pointed as in those illustrated by BECKER (1968). The specimen discussed differs from *Balantoides minimus* (LETHIERS) in its long posterior sulcus curved near the ventral

margin and from *B. parvulus* (POLENOVA) in higher anterior end, elongated adductorial sulcus, less distinct dorsal connection of the anterior and central lobe and smaller dimensions.

**Occurrence.** — Poland: W. Pomerania — M. Frasnian; W. Germany — Rhenish Slate Mts. — Frasnian (Refrath Beds).

*Balantoides parvulus* (POLENOVA, 1952)
(pl. 7:4–5)

1953. *Nodella* (?) *parvula* sp. n.; POLENOVA: 26, pl. 1:6.

**Material.** — Chojnice 5 borehole: one valve from the depth of 4,683.7–4,691.7 m, eight carapaces from the depth of 4,482–4,545.1 m and 14 carapaces and five valves from the depth of 4,398.2–4,436.4 m; Koczała 1 borehole: six carapaces from the depth of 3,041.8–3,119 m, 16 carapaces and three valves from the depth of 2,990.3–3,019 m, and more than 1,000 carapaces from the depth of 2,938.3–2,984.6 m; Miastko 2 borehole: several hundred carapaces and single valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/48 | 0.39 | 0.29 |
| C ING O/47 | 0.47 | 0.34 |

**Description.** — Carapace subcircular in lateral outline, trilobate. Hinge margin short (about 0.7 of the length). Anterior, ventral and posterior margins rounded, anterior of equal height as posterior or only slightly higher. Anterior and central lobe protruding above the hinge line. A short, rounded or tear-shaped adductorial sulcus does not separate entirely the lobes and therefore their dorsal connection remains and is more distinct on the larger, left valve. The cusp of central lobe may be slightly pointed. Posterior sulcus straight, relatively short, reaching only somewhat below the midheight of valve. Carapace strongly convex, the most so in the anterior part. Surface smooth.

**Remarks.** — Only a very small variability concerning the degree of pointedness of the cusp of central lobe was observed among the vast number of specimens.

The form under study differs from the most similar species, *Balantoides minimus* (LETHIERS) from the Lower Frasnian of Boullonais, France (LETHIERS 1970*a*), in a circular lateral outline, adductorial sulcus developed as a round pit, shorter hinge margin and equal height of the anterior and posterior margins.

**Occurrence.** — Poland: W. Pomerania — U. Givetian; USSR: Russian Platform — U. Givetian (Starooskol Horizon), Volhynia — U. Givetian (Pelcha Beds).

*Balantoides keslingi* sp. n.
(pl. 7:6–7)

*Holotype*: Carapace ING O/49, pl. 7:6.
*Type locality*: Koczała 1 borehole, depth 2,996.4–3,006.1 m. W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: in honour of Professor ROBERT V. KESLING, American ostracologist.

**Material.** — Chojnice 5 borehole: one carapace from the depth of 4,415.2–4,429.4 m; Koczała 1 borehole: one damaged carapace from the depth of 3,089–3,094 m, two carapaces from the depth of 2,978.1–2,984.6 m and two valves from the depth of 2,949.5–2,954.2 m.

**Diagnosis.** — Carapace small, sub-elliptical in lateral outline, quadrilobate. Anterior and posterior sulci long, reaching almost the ventral margin. Adductorial sulcus shorter than

a half of the height. Central lobe slightly protruding above the hinge line. Posterior lobe situated very close to the posterior margin. Surface reticulate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/49 | 0.35 | 0.21 |
| C ING O/50 | 0.42 | 0.22 |

**Description.** — Carapace small, elongate, subelliptical in lateral outline. Hinge margin straight. Anterior margin higher than the posterior, rounded. Ventral margin straight or slightly convex. Posterior margin rounded. Four distinct lobes, of which only the central one slightly protrudes above the hinge line, are visible on the surface of valves. Anterior sulcus long, narrow, straight, reaching almost the ventral margin. Adductorial sulcus shorter, not reaching the midheight, strongly extending upwards, shaped like an inverted triangle. Posterior sulcus very wide, lunular, reaching almost the ventral margin. Posterior lobe situated very close to the posterior margin. The surface of sulci and of the ventral connection of the anterior and central lobe reticulate.

**Remarks.** — *B. keslingi* is very similar to *B. allethaae* (COLEY) from the Silica formation (Middle Devonian) of North America (KESLING and CHILMAN 1978), from which it differs only in a wider adductorial sulcus and a posterior lobe situated closer to the posterior margin.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

## **Nezamysliidae** fam. n.

*Type genus*: *Nezamyslia* PŘIBYL, 1955

**Diagnosis.** — Palaeocopida with a flat, semioval carapace. Hinge margin long, straight, provided with an anterior and, sometimes, posterior cardinal spine. Adventral structure connected with dorsal ridge in a ringe-like structure. A smooth adductorial spot (in the genus *Obotritia* ADAMCZAK) or a single or, sometimes, a group of three adductorial pits (in *Nezamyslia* PŘIBYL) occur in the anterodorsal part of the valve. A ventral carina may also occur. Lateral surface reticulated or pitted. Dimorphism not recorded.

**Remarks.** — Dimorphism in the species *Nezamyslia magnifica* POLENOVA was described by POLENOVA (1974). On this basis, as well as due to considerable similarity to some Primitiopsidae, that author (*l.c.*) assigned the genus *Nezamyslia* PŘIBYL to this family, tentatively, since the dimorphism of this type (ventral dolon) is characteristic of the Eurychilinacea rather and not of Primitiopsacea. In the present writer's opinion, *N. magnifica* probably belongs to the Eurychilinacea and certainly could not be assigned either to the genus *Nezamyslia*, or to other representatives of the Nezamysliidae fam. n. For, this species differs from the Nezamysliidae in strongly covex valves, lack of a distinct adductorial pit and an oblique position of the adventral structure in relation to the lateral surface. Thus, dimorphism in the Nezamysliidae remains unknown, which precludes the possibility of assigning this group to the existing superfamilies of the Palaeocopida.

The genera *Nezamyslia* PŘIBYL and *Obotritia* ADAMCZAK have so far been assigned to the Kirkbyacea (PŘIBYL 1955; ADAMCZAK 1968; COPELAND 1977). However, the absence of what is known as a "kirkbyan pit" characteristic of this superfamily makes such a classification impossible. A connection of the adventral structure with the dorsal ridge is known, apart from the Kirkbyacea, also in other groups of the Palaeocopida, for example, in the Eurychilinacea and Primitiopsacea. The representatives of the Nezamysliidae fam. n. differ from those of the Eurychilinacea in a narrow, smooth, ridge-like adventral structure perpendicular to the lateral surface, the presence of cardinal spines and a more anterior situation of the adductorial pit or adductorial spot.

On the other hand, we observe a great similarity of the Nezamysliidae to some Primitiop-

sacea, to the genera *Limbinaria* SWARTZ et WHITMORE and *Limbinariella* SARV (POLENOVA, 1974). The lack of dimorphic perimarginal structures is the only obstacle in assigning it to this superfamily.

The family Nezamysliidae fam. n. includes the following genera: *Nezamyslia* PŘIBYL, 1955 and *Obotritia* ADAMCZAK, 1968.

In the present writer's opinion, *N. carinata* REYNOLDS and *N. walliseri* GROOS-UFFENORDE, described from the Emsian of Australia and southern France (REYNOLDS 1978; GROOS-UFFENORDE 1979), marked by the presence of a ventral carina and wide, radially striate adventral structure should form a separate genus of the family Nezamysliidae fam. n.

Age: Lower and Middle Devonian of Eurasia, Australia and North America.

## Genus *Nezamyslia* PŘIBYL, 1955

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

**Diagnosis** (revised). — Nezamysliidae with or without a ventral carina and with a single or a group of three adductorial pits. A small preadductorial node occurs sometimes. Adventral ridge low, smooth, sometimes with a spine in its anterodorsal part. Surface reticulate. The meshes of reticulation large, polygonal.

**Remarks.** — *Obotritia* ADAMCZAK was regarded by some authors (GROOS 1969; POLENOVA 1974; OLEMPSKA 1979), as junior synonym of the genus *Nezamyslia* PŘIBYL. In the present writer's opinion the external form of the muscle scar has a high generic rank within the Palaeocopida and, for this reason, she suggests to treat both taxa mentioned above as two separate genera, following BERDAN and COPELAND (1973).

The genus *Nezamyslia* includes the following species: *N. bohemica* (PŘIBYL et ŠNAJDR, 1950) (= *Arcyzona gemmula* WEYANT, 1966), *N. circularis* COPELAND, *N. jucunda* POLENOVA, *N. perforata* COPELAND and *N. bicornuta* sp. n.

### *Nezamyslia bicornuta* sp. n.

(pl. 5:3–4)

*Holotype*: Tecnomorph carapace ING O/31; pl. 5:3.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *bicornutus* — bicornate.

**Material.** — Miastko 2 borehole: one carapace and one damaged valve from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace postplete, with anterior cardinal spine and an anterior adventral spine. Adductorial pit and a small preadductorial node encircled form below and on the sides by a thin ridge. Surface ornamented by reticulation in the form of large, shallow, polygonal meshes separated from each other by fine, thin walls. Ventral margin denticulate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/31 | 1.01 | 0.61 |
| RV ING O/32 | 1.24 | 0.68 |

**Description.** — Carapace flat, elongate, semi-elliplical in lateral outline. Hinge margin long, straight, with anterior cardinal spine occuring on each valve. Anterior and posterior margins rounded, the anterior lower than the posterior. Ventral margin slightly convex. Adventral structure in the form of a narrow, smooth ridge running parallel to margins, except for the upper corners of valves, in particular the posterior one a large part of which remains outside the ridge. In the anterodorsal part of valve, the adventral ridge is provided with a short, triangu-

lar spine. Anterior connection of the adventral and dorsal ridge indistinct. Anterior part of dorsal ridge runs very close to hinge margin.

Antero-dorsal part of valve slightly depressed. An adductorial pit, with a small preadductorial node, is situated in the lower part of this depressed area. This part of valve is surrounded from below and on the sides by a thin ridge formed by the walls of the nearest meshes of the reticulation. Reticulation of the lateral surface of valves is very fine and consists of large tetra- and pentagons. The walls of meshes make up very thin ridges. Subadventral area smooth. Free margin denticulate. Maximum width occurring in the anterior part of carapace.

**Remarks.** — *N. bicornuta* sp. n. is most similar to *N. jucunda* POLENOVA from the Lower Devonian of the Arctic regions of the USSR (POLENOVA 1974), from which it differs in its anterior cardinal spine directed anteriorly in horizontal position, in the presence of an anterior adventral spine, in an indistinct connection of the adventral and dorsal ridge in the anterior part of valve and in the position of its larger convexity in the anterior part of carapace.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

## Genus *Obotritia* ADAMCZAK, 1968

*Type species*: *Obotritia eifeliensis* ADAMCZAK, 1968

### *Obotritia eifeliensis* ADAMCZAK, 1968

(pl. 5:5)

1959. *Nezamyslia bohemica* (PŘIBYL et ŠNAJDR); ROZHDESTVENSKAYA: 192, pl. 6:7.
1964. *Ostracodarum* gen. ind. sp. A; BECKER: 89, pl. 6:5.
1968. *Obotritia eifeliensis* sp. n.; ADAMCZAK: 85–86, pl. 38: 1–3.
1969a. *Obotritia eifeliensis* ADAMCZAK; BECKER: 262–263, pl. 1:6.
1969. *Nezamyslia eifeliensis* (ADAMCZAK); GROOS: 39–40, pl. 19:14.
1979. *Nezamyslia eifeliensis* (ADAMCZAK); OLEMPSKA: 87-88, pl. 13:5.

**Material.** — Koczała 1 borehole: one left valve from the depth of 2,949.5–2,954.2 m; Miastko 2 borehole: a fragmentary right valve from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| LV ING O/33 | 1.14 | 0.77 |

**Remarks.** — *Obotritia eifeliensis* ADAMCZAK differs from *Obotritia* ? sp. from the Lower Devonian of Alaska (BERDAN and COPELAND, 1973) in its reticulate surface and adventral ridge running parallel to free margin.

**Occurrence.** Poland: Holy Cross Mts., Łysogóry Region — Eifelian (Grzegorzowice Formation), Kielce Region — U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania — U. Givetian; W. Germany: Eifel Mts., and Rhenish Slate Mts. — U. Eifelian to M. Givetian; USSR: Bashkiria — Eifelian and Givetian (Biya and Afonin Beds).

## Family **Rozhdestvenskayitidae** MC GILL, 1966

## Genus *Fellerites* GRÜNDEL, 1962

*Type species*: *Fellerites bohlenesis* GRÜNDEL, 1962

### *Fellerites tuimazensis* (ROZHDESTVENSKAYA, 1959)

(pl. 7:11)

1959. *Aparchites tuimazensis* sp. n.; ROZHDESTVENSKAYA: 132–133, pl. 1:1–4.
1960. *Aparchites auriculiferus* ROZHDESTVENSKAYA sp. n.; ROZHDESTVENSKAYA: 284–285, pl. 58:2.
1962. *Aparchites auriculiferus* ROZHDESTVENSKAYA; ROZHDESTVENSKAYA: 171–172, pl. 1:1a–b, 2a–b
1979. *Rozhdestvenskayites tuimazensis* (ROZHDESTVENSKAYA); OLEMPSKA: 85–86, pl. 13:1.

**Material.** — Miastko 2 borehole: a dozen or so carapaces and single valves from a depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/54 | 1.53 | 1.19 |

**Description.** — See ROZHDESTVENSKAYA (1959).

**Remarks.** — The presence of auriculate processes developed in cardinal angles and of a marginal ridge allow one to assign this species to the genus *Fellerites* GRÜNDEL.

**Occurrence.** — Poland: Holy Cross Mts. — U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania — U. Givetian; USSR: Bashkiria — Eifelian (*Calceola* and Biya Beds).

## Family uncertain

## Genus *Evlanovia* EGOROV, 1950

*Type species*: *Evlanovia tichonovichi* EGOROV, 1950

**Remarks.** — The genus *Evlanovia* EGOROV was assigned by SOHN (1961) and BRAUN (1967) to the family Aechminellidae. It follows, however, from SOHN'S (1975) revision of this family that its representatives are characterized by the lack of marginal ridge and nodes in the ventral half of carapace. For this reason, the genus *Evlanovia* should be excluded from this family. No family to which this genus could be assigned is known to the present writer.

### *Evlanovia* sp. 1

(pl. 7:12)

**Material.** — Miastko 2 borehole: one damaged RV from a depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| RV ING O/55 | 0.61 | 0.42 |

**Remarks.** — This single specimen, assigned to the genus *Evlanovia* EGOROV on the basis of its general outline and the presence of nodes and a marginal ridge, is noteworthy inasmuch as it is surely a representative of the genus *Evlanovia* met within deposits older than the Upper Devonian ones. Like *E. tichonovichi* EGOROV from the Frasnian of the Russian Platform (EGOROV 1950), the Polish form has two ventral nodes, but differs from this species in its reticulate and not smooth surface and in an obtuse and not pointed posterodorsal node.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

## Genus *Coeloenellina* POLENOVA, 1952

*Type species*: *Coeloenellina parva* POLENOVA, 1952

### *Coeloenellina pomeranica* sp. n.

(pl. 7:9–10)

*Holotype*: Carapace ING O/53; pl. 7:9.

*Type locality*: Chojnice 5 borehole, depth 4,429.4–4,436.4 m, W. Pomerania.

*Type horizon*: U. Givetian.

*Derivation of the name*: After the name of the Pomerania Province, Poland.

**Material.** — Chojnice 5 borehole: ten carapaces from the depth of 4,517.4–4,526.1 m and two carapaces from the depth of 4,429.4–4,436.4 m; Koczała 1 borehole: six carapaces from the depth of 3,041.8–3,119 m and several scores of carapaces from the depth of 2,938.3–2,984.6 m Miastko 2 borehole: 15 carapaces from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace small, slightly convex, oval in lateral outline. Dorsal margin straight ventral slightly convex. Anterior and posterior margins symmetrically rounded. Hinge line and ventral part of contact line occurring in narrow depressions. Marginal ridges thin. Lateral surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/53 | 0.51 | 0.35 |
| C ING O/54 | 0.53 | 0.35 |

**Description.** — Carapace small, oval in lateral outline. Dorsal margin straight. Anterior and posterior margins equal in height, symmetrically rounded. Ventral margin slightly convex. Right valve, somewhat larger than left, overlapping the latter most strongly along the antero- and posterodorsal margin. Hinge line situated in a narrow depression. A similar depression is developed on the ventral surface of carapace. Thin marginal ridges run along the free margin of each valve. The largest convexity of carapace occurs in its middle part. Carapace, viewed dorsally, in the form of a flat rhomb. Surface smooth.

**Remarks.** — As compared with the known representatives of the genus *Coeloenellina* POLENOVA, the species described differs from them in the presence of a depression onə the ventra surface of carapace. In its outline, *C. pomeranica* resembles to the greatest extent *C. parva* POLENOVA from the Starooskol Horizon of the Russian Platform (POLENOVA 1952), differing from it in a flattened carapace, symmetry of anterior and posterior margins, almost equal height of both valves and the presence of a ventral depression.

**Occurrence.** — Poland: W. Pomerania — U. Givetian.

Order **Platycopida** SARS, 1866
Superfamily **Kloedenellacea** ULRICH et BASSLER, 1908
Family **Kloedenellidae** ULRICH et BASSLER, 1908
Genus *Poloniella* GÜRICH, 1896

*Type species*: *Poloniella devonica* GÜRICH, 1896

**Diagnosis** (revised). — Trisulcate kloedenellids with left valve overlapping the right one and having a wide stragulum (covering as much as one-fourth of the length of hinge line), not clearly set off from the hinge line.

**Remarks.** — A diagnosis of the genus *Dizygopleura* ULRICH et BASSLER was presented by BERDAN (1972) who thus explained a so far controversial subject of either the congenerity or separate character of the genera *Dizygopleura* and *Poloniella* GÜRICH. The manner of developing the stragulum was considered by that author as the most important character differing the two genera. According to this new interpretation, the genus *Dizygopleura* is marked by the presence of a narrow stragular process occurring above $S_1$ which fits into a deep narrow notch in the right valve (BERDAN 1972), while *Poloniella* displays a wide stragulum overlapping the right valve in the form of a gentle arc.

The two genera are marked by a considerable variability of lobation. Species having ventral connections $S_1$ and $S_3$, as well as those devoid of them occur in each of these genera. This variability is, however, interspecific and never intraspecific, as it was suggested by ADAMCZAK (1961).

BERDAN'S (1972) logical conception was accepted by not all authors, even American ones. KESLING and CHILMAN (1978) continue to employ the former division based on lobation and

assign, for example, *D. cingulata* (WARTHIN), having a narrow, pointed stragulum typical of *Dizygopleura*, to *Poloniella* and *P. trisinuata* (VAN PELT), having a wide and gently arcuate stragulum, to *Dizygopleura*.

## *Poloniella tertia* KRÖMMELBEIN, 1953
(pl. 8:4–6)

1953. *Poloniella tertia* sp. n.; KRÖMMELBEIN: 58, pl. 3:3.
1961. *Poloniella tertia* KRÖMMELBEIN; ADAMCZAK: 303–306, fig. 10–11, pl. 4:1–2.
1964. *Poloniella* cf. *claviformis* (KUMMEROW); BECKER: 77, pl. 13: 5–6.
1969. *Poloniella tertia* KRÖMMELBEIN; GROOS: 44, pl. 6:3.
1972. *Dizygopleura cingulata* (WARTHIN); GUREVICH: 320, pl. 7:8.

**Material.** — Chojnice 5 borehole: one heteromorph and one tecnomorph carapace from the depth of 4,683.7–4,691.7 m, two heteromorph carapaces and one valve from the depth of 4,482–4,545.1 m and one heteromorph carapace and three tecnomorph valves from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: one heteromorph and one tecnomorph valve from the depth of 2,990.2–3,019 m, 11 heteromorph carapaces and 17 tecnomorph carapaces and 17 tecnomorph valves from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: one tecnomorph carapace and one tecnomorph valve from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| **C** ♀ ING O/61 | 0.95 | 0.52 |
| **C** ♂ ING O/59 | 0.85 | 0.46 |
| **C** ♂ ING O/60 | 0.84 | 0.48 |

**Remarks.** — The material the present writer had at her disposal included, in addition to carapaces of adults, those of juvenile forms. However, the existence of a ventral connection of sulci $S_1$ and $S_3$ suggested by ADAMCZAK (1961) was not found in any ontogenetic stage.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; W. Germany: Eifel Mts. — Eifelian and Givetian, Rhenish Slate Mts. — M. Givetian; USSR: Volhynia — U. Givetian (Pelcha Beds).

## *Poloniella trisinuata* (VAN PELT, 1933)
(pl. 9:8; pl. 10:1)

1933. *Dizygopleura trisinuata* VAN PELT; 328, pl. 19:61–62.
1934. *Dizygopleura oblonga* WARTHIN: 211, pl. 1:8.
1936. *Dizygopleura oblonga* WARTHIN; STEWART: 750–751, pl. 101:1–4.
1945. *Dizygopleura trisinuata* VAN PELT; STEWART and HENDRIX: 90, pl. 10:9–11.
1950. *Dizygopleura trisinuata* VAN PELT; STEWART: 660–661, pl. 86:1–3.
1952. *Dizygopleura clara* sp. n.; POLENOVA: 104–106, pl. 6:8–9.
1961. *Poloniella diversa* sp. n.; ADAMCZAK: 306–307, fig. 12–13, pl. 5:2a–c.
1972. *Poloniella oblonga* (WARTHIN); GUREVICH: 317–318, pl. 7:5.
1978. *Dizygopleura trisinuata* VAN PELT; KESLING and CHILMAN: 77, 79, pl. 44:13–16; pl. 45:5–24; pl. 47:43–54; pl. 103:25–28.

**Material.** — Chojnice 5 borehole: two tecnomorph valves from the depth of 4,683.7–4,691.7 m, one heteromorph carapace and six tecnomorph carapaces and 18 valves from the depth of 4,482–4,545.1 m and two heteromorph valves and four tecnomorph carapaces and 15 valves from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: one tecnomorph carapace from the depth of 3,041.8–3,119 m, one tecnomorph carapace from the depth of 2,990.2–3,019 m and nine heteromorph carapaces and 24 tecnomorph carapaces and five valves from the depth

of 2,942.6–2,984.6 m; Miastko 2 borehole: three tecnomorph carapaces and two valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h | w |
|---|---|---|---|
| C ♂ ING O/70 | 0.74 | 0.40 | 0.41 |
| C ♂ ING O/71 | 0.77 | 0.43 | — |

**Remarks.** — *P. trisinuata* (VAN PELT) differs from the most closely related species *P. claviformis* (KUMMEROW) in a longer $S_2$, which reaches much below midheight and is, at the same time, more contracted and bent in its lower part and in $S_1$ more strongly incurved in the ventral part.

In the material under study, both adult and juvenile specimens are marked by the lack of ventral connection between $S_1$ and $S_3$. This does not, therefore, corroborate ADAMCZAK's (1961) suggestion that such a connection exists in the youngest ontogenetic stages of this species.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; USSR: Russian Platform — U. Givetian (Starooskol Horizon), Volhynia — U. Givetian (Pelcha Beds); USA: northwestern Ohio and northeastern Michigan — M. Devonian (Silica Formation).

## *Poloniella adamczaki* sp. n.

(pl. 8:1–3)

1952. *Dizygopleura clara* sp. n.; POLENOVA: pl. 7:1.
1961. *Poloniella cingulata* WARTHIN; ADAMCZAK: 308–311, fig. 14, pl. 6:1–2.
*Holotype*: Heteromorph carapace ING O/57; pl. 8:2.
*Type locality*: Koczała 1 borehole, depth 2,949.4–2,959.2 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: After the name of Dr. FRANCISZEK ADAMCZAK, ostracodologist.

**Material.** — Chojnice 5 borehole: one heteromorph and two tecnomorph carapaces from the depth of 4,483.7–4,691.7 m; Koczała 1 borehole: one tecnomorph and one heteromorph carapace from the depth of 3,041.8–3,048 m, one tecnomorph carapace from the depth of 2,996.4–3,006.1 m and five heteromorph carapaces and three tecnomorph carapaces and seven valves from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: five tecnomorph valves from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace preplete, with the posterior end truncate in both the hetero- and tecnomorphs. Ventral margin slightly concave, parallel to dorsal. $S_3$ long, reaching almost the dorsal margin, with its upper part slightly deflected posteriorly. $S_1$ and $S_3$ connected ventrally. A crest occurs on $L_4$ of both tecno- and heteromorphs.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♀ ING O/56 | 1.03 | 0.58 |
| C ♀ ING O/57 | 0.90 | 0.51 |
| C juv. ING O/58 | 0.74 | 0.43 |

**Description.** — Heteromorph: Carapace oval in lateral outline, slightly preplete. Dorsal margin slightly convex, ventral slightly concave, parallel to the former. Anterior margin rounded. Posterior part of carapace truncate. Sulci relatively wide and deep. $S_1$ and $S_3$ parallel to one another and inclined at an angle of about 100° to dorsal margin, connected ventrally. $S_2$, reaching below the midheight of carapace, runs diagonally, contracting uniformly downwards, with a slight anterior bend occurring halfway its length. $S_3$ long, almost reaching the dorsal margin, with a slight sigmoidal posterior bend observed in its upper part. A not very sharp,

gently arcuate crest occurs on $L_4$. $L_1$ and $L_4$ are connected ventrally by a narrow ventral ridge devoid of any sharp edge and parallel to both the ventral and dorsal margin.

Stragulum wide overlapping the right valve in the form of a gentle arc. Marginal ridge relatively wide.

Tecnomorph: Tecnomorphs differ from heteromorphs in a more strongly posteriorly narrowing lateral outline of their carapaces and in their narrow $L_4$.

**Remarks.** — Specimens of *P. adamczaki* sp. n. from the Holy Cross Mts. have been described by ADAMCZAK (1961) as *P. cingulata* WARTHIN. Unfortunately however, they have little in common with the last-named species which in fact belongs to *Dizygopleura*. Primarily, they have a wide stragulum, whereas *D. cingulata* (WARTHIN) displays a narrow, pointed triangular tooth. Also different is the outline of carapaces: in *P. adamczaki* the dorsal and ventral margins are parallel to one another, whereas in *D. cingulata* they converge. In *P. adamczaki*, the sulci are wider and deeper and $S_3$ reaching almost the dorsal margin, while in *D. cingulata* this sulcus reaches only the midheight of carapace. In *P. adamczaki*, $L_4$ of heteromorphs is provided with a crest which is lacking in those of the other species. In addition, *P. adamczaki's* ventral ridge is devoid of a sharp edge and its marginal ridge is wide in contrast to that of *D. cingulata*.

In its outline and the shape of its sulci and lobes, *P. adamczaki* sp. n. is unusually similar to *P. tertia* KRÖMMELBEIN. A ventral connection between sulci $S_1$ and $S_3$ occurring in *P. adamczaki* and lacking in *P. tertia* is the only essential difference between the two species.

**Occurrence.** — Poland: Holy Cross Mts. — Givetian (Skały Formation), W. Pomerania — U. Givetian; USSR: Russian Platform — U. Givetian (Starooskol Horizon).

## *Poloniella regularis* sp. n.

(pl. 9:1–7)

*Holotype*: Tecnomorph carapace ING O/66; pl. 9:1.
*Type locality*: Koczała 1 borehole, depth 2,978.1–2,984.6 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *regularis* — regular.

**Material.** — Chojnice 5 borehole: one tecnomorph carapace from the depth of 4,482–4,545.1 m; Koczała 1 borehole: six heteromorph carapaces and two valves, as well as 36 tecnomorph carapaces and 13 valves from the depth of 2,947.6–2,984.6 m; Miastko 2 borehole: one heteromorph carapace and several valves, six tecnomorph carapaces and several scores of valves from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace flat, subrectangular in lateral outline, with a rounded anterior and slightly truncate posterior end. Ventral margin slightly concave. Sulci narrow, perpendicular to hinge margin. $S_3$ straight, $S_1$ sinusoidally depressed halfway the height, connected with one another ventrally. $L_2$ semicircularly extended dorsally, wider on the left valve. Lobe $L_4$ straight, narrow in tecnomorph and extended and inflated in heteromorphs. Surface of lobes flat, with an indistint reticulation.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ holotype ING O/66 | 0.97 | 0.55 |
| C ♂ ING O/68 | 0.84 | 0.41 |
| LV ♀ ING O/69 | 1.03 | 0.44 |
| C ♀ ING O/67 | 0.92 | 0.48 |
| C juv. ING O/65 | 0.66 | 0.37 |
| C juv. ING O/64 | 0.53 | 0.32 |
| C juv. ING O/63 | 0.43 | 0.24 |

**Description.** — Heteromorph: Carapace large, oval, elongate, very regular and subrectangular in lateral outline, flattened. Dorsal margin straight, ventral slightly concave. Anterior margin uniformly rounded, posterior slightly truncate. $S_1$ and $S_3$ narrow, perpendicular to dorsal margin, connected ventrally with a ventral sulcus which is perpendicular to them. The distance between anterior margin and $S_1$ equals that between $S_3$ and posterior margin. $S_1$ sinusoidally bent in its middle part. This bend, very distinctly visible even in juvenile specimens, is formed as a result of the extension of $L_2$ in its dorsal part. $S_2$ comma-shaped, reaching mid-height. $S_3$ straight, long, reaching the dorsal margin. Lobes flattened. $L_2$ semicircularly extended in the dorsal part. $L_4$ strongly inflated, wide, occupying the whole posterior part of the valve. Surface of lobes flat, indistinctly reticulate. Ventral ridge distinct, of equal thickness and height.

Tecnomorph: Posterior lobe $L_4$ on tecnomorph carapaces narrow, with a distinct crest in its posterior margin. Beyond this crest, the surface of $L_4$ obliquely and, at first, fairly steeply descends towards the posterior margin of valves.

**Remarks.** — *P. regularis* sp. n, differs from other species of the genus *Poloniella* GÜRICH in its regular, rectangular outline, vertical $S_1$ and $S_3$ the anterior one of which is characteristically bent in its middle part and in flat surfaces of its lobes.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Poloniella* sp. 1
(pl. 8:7)

**Material.** — Koczała 1 borehole: one tecnomorph carapace from the depth of 3,089–3,094 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ ING O/62 | 0.74 | 0.43 |

**Description.** — Tecnomorph: Carapace subrectangular in outline, with a rounded anterior and narrower, ventrally slightly truncate, posterior margin. $S_1$ straight, running slightly obliquely toward the anterior part. $S_2$ fairly long, comma-shaped. $S_3$ arcuate, connected ventrally with $S_1$. $L_2$ widened fairly strongly in its middle part toward $S_2$. $L_3$ strongly widening ventrally. $L_4$ narrow, arcuate, provided in its posterior part with a crest. Part of carapace behind $L_4$ strongly shortened and, consequently, the posterior end, as viewed dorsally, is truncate. Surface reticulate.

**Remarks.** — The form described is most similar in its outline and shape of $S_3$ and $L_4$ to *Poloniella trisinuata* VAN PELT, from which it differs in an obliquely running $S_1$, strongly widened $L_2$, longer and more oblique $S_2$, shorter part of carapace behind $L_4$ and, what is most important, in ventral connection of $S_1$ and $S_3$. The last-named character approached this form to *Poloniella adamczaki* sp. n. from which in turn *Poloniella* sp. 1 differs, however, in an arcuate $S_3$, more rectangular outline of carapace and its shortened posterior part, as well as in a more strongly widened $L_2$. It is probably a new species.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Poloniella* sp. 2
(pl. 10:8)

**Material.** — Miastko 2 borehole: one left heteromorph valve from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| LV ♀ ING O/78 | 1.31 | 0.51 |

**Description.** — Heteromorph: Valve large, with a high and rounded anterior and lower, truncate posterior margin. Sulci wide, deep, perpendicular to the dorsal margin. Lobes narrow. $L_2$ only slightly widened in its dorsal part. $S_1$ gently bent posteriorly in the ventral part. $S_3$ widening towards the posterior end where it bends anteriorly in a hooklike manner. $S_2$ very wide and long, reaching below the midheight and slightly anteriorly. $L_2$ joins $L_3$ in the form of the letter U slightly widened in its lower part. $S_1$ not connected ventrally with $S_3$. A distinct, sharp crest runs obliquely and posteriorly over an inflated $L_4$. Behind the crest, the surface of lobe slopes at an angle of 45° towards the posterior margin of valve which is conspicuous in ventral view. Valve is twice as wide in its posterior than anterior part.

**Remarks.** — The specimen under study resembles heteromorphs of *Poloniella spriesterbachii* ZAGORA from the Lower Eifelian of Thuringia (ZAGORA 1968). *Poloniella* sp. 2 is marked, however, by the lack of ventral connection between $S_1$ and $S_3$, $S_3$ more strongly widened in the lower part and in its crest which is more distinct on $L_4$ of the heteromorph. This specimen belongs most certainly to a new species.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Uchtovia* EGOROV, 1950

*Type species*: *Uchtovia polenovae* EGOROV, 1950

### *Uchtovia materni* BECKER, 1971

(pl. 10:2)

1964. *Cavellina*? *abundans* POKORNÝ; MAGNE, pl. 30:263–267.
1971*b*. *Uchtovia materni* sp. n.; BECKER: 32–33, pl. 4:36–39; pl. 9:79.

**Material.** — Chojnice 5 borehole: two carapaces of tecnomorphs from the depth of 3,786.3–3,790.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♂ ING O/72 | 0.92 | 0.43 |

**Description.** — See BECKER (1971*b*).

**Remarks.** — The specimens under study are rather poorly preserved, but, on the basis of the general outline of valve and shape of two sulci, they may be most certainly assigned to *Uchtovia materni* BECKER.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian; France: Dinant Basin, M. Frasnian.

### *Uchtovia refrathensis* (KRÖMMELBEIN, 1954)

(pl. 10:3–7)

1954. *Sulcella refrathensis* sp. n.; KRÖMMELBEIN: 252–253, pl. 1:5.
1959. *Uchtovia dissimilis* sp. n.; ROZHDESTVENSKAYA: 145–146, pl. 11:1–2.
1969. *Sulcella refrathensis* KRÖMMELBEIN; GROOS: 53, pl. 9:2.
1969. *Sulcella* sp. Gruppe *S. refrathensis-speculaea*; GROOS: 53, pl. 9:1.

