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MIDDLE JURASSIC OSTRACODS OF THE CZĘSTOCHOWA REGION
(POLAND)

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Abstract.—The paper gives a description of Middle Jurassic ostracods from the Jaworznik, Choroń and Iwanowice Wielkie borings in Central Poland. They belong to the families: Polycopidae, Cytherellidae, Bairdiidae, Cyprididae and Cytheridae. Of 36 examined species and subspecies, 23 species and 4 subspecies are considered new ones. Within some species, the ontogenetic development and sexual dimorphism are analysed. Remarks are added on the geographical and stratigraphic distribution of the ostracods investigated.

INTRODUCTION

The present paper contains the results of the investigation of the ostracods from the *Garantiana garantiana*, *Parkinsonia parkinsoni*, *Parkinsonia compressa* (= *P. wuerttembergica*), *Perisphinctes tenuiplicatus*, *Morrisiceras morrissi* and *Paroecotraustes heterocostatus* zones.

The material investigated has been supplied in 1960 by the Geological Institute (Geological Survey) in Warsaw. The samples come from the bo-

rings, drilled in the 1950 by the employees of the Geological Institute at Jaworznik, Iwanowice Wielkie and Choroń (Fig. 1).

These samples, leached and sorted, have supplied a variable material, consisting of about 10,000 individuals. Five families, 20 genera and 3 sub-



Fig. 1. — Distribution of borings: 1 Jaworznik, 2 Choroń, 3 Iwanowice Wielkie

genera have been distinguished and a total of 31 species, 4 subspecies and 1 species with an uncertain taxonomic position have been described. Of this number, 23 species and 4 subspecies have been considered to be new ones. The ontogenetic stages of 15 species are described. The ostracods of the Częstochowa Region have already been described by Terquem (1886), Błaszyk (1959) and Błaszyk & Malz (1965).

In the general part of the present paper, there is a chapter, devoted to the problem of the influence, exerted by facial changes on the development of the ostracods and some remarks on their palaeoecology. The problem of the geographical distribution of the species under study and the comparison of their occurrence in Poland and in the NW Germany and England (Table 1) are dealt with separately.

In the chapter on the stratigraphic¹ range of the ostracod assemblages, their correlation with corresponding ammonite zones is established. The results obtained are, to a considerable extent, in conformity with those concerning the stratigraphic distribution of foraminifers of the family Miliolidae from the same borings described by Pazdro (1959).

The photographs of specimens are magnified about 60 times, whereas the text-figures are magnified 100 to 200 times.

The laboratory work has been carried out at the Palaeozoological Institute of the Polish Academy of Sciences.

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¹ On the basis of resolutions, passed in 1964 at the Conference of Polish specialists on the Jurassic in Warsaw, the name "Kuiavian" is introduced instead of Vesulian, which has so far been used in Polish geological literature to indicate a concept of a stage. This stage begins with the *Strenoceras subfurcatum* zone and terminates in the *Parkinsonia compressa* (= *P. wuerttembergica*) zone (Passendorfer, 1964; Malinowska, 1964; "The I Jurassic Colloquium in Poland", 1967).

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The collection described in the present paper is housed at the Palaeozoological Institute of the Polish Academy of Sciences in Warsaw, where it is given the catalogue numbers of O.IV/1-184.

MATERIAL

The microfauna samples were taken from cores 1 to 4 m apart from each other. In the Iwanowice Wielkie and Choroń borings, there were even larger intervals, sometimes reaching from 5 to 25 m (sections in Figs. 2-4). No materials, representing the *Morrisiceras morrиси* and *Paroecotraustes heterocostatus* zones, were found in the Choroń section. The samples from all the three borings were macerated at the Geological Institute. From thus enriched samples, about 10,000 specimens were picked out, representing complete carapaces, as well as left and right valves. Some stages of the ontogenetic development might be traced for many species on the basis of young forms that occurred in the material studied. Few species, i. e. *Bythocypris? jaworzniensis* n. sp., *Paracypris brevis* n. sp., *Mono-ceratina* cf. *vulsa* Jones & Sherborn, 1888, *M.? amygdaliformis* n.sp., *Praeschuleridea lepida* n. sp. and Genus & species indet., were represented in the available material only by the carapaces. The individuals, devoid of ornamentation, have very thin and fine valves, in contradistinction to ornamented ones whose valves are thicker and stronger. The weaker valves of unornamented species were probably destroyed in part during the sedimentation. Few of them, which escaped this destruction, were destroyed during the rock maceration and hence their complete absence from the enriched samples. The representatives of the family Cytherellidae, whose valves were strongly thickened along the contact line of the hinge and in the vicinity of the muscle scars field were the only exception in this respect. On the whole, the majority of the selected specimens are very well-preserved which allows one to trace the details of the hinge structure, the muscle scars, the ornamentation, as well as the number and character of the marginal pore canals.

METHODS

To pick out the ostracods from the samples, a 9 × 12 cm sheet iron tray was made with its bottom divided into square fields 1 sq. cm in area.

A sharply pointed steel wire, 3 mm in diameter, was thrust—from underneath upwards—through the bottom of the tray to form round openings in the middle of each square. Thus, the openings were limited from the inner side of the tray by 1.5 mm high rims. The tray was covered with a thin layer of the macerated sample from which, under a binocular microscope, single ostracods were picked out by means of a fine brush. Through the openings of the tray, selected specimens were put into bakelite cells placed under the microscope stage. These cells have one central, larger and 20 smaller, radially disposed cavities. The container was mounted on the microscope stage and aligned with the microscope axis. This method allowed one for rapid examining and sorting samples. Its additional advantages are, a possibility of a continuous observation through the microscope without the necessity of turning one's sight away from the eyepiece and a certainty of not losing the specimen while it is taken from the tray to the container which otherwise could happen if the latter would be situated in some other place. The upturned rims of the openings prevent the crumbs of rock from falling into the container. The ostracods, placed in the central cavity in the container, were divided into particular taxonomic units and, hereafter, put into appropriate smaller, radially disposed cavities.

To set off the outlines of the muscle scars examined, the specimens were immersed in a drop of glycerine or alcohol. The observations were carried out under the microscope in the transmitted light and with the use of a magnification of 40×10 .

A large number of young individuals within some species, allowed one to ascertain particular stages of the ontogenetic development which was attained by the application of Brook's law (Kesling, 1953). According to this law, each stage of the ontogenetic development was separated from the next one by a growth coefficient, amounting to 1.26. Arranging the development series, I used a diagram (Błaszyk, 1959) and changes, occurring in the number of the hinge elements and in the direction of the displacement of the muscle scar fields towards the central part of the inner surface of the valve. A change in the outline of the posterior part of the valve, connected with the development of sexual organs, was analyzed in particular ontogenetic stages. Changes in the ornamentation of the valve were also taken into account during the observations of definite stages. An eyepiece drum micrometer was used for measuring the individuals. Special methods were applied to the photography: the specimens were put in special baths to remove the rocky residua from the valves and to prepare their surface to uniform colouring. The most often used staining agents, blue in tinge, were made of a diluted sky-blue retouching ink, or different shades of red tint, prepared from different dilutions of eosin. The stained specimens might be easily washed with water or alcohol. The specimens were stained to enhance the ornamentation and the hinge elements.

Table 1

GEOGRAFICAL DISTRIBUTION OF OSTRACODS IN KUIAVIAN* AND BATHONIAN IN POLAND, NW GERMANY AND ENGLAND

Species	Jaworzniak					Choroń				Iwanowice Wielkie					NW Germany		England	
	Kuiavian*		Bathonian			Kuiavian*			Batho- nian	Kuiavian*		Bathonian			Bajocian <i>parkinsoni</i> zone	Bathonian	Bajocian	Bathonian
	M	U	L	M	U	L	M	U	L	M	U	L	M	U				
<i>Bythocypris? jaworzniakensis</i> n. sp.	-	+	+	+	+	-	+	-	+	-	-	+	-	+	-	-	-	-
<i>Cytherella limpida</i> n. sp.	+	+	+	-	+	+	+	-	+	+	-	+	+	-	+	+	-	-
<i>C. perennis</i> n. sp.	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	-	-
<i>Cytherelloidea certa</i> n. sp.	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Cytheropteron (Cytheropteron) tenuis</i> n. sp.	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-
<i>Ektyphocythere nucleopersica</i> n. sp.	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>E. pteriformis</i> n. sp.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>E. renatae</i> n. sp.	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
<i>Eucytherura rectodorsalis</i> n. sp.	-	-	+	+	-	-	+	-	+	-	-	-	+	+	-	-	-	-
<i>Fuhrbergiella (Fuhrbergiella) gigantea quarta</i> n. subsp.	+	-	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-
<i>F. (Praefuhrbergiella) lurida</i> n. sp.	+	-	+	+	-	-	+	-	+	-	+	+	+	+	-	-	-	-
<i>F. (Fuhrbergiella?) concentrica</i> n. sp.	-	-	+	-	-	-	-	-	+	-	-	+	-	-	-	+	-	-
Genus et species indet.	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glyptocythere perpolita magna</i> n. subsp.	+	-	-	-	-	+	+	-	-	-	+	-	-	-	-	-	-	-
<i>G. tuberosa angularis</i> n. subsp.	-	+	+	+	+	-	-	-	+	-	-	+	+	-	-	-	-	-
<i>Hutsonia? iwanowicensis</i> n. sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>Lophocythere carinata</i> n. sp.	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>L. cf. carinilia</i> Sylvester-Bradley, 1948	-	-	+	+	-	-	+	+	+	-	-	+	+	+	+	+	-	+
<i>L. verrucosa</i> n. sp.	+	+	+	+	+	-	+	-	+	-	-	+	-	-	-	-	-	-
<i>Monoceratina? amygdaliformis</i> n. sp.	-	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>M. cf. vulsa</i> (Jones & Sherborn, 1888)	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
<i>Oligocythereis cf. fullonica</i> (Jones & Sherborn, 1888)	-	-	+	+	-	-	-	-	+	-	-	+	+	+	-	+	-	+
<i>Paracypris cf. bajociana</i> Bate, 1963	+	-	+	+	+	-	+	-	+	-	-	+	-	-	-	-	+	-
<i>P. procerus</i> n. sp.	+	+	+	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Parariscus octoporalis</i> n. sp.	-	-	+	-	-	-	+	-	-	-	+	-	+	-	-	+	-	-
<i>Pleurocythere elliptica</i> n. sp.	+	-	-	+	-	-	+	-	+	-	-	+	-	-	-	-	-	-
<i>P. favosa</i> Triebel, 1951	-	-	+	+	-	-	-	-	+	-	-	+	+	+	-	+	-	-
<i>P. impar</i> Triebel, 1951	+	-	+	+	-	-	+	-	-	-	-	+	-	-	+	-	-	-
<i>Polycope cf. maculata</i> Müller, 1894	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-
<i>Praeschuleridea lepida</i> n. sp.	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-
<i>P. wartae</i> n. sp.	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-	-
<i>Procytheridea czestochowiensis</i> n. sp.	-	-	+	-	-	-	+	+	+	-	+	+	-	-	-	-	-	-
<i>Progonocythere? convexa</i> n. sp.	+	+	+	+	+	-	-	-	+	-	+	+	+	+	-	+	-	-
<i>P. polonica</i> Błaszcyk, 1959	-	-	+	+	+	-	-	-	+	-	-	-	+	+	-	+	-	-
<i>P.? posteriohumilis</i> n. sp.	+	-	+	+	-	-	-	-	+	-	-	+	-	-	-	+	-	-
<i>Schuleridea triebeli polypora</i> n. subsp.	+	-	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-

* = Vesulian, L = Lower, M = Middle, U = Upper

Thus prepared individuals were stuck with polystyrene or gum arabic to a glass plate with a red background and, hereafter, gently covered with a coating of the sublimated ammonium chloride.

Photographs were taken on a low-sensitivity microfilm with the application of the "Microtar" lenses, photographic eyepiece, spot-lighting supplied by a single light source and brightening screens. A special, graduated tripod on which the camera was mounted allowed one for taking uniformly magnified photographs. The pictures were printed on a lusterless photographic paper and, in a few cases, slightly retouched. The muscle scars and marginal zones of pore canals were photographed in the transmitted light. The photographs of these parts were used as a background for the text-figures. The photographs were taken by the author.

The following symbols were used in explanations of figures and plates: LA = larval stage, C = carapace, RV = right valve, LV = left valve.

FACIAL CONDITIONS AND THEIR INFLUENCE ON OSTRACODS

The lithofacial changes in the sections from which the studied ostracods come are frequent and distinct. Presumably, they were related to a small distance from the shore line (Deczkowski, 1958). They are especially strongly marked in the *Parkinsonia parkinsoni* zone which is developed in the sandy facies with clayey intercalations, as well as in the shale and sandy clay facies. These changes are less distinct in the *Parkinsonia compressa* and *Perisphinctes tenuiplicatus* zones. The clayey and shale-clay sediments with a small sand content predominate in these zones. The sand content of sediments increases once more in the zones of *Morrisiceras morrissi* and *Paroecotraustes heterocostatus* in which the sandy clays and mudstones with sandy intercalations are the predominant sediments. Sea basins in this area were probably inundating in character, sometimes, reaching inland, rather shallow and with a low degree of salinity. Consequently, the ecological conditions of the ostracods of this region were variable. Unfortunately, the ecology of the Recent marine ostracods and its influence on the morphology of the test are little-known so far. On the whole, the ecological changes exert their influence on the morphology of the valve, in particular on its shape and ornamentation. The difficulties in solving palaeoecological problems, undoubtedly consist in the fact that the ostracods live in different environments and at different depths. They creep over the bottom, attach to the plants and bury themselves in the bottom loam. The pelagic species are marked by a decrease in their body weight, related to a decrease in the CaCO_3 accumulation in the test. This phenomenon is particularly distinct in *Gigantocypris* whose carapaces have, according to Müller (1894), uncalcified valves. Most ostracods represent benthonic species which live

in the bottom mud or attached to the plants. Some marine species are often associated with a definite type of sediment. The benthonic forms were investigated by Klie (1938), Remane (1933) and Elofson (1941). In order to state the distribution of the individuals with smooth and ornamented valves which depends on the type of sediment, the latter author studied the ostracods, coming from the Skagerrak Straits. Elofson's results showed that the number of the ostracods with smooth, unornamented valves which live, attached to the plants or buried in a soft bottom loam, is larger than that of ornamented ostracods, living under identical conditions. This statement is, however, contradicted by the characters of the species that belong to the genus *Pterygocythereis* which — although they bury themselves in the sediment — have mostly ornamented valves with coarse spines.

Remane's (1933) studies were marked by a different trend. He was interested in the correlation between the length of the valve and the character of the sediment, observed in the ostracods, living in the North Sea. According to this author, the species living in a sandy sediment are the shortest, whereas those, found in the muddy sediment — the longest. An intermediate group is formed by individuals living on plants. These phenomena are explained by Remane by the fact that the spaces between single sand grains are very small and thus they restrict the growth of the valves in the species which bury themselves in the sand. This factor does not occur in the case of the muddy sediment and, consequently, the growth of the valve is not arrested. A great number of species of the family Cytheridae are represented by the forms which live in upper zones of the marine basins. They are marked by a high degree of insensibility to the changes in ecological conditions, such as, the salinity and temperature of the water which is especially distinct in adult individuals. However, the processes of their generation and of the growth of young individuals take place under ecologically stable conditions. This explains the fact that, in some sediments, there occur only adult individuals since an area in which young individuals developed not always was identical with that in which adult ones lived.

The occurrence of the ostracods in the Jaworznik, Iwanowice Wielkie and Choroń sections shows that the largest number of species and individuals are distributed in the clayey facies corresponding to the conditions that predominate in a rather shallow basin. In more sandy sediments this number distinctly decreases. In typically sandy sediment, the ostracods have not been found at all. According to Elofson (1941), it should be assumed that they have not been preserved in the sediments of this type. Their valves were destroyed as a result of a considerable friction taking place between particular sand grains of such sediments.

Table 2

STRATIGRAPHIC RANGE OF OSTRACODS FROM DOGGER OF CZĘSTOCHOWA REGION

Species	DOGGER					
	Kuiavian*			Bathonian		
	Lower	Middle	Upper	Lower	Middle	Upper
<i>Cytherella limpida</i> n. sp.	—	—	—	—	—	—
<i>Glyptocythere perpolita magna</i> n. subsp.	—	—	—	—	—	—
<i>Polycope</i> cf. <i>maculata</i> Müller, 1894	—	—	—	—	—	—
<i>Monoceratina</i> cf. <i>vulsa</i> (Jones & Sherborn, 1888)	—	—	—	—	—	—
Genus et species indet.	—	—	—	—	—	—
<i>Parariscus octoporalis</i> n. sp.	—	—	—	—	—	—
<i>Schuleridea triebeli polypora</i> n. subsp.	—	—	—	—	—	—
<i>Pleurocythere impar</i> Triebel, 1951	—	—	—	—	—	—
<i>Praeschuleridea lepida</i> n. sp.	—	—	—	—	—	—
<i>Cytheropteron</i> (<i>Cytheropteron</i>) <i>tenuis</i> n. sp.	—	—	—	—	—	—
<i>Eucytherura rectodorsalis</i> n. sp.	—	—	—	—	—	—
<i>Bythocypris?</i> <i>jaworzniensis</i> n. sp.	—	—	—	—	—	—
<i>Cytherella perennis</i> n. sp.	—	—	—	—	—	—
<i>Fuhrbergiella</i> (<i>Praefuhrbergiella</i>) <i>lurida</i> n. sp.	—	—	—	—	—	—
<i>Lophocythere verrucosa</i> n. sp.	—	—	—	—	—	—
<i>Paracypris procerus</i> n. sp.	—	—	—	—	—	—
<i>Paracypris</i> cf. <i>bajociana</i> Bate, 1963	—	—	—	—	—	—
<i>Lophocythere</i> cf. <i>carinilia</i> Sylvester-Bradley, 1948	—	—	—	—	—	—
<i>Procytheridea czestochowiensis</i> n. sp.	—	—	—	—	—	—
<i>Progonocythere?</i> <i>posteriorhumilis</i> n. sp.	—	—	—	—	—	—
<i>Fuhrbergiella</i> (<i>Fuhrbergiella</i>) <i>gigantea quarta</i> n. subsp.	—	—	—	—	—	—
<i>Pleurocythere elliptica</i> n. sp.	—	—	—	—	—	—
<i>Praeschuleridea wartae</i> n. sp.	—	—	—	—	—	—
<i>Progonocythere?</i> <i>convexa</i> n. sp.	—	—	—	—	—	—
<i>Glyptocythere tuberosa angularis</i> n. subsp.	—	—	—	—	—	—
<i>Monoceratina?</i> <i>amygdaliformis</i> n. sp.	—	—	—	—	—	—
<i>Progonocythere polonica</i> Błaszyk, 1959	—	—	—	—	—	—
<i>Cytherelloidea certa</i> n. sp.	—	—	—	—	—	—
<i>Fuhrbergiella</i> (<i>Fuhrbergiella?</i>) <i>concentrica</i> n. sp.	—	—	—	—	—	—
<i>Oligocythereis</i> cf. <i>fullonica</i> (Jones & Sherborn, 1888)	—	—	—	—	—	—
<i>Pleurocythere favosa</i> Triebel, 1951	—	—	—	—	—	—
<i>Ektyphocythere nucleopersica</i> n. sp.	—	—	—	—	—	—
<i>E. pteriformis</i> n. sp.	—	—	—	—	—	—
<i>Lophocythere carinata</i> n. sp.	—	—	—	—	—	—
<i>Ektyphocythere renatae</i> n. sp.	—	—	—	—	—	—
<i>Hutsonia?</i> <i>ivanowicensis</i> n. sp.	—	—	—	—	—	—

* = Vesulian

STRATIGRAPHIC DISTRIBUTION

The analysis of the occurrence of the ostracods in the studied sections reveals the possibility of these fossils to be useful for the stratigraphy (Table 2). The occurrence of definite assemblages of the ostracods coincides to a considerable extent with that of the foraminifers of the family Miliolidae (Pazdro, 1958, 1959, 1960). These relationships have been clearly outlined in the Iwanowice Wielkie and Choroń sections. In the Choroń section, the assemblage of such species as *Cytherelloidea certa*, *Fuhrbergiella* (*Fuhrbergiella*) *gigantea quarta*, *F.* (*Fuhrbergiella*?) *concentrica*, *Glyptocythere tuberosa angularis*, *Monoceratina?* *amygdaliformis*, *Oligocythereis* cf. *fullonica*, *Paracypris procerus*, *Pleurocythere favosa*, *Progonocythere?* *convexa*, *P. polonica* and *P.?* *posteriohumilis* is restricted to the *Perisphinctes tenuiplicatus* zone. The latter zone is represented by many of these forms in the Iwanowice Wielkie section.

Another assemblage is formed by *Pleurocythere impar*, *Cytheropteron* (*Cytheropteron*) *tenuis*, *Schuleridea triebeli polypora*, *Praeschuleridea lepida*, *Parariscus octoporalis*, *Polycope* cf. *maculata* and *Monoceratina* cf. *vulsa*. In the Choroń section, this assemblage is characteristic of the *Parkinsonia parkinsoni* zone. In the Iwanowice Wielkie section, it is only *Glyptocythere perpolita magna* that occurs in the *Parkinsonia compressa* zone. In the *Parkinsonia parkinsoni* zone of this section, I have found only two species: *Cytherella limpida* and *C. perennis*. Absence of other species may be ascribed to the scarcity of the material (only one sample, from the depth of 137 m was available). In the Iwanowice Wielkie section, at these depths, a layer a few meters thick is developed in the facies of a sandy shale. The remaining sediments of the *Parkinsonia parkinsoni* zone at Iwanowice Wielkie represent the sands in which the conditions were very unfavourable for the preservation of the ostracods. At Iwanowice Wielkie, the *Paroecotraustes heterocostatus* zone is represented by only the following three species: *Lophocythere carinata*, *Ektyphocythere pteriformis* and *Hutsonia?* *ivanowicensis*. In Jaworznik, the majority of forms occur in the upper part of the *Parkinsonia parkinsoni* and *P. compressa* zones, lesser quantities being recorded in the *Perisphinctes tenuiplicatus* and *Morrisiceras morrиси* zones. With regard to the number of particular species, the assemblage of the ostracods decreases in the *Paroecotraustes heterocostatus* zone. The occurrence of the following species is limited to the *Perisphinctes tenuiplicatus* zone: *Ektyphocythere pteriformis*, *Cytherelloidea certa*, *Lophocythere carinata*, *Parariscus octoporalis*, *Fuhrbergiella* (*Fuhrbergiella*?) *concentrica* and *Procytheridea czestochowiensis*. A larger assemblage of the ostracods is characteristic of the *Parkinsonia parkinsoni* zone. It consists of *Schuleridea triebeli polypora*, *Glyptocythere perpolita magna*, *Cytheropteron* (*Cythe-*

ropteron) *tenuis*, *Polycope* cf. *maculata*, *Praeschuleridea wartae* and *P. lepida*.

Detailed data, concerning the stratigraphic occurrence of other ostracods are shown in sections in Figs. 2-4. The studied ostracods from these sections allowed one to determine the range of particular species in the *Garantiana garantiana*, *Parkinsonia parkinsoni*, *Parkinsonia compressa*, *Perisphinctes tenuiplicatus*, *Morrisiceras morrisoni* and *Paroecotraustes heterocostatus* zones. In Polish geological literature, the *Perisphinctes tenuiplicatus* zone is considered a lower part of the Bathonian.

This first presentation of the data, concerning the orebearing loams in the Cześćochowa Region and which are based on the presence of the ostracods, may prove well-grounded if the vertical ranges of this group of animals will be confirmed by analogous findings in other parts of Poland. In such a case, detailed elaborations may lead to the determination of index forms. The fact should be emphasized that the assemblage of the Dogger ostracods from Central Poland is similar to that from North-West Germany. Many of the new species of the Dogger ostracods, erected in the present paper, are also represented in the sediments of this age, found in North-West Germany. These material, not described so far, are preserved in the collections of the Senckenberg Museum in Frankfurt on the Main. Thanks to the courtesy of Dr. H. Malz, it has been agreed that the new species from sections in Figs. 2-4, common for Poland and North-West Germany, may be described in the present paper.

On the basis of the available Soviet literature, it should be stated that the Dogger ostracods from sections in Figs. 2-4 have not any equivalents from that period in the U.S.S.R.

DESCRIPTIONS

Order **Ostracoda** (Latreille, 1802)

Suborder **Cladocopa** Sars, 1866

Family **Polycopidae** Sars, 1866

Genus *Polycope* Sars, 1866

Polycope cf. *maculata* Müller, 1894

Material. — Nine well-preserved carapaces.

Adult individual; Pl. I, Fig. 1 (O.IV/1). Dimensions (in mm):

	Length	Height	Width of carapace
Left valve	0.33	0.24	0.18
Right valve	0.33	0.24	

Description. — Carapace almost round in lateral outline. Anterior and posterior ends equally rounded. Dorsal margin straight along the hinge

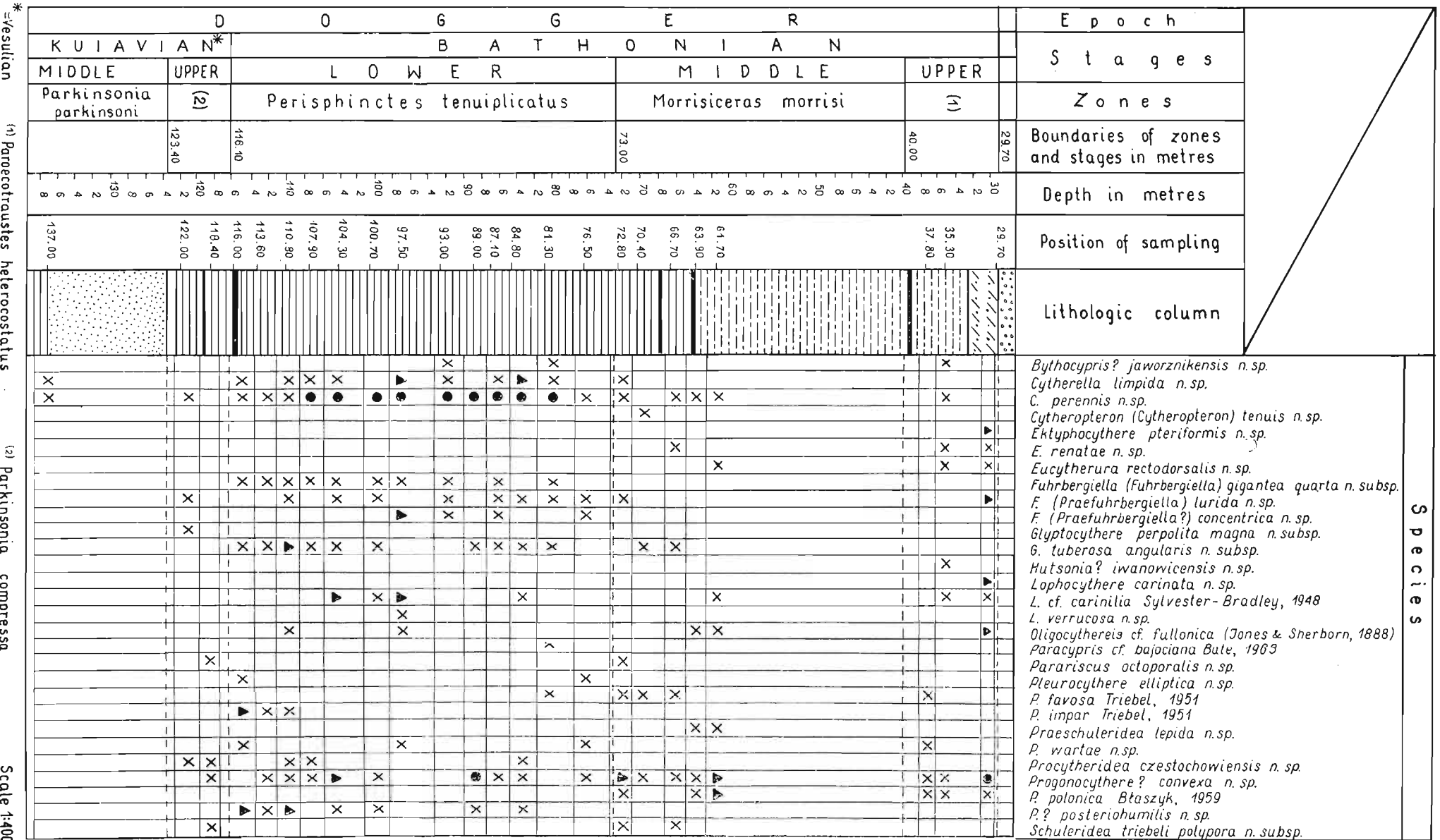


Fig. 2. — Distribution of ostracods in boring of Jaworzniak. Ammonite zones after J. Znosko, 1954
 Remark: In the above list of species, the name *F. (Praefuhrbergiella?) concentrica* n. sp. must be replaced by *F. (Fuhrbergiella?) concentrica* n. sp.

margin and in its posterior part, bending in the middle. Ventral margin uniformly rounded. Outer margin on the ventral side, straight. Right and left valve uniformly convex. At the hinge margin both valves are somewhat concave. A fine network with differently shaped depressions forms ornamentation which covers the entire surface of the valve. In the posterior part, there are subrectangular depressions, concentrically disposed in 5 rows. Irregularly shaped depressions, some of them almost round, occur in the median part of the lateral surface and on the ventral surface of the valve. Those, occurring in the anterior part are polygonal, elongated and disposed in conformity with the longer axis of the valve.