**Material.** — Chojnice 5 borehole: five carapaces and one valve of a heteromorph and one tecnomorph carapace from the depth of 4,482-4,545.1 m; Koczała 1 borehole: five heteromorph carapaces and 14 carapaces and the valves of tecnomorphs from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ♀ ING O/73 | 0.93 | 0.49 |
| C ♀ ING O/74 | 0.97 | 0.49 |

| | | |
|---|---|---|
| C♀ ING O/75 | 1.0 | 0.53 |
| C juv. ING O/76 | 0.77 | 0.45 |
| C juv. ING O/77 | 0.64 | 0.35 |

**Description.** — See KRÖMMELBEIN (1954) and ROZHDESTVENSKAYA (1959).

**Remarks.** — The first description of the species was based on specimens of tecnomorphs only (KRÖMMELBEIN 1954). The present writer had also at her disposal specimens of heteromorphs which are marked by a strongly inflated posterior part of carapace, higher posterior margin and truncate posterior part of carapace. The degree of pointedness of the posterior end is, however, variable. For, there also occur specimens with a rounded posterior end. In heteromorphs, the preadductorial sulcus is generally very slightly outlined or not developed at all. Forms described by GROOS (1969) as *Sulcella* sp. Gruppe *S. refrathensis-speculaea* should be assigned to this species.

**Occurrence.** — Poland: W. Pomerania, U. Givetian: W. Germany: Rhenish Slate Mts., U. Givetian and L. Frasnian; USSR: Bashkiria, U. Givetian (Starooskol Horizon).

## *Uchtovia rozhdestvenskayae* sp. n.

(pl. 11:1–4)

1959. *Uchtovia abundans* (POKORNÝ); ROZHDESTVENSKAYA: 143–145, pl. 10:1–5.

*Holotype*: Tecnomorph carapace ING O/79; pl. 11:1.

*Type locality*: Koczała 1 borehole, depth 2,949.5–2,954 m, W. Pomerania.

*Type horizon*: U. Givetian.

*Derivation of the name*: After Dr. ANNA ROZHDESTVENSKAYA, Soviet ostracodologist.

**Material.** — Chojnice 5 borehole: eight tecnomorph carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: five heteromorph carapaces and several dozen tecnomorph carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: five carapaces and two valves of tecnomorphs from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace elongated, oval in lateral outline. Anterior and posterior margins almost symmetrically rounded, in tecnomorphs the posterior one slightly truncate in its lower half. A narrow compression area occurs along the anterior margin. Adductorial sulcus elongated, shallow. A posterior shoulder, most distinct in very young specimens, occurs in tecnomorphs. Ventral margin concave in adult and straight in juvenile forms.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♂ holotype ING O/79 | 1.06 | 0.55 |
| C♀ ING O/81 | 1.25 | 0.61 |
| C juv. ING O/80 | 0.74 | 0.42 |
| C juv. ING O/82 | 0.72 | 0.47 |

**Description.** — Heteromorph: Carapace elongated, oval in lateral outline. Dorsal margin straight. The length of stragulum equalling about 1/3 of the entire length of carapace. Posterior part of hinge margin situated in a narrow and shallow depression. Anterior and posterior margins almost equal in height and uniformly rounded. A narrow compression area occurs along the anterior margin of valve. Ventral margin concave. A shallow and narrow adductorial sulcus, not reaching the dorsal margin, is situated in the anterodorsal part of valve. It occurs at midlength of stragulum. Carapace strongly convex posteriorly, most so at 1/6 of the distance from the posterior margin. Slight keels are present along the middle part of ventral margin. Marginal ridges occur on the free margin of the right valve. Surface smooth.

Tecnomorph: The carapaces of tecnomorphs differ from those of heteromorphs in the presence of a distinct shoulder in the posterior part of valve, turning into a ventral keel in the lower part of valve. In addition, tecnomorphs have a preadductorial sulcus, less distinctly outlined than the adductorial one. Dorsal and ventral margins convex.

**Remarks.** — *U. rozhdestvenskayae* resembles in its outline *Uchtovia refrathensis* (KRÖMMELBEIN) from the Lower Frasnian of the Rhenish Slate Mts., W. Germany (KRÖMMELBEIN 1954), differing from it in a less strongly developed, narrow, elongate adductorial sulcus.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Bashkiria, U. Givetian (Staro-oskol Horizon).

*Uchtovia* sp. 1

(pl. 11:5–6)

**Material.** — Koczała 1 borehole: two heteromorph carapaces and eight tecnomorph carapaces, not very well preserved from the depth of 3,041.8–3,119 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ ING O/84 | 1.19 | 0.61 |
| C juv. ING O/83 | 0.79 | 0.42 |

**Remarks.** — In their outline the carapaces of heteromorphs and tecnomorphs of *Uchtovia* sp. 1 resemble *Uchtovia rozhdestvenskayae* sp. n., but differ from them in the presence of a small, round (and not elongate), pit and in a less distinct shoulder in the posterior part of carapace in tecnomorphs. This is probably a new species.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Genus *Evlanella* EGOROV, 1950

*Type species*: *Evlanella ljaschenkoi* EGOROV, 1950

*Evlanella caduca* sp. n.

(pl. 11:7–8)

*Holotype*: Heteromorph carapace ING O/85; pl. 11:7.
*Type locality*: Koczała 1 borehole, depth 2,949.5–2,954.2 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *caducus* — falling.

**Material.** — Koczała 1 borehole: one carapace of a heteromorph and three of tecnomorphs from the depth of 2,949.5–2,954.2 m.

**Diagnosis.** — *Evlanella* species with an incomplete spiral ridge devoid of its anterior and anterodorsal parts. Dorsal margin fairly strongly convex. Surface reticulate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ holotype ING O/85 | 0.80 | 0.48 |
| C♂ ING O/86 | 0.60 | 0.42 |

**Description.** — Heteromorph: Carapace oval in lateral outline, slightly preplete. Dorsal margin convex. Anterior and posterior margins uniformly rounded, almost equal in height. Ventral margin concave in its middle part. Spiral ridge incompletely developep, most distinct in its posterior and ventral parts and less so in the dorsal part. No spiral ridge occurs, on the other hand, in the posterior and anterodorsal parts of valve. Adductorial sulcus shallow, widening upwards. A slightly outlined preadductorial lobe occurs before the adductorial sulcus. A depression occurring before the posterior ridge continues in the form of a narrow sulcus running along the ventral ridge. Surface reticulate.

Tecnomorph: The carapaces of tecnomorphs differ from those of heteromorphs in a less distinctly outlined posterior depression.

**Remarks.** — An incomplete spiral ridge devoid of its anterior and anterodorsal parts,

a convex dorsal and uniformly rounded posterior margin are characters which differ the species described from other so far known representatives of this genus. In regard to morphology, the form under study constitutes a transitional link between species of the genus *Evlanella* EGOROV with typically strongly developed spiral ridge and those of the genus *Eoevlanella* POLENOVA which are marked by the presence of only ventral and dorsal parts of this ridge (POLENOVA 1974). An extremely strong reduction of a ridge limited only to ventral parts is illustrated by *Evlanella mitis* and *E. mirabilis* erected by ADAMCZAK (1968). Their assignement to the genus *Evlanella* is rather doubtful as POLENOVA (1974) created the genus *Eoevlanella*.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Superfamily **Cytherellacea** SARS, 1866
Family **Cavellinidae** EGOROV, 1950

Genus *Cavellina* CORYELL, 1928
*Type species*: *Cavellina pulchella* CORYELL, 1928

*Cavellina parvula* sp. n.
(pl. 12:2).

*Holotype*: Carapace ING O/88; pl. 12:2.
*Type locality*: Koczała 1 borehole, depth 2,978.1–2,984.6 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *parvulus* — very small.

**Material.** — Chojnice 5 borehole: one carapace from the depth of 4,683.7–4,691.7 m, ten carapaces from the depth of 4,482–4,545,1 m and several dozen carapaces from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: more than 1,000 carapaces from the depth of 2,990.3–3,019 m; Miastko 2 borehole: about 1,000 carapaces from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace small, symmetrically outlined. Dorsal margin convex, most strongly bent in its middle part, arcuate on the right and angular on the left valve. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/88 | 0.55 | 0.37 |

**Description.** — Carapace small, amplete. Dorsal margin bent in its middle, gently and arcuately on the right and angularly on the left valve. Anterior and posterior margins symmetrically rounded, equal in height. Ventral margin straight. The largest height in the middle part of carapace equals about 0.62 of the length. The largest convexity of heteromorph carapaces, observed in the posterior and of tecnomorph ones in the middle part where it equals about 0.45 of the height. Lateral surface smooth.

**Remarks.** — The species abundantly occurs in all the profiles studied. It is most similar to *Cavellina mesodevonica* POKORNÝ (1950) from the Givetian of Bohemia and *C. accurata* POLENOVA (1952) from the Starooskol Horizon of the Russian Platform. It differs from the two species in a more symmetrical outline of carapace, angularly bent middle part of the dorsal margin of the left valve and more strongly convex carapace.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Cavellina subegorovi* sp. n.
(pl. 12:1)

*Holotype*: Carapace ING O/87; pl. 12:1.
*Type locality*: Koczała 1 borehole, depth 2,978.1–2,984.6 m. W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: The name suggests a similarity to the species *Cavellina egorovi* SHISHKINSKAYA.

**Material.** — Chojnice 5 borehole: 15 carapaces from the depth of 4,482–4,545.1 m and one carapace from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: several dozen carapaces from the depth of 2,990.3–3,019 m; Miastko 2 borehole: five carapaces from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace elongate, oval in lateral outline. The strongest bend of the dorsal margin occurs in the middle part of carapace. Anterior margin lower than the posterior. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/87 | 0.72 | 0.43 |

**Description.** — Carapace oval, elongate. Anterior and posterior margins uniformly rounded, anterior lower than the posterior. Dorsal margin forms an arc whose strongest bend occurs halfway the length of carapace. A slightly angular bend occurs in this place on the dorsal margin of the left valve. Ventral margin straight. Maximum height equals about 0.58 of the length in the middle part of carapace. Maximum width occurs in the middle part of tecnomorph carapace where it equals 0.40 of the length and in the posterior part of heteromorphs where it equals about 0.43 of the length. Surface smooth.

**Remarks.** — *Cavellina subegorovi* sp. n. is most similar in outline to *C. egorovi* SHISHKINSKAYA from the Upper Givetian of the Saratov District (SHISHKINSKAYA 1959), but differs from it in the position of a bend of its dorsal margin in the middle part of carapace, in a uniform convexity of carapace and in the shape of the margins of the right valve which are not thickened.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## *Cavellina sublongula* sp. n.

(pl. 12:3)

*Holotype*: Carapace ING O/89; pl. 12:3.
*Type locality*: Chojnice 5 borehole, depth 4,429.4–4,436.4 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: The name suggests a similarity to *Cavellina longula* COOPER.

**Material.** — Chojnice 5 borehole: two carapaces from the depth of 4,683.7–4,691.7 m, 11 from the depth of 4,482–4,545.1 m and 30 from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: one carapace from the depth of 3,041.8–3,119 m and 20 from the depth of 2,990.3–3,019 m.

**Diagnosis.** — Carapace irregularly oval in lateral outline, amplete. Anterior margin lower than the posterior. Dorsal margin strongly bent in the middle part. An arcuate depression occurs on the lateral surface of valve near the anterior margin. Right valve considerably larger than the left. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/89 | 0.76 | 0.45 |

**Description.** — Carapace irregularly oval in lateral outline. Dorsal margins of both valves strongly bent in the middle part. Anterior and posterior margins rounded, anterior lower than the posterior. Ventral margin of the right valve straight and of the left concave. An arcuate depression occurs on each valve near the anterior margin. Maximum height, equalling 0.47 of the length occurs in the middle part of carapace. Maximum convexity — in its posterior part. Right valve, considerably larger, overreaches the left one along all margins. Surface smooth.

**Remarks.** — This species resembles *Cavellina longula* COOPER from the Upper Carboniferous of North America (COOPER 1941) from which it differs, however, in the position of a maximum bend of the dorsal margin in its middle part, occurrence of a depression in the anterior part of valve and in somewhat different proportions (shorter and wider carapace).

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Mennerella* EGOROV, 1950

*Type species*: *Mennerella tuberosa* EGOROV, 1950

### *Menerella convexoventralis* sp. n.
(pl. 12:6–8)

*Holotype*: Heteromorph carapace ING O/92; pl. 12:6.
*Type locality*: Koczała 1 borehole, depth 2,633.3–2,636.6 m, W. Pomerania.
*Type horizon*.? U. Frasnian.
*Derivation of the name*. Lat. *convexus* — convex, *ventrum* — ventral surface.

**Material.** — Koczała 1 borehole: several dozen poorly preserved heteromorph carapaces and two carapaces and several valves of tecnomorphs from the depth of 2,633.3–2,636.6 m.

**Diagnosis.** — This species of the genus *Mennerella* has a convex ventral margin in both heteromorphs and tecnomorphs and maximum width of carapace occuring in its posterior part at a distance, equalling one-third of the length, from the posterior margin. A strong dimorphism is observed; tecnomorphs display two dorsal nodes and a thick ventral lobe.

Dimensions (in mm):

| | l | h | w |
|---|---|---|---|
| C♀ holotype ING O/92 | 1.39 | 0.75 | 0.61 |
| C♀ ING O/93 | 1.30 | 0.77 | 0.58 |
| C juv. ING O/94 | 0.98 | 0.70 | — |

**Description.** — Heteromorph: Carapace oval in lateral outline. Dorsal margins of both valves gently convex. Anterior and posterior margins rounded, posterior slightly truncate in the lower part. Ventral slightly convex. Two shallow, elongate sulci occur in the anterodorsal part of valve. Maximum convexity of carapace is observed in the posterior one-third of length. Hinge margin of the right, larger valve is provided over its whole length with a hinge groove corresponding to a sharp edge of the left valve. This groove continues, unbroken, into the contact groove of the free margin. Surface smooth or indistinctly granulose.

Tecnomorph: Tecnomorphs strongly differ from heteromorphs. Dorsal margin straight. Sulci considerably less distinct. Two nodes, the anterior one situated just before the anterior sulcus and posterior one — behind the posterior sulcus, occur in the dorsal part of valve. An arcuate ventral lobe, with a nodularly swelled posterior part, is situated in the ventral part of carapace.

**Remarks.** — *M. convexoventralis* sp. n. differs from others of the genus *Mennerella* EGOROV in a convex ventral margin and location of the maximum width of carapace in the posterior one-third of the length. The presence of the continuous groove on the inner margins of the right valve in the representatives of this genus induces the present writer to assign it to the Cavellinidae and not to the Kloedenellidae as it has so far been done by EGOROV (1950), POLENOVA (1953) and ROZHDESTVENSKAYA (1972).

**Occurrence.** — Poland: W. Pomerania, ?U. Frasnian.

Genus *Semilukiella* EGOROV, 1950

*Type species*: *Semilukiella zaspelovae* EGOROV, 1950

*Semilukiella polita* sp. n.

(pl. 12:4–5)

*Holotype*: Heteromorph carapace ING O/91; pl. 12:5.
*Type locality*: Chojnice 5 borehole, depth 4,390.1–4,395,4 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *politus* — elegant.

**Material.** — Chojnice 5 borehole: two heteromorph and two tecnomorph carapaces from the depth of 4,482–4,545.1 m and one heteromorph carapace and seven tecnomorph carapaces and one valve from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: one heteromorph carapace from the depth of 2,945–2,949.5 m.

**Diagnosis.** — Carapace oval in lateral outline, with an oblique adductorial pit. Dorsal margin slightly concave in the anterior part and angularly bent over the pit. Anterior margin lower than the posterior. Surface reticulate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ holotype ING O/91 | 0.61 | 0.39 |
| C♀ ING O/90 | 0.63 | 0.30 |

**Description.** — Heteromorph: Carapace oval in lateral outline. Dorsal margins of both valves angularly bent in the middle part. Its anterior part is slightly concave. Posterior part of the hinge line lies in a depression. Anterior margin lower than the posterior, uniformly rounded. Posterior margin slightly truncate in its lower half. Ventral margin straight or slightly concave. An elongate adductorial pit with a somewhat oblique axis occurs in the anterodorsal part of valves. Maximum convexity in the posterior part of carapace. Surface finely and closely reticulate.

Tecnomorph: It differs from heteromorph in a smaller degree of convexity of the posterior part of carapace. The carapaces of juvenile individuals are shorter and marked by an identical height of their ends, arcuately bent dorsal margin and finer reticulation.

**Remarks.** — The species described strongly resembles *Cavellina caduca* MC GILL from the Givetian of Canada (MC GILL 1963) from which it differs, however, in a larger, obliquely situated adductorial pit, slightly concavely outlined anterior part of the dorsal margin and a lower anterior end.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Order **Metacopida** SYLVESTER-BRADLEY, 1961

Superfamily **Thlipsuracea** ULRICH, 1894

Family **Thlipsuridae** ULRICH, 1894

Genus *Polyzygia* GÜRICH, 1896

*Type species*: *Polyzygia symmetrica* GÜRICH, 1896

*Polyzygia symmetrica* GÜRICH, 1896

(pl. 13:1–2)

1896. *Polyzygia symmetrica* n. gen, n. sp.; GÜRICH: 387–388, pl. 14:8–9.
1952. *Polyzygia gürichi* sp. n.; POLENOVA: 77–78, pl. 2:5.
1953. *Polyzygia symmetrica* GÜRICH; PŘIBYL: 321–322, pl. 2:2–11.
1953. *Polyzygia gürichi* sp. n.; KRÖMMELBEIN: 54–55, pl. 3:1.
1953. *Polyzygia geesensis* sp. n.; KRÖMMELBEIN: 56, pl. 3:2.
1969. *Polyzygia symmetrica* GÜRICH; GROOS: 21, pl. 4:9.
1972. *Polyzygia symmetrica* GÜRICH; MICHEL: 229–231, fig. 31–33, pl. 12:1–3 (with synonymy).

**Material.** — Chojnice 5 borehole: one carapace and one valve from the depth of 4,482–4,545.1 m and three valves from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: three carapaces and six valves from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: two carapaces and two valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/95 | 0.72 | 0.39 |
| C ING O/96 | 0.87 | 0.51 |

**Remarks.** — This species is widely distributed in the Devonian of Europe. Its synonymy and extensive description was given by MICHEL (1972).

**Occurrence.** — Poland: Holy Cross Mts., Eifelian and Givetian; W. Pomerania, U. Givetian; W. Germany: Eifel Mts. and Rhenish Slate Mts., Eifelian and Givetian; France: Dinant Basin, Givetian; Spain: Eifelian, Givetian and Frasnian; Algeria: Sahara, U. Eifelian and Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon).

## Genus *Favulella* SWARTZ et SWAIN, 1941

*Type species*: *Bythocypris favulosa* JONES, 1889

### *Favulella spissa* sp. n.

(pl. 13:3–6)

*Holotype*: Carapace ING O/99; pl. 13:5.
*Type locality*: Koczała 1 borehole, depth 2,730–2,734 m, W. Pomerania.
*Type horizon*: M. Frasnian.
*Derivation of the name*: Lat. *spissus* — dense.

**Material.** — Chojnice 5 borehole: three carapaces and two valves from the depth of 3,786.3–3,790.6 m; Koczała 1 borehole: several hundred carapaces and single valves from the depth of 2,727.8–2,734 m.

**Diagnosis.** — Carapaces outlined like an elongated triangle. Anterior margin higher than the posterior. The most anterior point of carapace is situated in its lower half. Except for their posterodorsal and posterior parts, the margins of valves are surrounded by a ridge. Ventral margin straight or slightly convex. An indistinct shallow groove is outlined only along the anterior part of ridge. Surface finely reticulate.

Dimensions (in mm):

| | l | h | w |
|---|---|---|---|
| 2 holotype ING O/99 | 0.85 | 0.52 | 0.38 |
| C ING O/100 | 0.85 | 0.58 | 0.43 |
| C juv. ING O/97 | 0.58 | 0.37 | — |
| C juv. ING O/98 | 0.64 | 0.34 | — |

**Description.** — Carapace outlined like an elongate, rounded triangle. Maximum height occurs in the anterior part. Dorsal margin arcuately, asymmetrically curved, with anterior part shorter and more convex. Hinge line situated in a depression occurring in the posterior part of dorsal margin. Anterior margin higher than the posterior. Ventral margin straight or slightly convex. A sharp-edged ridge runs along the ventral and anterior margins and anterior part of the ventral margin. A slightly outlined, shallow groove occurs along the anterior part of the ridge. Surface finely and closely reticulate. In the middle part, reticulation is obliterated on a circular adductorial spot. Maximum convexity of carapace occurs in the posterior part. A tripartite hinge of the left, longer valve is composed of two hinge grooves in the posterior and anterior parts of the margin connected with contact groove and a hinge list between them. Contact groove interrupted in its ventral part.

**Remarks.** — Among the largest specimens in the studied material there occur slim and elongate forms (?tecnomorphs), as well as shorter and wider ones, with their maximum convexity situated in the middle part (?heteromorphs). The juvenile forms are marked by an oval lateral outline, lack of anterior groove and a short ridge limited only to the anterior part of carapace. The species described differs from *Favulella lecomptei* BECKER from the Middle Frasnian of the Dinant Basin (BECKER 1971 *b*) in a longer carapace, shorter and less distinct groove, a sharp-edged ridge developed only in the anterodorsal, anterior and ventral parts, a straight or convex ventral margin and in a finer and closer reticulation. Specimens illustrated by MAGNE (1964, pl. 27, figs. 218–222; pl. 30, figs. 272-274) and identified as *Ropolonellus*? sp. F. from the Middle and Upper Frasnian of the Dinant Basin, France probably belong to *Favulella spissa* sp. n. and not to *F. lecomptei* BECKER (1971 *b*). Due to a poor quality of photographs published in MAGNE'S work (1964), this problem cannot be decisively solved at present.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian.

Family **Quasillitidae** CORYELL et MALKIN, 1936

Genus *Quasillites* CORYELL, et MALKIN, 1936

*Type species: Quasillites obliquus* CORYELL et MALKIN, 1936

*Quasillites quasillitiformis* (POLENOVA, 1952)

(pl. 14:1–9)

1952. *Costatia quasillitiformis* gen. et sp. n.; POLENOVA: 112–113, pl. 9:1.

**Material.** — Chojnice 5 borehole: six carapaces and four valves from the depth of 4,683.7–4,691.7 m, 17 carapaces from the depth of 4,482–4,545.1 m and several dozen carapaces and single valves from the depth of 4,390–4,436.4 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/109 | 0.90 | 0.48 |
| C juv. ING O/110 | 0.77 | 0.40 |
| C juv. ING O/108 | 0.77 | 0.40 |
| C juv. ING O/111 | 0.72 | 0.43 |
| C juv. ING O/107 | 0.62 | 0.39 |
| C juv. ING O/106 | 0.55 | 0.35 |
| C juv. ING O/105 | 0.48 | 0.29 |
| C juv. ING O/104 | 0.37 | 0.25 |
| C juv. ING O/103 | 0.30 | 0.19 |

**Remarks.** — The drawing of the holotype presented by POLENOVA'S (1952) slightly departs from its actual appearance. However, after comparing the specimens from Pomerania with the holotype, the present writer was able to assign them to POLENOVA'S genus. The presence of a stronger anterior shoulder in adult and a more genty outlined one in juvenile individuals is an important specific character not mentioned by POLENOVA (1952). This character differs *Q. quasillitiformis* from other species of the genus *Quasillites* CORYELL et MALKIN.

**Occurrence.** — Poland: W. Pomerania, U. Givetian: USSR: Russian Platform, U. Givetian (Starooskol Horizon), Volhynia, U. Givetian (Pelcha Beds).

Genus *Jenningsina* CORYELL et MALKIN, 1936

*Type species: Graphiodactylus catenulatus* VAN PELT, 1933

*Jenningsina cavernosa* (POLENOVA), 1952

(pl. 14:10–11; pl. 15:1–5)

1952. *Costatia cavernosa* gen. et sp. n.; POLENOVA: 111–112, pl. 8:4.

1953. *Amphissites inornatus* n. sp.; KUMMEROW: 47–48, pl. 2:10.

1972. *Jennigsina inornata* (KUMMEROW); GUREVICH: 288.

**Material.** — Chojnice 5 borehole: five carapaces and two valves from the depth of 4,482–4,545.1 m and five carapaces and six valves from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: one valve from the depth of 3,019–3,041.8 m and twenty-three carapaces and five valves from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: one valve from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/116 | 0.68 | 0.35 |
| C ING O/118 | 0.64 | 0.37 |
| C ING O/117 | 0.64 | 0.32 |
| RV ING O/113 | 0.68 | 0.32 |
| C juv. ING O/112 | 0.58 | 0.35 |
| C juv. ING O/115 | 0.50 | 0.30 |
| C juv. ING O/114 | 0.30 | 0.19 |

**Remarks.** — The drawing of the holotype published by POLENOVA (1952) departs from its actual appearance. The ridges in the anterior part of valves do not converge in the antero-ventral part as suggested by the illustration presented in this work, but run concentrically parallel to the anterior and ventral margins. Considerable variability in ornamentation, emphasized by POLENOVA (1952) has also been corroborated by the material from Pomerania, but there also occurs the type of ornamentation composed of ridges only (pl. 15:5 in the present paper) not mentioned by that author (*ibidem*).

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon), Volhynia, U. Givetian (Pelcha Beds).

## Genus *Svantovites* POKORNÝ, 1950

*Type species*: *Svantovites primus* POKORNÝ, 1950

### *Svantovites magnei* BECKER, 1971

(pl. 15:6–8)

1964. *Costatia* sp. $F_3$; MAGNE: pl. 24:171; pl. 31:284–288.
1971*b*. *Svantovites magnei* n. sp.; BECKER: 55–56, pl. 10:97–103.
1972. *Svantovites* n. sp.; LETHIERS: tab. 1, pl. 25: 48.
1974*b*. *Svantovites magnei* BECKER; LETHIERS: 49–50, pl. 8:24–25.

**Material.** — Chojnice 5 borehole: seven carapaces and several valves from the depth of 3,685.4–3,688.2 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/119 | 0.77 | 0.34 |
| C ING O/120 | 0.64 | 0.35 |
| C ING O/121 | 0.42 | 0.23 |

**Description.** — See BECKER (1971*b*).

**Remarks.** — The species differs from the most similar *Svantovites inops* BECKER from the Middle Frasnian of the Dinant Basin, Belgium (BECKER, 1971*b*) in a larger number of ribs.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian; Belgium: Dinant Basin, M. Frasnian and L. Famennian; France: Namur Basin, M. Frasnian.

## Genus *Jefina* ADAMCZAK, 1976

*Type species*: *Jefina celebris* ADAMCZAK, 1976

### *Jefina obtusa* sp. n.

(pl. 16:1–2)

*Holotype*: Carapace ING O/125; pl. 16:2.
*Type locality*: Chojnice 5 borehole, depth 4,415.2–4,429.4 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *obtusus* — obtuse.

**Material.** — Chojnice 5 borehole: one carapace from the depth of 4,482–4,501 m and several dozen carapaces from the depth of 4,390.1–4,436.4 m.

**Diagnosis.** — Carapace outline as parallelogram, with its width almost uniform over the entire lenght. Left valve considerably larger than the right. A wide, slightly arcuate, bow-shaped projection occurs.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/125 | 0.71 | 0.40 |
| C ING O/124 | 0.72 | 0.40 |

**Description.** — Carapace outlined as parallelogram in lateral view. Dorsal margin slightly convex. Anterior margin irregularly rounded, with the most anterior point in the ventral half of carapace. Posterior margin identical in height with the anterior, with the most posterior point in the dorsal part. Ventral margin slightly concave. Lateral walls of carapace almost completely flat over its entire length and strongly turned inwards near margins. Left valve, considerably larger than the right, overlaps the latter and overreaches it along all margins. In the ventral part, the left valve overlaps the right one to the greatest extent in the form of a very wide and gently arcuate bow-shaped projection. Surface smooth.

**Remarks.** — From *Jefina celebris* ADAMCZAK from the Grzegorzewice Formation (Eifelian) of the Holy Cross Mts. (ADAMCZAK 1976) *J. obtusa* sp. n. differs in its equilateral outline, almost uniform width of carapace almost over its entire length and a less arcuate and wider bow-shaped projection occurring on the ventral margin of the left valve.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Eriella* STEWART et HENDRIX, 1945

*Type species*: Eriella robusta STEWART et HENDRIX, 1945

### *Eriella rostrata* sp. n.

(pl. 13:7–8)

*Holotype*: Carapace ING O/101; pl. 13:7.
*Type locality*: Koczała 1 borehole, depth 3,065.1–3,071.1 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *rostratus* — provided with a rostrum.

**Material.** — Koczała 1 borehole: ten carapaces from the depth of 3,041.8–3,119 m.

**Diagnosis.** — Carapace large, relatively flat, elongate, oval in lateral outline. Anterior margin higher than the posterior, provided in its middle part with a nodular spine. Postero-ventral spine very small. Ornamentation in the form of an indistinct reticulation.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/101 | 1.08 | 0.61 |
| C ING O/102 | 0.65 | 0.42 |

**Description.** — Carapace elongate, oval, amplete. Dorsal margin convex. Hinge line situated in a narrow, long depression. Anterior and posterior margins uniformly rounded,

anterior higher than the posterior. Ventral margin convex. A small nodular spine occurs on the anterior margin of each valve. A very fine spine is present in the posteroventral part of each valve. Maximum width is recorded in the middle part of carapace. Except for the marginal area and adductorial spot, the entire surface is finely reticulate.

**Remarks.** — The juvenile forms are marked by a proportionally shorter carapace, large disproportion in the height of ends, lack of anterior spines and more strongly developed posteroventral spines. *Eriella rostrata* sp. n. is similar to *Eriella*? *cribraria* GREEN from the Lower Carboniferous of the Province of Alberta, Canada (GREEN 1963), from which it differs in larger anterior spines, higher posterior margin, more fusiform outline as seen dorsally, finer sculpture and larger adductorial spot.

**Occurrence.** — W. Pomerania, U. Givetian.

## Genus *Ponderodictya* CORYELL et MALKIN, 1935

*Type species*: *Leperditia punctulifera* HALL, 1860

### *Ponderodictya querula* sp. n.

(pl. 16:3–5)

*Holotype*: Carapace ING O/127; pl. 16:4.
*Type locality*: Koczała 1 borehole; depth 2,710.6–2,716.2 m, W. Pomerania.
*Type horizon*: M. Frasnian.
*Derivation of the name*: Lat. *querulus* — doleful.

**Material.** — Koczała 1 borehole: 51 carapaces and 9 valves from the depth of 2,705–2,743 m.

**Diagnosis.** — Carapace small, oval in lateral outline. Anterior margin lower than the posterior, both rounded. Dorsal and ventral margins uniformly convex. A small, posteroventral spine occurs on each valve near the margin. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/127 | 0.97 | 0.65 |
| C ING O/126 | 1.0 | 0.58 |
| C ING O/128 | 0.77 | 0.45 |

**Description.** — Carapace oval in lateral outline, slightly postplete. Dorsal margin convex. The middle part of hinge line runs in a depression. Anterior and posterior margins rounded, posterior somewhat higher. Ventral margin convex. A small spine occurs in the posteroventral part of each valve. A thin marginal ridge runs along the free margin of the right, smaller valve. A bow-shaped projection of the ventral margin of the left valve is slightly curved. Maximum width of carapace occurs in its middle part. Surface smooth. The hinge of the left, larger valve is tripartite, composed of two hinge grooves continuing into a contact groove. A relatively short hinge list is situated between a long anterior and short posterior groove. Contact groove interrupted in the middle of the ventral part. The hinge of the right valve is composed of a groove occupying the anterior one-third of the hinge margin and of the posterior list situated behind it. Juvenile carapaces are marked by a more regular, subrectangular outline with their maximum height occurring in their middle parts.

**Remarks.** — The species described was assigned to the genus *Ponderodicta* CORYELL et MALKIN on the basis of the structure of its hinge, oval, postplete outline of its carapace, occurrence of a marginal ridge along the free margin of its left valve and its posterodorsal spines. It differs from other species in a lack of any traces of ornamentation on the lateral surface of valves and in the situation of its posteroventral spines close to the margins of valves. The last-named character relates the species described with some representatives of *Eriella* STEWART

et HENDRIX, from which it can be easily distinguished by, among other characters, its anterior end which is lower than the posterior and by the presence of a bow-shaped projection on its left valve.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian.

## Genus *Graphiadactyllis* ROTH, 1929

*Type species*: *Kirkbya lindahli arkansana* GIRTY, 1910

**Remarks.** — The genus *Graphiadactyllis* ROTH is a heterogenous taxon. The species assigned to it are marked by either well or poorly developed anterior marginal flange (GRÜNDEL, 1975) and either the presence or lack of posteroventral spines (BLUMENSTENGEL 1975).According to GREEN (1963), the presence of a well developed anterior marginal flange, posterior shoulder and posteroventral spines are the first-rank criterion of generic classification within the Quasillitidae. GREEN also maintains that "a partial presence of a feature is considered more important than partial absence" (GREEN 1963:172), for example, the presence of a posteroventral spine on only one of the two valves. According to this principle, the species having only one spine, described in BLUMENSTENGEL'S (1975) work, should be assigned to the genus *Eriella* STEWART et HENDRIX rather, and not to *Graphiadactyllis* ROTH.

The genus *Graphiadactyllis* requires revision. Maybe, such species as *G. facetus* sp. n. and *G. indotatus* sp. n., marked by a poor development of the anterior marginal flange, should be excluded from this genus. At present, however, it is not possible, mostly due to a scarcity of the material which the present writer has at her disposal.

### *Graphiadactyllis facetus* sp. n.

(pl. 15:10)

*Holotype*: Carapace ING O/123; pl. 15:10.
*Type locality*: Koczała 1 borehole, depth 2,949.5– 2,954 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *facetus* — delicate.

**Material.** — Koczała 1 borehole: several dozen carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: three carapaces from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace short, oval in lateral outline, amplete. Anterior marginal flange poorly developed. Ornamentation delicate of the "fingerprint" type. Adductorial pit indistinct.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/123 | 0.61 | 0.34 |

**Description.** — Carapace small, short, oval in lateral outline. Ends uniformly rounded, equal in height. Maximum height in the middle, maximum width in the posterior part of carapace. Anterior marginal flange narrow, poorly developed. The entire surface of valves covered with delicate, very closely spaced, concentric striae forming a pattern of the "fingerprint" type. An indistinct adductorial pit occurs in the central part of valves somewhat above midheight.

**Remarks.** — *G. facetus* sp. n. differs from other species of *Graphiadactyllis* ROTH in a short, oval carapace, uniform height of ends and a very delicate and closely spaced striation.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Graphiadactyllis indotatus* sp. n.
(pl. 15:9)

*Holotype*: Carapace ING O/122; pl. 15:9.
*Type locality*: Chojnice 5 borehole, depth 4,517.4–4,526.1 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *indotatus* — unprovided, poor.

**Material.** — Chojnice 5 borehole: two carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: 14 carapaces from the depth of 2,942.6–2,984.5 m; Miastko 2 borehole: one carapace from the depth of 2,080–2,085 m.

**Diagnosis** — Carapace elongate, rectangular-oval in lateral outline, slightly preplete. Ornamentation in the form of barely visible concentric striae.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/122 | 0.71 | 0.36 |

**Description.** — Carapace rectangular-oval in lateral outline. Dorsal margin straight. Anterior and posterior margins rounded, anterior somewhat lower and slightly truncate in the dorsal part, while posterior slightly truncate in the anterior half. Ventral margin slightly concave. Maximum height in the anterior half. Carapace uniformly convex, cylindrical in dorsal outline. Maximum width in the posterior part. Ornamentation in the form of very thin, barely visible, concentric striae.

**Remarks.** — The species described differs from *Graphiadactyllis facetus* sp. n. in a longer carapace, subrectangular in lateral and cylindrical in dorsal outline and in a considerably less distinct ornamentation.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Family **Ropolonellidae** CORYELL et MALKIN, 1936
Genus *Ropolonellus* VAN PELT, 1933
*Type species*: *Ropolonellus papillatus* VAN PELT, 1933

*Ropolonellus kettneri* (POKORNÝ, 1950)
(pl. 16:6; pl. 17:1–2)

1950. *Bairdia* (*Varicobairdia*) *kettneri* n. sp.; POKORNÝ: 610–611, pl. 2:6.
1959. *Birdsalella* (?) *aznajevaensis* sp. n.; ROZHDESTVENSKAYA: 207–208, pl. 13:4.
1960. *Varicobairdia kettneri* POKORNÝ; SOHN: 12, pl. 1:1–3.
1965*a*. *Varicobairdia kettneri* (POKORNÝ); BECKER: 413, pl. 33:6.
1976. *Ropolonellus* cf. *kettneri* (POKORNÝ); ADAMCZAK: 381–382, pl. 27:164.

**Material.** — Chojnice 5 borehole: two carapaces and one valve from the depth of 4,482–4,545.1 m; Koczała 1 borehole: three carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: 14 carapaces and one valve from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/129 | 0.68 | 0.48 |
| C ING O/130 | 0.47 | 0.30 |
| C ING O/131 | 0.53 | 0.35 |

**Remarks.** — This species is similar to *Ropolonellus robustus* ADAMCZAK, 1976 from the Grzegorzowice Formation (Eifelian) of the Holy Cross Mts., from which it differs, however, in a depressed anterior and posterior parts, strongly convex middle part of carapace, smaller extramarginal tubercles and the presence of marginal tubercles on the posterior margin of valve.

**Occurrence.** — Poland: Holy Cross Mts., Eifelian (Grzegorzowice Formation), W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., U. Eifelian and L. Givetian, Eifel Mts., U. Eifelian; Bohemia, Givetian; USSR: Bashkiria, U. Givetian (Starooskol Horizon).

*Ropolonellus* sp. 1
(pl. 17:3)

**Material.** — Chojnice 5 borehole: one valve from the depth of 3,786.3–3,790.6 m, as well as one complete and one damaged carapace from the depth of 3,685.4–3,688.2 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/132 | 0.84 | 0.45 |

**Remarks.** — The present writer had at her disposal only one well preserved specimen which, in its nodulous surface, long hinge margin and relatively slightly outlined depressions near the ends, differs from other species known to this writer and probably represents a new one.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian.

Family **Bufinidae** SOHN et STOVER, 1961
Genus *Bufina* CORYELL et MALKIN, 1936
*Type species*: *Moorea bicornuta* ULRICH, 1891 (syn. = *Bufina elata* CORYELL et MALKIN, 1936)

*Bufina colliquefacta* sp. n.
(pl. 17:5)

*Holotype*: Carapace ING O/134; pl. 17:5.
*Type locality*: Chojnice 5 borehole, depth 4,429.4–4,436.4 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *colliquefactus* — dissolved, melted.

**Material.** — Chojnice 5 borehole: four carapaces and two valves from the depth of 4,683.7–4,591.7 m, 16 carapaces and two valves from the depth of 4,390–4,436.4 m.

**Diagnosis.** — Carapace oval in lateral outline. Anterior and posterior margin equal in height, rounded. Dorsal and ventral margins uniformly convex. Anterior ridge semicircular, narrow, low. Posterior ridge on the left valve completely reduced and on the right valve in the form of a small ventral spine.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/134 | 0.79 | 0.44 |

**Description.** — Carapace oval in outline, amplete. Anterior and posterior margins equal in height, strongly rounded. Dorsal and ventral margins uniformly convex. Posterior part of hinge line situated in a slight depression. A narrow and low anterior ridge runs near and parallel to anterior margin. Posterior part of the left, larger valve smooth. A very indistinct, short posterior ridge is outlined in the posteroventral part of the right valve. Maximum width in the posterior part. Surface of valves smooth.

**Remarks.** — From the species of the genus *Bufina* CORYELL et MALKIN described in the present paper, *B. colliquefacta* sp. n. differs in the most advanced reduction of ridges and in asymmetry of valves, the right one of which is devoid of any elevated elements in its posterior part.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Bufina intermedia* sp. n.

(pl. 17:6)

*Holotype*: Carapace ING O/135; pl. 17:6.
*Type locality*: Koczała 1 borehole; depth 2,949.5–2,954.2 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *intermedius* — intermediate.

**Material.** — Chojnice 5 borehole: one carapace from the depth of 4,482–4,545.1 m; Koczała 1 borehole: two carapaces from the depth of 3,041.8–3,119 m and 33 carapaces and three valves from the depth of 2,942.6–2,984.6 m.

**Diagnosis.** — Carapace rectangular-oval in lateral outline, elongate, plano-convex. Anterior and posterior margins equal in height, rounded. Dorsal and ventral margins straight. Hinge line running in a depression occupying the posterior two-thirds of the length of hinge margin. A narrow ridge occurs in the posterior part of each valve. In the posterior part of the right valve, there occur two spines and of the left valve — only one, dorsal spine. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/135 | 0.87 | 0.52 |

**Description.** — Carapace large, elongate, rectangular-oval in lateral outline. Dorsal margin straight. Posterior part of hinge line situated in a narrow depression. Anterior and posterior margins equal in height, symmetrically rounded. Lateral walls of valves flat, straight in dorsal outline. Width of carapace, gradually increasing posteriorly, reaches its maximum at a distance from the posterior margin equalling one-fifth of the length of carapace. A narrow, sharp-edged anterior ridge, thickened in the dorsal part, runs close and parallel to the anterior margin. Small spines are developed in the posterodorsal and posteroventral parts of the right, smaller valve, while a posterodorsal spine on the left valve is only indistinctly outlined. No posteroventral spine is present. Surface smooth.

**Remarks.** — The species described differs from *Bufina colliquefacta* sp. n. in a more elongate carapace, which is subrectangular in outline, in an almost equal width of carapace over its entire length and in the presence of two posterior spines on the right valve. In regard to morphology, this species makes up a transitional type between *B. salva* sp. n. with non-reduced ridges, and *B. colliquefacta* sp. n. From the morphologically most related species *B. europaea* PŘIBYL from the Skały Formation of the Holy Cross Mts. (PŘIBYL 1953), *B. media* sp. n. differs in a more elongate and, in the posterior part, narrower carapace, equal length of ends, lack of a depression behind the anterior, shorter, narrower and sharp-edged, ridge, smaller posterior spines situated nearer the margin and in a less distinct ornamentation of the left than the right valve.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Bufina salva* sp. n. [1]

Superfamily **Healdiacea** HARLTON, 1933
Family **Healdiidae** HARLTON, 1933
Genus *Cytherellina* JONES et HALL, 1869

*Type species*: *Beyrichia siliqua* JONES, 1855

**Remarks.** — A considerable external similarity of particular species of the genera *Cytherellina* JONES et HALL and *Healdianella* POSNER has already been emphasized by POLENOVA (1960) who suggested that if the muscle scars of the representatives of these two genera turn out to be identical then the genus *Healdianella* should be considered as a junior synonym of the *Cythe-*

[1] For diagnosis and description see Addendum on p. 108.

*rellina*. Discussing the two taxons, BECKER and SANCHEZ de POSADA (1977) found that the species which have valves with vertical, inner swelling characteristic of the type species *Cytherellina siliqua* JONES et HALL should be assigned to the *Cytherellina* and those in which such swellings do not occur or cannot be observed — to the *Healdianella*. According to ADAMCZAK (1976), it is not the character of a muscle scar, but only the structure of the contact margin which may constitute a basis for classifying these morphologically related forms. On the basis of a distinct contact groove, interrupted in its middle on the left, larger valve occurring in its type species, the same author assigns the genus *Cytherellina* to the Metacopa. A well developed contact groove interrupted in its middle part was also observed by the present writer on the left valves of the Upper Silurian species *C. magna* NECKAYA from boreholes situated in the Łeba Elevation, N. Poland, as well as in the species described below.

## *Cytherellina* sp. 1

(pl. 18:4–5)

**Material.** — Chojnice 5 borehole: ten carapaces, three valves and several internal molds from the depth of 4,390.1–4,545.1 m; Koczała 1 borehole: five carapaces and two valves from the depth of 2,942.6–3,019 m; Miastko 2 borehole: several damaged valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/140 | 1.16 | 0.59 |
| C ING O/141 | 1.38 | 0.72 |

**Description.** — Carapace large, thick-walled, elongate-oviform in lateral outline. Dorsal margin convex, ventral subrectilinear. Ends rounded, posterior one considerably higher than the anterior. Dorsal part of carapace flattened, without a hinge depression. The left, larger valve slightly overlaps the right one along the middle and anterior part of hinge margin, more so in the ventral part where it overlaps the right valve in the form of a wide, slightly curved tongue. Maximum height and width in the posterior part. Surface smooth. A distinct, finely and transversely denticulate hinge groove, the widest in the anterior part, runs along the hinge margin of the left valve. At its anterior and posterior ends, the hinge groove continuously passes into a contact groove, narrow along the anterior and posterior margins and extending in the ventral part. The groove disappears in the ventromedial part of contact margin. A hinge list is situated on the hinge margin of the right valve, with a narrow groove running over it in the posterodorsal part of the margin. A contact list runs along the free margin of the right valve. A thin marginal ridge, invisible when the valves are closed, may be observed on the anterior margin of the right valve. Two elongate swellings widening upwards are present on the inner side of valves in their anterodorsal part. An oval depression occurs between them. A relatively small circular adductor muscle scar is situated in the lower part of this depression below the midheight of a valve. No details of its structure could be observed.

**Remarks.** — The presence of inner swellings on valves suggests that this species belongs to the genus *Cytherellina* JONES et HALL. At the same time, the structure of the hinge and contact margins indicates that it is a representative of the order Metacopida (superfamily Healdiacea). In its lateral outline, *Cytherellina* sp. 1 resembles *C.* sp. A from the Spickberg Beds of the Eifel Mts. (BECKER 1965*a*), differing from it, however, in a more cylindrical dorsal outline. A poor state of preservation of the material prevents the present writer from erecting a new species.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Incisurella* COOPER, 1941

*Type species*: *Incisurella prima* COOPER, 1941

### Incisurella sp. 1

(pl. 17:7)

**Material.** — Chojnice 5 borehole: one carapace from the depth of 4,415.1–4,429.4 m.
Dimensions (in mm)

| | l | h |
|---|---|---|
| C ING O/136 | 0.71 | 0.42 |

**Remarks.** — The specimen under study is marked by the dorsal margin slightly bent in its posterior part and by the furrow in the posterior part of carapace which on the right valve is less developed. From the types species *I. prima* COOPER from the Lower Carboniferous of the State of Illinois, USA (COOPER 1941), it differs in its oval outline, longer and narrower furrow on the left valve, and in various development of this furrow on each valve.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Gerbeckites* gen. n.

*Type species*: *Gerbeckites pomeranicus* sp. n.

*Derivation of the name*: Named in honor of Dr. GERHARD BECKER, German ostracodologist, the first letters of whose first and last name combine to form the name of the species.

**Diagnosis.** — Healdiidae with a small (less than 1 mm in lenght) carapace, triangular and preplete in lateral outline. Dorsal margin angularly bent in the anterior part. Anterior margin rounded, considerably higher than the posterior. Posterior margin narrowly rounded. Ventral margin straight, slightly convex or slightly concave. Maximum width in the posteroventral part of carapace. A thin spine turned outwards and posteriorly, occurs in the place of maximum width or somewhat below it. On the left, larger valve, this spine is usually reduced to a small elevation. Surface smooth. Hinge not differentiated, of holosenic type (*sensu* POKORNÝ 1958).

**Remarks.** — This genus differs from other ones of the Healdiidae in a triangular-oval outline, maximum height occurring in the anterior part and the presence of a ventral spine. The structure of hinge is characteristic of the family. In addition to the type species, the present writer assigns to the genus *Gerbeckites* gen. n. the specimens described by BECKER and SANCHEZ de POSADA (1977) as Genus 3 sp. A and Genus 3 sp. B, certainly representing two other species.

**Stratigraphic range.** — Lower to Middle Devonian.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; N. Spain: U. Emsian and L. Eifelian (Moniello Formation); USSR: Russian Platform, U. Givetian (Starooskol Horizon).

### *Gerbeckites pomeranicus* sp. n.

(pl. 18:1–3)

*Holotype*: Carapace ING O/137; pl. 18:1.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: After the name of the Pomerania Province, Poland.

**Material.** — Koczała 1 borehole: one carapace from the depth of 3,041.8–3,119 m and one carapace from the depth of 2,990.3–3,019 m; Miastko 1 borehole: 17 carapaces from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace triangular-oval in lateral outline, preplete. Dorsal margin angularly bent in the anterior part, with a swollen apex on the left valve. Anterior margin considerably lower than the posterior. Ventral margin slightly convex. Ventral spine situated somewhat below the point of maximum width of valve. On the left valve, the spine is less developed than on the right. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/137 | 0.59 | 0.35 |
| C juv. ING O/138 | 0.32 | 0.20 |
| C juv. ING O/139 | 0.42 | 0.26 |

**Description.** — Carapace triangular-oval in lateral outline, preplete. Dorsal margin angularly bent at a quarter of the length of carapace on both valves. Dorsal margin of the right valve provided with a swollen, slightly outwardly deflected cusp. Anterior margin widely rounded, considerably higher than the posterior. Maximum width of carapace in its posteroventral part, close to midlength. A thin spine with a wide base occurs somewhat below this place on the right valve. This spine is directed outwards and posteriorly. On the right valve, the spine is strongly reduced and occurs in the form of a small elevation, or even is not outlined at all. Carapace rhomboidal in dorsal outline. Surface smooth. Hinge of the left valve in the form of a hinge groove passing gradually to a continuous contact groove.

**Remarks.** — The species discussed differs from Genus 3 sp. A (BECKER and SANCHEZ de POSADA 1977) in a more strongly bent dorsal and smaller posterior margin.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Bashkiria, U. Givetian (Starooskol Horizon).

Order **Podocopida** MÜLLER, 1894
Suborder **Cypridocopina** JONES, 1901
Superfamily **Bairdiocypridacea** SHAVER, 1961
Family **Pachydomellidae** BERDAN et SOHN, 1961
Genus *Microcheilinella* GEIS, 1933
*Type species*: *Microcheilus distortus* GEIS, 1932

*Microcheilinella clava* (KEGEL, 1932)
(pl. 18:6)

1932. *Bythocypris* (*Bairdiocypris*) *clava* sp. n.; KEGEL: 246–247, pl. 13:2.
1953. *Microcheilinella clava* (KEGEL); KUMMEROW: 60, pl. 2:6.
1955. *Pachydomella clava* (KEGEL); KRÖMMELBEIN: 300–301, pl. 1:8–11, pl. 2:26.
1965*b*. *Tubulibairdia clava* (KEGEL); BECKER: 177, pl. 6:7.
1969. *Tubulibairdia clava* (KEGEL); GROOS: 67, pl. 13:3.
1976. *Microcheilinella clava* (KEGEL); ADAMCZAK: 336–339, fig. 30, 36–37; pl. 9:43–45; pl. 10:47–51; pl. 11:55; pl. 12:59–61.

**Material.** — Koczała 1 borehole: two carapaces from the depth of 3,041.8–3,119 m. Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/142 | 0.90 | 0.58 |

**Remarks.** — The two carapaces assigned to *M. clava* (KEGEL) probably represent juvenile forms. They do not show a dorsal papilla which, according to ADAMCZAK (1976), constitutes an important diagnostic element for *M. clava*. Unfortunately, the diagnostic value of this papilla is diminished by the fact that, due to its small dimensions, its presence depends to a considerable

extent on the state of preservation of specimens. This has been confirmed by the present writer's examination of a collection of *M. clava* from the Holy Cross Mts. made available to her by Dr. F. ADAMCZAK. In this collection, the papilla is visible only in very well preserved specimens.

**Occurrence.** — Poland: Holy Cross Mts., Eifelian and Givetian (Grzegorzowice and Skały Formations), W. Pomerania, U. Givetian; W. Germany: Eifel Mts., Eifelian and L. Givetian, Rhenish Slate Mts., U. Eifelian and L. Givetian.

### *Microcheilinella fecunda* (PŘIBYL et ŠNAJDR, 1950)
(pl. 18:7; pl. 19:4)

1950. *Bythocypris (Bairdiocypris) fecunda* n. sp.; PŘIBYL and ŠNAJDR: 161, pl. 2:5–8.
1976. *Microcheilinella* cf. *fecunda* (PŘIBYL et ŠNAJDR); ADAMCZAK: 339–340, pl. 11:52–54.

**Material.** — Chojnice 5 borehole: two carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: several dozen carapaces from the depth of 2,492.6–2,984.8 m.

Dimensions (in mm):

| | l | h | w |
|---|---|---|---|
| C ING O/143 | 1.22 | 0.76 | — |
| C ING O/147 | 1.30 | 0.80 | 0.65 |

**Remarks.** — This species differs from *Microcheilinella clava* (KEGEL, 1932) in its subtriangular outline, sharp posterior margin and better outlined bow-shaped projection on the left valve.

**Occurrence.** — Poland: Holy Cross Mts., Givetian (Skały Formation), W. Pomerania, U. Givetian; Bohemia, M. Devonian ((Hlubočepy Beds and Choteč Formation).

### *Microcheilinella mandelstami* POLENOVA, 1952
(pl. 19:1–2)

1952. *Microcheilinella mandelstami* sp. n.; POLENOVA: 126–127, pl. 12:3.
1979. *Microcheilinella mandelstami* POLENOVA; OLEMPSKA: 121, pl. 25:6.

**Material.** — Chojnice 5 borehole: five carapaces from a depth of 4,482–4,545.1 m; Koczała 1 borehole: one carapace from the depth of 3,041.8–3,119 m and several dozen carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 boreholes: hundreds of carapaces and single valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/144 | 0.55 | 0.29 |
| C ING O/145 | 0.61 | 0.26 |

**Description.** — See POLENOVA (1952).

**Remarks.** — *M. mandelstami* sp. n. differs from *M. seminalis* KUMMEROW from the Givetian of the Eifel Mts. and Rhenish Slate Mts. (KUMMEROW 1953; GROOS 1969) in a more rectangular and shorter carapace.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon).

### *Microcheilinella insignita* sp. n.
(pl. 19:3)

*Holotype*: Carapace ING O/146; pl. 19:3.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *insignitus* — easily identifiable.

**Material.** — Miastko 2 borehole: four carapaces and three valves from a depth of 2,080–2.085 m.

**Diagnosis.** — Carapace fusiform in lateral outline. Anterior and posterior margins equal in height, pointed. Keels occur along the anterior and posteroventral margins of the left valve and along anterior and posterior margins of the right valve. Lateral surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/146 | 0.92 | 0.53 |

**Description.** — Carapace medium-sized, fusiform in lateral outline. Hinge line running in a small depression. Dorsal and ventral margins uniformly convex. Anterior and posterior margins equal in height, pointed. Posterior margin more pointed. Valves strongly asymmetrical. A short keel runs along the anterior margin of the left valve and another, considerably longer — along the middle and posterior parts of the ventral and along the posterior margin. An area between the keel and the margin of the left valve is characteristically flattened. Two keels also occur on the right valve, running in the anterior and posterior parts of valve close to the contact line. Maximum height and width in the middle part of carapace. Lateral surface smooth.

**Remarks.** — From the most related species *Microcheilinella chlupaci* ROZHDESTVENSKAYA from the Givetian (Mullin Beds) of Western Bashkiria (ROZHDESTVENSKAYA 1962), the species described differs in its more regular outline, the most anteriorly and posteriorly protruding points occurring at midheight, maximum height and width observed in the middle part of carapace and in the lack of keels along the dorsal margins of valves.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Ampuloides* POLENOVA, 1952

*Type species*: *Ampuloides verrucosa* POLENOVA, 1952

### *Ampuloides verrucosa* POLENOVA, 1952

(pl. 19:5)

1952. *Ampuloides verrucosa* gen. et sp. n.; POLENOVA: 138–140, pl. 14:3–4.

**Material.** — Koczała 1 borehole: two carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: 16 carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/148 | 0.45 | 0.26 |

**Description.** — See POLENOVA (1952).

**Remarks.** — No dimorphic forms with a groove characteristic of the genus, separating the most inflated part of carapace, have been found in the material under study, which thus probably includes the carapaces of tecnomorphs only. The species described differs from *Ampuloides parvus* BLUMENSTENGEL from the Frasnian (*gigas* Zone) of the Harz Mts. (BLUMENSTENGEL 1970) in a rectangular outline, straight ventral margin and less distinct posterior cardinal angle.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon).

Family **Bairdiocyprididae** SHAVER, 1961
Genus *Bairdiocypris* KEGEL, 1932
*Type species*: *Bythocypris* (*Bairdiocypris*) *gerolsteinensis* KEGEL, 1932

*Bairdiocypris vastus* POLENOVA, 1952
(pl. 19:7)

1952. *Bairdiocypris vastus* sp. n.; POLENOVA: 135–136, pl. 14:1–2.
1972. *Bairdiocypris vastus* POLENOVA; GUREVICH: 288.
1979. *Bairdiocypris vastus* POLENOVA; OLEMPSKA: 113, pl. 22:1–2.

**Material.** — Miastko 2 borehole: several dozen carapaces from the depth of 2,080–2,085 m. Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/150 | 1.10 | 0.82 |

**Description.** — See POLENOVA (1952).

**Remarks.** — The material under study includes carapaces of both adult and juvenile forms. The latter are marked by a strongly, apically bent middle part of the dorsal margin of the left valve, by arcuated dorsal margin of the right valve and by a more triangular outline.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon), Volhynia, U. Givetian (Pelcha Beds).

*Bairdiocypris deliberatus* sp. n.
(pl. 19:6; pl. 20:1–3)

*Holotype*: Carapace ING O/151; pl. 20:1.
*Type locality*: Koczała 1 borehole, depth 3,041.8–3,048 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *deliberatus* — considered, discussed.

**Material.** — Chojnice 5 borehole: one carapace from the depth of 4,482–4,545.1 m; Koczała 1 borehole: five carapaces from the depth of 3,041.8–3.119 m and three from the depth of 2,942.6–2,984.6 m.

**Diagnosis.** — Carapace subtriangular in lateral and fusiform in dorsal outline. Anterior margin rounded, posterior pointed. Apical region high (apical index 12.1). Ridges occur in the dorsal and ventral parts of the left and depressions in the anterior and posterior parts of the right valve. Maximum width in midlength, maximum height posteriorly of midlength.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/151 | 1.51 | 0.86 |
| C ING O/152 | 1.25 | 0.72 |
| C ING O/153 | 1.16 | 0.72 |
| C ING O/149 | 2.29 | 1.49 |

**Description.** — Carapace subtriangular in lateral and fusiform in dorsal outline. Dorsal margin arcuate. Apical region (as designated by ADAMCZAK 1976) high (apical index 12.1). Anterior margin rounded, posterior pointed. Ventral margin concave anteriorly. A depression occurs near the anterior and posterior margin of the right valve. Arcuate ridges run along the dorsal and ventral margins of valves. A wide, bow-shaped projection occupies about a half of the length of carapace. Maximum height of carapace in its posterior and maximum width in its anterior part. Lateral surface smooth.

**Remarks.** — In its outline, the species discussed strongly resembles *Bairdiocypris* cf. *rauffi rauffi* KRÖMMELBEIN from the Lower Givetian of the Rhenish Slate Mts. (GROOS 1969), from which it differs, however, in the lack of anterodorsal depressions on its valves and in its ventral margin which is concave in the anterior part. It is also related to a form described by GROOS (1969) from the uppermost Givetian of the Rhenish Slate Mts. as *Bairdiocypris* sp. aff. *moravica* (KEGEL), from which it differs in a lower anterior margin and a higher stituation of the most posterior point of carapace.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

### *Bairdiocypris phaseoliformis* sp. n.
(pl. 20:4–5)

*Holotype*: Carapace ING O/154; pl. 20:4.
*Type locality*: Koczała 1 borehole, depth 2,949.5–2,954.2 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *phaseoliformis* — beanlike.

**Material.** — Koczała 1 borehole: 12 carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: one carapace from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace beanlike in lateral outline. Apical region very low (apical index 3.5). Anterior and posterior margins rounded. Posterior end lowered. Bow-shaped projection very long, indistinct. Surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/154 | 1.03 | 0.58 |
| C juv. ING O/155 | 0.76 | 0.50 |

**Description.** — Carapace beanlike in outline. Apical region very low (apical index 3.5). Dorsal margin of the right valve arcuate and of the left valve angularly bent in its anterior part. Anterior and posterior margins rounded, almost equal in height. Ventral margin concave. The right valve slightly protrudes beyond the left along all margins. Maximum height and width of carapace in its middle part. Surface smooth.

**Remarks.** — This species displays a considerable degree of variability. Both short and long specimens occur in the material. The last-named ones are marked by a more convex ventral margin. Its beanlike outline, equal height of ends and concave ventral margins are characters in which this species differs from the most closely related *Bairdiocypris soetenica* BECKER (1965*a*) from the Eifelian (Nohn and Junkenberg beds) of the Eifel Mts.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Healdianella* POSNER, 1951
*Type species*: *Healdianella darwinuloides* POSNER, 1951

### *Healdianella obliqua* (KUMMEROW, 1953)
(pl. 20:9–10)

1953. *Orthocypris obliqua* n. sp.; KUMMEROW: 56, pl. 7:8.
1965*a*. *Cytherellina* ? *obliqua* (KUMMEROW); BECKER: 385–387, pl. 30:2–3.
1965*b*. *Cytherellina* ? *obliqua* (KUMMEROW); BECKER: 175–176, pl. 7:6.
1969. *Cytherellina obliqua* (KUMMEROW); GROOS: 63–64, pl. 12:7, 9.

**Material.** — Chojnice 5 borehole: 11 carapaces from the depth of 4,482–4,545.1 m and four from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: ten carapaces from a depth of 3,041.8–3,119 m, eight from the depth of 2,990.3–3,019 m and three from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: four carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/159 | 0.69 | 0.35 |
| C ING O/160 | 0.77 | 0.47 |

**Description.** — See BECKER (1965*a*).

**Occurrence.** — Poland: W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., Eifelian and Givetian.

## *Healdianella resima* (ROZHDESTVENSKAYA, 1959)
(pl. 20:6–8)

1959. *Cavellina (Cavellinella) resima* sp. n.; ROZHDESTVENSKAYA: 143, pl. 11:3–4.
1972. *Cavellina resima* ROZHDESTVENSKAYA; GUREVICH: 341–342, pl. 13: 5–6.

**Material.** — Chojnice 5 borehole: three carapaces from a depth of 4,482–4,545.1 m and four from the depth of 4.390.1–4,436.4 m; Koczała 1 borehole: nine carapaces from the depth of 3,041.8–3,119 m, two from the depth of 2,990.3–3,019 m and 11 from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: ten carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/156 | 0.53 | 0.32 |
| C ING O/158 | 0.53 | 0.34 |
| C juv. ING O/157 | 0.37 | 0.26 |

**Description.** — See ROZHDESTVENSKAYA (1959).

**Remarks.** — This species differs from *Healdianella modesta* (ROZHDESTVENSKAYA) from the Lower Givetian of Bashkiria (ROZHDESTVENSKAYA 1959) in a shorter carapace having a higher anterior and less arcuate dorsal margin.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Bashkiria, U. Givetian (Staroskol Horizon).

## *Healdianella* sp. 1
(pl. 21:1)

**Material.** — Koczała 1 borehole: two carapaces from the depth of 3,089–3,094 m and two from the depth of 2,942.6–2,984,6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/161 | 0.92 | 0.53 |

**Remarks.** — In its lateral outline, *Healdianella* sp. 1 resembles to the largest extent *H. brassicalis* BECKER from the Freilingen and Cürten beds of the Eifel Mts. (BECKER 1965*a*). Certain small differences are observed in a larger symmetry of the dorsal margin (an equal degree of sloping towards both ends) and in a distinct incurvature of the anterior part of ventral margin, characters which occur in *Healdianella* sp. 1.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## Genus *Orthocypris* KUMMEROW, 1953

*Type species*: *Bythocypris recta* KUMMEROW, 1953

### *Orthocypris perlonga* KUMMEROW, 1953

(pl. 21:4–5)

1953. *Orthocypris perlonga* n. sp.; KUMMEROW: 55, pl. 7:7.
1963. *Cytherellina* cf. *perlonga* (KUMMEROW); LE FEVRE: 74, pl. 9:150–151.
1965*a*. *Cytherellina perlonga* (KUMMEROW); BECKER: 391–392, pl. 30: 4–5.
1965*b*. *Cytherellina perlonga* (KUMMEROW); BECKER: 175, pl. 7:5.
1969*a*. *Cytherellina perlonga* (KUMMEROW); BECKER: pl. 3:4.
1969. *Cytherellina perlonga* (KUMMEROW); GROOS: 64, pl. 12:10.
1971. *Cytherellina* cf. *perlonga* (KUMMEROW); LE FEVRE: 823, 825, pl. 5B:62.
1977. *Orthocypris* cf. *perlonga* KUMMEROW; BECKER and SANCHEZ de POSADA: 170, pl. 9:5–7.

**Material.** — Chojnice 5 borehole: three carapaces from the depth of 4,683.7–4,691.7 m, six from the depth of 4,482–4,545.1 m four from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: four carapaces from the depth of 3,041.8–3,119 m and five from the depth of 2.942.6–2,984.6 m; Miastko 2 borehole: three carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/164 | 0.77 | 0.42 |
| C ING O/165 | 0.68 | 0.33 |

**Description.** — See BECKER (1965*a*).

**Occurrence.** — Poland: W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., Eifelian; N. Spain: Eifelian; Algeria: Sahara, Eifelian.

### *Orthocypris kummerowi* sp. n.

(pl. 21:6–7)

*Holotype*: Carapace ING O/167; pl. 21:7.
*Type locality*: Koczała 1 borehole, depth 2,945–2,949.5 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: after Dr. EGMONT KUMMEROW, German paleontologist.

**Material.** — Chojnice 5 borehole: two carapaces from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: seven carapaces from the depth of 3,041.8–3,119 m and four from the depth of 2,942.6–2,984.6 m.

**Diagnosis.** — Carapace subrectangular in lateral and cigar-shaped in dorsal outline. Anterior and posterior margins equal in height. Posterior subrectilinear in ventral part. Bow-shaped projection distinct, occupying almost the whole length of the ventral margin.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/167 | 0.70 | 0.37 |
| C ING O/166 | 0.66 | 0.33 |

**Description.** — Carapace subrectangular in lateral and cigar-shaped in dorsal outline. Height of carapace almost uniform almost over its whole length and equaling about a half of it. Dorsal and ventral margins straight, parallel to one another. Anterior and posterior margins equal in height, anterior rounded. Posterior margin rounded in the dorsal and subrectilinear in the ventral part where it forms a right angle with the ventral margin. Left, larger valve overlaps the right one only in the ventral part where it forms a distinct bow-shaped projection occupying almost the whole length of ventral margin. Maximum width in the posterior part of carapace. Surface smooth.

**Remarks.** — In its lateral outline, this species is similar to *Orthocypris subparalellus* (POLENOVA) from the Upper Givetian of the Russian Platform (POLENOVA 1952), from which it differs, however, in less rounded anterior and posterior margins and in a more uniform convexity of carapace.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Orthocypris* sp. 1
(pl. 21:8)

**Material.** — Chojnice 5 borehole: one carapace from the depth of 3,786.3–3,790.6 and two from the depth of 3,685.4–3,688.2 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/168 | 0.55 | 0.27 |

**Description.** — Carapace laterally compressed, subrectangular in lateral outline. Height equals half a length. Dorsal and ventral margins straight, parallel to one another, ventral shorter. Anterior and posterior margins rounded, anterior more so and higher. Left valve overlaps the right one along the ventral margin. Maximum width of carapace in its posterior part. Surface smooth.

**Remarks.** — A shorter carapace, with the anterior margin higher than the posterior and symmetrically rounded are characters in which *Orthocypris* sp. 1 differs from the most closely related species *O. parilis* ROZHDESTVENSKAYA from the Lower Frasnian of Southern Ural (ROZHDESTVENSKAYA 1972). The specimens under study probably represent a new species which, however, cannot be here erected due to the scarce and poorly preserved material.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian.

Family **Gerodiidae** GRÜNDEL, 1962
Genus *Baschkirina* ROZHDESTVENSKAYA, 1959
*Type species*: *Baschkirina memorabilis* ROZHDESTVENSKAYA, 1959

*Baschkirina miastkoensis* sp. n.
(pl. 21:9)

*Holotype*: Carapace ING O/169; pl. 21:9.
*Type locality*: Miastko 2 borehole, depth 2,080-2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: After the locality Miastko in W. Pomerania, Poland.

**Material.** — Miastko 2 borehole: two carapaces and three right valves from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace subtrapezoidal in lateral outline, preplete. Dorsal margin convex, with the largest convexity occurring in its anterior part. Anterior margin higher than the posterior. Ventral margin convex. Transition of the posterior into ventral margin angular. Spine occurs in the posteroventral part of the right valve.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/169 | 0.56 | 0.39 |

**Description.** — Carapace subtrapezoidal in lateral outline, preplete, relatively short (height = 0.6 of length). Carapace oval-fusiform in dorsal outline, with maximum width occurring in the middle part. Dorsal margin convex, with its largest, almost angular, bend occurring in

the anterior part. Anterior and posterior margins rounded, anterior higher. Transition of the posterior into ventral margin angular (about 100°). Ventral margin of the left, larger valve convex, of the right — straight. A small spine occurs in the posteroventral part of the right valve. Lateral surface smooth.