Remarks. — *Polycope maculata* Müller, 1894, has been described from Recent sediments of the Bay of Naples. Both its description and illustrations depicting them are similar to those of our Middle Jurassic form. The outline of the Polish form is identical with that in *P. cf. maculata* Müller, described by Plumhoff (1963) from the Aalenian of North-West Germany; Polish specimens differ from them, however, in a more distinct ornamentation. *P. cf. maculata* from Poland differs from *Polycope* sp. indet. Digler, 1963 from the Dogger of Swabia, from *P. pelta* Fischer, 1961 from the Upper Lias of Württemberg, and from *Polycope* sp. 11 Oertli, 1959 from the Lias of the Paris Basin — in a more elongated shape of the carapace and more distinct ornamentation.

Occurrence. — Poland: Jaworzniak and Choroń, Middle Kuyavian; NW Germany, Aalenian, Bathonian.

Suborder **Platycopa** Sars, 1866
 Family **Cytherellidae** Sars, 1866
 Genus *Cytherella* Jones, 1849
Cytherella limpida n. sp.
 (Pl. I, Figs. 2-13; Pl. II, Fig. 12)

Holotypus: Pl. I, Fig. 11; Pl. II, Fig. 12 (O.IV/11).

Stratum typicum: Middle Kuyavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *limpida*, Lat. *limpidus* = clear, transparent.

Diagnosis. — Carapace ellipsoidal-ovate in outline, smooth. Posterior part strongly inflated. Posterior and anterior ends uniformly rounded. A roll-like thickening, on which parallel ribs are visible, occurs on the anterior margin.

Material. — Two thousand very well-preserved specimens, including right and left valves and complete carapaces of adult and young individuals.

Description. — Carapace ellipsoidal-ovate in outline. Right, larger valve overlaps the left one in its dorsal, anterodorsal and ventral parts. The anterior and posterior ends uniformly rounded. On the anterior margin

there is a roll-like thickening on which 3-5 parallel ribs are disposed. In the posteroventral part, the posterior margin deflects and passes into the ventral margin. Dorsal margin is thickened particularly in the postero-dorsal part, where it obscures the contact margin. Ventral margin straight. Carapace smooth, in the posterior part strongly inflated due to the presence of a well-developed brood pouch. As viewed dorsally, the contact line is, in the anterodorsal part, deflected towards the left valve. The contact line, as viewed ventrally, is straight. Three distinct depressions occur on inner surfaces of the left and right valve. In the posterior part, there occurs a depression corresponding to the brood pouch. It is separated by a transverse ridgelike thickening from another depression visible behind the muscle field. The third depression occurs in the anterior part of the valve. The zone of marginal pore canals is only slightly outlined in the anterior part, where it is fused with the inner surface of the valve. The hinge is simple in structure and consists of a small bar in the left and a groove in the right valve. In the anterior and posterior parts, the hinge passes directly into a contact margin. Muscle scars, slightly raised, are disposed in the middle part of the valve. Their shape and arrangement are typical of the family Cytherellidae.

Ontogeny. — Ontogenetic stages 2-7 have been recognized in the material examined. In the course of ontogeny, a fundamental change occurs in the outline of the valve which is related to a change in the convexity of the posterior part of the valve and to the displacement of the greatest height from the anterior to the posterior part.

Instar II; Pl. I, Fig. 2 (O.IV/2). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.27	0.20	0.15
Left valve	0.26	0.19	

The ventral and dorsal margins converge posteriorly. In the posteroventral part, there occurs an elongated thickening which, beginning in the middle, gradually disappears towards the front. The right valve is slightly larger and overlaps the left one in the dorsal and ventral parts. The anterior part of the valve is the highest one.

Instar III; Pl. I, Fig. 3 (O.IV/3). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.31	0.23	0.16
Left valve	0.33	0.22	

In this stage, the degree of convergence of dorsal and ventral margins is smaller. As compared with the previous instar, the thickening of the carapace is shifted to the posteromedian part.

Instar IV; Pl. I, Fig. 4 (O.IV/4). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.41	0.21	0.18
Left valve	0.40	0.25	

The dorsal margin and ventral margin are parallel. As compared with the previous instar, the thickening of the carapace is smaller. The anterior and posterior part of the valve are equal in height.

Instar V; Pl. I, Fig. 5 (O.IV/5). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.50	0.32	0.21
Left valve	0.48	0.30	

The dorsal and ventral margins converge anteriorly. The thickening of the carapace, which occurred in previous instars, has disappeared. The greater height of the carapace is recorded in the anteromedian part. Muscle scars are situated in the posteromedian part.

Instar VI; Pl. I, Fig. 8 (O.IV/8). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.65	0.42	0.29
Left valve	0.63	0.39	

The posterior part of the valve is slightly inflated resulting from the initial development stage of the brood pouch. Inside the valve, a transverse thickening is outlined in the posterior part. Muscle scars are disposed nearer the middle part of the valve.

Adult individual; Pl. I, Fig. 11 (O.IV/11), Pl. II, Fig. 12 (O.IV/11). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.84	0.54	0.39
Left valve	0.82	0.47	

Remarks. — *Cytherella limpida* n. sp. is most similar to *C. callosa ampla* Braun, 1958, described by Dilger (1963) from which it differs, however, in having a dorsal margin somewhat truncated in the anterodorsal part. From *C. index* Oertli, 1959 it differs in a more rounded outline of its anterior and posterior parts.

Occurrence. — Poland: Jaworzniak, Middle and Upper Kuiavian, Lower and Upper Bathonian; Choroń, Lower and Middle Kuiavian, Lower Bathonian; Iwanowice Wielkie, Middle Kuiavian, Lower and Middle Bathonian. NW Germany: *parkinsoni* zone, Bathonian.

Cytherella perennis n. sp.

(Pl. II, Figs. 1-11; Pl. III, Figs. 6-7)

1966. *Cytherella* sp.; F. Adamczak, On kloedenellids..., pp. 7-21, Pl. 5, Fig. 2.*Holotypus*: Pl. III, Fig. 6 (O.IV/25).*Stratum typicum*: Middle Bathonian, *Morrisiceras morrиси* zone.*Locus typicus*: Jaworznik, Poland.*Derivatio nominis*: *perennis*, Lat. *perennus* = long-lived.

Diagnosis. — Carapace beanlike in lateral outline, smooth. Anterior and posterior ends uniformly rounded. Roll-like, smooth thickening occurs on the anterior margin of the valve. In the dorsal view, carapace is contracted in its middle.

Material. — Two thousand very well-preserved specimens, including left and right valves and complete carapaces of the adult and young individuals.

Description. — Carapace beanlike in lateral outline. Right, larger valve overlaps left valve along its dorsal, posterodorsal, ventral and posteroventral margins. Anterior and posterior ends uniformly rounded. A roll-like, smooth thickening is visible on the anterior margin. Dorsal margin straight, ventral slightly concave in the middle. Valves smooth, in the posterior part more inflated due to the presence of a well-developed brood pouch. As viewed dorsally, the contact line is, in the middle part, bent towards the left valve, whereas viewed ventrally — it is straight. An arcuate, transverse thickening occurs on the inner valve surface, in the posterior part of both left and right valves. It separates the brood pouch from another depression, situated behind the muscle scar field. The third depression is disposed in the anterior part of the valve, in front of the muscle scar field. There is indistinctly developed posterior part of the zone of marginal pore canals and the anterior one is only slightly outlined. The hinge is simple in structure and consists of a bar in the left and a groove in the right valve. Anteriorly and posteriorly the hinge passes directly into the contact margin. The muscle scar field slightly elevated in the middle part of the valve and somewhat shifted dorsally. The muscle scar pattern is typical of the Cytherellidae.

Ontogeny. — Ontogenetic stages 2-7 have been recognized in the material examined. In the course of the ontogenetic development, a fundamental change occurs in the outline of valves, and it is related to the development of the brood pouch in stages 6 and 7. In the initial ontogenetic stage, some changes also occur in the convexity of the valve.

Instar II; Pl. II, Fig. 1 (O.IV/14). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.28	0.18	0.12
Left valve	0.28	0.18	

In this stage, carapace has, in its posteroventral part, an oblong thickening, extended half-way along the valve and disappearing anteriorly. Anterior and posterior ends are rounded. The dorsal margin is straight, except for its posterodorsal part where it slightly bends and passes into the posterior end of the valve. Ventral margin straight. Right valve slightly larger than left. The greatest height is recorded in the anterior part of the valve.

Instar III; Pl. II, Fig. 2 (O.IV/15). Dimensions (in mm):

	Length	Height	Width of carapace
Left valve	0.36	0.21	0.15
Right valve	0.36	0.20	

The longitudinal thickening of the carapace is smaller. The right valve overlaps the left dorsally and ventrally.

Instar IV; Pl. II, Fig. 3 (O.IV/16). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.43	0.25	0.18
Left valve	0.43	0.23	

Longitudinal thickening of the carapace lacking. The dorsal margin is parallel to the ventral. The heights of the anterior and posterior parts of the valve are equal.

Instar V; Pl. II, Fig. 6 (O.IV/19). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.51	0.30	0.20
Left valve	0.50	0.28	

The muscle scar field is slightly shifted towards the posterior end of the valve.

Instar VI; Pl. II, Fig. 9 (O.IV/22). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.66	0.35	0.23
Left valve	0.65	0.33	

The initial development stage of the brood pouch is visible in the posterior part of the valve. The ventral margin is slightly concave in the middle. The muscle scar field, slightly raised, is shifted towards the middle part of the valve.

Adult individual; Pl. III, Fig. 6 (O.IV/25). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.78	0.41	0.33
Left valve	0.76	0.38	

Remarks. — The specimens of *Cytherella perennis* n. sp. are similar to the specimens of *C. woltersdorfi* Oertli, 1959, described from the transitional facies of the Lower Argovian-Rauracian from the locality Lindenhof, Switzerland, as well as to the specimens of *C. woltersdorfi*, described by Donze (1962) from the Upper Argovian and Lower Rauracian from the locality Trept, France. *C. perennis* n. sp. differs from the species, referred to above, in a more rounded outline of the anterior and posterior ends of the valve and in a contracted outline of the middle part, as viewed in the dorsal aspect.

Occurrence. — Poland: Jaworzniak, Middle and Upper Kuiavian and Bathonian; Choroń, Middle and Upper Kuiavian and Lower Bathonian; Iwanowice Wielkie, Middle and Upper Kuiavian and Bathonian. NW Germany: *parkinsoni* zone, Bathonian.

Genus *Cytherelloidea* Alexander, 1929

Cytherelloidea certa n. sp.

(Pl. III, Figs. 8-9)

Holotypus: Pl. III, Fig. 8 (O.IV/32).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *certa*, Lat. *certus* = certain.

Diagnosis. — Valve elongated, beanlike in lateral outline, ornamented with a fine meshwork pattern. In the middle part, the valve is depressed, whereas in the posterior part strongly inflated. A longitudinal furrow runs through the middle of the posterior inflation.

Material. — Fifteen right and left valves.

Adult individuals; Pl. III, Figs. 8-9. Dimensions (in mm):

	Length	Height
Right valve (O. IV/32)	0.71	0.40
Left valve (O. IV/33)	0.71	0.34

Description. — Valve elongated, beanlike in lateral outline, in the anterior and posterior parts uniformly rounded. The anterior margin developed in the form of a small roll. Dorsal margin straight. Outer margin distinctly concave in the middle, but ventral one slightly rounded. Ornamentation, in form of a fine meshwork, covers the entire valve surface. In the anterior part, fine depressions of ornamen-

tation are disposed concentrically. On the remaining parts of the valve surface, ornamentation is irregular. The valves are swollen in their anterior and posterior parts, but concave in the middle part. The central depression passes into a furrow-like cavity occurring postero-medially. The zone of marginal pore canals not developed. Three depressions are visible on the inside: one — in the anterior part of the valve, another — between the muscle field and brood pouch, and still another forming the brood pouch. The hinge, simple in structure, is formed by a groove in the right valve and a bar in the left valve. In the anterior and posterior parts, hinge passes directly into a contact margin. Muscle scars, typical of the Cytherellidae, occur in the middle part of the valve.

Remarks. — *Cytherelloidea certa* n. sp. is similar to *C. besrineensis* Bischoff, 1964 from the Lower Cretaceous of Liban, from which it differs, however, in a more distinct ornamentation and in having a central depression.

Occurrence. — Poland: Jaworzniak and Choroń, Lower Bathonian.

Suborder **Podocopa** Sars, 1866

Family **Bairdiidae?** Sars, 1888

Genus *Bythocypris* Brady, 1880

Bythocypris? jaworzniakensis n. sp.

(Pl. III, Figs. 1-5)

Holotypus: Pl. III, Fig. 5 (O.IV/31).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Lucus typicus: Jaworzniak, Poland.

Derivatio nominis: *jaworzniakensis* — after the locality from which this species has been described.

Diagnosis. — Dorsal margin subangulate, ventral margin slightly rounded. Anterior end rounded, the posterior truncated in its upper part and less rounded. Valve surface smooth. The left valve strongly overlaps the right one on the ventral side, especially so in its middle part.

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

Description. — Carapace elongated. Left valve larger than right one. Anterior end rounded, posterior end narrowly rounded. In the middle part, dorsal margin subangulate. Ventral margin slightly concave. Carapace surface smooth. As viewed dorsally, the contact line is slightly sinuous, whereas ventrally it bends in the middle towards the right valve. This results from the fact that the right valve is overlapped by the left.

Ontogeny. — One adult and four larval stages have been recognized in the ontogenetic development. Particular instars differ from each other mostly in size.

Instar II; Pl. III, Fig. 1 (O.IV/27). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.21	0.10	0.10
Left valve	0.21	0.11	

Instar III; Pl. III, Fig. 2 (O.IV/28). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.24	0.13	0.11
Left valve	0.24	0.14	

Instar IV; Pl. III, Fig. 3 (O.IV/29). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.32	0.15	0.13
Left valve	0.32	0.16	

Instar V; Pl. III, Fig. 4 (O.IV/30). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.40	0.17	0.15
Left valve	0.40	0.18	

Adult individual; Pl. III, Fig. 5 (O.IV/31). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.50	0.21	0.17
Left valve	0.50	0.22	

Remarks. — *Bythocypris? jaworzniensis* n.sp. displays a considerable similarity to *B. proceraformis* Mandelstam, 1963 from the Upper Cretaceous of Central Asia. It differs, however, from the latter in a slightly truncated anterior end of its upper part. From *B. windhami* Butler & Jones, 1957 from Campanian of Arkansas, U.S.A. (Benson & Tarto, 1964), it differs in a bigger valve inflation in its central part. Any analysis of muscle scars and of the type of the hinge was impossible because of the lack of open carapaces. Therefore, the assignment of *B.? jaworzniensis* n. sp. to the family Bairdiidae Sars, 1888, is only tentative. The opinions of many authors (cf. Howe, 1962, and Mandelstam, 1963), who described the *Bythocypris* species, are divergent in this respect.

Occurrence. — Poland: Jaworzniak, Upper Kuiavian and Bathonian; Choroń, Middle Kuiavian and Lower Bathonian; Iwanowice Wielkie, Lower and Upper Bathonian.

Family **Cyprididae** Baird, 1845
 Genus *Paracypris* Sars, 1866
Paracypris cf. *bajociana* Bate, 1963
 (Pl. IV, Figs. 1-3)

Material. — Eighty well-preserved complete caparaces of adult and one representing juvenile individual.

Description. — Carapace oblong in lateral outline. Left, larger valve overlaps right one dorsally and ventrally. Anterior end rounded, posterior slightly pointed. Dorsal margin arched, somewhat angulate, ventral margin only slightly concave. Carapace surface smooth. As viewed dorsally the contact line, in the postero-median and anterior part, slightly deflects towards the left valve. As viewed ventrally, the contact line is strongly deflected towards the right valve, this being caused by the fact that the right valve is overlapped by the left. A sexual dimorphism is observed among adult individuals and, in female specimens, it is expressed by a more convex posterior part of the valve; valves of males are lower and, in the posterior part, less convex.

Ontogeny. — One only larval stage has been found in the material available. Apart from its dimensions, this stage does not differ at all from the adult one.

Larval stage; Pl. IV, Fig. 1 (O.IV/34). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.44	0.20	0.16
Left valve	0.45	0.21	

Adult female individual; Pl. IV, Fig. 2 (O.IV/35). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.68	0.28	0.23
Left valve	0.69	0.30	

Adult male individual; Pl. IV, Fig. 3 (O.IV/36). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.67	0.26	0.21
Left valve	0.68	0.23	

Remarks. — Our specimens differ from those of *Paracypris bajociana* Bate, 1963, in having a more sinuous contact line as viewed in the dorsal and ventral aspects. With regard to the outline, the valves somewhat resemble those of *Pontocyprilla suprajurassica* Oertli, 1959, and *P. aureola* Liubimova, 1955. From the specimens of *Pontocypris elongatissima* Mandelstam, 1959, they differ in a more angular outline of the dorsal margin.

Occurrence. — Poland: Jaworznik, Middle Kuiavian and Bathonian; Choroń, Middle Kuiavian and Lower Bathonian; Iwanowice Wielkie, Lower Bathonian. England: Middle Bajocian.

Paracypris procerus n. sp.

(Pl. IV, Figs. 4-6)

Holotypus: Pl. IV, Fig. 6 (O.IV/39).

Stratum typicum: Middle Bathonian, *Morrisiceras morrissi* zone.

Locus typicus: Jaworznik, Poland.

Derivatio nominis: *procerus*, Lat. *procerus* = slim.

Diagnosis. — Carapace low, strongly elongated, smooth. Dorsal margin rounded, in its anterior part truncated, ventral margin slightly concave. Posterior end elongated, low, pointed and somewhat upturned. Anterior end obliquely rounded.

Material. — A hundred well-preserved carapaces, including both the adult and young individuals.

Description. — Carapaces rather low, slim, strongly elongated. Left, slightly larger valve, overlaps right valve on the ventral side. Anterior end rounded. Posterior end pointed, slightly upturned. Dorsal margin, somewhat angulate at both ends, posteriorly passing into a pointed valve termination. The ventral margin slightly concave in the middle. Valve surface smooth. As viewed in the dorsal aspect, the contact line is straight, and in the ventral aspect, it is bent towards the right valve.

Ontogeny. — An adult stage and two larval stages have been recognized among these specimens, representing an incomplete ontogenetic development. The difference between particular instars is expressed mostly in carapace dimensions.

Instar III; Pl. IV, Fig. 4 (O.IV/37). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.33	0.15	0.11
Left valve	0.33	0.15	

Instar IV; Pl. IV, Fig. 5 (O.IV/38). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.40	0.16	0.13
Left valve	0.40	0.17	

Adult individual; Pl. IV, Fig. 6 (O.IV/39). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.62	0.25	0.16
Left valve	0.62	0.26	

Remarks.—*Paracypris procerus* n. sp. differs from *P. acris* Oertli, 1959, from Malm of the Swiss Jurassic, in a less elongated posterior part of the valve and in a more rounded anterior part. From *P. acris* Oertli, 1959, described by Donze (1962) from Dogger and Malm of France, it differs in a smaller height and a slightly upturned, pointed posterior end.

Occurrence.—Poland: Jaworzniak, Middle and Upper Kuyavian and Bathonian; Choroń, Lower Bathonian.

Family **Cytheridae** Baird, 1850
Genus *Pleurocythere* Triebel, 1951
Pleurocythere favosa Triebel, 1951
(Pl. V, Figs. 1-3)

1951. *Pleurocythere favosa* Triebel; E. Triebel, Einige stratigraphisch..., p. 93, Pl. 45, Figs. 19-22.

Material.—Fifty well-preserved right and left valves, including both adult and young individuals.

Diagnosis and description—cf. Triebel, 1951.

Ontogeny.—One adult and two larval stages have been recognized in the material available. In the course of the ontogenetic development, the greatest changes are recorded in the outline of the posterior part of the valve. The reduction of the dorsal rib and gradual rounding of the posterior end are also noted. The number of the hinge elements increases.

Instar V; Pl. V, Fig. 1 (O.IV/40). Dimensions (in mm):

	Length	Height
Left valve	0.55	0.32

The dorsal and ventral margins converge posteriorly. Posterior end acute. Dorsal rib, as well as the connection of the median and anterior ribs, are well-developed. In the left valve, terminal hinge elements, consisting of seven denticles, are separated by a row of eleven sockets.

Instar VI; Pl. V, Fig. 2 (O.IV/41). Dimensions (in mm):

	Length	Height
Right valve	0.65	0.33

Posterior end bluntly pointed and, as compared with that in the previous stage—higher. Eight denticles each occur in the posterior and anterior hinge elements, and twelve sockets in the median element.

Adult individual; Pl. V, Fig. 3 (O.IV/42). Dimensions (in mm):

	Length	Height
Left valve	0.81	0.42

In the left valve, nine sockets each occur in the anterior and posterior hinge elements, and 13 denticles — in the median element.

Remarks. — Only small differences in ornamentation are displayed by our specimens as compared with the holotype (Triebel, 1951, Pl. 46, Figs. 19-22). They concern the dorsal and anterior ribs which, in the individuals from the Choroń boring, occur near each other over a very short stretch in the anterodorsal part.

Occurrence. — Poland: Jaworzniak, Lower and Middle Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Bathonian. Germany: Upper Bathonian.

Pleurocythere impar Triebel, 1951

(Pl. V, Figs. 4-7)

1951. *Pleurocythere impar* Triebel; E. Triebel, Einige stratigraphisch..., pp. 91-92, Pl. 45, Figs. 8-12.

Material. — A hundred well-preserved specimens, including right and left valves and complete carapaces.

Adult female individual; Pl. V, Fig. 7 (O.IV/46). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.63	0.34	0.34
Left valve	0.63	0.37	

Adult male individual; Pl. V, Fig. 4 (O.IV/43). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.65	0.33	0.32
Left valve	0.67	0.36	

Diagnosis and description — cf. Triebel, 1951.

Remarks. — Polish specimens assigned to *Pleurocythere impar* Triebel differ from the holotype (Triebel, 1951, Pl. 45, Figs. 8-12) in a more acute posterior valve termination.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian, Lower and Middle Bathonian; Choroń, Middle Kuiavian; Iwanowice Wielkie, Lower Bathonian. NW Germany: *parkinsoni* zone.

Pleurocythere elliptica n. sp.

(Pl. VI, Figs. 1-4; Text-fig. 5)

Holotypus: Pl. VI, Fig. 1 (O.IV/47).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Iwanowice Wielkie, Poland.

Derivatio nominis: *elliptica*, Lat. *ellipticus* = elliptical; since a rib, elliptical in shape, occurs in the dorsal part.

Diagnosis. — Valves elongated, ornamented with ribs, the dorsal one of which is elliptical. Reticulated valve depressions occur between the ribs.

Material. — Twenty specimens including right and left valves and complete carapaces.

Adult female individual; Pl. V, Fig. 1 (O.IV/47). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.59	0.31	0.28
Left valve	0.60	0.32	

Adult male individual; Pl. VI, Figs. 3-4. Dimensions (in mm):

	Length	Height
Right valve (O.IV/50)	0.65	0.35
Left valve (O.IV/49)	0.66	0.33

Description. — Carapace elongated in lateral outline. The left, larger valve overlaps the right one along the dorsal and ventral margin. Anterior end rounded, posterior slightly pointed. On the ventral side, valves are ornamented by two parallel, oblong ribs, out of which one

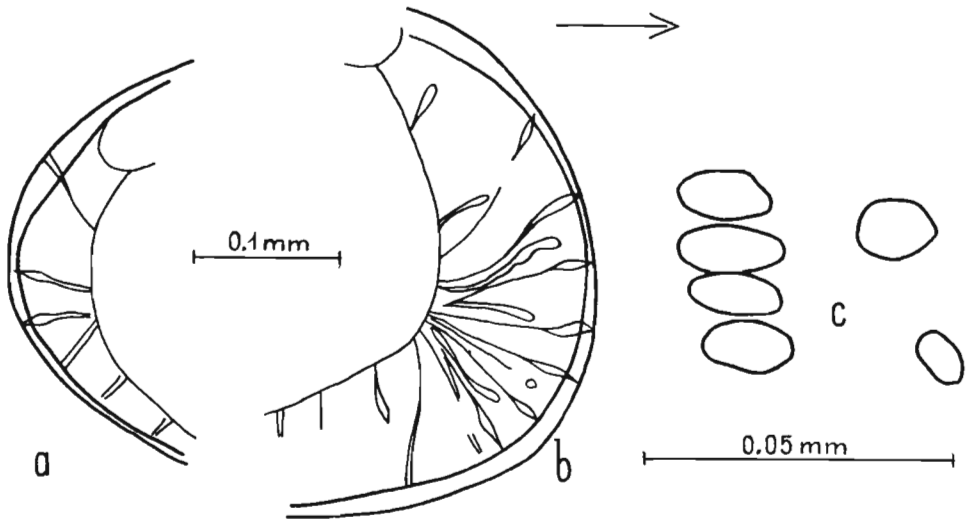


Fig. 5. — *Pleurocythere elliptica* n. sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals, c muscle scars (O.IV/49).

forms the lateroventral ridge. At the dorsal margin, there is an elliptical rib from which single, fine ribs branch off antero and posteroventrally. In the anterodorsal part, a rib occurs which is parallel to the anterodorsal margin. A bluntly terminating rib branches off from the anterodorsal rib and runs towards the middle of the valve. Wide reticulated furrow-like depressions occur between ribs. Between ventral

ribs, the meshes are disposed in two, and between the lateroventral ridge and the dorsal elliptical rib — in four rows. The meshes, situated within limits of the elliptical rib, are distributed in conformity with its shape, 3-4 meshes occurring in the middle form a straight line. In dorsal view, the contact line is slightly bent towards the left valve. The dorsal surface of the valve, between the elliptical rib and the dorsal margin, is ornamented by irregular, small depressions, twice as large as the remaining meshes. On the ventral side, the surface between the lateroventral ribbed ridge and the outer margin is ornamented by elongated depressions, disposed in 2 and sometimes 3 rows, separated from each other by fine ribs. In the middle part of the ventral side, the outer margin is bent inwards. The merodont type hinge in the right valve has, in the anterior and posterior element 8 denticles each. They are slightly crenulated. The median hinge element consists of 8 sockets. Muscle scars, typical of the family Cytheridae (Fig. 5), occur in the middle of the inner surface of the valve. The anterior and posterior parts of the zone of marginal pore canals are well-developed (Fig. 5).