**Remarks.** — The species described resembles to the greatest extent *Baschkirina sublimis* ROZHDESTVENSKAYA from the Eifelian of Western Bashkiria (ROZHDESTVENSKAYA 1962) from which it differs in a shorter carapace, convex ventral margin, angular connection of the posterior and ventral margins and in its more oval dorsal outline.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Family **Rectellidae** NECKAYA, 1966

Genus *Rectella* NECKAYA, 1952

*Type species*: *Mica inaegalis* NECKAYA, 1952

*Rectella telleri* sp. n.

(pl. 21:2–3)

*Holotype*: Carapace ING O/163; pl. 21:3.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: After Professor LECH TELLER, Polish geologist.

**Material.** — Miastko 2 borehole: several dozen well preserved carapaces from the depth of 2,080–2,085 m.

**Diagnosis.** — Carapace subtrapezoidal in lateral and fusiform in dorsal outline, amplete. Dorsal margin straight, ventral slightly convex and longer than dorsal. Hinge line in a wide depression. Anterior and posterior margins equal in height. Posterior cardinal angle larger than the anterior. Lateral surface smooth.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/163 | 0.69 | 0.34 |
| C ING O/162 | 0.68 | 0.37 |

**Description.** — Carapace subtrapezoidal in lateral and fusiform in dorsal outline. Height equalling a half of length. Dorsal margin straight, its length equalling about 0.6 of the length of the whole carapace. Hinge line situated in a distinct, wide depression. Anterior and posterior margins equal in height, almost symmetrical, slightly pointed in the lower half. Cardinal angles obtuse, anterior of about 120°, posterior of about 140°. Ventral margin slightly convex, longer than the dorsal (about 0.8 of the length of carapace). Left, larger valve overlaps the right one along the entire free margin. Lateral surface smooth.

**Remarks.** — A rather small variability of this species is mostly expressed in a variable height of its carapaces fluctuating within limits of 0.50 and 0.58 of the length. The outline of the posterior end also varies from a rounded to an almost pointed in the lower half. In the outline of its carapace, *Rectella telleri* sp. n. strongly resembles *R. trapezoides* ZASPELOVA from the Middle Devonian (Narov Horizon) of Byelorussia (POLENOVA 1966), from which it differs, however, in a longer carapace and wider dorsal depression.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Superfamily **Bairdiacea** SARS, 1888
Family **Bairdiidae** SARS, 1888
Genus *Bairdia* MC COY, 1844
*Type species*: *Bairdia curta* MC COY, 1844

*Bairdia aperta* POLENOVA, 1952
(pl. 22:5–7)

1952. *Bairdia aperta* sp. n.; POLENOVA: 133–134, pl. 13:3.

**Material.** — Chojnice 5 borehole: five carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: 14 carapaces from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C juv. ING O/174 | 1.0 | 0.51 |
| C juv. ING O/175 | 0.72 | 0.37 |
| C juv. ING O/176 | 0.88 | 0.45 |

**Description.** — See POLENOVA (1952).

**Remarks.** — *Bairdia aperta* POLENOVA displays a considerable similarity to *B. crebra* ROZHDESTVENSKAYA from the Eifelian of Bashkiria (ROZHDESTVENSKAYA 1962), from which it differs in a stronger bend of its dorsal margin, slighter bend of its antero- and postero- dorsal margins, less sharp and less upturned posterior margin and the place of maximum height in the anterior part of carapace.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon).

*Bairdia hexagona* POLENOVA, 1952
(pl. 22:1–2; fig. 6)

1952. *Bairdia hexagona* sp. n.; POLENOVA: 128–129, pl. 13:5–6.
1962. *Bairdia hexagona* POLENOVA; ROZHDESTVENSKAYA: 254, pl. 32:3.
1979. *Bairdia* (*Rectobairdia*) *hexagona* POLENOVA; OLEMPSKA: 105–106, pl. 19:3.

**Material.** — Chojnice 5 borehole: 12 carapaces from the depth of 4,482–4,545.1 m and one from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: several dozen carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: five carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/170 | 0.87 | 0.41 |
| C ING O/171 | 0.84 | 0.43 |

**Description.** — See POLENOVA (1952).

**Remarks.** — The specimens of *Bairdia hexagona* POLENOVA from W. Pomerania are marked by considerable degree of variability (see fig. 6). In their lateral outline, the elongated forms resemble typical specimens of *B. paffrathensis* (KUMMEROW), from which they differ in their parallel middle parts of the lateral walls of carapace.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (Stringocephalus burtini Beds), W. Pomerania, U. Givetian; USSR: Russian Platform and Bashkiria, U. Givetian (Starooskol Horizon).

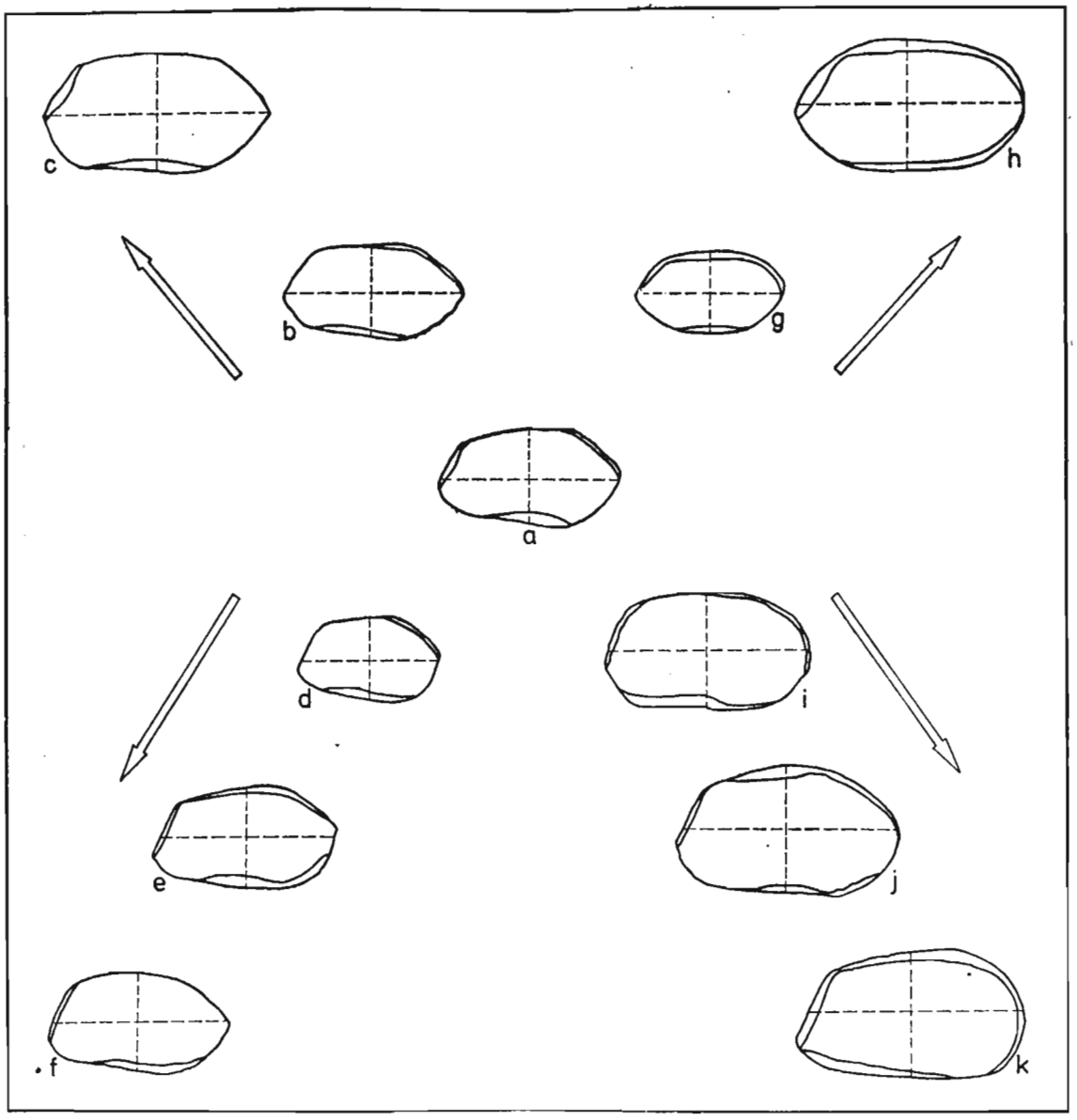



Fig. 6

Intraspecific variability of *Bairdia hexagona* POLENOVA ( Koczała 1 borehole, depth 2,945–2,954.2 m): *a* specimen most similar to the holotype, *b–f* specimens with pointed anterior margin, *b–c* specimens with posterior point at the midheight *d–f* specimens with posterior point below the midheight *g–k* specimens with rounded anterior margin, *g–h* specimens with posterior point at the midheight, *i–k* specimens with posterior point below the midheight.

## *Bairdia paffrathensis* KUMMEROW, 1953

(pl. 22:3–4; fig. 10)

1953. *Bairdia paffrathensis* n. sp.; KUMMEROW: 52, pl. 5:10.
1953. *Bairdia tantilla* n. sp.; KUMMEROW: 52, pl. 5:8.
1960. *Bairdiacypris* ? *paffrathensis* (KUMMEROW); SOHN: 45, 58, 59.
1965*a*. *Bairdia* (*Rectobairdia*) *paffrathensis* KUMMEROW; BECKER: 417–419, pl. 35:3–4.
1965*b*. *Bairdia* (*Rectobairdia*) *paffrathensis* KUMMEROW; BECKER: 180–181, pl. 7:3.
1969. *Bairdia* (*Rectobairdia*) *paffrathensis* KUMMEROW; GROOS: 72, pl. 15:1–4.
1971*b*. *Bairdia* (*Rectobairdia*) *paffrathensis* KUMMEROW; BECKER: 64, pl. 12:116.
1979. *Bairdia* (*Rectobairdia*) aff. *paffrathensis* KUMMEROW; OLEMPSKA: 106, pl.19:4.

**Material.** — Chojnice 5 borehole: several dozen carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: four carapaces from the depth of 3,041–3,119 m, one from the depth of 2,990.3–3,019 m and 27 from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/172 | 0.92 | 0.43 |
| C ING O/173 | 1.09 | 0.48 |

**Description.** — See BECKER (1965*a*).

**Remarks.** — Considerable intraspecific variability of the taxon discussed has already been pointed out by other authors (BECKER 1965*a*, 1971*b*; GROOS 1969), who, at the same time, emphasized the fact of the presence of continuous transitions between its various morphological types. Similar is the case of the material under study in which differences may be observed which are even more distinct than those described by these authors (see fig. 7). The polymorphism observed within this species is the reason why it is similar to several other species which was discussed in detail by BECKER (1965*a*) who suggested the possibility of the conspecificity of *B. paffrathensis* KUMMEROW with *B.* (*Rectobairdia*) *fragosa* MOREY, *B. saxifraga* KRÖMMELBEIN and *B. scaphula* ROZHDESTVENSKAYA. *B. tikhyi* POLENOVA may be also added to this group of presumable synonyms. For, among the Pomeranian specimens, marked by the presence of strongly developed antero- and posterodorsal margins, upturned posterior and extended anterior end, there were those almost identical with a holotype of *B. tikhyi* (see pl. 22:4) illustrated by POLENOVA (1952).

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian; W. Germany: Eifel Mts. and Rhenish Slate Mts., Eifelian and Givetian, Rhenish Slate Mts., L. Frasnian (Refrath Beds); Belgium: Dinant Basin, M. Frasnian (F2i); USSR: Volhynia, U. Givetian (Pelcha Beds).

## *Bairdia plicatula* POLENOVA, 1952

(pl. 23:1–2)

1952. *Bairdia plicatula* sp. n.; POLENOVA: 127–128, pl. 13:1–2.
1953. *Bairdia plicatula* POLENOVA; (in litt.); EGOROV: 26–27, pl. 9:1–7.
1960. *Bekena ? plicatula* (POLENOVA); SOHN: 45, 82.
1962. *Bairdia plicatula* POLENOVA; ROZHDESTVENSKAYA: 256, pl. 32:3.
1969. *Bairdia* (*Bairdia*) *plicatula* POLENOVA; GROOS: 72–73, fig. 31, pl. 15:5–8; pl. 20:8.
1979. *Bairdia* (*Bairdia*) *plicatula* POLENOVA; OLEMPSKA: 102, pl. 19:2.

**Material.** — Koczała 1 borehole: five carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: several hundred carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/182 | 1.50 | 0.87 |
| C ING O/183 | 0.58 | 0.32 |

**Description.** — See POLENOVA (1952).

**Remarks.** — This species displays a considerable degree of variability (EGOROV 1953; GROOS 1969) which has also recently been confirmed by the material from W. Pomerania. It probably includes forms described as *Bairdia siliklensis* ROZHDESTVENSKAYA (ROZHDESTVENSKAYA 1962) and *B.* (*Rectobairdia*) *lepidocentri* ssp. A BECKER (BECKER 1969*a*).

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., U. Givetian; USSR: Russian Platform and Bashkiria, U. Givetian (Starooskol Horizon).

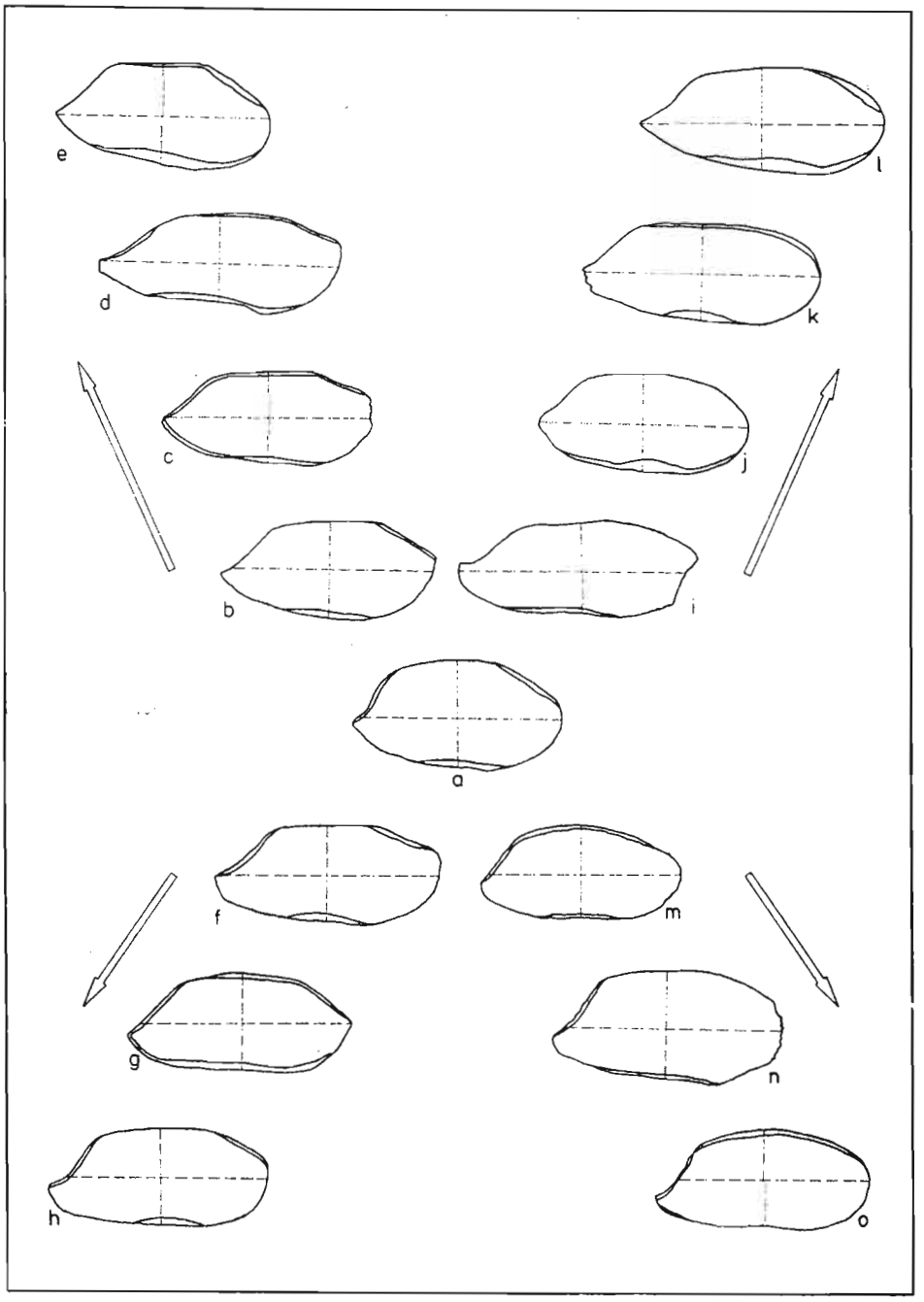



Fig. 7

Intraspecific variability of *Bairdia paffrathensis* KUMMEROW (Koczała 1 borehole, depth 2,945–2,954.2 m): *a* specimen most similar to the holotype, *b–h* specimens with straight anteriodorsal slope and pointed anterior margin, *b–e* specimens with posterior point near or at the midheight, *f–h* specimens with posterior point below the midheight, *i–o* specimens with rounded anteriodorsal slope and anterior margin: *i–l* specimens with posterior point near or at the midheight, *m–o* specimens with posterior point below the midheight.

## *Bairdia volatilis* ROZHDESTVENSKAYA, 1962
(pl. 22:8–9)

1962. *Bairdia volatilis* sp. n.; ROZHDESTVENSKAYA: 254–255, pl. 31:1.

**Material.** — Chojnice 5 borehole: five carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: two carapaces from the depth of 2,990.3–3,019 m and 50 from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/177 | 0.90 | 0.37 |
| C ING O/178 | 0.98 | 0.37 |

**Description.** — See ROZHDESTVENSKAYA (1962).

**Remarks.** — In its lateral outline this species is most similar to *Bairdia actuaria* Rozhdestvenskaya from the Eifelian of Bashkiria (ROZHDESTVENSKAYA 1962), from which it differs, however, in a more convex dorsal margin, higher anterior end and situation of maximum width in the middle part of carapace.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Bashkiria, Givetian (Afonin Beds).

## *Bairdia chojnicensis* sp. n.
(pl. 22:10–11)

*Holotype*: Carapace ING O/179; pl. 22:10.
*Type locality*: Chojnice 5 borehole, depth 4,517.4–4,526.1 m. W. Pomerania
*Type horizon*: U. Givetian.
*Derivation of the name*: After the Chojnice borehole.

**Material.** — Chojnice 5 borehole: five carapaces from the depth of 4,517.4–4,526.1 m.

**Diagnosis.** — Carapace small, short. Dorsal margin arcuate, with a slightly convex anterior and slightly concave posterior slope. Posterior margin high, vertically truncate. Maximum convexity of carapace in its dorsal part. Surface ornamented by fine, longitudinal striae.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/179 | 0.58 | 0.36 |
| C ING O/180 | 0.58 | 0.32 |

**Description.** — Carapace postplete in lateral outline, small (about 0.6 mm long). Maximum height equalling 0.6 of length. Dorsal margin strongly convex, with a slightly convex anterior and slightly concave posterior slope. Anterior margin rounded. Posterior margin high, vertically truncate, pointed above the level of midheight of carapace. Bow-shaped projection barely outlined. Maximum convexity of carapace in its dorsal half. Lateral surface ornamented by fine, longitudinal striae.

**Remarks.** — *Bairdia chojnicensis* sp. n. differs from all other species of the genus *Bairdia* MC COY in its small dimensions, ornamentation in the form of striae, high, vertically truncate posterior margin and maximum convexity situated in the dorsal part of carapace.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

*Bairdia* sp. 1
(pl. 22:12)

**Material.** — Koczała 1 borehole: one damaged carapace from the depth of 2,710.6–2,716.2 m.

Dimensions (in mm):

| | l | h | w |
|---|---|---|---|
| C ING O/181 | 1.0 | 0.47 | 0.42 |

**Remarks.** — This specimen considerably resembles forms described by ROZHDESTVENSKAYA (1972) and identified by her as *Bairdia quarziana* EGOROV. As compared with a specimen illustrated by her in pl. 31:4 (ROZHDESTVENSKAYA 1972), *Bairdia* sp. 1 has a yet more rounded anterior margin, somewhat longer and lower placed posterior margin, maximum convexity of carapace in its posterior and not anterior part and a slightly incurved and not straight dorsal margin. The forms described by ROZHDESTVENSKAYA (1972) most certainly do not belong to *B. quarziana* EGOROV, since, in this respect, of decisive importance is primarily the different dorsal outline which, in *B. quarziana* EGOROV is fusiform and in the species described by ROZHDESTVENSKAYA, like in *Bairdia* sp. 1, hexagonal, which results from the presence of a convexity occurring in the anterior and posterior part of carapace.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian.

*Bairdia* ? sp. 2
(pl. 23:3)

**Material.** — Koczała 1 borehole: five incomplete carapaces from the depth of 3,041.8–3,048 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/184 | 1.37 | 0.61 |

**Remarks.** — Due to a poor state of preservation of the specimens examined, it is impossible to determine accurately taxonomic position. Such characters as their bent dorsal margin, pointed anterior and posterior margins and strong overlapping of the right, smaller valve by the left on the ventral side suggest that they belong to the genus *Bairdia* MC COY and, according to SOHN'S (1960) classification, to the genus *Cryptobairdia* SOHN, from the representatives of which *Bairdia*? sp. 2 differs in its anterior margin more elongated and pointed than the posterior.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Genus *Bairdiacypris* BRADFIELD, 1935
*Type species*: *Bairdiacypris deloi* BRADFIELD, 1935

*Bairdiacypris* sp. 1
(pl. 23:8–9)

**Material.** — Chojnice 5 borehole: one internal mold of the right valve from a depth of 3,999.6–4,002,4 m; Koczała 1 borehole: one carapace from a depth of 2,705–2,710.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/189 | 1.03 | 0.42 |
| RV ING O/190 | 1.09 | 0.47 |

**Remarks.** — In its lateral outline, *Bairdiacypris* sp. 1 strongly resembles *B. quarziana* (EGOROV) from the Upper Frasnian of the Russian Platform (EGOROV 1953), from which it differs, however, in a more elongated carapace and slightly convex dorsal margin. The scarcity of material and the poor state of its preservation preclude any possibility of more accurate comparisons.

**Occurrence.** — Poland: W. Pomerania, L. and M. Frasnian.

## Genus *Fabalicypris* COOPER, 1946

*Type species*: *Fabalicypris wileyensis* COOPER, 1946

### *Fabalicypris holuschurmensis holuschurmensis* (POLENOVA, 1955)

(pl. 23:10)

1955. *Bairdia* (?) *holuschurmensis* var. *holuschurmensis* sp. et var. n.; POLENOVA: 235, pl. 12:1.
1962. *Fabalicypris holuschurmensis* var. *holuschurmensis* (POLENOVA); ROZHDESTVENSKAYA: 257–258, pl. 31:4.
1969. *Fabalicypris* ? cf. *holoschurmensis* (POLENOVA); GROOS: 74–75, pl. 16:7.
1979. *Fabalicypris holuschurmensis* (POLENOVA); OLEMPSKA: 115–116, pl. 23:3.

**Material.** — Chojnice 5 borehole: two carapaces from the depth of 4,482–4,545.1 m; Koczała 1 borehole: four carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: 25 carapaces from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/191 | 0.77 | 0.35 |

**Remarks.** — This species displays a considerable similarity to *Bairdia* (?) *volaformis* POLENOVA from the Upper Givetian of the Russian Platform (POLENOVA 1952), from which it differs, however, in a more elongated carapace, less convex ventral and more widely rounded posterior margin.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., U. Givetian (Bücheler Beds); USSR: Russian Platform and Bashkiria, U. Givetian (Starooskol Horizon).

## Genus *Acratia* DELO, 1930

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

### *Acratia integra* ROZHDESTVENSKAYA, 1962

(pl. 23:5–7)

1962. *Acratia* (?) *integra* sp. n.; ROZHDESTVENSKAYA: 259–260, pl. 33:2.

**Material.** — Koczała 1 borehole: seven carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: six carapaces and three valves from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/188 | 0.85 | 0.37 |
| C ING O/186 | 0.87 | 0.42 |
| C ING O/187 | 0.69 | 0.30 |

**Description.** — See ROZHDESTVENSKAYA (1962).

**Remarks.** — In its lateral outline, this species is related to *A. evlanensis* EGOROV and *A. samoilovae* SHISHKINSKAYA, but differs from them in a stronger bend of its dorsal margin,

more elongated and pointed anterior margin and in a spine which occurs on the posterior end of each valve.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Bashkiria, U. Givetian (Staro-oskol Horizon).

Family **Beecherellidae** ULRICH, 1894
Genus *Acanthoscapha* ULRICH et BASSLER, 1923
*Type species*: *Beecherella navicula* ULRICH, 1891

*Acanthoscapha* vel *Beecherella* sp. 1
(pl. 23:4)

**Materjal.** — Miastko 2 borehole: one carapace from the depth of 2,080–2,085 m.
Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/185 | 0.64 | 0.23 |

**Remarks.** — The species combines characters of two genera: *Acanthoscapha* ULRICH et BASSLER and *Beecherella* ULRICH. A strong lateral compression of the ends of its valves, maximum length in the upper half of carapace and what is known as a *Bairdia*-like outline are features characteristic of the former genus, while maximum convexity in the ventral half of its carapace, flattening of the ventral side, presence of posteroventral spines and a vestigial carina the extension of which is formed by these spines are features ascribed to the genus *Beecherella* (cf. BECKER and SANCHEZ de POSADA 1977). The species *Acanthoscapha* vel *Beecherella* sp. B was described by BECKER and SANCHEZ de POSADA (1977) from the Moniello Formation (Lower Devonian) of Northern Spain. The specimen from Poland differs from the last-named species in a more strongly curved margin and in the lack of the anterodorsal spine.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Superfamily **Cypridacea** BAIRD, 1845
Family uncertain
Genus *Schneideria* KOTSCHETKOVA, 1960
*Type species*: *Schneideria kazanica* KOTSCHETKOVA, 1960

*Schneideria groosae* BECKER, 1971
(pl. 24:1)

1971*b*. *Schneideria* ? *groosae* sp. n.; BECKER: 67–68, pl. 5:47–50.

**Material.** — Chojnice 5 borehole: three juvenile carapaces from the depth of 3,685.4–3,688.2 m.

**Diagnosis.** (emended). — Carapace short. Left valve slightly larger than the right. Anterior and posterior margins almost equal in height, anterior sometimes somewhat higher. Posterior margin uniformly, semicircularly rounded, anterior obtusely truncate. Maximum convexity of carapace in the posterior part of its upper half.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/194 | 0.45 | 0.28 |

**Remarks.** — BECKER (1971*b*) assigned this species, with a reservation, to *Schneideria* KOTSCHETKOVA emphasizing that the size relation of its valves is quite reverse than in the dia-

gnosis of the genus. He found that, the same as in *S. schigrovskiensis* (POLENOVA), the right valve of his species was larger. However, as follows from POLENOVA's (1953) description, *S. schigrovskiensis* has the left and not right valve larger, although in the explanations of figures (*ibidem*, pl. 5:1–3) smaller (right) valves were erroneously determined as left ones. Specimens of *S. groosae* from Belgium are marked by their maximum convexity situated in the middle part of carapace which may pose certain problems in orienting them correctly. Specimens from Pomerania are identical in lateral outline with the forms described from Belgium (BECKER 1971*b*), but their maximum convexity is shifted distinctly to the area near the lower, semicircularly rounded margin. This margin is precisely a posterior margin and, therefore, it is the left and not right valve which is larger. Thus, the orientation of the carapaces of *S. groosae* is opposite to that suggested by BECKER (*ibidem*) and the size relations of valves are in conformity with KOTSCHETKOVA's (1960) diagnosis of the genus *Schneideria*.

**Occurrence.** — Poland: W. Pomerania, M. Frasnian; Belgium: Dinant Basin, M. Frasnian (F2i).

*Schneideria schigrovskiensis* (POLENOVA, 1955)
(pl. 23:11–12)

1955. *Indivisia* (?) *schigrovskiensis* sp. n.; POLENOVA: 220–221, pl. 5:1–3.

**Material.** — Chojnice 5 borehole: a dozen or so carapaces from the depth of 3,999.6–4,002.4 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/192 | 0.79 | 0.40 |
| C ING O/193 | 0.43 | 0.22 |

**Remarks.** — *S. schigrovskiensis* POLENOVA differs from the most closely related species *S. edita* AVERJANOV from the Eifelian of the eastern part of the Russian Platform (AVERJANOV 1968) in a more elongated carapace.

**Occurrence.** — Poland: W. Pomerania, L. Frasnian; USSR: Eastern Russian Platform and Western Ural, L. Frasnian (Kynov Beds).

*Schneideria* sp. 1
(pl. 24:2)

**Material.** — Koczała 1 borehole: five poorly preserved carapaces from the depth of 3,041.8–3,119 m, one carapace from the depth of 2,990.3–3,019 m and five from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/195 | 0.61 | 0.32 |

**Remarks.** — This form differs from other species of the genus *Schneideria* KOTSCHETKOVA in an almost perfectly symmetrical carapace, parallel dorsal and ventral margins, semicircularly rounded anterior and posterior margins which are equal in height and strongly convex valves which are almost equal in size. A very poorly preserved material precludes, however, any more accurate classification of the specimens examined.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Suborder **Cytherocopina** GRÜNDEL, 1967
Superfamily **Cytheracea** BAIRD, 1850
Family **Bythocytheridae** SARS, 1926
Subfamily **Editiinae** KNÜPFER, 1967
Genus *Pseudomonoceratina* GRÜNDEL et KOZUR, 1971
*Type species*: *Monoceratina celsalobata* COOPER, 1941

*Pseudomonoceratina* ex gr. *sublimis* (POLENOVA, 1952)
(pl. 24:3–6)

1952. *Monoceratina sublimis* sp. n.; POLENOVA: 80–81, pl. 3:1–2, 4.
1952. *Monoceratina sublimis* var. *spinosa* sp. et var. n.; POLENOVA: 81–82, pl. 3:3.

**Material.** — Chojnice 5 borehole: three carapaces from the depth of 4,482–4,545.1 m and one from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: four carapaces and one valve from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/196 | 0.45 | 0.21 |
| C ING O/197 | 0.45 | 0.27 |
| C ING O/198 | 0.45 | 0.22 |
| C ING O/199 | 0.45 | 0.22 |

**Remarks.** — Several specimens considerably differing from each other were illustrated by POLENOVA (1952) who assigned them all to one species, *Monoceratina sublimis*. She expressed the supposition that the differences they displayed in the development of the ventral parts of their valves could be a symptom of sexual dimorphism. Since at present, the lack of sexual dimorphism is considered as a feature characteristic of the entire family Bythocytheridae (GRÜNDEL and KOZUR 1971, 1973) it should be assumed that POLENOVA had to do with specimens of different species. Specimens corresponding to various morphological types illustrated by POLENOVA (1952) were also found in the Upper Givetian deposits of W. Pomerania. A small number of the specimens available precludes the possibility of separating new species. In GRÜNDEL'S and KOZUR'S (1971) revisions of the genus *Monoceratina* ROTH, POLENOVA'S species has been excluded from this and included in the newly erected *Pseudomonoceratina*.

**Occurrence.** — Poland: W. Pomerania, U. Givetian; USSR: Russian Platform, U.Givetian (Starooskol Horizon).

Genus *Triebacythere* GRÜNDEL et KOZUR, 1971
*Type species*: *Monoceratina hartmanni* KOZUR, 1970

*Triebacythere* ? *mesodevonica* sp. n.
(pl. 24:7–10)

*Holotype*: Right valve ING O/202; pl. 24:9.
*Type locality*: Miastko 2 borehole, depth 2,080–2,085 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *mesodevonicus* — Middle Devonian.

**Material.** — Chojnice 5 borehole: one valve from the depth of 4,482–4,545.1 m and one from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: 17 valves and two carapaces from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: several dozen single valves from the depth of 2,080–2,085 m.

**Diagnosis.** — Lateral outline subrectangular. Anterior and posterior marginal ridges wide, ellipsoidal in outline. Median depression shallow. Wing-like ventral extension short, with a flat ventral side. Dorsum narrow. Lateral surface covered with a dense reticulation.

Dimensions (in mm):

| | l | h |
|---|---|---|
| RV holotype ING O/202 | 0.58 | 0.34 |
| LV ING O/203 | 0.58 | 0.34 |
| LV ING O/200 | 0.47 | 0.27 |
| RV ING O/201 | 0.45 | 0.24 |

**Description.** — Valve subrectangular in lateral outline, postplete. Dorsal margin long (= 0.84 of the length of valve), anterior margin gently rounded, somewhat higher than the posterior. Posterior margin narrowly rounded in the dorsal and truncate in the ventral part. Ventral margin convex. Anterior marginal ridge in the form of a convexity ellipsoidal in outline. Posterior marginal ridge wide. A wing-like extension occupying one-third of the length of valve and terminating in a short, obtuse spine directed downwards and, sometimes, slightly outwards, is present in the ventral part of valve. Ventral surface of valve flattened. A flattened dorsal part of valve forms a narrow, posteriorly extending dorsum. Median and dorsomedian parts of valve are occupied by a shallow depression, the deepest in its anterior part. The entire surface of valve is covered with a fine reticulation. Reticulation meshes are arranged in rows running along the anterior and ventral margin. Hinge adont, with a smooth list in the left and a groove in the right valve.

**Remarks.** — This species is strongly related morphologically to the representatives of the Triassic genus *Triebacythere* GRÜNDEL et KOZUR. Unfortunately, the present writer did not succeed in studying the internal structure of valves, in particular the character of their muscle scars. An inner lamella has not been found. For these reasons, the assignement of this species to the genus *Triebacythere* may be questionable. Its finer reticulation, wide, ellipsoidal anterior and posterior marginal ridges, less differentiated height of the anterior and posterior parts of valve, narrower dorsum and longer spine of the ventral wing-like extension are the characters in which the species described differs from the most closely related *T. hartmanni* KOZUR from the Middle Triassic of Thuringia (KOZUR 1968).

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

Suborder **Paraparchitocopina** GRAMM, 1975
Superfamily **Paraparchitacea** SCOTT, 1959
Family? **Paraparchitidae** SCOTT, 1959
Genus *Samarella* POLENOVA, 1952
*Type species*: *Samarella crassa* POLENOVA, 1952.

**Remarks.** — The taxonomic position of this genus is uncertain. POLENOVA placed it among "genera *incertae sedis*". SOHN (1960) assigned it to his new family Rishonidae and his standpoint was accepted later by many other authors, including MC GILL (1967), ROZHDESTVENSKAYA (1972) and POLENOVA (1974). In their revision of this family, ADAMCZAK and WEYANT (1973) decidedly excluded from it other genera, except for *Rishona* SOHN. The soundest seems to be the opinion of BECKER (1964) who assigned this genus with a certain reservation to the Paraparchitidae. The correctness of his suggestion is corroborated by the fact that what is known as a "reversal overlapping of the valves", so characteristic of species of the genus *Samarella*, may also be observed among the genera of the Paraparchitidae. The genus discussed displays the largest external similarity to *Chamishaella* SOHN, but differs from it in less rounded ends and only slightly convex ventral margin.

*Samarella crassa* POLENOVA, 1952
(pl. 24:11; pl. 25:1)

1952. *Samarella crassa* gen. et sp. n.; POLENOVA: 137–138, pl. 15:1–2.
1962. *Samarella crassa* POLENOVA; ROZHDESTVENSKAYA: 229–230, pl. 20:5.
1969. *Samarella crassa* POLENOVA; GROOS: 55, Abb. 29, fig. 1–3.
1979. *Samarella* aff. *crassa* POLENOVA; OLEMPSKA: 124, pl. 14:9.

**Material.** — Chojnice 5 borehole: ten, mostly deformed, carapaces from the depth of 4,482–4,541.1 m; Koczała 1 borehole: five carapaces from the depth of 2,942.6–2,984.6 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/204 | 0.63 | 0.42 |
| C ING O/205 | 1.03 | 0.65 |

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds) W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., U. Givetian (Bücheler Beds); USSR: Russian Platform, U. Givetian (Starooskol Horizon).

## ? Podocopida
Superfamily uncertain
Family **Knoxitidae** EGOROV, 1950

**Remarks.** — The family Knoxitidae has so far been assigned to the Kloedenellidae (EGOROV 1950; POLENOVA 1952; ROZHDESTVENSKAYA 1974). The family Kloedenellidae, as well as the Cytherellidae, was included by ADAMCZAK (1966) to the Platycopa. The "kloedenellid type" of dimorphism (ADAMCZAK 1966), expressed in the inflation of the posterior part of heteromorph carapace, accompanied always by the presence of an inner partition called limen on the inner surface of valves, is a characteristic feature of the Platycopa. In ADAMCZAK's (1976) opinion, the widening of the posterior part of heteromorph carapaces alone is not a sufficient character for assigning the forms, marked by it, to the Platycopa. He cites several examples of genera of suborders other than the Platycopa which display an inflation in the posterior part of their heteromorph carapaces. However, such forms have never displayed the presence of the inner partition.

The representatives of the family Knoxitidae are also devoid of limen, and, therefore, according to ADAMCZAK (1966, 1976) cannot be assigned to the Platycopa. ADAMCZAK (1976) believed that the species *Knoxiella accepta* POLENOVA, devoid of limen, but having a strongly developed duplicature (GRÜNDEL 1967; ADAMCZAK 1961) should be assigned to the Podocopa. If such is the case, the Knoxitidae would probably be a family of this suborder.

### Genus *Marginia* POLENOVA, 1952
*Type species*: *Marginia sculpta* POLENOVA, 1952

**Remarks.** — The genus *Marginia* was assigned by the Soviet authors (POLENOVA 1952; ROZHDESTVENSKAYA 1959, 1962, 1974) to the family Knoxitidae EGOROV and by MC GILL (1967) and COPELAND (1977) to the family Beyrichiopsidae HENNINGSMOEN, while JONES (1968), believing that the similarities to the genus *Beyrichiopsis* JONES and KIRKBY, suggested by POKORNÝ (1958), did not result from the homology of admarginal structures, placed the genus *Marginia* within the family Geisinidae SOHN. The *Knoxites* EGOROV, *Knoxiella* EGOROV and

others were mentioned by SOHN (1961 *b*) within the range of the Gesinidae. It is not unlikely that the name of this family is a junior synonym of the Knoxitidae and, for this reason, the present writer assigns here the genus *Marginia* to the Knoxitidae.

### *Marginia syzranensis* POLENOVA, 1952
(pl. 25:2–6)

1952. *Marginia syzranensis* sp. n.; POLENOVA: 100–101, pl. 5:4–5.
1979. *Marginia syzranensis* POLENOVA; OLEMPSKA: 93–94, pl. 15:4–5.

**Material.** — Chojnice 5 borehole: one carapace and six valves of tecnomorphs from the depth of 4,482–4,545.1 m; Koczała 1 borehole: nine heteromorph carapaces and one carapace and six valves of tecnomorphs from the depth of 2,942.6–2,984.6 m; Miastko 2 borehole: one heteromorph carapace and four carapaces and 11 valves of tecnomorphs from the depth of 2,080–2,085 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C♀ ING O/207 | 1.29 | 0.77 |
| C juv. ING O/208 | 1.0 | 0.53 |
| C juv. ING O/209 | 0.71 | 0.34 |
| C juv. ING O/210 | 0.59 | 0.32 |
| C juv. ING O/206 | 0.55 | 0.30 |

**Description.** — See POLENOVA (1952).

**Remarks.** — *M. syzranensis* is related to *M. ollii* ROZHDESTVENSKAYA from the Eifelian of Southern Ural (ROZHDESTVENSKAYA 1960), from which it differs in larger dimensions, more rounded and higher anterior end, slightly outlined preadductorial node and shorter depression of hinge margin.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian; USSR: Russian Platform, U. Givetian (Starooskol Horizon).

## Order **Myodocopida** SARS, 1866
## Suborder **Entomozocopina** GRÜNDEL, 1969
## Superfamily **Entomozoacea** PŘIBYL, 1950
## Family **Entomozoidae** PŘIBYL, 1950
## Genus *Entomozoe* PŘIBYL, 1950
*Type species*: *Entomis tuberosa* JONES, 1861
## Subgenus *Nehdentomis* MATERN, 1929
*Type species*: *Entomozoe* (*Nehdentomis*) *nehdensis* MATERN, 1929

### *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH, 1896)
(pl. 26:6)

1896. *Entomis tenera* nov. nom.; GÜRICH: 375, pl. 10:15.
1929. *Entomis* (*Nehdentomis*) *tenera* GÜRICH; MATERN: 57, pl. 4:48.
1954. *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH); RABIEN: 98–99.
1975. *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH); CASIER: 18, pl. 2:6.
1979. *Entomozoe* (*Nehdentomis*) *tenera* (GÜRICH); OLEMPSKA: 134–135, pl. 29:4–6.

**Material.** — Chojnice 5 borehole: one carapace and three internal molds of valves from the depth of 3,685.4–3,688.2 m and three valves from the depth of 3,457.6–3.460.8 m; Koczała 1 borehole: two carapaces from the depth of 2,376–2,382 m.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C ING O/216 | 1.11 | 0.63 |

**Occurrence.** — Poland: Holy Cross Mts., Frasnian and L. Famenian, Sudeten Mts., U. Devonian, W. Pomerania, M. Frasnian and L. Famennian; W. Germany: Rhenish Slate Mts., L. Frasnian to L. Famennian (cicatricosa-torleyi to *Entomozoe* Zone); E. Germany: Thuringia, L. Famennian; Belgium, U. Frasnian (Matagne Formation); SW England, Frasnian.

*Incertae ordinis*

Family **Buregiidae** POLENOVA, 1953

Genus *Buregia* ZASPELOVA *in*: POLENOVA, 1953

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

**Remarks.** — The taxonomic position of the genus, as well as the family the only representative of which it is, is uncertain. A dozen or so species of the genus *Buregia* are known at present. Most of them were described from the Middle and Upper Devonian of the Russian Platform (POLENOVA 1953); SHISHKINSKAYA 1959; ROZHDESTVENSKAYA 1972), as well as from the Middle Devonian of the Rhenish Slate Mts., W. Germany (GROOS 1969) and Holy Cross Mts., Poland (OLEMPSKA 1979). On the basis of the sexual dimorphism expressed in a larger convexity of the posterior end of carapace in heteromorphs observed by Soviet authors (POLENOVA 1953; ROZHDESTVENSKAYA 1972), the Buregiidae was assigned by ROZHDESTVENSKAYA (1972) to the Kloedenellacea. However, the soundness of this classification is precluded by the lack of limen, an element characterictic of the so-called "kloedenellid" type of dimorphism (ADAMCZAK 1968, 1976). The lack of data on the details of internal structure, in particular on the type of hinge and on the presence or absence of duplicature, prevents the possibility of deciding whether the genus *Buregia* should be assigned to the Podocopida or Palaeocopida. Its general outline and the presence of a ridge running along the free margin relate *Buregia* to *Urftella* BECKER (Primitiopsacea, Palaeocopida). What is known as "perimarginal" dimorphism characteristic of the Primitiopsacea does not, however, occur in *Buregia*. A hypothetical possibility of the existence of entirely non-dimorphic families was assumed by BECKER (1970*a*) and GRÜNDEL (1977) on the basis of a tendency to reducing dimorphic structure which they observed in the superfamily Primitiopsacea. The family Buregiidae may presumably be one of them.

*Buregia curta* sp. n.

(pl. 26:3–4)

*Holotype*: Carapace ING O/213; pl. 26:3.
*Type locality*: Koczała 1 borehole, depth 2,966–2,969.3 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: Lat. *curtus* — short.

**Material.** — Koczała 1 borehole: 16 poorly preserved carapaces from the depth of 2,966–2,969.3 m.

**Diagnosis.** — Carapace short, truncate-circular in outline, strongly convex. Ends equal in height, slightly rounded. Cardinal angles indistinct. Ventral margin convex. Spines small. Surface smooth or indistinctly punctate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/213 | 0.98 | 0.69 |
| C juv. ING O/214 | 0.55 | 0.41 |

**Description.** — Carapace medium-sized, relatively short (height = 0.7 of length), truncate-circular in outline, strongly convex. Anterior and posterior margins equal in height, slightly rounded. Ventral margin slightly convex, parallel to the dorsal. A delicate list with small spines in the ventral part of the anterior and posterior margins runs parallel to the free margin of each valve. Anterior and posterior spines of the right and left valve are situated at the same level, whereas the posterior spine of the left valve is always situated somewhat higher than the posterior spine of the right valve. Maximum convexity of carapace in the posteroventral part of carapace. Carapace subcircular in transverse section. Surface smooth or indistinctly punctate. Carapaces of juvenile individuals differ from those of adult ones only in size.

**Remarks.** — No dimorphism was observed among the largest carapaces and so it was likely that only tecnomorph carapaces were in this material. In its lateral outline and stronger convexity, the species discussed resembles *Buregia benigna* ROZHDESTVENSKAYA from the Upper Famennian of *Bashkiria* (ROZHDESTVENSKAYA 1972). It differs from it in less distinctly outlined cardinal angles, equal height of the anterior and posterior margins and lack of keels on the ventral surface of valves.

**Occurrence.** — Poland: W. Pomerania, U. Givetian.

## *Buregia groosae* sp. n.
(pl. 26:1–2)

1969. *Buregia* sp. aff. *B. krestovnikovi* POLENOVA; GROOS: 40, pl. 18:14.
*Holotype*: Carapace ING O/211; pl. 26:1.
*Type locality*: Koczała 1 borehole, depth 2,966–2,969.3 m, W. Pomerania.
*Type horizon*: U. Givetian.
*Derivation of the name*: After Dr. HELGA GROOS-UFFENORDE, German researcher of the Devonian ostracods.

**Material.** — Chojnice 5 borehole: hundreds, mostly deformed carapaces from a depth of 2,942.6–2,984.6 m.

**Diagnosis.** — Carapace rectangular in lateral outline. Anterior and posterior margins rounded, almost equal in height or anterior somewhat higher. Posterior cardinal angle more distinctly outlined than the anterior. Ventral margin slightly convex or subrectilinear, parallel to the dorsal. Spines small. Surface closely and finely punctate.

Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/211 | 1.21 | 0.72 |
| C juv. ING O/212 | 0.48 | 0.30 |

**Description.** — Carapace rectangular-oval in lateral outline. Dorsal margin straight. Posterior cardinal angle more distinctly outlined than the anterior. Anterior and posterior margins almost equal in height, symmetrical or anterior slightly higher. Ventral margin rectilinear or slightly convex. Maximum convexity of carapace situated close behind the midlength, in its ventral half, which gives a triangular outline of its transverse section. Right valve, somewhat larger, slightly overlaps the left one along the free margin. Free margin of each valve is bordered by a thin list, with small spines in its anterior and posterior parts. Anterior spines of both right and left valves are situated at the same level, while the posterior spine of the left valve occurs always considerably higher than the posterior spine of the right valve. The entire lateral surface finely and closely punctate. No differences which could suggest the existence of sexual dimorphism were found among the largest carapaces examined. Maybe, this material included tecnomorphs only.

**Remarks** — The species here described differs from the most closely related species *Buregia krestovnikovi* POLENOVA from the Upper Frasnian of the Russian Platform (POLENOVA 1953)

in an equal height of ends, finely punctate surface and different situation of the posterior spine on the right and left valve.

**Occurrence.**. — Poland: W. Pomerania, U. Givetian; W. Germany: Rhenish Slate Mts., U. Givetian (Grövensteinen Beds).

Family uncertain
Gen. et sp. indet.
(pl. 26:5)

1979. Gen. et sp. indet; OLEMPSKA: 132, pl. 28:7.

**Material.** — Chojnice 5 borehole: one left valve from the depth of 4,507.8–4,517.4 m. Dimensions (in mm):

| | l | h |
|---|---|---|
| LV ING O/215 | 2.13 | 1.22 |

**Description.** — Valve large, suboval in outline. Dorsal margin straight, passing, in the form of gentle arcs, into the anterior and posterior margins. Anterior and posterior margins widely rounded, anterior considerably lower than the posterior. Ventral margin gently convex. Maximum height in the posterior part. Surface smooth.

**Remarks.** — The specimen described by OLEMPSKA (1979) from the Upper Givetian of the Holy Cross Mts. is only slightly smaller than that under study and shows, as a results of partial corrosion of the surface of valve, a round, large muscle scar situated in the middle part of its valve. The structure of hinge and internal part of the free margin could not be traced in the specimen studied by OLEMPSKA (1979), as well as in the material from Pomerania. This precludes any possibility of settling its taxonomic position even at the level of order.

**Occurrence.** — Poland: Holy Cross Mts., U. Givetian (*Stringocephalus burtini* Beds), W. Pomerania, U. Givetian.

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# EXPLANATION OF PLATES 1–26

## PLATE 1

Page

*Pribylites (Parapribylites) hanaicus* POKORNÝ . . . . . 21

1. Heteromorph carapace: *a* — left lateral view, *b* — ventral view, *c* — posterior view, *d* — dorsal view, × 60 (ING O/1); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
2. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior viev, × 60 (ING O/2); locality, depth and age as above.
3. Heteromorph carapace; *a* — right lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/3); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
4. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/4); locality, depth and age as above.
5. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/5); locality, depth and age as above.
6. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/6); locality, depth and age as above.
7. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/7); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.

*Pribylites (Gravia)* sp. 1 . . . . . 21

8. Tecnomorph valve; *a* — right lateral view, *b* — ventral view, × 60 (ING O/8); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

## PLATE 2

*Pribylites (Parapribylites) hanaicus* POKORNÝ . . . . . 24

1. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/9); Chojnice 5 borehole, depth 4,517.4–4,526,1 m, Upper Givetian.
2. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/10); locality, depth and age as above.
3. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, × 60 (ING O/11); locality, depth and age as above.
4. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60 (ING O/12); locality, depth and age as above.

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*Selebratina accommoda* sp. n. . . . . 22

5. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60 (ING O/13); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
6. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60, holotype (ING O/14); locality, depth and age as above.

PLATE 3

*Russia apicata* sp. n. . . . . 22

1. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60 (ING O/15); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.
2. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60, holotype (ING O/16); locality, depth and age as above.
3. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60 (ING O/17); locality, depth and age as above.

*Russia cingulata* (KUMMEROW) . . . . . 23

4. Tecnomorph carapace; left lateral view, × 60 (specimen lost); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

*Urftella adamczaki* BECKER . . . . . 24

5. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60 (ING O/18); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.
6. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 60 (ING O/19); locality, depth and age as above.
7. Juvenile carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/20); Chojnice 5 borehole, depth 4,507.8–4,517.4 m, Upper Givetian.

PLATE 4

*Sulcatiella olempskae* sp. n. . . . . 25

1. Carapace; *a* — right lateral view, *b* — dorsal view, *c* — posterior view, × 60, holotype (ING O/21); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
2. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, *c* — posterior view, × 60 (ING O/22); locality, depth and age as above.

*Parabolbinella anteaculeata* ADAMCZAK . . . . . 26

3. Tecnomorph valve; *a* — left lateral view, *b* — ventral view, × 40 (ING O/23); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
4. Tecnomorph carapace: *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/24); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

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*Hanaites mirabilis* (POLENOVA) . . . . . 26

5. Valve; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/25); Chojnice 5 borehole, depth 4.543,6–4,545,1 m, Upper Givetian.

*Hollinella antri* ADAMCZAK . . . . . 27

6. Tecnomorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/26); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
7. Fragmentary juvenile valve; *a* — right lateral view, *b* — dorsal view, × 40 (ING O/27); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

*Hollinella suffflata* (BECKER) . . . . . 27

8. Tecnomorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/28); Chojnice 5 borehole, depth 4,429.4–4,436.4 m, Upper Givetian.

PLATE 5

*Adelphobolbina rectangularis* sp. n. . . . . 28

1. Tecnomorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/29); Chojnice 5 borehole, depth 3,685.4–3,688.2 m, Middle Frasnian.
2. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 40, holotype (ING 0/30); Koczała 1 borehole, depth 2,730–2,734 m, Middle Frasnian.

*Nezamyslia bicornuta* sp. n. . . . . 37

3. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, *e* — anterior view, × 50 holotype (ING O/31); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
4. Valve; *a* — right lateral view × 50 (ING O/32); locality, depth and age as above.

*Obotritia eifeliensis* ADAMCZAK . . . . . 38

5. Juvenile valve; left lateral view, × 50 (ING O/33); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

*Kozlowskiella moderabilis* sp. n. . . . . 28

6. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 40, holotype (ING O/34); Koczała 1 borehole, depth 2,966.0–2,969.3 m, Upper Givetian.
7. Heteromorph carapace; right lateral view, × 40 (ING O/35); locality, depth and age as above.

*Illativella* sp. 1 . . . . . 29

8. Heteromorph valve; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, × 40 (ING O/38); Koczała 1 borehole, depth 2,633.3–2,636,6 m, ? Upper Frasnian.
9. Fragmentary juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — dorsal view, *d* — ventral view, × 40 (ING O/37); locality, depth and age as above.

## PLATE 6

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*Aechmina* sp. . . . . 30

1. Fragmentary carapace; *a* — left lateral view, *b* — right lateral view, *c* — dorsal view, *d* — ventral view, × 60 (ING O/38); Koczała 1 borehole, depth 2,978.1–2,984.6 m, Upper Givetian.

*Amphissites multicarinatus* sp. n. . . . . 32

2. Carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, × 60, holotype (ING O/39); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

*Amphissites irinae* Gleb. et Zasp. *in*: EGOROV . . . . . 30

3. Juvenile carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, × 60 (ING O/40); Koczała 1 borehole, depth 2,730–2,734 m, Middle Frasnian.

*Amphissites pulcher* POLENOVA . . . . . 31

4. Carapace; *a* — left lateral view, *b* — dorsal view, *c* — ventral view, × 60 (ING O/41); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
5. Carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, × 60 (ING O/42); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

*Amphissites remesi* POKORNÝ . . . . . 31

6. Valve; *a* — left lateral view, *b* — dorsal view, × 60 (ING O/43); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian

## PLATE 7

*Refrathella* sp. 1. . . . . 32

1. Valve; *a* — right lateral view, *b* — ventral view, × 60 (ING O/44); Koczała 1 borehole, depth 2,949.5–2,954.2 m Upper Frasnian.

*Moorites koczalensis* sp. n. . . . . 33

2. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, × 60, holotype (ING O/45); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

*Moorites givetianus* (ROZHDESTVENSKAYA) . . . . . 33

3. Carapace; *a* — left lateral view, *b* — ventral view, × 80, holotype (ING O/46); locality, depth and age as above.

4. Carapace; *a* — right lateral view, *b* — dorsal view, × 60 (ING 0/47); locality, depth and age as above.
5. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 80 (ING O/48); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.



6. Carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, × 80, holotype (ING O/49); Koczała 1 borehole depth 2,996.4–3,006.1 m, Upper Givetian.
7. Carapace; right lateral view, × 80 (ING O/50); Chojnice 5 borehole, depth 4,415.2–4,429.4 m, Upper Givetian.



8. Carapace; *a* — left lateral view, *b* — dorsal view, × 80 (ING O/51); Chojnice 5 borehole, depth 3,685.4–3,688.2 m Middle Frasnian.



9. Carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/52); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.
10. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/53); Chojnice 5 borehole, depth 4,429.4–4,436.4 m, Upper Givetian.



11. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/54); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.



12. Valve; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/55); locality, depth and age as above.

## PLATE 8



1. Heteromorph carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/56); Chojnice 5 borehole, 4,507.8–4,517.4 m, Upper Givetian.
2. Heteromorph carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60, holotype (ING O/57); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
3. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/58); locality, depth and age as above.



4. Tecnomorph carapace; right lateral view, × 60 (ING 0/59); locality, depth and age as above.
5. Juvenile carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/60); locality, depth and age as above.
6. Heteromorph carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/61); locality, depth and age as above.

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*Poloniella* sp. 1 . . . . . 44

7. Tecnomorph carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/62); Koczała 1 borehole, depth 3,089–3,094 m, Upper Givetian.

PLATE 9

*Poloniella regularis* sp. n. . . . . 43

1. Juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/63); Koczała 1 borehole, depth 2,978.1–2,984.6 m, Upper Givetian.
2. Juvenile carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/64); locality, depth and age as above.
3. Juvenile carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/65); locality, depth and age as above.
4. Tecnomorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/66); locality, depth and age as above.
5. Heteromorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/67); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
6. Tecnomorph carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/68); locality, depth and age as above.
7. Heteromorph valve; left lateral view, × 60 (ING O/69); locality, depth and age as above.

*Poloniella trisinuata* (VAN PELT) . . . . . 41

8. Tecnomorph carapace; *a* — right lateral view, *b* — dorsal view, × 60 (ING 0/70); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

PLATE 10

*Poloniella trisinuata* (VAN PELT) . . . . . 41

1. Tecnomorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/71); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

*Uchtovia materni* BECKER . . . . . 45

2. Tecnomorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/72); Chojnice 5 borehole, depth 3,786.3–3,790.6 m, Middle Frasnian.

*Uchtovia refrathensis* (KRÖMMELBEIN) . . . . . 45

3. Heteromorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/73); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.
4. Heteromorph carapace; *a* — left lateral view, *b* — dorsal view, × 60 (ING O/74); Koczała borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

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5. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/75); locality, depth and age as above.
6. Juvenile carapace; *a* — left lateral view, *b* — ventral view, × 60 (ING O/76); locality, depth and age as above.
7. Juvenile carapace; left lateral view, × 60 (ING O/77); locality, depth and age as above.

*Poloniella* sp. 2 . . . . . 44

8. Heteromorph valve; *a* — left lateral view, *b* — ventral view, × 60 (ING O/78); Miastko 2 borehole, depth 2,080–2.085 m, Upper Givetian.

PLATE 11

*Uchtovia rozhdestvenskayae* sp. n. . . . . 46

1. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, × 60, holotype (ING O/79); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
2. Juvenile carapace; *a* — left lateral view, *b* — ventral view, × 60 (ING O/80); locality, depth and age as above.
3. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, × 60 (ING O/81); locality, depth and age as above.
4. Juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/82); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

*Uchtovia* sp. 1 . . . . . 47

5. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/83); Koczała 1 borehole depth 3,089–3,094 m, Upper Givetian.
6. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/84); locality, depth and age as above.

*Evlanella caduca* sp. n. . . . . 47

7. Heteromorph carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60, holotype (ING O/85); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
8. Tecnomorph carapace; *a* — left lateral view, *b* — ventral view, × 60 (ING O/86); locality, depth and age as above.

PLATE 12

*Cavellina subegorovi* sp. n. . . . . 48

1. Carapace; *a* — left lateral view, *b* — ventral view, × 60, holotype (ING O/87); Koczała 1 borehole, depth 2,978.1–2.984.6 m, Upper Givetian.

*Cavellina parvula* sp. n. . . . . 48

2. Carapace; *a* — left lateral view, *b* — ventral view, × 60, holotype (ING O/88); locality, depth and age as above.

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2. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/104); locality, depth and age as above·
3. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/105); locality, depth and age as above.
4. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/106); locality, depth and age as above.
5. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/107); locality, depth and age as above.
6. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, × 60 (ING O/108); locality, depth and age as above.
7. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/109); locality depth and age as above.
8. Carapace; *a* — right lateral view *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING 0/110); locality, depth and age as above.
9. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, × 60 (ING O/111); locality, depth and age as above.

*Jenningsina cavernosa* (POLENOVA) . . . . . 53

10. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/112); Chojnice 5 borehole, depth 4,429.4–4,436.4 m, Upper Givetian.
11. Valve; *a* — right lateral view, *b* — inner view, × 60 (ING O/113); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

PLATE 15

*Jenningsina cavernosa* (POLENOVA) . . . . . 53

1. Juvenile carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/114); Koczała 1 borehole, depth 2,978.1–2,984.6 m, Upper Givetian.
2. Juvenile carapace; left lateral view, × 60 (ING O/115); locality, depth and age as above.
3. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/116); locality, depth and age as above.
4. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/117); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
5. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/118); locality, depth an age as above.

*Svantovites magnei* BECKER . . . . . 54

6. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/119); Chojnice 5 borehole, depth 3,685.4–3,688.2 m, Middle Frasnian.
7. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/120); locality, depth and age as above.
8. Juvenile carapace; *a* — left lateral view, *b* — dorsal view, × 60 (ING O/121); locality, depth and age as above.

*Graphiadactyllis indotatus* sp. n. . . . . 58

9. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/122); Chojnice 5 borehole, depth 4,517.4–4.526.1 m, Upper Givetian.

*Graphiadactyllis facetus* sp. n.. . . . . 57

10. Carapace; *a* — right lateral view, *b* — dorsal view, *c* — ventral view, × 60, holotype (ING O/123); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

PLATE 16

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*Jefina obtusa* sp. n. . . . . 55

1. Carapace; *a*— left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/124); Chojnice 5 borehole, depth 4,415.2–4,429.4 m, Upper Givetian.
2. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/125); locality, depth and age as above.

*Ponderodictya querula* sp. n. . . . . 56

3. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/126); Koczała 1 borehole, depth 2,710.6–2,716.6 m, Middle Frasnian.
4. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60, holotype (ING O/127); locality, depth and age as above.
5. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 60, (ING O/128); locality, depth and age as above.

*Ropolonellus kettneri* (POKORNÝ) . . . . . 58

6. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, *e* — posterior view, × 80. (ING O/129); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

PLATE 17

*Ropolonellus kettneri* (POKORNÝ) . . . . . 58

1. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, *c* — posterior view, × 80 (ING O/130); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
2. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, *c* — posterior view, × 80 (ING O/131); Chojnice 5 borehole, depth 4,507.8–4,517.4 m, Upper Givetian.

*Ropolonellus* sp. 1 . . . . . 59

3. Carapace; right lateral view, × 60 (ING 0/132); Chojnice 5 borehole, depth 3,685.4–3,688.2 m, Middle Frasnian.

*Bufina salva* sp. n. . . . . 59

4. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/133); Chojnice 5 borehole, depth 4,390.1–4,395.4 m, Upper Givetian.

*Bufina colliquefacta* sp. n. . . . . 59

5. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/134); Chojnice 5 borehole, depth 4,429.4–4,436.4 m, Upper Givetian.

*Bufina intermedia* sp. n. . . . . 60

6. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/135); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

7. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/136); Chojnice 5 borehole, depth 4,415.1–4,429,4 m, Upper Givetian.

PLATE 18



1. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, × 80, holotype (ING O/137); Miastko 2 borehole, depth 2,080.0–2,085.0 m, Upper Givetian.
2. Juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, × 80 (ING O/138); locality, depth and age as above.
3. Juvenile carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 80 (ING O/139); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.



4. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/140); Chojnice 5 borehole, depth 4.415.1–4.429.4 m, Upper Givetian.
5. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/141); Koczała 1 borehole, depth 2,942.6–2,945 m, Upper Givetian.



6. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/142); Koczała 1 borehole, depth 3,089–3,095 m, Upper Givetian.



7. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/143); Chojnice 5 borehole, depth 4,543.6–4,545.1 m, Upper Givetian.

PLATE 19



1. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 80 (ING O/144), Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
2. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 80 (ING O/145); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.



3. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, *d* — posterior view, × 40, holotype (ING O/146); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

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*Microcheilinella fecunda* (PŘIBYL et ŠNAJDR) . . . . . 64

4. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/147); Koczała 1 borehole, depth 2,960.7–2,965.2 m, Upper Givetian.

*Ampuloides verrucosa* POLENOVA . . . . . 65

5. Carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/148); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

*Bairdiocypris deliberatus* sp. n. . . . . 66

6. Carapace; *a* — right lateral view, *b* — dorsal view, × 40 (ING O/149); Koczała 1 borehole, depth 2,960.7–2,965.2 m, Upper Givetian.

*Bairdiocypris vastus* POLENOVA . . . . . 66

7. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/150); Miastko 2 borehole, depth 2,080–2.085 m, Upper Givetian.

## PLATE 20

*Bairdiocypris deliberatus* sp. n. . . . . 66

1. Carapace; *a* — right lateral view, *b* — dorsal view, × 40, holotype (ING O/151); Koczała 1 borehole, depth 3,041–3,048 m, Upper Givetian.
2. Carapace; *a* — right lateral view, *b* — dorsal view, × 40 (ING O/152); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
3. Carapace; *a* — right lateral view, *b* — ventral view, × 40, (ING O/153); locality, depth and age as above.

*Bairdiocypris phaseoliformis* sp. n. . . . . 67

4. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40, holotype (ING O/154); locality, depth and age as above.
5. Juvenile carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/155); locality, depth and age as above.

*Healdianella resima* (ROZHDESTVENSKAYA) . . . . . 68

6. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 80 (ING O/156); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
7. Juvenile carapace; right lateral view, × 80 (ING O/157); Koczała 1 borehole, depth 2,978.1–2,984.6 m, Upper Givetian.
8. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 80 (ING O/158); locality, depth and age as above.

*Healdianella obliqua* (KUMMEROW) . . . . . 67

9. Carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/159); locality, depth and age as above.
10. Carapace; *a* — right lateral view, *b* — dorsal view, × 60 (ING O/160); Koczała 1 borehole, depth 2,949.5–2,954.2 m), Upper Givetian.

PLATE 21

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*Healdianella* sp. 1 . . . . . 68

1. Carapace; *a* — right lateral view, *b* — dorsal view, × 60 (ING O/161); Koczała 1 borehole, depth 3,089–3,094 m, Upper Givetian.

*Rectella telleri* sp. n. . . . . 71

2. Carapace; *a* — right lateral view, *b* — dorsal view, × 60 (ING O/162); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
3. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60, holotype (ING O/163); locality, depth and age as above.

*Orthocypris perlonga* KUMMEROW . . . . . 69

4. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/164); Chojnice 5 borehole, depth 4,429.4–4,436.4 m, Upper Givetian.
5. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/165); locality, depth and age as above.

*Orthocypris kummerowi* sp. n. . . . . 69

6. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, × 60 (ING O/166); Koczała 1 borehole, depth 3,089–3,094 m, Upper Givetian.
7. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60, holotype (ING O/167); Koczała 1 borehole, depth 2,945–2,949.5 m, Upper Givetian.

*Orthocypris* sp. 1 . . . . . 70

8. Carapace; *a* — right lateral view, *b* — ventral view, × 60 (ING O/168); Chojnice 5 borehole, depth 3,685.4–3,688.2 m, Middle Frasnian.

*Baschkirina miastkoensis* sp. n. . . . . 70

9. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60, holotype (ING O/169); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

PLATE 22

*Bairdia hexagona* POLENOVA . . . . . 72

1. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/170); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
2. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/171); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.

3. Carapace; *a* — right lateral view, *b* — ventral view, × 40, (ING O/172); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
4. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/173); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.



5. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/174); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
6. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, × 40 (ING 0/175); locality, depth and age as above.
7. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/176); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.



8. Carapace; *a* — right lateral view, *b* — ventral view, × 40, (ING O/177); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
9. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/178); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.



10. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 80, holotype (ING O/179); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.
11. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 80 (ING O/180); locality, depth and age as above.



12. Carapace, *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 40 (ING O/181); Koczała 1 borehole, depth 2,710.6–2,716.2 m, Middle Frasnian.

PLATE 23



1. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 40 (ING O/182); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
2. Juvenile carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/183); Koczała 1 borehole, depth 2,949.5–2.954.2 m, Upper Givetian.



3. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/184); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

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*Acanthoscapha* vel *Beecherella* sp. 1 . . . . . 79

4. Carapace; *a* — right lateral view, *b* — dorsal view, × 60, (ING O/185); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

*Acratia integra* ROZHDESTVENSKAYA . . . . . 78

5. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/186); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
6. Juvenile carapace; left lateral view, × 60 (ING 0/187); locality, depth and age as above.
7. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/188); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.

*Bairdiacypris* sp. 1 . . . . . 77

8. Carapace; *a* — right lateral view, *b* — ventral view, × 40 (ING O/189); Koczała 1 borehole, depth 2,705–2.710 m, Middle Frasnian.
9. Valve; *a* — right lateral view, *b* — ventral view, × 40 (ING O/190); Chojnice 5 borehole, depth 3,999.6–4.002.4 m, Lower Frasnian.

*Fabalicypris holushurmensis holushurmensis* (POLENOVA) . . . . . 78

10. Juvenile carapace; right lateral view, × 40 (ING O/191); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

*Schneideria schigrovskiensis* (POLENOVA) . . . . . 80

11. Carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 60 (ING O/192); Chojnice 2 borehole, depth 3,999.6–4,002.4 m, Lower Frasnian.
12. Juvenile carapace; *a* — right lateral view, *b* — dorsal view, × 60 (ING O/193); locality, depth and age as above.