Remarks. — With regard to the outline of the valve, *Pleurocythere elliptica* n. sp. displays a considerable similarity to *P. longicosta* Triebel, 1951, from which it differs in the presence of the elliptical rib.

Occurrence. — Poland: Jaworzniak, Middle Kuyavian, Middle Bathonian; Choroń, Middle Kuyavian, Lower Bathonian; Iwanowice Wielkie, Lower Bathonian.

Genus *Oligocythereis* Sylvester-Bradley, 1948

Oligocythereis cf. *fullonica* (Jones & Sherborn, 1888)

(Pl. VI, Figs. 5-8)

1948. *Oligocythereis* cf. *fullonica* (Jones & Sherborn, 1888); P. C. Sylvester-Bradley, *The ostracods...*, pp. 795-796, Pl. 122, Figs. 1-6.

Material. — Fifty well-preserved specimens, including right and left valves and complete carapaces.

Description. — Carapace strongly elongated in lateral outline. Outline of the dorsal margin is bent inwards in the middle part and that of the ventral margin — straight. The left valve is larger than the right. The posterior end narrowly rounded. Numerous, fine tubercles occur on the anterior margin. Single tubercles (4-5 in all) are situated on the admarginal, flat, anterior part of the valve. The posterior end with tubercles similar to those occurring on the anterior end. On the posterior admarginal smooth surface, there occur 3 tubercles. Ornamentation consists of large ribs, variable in thickness. A fairly thick, saddlelike rib occurs along the dorsal margin; posteriorly, it is deflected down-

wards and anteriorly it joins the eye tubercle, disappearing below it. On the dorsal side of the valve, this rib forms a laterodorsal ridge. An oblique rib, running towards the middle, branches off from the posterior end of the rib, referred to above. Its horizontal prolongation is formed by another rib, having numerous transverse branches; its anteroventral prolongation passes into an anteroventral ridge. Posteriorly, the lateroventral ridge deflects upwards and joins another, convergent rib. Its terminal part also has many thickenings which sometimes are large enough to be considered rib branchings. The arrangement of these ribs, viewed from the ventral side of the carapace, is similar in shape to the letter C, with its lower end strongly upturned. A slightly outlined reticulation is observed between particular ribs, especially so in the posteroventral part. Numerous, distinctly visible tubercles occur between the ribs in the dorsal and anterodorsal parts. On the ventral side the contact line is bent inwards and, on the dorsal side, slightly deflects towards the right valve along the anterior and posterior hinge elements. Zone of marginal pore canals is distinctly visible on the inside of the valve. In the anterior, wider part, there are 25-28 parallel pore canals, and in the posterior, narrower part—15-18 of them. The entomodont type hinge contains 5 denticles each in the posterior and anterior parts, and 18 fine sockets in the median element. Muscle scars are typical of the family Cytheridae.

Ontogeny.—An adult and a larval stage have been recognized in the material examined. The characters in which both these stages differ from each other are related to the structure of the median hinge part and to the outline of the posterior part of the valve.

Larval stage; Pl. VI, Fig. 8 (O.IV/54). Dimensions (in mm):

	Length	Height
Right valve	0.51	0.23

The ventral and dorsal margins converge posteriorly. In the posterodorsal part, the posterior end is somewhat angular. In the right valve, the median hinge element consists of 16 fine sockets.

Adult individual; Pl. VI, Fig. 5 (O.IV/51). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.58	0.27	0.28
Left valve	0.59	0.29	

Remarks.—Our specimens differ from those of *Cythereis fullonica* Jones & Sherborn, 1888 in having better-developed ribs and in a poorly visible reticulation. The species described seem to be conspecific with *Cythereis* cf. *fullonica* Jones & Sherborn, described by Sylvester-Bradley (1948 a, Pl. 12, Fig. 9), from which it differs. in the number

of tubercles, occurring on the posterior admarginal valve surface. From other specimens, described by this author (*l.c.*, Pl. 12, Figs. 7, 8, 10), it differs in being more pronouncedly ribbed, and in having a slight reticulation, visible between the ribs. Polish species differs from *O. fulonica* (Jones & Sherborn), described by Sylvester-Bradley (1948 b, Pl. 122, Figs. 1-6) in having better-developed and more distinct ribs.

Occurrence. — Poland: Jaworznik, Lower and Middle Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Bathonian. England, Bathonian. North-West and Southern Germany, Bathonian. France, Bathonian.

Genus *Lophocythere* Sylvester-Bradley, 1948
Lophocythere cf. carinilla Sylvester-Bradley, 1948
 (Pl. VII, Figs. 1-4)

1962. *Pleurocythere* sp., aff. *impar* Triebel; H. Malz, *Palaeocytheridea...*, p. 238, Pl. 24, Fig. 5.

Material. — Fifty well-preserved specimens, including right and left valves and complete carapaces of both adult and young individuals.

Adult individual; Pl. VII, Fig. 2 (O.IV/56). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.59	0.32	0.30
Left valve	0.60	0.35	

Description. — Carapace elongated in lateral outline, dorsal margin straight, ventral margin rounded. The left, larger valve overlaps the right one along the dorsal margin and in the middle part of the ventral one. Anterior end obliquely rounded, posterior — sharply terminated. The ventral part of the valve is inflated, thus obscuring the median part of the contact margin. On the ventral side, there occur two oblong ribs. One of them, shorter and arcuate, forms a link between the anteroventral and posteroventral part of the valve. Laterally, it is invisible because it is obscured by another, bigger, ventral rib which forms a lateroventral ridge. Between the first and second ventral rib there occurs a deep furrow in which two rows of depressions, subsquare in shape, are situated. On the lateral side, there occurs a distinct, oblong rib running along its central part. Fairly well-visible, round depressions, irregularly arranged, are disposed in a large furrow between the second ventral rib and the middle rib. A rib parallel to the posterodorsal margin occurs in the dorsal part and gradually disappears at both ends. The dorsal and middle ribs are connected with each other, in the posterior part of the valve, by a fine transverse rib, shaped like the letter H. In the anterior part of the valve, two fine ribs, intersecting each other,

occur above the middle rib. Between the middle and dorsal rib, the valve surface is covered with irregularly scattered depressions. On the dorsal side, the contact line is straight, whereas on the ventral side it is slightly bent inwards along the middle part. The zone of marginal pore canals, visible on the inner valve surface, is well-developed in the anterior and posterior parts of the valve. In the right valve, the merodont type hinge has in its anterior and posterior elements 7 denticles each and — in the median element — 11 sockets. Muscle scars are typical of the family Cytheridae.

Remarks. — Polish specimens differ from those of *Lophocythere carinilla* Sylvester-Bradley, 1948 in a more inflated ventral part and in the presence of transverse ribs in the posterior part of the valve, whereas from those of *Lophocythere cruciata cruciata* Triebel, 1951 and *L. intermedia* Lutze, 1960 they differ in the outline of the valve and, partly, in the ornamentation.

Occurrence. — Poland: Jaworzniak, Lower and Middle Bathonian; Choroń, Middle and Upper Kuiavian, Lower Bathonian; Iwanowice Wielkie, Bathonian. England: Bueti Bed; NW Germany, *parkinsoni* zone, Bathonian.

Lophocythere verrucosa n. sp.

(Pl. VII, Figs. 5-7; Text-fig. 6)

Holotypus: Pl. VII, Fig. 7 (O.IV/61).

Stratum typicum: Kuiavian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *verrucosa*, Lat, *verrucosus* = verrucose, because of its surface which is covered with nodules.

Diagnosis. — Carapace elongated in lateral outline, in the anterodorsal and posterodorsal parts there occur protuberant nodes. The outline of the ventral margin is straight and also partly obscured by protuberant nodules which are present in the posteroventral part. Anterior end uniformly rounded, posterior bluntly pointed. Anterior and posterior margins are covered, along the anterior margin, with better-developed denticles.

Material. — Fifty well-preserved specimens, including right and left valves and complete carapaces.

Adult female individual; Pl. VII, Fig. 7 (O.IV/61). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.55	0.33	0.26
Left valve	0.56	0.34	

Adult male individual; Pl. VII, Fig. 6 (O.IV/60). Dimensions (in mm):

	Length	Height
Right valve	0.70	0.37

Description. — Carapace elongated in lateral outline. Along the antero- and posterodorsal margins, the outline is obscured by protuberant nodules. The outline of the ventral margin is straight and obscured in the posteroventral part by protuberant tubercles. The left valve is larger than the right one. Anterior end uniformly rounded. About 10-13

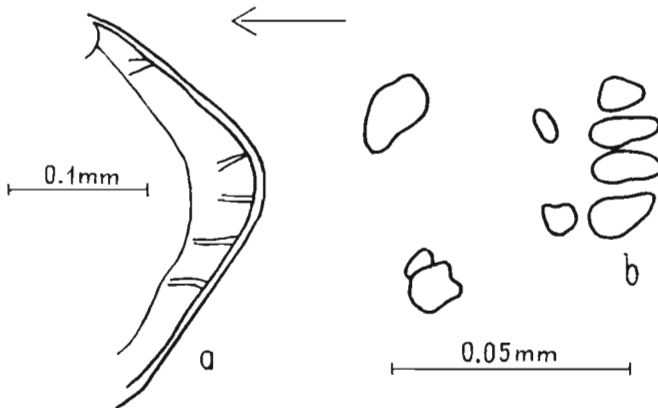


Fig. 6. — *Lophocythere verrucosa* n.sp., right valve: a posterior marginal pore canals, b muscle scars (O.IV/60).

small tubercles, slightly protruding beyond the valve outline, occur along the anterior margin. Posterior end bluntly pointed and slightly upturned. Posterior margin somewhat thickened, with many small tubercles, protruding beyond the valve outline. Ornamentation is formed by numerous depressions, concentrically arranged and, only in the anterior part, scattered at random. In addition, there are distinct nodules 10-12 in number, which are disposed mostly along the posterior and median parts of the ventral margin, as well as in the anterior and posterior parts of a dorsal margin. The general size and height of these nodules are variable. The largest of them, reaching about 0.04 mm, are observed in the dorsal part. On the dorsal side, the contact line is, along the median hinge element, slightly bent inwards. On the ventral side, this line is straight. Single rows of very fine tubercles, situated near each other, occur along the ventral margin. The zone of marginal pore canals (Fig. 6) is visible on the inside of the valve. The merodont type hinge occurs in specimens of that species. Muscle scars (Fig. 6) are represented by four oval adductor muscle scars, and slightly posteriorly — by an additional muscle scar. More anteriorly, there occurs a large antennal muscle scar and two mandibular muscle scars, connected with each other.

Remarks.—*Lophocythere verrucosa* n.sp. is similar to *L. scabra bucki* Lutze, 1960 from which it differs, however, in the presence of a reticular ornamentation and protuberant tubercles, as well as of fine tubercles, disposed on the anterior, posterior and ventral margins of the valve.

Occurrence.—Poland Jaworzniak, Middle and Upper Kuiavian, Bathonian; Choroń, Middle Kuiavian and Lower Bathonian; Iwanowice Wielkie, Lower Bathonian.

Lophocythere carinata n.sp.

(Pl. VII, Figs. 8-10; Text-fig. 7)

Holotypus: Pl. VII, Fig. 8 (O.IV/62).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *carinata*, Lat. *carina* = a comb; a characteristically comblike rib occurs in the posteromedian part of the valve.

Diagnosis.—In the dorsal part, valve has an outline bent inwards, and in the ventral part—arcuate. It is covered with ribs and depressions. A characteristically comblike transverse rib occurs in the posteromedian part. Anterior end uniformly rounded. Posterior end short, sharply terminating. Posterior and anterior margins covered with tubercles.

Material.—Thirty well-preserved right and left valves.

Adult male individual; Pl. VII, Fig. 8 (O.IV/62). Dimensions (in mm):

	Length	Height
Right valve	0.49	0.25

Adult female individuals; Pl. VII, Figs. 9-10. Dimensions (in mm):

	Length	Height
Right valve (O.IV/63)	0.46	0.27
Left valve (O.IV/64)	0.48	0.27

Description.—In the dorsal part, the valve is inwardly bent, and in the ventral part—arcuate in outline. The left valve is longer than the right one. Anterior end uniformly rounded. Small tubercles, 8-10 in number, are visible on the anterior margin. Posterior end short, pointed. Three to five small tubercles occur on the posterior margin. A characteristically comblike transverse rib, perpendicular to the dorsal margin, occur in the posteromedian part of the valve surface. There are also two another ribs: one running on the ventral side, and another, forming the lateroventral ridge. Both are parallel to the dorsal valve margin. The ventral rib originates in the anteroventral part of the valve and terminates in the admarginal posteroventral part. The lateroventral rib originates in the posteroventral part and runs, at first as an arcuate

line, to the anteroventral part, where it deflects upwards at an angle of 90° . Further on, in the form of a straight line, it passes through the dorsal part and terminates in the posterior part of the valve. Between the lateroventral and inner ventral rib, the valve surface is ornamented with 2-3 parallel rows of meshes. Lateral valve surface strongly reti-

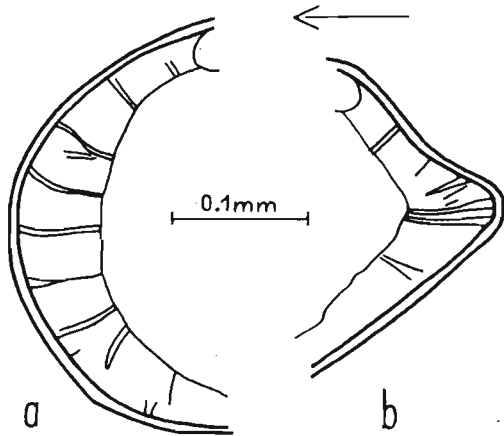


Fig. 7. — *Lophocythere carinata* n. sp., right valve: a anterior marginal pore canals, b posterior marginal pore canals (O.IV/62).

culated. The meshes of the reticulation are differently shaped and irregularly arranged. A large nodule, protruding beyond the valve outline, occurs in the posterodorsal admarginal part. The outer margin, bent inwards, is visible on the inside of the valve. The zone of marginal pore canals is well-developed, especially so in the posterior and anterior parts of the valve. In the anterior part, there occur about 7 straight pore canals, whereas in the posterior one there are two parallel pore canals, situated near each other. The pore canals mentioned above are more distant from each other (Fig. 7). The anterior and posterior parts of the hinge of the right valve have 7 oval denticles each and the median part—12 sockets. Muscle scars, typical of the genus *Lophocythere*, are situated on the inner surface of the valve.

Remarks.—*Lophocythere carinata* n. sp. differs from *L. scabra scabra* Triebel, 1951 in the presence of comblike ribs, occurring in the posterior part of the valve.

Occurrence.—Poland: Jaworzniak, Lower Bathonian; Iwanowice Wielkie, Upper Bathonian.

Genus *Fuhrbergiella* Brand & Malz, 1962

Subgenus *Fuhrbergiella* (*Fuhrbergiella*) Brand & Malz, 1962

Fuhrbergiella (*Fuhrbergiella*) *gigantea quarta* n. subsp.

(Pl. VIII, Figs. 1-12; Pl. IX, Figs. 1-6; Text-fig. 8)

Holotypus: Pl. IX, Fig. 1 (O.IV/75).

Stratum typicum: Middle Bathonian, *Morrisiceras morrisi* zone.

Locus typicus: Jaworznik, Poland.

Derivatio nominis: *quarta*, Lat. *quarto* = the fourth subspecies, described within this species.

Diagnosis. — Carapace slightly concave in lateral outline in the dorsal part and strongly arched in the ventral part. Anterior end uniformly rounded, with some 8 tubercles, occurring below the margin. Posterior end, bluntly pointed, occurs somewhat below the line of the dorsal margin. Three oval tubercles are disposed along the posterior margin. The valve surface is covered with a distinct reticulation, with variably shaped meshes, circularly arranged.

Material. — Five hundred very well-preserved specimens, including right and left valves and complete carapaces of both adult and larval stages.

Description. — Carapace slightly concave in lateral outline in the dorsal, and strongly arched in the ventral part. The greatest height occurs in the middle part of the valve. The left, larger valve overlaps

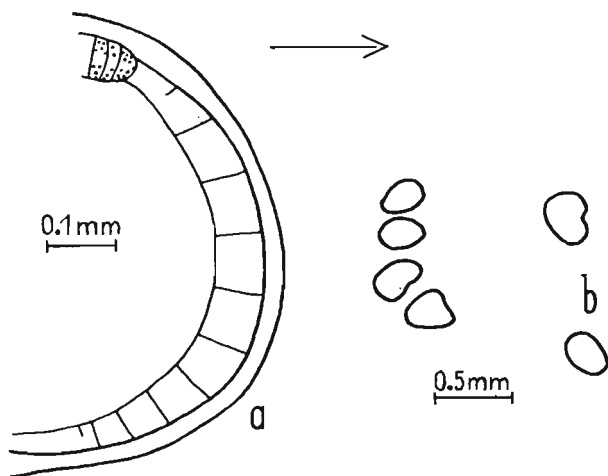


Fig. 8. — *Fuhrbergiella* (*Fuhrbergiella*) *gigantea quarta* n. subsp., left valve: a anterior marginal pore canals, b muscle scars (O.IV/73).

the right one, along the dorsal and ventral margins. Anterior end uniformly rounded and covered marginally with eight oblong tubercles. Posterior end of the right valve slightly pointed, and of the left one even less pointed and slightly upturned. Three oblong tubercles occur along the posterior margin. The valve surface strongly reticulated. Particular meshes of reticulation are round, oval or polygonal in shape. In addition, there are fine ribs, running along the valves. On the left valve there are three of them, the adventral and ventral ones being parallel to each other, and the third, dorsal rib — bent upwards in the posterodorsal part. In the posterior part, the dorsal and adventral rib converge but do not contact each other. On the right valve there are

4 longitudinal ribs, two of them parallel to each other in the dorsal part, and two parallel to each other in the ventral part. Ventral ribs are parallel to the ventral outline, and dorsal — to the dorsal outline. The outer dorsal rib is shorter and joins the inner dorsal rib in the anterodorsal part of the valve, where it bounds a large depression, shaped like an inverted coma, and — upwards — passes into an indistinct eye tubercle. Most meshes on the valve surface are arranged concentrically. Small tubercles occur in the place in which the walls of the reticulation meshes converge.

On the dorsal side of the left valve, rectangular admarginal meshes are arranged in a single row which, in the middle, is deflected outwards. On the ventral side, the contact line is, in its middle, bent inwards. The admarginal part of the ventral valve surface has two parallel rows of elongated meshes of reticulation. On the inside of the valve, a swelling gradually spreads posteriorly over the hinge margin, corresponding to a large outer depression. This swelling gradually disappears downwards. In the anterior and posterior parts of the zone of marginal pore canals (Fig. 8) there occur straight pore canals. In the right valve, the entomodont type hinge has, in the anterior and posterior parts, 7 denticles each and, in the median part, 14 sockets; the denticles are transversely crenulated. Four muscle scars (Fig. 8) oval in shape occur one over another. The antennal and mandibular muscle scars run posteriorly from them. Sexual dimorphism distinct. Males are longer and lower, females — shorter, stocky and more convex.

Ontogeny. — An adult and three larval stages have been distinguished in the material examined. The outline of the valve and, in particular, that of its posterior part is the most changeable character recorded in the ontogenetic development. Ornamentation identical in all stages.

Instar IV; Pl. VIII, Fig. 1 (O.IV/65). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.54	0.32	0.27
Left valve	0.56	0.33	

Carapace outline tapering posteriorly. The greatest height occurs in the anterior part. In the right valve, in the anterior and posterior parts, the hinge has 6 denticles and — in the median part — 12 sockets.

Instar V; Pl. VIII, Fig. 4 (O.IV/68). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.65	0.42	0.37
Left valve	0.67	0.44	

This stage differs from the previous one mainly in carapace dimensions.

Instar VI; Pl. VIII; Figs. 7-8. Dimensions (in mm):

	Length	Height
Right valve (O.IV/71)	0.75	0.46
Left valve (O.IV/72)	0.77	0.48

The difference between the heights of the anterior and posterior parts is, in this stage, smaller. The anterior and posterior parts of the hinge have 7 denticles each, the median part — 14 sockets.

Adult male individual; Pl. IX, Fig. 1 (O.IV/75). Dimensions (in mm):

	Length	Height	Width of caparace
Right valve	0.88	0.50	0.50
Left valve	0.91	0.53	

Adult female individual; Pl. IX, Fig. 4 (O.IV/78). Dimensions (in mm):

	Length	Height	Width of caparace
Right valve	0.75	0.47	0.49
Left valve	0.80	0.53	

Remarks. — Specimens of *Fuhrbergiella (Fuhrbergiella) gigantea quarta* n.subsp. differ from those of *F. (Fuhrbergiella) gigantea gigantea* Brand & Malz, 1962 in a more elongated valves and in a different manner of distribution of the reticulation meshes between the adventral and the inner dorsal rib.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian, Lower and Middle Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Lower Bathonian.

Fuhrbergiella (Fuhrbergiella?) concentrica n. sp.

(Pl. X, Figs. 1-3; Text-fig. 9)

Holotypus: Pl. X, Fig. 1 (O.IV/79).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *concentrica*, Lat. *concentricus*; after concentrically arranged meshes of reticulation, occurring in the middle part of the valve.

Diagnosis. — Carapace slightly concave in outline of the dorsal margin and rounded in that of the ventral one. Anterior end rounded, posterior very sharply terminating half-way the valve height. On lateral and ventral sides there occur a distinct reticulation and ribs. In the middle part of the lateral valve surface the reticulation meshes are arranged concentrically.

Material.— Fifty very well-preserved specimens, including right and left valves and complete carapaces.

Adult individual; Pl. X, Fig. 1 (O.IV/79). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.55	0.27	0.31
Left valve	0.56	0.30	

Description.— Carapace outline slightly concave in the dorsal and rounded in the ventral part. The left, larger valve overlaps the right valve in the postero- and anterodorsal parts. Anterior end uniformly rounded. Small tubercles occur along the anterior margin. Posterior end very sharply terminating and slightly upturned. Small tubercles also occur along the posterior margin. The entire valve surface ornamented

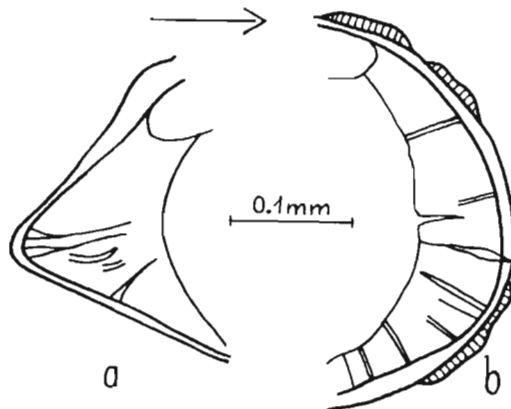


Fig. 9.— *Fuhrbergiella* (*Fuhrbergiella*?) *concentrica* n. sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals (O.IV/81).

with round, oval and polygonal reticulation meshes. In addition, two longitudinal ribs, parallel to each other, occur near the ventral side, one along the lateroventral ridge, the other above it. In the postero-dorsal part, there occurs a rib shaped like an inverted Y; in its posterior part it is looplike in shape and contains two rows of round meshes. Three double, transverse rows of meshes occur between the branches of the posterodorsal rib and are situated above this lateroventral ridge. The branch of the posterodorsal rib, running towards the middle of the valve, joins the upper adventral rib. An anterior rib, bifurcated in the upper part of the valve like the letter Y, originates in the anteroventral part. Between the branches of the ramified anterior rib, there occur more or less regularly arranged meshes. Three rows of round meshes, concentrically arranged, occur in the middle part of lateral side of the valve. Three oblong rows of polygonal meshes, alternately dispo-

sed, occur between the lateroventral and lateral ribs. A row of rectangular meshes runs over the admarginal dorsal surface of the left valve. On the ventral side, on both the right and left valve, narrow admarginal surfaces devoid of ornamentation are visible along a straight contact line. However, there are two parallel rows of oval meshes, outside the unornamented part. On the inner surface of the valve, a well-developed zone of marginal pore canals is visible; it is especially well-developed in the anterior and posterior parts (Fig. 9). In the posterior part, marginal pore canals bifurcate, in the anterior — they are straight. The outer margin, in both the right and left valve, is slightly concave. In the right valve, the entomodont type hinge consists, in the anterior part, of 6, in the posterior part — of 7 oval denticles, and in the median part — of 11 sockets.

Remarks. — Specimens of *Fuhrbergiella* (*Fuhrbergiella*?) *concentrica* n.sp. differ from adult specimens of *F.* (*Fuhrbergiella*) *gigantea quarta* n.subsp. in more elongated and sharply pointed posterior ends of valves and in the character of their ornamentation; as compared with young specimens of *F.* (*Fuhrbergiella*) *gigantea quarta*, they have, however, a similarly formed (i. e. pointed) posterior end. This is the reason why *F.* (*Fuhrbergiella*?) *concentrica* n.sp. has been only tentatively assigned by the present author to the subgenus *Fuhrbergiella* (*Fuhrbergiella*) Brand & Malz, 1962. The round posterior end is characteristic of the representatives of *Fuhrbergiella*.

Occurrence. — Poland: Jaworznik, Choroń, Iwanowice Wielkie, Lower Bathonian. NW Germany: Bathonian.

Subgenus *Fuhrbergiella* (*Praefuhrbergiella*) Brand & Malz, 1962

Fuhrbergiella (*Praefuhrbergiella*) *lurida* n.sp.

(Pl. X, Figs. 4-11)

Holotypus: Pl. X, Fig. 9 (O.IV/87).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Jaworznik, Poland.

Derivatio nominis: *lurida*, Lat. *luridus* = yellow; after a yellow colouration of the valves.

Diagnosis. — Carapace elongated-oval in outline, in the dorsal part slightly concave, in the ventral — straight. Valve surface ornamented with hollows and having a single rib which occurs in the posterodorsal part.

Material. — Three hundred well-preserved specimens, including the right and left valves of both adult and larval stages.

Description. — Carapace elongated-oval in outline. The left, larger valve overlaps the right one in the posterodorsal, anterodorsal and anterior parts. In the dorsal part, the outline is concave anteriorly and mildly bent outwards in the ventral part. Anterior end uniformly

rounded, posterior end bluntly pointed. Several round and oval hollows, distributed at random, form the ornamentation. In the anterodorsal part, there occurs a single rib which forms here an anterodorsal ridge. Posteriorly the rib bends and anteriorly gradually disappears. In the anterodorsal part, below the anterior hinge element, there occurs an eye tubercle. Between the eye tubercle and a dorsal rib, bent anteriorly, there occurs a large, slightly ornamented depression, shaped like an inverted coma. Two very fine ribs, originating on the dorsal side, pass through the eye tubercle. On the dorsal side, the contact line is, along the anterior and posterior hinge element, bent towards the right valve and — along the middle hinge element — towards the left valve. On the ventral side the contact line is straight. The most admarginal part of the ventral valve surface is unornamented. The remaining part of the ventral valve surface is ornamented with meshes of reticulation, arranged in three, slightly discernible rows. On the inside of the valve, there is visible, a well-developed zone of marginal pore canals. The ventral margin in the median part is slightly concave, and in the posteroventral part it passes, forming a mild arch, into a posterior termination. In the right valve the merodont type hinge has, in the posterior and anterior parts, 8 denticles each, and in the median part — 16 sockets. Muscle scars are typical of the family Cytheridae. Sexual dimorphism clearly visible. Male individuals are lower and more elongated, while female ones are shorter, higher and, in the posterior part, more convex.

Ontogeny. — An adult and a larval stage have been recognized in the material examined. Differences that occur between them are mostly expressed in the number of elements which the hinges are built of.

Premature instar; Pl. X, Fig. 4 (O.IV/82). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.46	0.27	0.25
Left valve	0.47	0.28	

In the right valve, the merodont type hinge contains, in the anterior and posterior parts, 7 denticles each, and in the median part — 14 sockets. Adult female individual; Pl. X, Figs. 7-8. Dimensions (in mm):

	Length	Height
Right valve (O.IV/85)	0.51	0.28
Left valve (O.IV/86)	0.52	0.29

Adult male individual; Pl. X, Fig. 9. (O.IV/87). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.61	0.30	0.29
Left valve	0.62	0.31	

Remarks. — Specimens of *Fuhrbergiella* (*Praefuhrbergiella*) *lurida* n. sp. differ from those of *F.* (*Praefuhrbergiella*) *horida horida* Brand & Malz, 1962 from Dogger of NW Germany, in a finer ornamentation and in a lack of a rib on the ventral side.

Occurrence. — Poland: Jaworznik, Middle Kuiavian, Lower and Middle Bathonian; Choroń, Middle Kuiavian and Lower Bathonian; Iwanowice Wielkie, Upper Kuiavian and Bathonian.

Genus *Schuleridea* Swartz & Swain, 1946

Schuleridea triebeli polypora n. subsp.

(Pl. XI, Figs. 1-5; Pl. XII, Figs. 3-7; Text-fig. 10)

Holotypus: Pl. XI, Fig. 4 (O.IV/93).

Stratum typicum: Middle Kuiavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *polypora*, Gr. *poly* = many, *poros* = pore; after a densely pitted surface of the valve.

Diagnosis. — Carapace ovate in shape, smooth, with many small pits scattered all over the surface.

Material. — A hundred well-preserved specimens, including left and right valves of both adult and young individuals.

Description. — Carapace ovate in lateral outline, strongly convex. The left, much larger valve overlaps the right one. Outline of the dorsal part

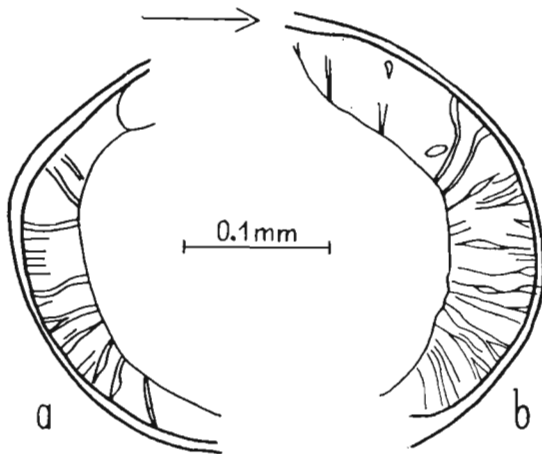


Fig. 10. — *Schuleridea triebeli polypora* n. subsp., left valve: a posterior marginal pore canals, b anterior marginal pore canals (O.IV/93).

strongly arched and slightly angulate anteriorly. Outline of the ventral part rounded. Anterior end uniformly rounded, with roll-like thickening along the margin. Posterior end more narrowly rounded. Carapace smooth, covered with very numerous fine pits which disappear along the admarginal surface. Normal pore canals are distributed over the valve

surface at random except for those situated in the vicinity of the muscle field which, in a number of 6-7, are arranged in an arcuate row, and except for 9-10 pores, ovally arranged in the anterior part of the valve. In the middle of ovally disposed pores, there is also distinctly visible, single pore. The pores, arranged according to a definite pattern, are by half larger than the remaining ones. The contact line is, on the dorsal side, bent towards the right valve along the anterior and posterior hinge elements and towards the left valve along the median hinge element. The contact line is, in the middle part of the ventral side, mildly bent towards the right valve. The outer margin is concave in its middle part. The zone of marginal pore canals is well-developed, especially so anteriorly and posteriorly (Fig. 10). Many pore canals are arcuate in outline and, sometimes, widened. On reaching the margin of the valve, some of them bifurcate. The merodont type hinge has, in the anterior and posterior parts, in the left valve of female individuals, 9 sockets each, and in the median part — 11 denticles. In the left valve of male individuals, it has, in the anterior and posterior parts, 9 sockets each, and in the median part — 12 denticles. Viewed from the inside of the valve, the hinge line is, in its anterior and posterior parts, bent outwards, and in its middle part — straight. Above the median hinge element of the left valve, there is an accommodation groove and in the right valve — a bar. Muscle scars, consisting of 4 overlaying oval scars, are visible in the middle part of the inner surface of the valve. Female individuals are short and inflated, male ones — longer and slimmer.

Ontogeny. — Male and female adult individuals and their larval stages have been distinguished in the ontogenetic development. Young individuals differ from the adult ones in their size and number of elements of which the hinge consists.

Larval stage, female individual; Pl. XI, Fig. 1 (O.IV/90). Dimensions (in mm):

	Length	Height
Left valve	0.38	0.25

In the anterior and posterior parts, the hinge of the left valve has 7 oval sockets each, in the median part — 8 denticles.

Premature instar, female individual; Pl. XI, Fig. 2 (O.IV/91). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.51	0.29	0.27
Left valve	0.52	0.30	

In the anterior and posterior parts, in the right valve, the hinge has 8 oval denticles each, and in the median part — 10 sockets.

Larval stage, male individual; Pl. XII, Fig. 3 (O.IV/95). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.40	0.21	0.19
Left valve	0.41	0.22	

In the anterior and posterior parts, in the left valve, the hinge has 7 oval sockets each, and in the median part — 10 denticles.

Adult female individual; Pl. XI, Fig. 4 (O.IV/93). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.56	0.33	0.30
Left valve	0.57	0.38	

Adult male individual; Pl. XII, Fig. 5 (O.IV/97). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.67	0.36	0.30
Left valve	0.68	0.40	

Remarks. — Specimens of *Schuleridea triebeli polypora* n. subsp. are similar in outline to specimens of *S. triebeli triebeli* (Steghaus, 1951) from which they differ, however, in the lack of any distinct concavity in the anterodorsal part of the valve.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian; Choroń, Middle Kuiavian; Iwanowice Wielkie; Upper Kuiavian and Middle Bathonian.

Genus *Praeschuleridea* Bate, 1963

Praeschuleridea lepida n. sp.

(Pl. XI, Figs. 6-9)

Holotypus: Pl. XI, Fig. 8 (O.IV/102).

Stratum typicum: Middle Kuiavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *lepida*, Lat. *lepidus* = nimble, agile.

Diagnosis. — Carapace angular in outline, elongated. Valve surface smooth, with numerous pits in the middle part.

Material. — Fifty well-preserved specimens, most of them — complete carapaces.

Description. — Carapace with an angular and elongated outline. The left, larger valve overlaps the right one along all margins, except for short part along the anterior and posterior margins. The outline of the valve is, along the dorsal margin, mildly and uniformly rounded. An-

terior end uniformly rounded. A roll-like thickening occurs along the anterior margin. Posterior end bluntly pointed. Valve surface almost completely smooth, but with numerous (50-60) radially arranged apertures of normal pore canals. In the middle part, near the adductor muscle scars, there is an arcuate row of larger apertures of normal pore canals which posteriorly bound the muscle field. Admarginal surfaces of the valve are devoid of pore canals. On the dorsal side, along the anterior and posterior hinge elements, the contact line is bent towards the right valve, and along the median hinge element — towards the left valve. On the ventral side, this line is straight except for its middle part along which it is slightly bent towards the right valve. On the inside of the valve, the middle part of the outer margin is slightly concave. The anterior and posterior parts of the zone of marginal pore canals are well-developed. The merodont type hinge has, in the anterior and posterior parts in the left valve, 8 sockets each, and in the median part — 9 denticles. The anterior and posterior hinge elements are slightly larger than the median hinge element, along and above which a distinct accommodation groove occurs. The adductor muscle scars occur half-way the valve height on the inner surface of the valve; they form 4 oval, overlapping scars.

Ontogeny. — Two larval stages and an adult stage have been recognized in the material examined. Larval stages are represented only by complete carapaces, among adult ones — single valves are also rather scarce.

Younger instar; Pl. XI, Fig. 6 (O.IV/100). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.42	0.26	0.23
Left valve	0.42	0.29	

Older instar; Pl. XI, Fig. 7 (O.IV/101). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.48	0.28	0.24
Left valve	0.48	0.31	

Adult individual; Pl XI, Fig. 8 (O.IV/102). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.61	0.31	0.29
Left valve	0.61	0.37	

Remarks. — In the outline of their carapace, specimens of *Praeschule-ridea lepida* n. sp. are similar to those of *P. subtrigona intermedia* Bate, 1965 from which, however, they differ in the presence of normal pore

canals in the middle part of the valve and of a roll-like thickening along the anterior margin.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian; Choroń, Middle Kuiavian; Iwanowice Wielkie, Middle Bathonian.

Praeschuleridea wartae n. sp.

(Pl. XII, Figs. 1-2; Text-fig. 11)

Holotypus: Pl. XII, Fig. 2 (O.IV/105).

Stratum typicum: Middle Kuiavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *wartae* — after the Warta River.

Diagnosis. — Carapace elongated and angular in outline. Valve surface smooth, having, however, especially distinct openings of normal pore canals.

Material. — Twenty well-preserved specimens, including left valves and complete carapaces of both young and adult individuals.

Description. — Carapace elongated and angular in outline. The left, larger valve overlaps the right one along all margins, except for a short part along the anterior margin. The outline of the dorsal margin is

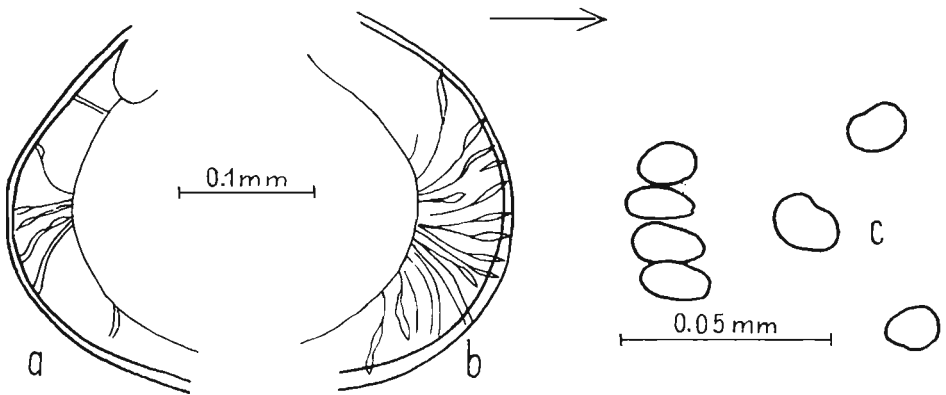


Fig. 11. — *Praeschuleridea wartae* n. sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals, c muscle scars (O.IV/105).

angularly bent, and of the ventral margin — mildly and uniformly arched. A slightly marked roll-like thickening occurs along the anterior margin. Posterior end narrowly rounded. The valve surface is smooth but has 25-35 normal pore canals, scattered at random in the middle part. The arrangement of the openings of normal pore canals, on the outer valve surface, is constant in young and adult specimens. The admarginal valve surfaces are devoid of openings. On the dorsal side, the contact line is, in the middle part, bent towards the left valve and, along the anterior and posterior hinge elements — towards the right valve. On the

ventral side, this line is straight except for a short part in the middle where it is bent towards the right valve. On the inside of the valve, the middle part of the outer margin is bent inwards. Anterior and posterior parts of the zone of marginal pore canals are well-developed (Fig. 11). Many marginal pore canals are arcuate; on reaching the valve margin, the majority of them extend. The merodont type hinge has, in its anterior and posterior parts, in the left valve of a young individual, 7 sockets each, and in the middle part — 9 denticles. Above the median hinge element, there occurs a distinctly visible accommodation groove. The adductor muscle scars occur on the inner surface, half-way the valve height; they form 4 overlaying oval scars. Somewhat anteriorly, there occurs a single subround muscle scar and, more anteriorly, there are antennal and mandibular muscle scars (Fig. 11).

Larval stage; Pl. XII, Fig. 1 (O.IV/104). Dimensions (in mm):

	Length	Height
Left valve	0.50	0.24

Adult individual; Pl. XII, Fig. 2 (O.V/105). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.57	0.35	0.27
Left valve	0.58	0.37	

Remarks. — In the outline of its dorsal margin and in the manner in which the right valve is overlapped by the left, *Praeschuleridea wartae* n. sp. is similar to *P. subtrigona intermedia* Bate, 1965 from which it differs, however, in the presence of distinct openings of normal pore canals in the middle part and a roll-like thickening, occurring along the anterior margin. It differs from *P. lepida* n. sp. in a smaller number of normal pore canal openings, in their random distribution over the valve surface, as well as in a manner in which the right valve is overlapped, along the posterior margin, by the left valve.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian; Iwanowice Wielkie, Lower and Upper Bathonian. NW Germany, Bathonian.

Genus *Glyptocythere* Brand & Malz, 1962

Glyptocythere tuberosa angularis n. subsp.

(Pl. XIII, Figs. 1-8; Pl. XIV, Figs. 1-6; Text-fig. 12)

Holotypus: Pl. XIV, Fig. 4 (O.IV/117).

Stratum typicum: Middle Bathonian, *Morrisiceras morrissi* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *angularis*, Lat. *angularis* = angular; the carapace, viewed dorsally, is angular in outline.

Diagnosis. — Carapace ovate in lateral outline, posteriorly elongated, viewed dorsally and ventrally — angular in outline. In the posterodorsal part, the main transverse thickening is tapering towards the end of the valve. On the ventral side, both the right and left valves have 4 parallel ribs each.

Material. — Five hundred well-preserved specimens, including right and left valves and complete carapaces of both adult and young individuals.

Description. — Carapace oval in lateral outline, in the posterior part — elongated. Along the anterodorsal, dorsal and posterodorsal margins, the left, larger valve overlaps the right one. The outline of the valve in the dorsal part is, along the hinge margin, straight, and in the ventral part — mildly rounded. In the ventral part, valves are strongly inflated, obscuring there the contact line. Anterior end rounded, in the

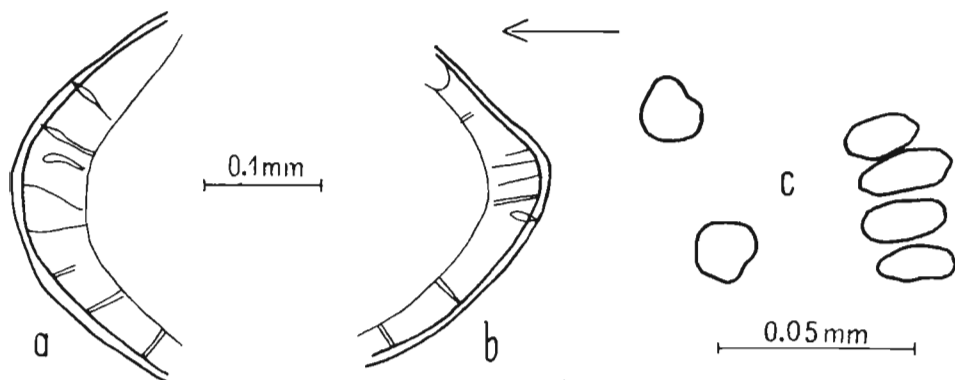


Fig. 12. — *Glyptocythere tuberosa angularis* n. subsp., right valve: a anterior marginal pore canals, b posterior marginal pore canals, c muscle scars (O.IV/118).

lower part slightly elongated. Anterior margin strongly thickened. Posterior end pointed, slightly upturned. Posterior margin strongly thickened. The valve ornamentation consists of irregular, transverse roll-like thickenings between which there occur furrows. A large muscle node, triangular in outline, is situated in the anteromedian part. A single normal pore canal opening is visible on the anterior part of the node. The remaining 40-50 distinct normal pore canal openings occur in furrows and on roll-like thickenings. Admarginal surfaces are devoid of ornamentation and of normal pore canal openings. On the ventral side of the valve, ornamentation consists of 4 parallel ribs. On the ventral side, furrows are twice as wide as ribs between which they occur. In this part of the valve, normal pore canals occur only in furrows most distant from the ventral margin. On the dorsal side, the contact line is, along the hinge margin, bent towards the left valve and, on the ventral side, straight. On the inside of the valve, the anterior and posterior parts of the zone of marginal pore canals are well-developed (Fig. 12). Along the antero- and

posteroventral margins, the marginal pore canals are straight and with an identical diameter, whereas those along the anterodorsal margin, near their outlets, are extended in a macelike manner. On the ventral side, the outer margin is slightly bent inwards. The merodont type hinge, in the left valve, consists in the anterior part of 8, and in the posterior part — of 9 sockets. The median hinge element, above which there occurs a structure, resembling the accommodation groove, is built of 12 denticles. The accommodation groove is not recorded in young individuals. The terminal hinge elements are crenulated in both valves. The adductor muscle scars consist of 4 overlaying oval scars (Fig. 12); two almost round antennal and mandibular scars run anteriorly. Male individuals are longer and lower than the female ones which are stockier and higher.

Ontogeny. — Of male individuals three larval and an adult stages, and of female individuals a larval and an adult stage — have been recognized in the material examined. Differences in ornamentation and in number of hinge elements occur between particular ontogenetic stages.

Ontogeny of male individuals

Instar III; Pl. XIII, Fig. 1 (O.IV/106). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.31	0.18	0.16
Left valve	0.31	0.19	

This stage is represented by complete carapaces. An oval node, bounded posteriorly by a furrow, occurs in the middle of the outer valve surface. Dorsal and anterodorsal parts of the lateral valve surface are smooth, but have few pore openings. Two oblong ribs are visible in the lateroventral part of the valve. On the ventral side there occur three parallel ribs different in length. The most admarginal rib is the shortest one. Other ribs, occurring farther from the outer margin, are gradually longer and longer.

Instar IV; Pl. XIII, Fig. 2 (O.IV/107). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.39	0.24	0.20
Left valve	0.39	0.25	

This stage is represented by complete carapaces, left and right valves. Anteriorly and posteriorly of the middle node, there occur roll-like thickenings and furrows. In front and behind the muscle node, there appear indistinct furrows and thickenings. The merodont type hinge has in the right valve, in the anterior part 6, and in the posterior part — 7 denticles. Ten sockets occur in the median part.

Instar VI; Pl. XIII, Figs. 5-6. Dimensions (in mm):

	Length	Height
Right valve (O.IV/111)	0.60	0.35
Left valve (O.IV/110)	0.61	0.38

This stage is represented by right and left valves. As compared with the valve morphology of the previous stage, the middle node is here situated more anteriorly and takes a triangular shape. The roll-like thickenings and furrows are, in the anterior, posterior and dorsal parts, more distinctly outlined. In the anterior part, in the right valve, the hinge consists of 8 denticles, in the posterior part — of 9 denticles, and in the median part — of 12 sockets.

Adult individual; Pl. XIII, Figs. 7-8. Dimensions (in mm):

	Length	Height
Right valve (O.IV/113)	0.75	0.42
Left valve (O.IV/112)	0.78	0.45

Ontogeny of female individuals

Larval stage; Pl. XIV, Fig. 1 (O.IV/114). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.53	0.33	0.27
Left valve	0.53	0.36	

Specimens of this instar differ from those of instar VI—of male individuals—in a shorter valve and stockier build. In the anterior part, in the right valve, the hinge consists of 7 denticles, in the posterior part of 8 denticles, and in the median part — of 11 sockets.

Adult individual; Pl. XIV, Fig. 4 (O.IV/117). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.62	0.41	0.38
Left valve	0.63	0.42	

Remarks. — Specimens of *Glyptocythere tuberosa angularis* n. subsp. differ from those of *G. tuberosa tuberosa* Brand & Malz 1966, from Dogger of NW Germany, in their tapering end of the main transverse thickening in the posterodorsal part, in a greater number of parallel ribs on the ventral side of the valve, and in a uniformly rounded outline of its ventral margin. A difference is also recorded in a greater number of elements of which hinge is built.

Occurrence. — Poland. Jaworzniak, Upper Kuyavian, Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Lower and Middle Bathonian.

Glyptocythere perpolita magna n. subsp.

(Pl. XV, Figs. 1-13; Pl. XVI, Figs. 1-4; Pl. XVII, Fig. 1; Text-fig. 13)

Holotype: Pl. XVII, Fig. 1 (O.IV/134).*Stratum typicum*: Middle Kuiavian, *Parkinsonia parkinsoni* zone.*Locus typicus*: Jaworznik, Poland.*Derivatio nominis*: *magna*, Lat. *magnus* = big.

Diagnosis. — Carapace big, obliquely oval in lateral outline, in the posterior part elongated upwards, in the ventral part strongly convex. Valve surface reticulated with large meshes different in shape and size, and on the ventral side — with fine, oblong ribs.

Description. — Carapace obliquely oval in outline, in the posterior part elongated upwards. The left, larger valve overlaps the right one along the posterodorsal, dorsal, anterodorsal and anterior margins. In the dorsal part, the valve is, along the hinge margin, straight in outline. In the ventral part, the outline of the valve is strongly rounded, whereas

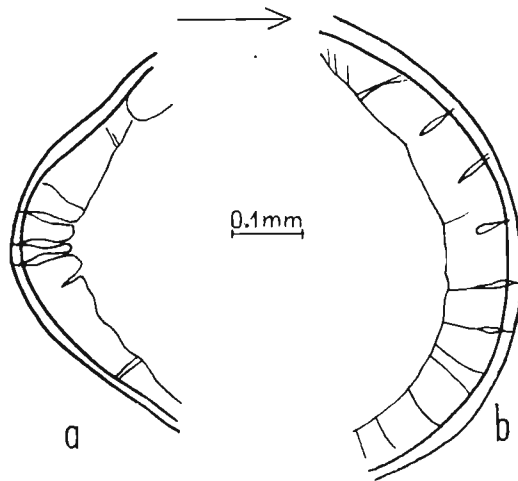


Fig. 13. — *Glyptocythere perpolita magna* n. subsp., left valve: a posterior marginal pore canals, b anterior marginal pore canals (O.IV/134).

in the posteroventral part it is truncated and passes into a posterior termination of the valve. Valves strongly convex. Ventral inflation obscures, in the middle part, the contact line. Anterior end uniformly rounded, with strongly thickened margin. Posterior end pointed and upturned. Posterior margin also strongly thickened. Valve surface reticulated with large meshes, oval, triangular, rectangular and polygonal in shape. On the boundary between the middle and anterior parts, there occurs a large, oval muscle node which, posteriorly and ventrally, is surrounded by a row of very large, rectangular meshes. Few normal pore canal openings occur between particular reticulation meshes. Admarginal surface is smooth and has few, widely scattered normal pore

canal openings. On the ventral side of the valve, there are 5 very fine, oblong ribs. On the dorsal side, along the anterior and posterior hinge elements, the contact line is bent towards the right valve, and along the median element—towards the left valve. On the ventral side, the contact line is straight. The anterior and posterior parts of the zone of marginal pore canals, which consist of numerous straight canals, is distinctly visible on the inside of the valve. The openings of 3 and, sometimes, 4 marginal pore canals are, in the middle of the anterior and posterior parts, macelike in shape (Fig. 13). Along the middle part, the outer margin is bent towards the inside of the valve. Funnellike openings of normal pore canals occur on the inner surface of the valve. The merodont type hinge is built in the right valve, in the anterior part, of 9, and in the posterior part—of 10 oval denticles. The median hinge element consists of 9 sockets. Terminal hinge elements are crenulated. The adductor muscle scars, consisting of 4 elliptic scars, occur in the middle part of the inner surface of the valve. Somewhat anteriorly, there occurs an antennal muscle scar. Below the adductor muscle scars, there occurs a mandibular muscle scar, situated most anteriorly of all scars. Sexual dimorphism is quite distinct. Male valves are longer and more mildly bent in the ventral part than those of female individuals.

Ontogeny.—The hinge, whose elements are variable in number and size, is the most changeable element of the valve over the entire ontogenetic development.

Instar III; Pl. XV, Fig. 1 (O.IV/120). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.42	0.24	0.21
Left valve	0.44	0.26	

In the right valve, anteriorly, the hinge contains 5 and posteriorly 6 denticles. Thirteen sockets form the median part of the hinge.

Instar IV; Pl. XV, Figs. 4-5. Dimensions (in mm):

	Length	Height
Right valve (O.IV/123)	0.53	0.33
Left valve (O.IV/124)	0.54	0.37

In the right valve, in the anterior part, the hinge has 6 denticles, in the posterior part—7 denticles, and in the median part—12 sockets.

Instar V; Pl. XV, Fig. 6 (O.IV/125). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.59	0.35	0.31
Left valve	0.60	0.37	

In the right valve, in the anterior part, the hinge has 7 denticles, in the posterior — 8 denticles, and in the median — 11 sockets.

Instar VI; Pl. XV, Fig. 9; Pl. XVI, Fig. 4 (O.IV/128). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.80	0.49	0.41
Left valve	0.81	0.50	

In the right valve, in the posterior part, the hinge has 8 denticles, in the posterior — 9 denticles, and in the median — 10 sockets.

Adult male individual; Pl. XVI, Fig. 1 (O.IV/133). Dimensions (in mm):

	Length	Height	Width of arapace
Right valve	1.20	0.65	0.60
Left valve	1.20	0.68	

Adult female individual; Pl. XVII, Fig. 1 (O.IV/134). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.99	0.63	0.57
Left valve	0.99	0.66	

Remarks. — Specimens of *Glyptocythere perpolita magna* n. subsp. differ from those of *G. perpolita perpolita* Brand & Malz, 1966 in their by half as large dimensions and in a greater number of elements of which their hinge is built.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian; Choroń, Lower and Middle Kuiavian; Iwanowice Wielkie, Upper Kuiavian.

Genus *Ektyphocythere* Bate, 1963
Ektyphocythere nucleopersica n. sp.
 (Pl. XVIII, Figs. 1-3)

Holotypus: Pl. XVIII, Fig. 1 (O.IV/135).

Stratum typicum: Middle Bathonian, *Morrisiceras morrissi* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *nucleopersica*, Lat. *nucleus* = grain, nucleus, stone, *persicum* = peach; the surface of the valve is similar to that of a peach stone.

Diagnosis. — Carapace elongated, in the dorsal part slightly concave, in the ventral part straight. Ornamentation similar to that of the surface of the peach stone. Ventral rib forms a lateroventral ridge. Sexual dimorphism distinctly visible.

Material. — Forty well-preserved specimens, including right and left valves, as well as complete carapaces.

Adult male individual; Pl. XVIII, Fig. 1 (O.IV/135). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.45	0.25	0.23
Left valve	0.46	0.26	

Adult female individuals; Pl. XVIII, Figs. 2-3. Dimensions (in mm):

	Length	Height
Right valve (O.IV/137)	0.42	0.23
Left valve (O.IV/136)	0.43	0.27

Description. — Carapace elongated in lateral outline. Left, larger valve overlaps the right one along the anterodorsal and posterodorsal margins. Dorsal margin is slightly bent inwards, whereas ventral — outwards. Anterior end rounded. Margin of anterior end slightly thickened. Posterior end acute. Fine ribs and roll-like thickenings, with many pits between them, occur on the lateral surface of the valve. An irregular muscle node is situated in the anteromedian part. Two oblique, roll-like thickenings, oriented posterodorsally, occur in the median and posteromedian parts. Muscle node and two oblique, roll-like thickenings are rimmed at the bottom by a lateroventral ridge. In the anterior part, this ridge is upturned. In the antero- and posteroventral parts, there occur 2-3 short, fine ribs, oblique to the dorsal margin. Oblique ribs also occur on the valve surface viewed ventrally. On the dorsal side, the contact line is slightly bent in the middle towards the left valve and — along the anterior and posterior hinge elements — towards the right valve. On the ventral side, this line is straight. A zone of marginal pore canals, particularly well-developed in the anterior and posterior parts of the valve, is visible on the inside of the valve. In the anteroventral part, the outer margin of the valve is slightly bent inwards. The merodont type hinge consists, in the left valve, of 6 sockets in the anterior, of 7 sockets in the posterior and of 9 denticles in the median part. Above the median hinge element there occurs an accommodation groove. Sexual dimorphism distinctly visible. Male individuals are longer, female — shorter and more inflated.

Remarks. — Carapace of the specimen of *Ektypocythere nucleopersica* n. sp. differs from that of *E. triangula* (Brand, 1961) in its dorsal margin bent inwards and ventral straight. It also differs in an elongated posterior end of the valve, as well as in ornamentation.

Occurrence. — Poland: Jaworzniak, Lower and Middle Bathonian.