PLATE 24

*Schneideria groosae* BECKER . . . . . 79

1. Carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 80 (ING O/194); Chojnice 5 borehole, depth 3,685.4–3,688.2 m, Middle Frasnian.

*Schneideria* sp. 1 . . . . . 80

2. Carapace; *a* — left lateral view, *b* — dorsal view, × 80 (ING O/195); Koczała 1 borehole, depth 3,089–3,094 m, Upper Givetian

*Pseudomonoceratina* ex gr. *sublimis* (POLENOVA) . . . . . 81

3. Carapace; *a*— right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 80 (ING O/196); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
4. Carapace; *a* — right lateral view, *b* — ventral view, *c* — dorsal view, × 80 (ING O/197); locality, depth and age as above.

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5. Carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 80 (ING O/198); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.
6. Carapace; *a* — left lateral view, *b* — ventral view, *c* — dorsal view, × 80 (ING O/199); locality, depth and age as above.

*Triebacythere*? *mesodevonica* sp. n. . . . . 81

7. Juvenile valve; left lateral view, × 80 (ING 0/200); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.
8. Juvenile valve; *a* — right lateral view, *b* — ventral view, × 80 (ING O/201); locality, depht and age as above.
9. Valve; *a* — right lateral view, *b* — ventral view, × 80, holotype (ING O/202); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
10. Valve; *a* — left lateral view, *b* — ventral view, × 80 (ING 0/203); locality, depth and age as above.

*Samarella crassa* POLENOVA . . . . . 81

11. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, × 60 (ING O/204); Koczała 1 borehole, depth 2,949.5–2,954.2 m, Upper Givetian.

PLATE 25

*Samarella crassa* POLENOVA . . . . . 83

1. Carapace; *a* — right lateral view, *b* — left lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/205); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.

*Marginia syzranensis* POLENOVA . . . . . 84

2. Juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 60 (ING O/206); Miastko 2 borehole, depth 2,080–2,085 m, Upper Givetian.
3. Heteromorph carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 50 (ING O/207); locality, depth and age as above.
4. Juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 50 (ING O/208); locality, depth and age as above.
5. Juvenile carapace; *a* — left lateral view, *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 50 (ING O/209); Koczała 1 borehole, depth 2,978.1–2,984.6 m, Upper Givetian.
6. Juvenile carapace; *a* — left lateral view *b* — right lateral view, *c* — ventral view, *d* — dorsal view, × 50 (ING O/210); Chojnice 5 borehole, depth 4,517.4–4,526.1 m, Upper Givetian.

PLATE 26

*Buregia groosae* sp. n. . . . . 85

1. Carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, *d* — anterior view, × 40, holotype (ING O/211); Koczała 1 borehole, depth 2,966–2,969.3 m, Upper Givetian.
2. Juvenile carapace; *a* — left lateral view, *b* — ventral view, × 40 (ING O/212); locality, depth and age as above.

3. Carapace; *a* — left lateral view, *b* — ventral view, *c* — posterior view, *d* — anterior view, × 40, holotype (ING O/213); locality, depth and age as above.
4. Juvenile carapace; *a* — left lateral view, *b* — ventral view, × 40 (ING O/214); locality, depth and age as above.



5. Valve; *a* — left lateral view, *b* — ventral view, × 40 (ING O/215); Chojnice 5 borehole, depth 4,507.8–4,517.4 m, Upper Givetian.



6. Carapace; *a* — right lateral view, *b* — left lateral view, × 40 (ING O/216); Chojnice 5 borehole, depth 3,685.4–3,688.2 m, Middle Frasnian.

## ADDENDUM

### *Bufina salva* sp. n.
(pl. 17:4)

*Holotype:* carapace ING O/133; pl. 17:4.

*Type locality:* Chojnice 5 borehole, depth 4,390.1–4,395.4 m, W. Pomerania.

*Type horizon:* U. Givetian.

*Derivation of the name:* Lat. *salvus* — unscathed, survived.

*Material.* — Chojnice 5 borehole: four carapaces and five valves from the depth of 4,482.9–4,545.1 m, and three carapaces and one valve from the depth of 4,390.1–4,436.4 m; Koczała 1 borehole: three carapaces from the depth of 2,990.3–3,019 m.

*Diagnosis.* — Carapace oval in lateral outline. Anterior and posterior margins equal in height, symmetrically rounded. Ventral margin somewhat more convex then the dorsal. Two ridges — anterior and posterior — occur on the each valve. Surface of valves smooth.

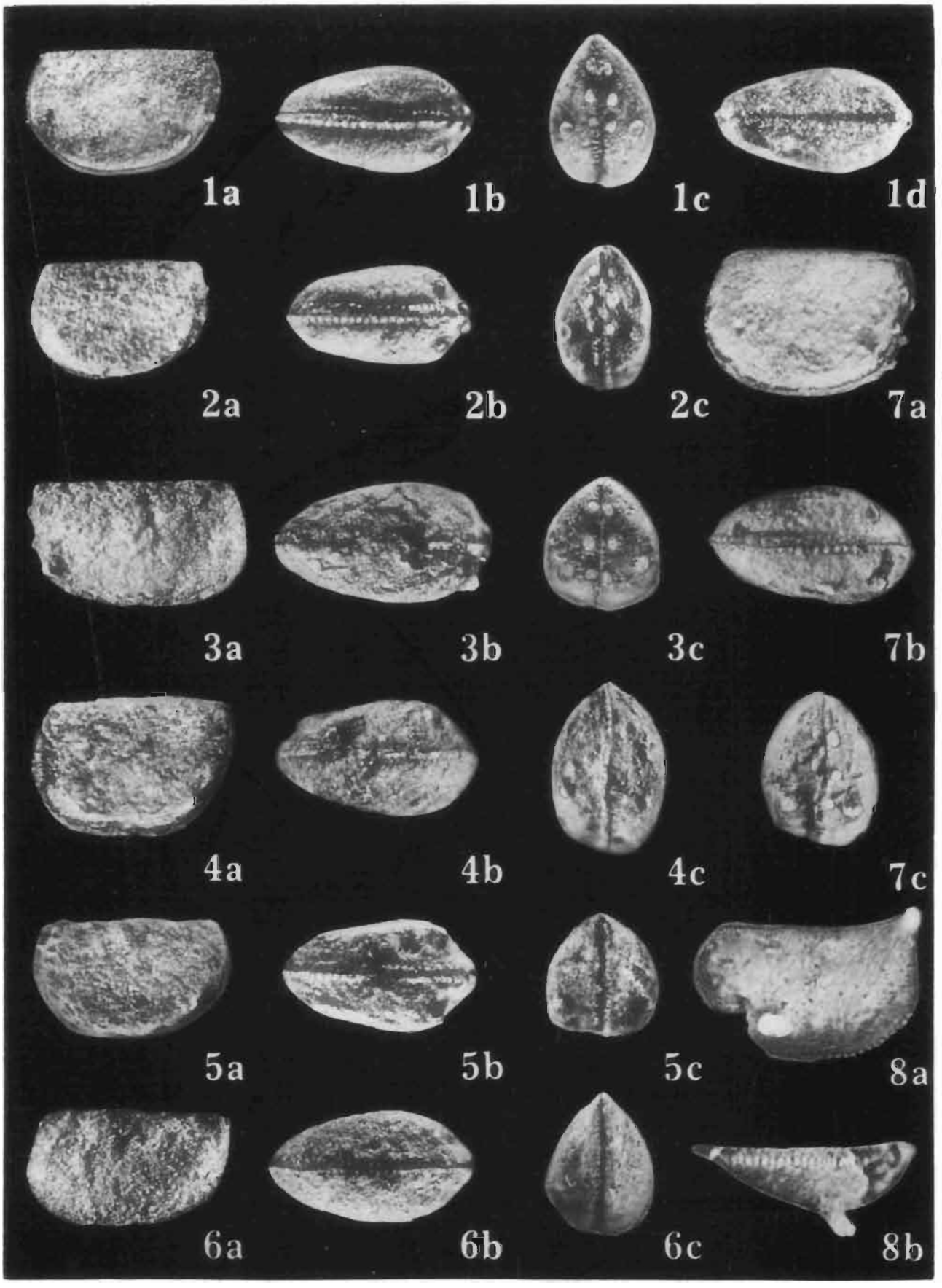
Dimensions (in mm):

| | l | h |
|---|---|---|
| C holotype ING O/133 | 0.82 | 0.45 |

*Description.* — Carapace oval in lateral outline. Dorsal margin convex. Anterior and posterior margins equal in height, symmetrically rounded. Ventral margin somewhat more convex then the dorsal. Maximum height and width in the middle part. Low, narrow ridges run parallel to anterior and posterior margins. Posterior ridge more curved. It is shorter and less developed on the left valve. Surface smooth.

*Remarks.* — From *Bufina colliquefacta* sp. n. and *B. media* sp. n. the species described differs in the presence of ridges near the both anterior and posterior margins. In this character *B. salva* is similar to *B. granulifera* ADAMCZAK from the Grzegorzowice Formation (Eifelian) of the Holy Cross Mts. (ADAMCZAK 1976), from which it differs in oval outline, shorter and less developed ridges and in a smooth surface.

*Occurrence.* — Poland: W. Pomerania, U. Givetian.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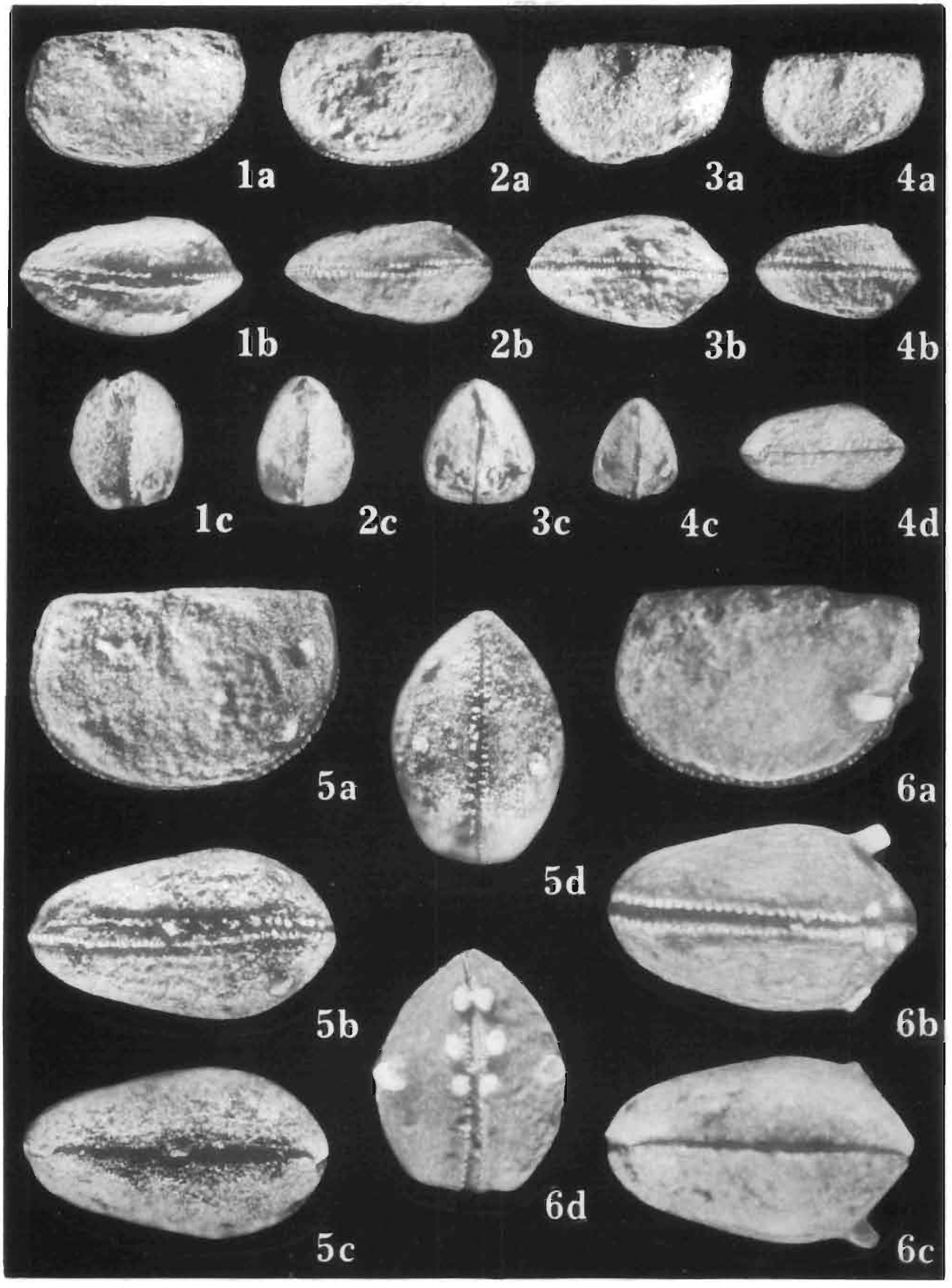


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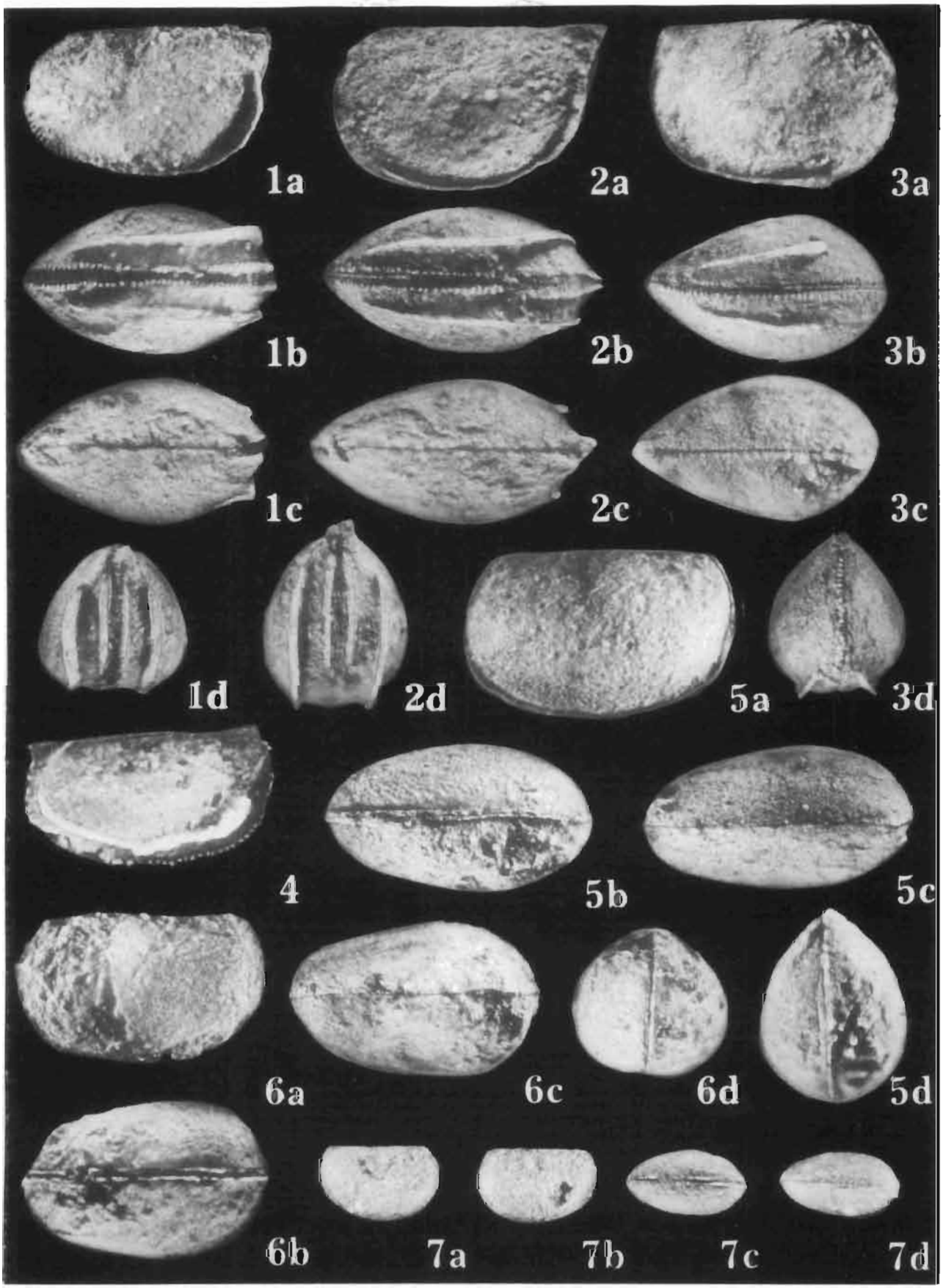


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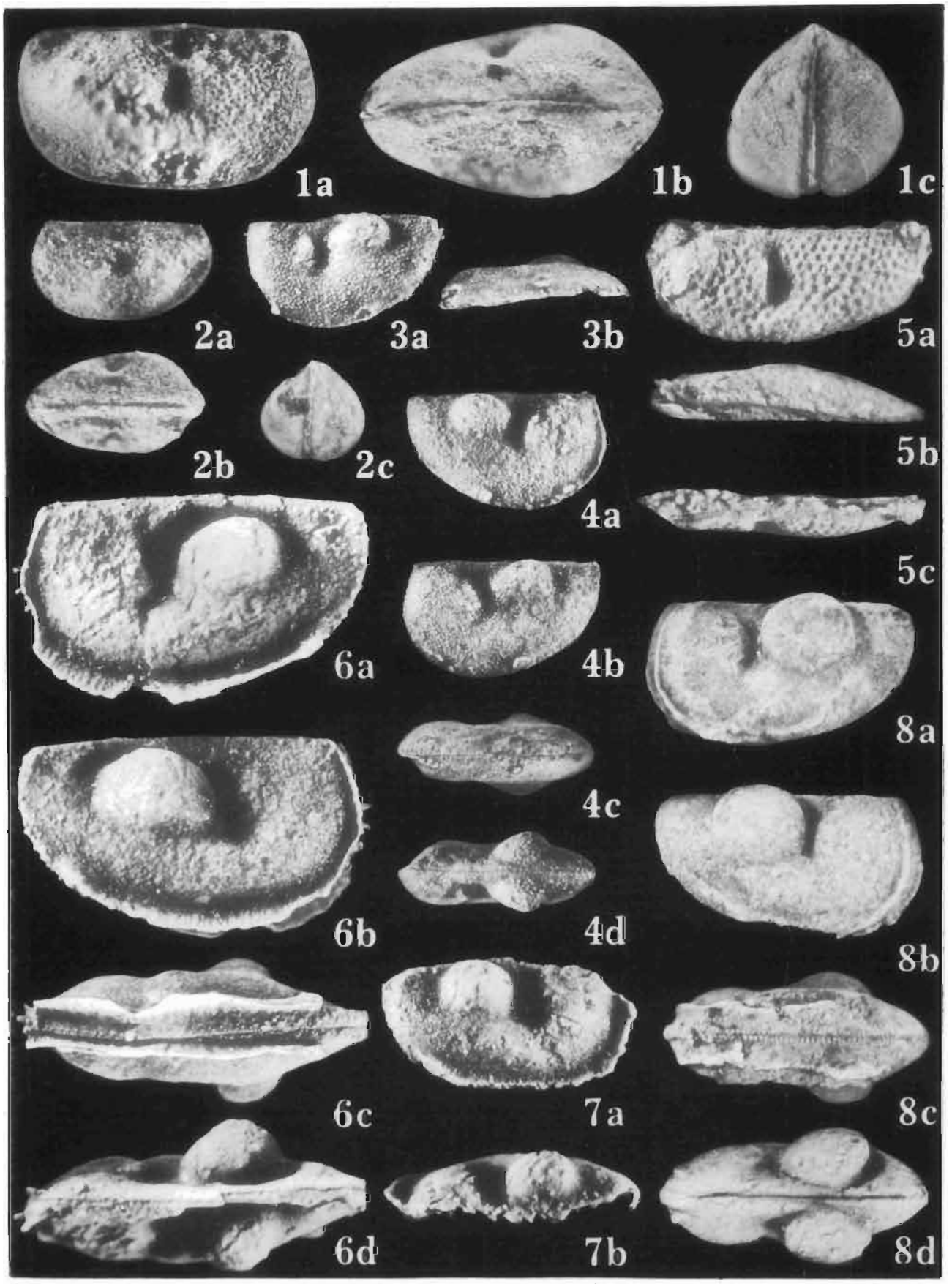


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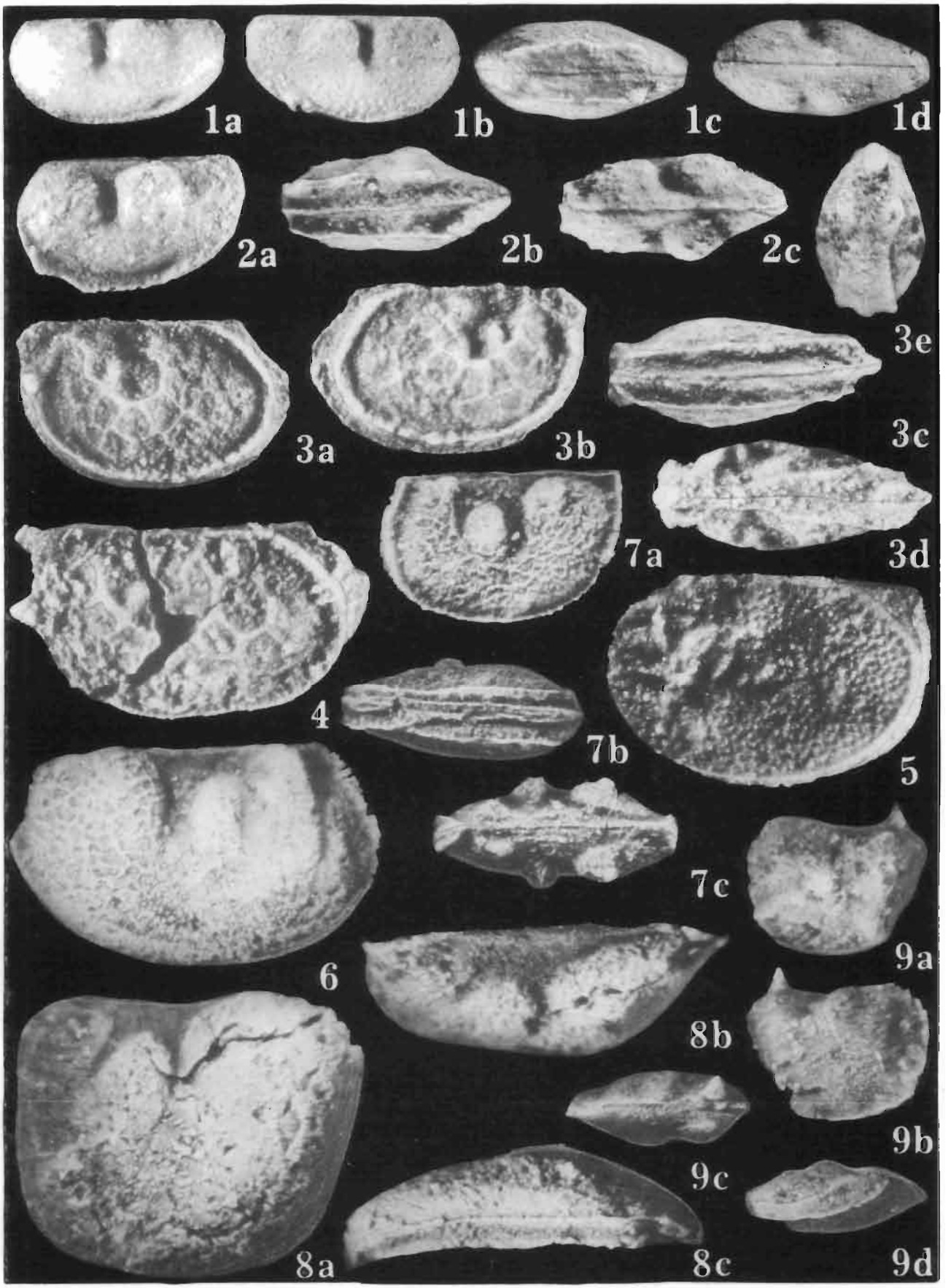


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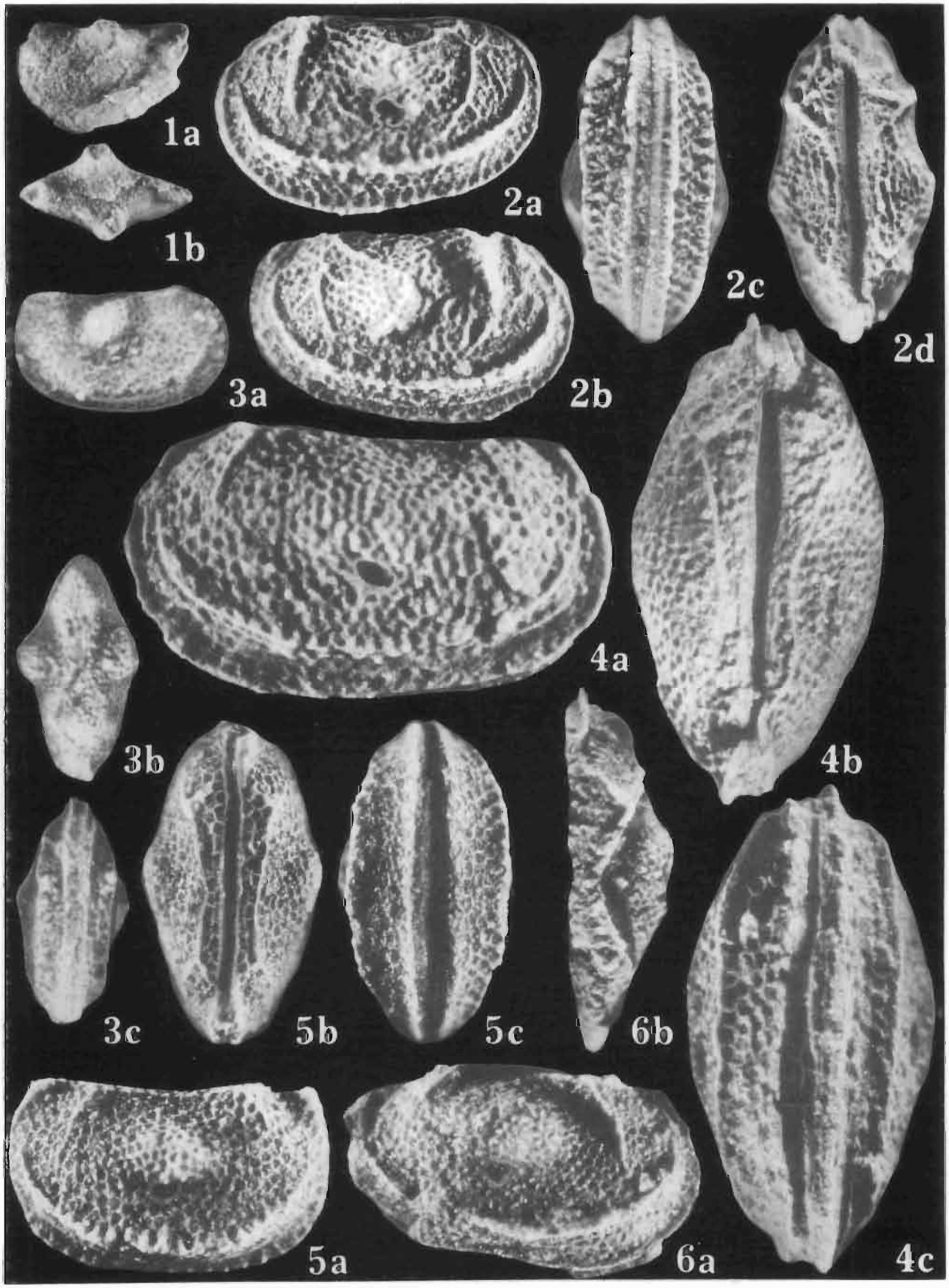


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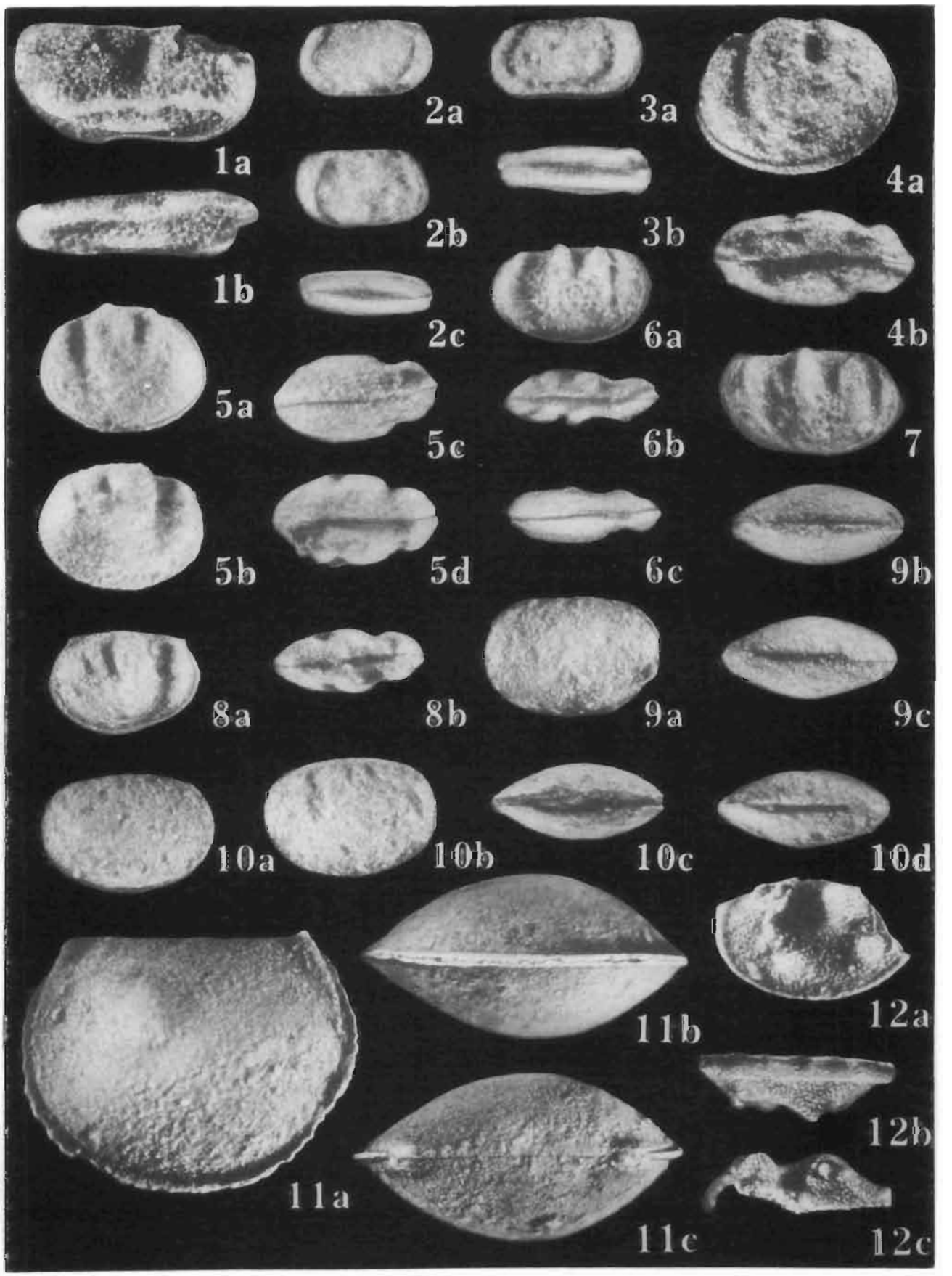
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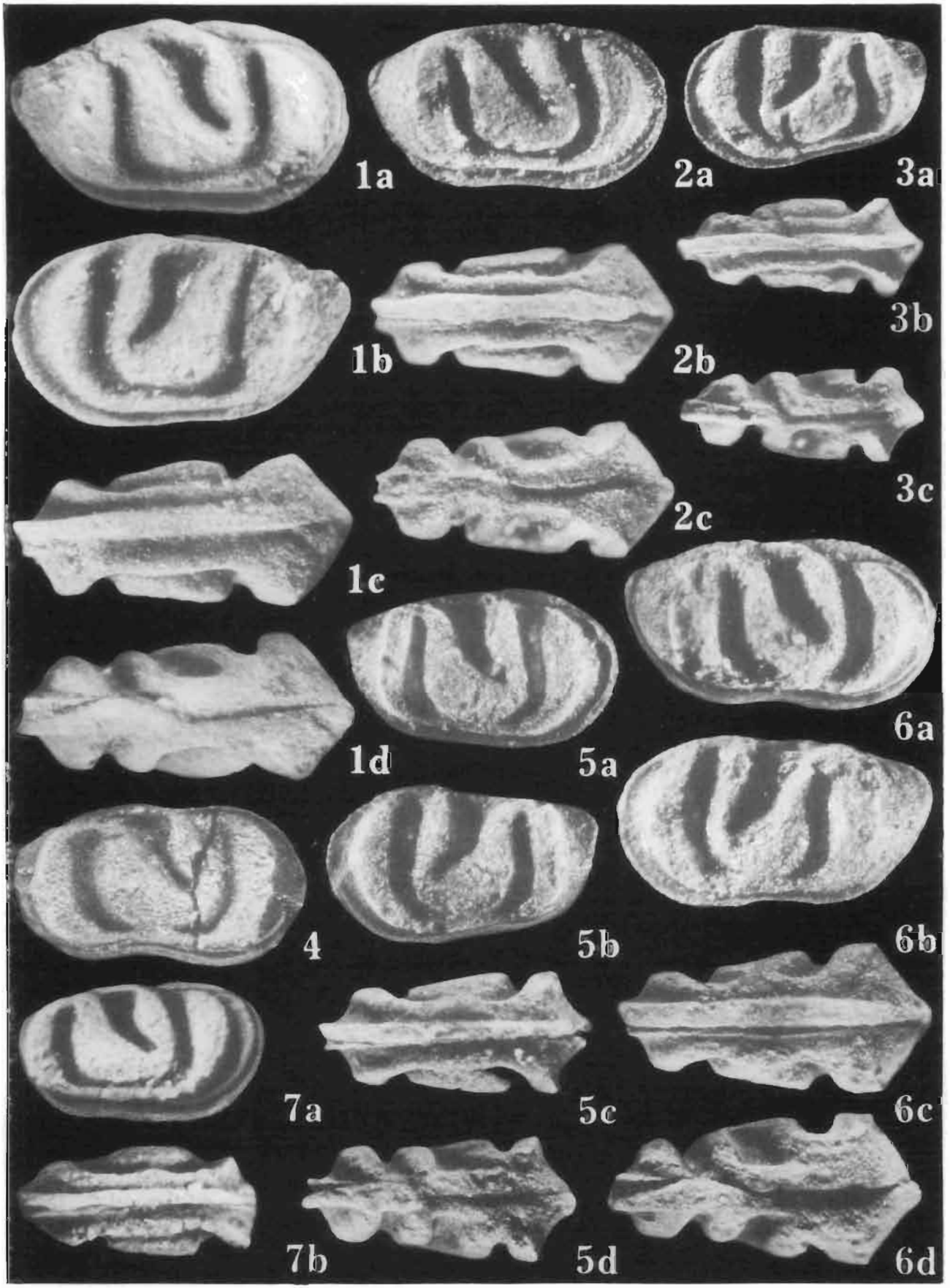