Ektyphocythere pteriformis n. sp.
(Pl. XVIII, Figs. 4-5)

Holotypus: Pl. XVIII, Fig. 4 (O.IV/138).

Stratum typicum: Lower Bathonian, *Perisphinctes tenuiplicatus* zone.

Locus typicus: Jaworznik, Poland.

Derivatio nominis: *pteriformis*, Lat. *pterum* = wing, *forma* = form, shape; ventral rib is winglike in outline.

Diagnosis. — Valve elongated, ribbed. Its middle part is surrounded at the bottom with a large rib winglike in outline.

Material. — Forty well-preserved individuals, including right and left valves.

Adult individuals; Pl. XVIII, Figs. 4-5). Dimensions (in mm):

	Length	Height
Right valve (O.IV/139)	0.40	0.23
Left valve (O.IV/138)	0.41	0.24

Description. — Valve elongated, its dorsal margin straight, ventral slightly bent outwards. Anterior end rounded, posterior acute. Roll-like thickenings and ribs occur on the lateral surface of the valve. An irregular muscle node occurs in the anteromedian part. Two oblique, roll-like thickenings are disposed posteriorly of this node. The first of them bifurcates in the posterodorsal part. Dorsally, posteriorly and ventrally the node and roll-like thickenings are rimmed by a distinctly visible rib, whose outline resembles a wing. An oblique rib occurs near the anteroventral margin of the valve, which in the anterior part of the valve has 2 branches. One of them is directed anterodorsally, the other — towards the lower part of valve. In the place in which normal pore canals are situated, there are few pits occurring between the muscle node, roll-like thickenings and ribs. Moreover, normal pore canals, 2 of them each, are situated on roll-like thickenings. The anterior and posterior parts of the zone of marginal pore canals are visible on the inside of the valve. The merodont type hinge consists, in the left valve, of 7 sockets in the anterior, and of 8 sockets in the posterior part. Ten denticles occur in the median part of the hinge margin, above which there is an accommodation groove. The outer margin of the anteroventral part is slightly bent inwards.

Remarks. — In the outline of its valve, *Ektyphocythere pteriformis* n. sp. is similar to *E. nucleopersica* n. sp. from which it differs, however, in the presence of a winglike rib, situated in the ventral part, and in a larger number of hinge elements.

Occurrence. — Poland: Jaworznik, Lower Bathonian; Iwanowice Wielkie, Upper Bathonian.

Ektyphocythere renatae n. sp.

(Pl. XVIII, Figs. 6-9)

Holotypus: Pl. XVIII, Fig. 6 (O.IV/140).*Stratum typicum*: Upper Bathonian, *Paroecotraustes heterocostatus* zone.*Locus typicus*: Iwanowice Wielkie, Poland.*Derivatio nominis*: *renatae*—after the name of the author's daughter.

Diagnosis. — Carapace elongated and ornamented with oblong ribs on the ventral and oblique ribs on the dorsal side.

Material. — Fifty well-preserved specimens, including right and left valves and complete carapaces.

Adult male individual; Pl. XVIII, Fig. 6 (O.IV/140). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.38	0.21	0.19
Left valve	0.38	0.22	

Description. — Carapace elongated in lateral outline. Along the anterior and posterior parts of the hinge, the right, smaller valve is overlapped by the left valve. The dorsal outline is straight, whereas the ventral, slightly bent outwards, obscures the contact margin. Anterior end rounded, posterior acute. On the lateral surface of the valve, there occur two fine, oblique ribs which bifurcate ventrally. Two obliquely parallel ribs are disposed in the posterodorsal part, and 6 elongated ribs, parallel to each other, occur on the ventral surface of the valve. The ventral rib which constitutes a lower boundary of the lateral surface of the valve, is more distinctly outlined than the remaining five ribs. On the dorsal side the contact line is, along the median part of the hinge margin, bent towards the left valve, and along the terminal parts—towards the right. On the ventral side, this line is straight. Well-developed anterior and posterior parts of the zone of marginal pore canals, are visible on the inside of the valve. In the median part of the ventral side, the outer margin is slightly bent inwards. In the anterior part, the merodont type hinge consists, in the left valve of 8 sockets, in the posterior part—of 9 sockets, and in the middle of 8 denticles. The anterior and posterior hinge elements are bent outwards. The denticles, which form the anterior and posterior hinge element, in the right valve are crenulated in accordance with correspondingly shaped sockets of an opposite valve. Terminal denticles are ovate, whereas sockets of the median hinge element—round. Female specimens have higher valves, which are more inflated in their posterior parts.

Remarks. — In the outline of its valve, *Ektyphocythere renatae* n. sp. is similar to *E. nucleopersica* n. sp. and *E. pteriformis* n. sp., but differs

from them in its ribs obliquely arranged on the lateral surface and in the lack of the node in the median part.

Occurrence.—Poland: Iwanowice Wielkie, Middle and Upper Bathonian.

Genus *Procytheridea* Peterson, 1954

Procytheridea czestochowiensis n. sp.

(Pl. XVIII, Figs. 10-12; Text-fig. 14)

Holotypus: Pl. XVIII, Fig. 10 (O.IV/144).

Stratum typicum: Middle Kuiavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *czestochowiensis*—after the Częstochowa Region (Central Poland), from which the species described comes.

Diagnosis.—Carapace rhomboidal in outline. Fine ribs, between which numerous normal pore canals occur, are disposed on the lateral surface.

Material.—Eighty well-preserved specimens, including right and left valves, as well as complete carapaces.

Adult individual; Pl. XVIII, Fig. 10 (O.IV/144). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.55	0.33	0.30
Left valve	0.55	0.33	

Description.—Carapace rhomboidal in outline. Right and left valve equal in size. The outline of dorsal margin straight, of ventral margin strongly bent outwards and obscuring the contact line. Anterior end obliquely rounded, posterior obtusely rounded and situated above the

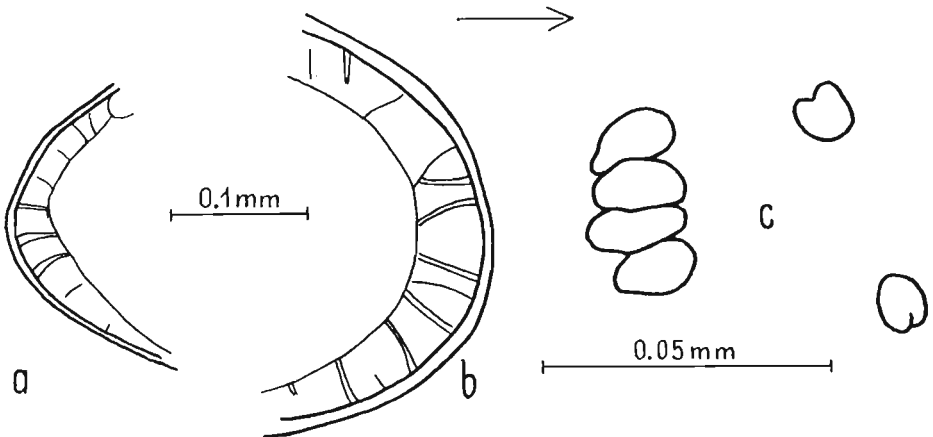


Fig. 14. — *Procytheridea czestochowiensis* n.sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals, c muscle scars (O.IV/145).

middle of the valve height. In the middle part of the lateral surface of the valve, there are ribs situated dorsally. A roll-like, transversely elongated muscle node occurs in the median part of the valve. In the middle part, between the muscle node and ribs, there occur round, very distinct pits with openings of normal pore canals. Fine, oblong ribs, between which many pore openings are visible, occur on the valve surface viewed ventrally. On the dorsal side, the admarginal surface is smooth. Along the anterior and posterior hinge elements, the contact line is, on the dorsal side, slightly bent towards the left valve. On the ventral side, this line is straight. Anterior and posterior parts of the zone of marginal pore canals are distinctly visible on the inside of the valve (Fig. 14). Outer margin is bent inwards. The merodont type hinge in the right valve has, in the anterior and posterior parts, 7 denticles each, and in the median part — 12 sockets situated in a groove. Above the median hinge element there occurs a fine bar, corresponding to the accommodation groove in the opposite valve. Numerous normal pore canals are visible on the inner surface of the valve; in its middle part, there occurs a fine thickening to which four oval overlaying adductor muscle scars adhere in the anterior part (Fig. 14).

Remarks. — Specimens of *Procytheridea czestochowiensis* n. sp. are similar in their ornamentation to specimens of *P. multicostata* Klingler & Neuweiler, 1959, from which they differ in a more tapering posterior end, in the presence of a transverse, roll-like muscle node and in a greater number of normal pore canals.

Occurrence. — Poland: Jaworznik, Lower Bathonian; Choroń, Middle and Upper Kuiavian and Lower Bathonian; Iwanowice Wielkie, Upper Kuiavian and Lower Bathonian.

Genus *Eucytherura* Müller, 1894

Eucytherura rectodorsalis n. sp.

(Pl. XIX, Figs. 1-3; Text-fig. 15)•

Holotypus: Pl. XIX, Fig. 1 (O.IV/147).

Stratum typicum: Upper Bathonian, *Paroecotraustes heterocostatus* zone.

Locus typicus: Iwanowice Wielkie, Poland.

Derivatio nominis: *rectodorsalis*, Lat. *rectus* = straight, *dorsum* = dorsum, the back of the body; a species with a straight dorsal margin.

Diagnosis. — Carapace trapezoidal in lateral outline. Along the lateroventral ridge, there occurs a rib which thickens posteriorly. Another, arched rib is present in the posterodorsal part.

Material. — Twenty well-preserved specimens, including right and left valves and complete carapaces.

Adult individual; Pl. XIX, Fig. 1 (O.IV/147). Dimensions (in mm):

Right valve Left valve	Length	Height	Width of carapace
	0.30	0.16	0.18
	0.30	0.18	

Description. — Carapace trapezoidal in lateral outline. Left valve larger than right one. Outlines of the dorsal and ventral parts straight and parallel to each other. Anterior end rounded in the lower and truncated in the upper part. Posterior end acute. A rib arched outwards occurs in the posterodorsal part of the valve surface. This rib bends downwards in the middle of the dorsal margin, where it gradually disappears. Along the lateroventral ridge, there occurs a rib, posteriorly

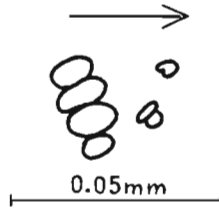


Fig. 15. — *Eucytherura rectodorsalis* n. sp., left valve: muscle scars (O.IV/148).

thickening and anteriorly disappearing near the anterior margin and below the middle of the valve height. A small eye tubercle is situated in the anterodorsal part. The lateral valve surface is reticulated. The openings of normal pore canals are visible in the meshes of the reticulation. On the dorsal side, the contact line is straight. On the dorsal and posterodorsal surfaces of the right and left valves, there are five large pits each, arranged in a row, next to which another row occurs, consisting of two pits on each valve. The anterior and posterior parts of the zone of marginal pore canals are distinctly visible on the inside of the valve. Outer margin very slightly bent inwards. The lophodont type hinge in the right valve consists, in its anterior and posterior parts, of single, round denticles. The median hinge element is developed in the form of a smooth groove. A transverse roll-like thickening, disappearing near the median hinge element to which, in the anterior part, adhere the adductor muscle scars, occurs in the middle part of the inner valve surface (Fig. 15).

Remarks. — Specimens of *Eucytherura rectodorsalis* n. sp. differ from those of *E. reticulata* Petersen, 1954, in their straight outline of the dorsal margin and in a more truncated outline of the anterior end of the valve. From specimens of *E. murdercreekensi* Howe & Law, 1936, they differ in the lack of a rib in the posterior and anteroventral parts of the valve.

Occurrence. — Poland: Jaworznik, Lower and Middle Bathonian; Cho-
roń, Middle Kuyavian and Lower Bathonian; Iwanowice Wielkie, Middle
and Upper Bathonian.

Genus *Hutsonia* Swain, 1946
Hutsonia? *iwanowicensis* n. sp.
(Pl. XIX, Figs. 4-6; Text-fig. 16)

Holotypus: Pl. XIX, Fig. 4 (O.IV/150).

Stratum typicum: Upper Bathonian, *Paroecotraustes heterocostatus* zone.

Locus typicus: Iwanowice Wielkie, Poland.

Derivatio nominis: *iwanowicensis* — after the locality Iwanowice Wielkie.

Diagnosis. — Dorsal margin straight, ventral almost straight. Five
irregular inflations occur on the lateral surface of the valve. The entire
valve surface is finely reticulated.

Material. — Ten very well-preserved specimens, including right and
left valve and complete carapaces,

Adult individual; Pl. XIX, Fig. 4 (O.IV/150). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.31	0.15	0.18
Left valve	0.32	0.17	

Description. — Carapace elongated in lateral outline. The left, lar-
ger valve overlaps the right one, along the anterior and posterior parts
of the hinge margin and in the ventral part. Along the anterior and
posterior hinge elements, dorsal margin of the right valve is straight,
of the left — arched. Ventral margin, slightly arched, obscures the
contact line. Anterior end truncatedly rounded, posterior — pointed.
In the ventral, anterodorsal and posterodorsal parts, on the valve
surface, there are 5 irregular inflations connected with each other. Dis-
tinct depressions occur between these inflations. Almost entire valve
surface, its inflations included, is finely reticulated. Along the anterior
and posterior margins, the admarginal surface is flat and smooth. On
the dorsal side, the contact line is sinuous. On the inside of the valve,
the zone of the marginal pore canals, especially its anterior and poster-
ior parts, is well-developed. Marginal pore canals, situated 7 each in
dian hinge element, this thickening gradually disappears anteriorly and
the anterior and posterior parts of the valve, are straight in outline
(Fig. 16). A transverse roll-like thickening, dividing the inner surface
into two parts, stretches across the middle of the valve. Along the me-
posteriorly. The merodont type hinge in the right valve has, in the an-
terior and posterior parts, 5 denticles each. In the median part there
are 15 sockets, distributed in a groove.

Remarks. — On the basis of the structure of the median hinge element which, in specimens of *Hutsonia? iwanowicensis* n.sp. from Poland, is crenulated, this species has been tentatively assigned to the genus *Hutsonia*. With regard to its representatives' ornamentation it is simi-

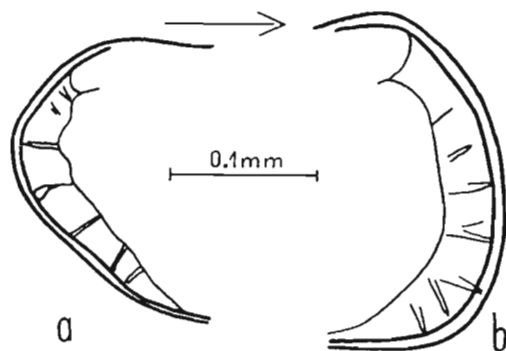


Fig. 16. — *Hutsonia? iwanowicensis* n.sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals (O.IV/152).

lar to *Hutsonia?* sp. Bizon, 1958, from which it differs in a more elongated outline and a lower valve. From specimens of *H. vulgaris* Swain, 1946, specimens of *H.? iwanowicensis* differ in their straight outline of the dorsal margin and a very slightly arched outline of the ventral margin. In addition, a difference is recorded in the structure of the median hinge element, which in specimens of *H.? iwanowicensis* n.sp. is — in the left valve — crenulated.

Occurrence. — Poland: Iwanowice Wielkie, Upper Bathonian.

Genus *Cytheropteron* Sars, 1866

Subgenus *Cytheropteron* (*Cytheropteron*) Sars, 1866

Cytheropteron (*Cytheropteron*) *tenuis* n. sp.

(Pl. XIX, Figs. 7-8; Text-fig. 17)

Holotypus: Pl. XIX, Fig. 7 (O.IV/153).

Stratum typicum: Middle Kuiavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *tenuis*, Lat. *tenuis* = thin; thin-valved.

Diagnosis. — Carapace elongated in lateral outline which, in the dorsal part, is almost straight, in the ventral slightly arched. In the posteroventral part, there occurs a spine which anteriorly passes into a lateroventral ridge. Oblique ribs occur on the lateral surface of the valve. Valve surface strongly pitted.

Material. — Forty specimens, including right and left valves and complete carapaces.

Adult individual; Pl. XIX, Fig. 7 (O.IV/153). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.46	0.24	0.18
Left valve	0.46	0.24	

Description. — Carapace elongated in lateral outline. Both valves equal in size. In the dorsal part, the outline is straight, in the ventral — slightly arched. Anterior end uniformly rounded, posterior — pointed

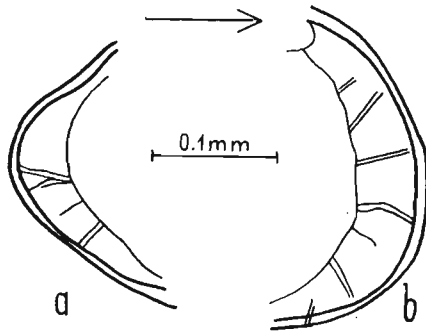


Fig. 17. — *Cytheropteron (Cytheropteron) tenuis* n. sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals (O.IV/154).

and situated above the middle of the valve height. In the posteroventral part, valves are slightly inflated and have a fairly sharp spine, almost perpendicular to the valve surface. Anteriorly, this spine passes into a ribbed lateroventral ridge, upturned in the anteroventral part. In the lower part, a small rib runs mediodorsally from the anterior margin. This rib, before joining — in the anteromedian part — the extension of the lateroventral ridge, branches off, taking a shape of an anchor. Near the dorsal margin, it turns violently at an angle of 90° , forming — in the posteromedian part — an elliptical loop directed towards the spine. An irregularly shaped muscle node occurs in the central part of the valve. The valve surface is covered, between ribs, with distinctly visible, round and oval pits. On the dorsal and ventral side, the contact line is straight. On the ventral side, there are two oblong ribs, a shorter one which occurs close to the margin, and a longer, running more outside of it. The admarginal, ventral surface is devoid of ornamentation. The zone of marginal pore canals, in particular its anterior and posterior parts with straight pore canals (Fig. 17), is distinctly visible on the inside of the valve. In the middle part of the ventral side, the outer margin is slightly bent inwards. The merodont type hinge has, in its anterior and posterior parts in the left valve, 5 sockets each, while in its median part it is developed in the form of a very finely

crenulated bar. Muscle scars, typical of the family Cytheridae, occur in the middle of the inner valve surface.

Remarks. — Specimens of *Cytheropteron (Cytheropteron) tenuis* n. sp. differ from those of *C. (Cytheropteron) bispinosum* Fischer, described by Plumhoff (1963), in a more elongated spine and in the pattern of ornamentation.

Occurrence. — Poland: Jaworznik, Middle Kuiavian; Choroń, Middle Kuiavian; Iwanowice Wielkie, Middle Bathonian.

Genus *Parariscus* Oertli, 1959

Parariscus octoporalis n. sp.

(Pl. XIX, Figs. 9-15; Text-fig. 18)

1949. "Ostr. 120", Brand; E. Brand, Erdöl u. Tektonik, Pl. 12 (Fauna 5), Fig. 6.

Holotypus: Pl. XIX, Fig. 13 (O.IV/159).

Stratum typicum: Middle Kuiavian, *Parkinsonia parkinsoni* zone.

Locus typicus: Choroń, Poland.

Derivatio nominis: *octoporalis*, Lat. *octo* = eight, Gr. *poros* = aperture, pore; having eight pores.

Diagnosis. — Carapaces elongated in outline which, in the dorsal and ventral parts, is straight. Valve surface reticulated. In the posterior part of the valve, 8 distinct meshes are arranged circularly.

Material. — Thirty well-preserved specimens, including right and left valves, as well as complete carapaces of both adult and young individuals.

Description. — Carapace elongated in outline. Right and left valve equal in size. Outline of both the dorsal and ventral margins straight. Anterior end obliquely rounded, posterior elongated, narrowly rounded.

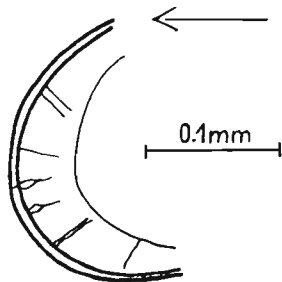


Fig. 18. — *Parariscus octoporalis* n. sp., right valve: anterior marginal pore canals (O.IV/161).

flattened, of the posterior end—more broadly flattened. The entire Margins of anterior and posterior ends are finely thickened, with a slightly outlined furrow. Admarginal surface of the anterior end surface, in both valves, is reticulated; reticulation meshes vary in size and shape and, in the anterior part of the valve, are arranged concentri-

cally. In the posteroventral part, there occurs a small inflation with a single, round mesh, situated in the upper part of this inflation and surrounded by 8 smaller, round meshes. On the dorsal side, the nearly straight contact line is slightly shifted, along the anterior hinge element, towards the right valve. On the admarginal surface, in the posterior part of both valves, single rows of rectangular meshes, larger than the remaining ones, occur on the dorsal side. On the ventral side, the contact line is straight. An oblong furrow occurs on the ventral side of both valves, on the admarginal surface. A zone of marginal pore canals is distinctly visible on the inside of the valve. Its anterior part (Fig. 18) has 5 straight canals of which two middle ones are widened at the outlet. We have not succeeded in ascertaining the number and shape of marginal canals in the posterior part. The merodont type hinge has, in its anterior and posterior parts, in the left valve, 6 sockets each. The median hinge element of this valve is developed in the form of a bar, with 13 fine denticles occurring on it. Outer margin bent inwards. Four adductor muscle scars are arranged in a manner characteristic of the family Cytheridae. Sexual dimorphism distinctly visible. Valves of female individuals are shorter and broader in the posterior part, than those of male individuals which are longer and narrower in this part.

Ontogeny.— Three ontogenetic development stages have been recognized in the material examined. Due to the incomplete material, it is difficult to determine the number of instars within this species. On the whole, the young individuals are the highest in the anterior part of the valve. In adult individuals, difference between the heights of the anterior and posterior parts is hardly perceptible. Young and adult individuals display no differences in the valve ornamentation. In the examined material, young individuals are represented only by closed carapaces and for this reason there were no possibilities to trace any changes in hinge structure.

Instar III; Pl. XIX, Fig. 9 (O.IV/155). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.25	0.14	0.12
Left valve	0.25	0.14	

Instar IV; Pl. XIX, Fig. 10 (O.IV/156). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.31	0.16	0.14
Left valve	0.31	0.16	

Instar V; Pl. XIX, Fig. 11 (O.IV/157). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.44	0.22	0.21
Left valve	0.44	0.22	

Adult male individual; Pl. XIX, Fig. 12 (O.IV/158). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.50	0.22	0.21
Left valve	0.50	0.22	

Adult female individual; Pl. XIX, Fig. 13 (O.IV/159). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.43	0.23	0.22
Left valve	0.43	0.23	

Remarks. — Specimens assigned to *Parariscus octoporalis* n. sp. differ from those of *P. bathonicus* Oertli, 1959, in its straight outline of the dorsal and ventral margins and in a finer reticulation. In addition, in the posteromedian part of the valve, the representatives of *P. octoporalis* n. sp. have 8 reticulation meshes, characteristically arranged in the form of a circle, which is lacking in specimens of *P. bathonicus* Oertli.

Occurrence. — Poland: Jaworzniak, Lower Bathonian; Choroń, Middle Kuiavian; Iwanowice Wielkie, Upper Kuiavian and Middle Bathonian. NW Germany, Bathonian.

Genus *Progonocythere* Sylvester-Bradley, 1948

Progonocythere? *convexa* n. sp.

(Pl. XX, Figs. 1-10; Text-fig. 19)

1960. *Ostracode nr. 9* Lutze; G. Lutze, Zur Stratigraphie..., p. 415, Pl. 38, Fig. 7 (non Fig. 6 = *P. polonica*).

Holotypus: Pl. XX, Fig. 8 (O.IV/169).

Stratum typicum: Upper Bathonian, *Paroecotraustes heterocostatus* zone.

Locus typicus: Iwanowice Wielkie, Poland.

Derivatio nominis: *convexa*, Lat. *convexus* = convex.

Diagnosis. — Carapace elliptical in lateral outline, strongly inflated. Surface smooth, with numerous funnellike outlets of pore canals. Hinge of the entomodont-merodont type.

Material. — Three hundred well-preserved specimens, including right and left valves, as well as complete carapaces of both adult and young individuals.

Description.—Carapace elliptical in lateral outline and strongly inflated. Left, larger valve overlaps the right one along the dorsal, anterodorsal, posterodorsal and ventral margins. Outline of the dorsal margin almost straight, of the ventral margin—which obscures the contact line—arched. Anterior end truncated in the upper part, and uniformly rounded in the median and in the lower part. Posterior end narrowly rounded and slightly upturned. The entire valve uniformly inflated. Valve surface smooth, with numerous characteristically arranged, funnellike outlets of normal pore canals. In the median part, there occurs a transverse, not very deep furrow, with which the muscle field is

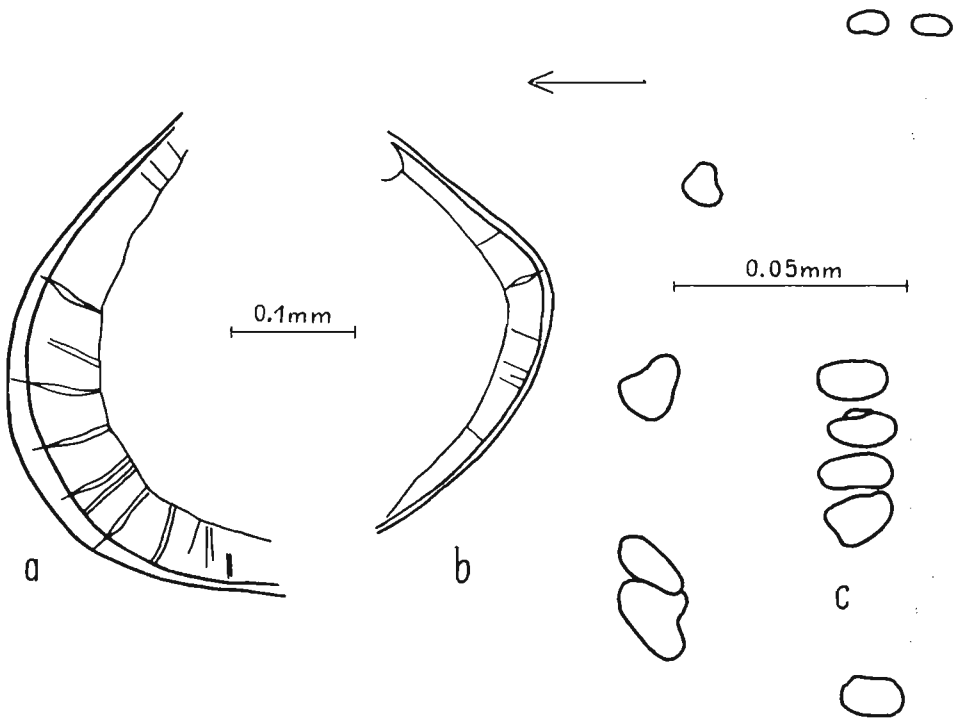


Fig. 19. — *Progonocythere? convexa* n. sp., right valve: a anterior marginal pore canals, b posterior marginal pore canals, c muscle scars (O.IV/171).

bounded posteriorly. In the medioventral part, 8 funnellike outlets of normal pore canals are arranged in the form of an ellipse. A transverse furrow, rimming the muscle field, is originated below one of the funnellike outlets of normal pore canals, which occurs in the upper part of this ellipse. In the anteroventral part of the valve, there occur three rows of funnellike outlets of normal pore canals, parallel to the anterior margin. Two rows have 6 openings each, and one, situated next to the anterior margin, has 5 openings. In the anterodorsal part of the valve, there occur three outlets of normal pore canals, two of them situated near

each other and overlaying each other, while the third, slightly more distant, is situated below the anterior hinge element. In the postero-ventral part, a closed circle is formed by 7 normal pore canals. As a result of their regular arrangement, the remaining normal pore canals also form definite patterns in the posterior part. On the dorsal side, the contact line is sinuous in shape, resembling the letter S. Along the median hinge element, this line is slightly enlarged. The anterior and posterior parts of the zone of straight marginal pore canals (Fig. 19) are distinctly visible on the inside of the valve. On the inner surface of the valve, there occur funnellike outlets of normal pore canals, similar to those situated on the outer surface. Ventral margin bent inwards. The entomodont-merodont type hinge has, in its anterior and posterior parts, in the right valve, 7 oval denticles each, while its anteromedian element consists of 8 larger, and the posteromedian — of 12 smaller sockets. The hinge elements of the median element only slightly differ in size. In the left valve, above the median hinge element, there occurs an accommodation groove. The adductor muscle scars (4 oval overlaying scars) occur in the middle of the inner valve surface, on the anterior side of the roll-like transverse thickening. The antennal muscle scar is situated slightly anteriorly at the level of the upper adductor muscle scar. Anteriorly, below the adductor muscle scar, there occur two mandibular muscle scars, connected with each other. Dorsal muscle scars occur above the adductor muscle scars, and still another muscle scar (Fig. 19) is visible below them. Sexual dimorphism distinctly visible. Male individuals are lower and longer than the females.

Ontogeny. — One adult and two larval stages have been recognized in the material examined. Differences between particular instars are expressed in valve dimensions, outline of the posterior part and number of elements of which hinge is built.

Instar IV; Pl. XX, Figs. 1-2. Dimensions (in mm):

	Length	Height
Right valve (O.IV/163)	0.37	0.22
Left valve (O.IV/162)	0.38	0.22

Posterior part strongly narrowed in outline. Anterior and posterior hinge elements have, in the right valve, 6 oval denticles each. Median hinge element consists anteriorly of 6 larger and posteriorly of 8 smaller sockets.

Instar V; Pl. XX, Figs. 3-4. Dimensions (in mm):

	Length	Height
Right valve (O.IV/165)	0.47	0.33
Left valve (O.IV/164)	0.48	0.34

Valves of this instar differ from those of the previous one in a more extended posterior part. In the right valve, hinge has, in the anterior and

posterior parts, 7 oval denticles, in the anteromedian part — 6 larger sockets, and in the posteromedian part — 8 smaller sockets.

Adult female individual; Pl. XX, Fig. 5 (O.IV/166). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.57	0.38	0.35
Left valve	0.58	0.41	

Adult male individual; Pl. XX, Fig. 8 (O.IV/169). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.65	0.38	0.35
Left valve	0.66	0.40	

Remarks. — On the basis of the hinge structure, entomodont-merodont in type, specimens of *Progonocythere? convexa* n. sp. have only tentatively been assigned to the genus *Progonocythere*. The anterior and posterior parts of the median hinge element slightly differ from each other in the size of their elements. The occurrence of an additional muscle scar below the adductor muscle scars, hitherto not found on the valves of representatives of the genus *Progonocythere*, is another character which caused the fact that this species has been only tentatively assigned to the genus referred to above. The specimens assigned to *P.? convexa* n. sp. differ from those, assigned to *P. multipunctata* Whetley, 1964, in a smooth surface of the valve, and from *P. polonica* Błaszyk, 1959 — in the structure of the entomodont-merodont type hinge and in a more uniformly inflated valve.

Occurrence. — Poland: Jaworzniak, Middle and Upper Kuyavian, Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Upper Kuyavian and Bathonian. NW Germany, Bathonian.

Progonocythere? posteriohumilis n. sp.

(Pl. XX, Figs. 11-13; Text-fig. 20)

Holotypus: Pl. XX, Fig. 13 (O.IV/174).

Stratum typicum: Middle Bathonian, *Morrisiceras morrisoni* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *posteriohumilis*, Lat. *posterior* = posterior, *humilis* = low; after a narrowly terminated posterior end of the valve.

Diagnosis. — Valve oval in lateral outline, strongly narrowed posteriorly. The greatest height occurs in the anterior part. Valve surface smooth, with few funnellike openings of normal pore canals. Hinge of the entomodont-merodont type.

Material. — A hundred well-preserved specimens, including left and right valves of both adult and young individuals.

Description. — Valves oval in lateral outline, strongly narrowed posteriorly and inflated. Ventral and dorsal outlines slightly rounded. Anterior end slightly truncated in the upper part and uniformly rounded in the middle and lower parts. Posterior end pointed. The greatest height occurs in the anterior part. Valve surface smooth, with few funnellike openings of normal pore canals. In the middle part there occurs a fine,

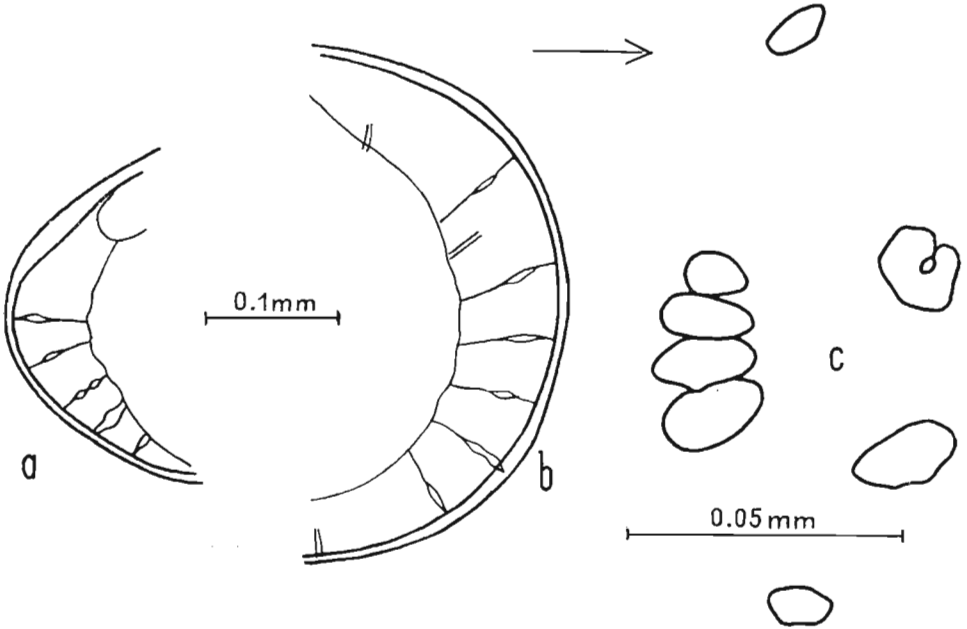


Fig. 20. — *Progonocythere? posteriohumilis* n.sp., left valve: a posterior marginal pore canals, b anterior marginal pore canals, c muscle scars (O.IV/174).

transverse arcuate furrow which posteriorly rims a slightly outlined muscle node. The admarginal surface of the anterior and posterior ends is flattened. A zone of marginal pore canals whose anterior and posterior parts are well-developed and have straight pore canals, is visible on the inside of the valve (Fig. 20). Over their entire length, the width of marginal pore canals is doubled and, sometimes, even tripled. Outer margin bent towards the inside of the valve. In the right valve, the entomodont-merodont type hinge has, in its anterior and posterior parts, 7 oval denticles each. In the anteromedian part, there are 10 larger, and in the posteromedian part—14 smaller sockets. The difference in size between the particular hinge elements of the median part is not great. Above the median hinge element, in the left valve, there occurs an accommodation groove. Funnellike normal pore canals are visible on the inner surface of the valve. In the middle part, on the inner surface of

the valve, there occurs a transverse swelling, on the anterior part of which 4 oval, overlaying adductor muscle scars are visible (Fig. 20). Scars of single antennal and mandibular muscles are situated anteriorly of adductor muscle scars. A single dorsal muscle scar occurs above the adductor muscle scars, and a scar of another muscle occurs below them.

Ontogeny. — A premature and an adult stage have been recognized in the material examined. The difference between them is expressed in their dimensions and in the number of elements that form their hinge.

Larval stage, male individual; Pl. XX, Fig. 11 (O. IV/172). Dimensions (in mm):

	Length	Height
Right valve	0.53	0.27

In the right valve, the hinge has, in its anterior and posterior parts, 6 oval denticles each. In the anteromedian part, there are 8 larger, and in the posteromedian part — 12 smaller sockets.

Adult male individual; Pl. XX, Figs. 12-13. Dimensions (in mm):

	Length	Height
Right valve (O.IV/173)	0.67	0.33
Left valve (O.IV/174)	0.68	0.36

Remarks. — Mostly on the basis of the structure of the entomodont-merodont type hinge, occurring in the representatives of this species, *Progonocythere? posteriohumilis* n.sp. have only tentatively been assigned to the genus *Progonocythere*. The anterior part of the median hinge element slightly differs from its posterior part in the size of elements of which it is built. The occurrence of an additional muscle scar below the adductor muscle scars in representatives of *P.? posteriohumilis* n.sp., hitherto never observed in the representatives of the genus *Progonocythere*, is another character in which the difference is expressed. Specimens assigned to *P.? posteriohumilis* n.sp. differ from those of *P. polonica* Błaszyk, 1959 in a more elongated valve, wedgelike outline of the posterior part and smaller height. Specimens of *P.? posteriohumilis* from Poland differ from those of *Progonocythere* sp. 110 Brand, 1962 (pp. 145-146, Pl. 21, Figs. 14-15) in a smaller number of normal pore canals and in a wedgelike outline of the posterior part of the valve. In shape of their valves and number of normal pore canals, representatives of *P.? posteriohumilis* n.sp. are similar to those of *Cytheridea approximata* Terquem, 1886. However, the lack of more detailed description of the latter species, as well as inaccurate illustrations in Terquem's work, do not allow to take a firmer view on this problem.

Occurrence. — Poland: Jaworzniak, Middle Kuyavian, Lower and Middle Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Lower Bathonian. NW Germany, Bathonian.

Progonocythere polonica Błaszyk, 1959

(Pl. XXI, Figs. 1-3)

1959. *Progonocythere polonica* Błaszyk; J. Błaszyk, Two new . . ., pp. 434-440, Pl. 1, Figs. 5 a-f; Pl. 2, Figs. 5 a-b; Pl. 3; Pl. 4, Figs. 2 a-b; Text-fig. 3.
 1959. *Progonocythere ogrodzieniecensis* Błaszyk; J. Błaszyk, *Ibid.*, pp. 440, 441, Pl. 4, Figs. 1 a-j; Pl. 5.
 1960. *Ostracode nr. 9* Lutze; G. Lutze, Zur Stratigraphie . . ., p. 415, Pl. 38, Fig. 6.
 1962. *Progonocythere polonica* Błaszyk; E. Brand & H. Fahrion, In Leitfossilien . . ., p. 146, Pl. 21, Figs. 22-24.

Material. — Five hundred well-preserved specimens, including the right and left valves and complete carapaces.

Diagnosis and description — cf. Błaszyk, 1959.

Adult female individual; Pl. XXI, Fig. 3 (O.IV/177). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.64	0.31	0.31
Left valve	0.65	0.36	

Remarks. — Compare a reference in the work by Błaszyk & Malz (1965, p. 443).

Occurrence. — Poland: Jaworzniak Bathonian; Choroń, Lower Bathonian; Iwanowice Wielkie, Middle and Upper Bathonian; Ogrodzieniec, Upper Bathonian. NW Germany, Bathonian.

Genus *Monoceratina* Roth, 1928*Monoceratina* cf. *vulsa* (Jones & Sherborn, 1888)

(Pl. XX, Fig. 4)

1888. *Cytheridea vulsa* Jones & Sherborn; T. R. Jones & C. D. Sherborn, On some Ostracoda . . ., p. 263, Pl. 2, Figs. 4 a-b.
 1963. *Monoceratina* sp. juv., aff. *vulsa* (Jones & Sherborn, 1888); F. Plumhoff, Die Ostracoden . . ., Pl. 11, Figs. 167-168 (synonymy therein).

Material. — Thirty complete, well-preserved carapaces.

Adult individual; Pl. XXI, Fig. 4 (O.IV/178). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.53	0.25	0.26
Left valve	0.53	0.25	

Description. — Carapace elongated in lateral outline. Right and left valve equal in size. Outline of both the anterior and posterior margin straight. Anterior end uniformly rounded. Posterior end elongated and sharply terminating at the level of the dorsal margin. Along the anterior

and posterior margins, valve flattened. Lateral surface smooth, although fairly porous and, in the middle part, with a transverse, deep sulcus. On the dorsal side, contact line straight and widened, on the ventral — also straight.

Remarks. — Valves of *Monoceratina* cf. *vulsa* (Jones & Sherborn, 1888) from Poland differ from the holotype of this species in having a median sulcus, and from valves of *M. vulsa* (Jones & Sherborn, 1888), described by Bate (1963) from the Middle Jurassic of England, in a more pointed posterior end.

Occurrence. — Poland: Jaworzniak, Upper Kuiavian; Choroń, Middle Kuiavian.

Monoceratina? amygdaliformis n. sp.

(Pl. XXI, Figs. 5-9)

Holotypus: Pl. XXI, Fig. 8 (O.IV/182).

Stratum typicum: Middle Bathonian, *Morrisiceras morrisi* zone.

Locus typicus: Jaworzniak, Poland.

Derivatio nominis: *amygdaliformis*, Lat. *amygdala* = almond, *forma* = shape; valve almond-shaped.

Diagnosis. — Carapace elongated in lateral outline, almond-shaped, smooth. Both valves equal in size. In the middle part, valve slightly depressed. Posterior end elongated and, at the level of the dorsal margin, sharply terminating. Sexual dimorphism distinctly visible.

Material. — A hundred well-preserved carapaces, including young and adult stages.

Description. — Carapace strongly elongated, almond-shaped in lateral outline. Right and left valve equal in size. Outline of dorsal margin straight, of ventral — slightly rounded. The greatest height is noted in the anterior part from which the outline of the valve tapers off posteriorly in a wedgelike manner. Anterior end uniformly rounded, posterior elongated and sharply terminating at the level of the dorsal margin. Admarginal surface of the anterior end inflated, of the posterior — flat. Lateral surface flattened, in the middle part slightly depressed, in the ventral part inflated. On the ventral and dorsal sides, contact line straight and — on the latter — slightly widened. Sexual dimorphism distinctly visible. Males are longer and slimmer.

Ontogeny. — An adult and three larval stages have been recognized in the material examined. The differences between particular instars are mostly expressed in size.

Instar III; Pl. XXI, Fig. 5 (O.IV/179). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.27	0.14	0.10
Left valve	0.27	0.14	

Instar IV; Pl. XXI, Fig. 6 (O.IV/180). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.32	0.16	0.14
Left valve	0.32	0.16	

Instar V; Pl. XXI, Fig. 7 (O.IV/181). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.40	0.18	0.16
Left valve	0.40	0.18	

Adult female individual; Pl. XXI, Fig. 8 (O.IV/182). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.48	0.20	0.18
Left valve	0.48	0.20	

Adult male individual; Pl. XXI, Fig. 9 (O.IV/183). Dimensions (in mm):

	Length	Height	Width of carapace
Right valve	0.50	0.20	0.18
Left valve	0.50	0.20	

Remarks.— It is mostly on the basis of the lack of any distinct middle sulcus that *Monoceratina? amygdaliformis* n. sp. has been only tentatively assigned to the genus *Monoceratina*. The valves of *M.? amygdaliformis* n. sp. are most similar to those of *M. obtusifomis* Triebel & Bartenstein, 1938, from which they differ, however, in a more wedge-like outline of their posterior part.

Occurrence.— Poland: Jaworzniak, Upper Kuyavian, Lower and Middle Bathonian; Choroń, Lower Bathonian.

Family uncertain
Genus et species indet.
(Pl. XXI, Fig. 10)

Material.— Two closed, poorly preserved carapaces.
Dimensions (in mm), Pl. XXI, Fig. 10 (O.IV/184):

	Length	Height	Width of carapace
Right valve	0.61	0.33	0.35
Left valve	0.63	0.35	

Description. — Carapace oval in lateral outline. Left, larger valve overlaps right one along the anterodorsal, posterodorsal and ventral margins. Outline of dorsal margin straight, of ventral — slightly bent to the inside of the valve. Anterior and posterior ends truncated, rounded. Valve uniformly inflated. Lateral valve surface smooth. On the dorsal side, contact line slightly bent towards the left valve, on the ventral side — straight.

Remarks. — The carapace described is somewhat similar in shape to the specimens of *Eocytheridea? astrica* Bate, 1964 from which it differs, however, in length and outline of the posterior part of the valve.

Occurrence. — Poland: Jaworzniak, Middle Kuiavian and Lower Bathonian.

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JANUSZ BŁASZYK

MAŁŻORACZKI ŚRODKOWO-JURAJSKIE REGIONU CZĘSTOCHOWSKIEGO

Streszczenie

Praca zawiera wyniki opracowania małżoraczków z poziomów: *Garantiana garantiana*, *Parkinsonia parkinsoni*, *Parkinsonia compressa* (= *P. wuerttembergica*), *Perisphinctes tenuiplicatus*, *Morrisiceras morrissi* i *Paroecotraustes heterocostatus*. Dwa pierwsze poziomy należą do piętra „kujaw”, ustanowionego na kolokwium jurajistów polskich w Warszawie w 1964 r. na miejsce dotychczasowego piętra „wezul” (Passendorfer, 1964; Malinowska, 1964). Piętro to rozpoczyna się poziomem *Strenoceras subfurcatum*, a kończy poziomem *Parkinsonia compressa* (= *P. wuerttembergica*).

Materiał do badań, w postaci przemacerowanych próbek, autor otrzymał z Instytutu Geologicznego w Warszawie w 1960 r.; pochodzi on z wierceń w Jaworzniku, Choroni i Iwanowicach Wielkich (region częstochowski). Spośród 10.000 osobników, w skład których wchodziły pancerzyki, skorupki prawe i lewe, dorosłe i młodociane, wyróżniono 32 gatunki i 4 podgatunki należące do 5 rodzin, 20 rodzajów i 3 podrodzajów, z tego 23 gatunki i 4 podgatunki uznano za nowe.

Małżoraczki okręgu częstochowskiego były już częściowo opisane w pracach: Terquema (1886), Błaszyka (1959) oraz Błaszyka i Malza (1965).

Często występujące zmiany litofacjalne w profilach, z których pochodzą małżoraczki, pozwoliły stwierdzić, że największa ilość gatunków i osobników znajduje się w facji ilastej, odpowiadającej warunkom zbiornika niezbyt głębokiego. W osadach o większej piaszczystości ilość gatunków i osobników wyraźnie maleje. W osadach typowo piaszczystych obecności małżoraczków w ogóle nie stwierdzono. Analiza występowania małżoraczków w opracowanych profilach wskazuje, że skamieniałości te mogą oddać duże usługi w ustalaniu stratygrafii. Rozmieszczenie stratygraficzne określonych zespołów małżoraczków w dużej mierze pokrywa się z rozmieszczeniem otwornic z rodziny Miliolidae (Pazdro, 1958, 1959, 1960).

Badając rozprzestrzenienie geograficzne zespołów małżoraczków doggerskich z Polski środkowej, można stwierdzić ich duże podobieństwo do zespołów małżoraczków tego wieku z północno-zachodnich Niemiec, a tylko w bardzo małym stopniu z Anglii. Na podstawie dostępnej literatury radzieckiej autor nie mógł stwierdzić obecności w jurze Z.S.R.R. odpowiedników fauny ostrakodowej Polski.

ЯНУШ БЛАШИК

СРЕДНЕЮРСКИЕ ОСТРАКОДЫ ЧЕНСТОХОВСКОГО РАЙОНА (ПОЛЬША)

Резюме

В работе приводятся результаты изучения остракод из следующих горизонтов: *Garantiana garantiana*, *Parkinsonia parkinsoni*, *Parkinsonia compressa* (= *P. wuerttembergica*), *Perisphinctes tenuiplicatus*, *Morrisiceras morrissi* и *Paroecotraustes heterocostatus*. Два первые горизонта принадлежат к ярусу „куяв”, установленному во время коллоквиума польских юраистов в Варшаве в 1964 году, вместо прежнего яруса „везуль” (Passendorfer, 1964; Malinowska, 1964). Ярус этот начинается горизонтом *Strenoceras subfurcatum*, а кончается горизонтом *Parkinsonia compressa* (= *P. wuerttembergica*).

Материал для исследований, в виде промытых проб, получен в 1960 г. из Геологического Института в Варшаве; происходит он из скважин в Яворжнику, Хороню и Ивановицах Вельких (ченстоховский район). Из 10.000 особей, в которых состав входили раковины, правые и левые створки, взрослые и юные, выделено 32 вида и 4 подвида принадлежащих к 5 семействам, 20 родам и 3 под родам; в этом 23 вида и 4 подвида новые.

Остракоды ченстоховского района частично были уже описаны в работах: Терквема (Terquem, 1886), Блашика (Błaszyk, 1959), а также Блашика и Мальца (Błaszyk & Malz, 1965).

Часто выступающие литофациальные смены в разрезах, из которых происходят остракоды, разрешили констатировать, что наибольшее количество видов и особей находится в аргиллитовых отложениях, свидетельствующих о условиях неглубокого бассейна. В осадках более песчаных количество видов и особей четко уменьшается. В отложениях типично песчаных наличия остракод автор вообще не констатировал. Анализ распространения остракод в изученных разрезах указывает на то, что эти окаменелости могут быть очень полезны для установления стратиграфии. Стратиграфическое распространение определенных сообществ остракод в большой степени совпадает с распространением фораминифер из семейства *Milliolidae* (Pazdro, 1958, 1959, 1960).

Изучая географическое распространение сообществ остракод из доггера центральной Польши, автор констатировал большое их сходство с сообществами остракод этого самого возраста из северо-западной Германии, а только в небольшой степени из Англии. На основании доступной автору советской литературы, не констатировано наличия эквивалентов фауны остракод Польши в юрайских отложениях СССР.

PLATES

Abbreviations used in the plate explanations:

LA = larval stage

C = carapace

RV = right valve

LV = left valve

Dimensions (in mm) of the individuals are given in parenthesis.

Magnifications of all figures — approximately $\times 60$.

Plate I

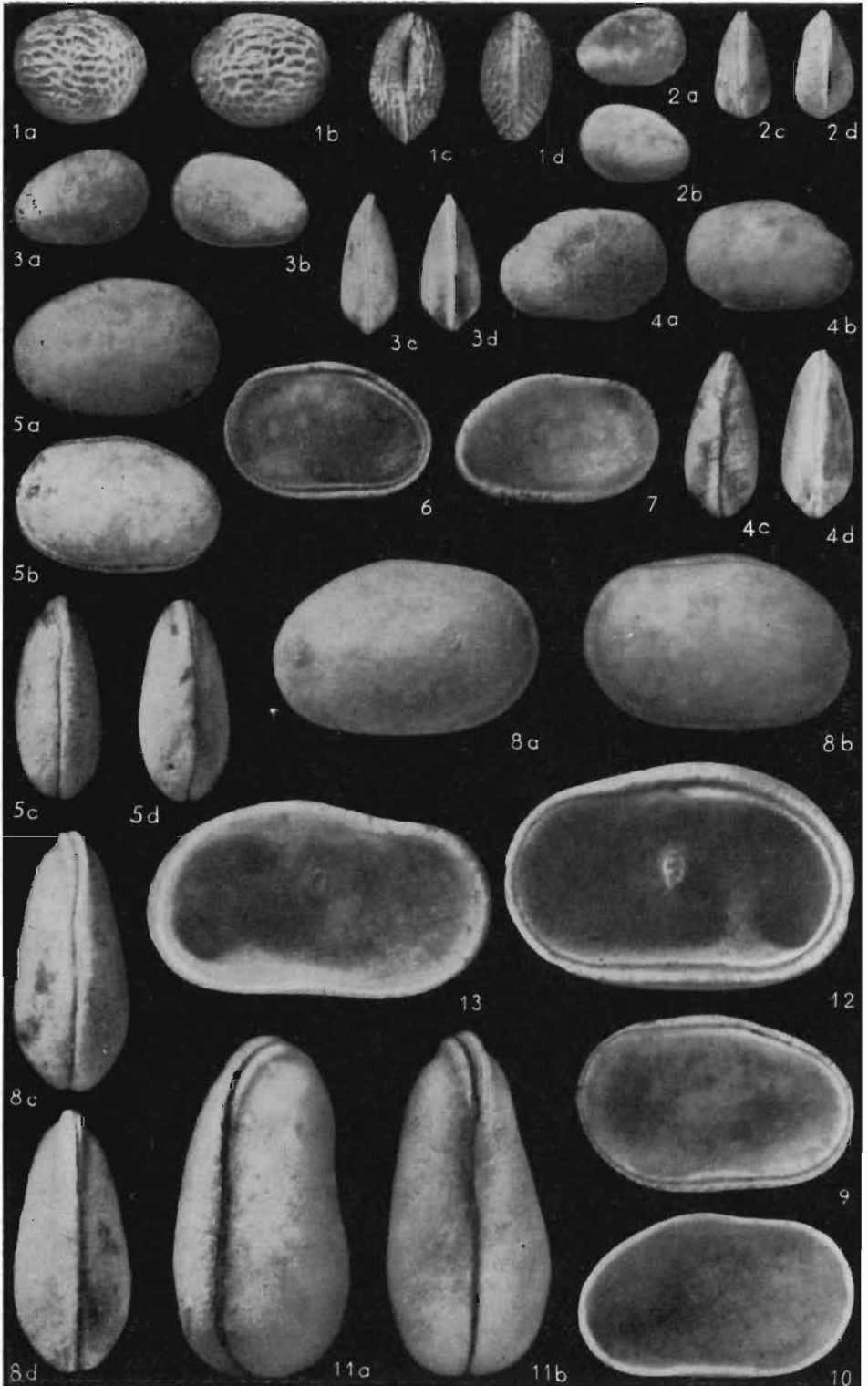
Polycope cf. maculata Müller
(Choroń, 85.4 m, Middle Kuiavian)

Fig. 1. C (0.33)—*a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/1.

Cytherella limpida n. sp.
(Choroń, 77.8 m, Middle Kuiavian)

- Fig. 2. C (0.27)—Instar II: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/2.
Fig. 3. C (0.34)—Instar III: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/3.
Fig. 4. C (0.41)—Instar IV: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/4.
Fig. 5. C (0.50)—Instar V: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/5.
Fig. 6. (0.50)—Instar V: RV internal view; O.IV/6.
Fig. 7. (0.48)—Instar V: LV internal view; O.IV/7.
Fig. 8. C (0.65)—Instar VI: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/8.
Fig. 9. (0.65)—Instar VI: RV internal view; O.IV/9.
Fig. 10. (0.63)—Instar VI: LV internal view; O.IV/10.
Fig. 11. C (0.84)—Adult, holotype: *a* ventral view, *b* dorsal view; O.IV/11.
Fig. 12. (0.83)—Adult: RV internal view; O.IV/12.
Fig. 13. (0.81)—Adult: LV internal view; O.IV/13.