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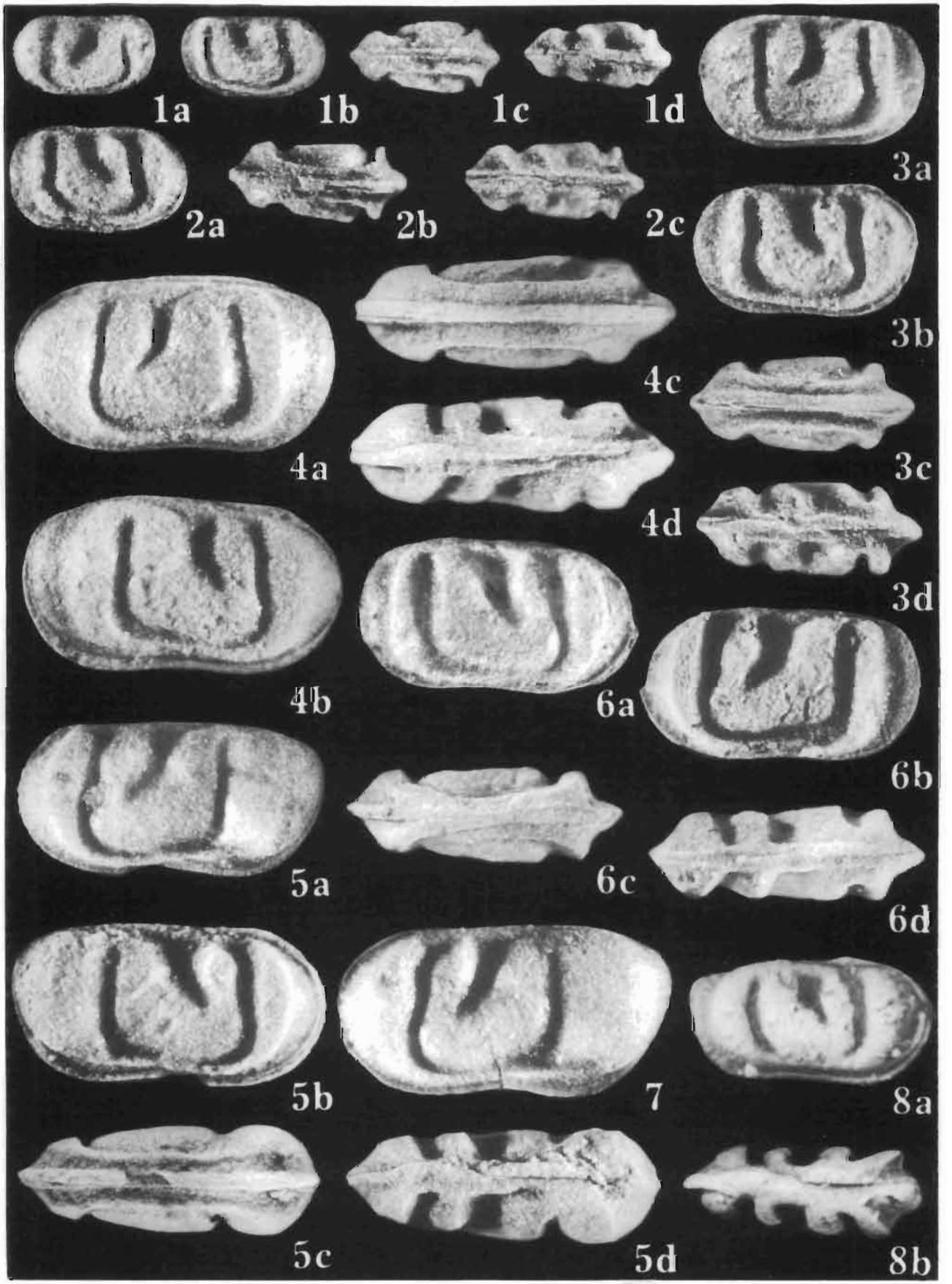


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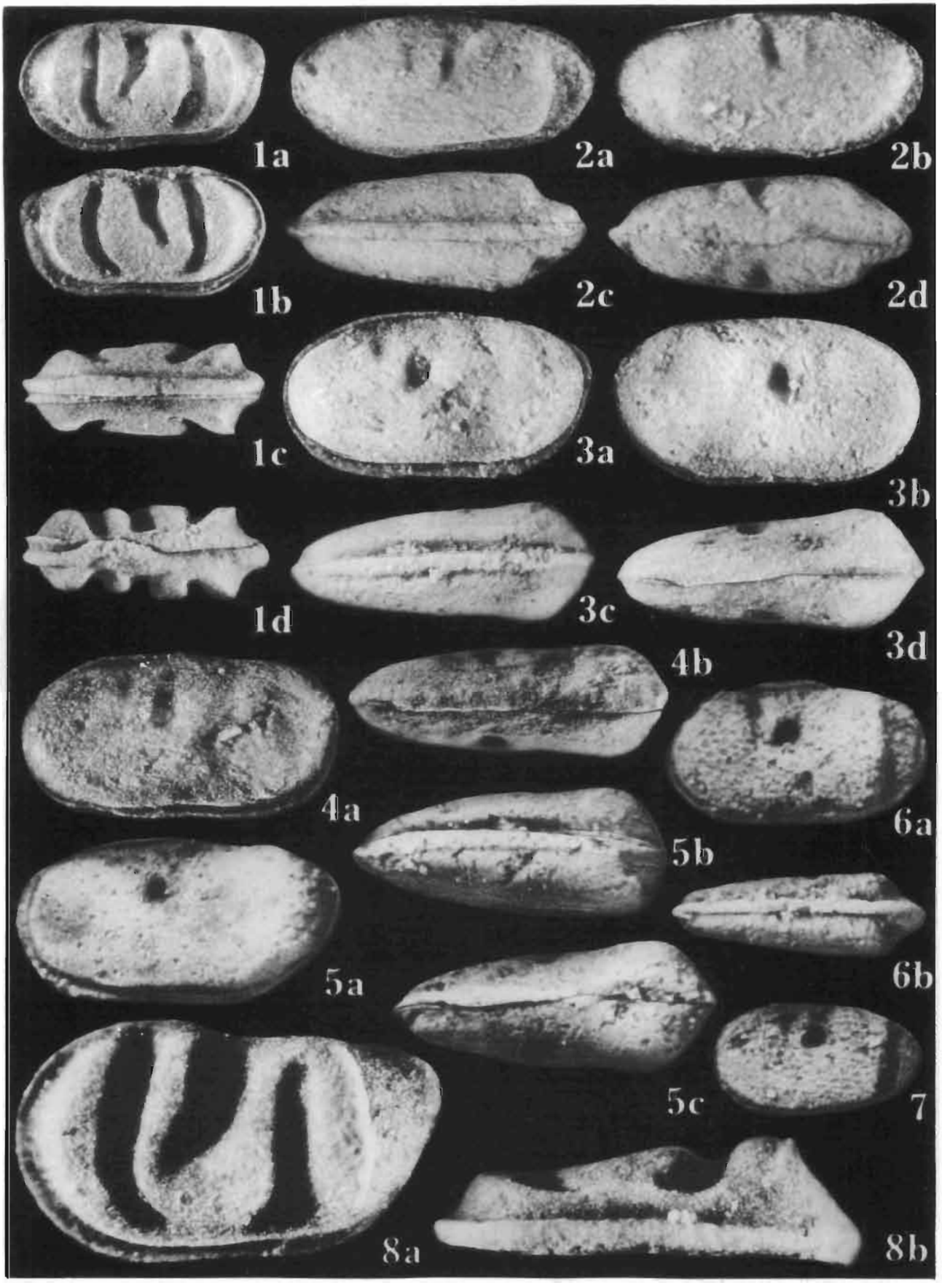


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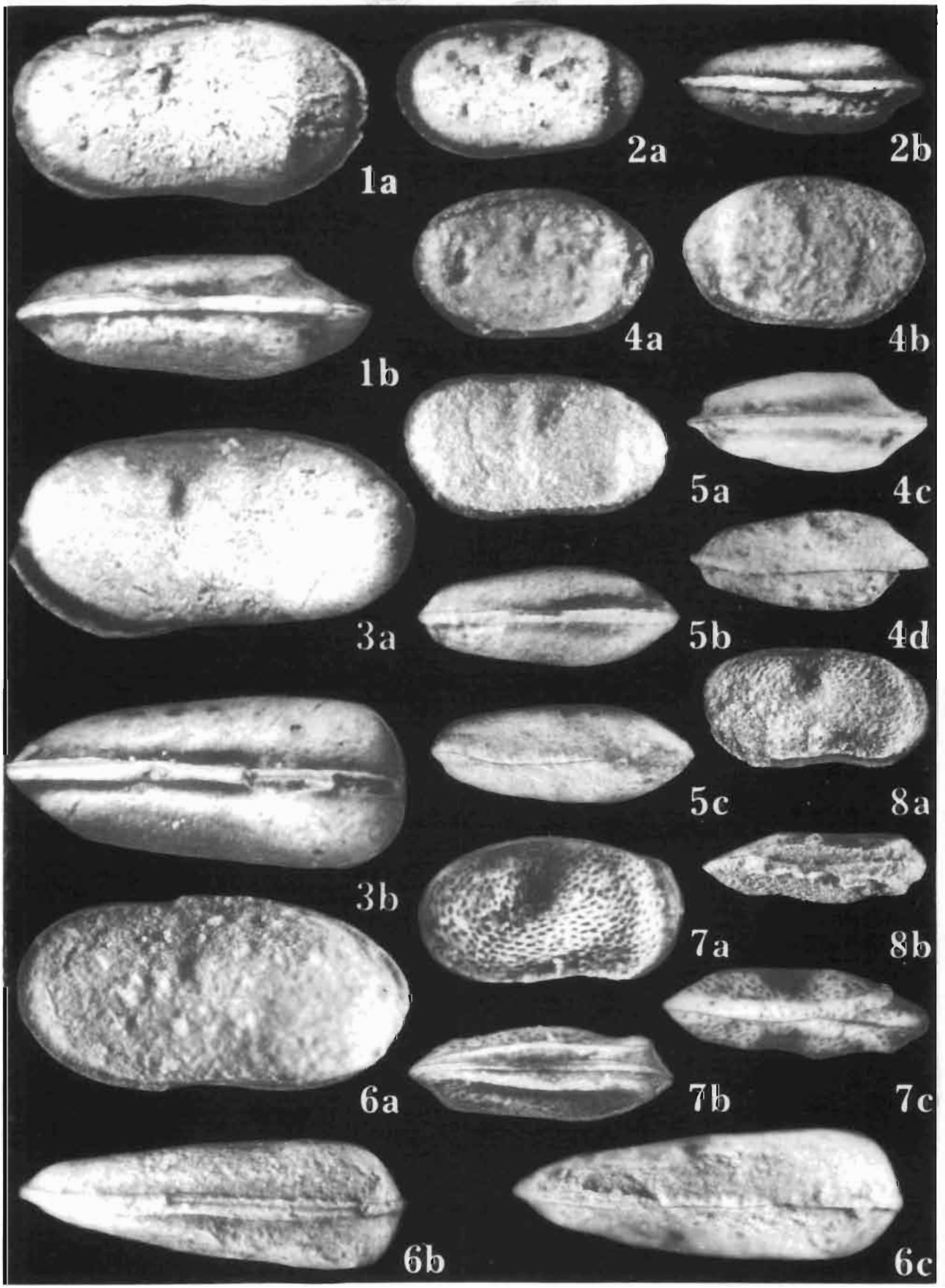


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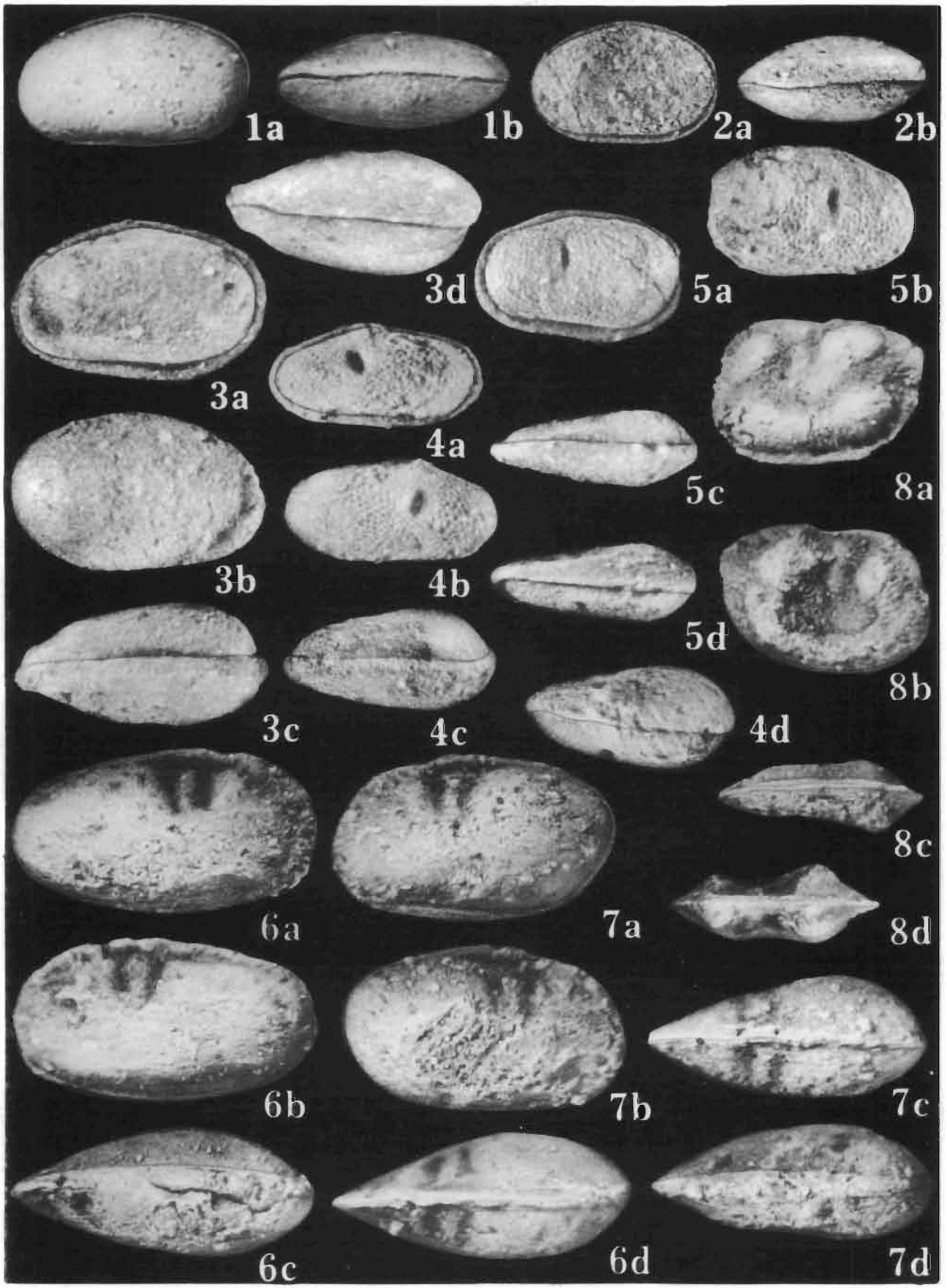


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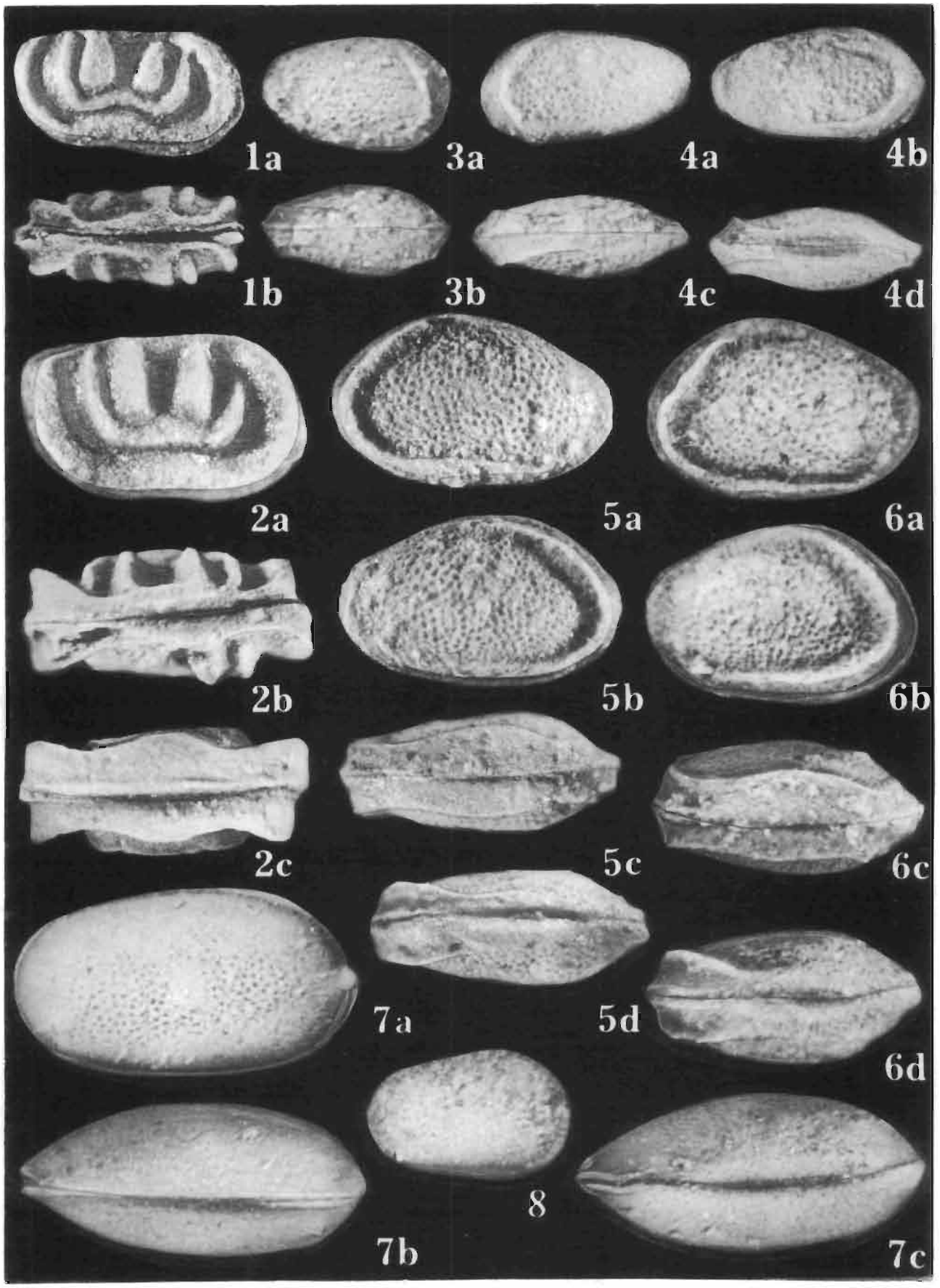


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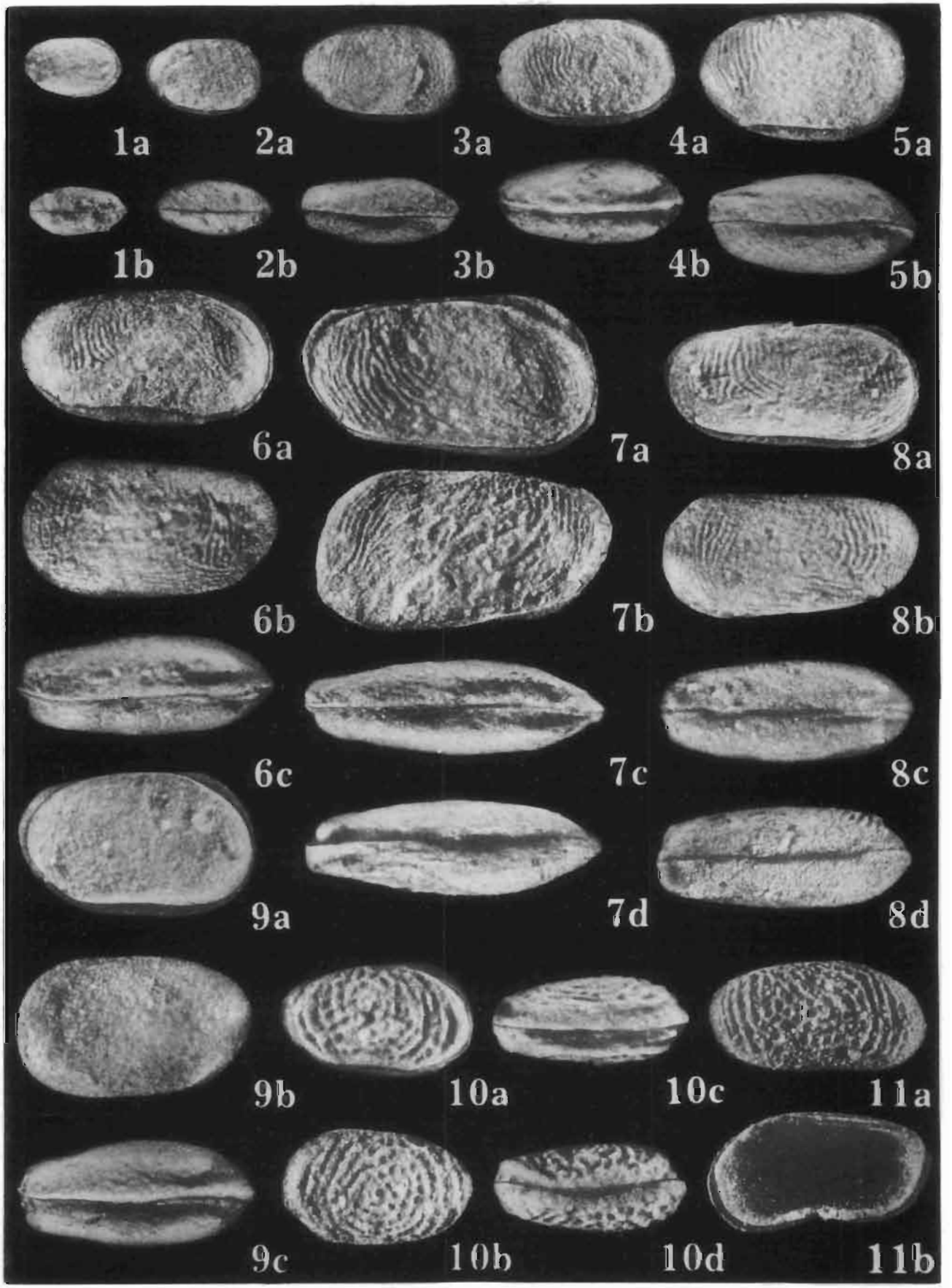


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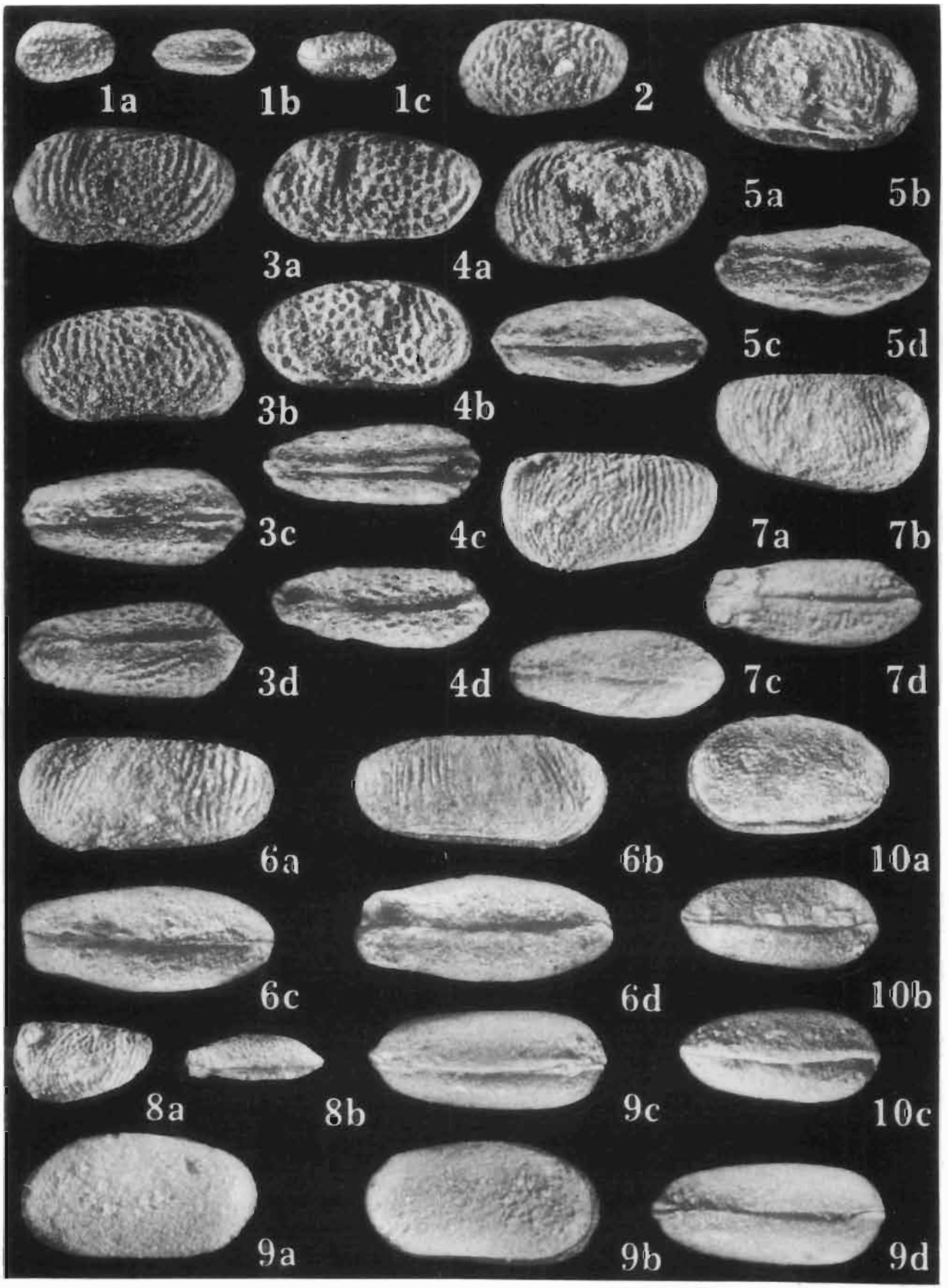
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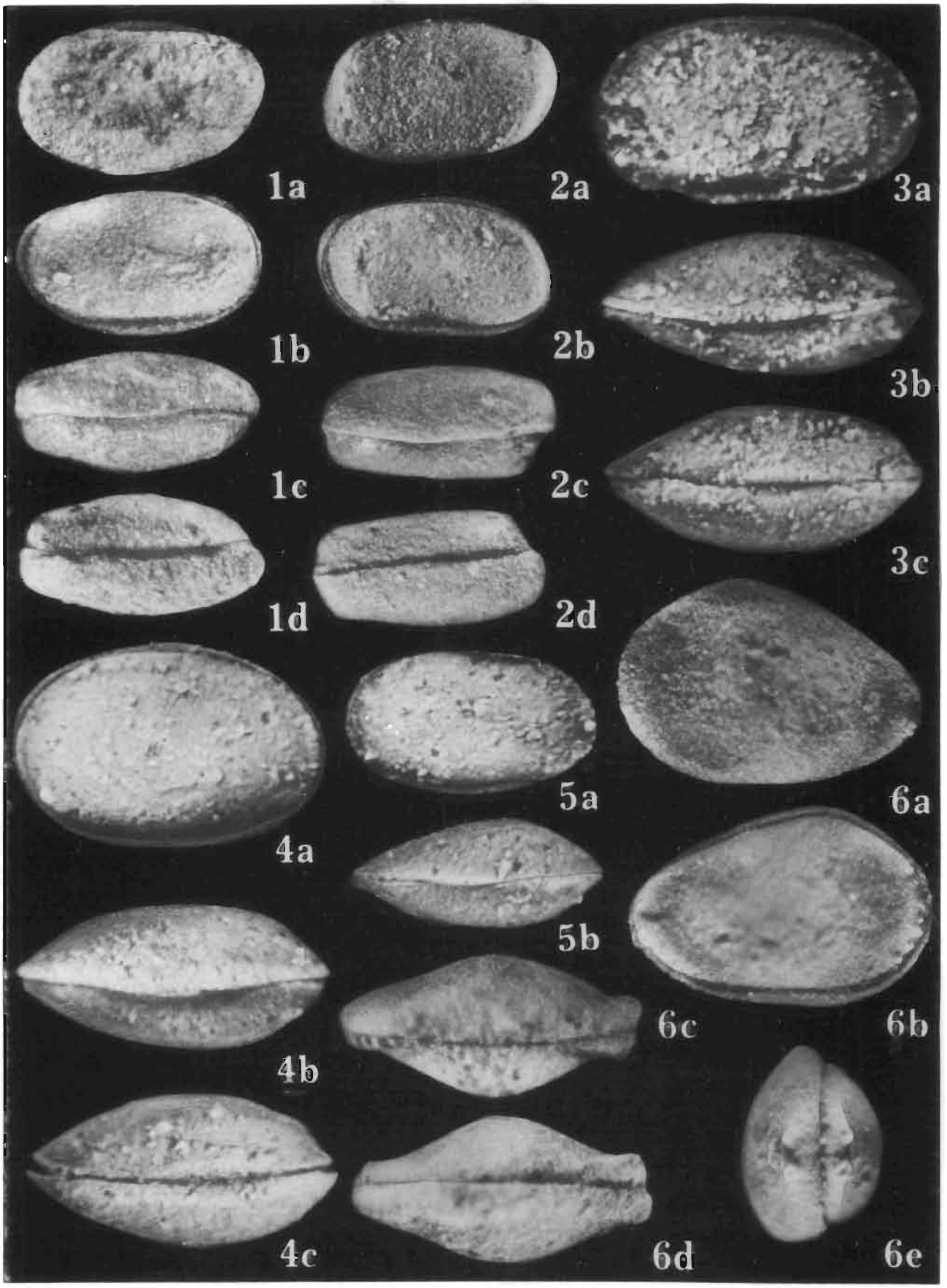