(see also Plate II)



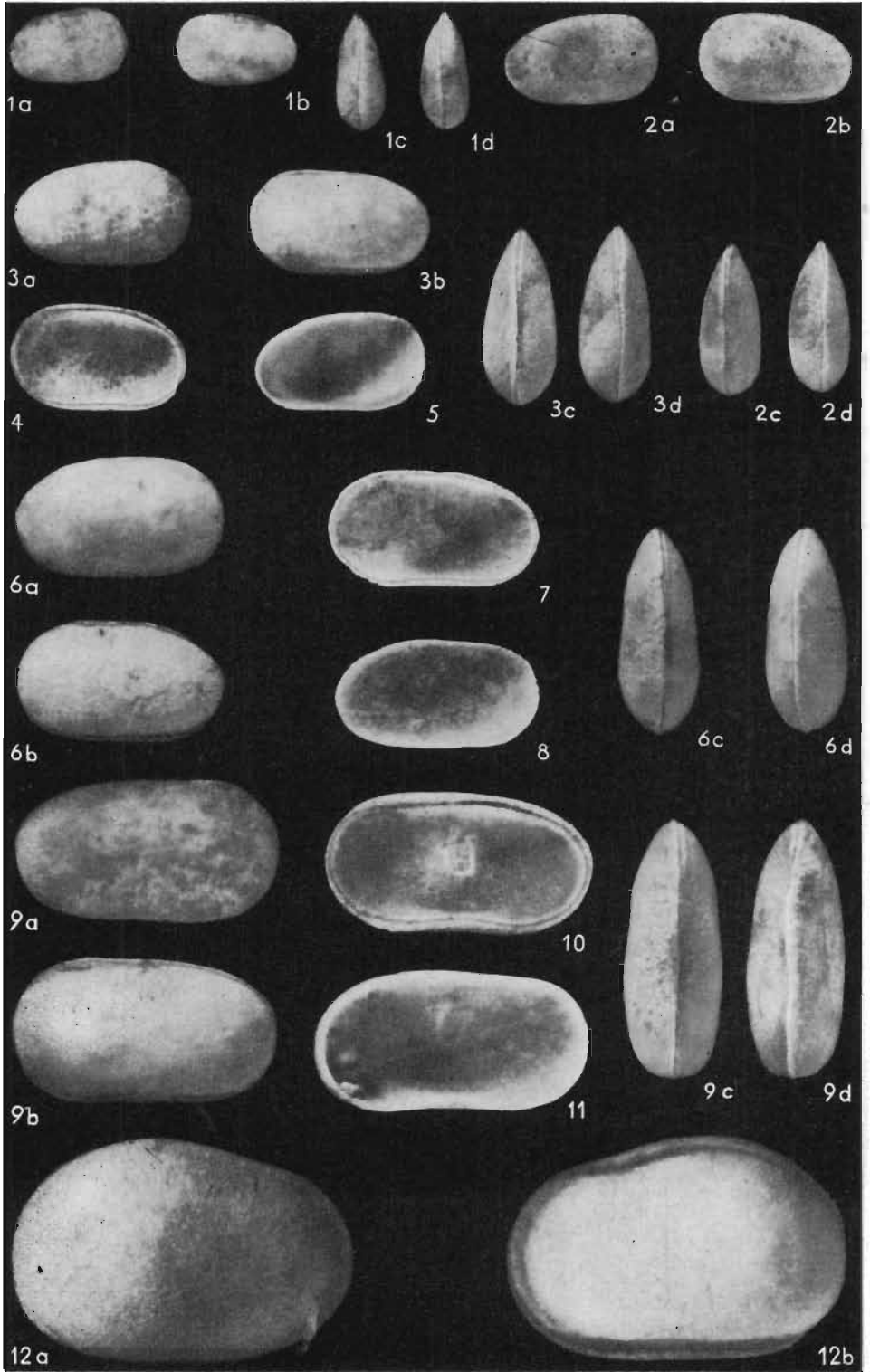


Plate II

Cytherella perennis n. sp.
(Jaworznik, 27.0 m, Middle Bathonian)

- Fig. 1. C (0.28) — Instar II: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/14.
Fig. 2. C (0.36) — Instar III: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/15.
Fig. 3. C (0.43) — Instar IV: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/16.
Fig. 4. (0.43) — Instar IV: RV internal view; O.IV/17.
Fig. 5. (0.43) — Instar IV: LV internal view; O.IV/18.
Fig. 6. C (0.51) — Instar V: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/19.
Fig. 7. (0.52) — Instar V: RV internal view; O.IV/20.
Fig. 8. (0.50) — Instar V: LV internal view; O.IV/21.
Fig. 9. C (0.66) — Instar VI: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/22.
Fig. 10. (0.66) — Instar VI: RV internal view; O.IV/23.
Fig. 11. (0.66) — Instar VI: LV internal view; O.IV/24.

(see also Plate III)

Cytherella limpida n. sp.
(Choroń, 77.8 m, Middle Kuiavian)

- Fig. 12. C (0.83) — Adult, holotype: *a* RV lateral view, *b* LV lateral view; O.IV/11.
(see also Plate I)

Plate III

Bythocypris? jaworzniensis n. sp.
(Jaworznik, 37.2 m, Lower Bathonian)

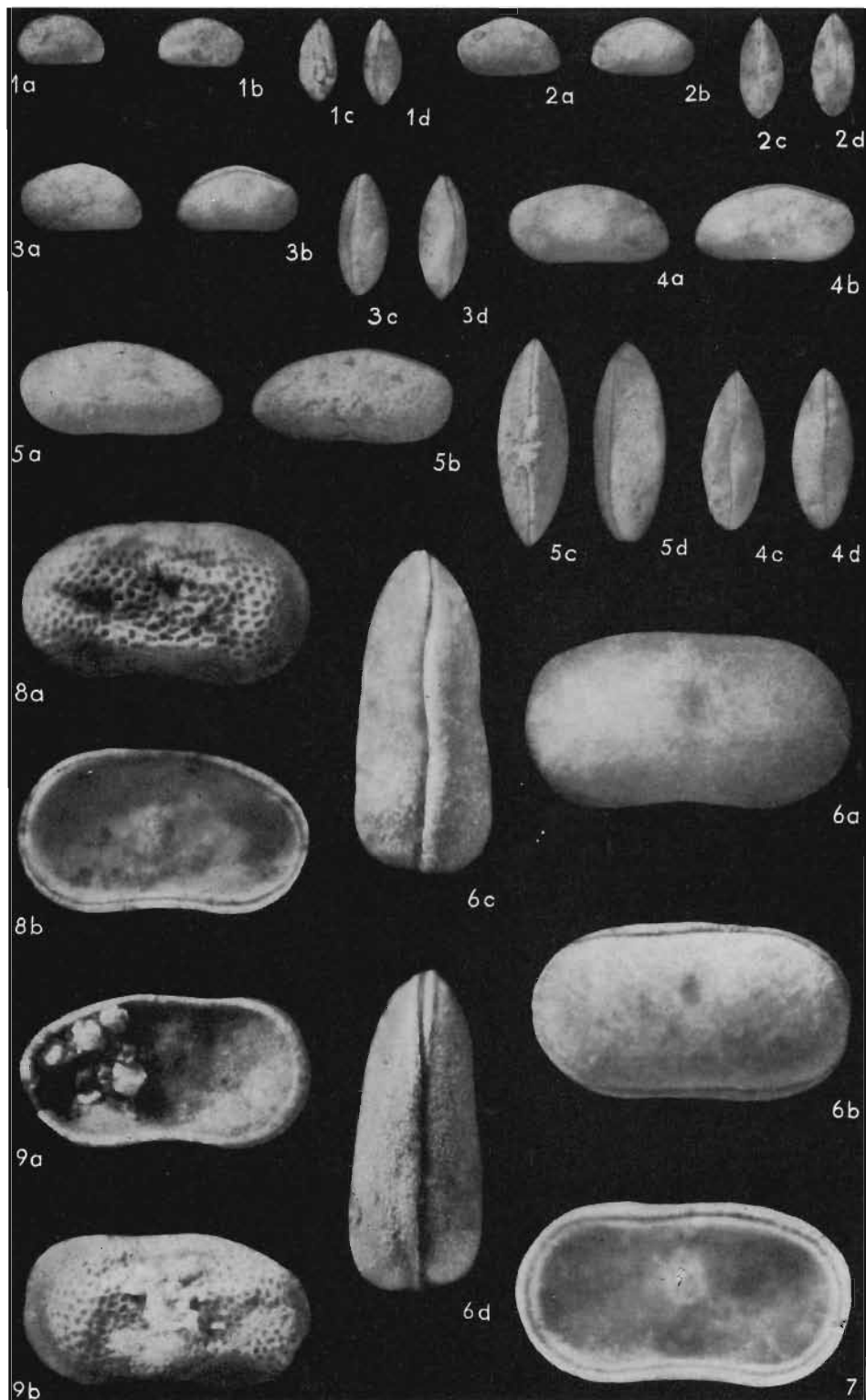
- Fig. 1. C (0.21) — Instar II: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/27.
Fig. 2. C (0.24) — Instar III: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/28.
Fig. 3. C (0.32) — Instar IV: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/29.
Fig. 4. C (0.40) — Instar V: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/30.
Fig. 5. C (0.50) — Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/31.

Cytherella perennis n. sp.
(Jaworznik, 27.0 m, Middle Bathonian)

- Fig. 6. C (0.78) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/25.
Fig. 7. (0.78) — Adult: RV internal view; O.IV/26.
(see also Plate II)

Cytherelloidea certa n. sp.
(Jaworznik, 38.4 m, Lower Bathonian)

- Fig. 8. (0.71) — Adult, holotype: *a* RV lateral view, *b* RV internal view; O.IV/32.
Fig. 9. (0.71) — Adult; *a* LV internal view, *b* LV lateral view; O.IV/33.



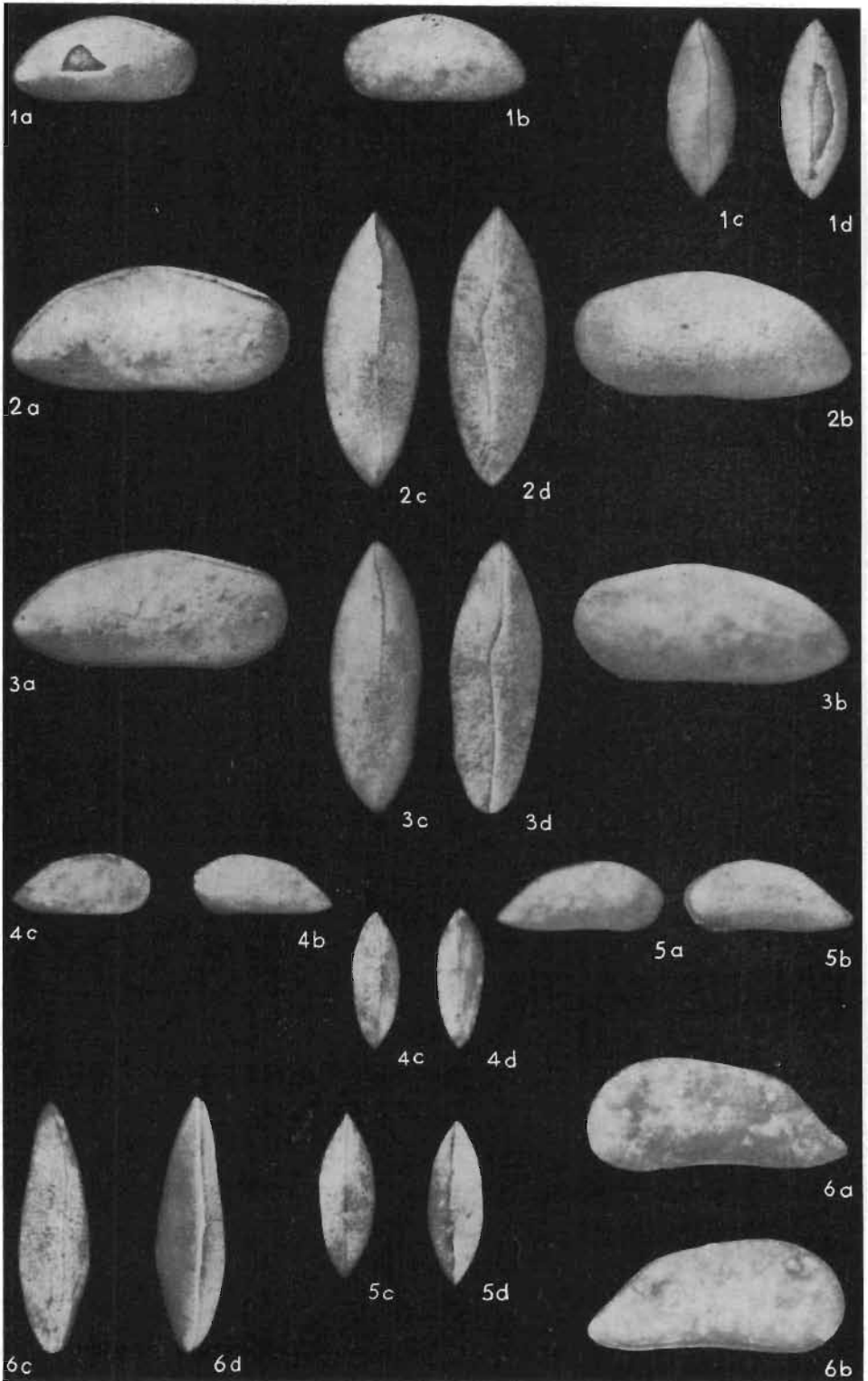


Plate IV

Paracypris cf. bajociana Bate

(Jaworznik, 37.2 m., Lower Bathonian)

- Fig. 1. C (0.45) — LA: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/34.
- Fig. 2. C ♀ (0.69) — Adult: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/35.
- Fig. 3. C ♂ (0.68) — Adult: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/36.

Paracypris procerus n. sp.

(Jaworznik, 31.5 m., Middle Bathonian)

- Fig. 4. C (0.33) — Instar III: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/37.
- Fig. 5. C (0.40) — Instar 4: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/38.
- Fig. 6. C (0.62) — Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/39.

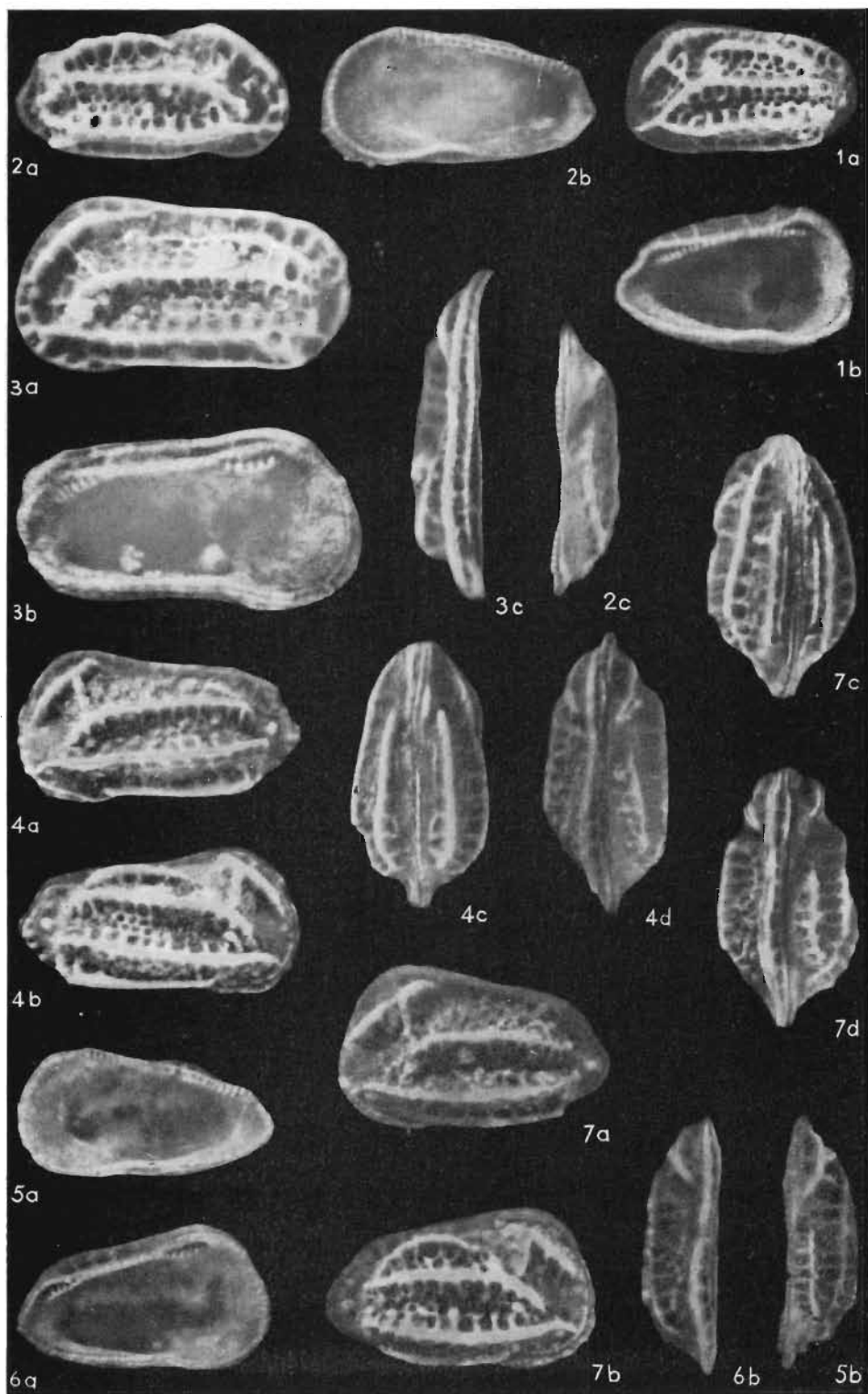
Plate V

Pleurocythere favosa Triebel
(Choroń, 46.8 m, Lower Bathonian)

- Fig. 1. (0.55) — Instar V: *a* LV lateral view, *b* LV internal view; O.IV/40.
Fig. 2. (0.65) — Instar VI: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/41.
Fig. 3. (0.81) — Adult: *a* LV lateral view, *b* LV internal view, *c* LV dorsal view; O.IV/42.

Pleurocythere impar Triebel
(Choroń, 69.0 m, Middle Kuiavian)

- Fig. 4. C ♂ (0.67) — Adult: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/43.
Fig. 5. ♂ (0.60) — Adult: *a* RV internal view, *b* RV dorsal view; O.IV/44.
Fig. 6. ♂ (0.60) — Adult: *a* LV internal view, *b* LV dorsal view; O.IV/45.
Fig. 7. C ♀ (0.64) — Adult: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/46.



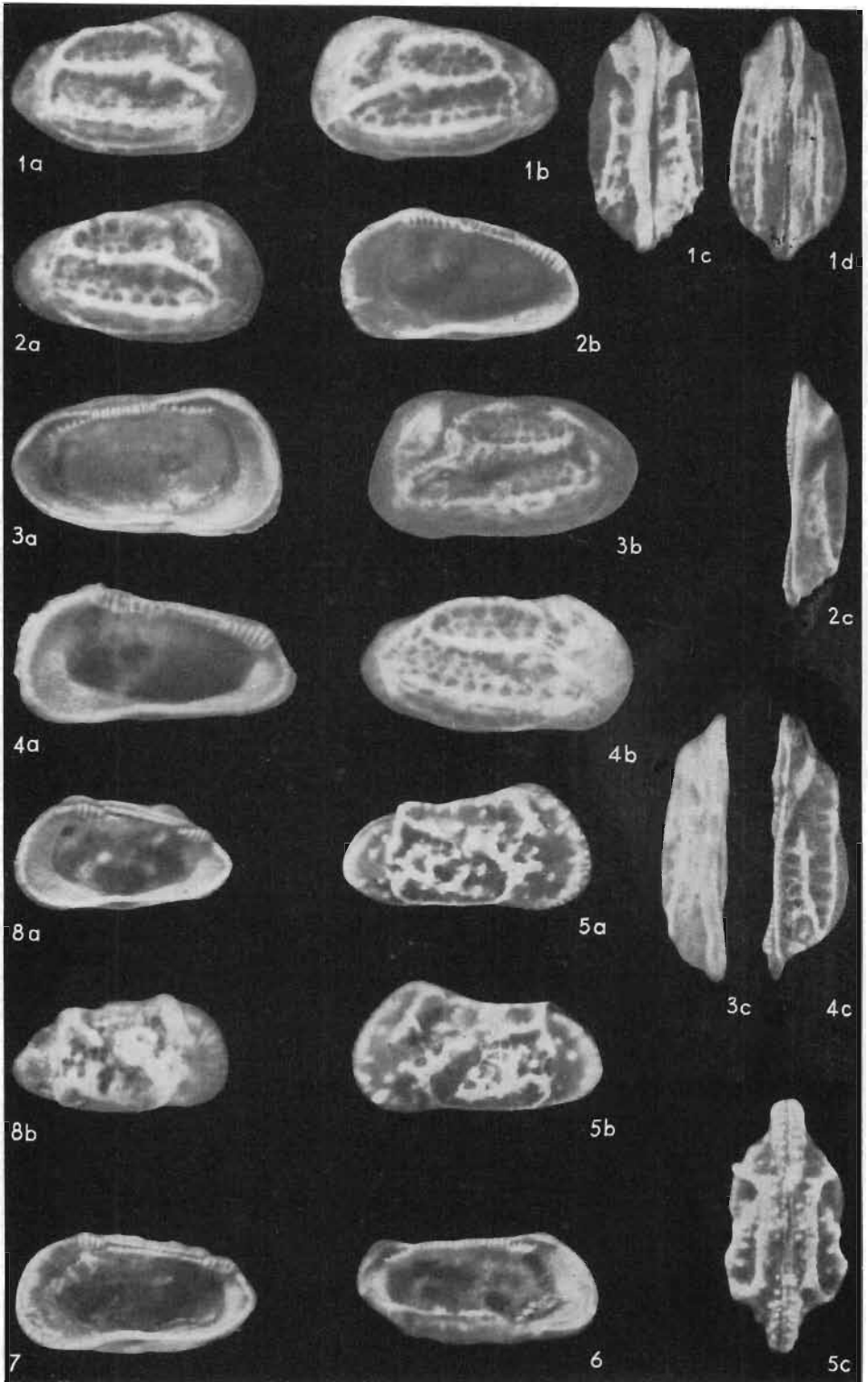


Plate VI

Pleurocythere elliptica n. sp.

(Iwanowice Wielkie, 116,0 m, Lower Bathonian)

- Fig. 1. C ♀ (0.60) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/47.
Fig. 2. ♀ (0.59) — Adult: *a* RV lateral view, *b* RV internal view, *c* dorsal view; O.IV/48.
Fig. 3. ♂ (0.65) — Adult: *a* LV internal view, *b* LV lateral view, *c* dorsal view; O.IV/49.
Fig. 4. ♂ (0.66) — Adult: *a* RV internal view, *b* RV lateral view, *c* RV dorsal view; O.IV/50.

Oligocythereis cf. *fullonica* (Jones & Sherborn)

(Jaworzniak, 38.4 m, Lower Bathonian)

- Fig. 5. C (0.59) — Adult: *a* RV lateral view, *b* LV lateral view, *c* ventral view; O.IV/51.
Fig. 6. (0.59) — Adult: LV internal view; O.IV/52.
Fig. 7. (0.59) — Adult: RV internal view; O.IV/53.
Fig. 8. (0.51) — LA: *a* RV internal view, *b* RV lateral view; O.IV/54.

Plate VII

Lophocythere cf. carinilia Sylvester-Bradley
(Choroń, 74.4 m, Middle Kuiavian)

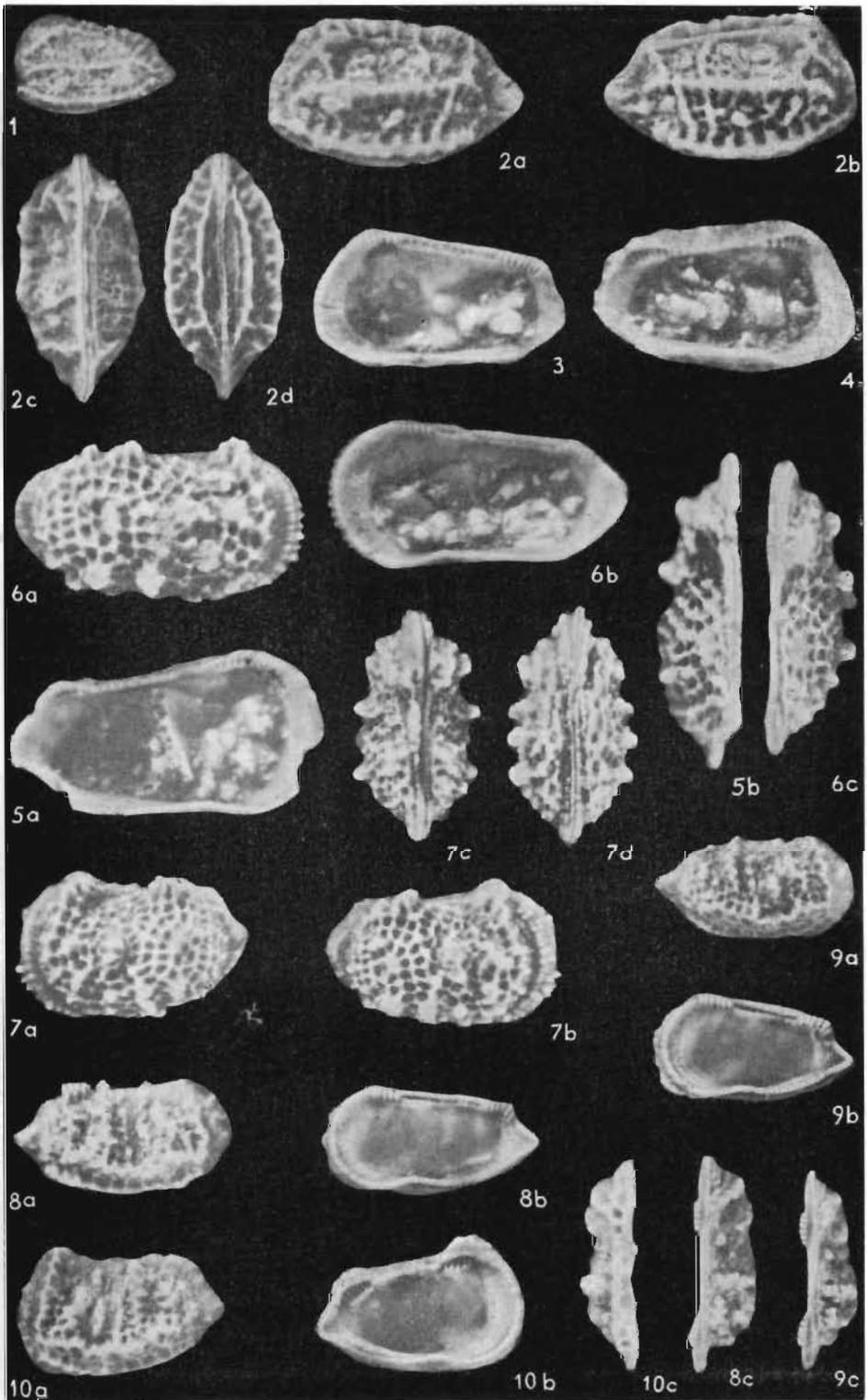
- Fig. 1. (0.36) — LA: LV lateral view; O.IV/55.
Fig. 2. C (0.60) — Adult: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/56.
Fig. 3. (0.62) — Adult: RV internal view; O.IV/57.
Fig. 4. (0.63) — Adult: LV internal view; O.IV/58.

Lophocythere verrucosa n. sp.
(Jaworznik, 38.4 m, Lower Bathonian)

- Fig. 5. ♂ (0.72) — Adult: *a* LV internal view, *b* LV dorsal view; O.IV/59.
Fig. 6. ♂ (0.70) — Adult: *a* RV lateral view, *b* RV internal view, *c* dorsal view; O.IV/60.
Fig. 7. C ♀ (0.56) — Adult, holotype: *a* LV lateral view, *b* RV lateral view, *s* dorsal view, *d* ventral view; O.IV/61.

Lophocythere carinata n. sp.
(Jaworznik, 43.0 m, Lower Bathonian)

- Fig. 8. ♂ (0.49) — Adult, holotype: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/62.
Fig. 9. ♀ (0.46) — Adult: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/63.
Fig. 10. ♀ (0.48) — Adult: *a* LV lateral view, *b* LV internal view, *c* dorsal view; O.IV/64.