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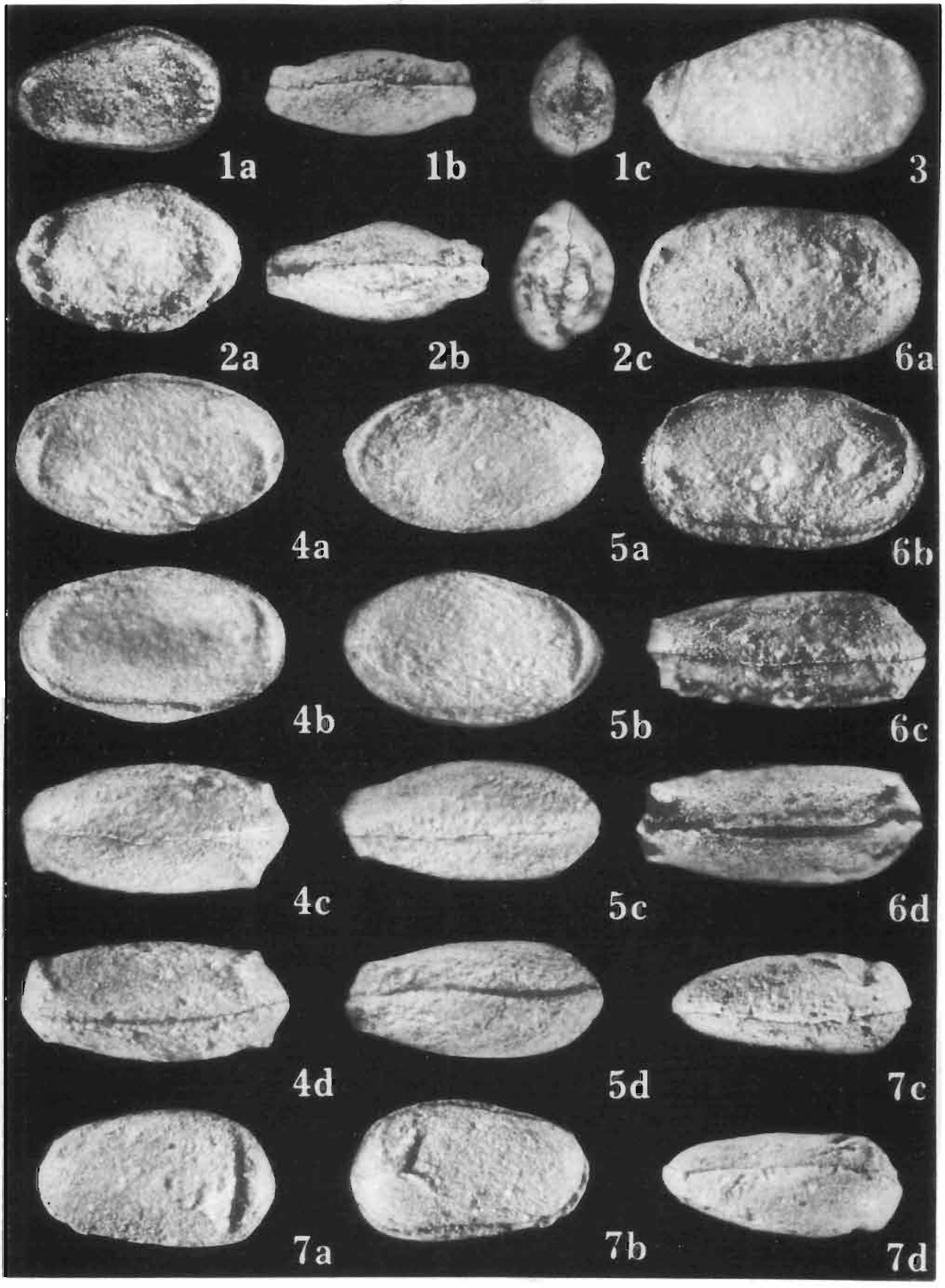
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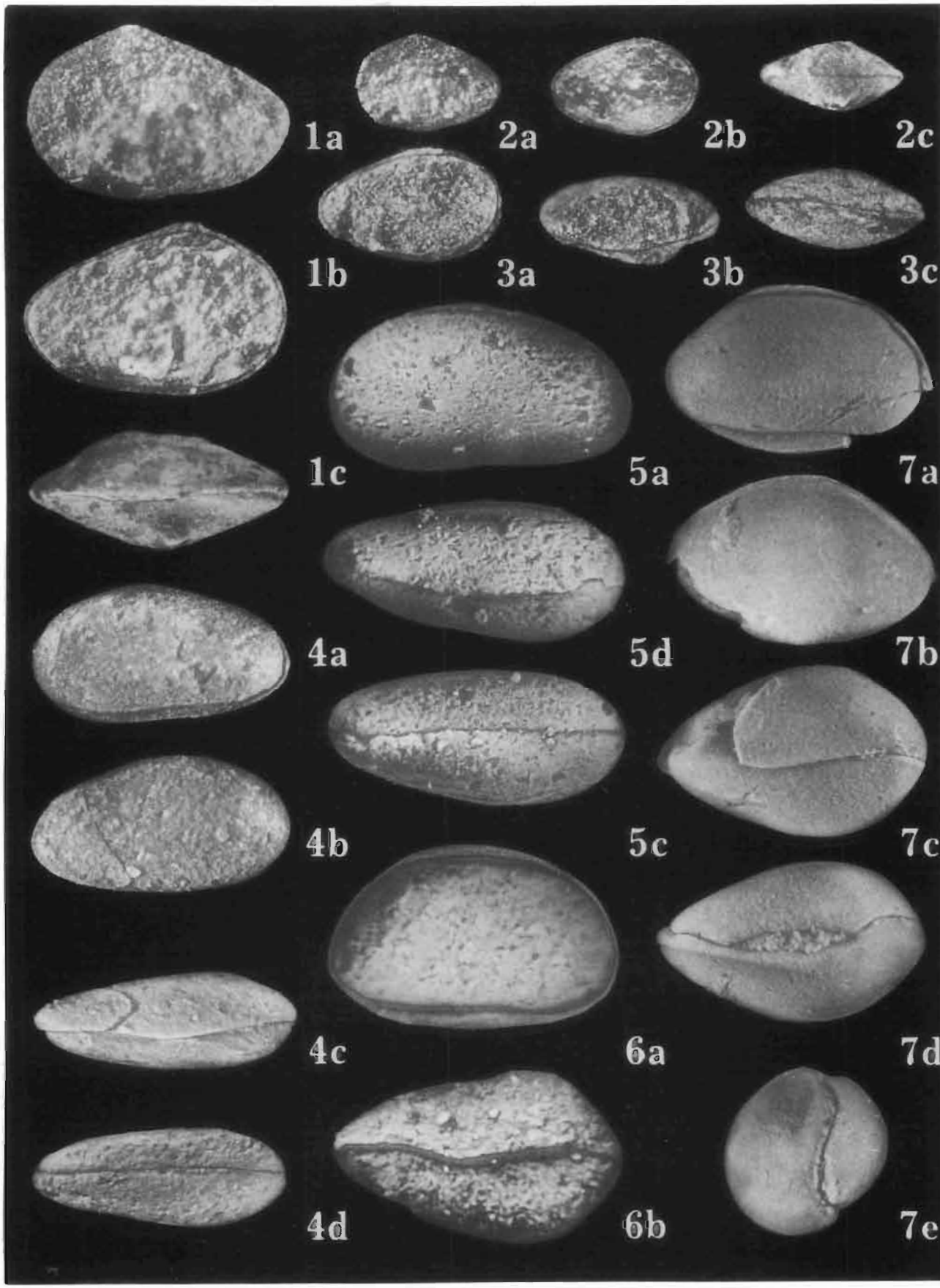


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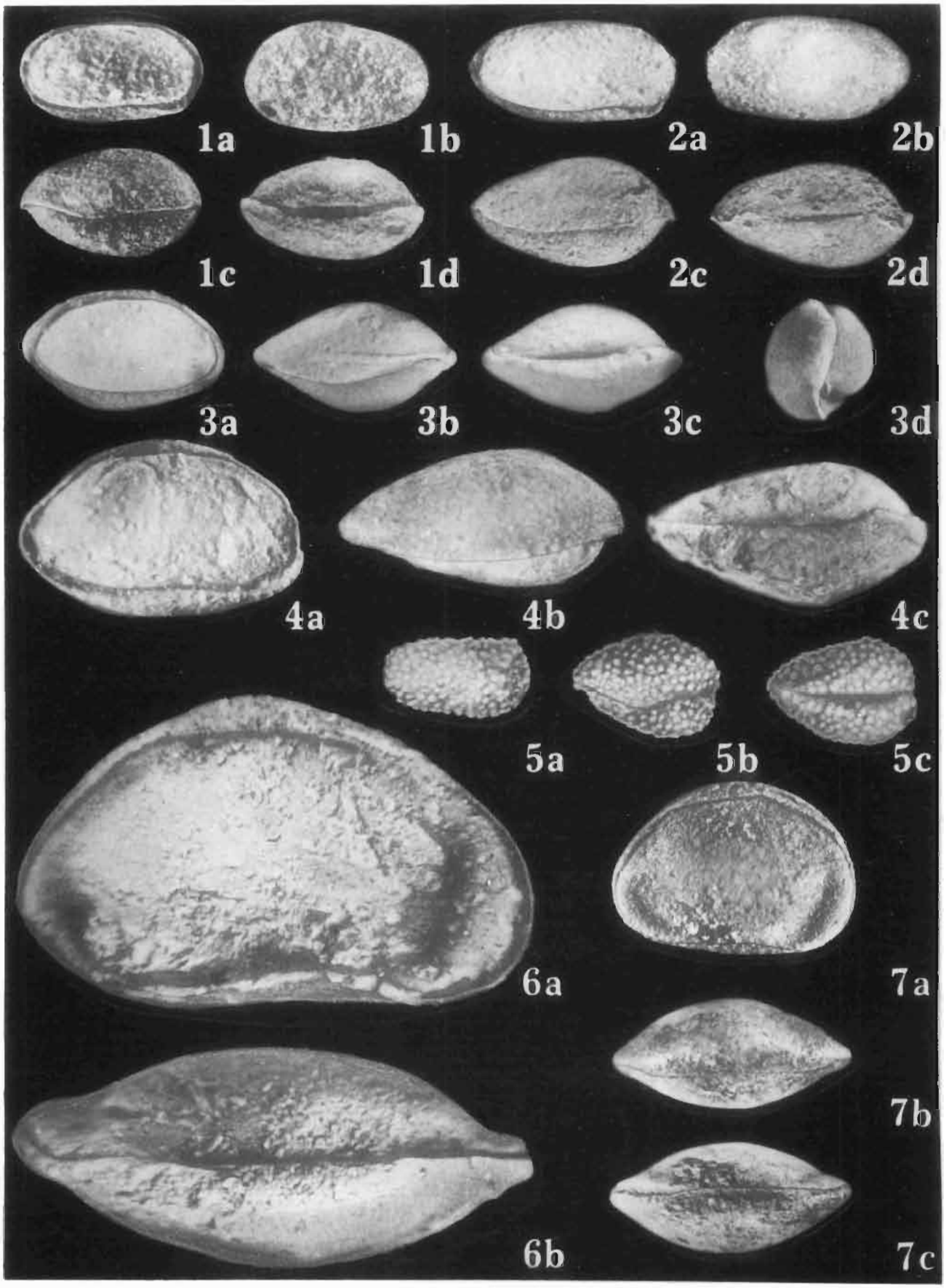


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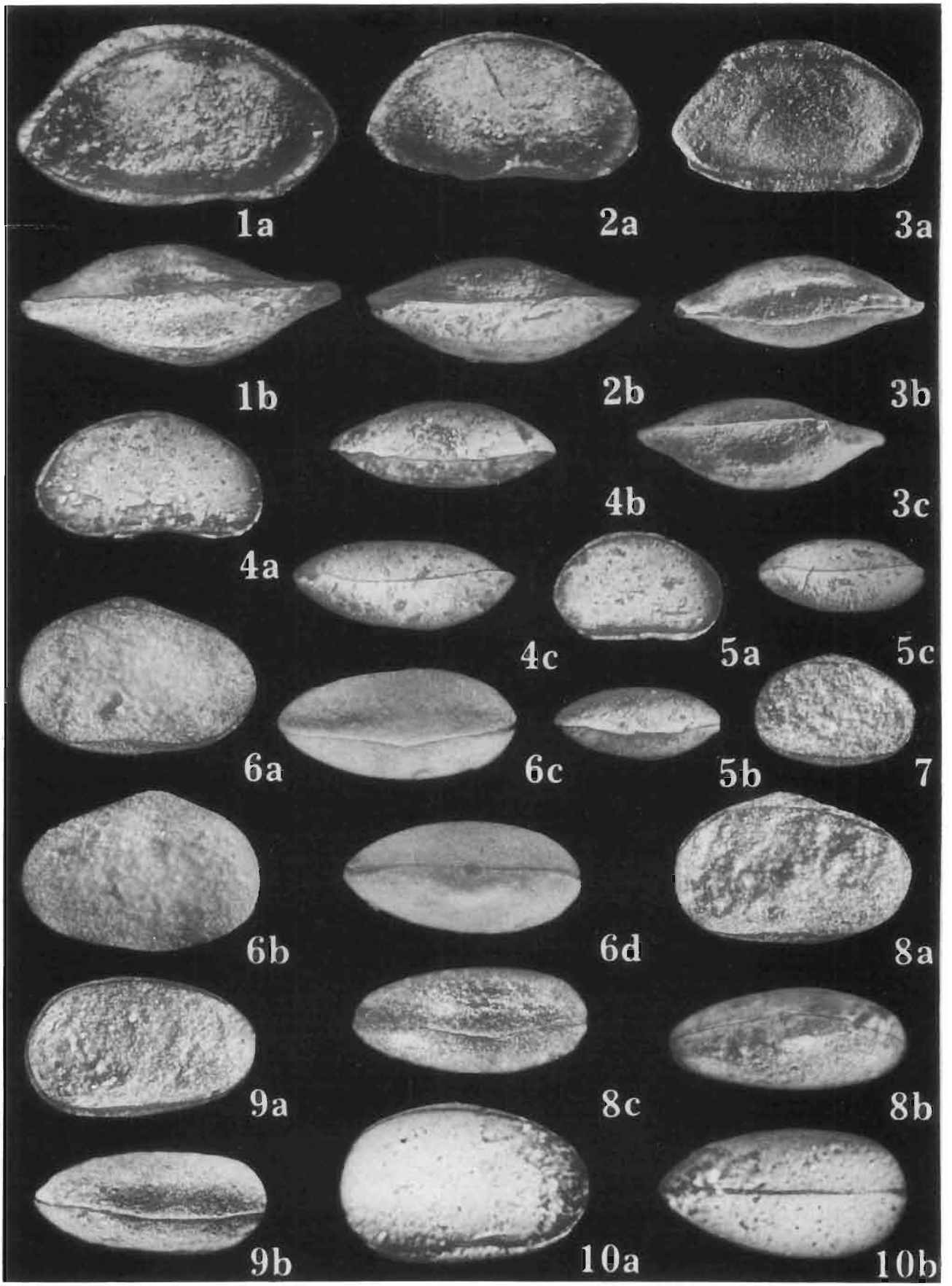


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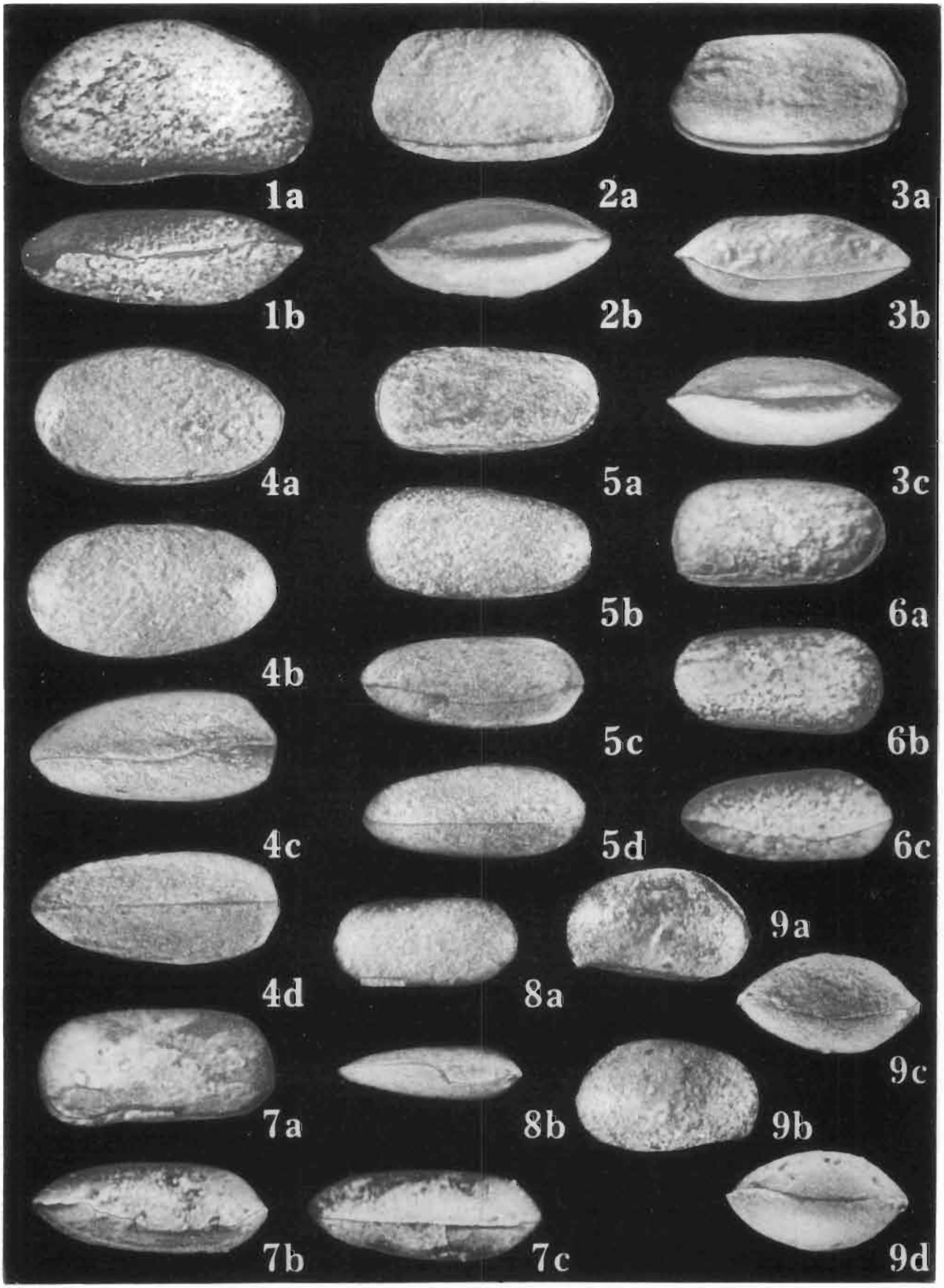


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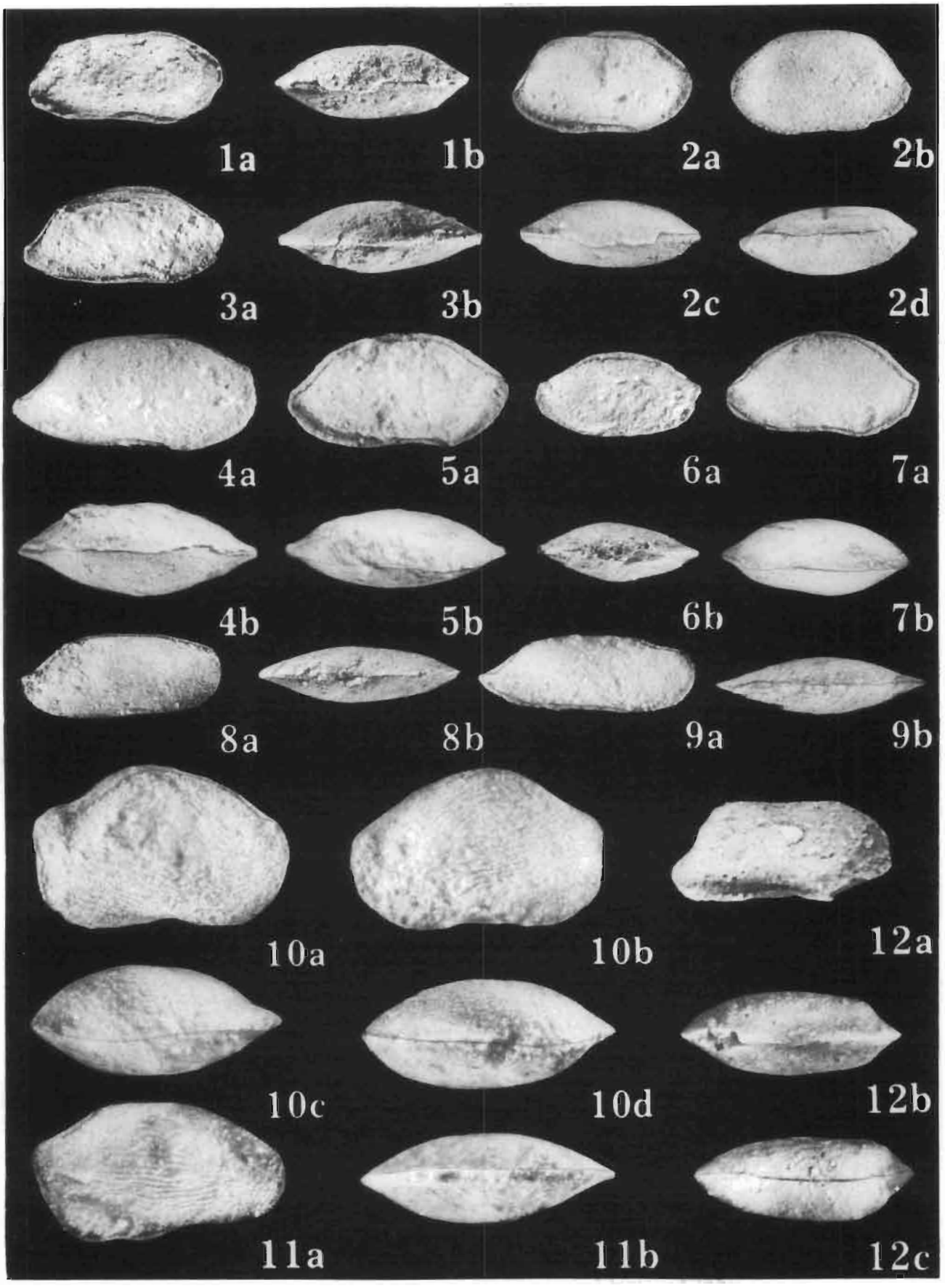


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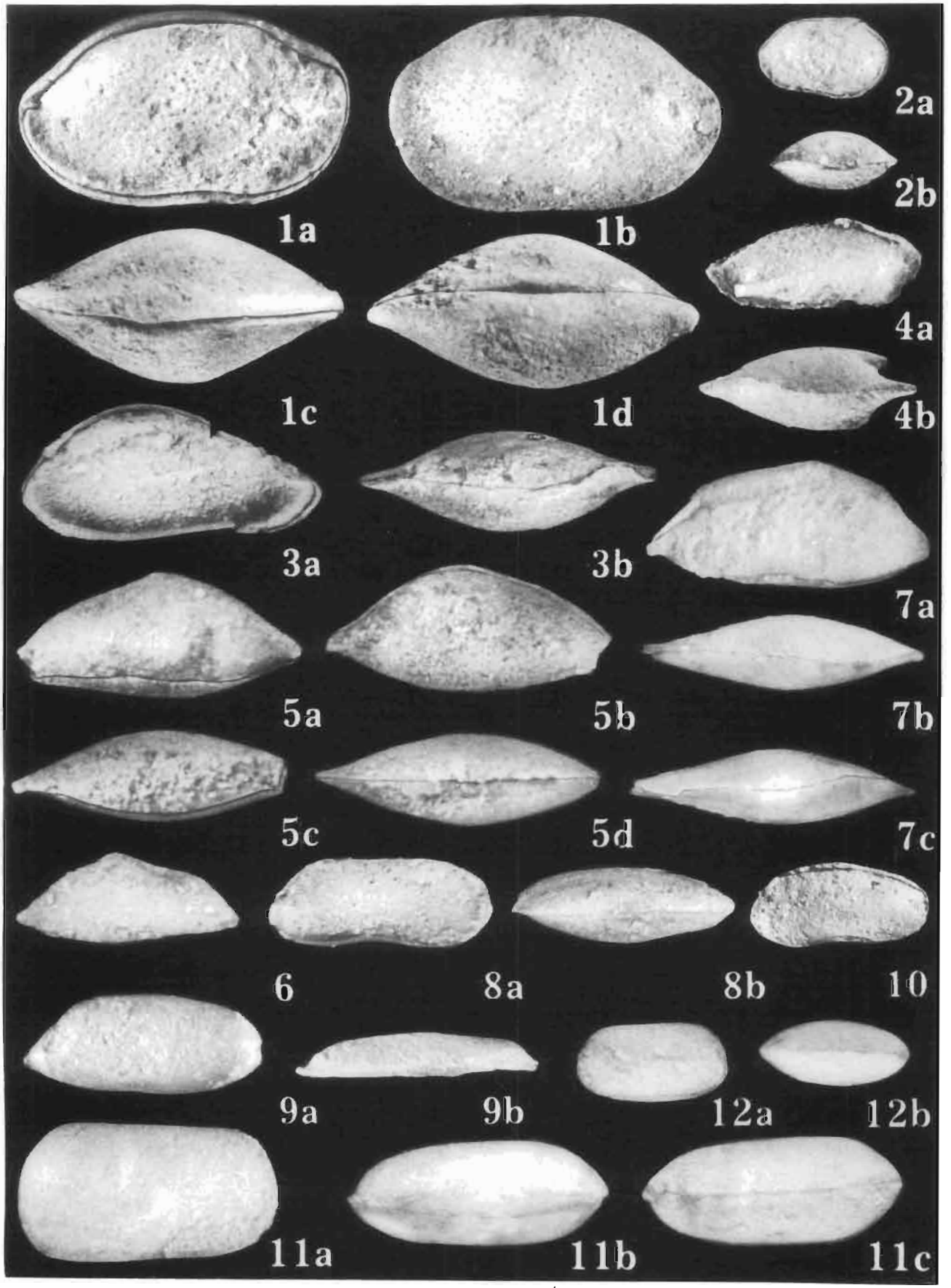


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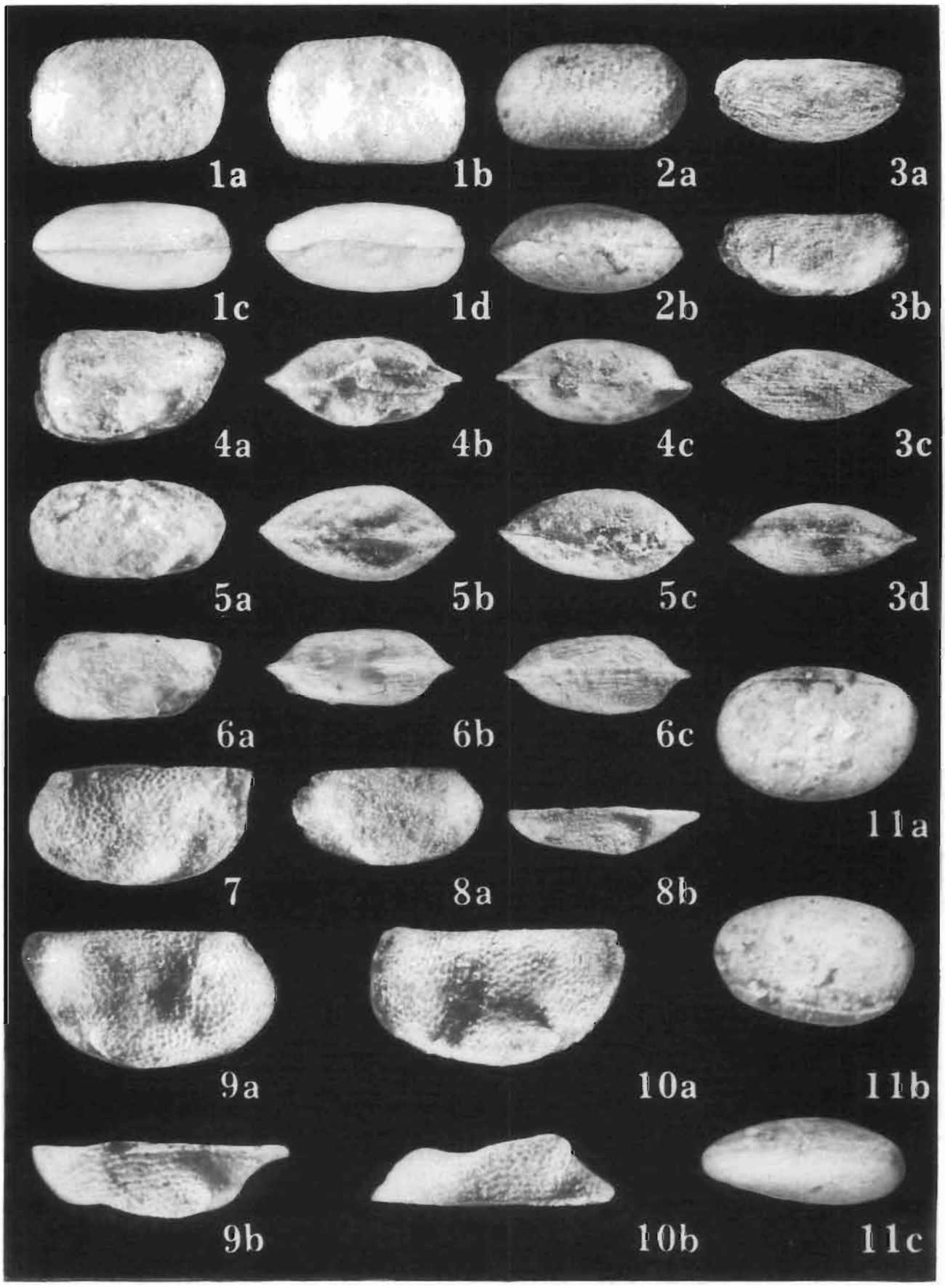


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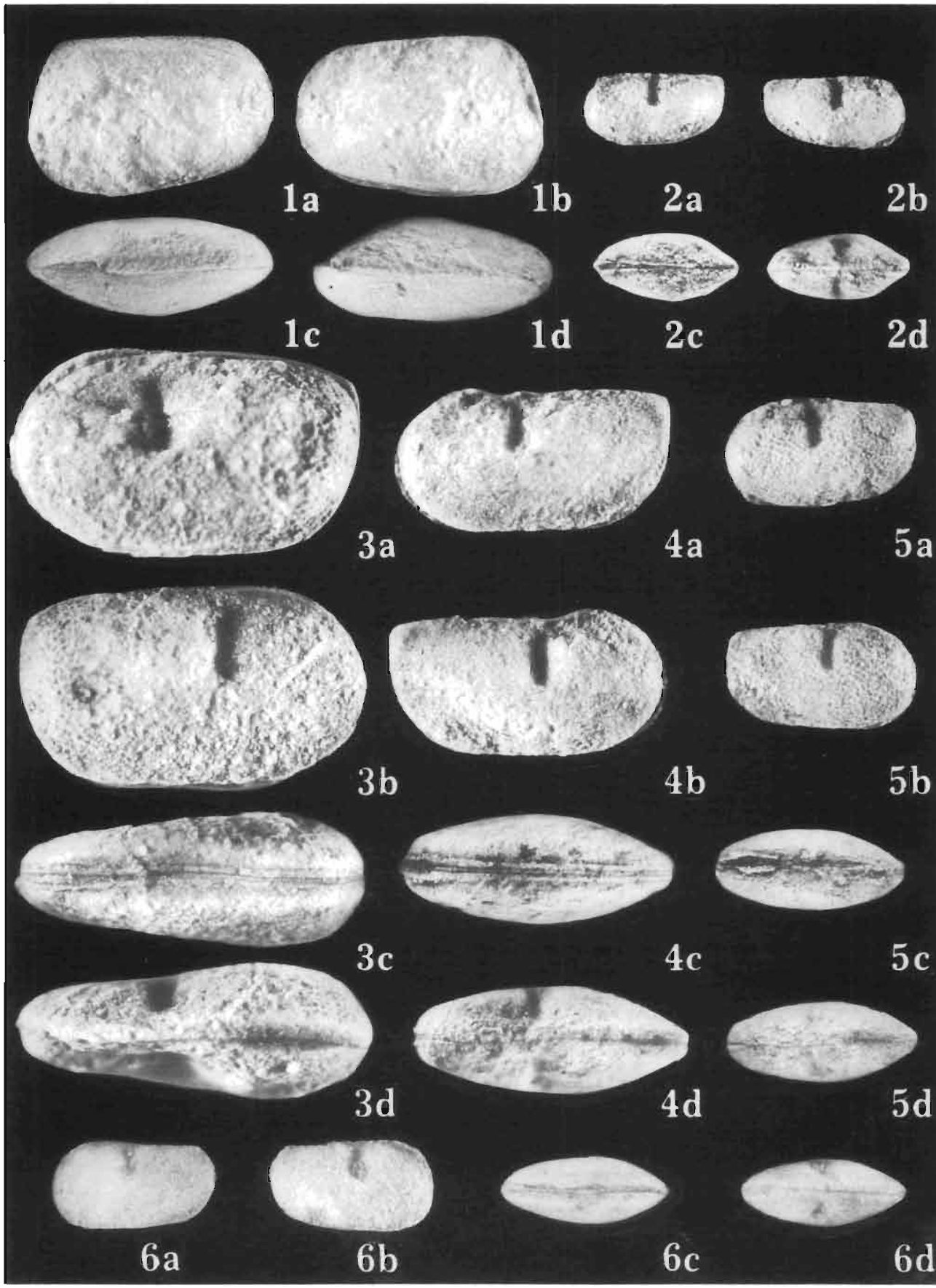


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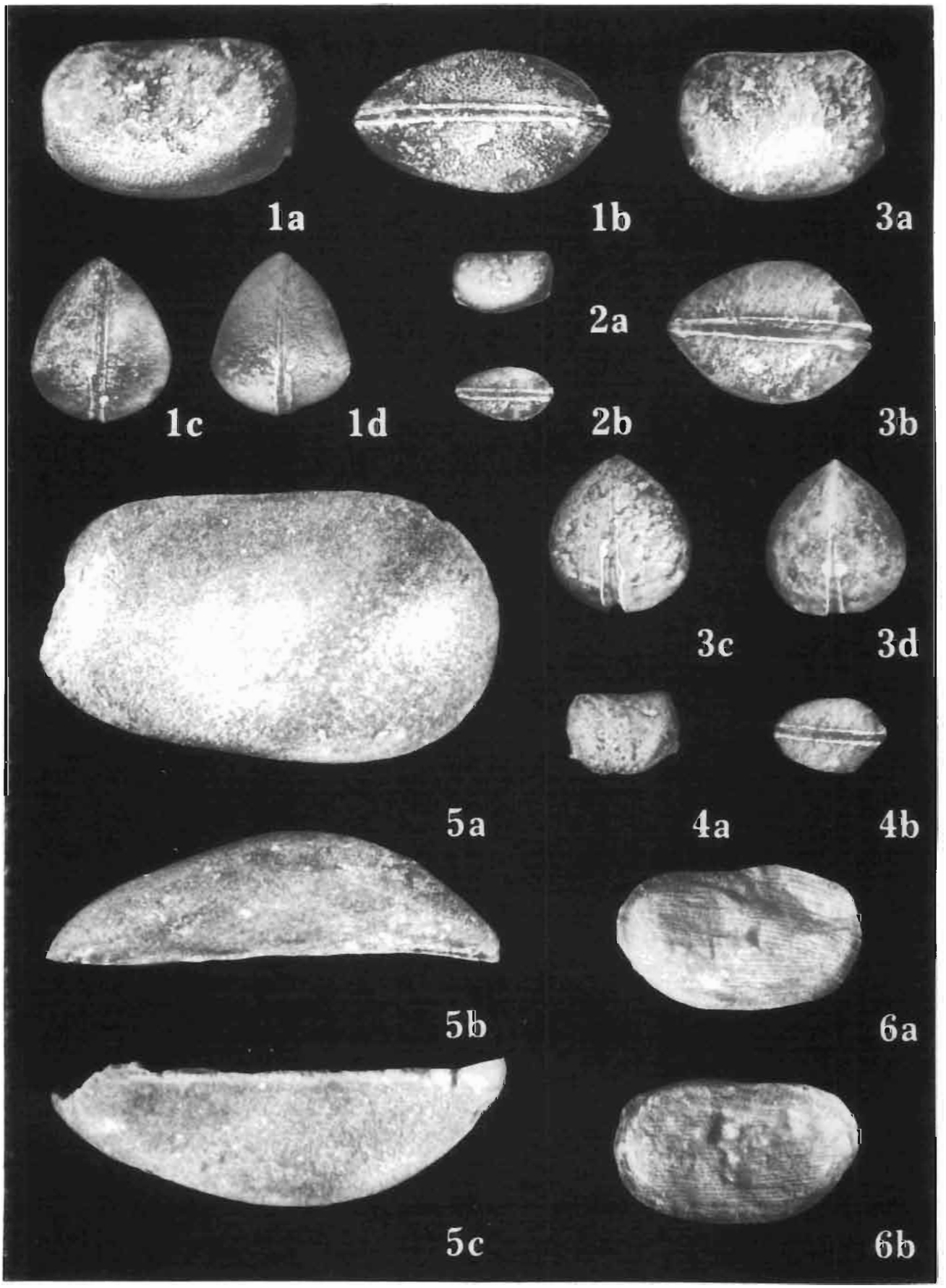


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