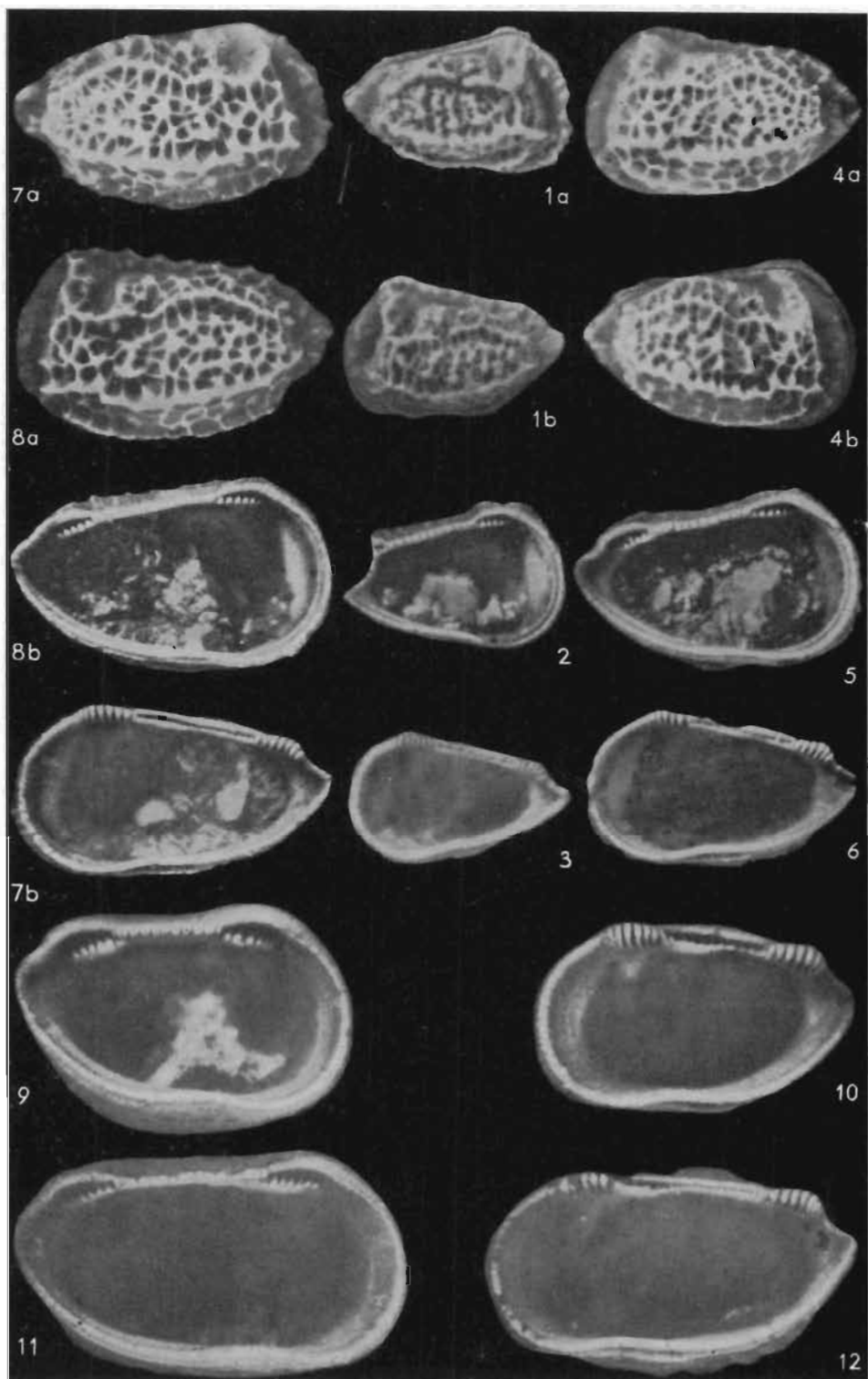


Plate VIII

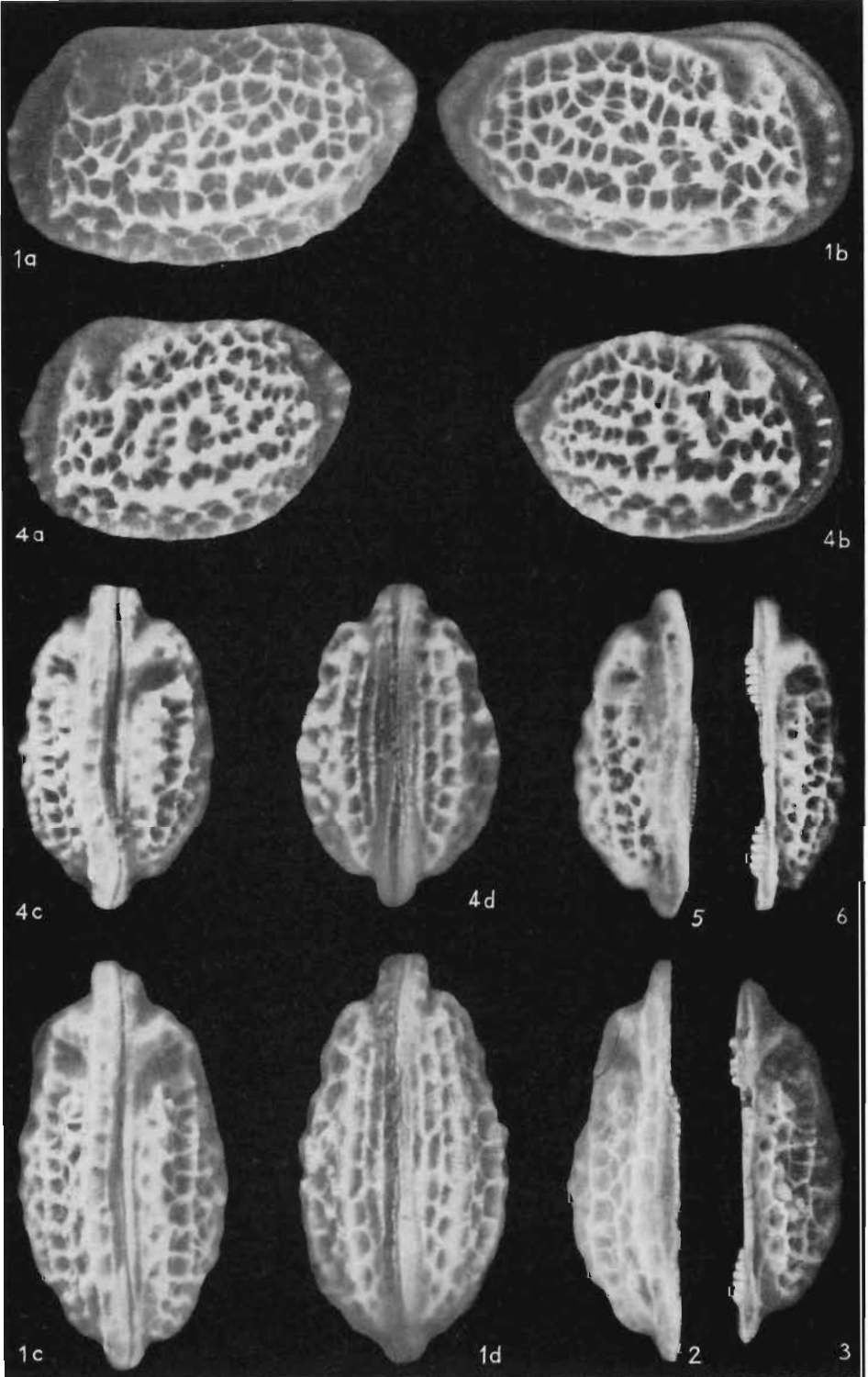
Fuhrbergiella (Fuhrbergiella) gigantea quarta n. subsp.
(Jaworznik, 27.0 m, Middle Bathonian)

- Fig. 1. C (0.56) — Instar IV: *a* RV lateral view, *b* LV lateral view; O.IV/65.
Fig. 2. (0.56) — Instar IV: LV internal view; O.IV/66.
Fig. 3. (0.54) — Instar IV: RV internal view; O.IV/67.
Fig. 4. C (0.67) — Instar V: *a* LV lateral view, *b* RV lateral view; O.IV/68.
Fig. 5. (0.68) — Instar V: LV internal view; O.IV/69.
Fig. 6. (0.67) — Instar V: RV internal view; O.IV/70.
Fig. 7. (0.75) — Instar VI: *a* RV lateral view, *b* RV internal view; O.IV/71.
Fig. 8. (0.77) — Instar VI: *a* LV lateral view, *b* LV internal view; O.IV/72.
Fig. 9. ♀ (0.80) — Adult: LV internal view; O.IV/76.
Fig. 10. ♀ (0.75) — Adult: RV internal view; O.IV/77.
Fig. 11. ♂ (0.91) — Adult: LV internal view; O.IV/73.
Fig. 12. ♂ (0.88) — Adult: RV internal view; O.IV/74.

Plate IX

Fuhrbergiella (Fuhrbergiella) gigantea quarta n. subsp.
(Jaworznik, 27.0 m, Middle Bathonian)

- Fig. 1. C ♂ (0.91) — Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/75.
Fig. 2. ♂ (0.91) — Adult: LV dorsal view; O.IV/73.
Fig. 3. ♂ (0.88) — Adult: RV dorsal view; O.IV/74.
Fig. 4. C ♀ (0.80) — Adult: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/78.
Fig. 5. ♀ (0.80) — Adult: LV dorsal view; O.IV/76.
Fig. 6. ♀ (0.75) — Adult: RV dorsal view; O.IV/77.



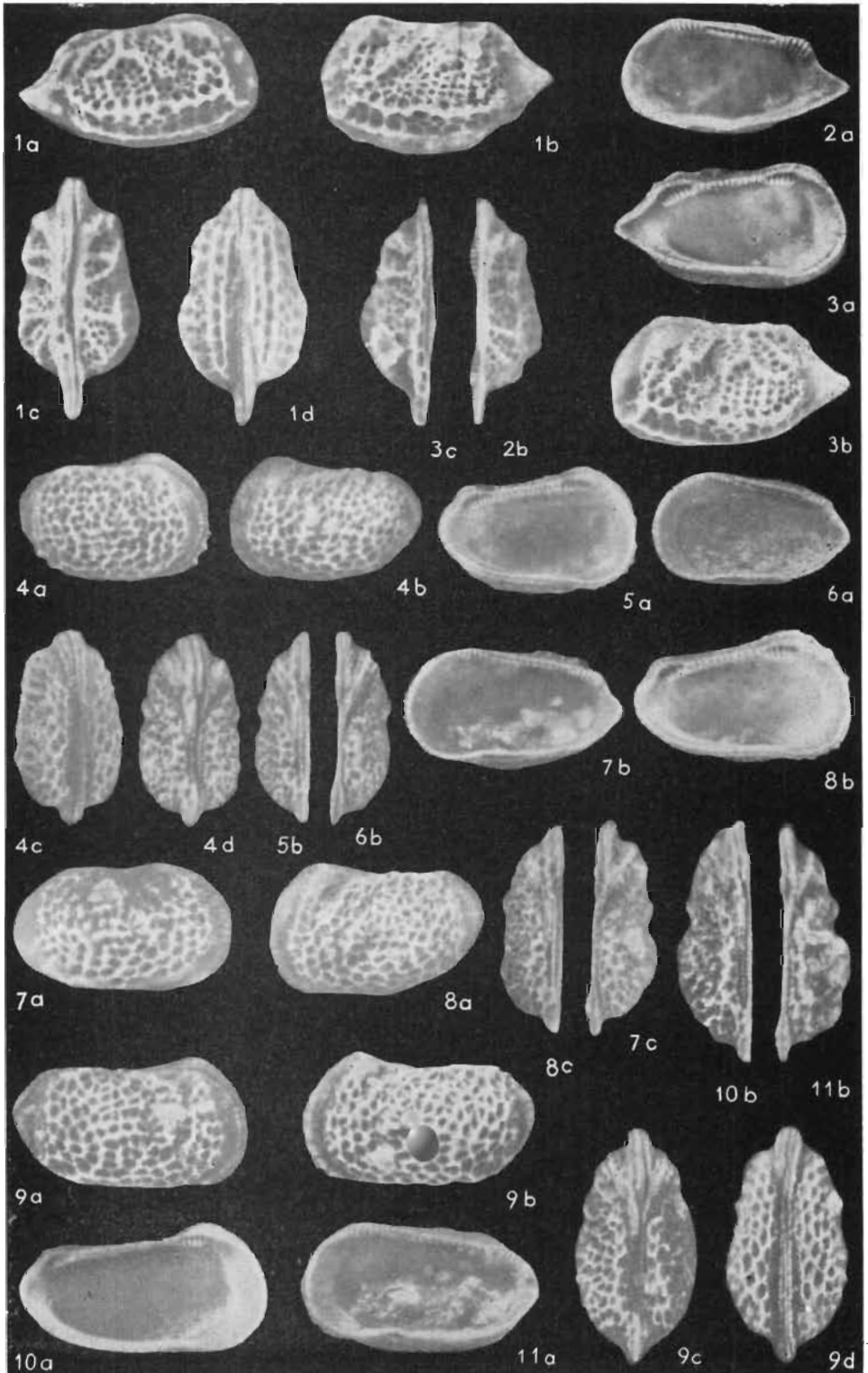


Plate X

Fuhrbergiella (Fuhrbergiella?) concentrica n. sp.
(Jaworznik, 38.4 m, Lower Bathonian)

- Fig. 1. C (0.56) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/79.
Fig. 2. (0.56) — *a* RV internal view, *b* RV dorsal view; O.IV/80.
Fig. 3. (0.57) — *a* LV internal view, *b* LV lateral view, *c* dorsal view; O.IV/81.

Fuhrbergiella (Praefuhrbergiella) lurida n. sp.
(Jaworznik, 38.4 m, Lower Bathonian)

- Fig. 4. C (0.47) — LA: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/82.
Fig. 5. (0.47) — LA: *a* LV internal view, *b* LV dorsal view; O.IV/83.
Fig. 6. (0.46) — LA: *a* RV internal view, *b* RV dorsal view; O.IV/84.
Fig. 7. ♀ (0.51) — Adult: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O. IV/85.
Fig. 8. ♀ (0.52) — Adult: *a* LV lateral view, *b* LV internal view, *c* LV dorsal view; O.IV/86.
Fig. 9. ♂ (0.62) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/87.
Fig. 10. ♂ (0.62) — Adult: *a* LV internal view, *b* LV dorsal view; O.IV/88.
Fig. 11. ♂ (0.61) — Adult: *a* RV internal view, *b* RV dorsal view; O.IV/89.

Plate XI

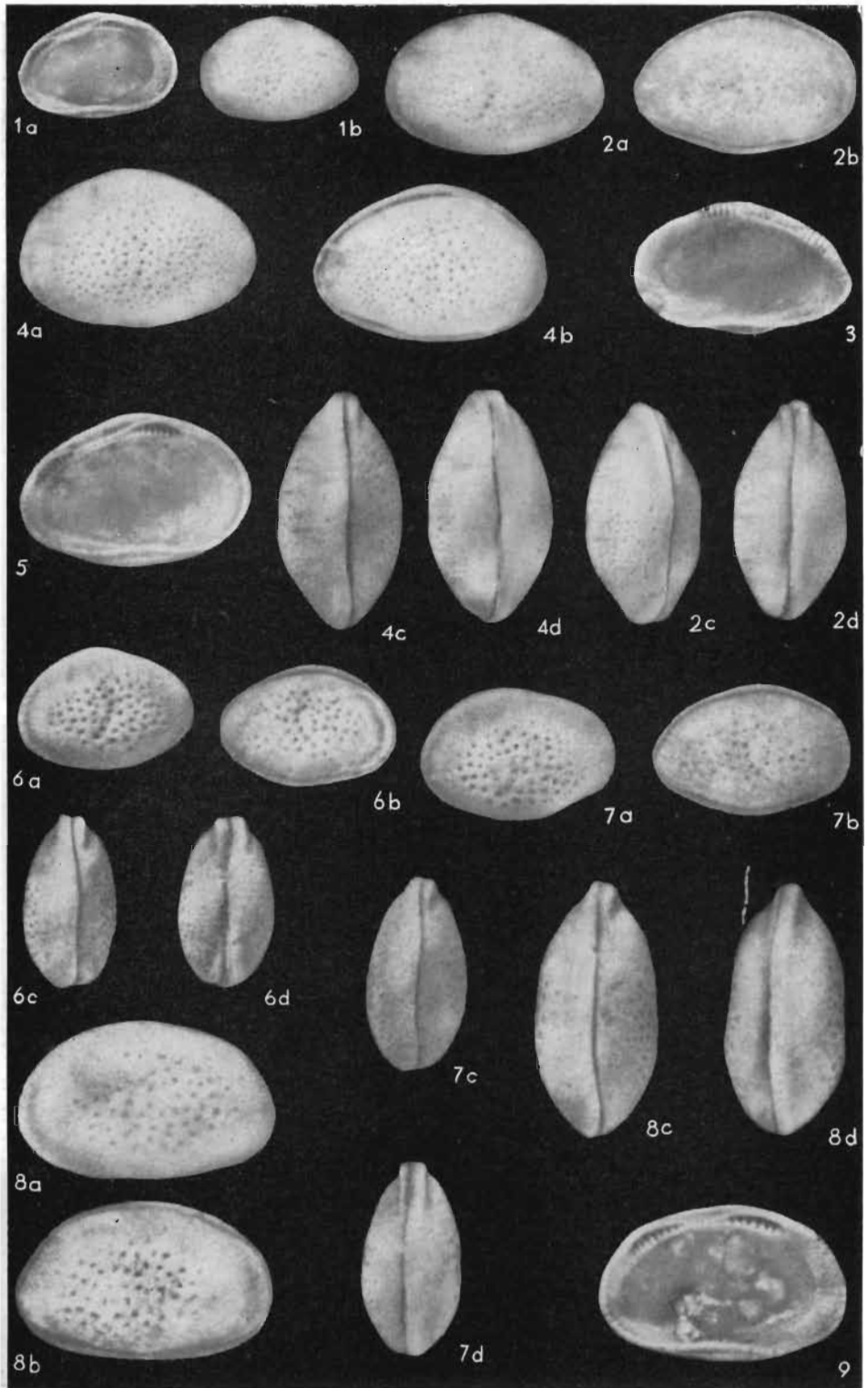
Schuleridea triebeli polypora n. subsp.
(Choroń, 77.8 m, Middle Kuiavian)

- Fig. 1. ♀ (0.38)—LA: *a* LV internal view, *b* LV lateral view; O.IV/90.
Fig. 2. C ♀ (0.52)—LA: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/91.
Fig. 3. ♀ (0.53)—LA: RV internal view; O.IV/92.
Fig. 4. C ♀ (0.57)—Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/93.
Fig. 5. ♀ (0.57)—Adult: LV internal view; O.IV/94.

(see also Plate XII)

Praeschuleridea lepida n. sp.
(Choroń, 91.7 m, Middle Kuiavian)

- Fig. 6. C (0.42)—Younger instar: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/100.
Fig. 7. C (0.48)—Older instar: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/101.
Fig. 8. C (0.61)—Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/102.
Fig. 9. (0.61)—Adult: LV internal view; O.IV/103.



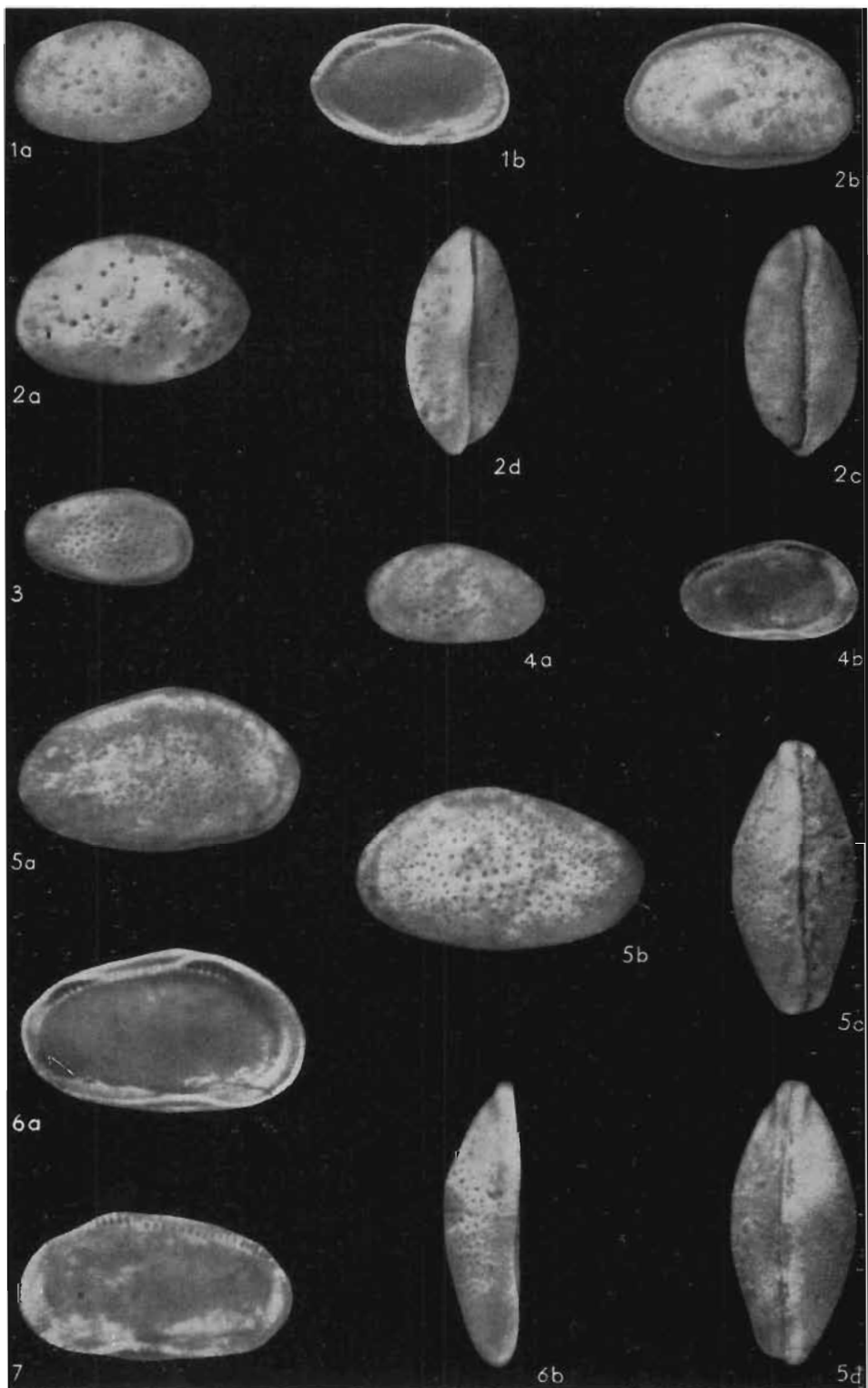


Plate XII

Praeschuleridea wartae n. sp.

(Jaworznik, 63,6 m, Middle Kuiavian)

Fig. 1. (0.50) — LA: a LV lateral view, b LV internal view; O.IV/104.

Fig. 2. (0.57) — Adult, holotype: a LV lateral view, b RV lateral view, c ventral view, d dorsal view; O.IV/105.

Schuleridea triebeli polypora n. subsp.

(Choroń, 77.8 m, Middle Kuiavian)

Fig. 3. C ♂ (0.40) — LA: LV lateral view; O.IV/95.

Fig. 4. ♂ (0.42) — LA: a LV lateral view, b LV internal view; O.IV/96.

Fig. 5. C ♂ (0.68) — Adult: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; O.IV/97.

Fig. 6. ♂ (0.68) — Adult: a LV internal view, b dorsal view; O.IV/98.

Fig. 7. ♂ (0.67) — Adult: RV internal view; O.IV/99.

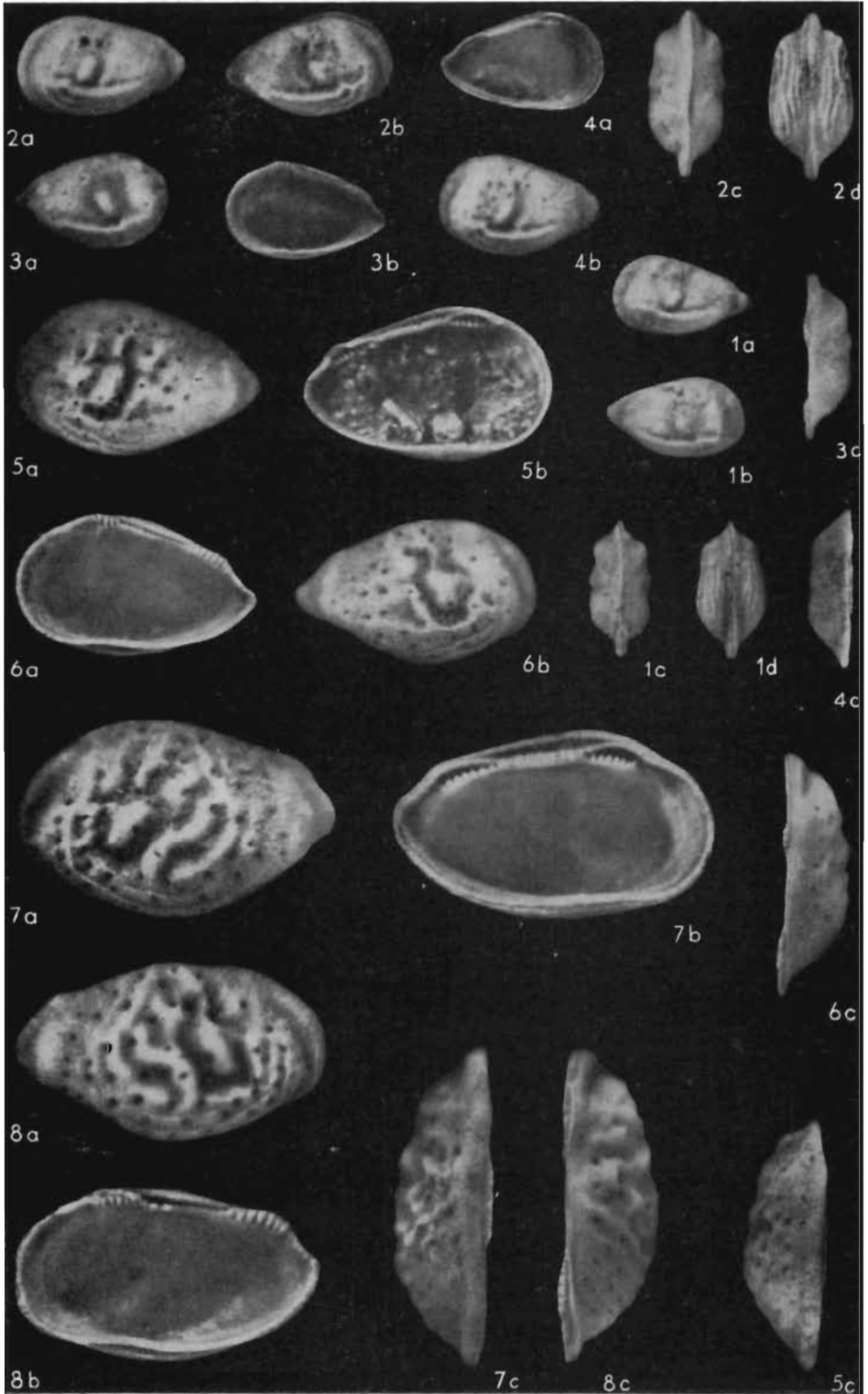
(see also Plate XI)

Plate XIII

Glyptocythere tuberosa angularis n. subsp.
(Jaworzniak, 27.0 m, Middle Bathonian)

- Fig. 1. C ♂ (0.31) — Instar III: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/106.
- Fig. 2. C ♂ (0.39) — Instar IV: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/107.
- Fig. 3. ♂ (0.38) — Instar IV: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/108.
- Fig. 4. ♂ (0.39) — Instar IV: *a* LV internal view, *b* LV lateral view, *c* LV dorsal view; O.IV/109.
- Fig. 5. ♂ (0.61) — Instar VI: *a* LV lateral view, *b* RV internal view, *c* LV dorsal view; O.IV/110.
- Fig. 6. ♂ (0.60) — Instar VI: *a* RV internal view, *b* RV lateral view, *c* RV dorsal view; O.IV/111.
- Fig. 7. ♂ (0.78) — Adult: *a* LV lateral view, *b* LV internal view, *c* LV dorsal view; O.IV/112.
- Fig. 8. ♂ (0.75) — Adult: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/113.

(see also Plate XIV)



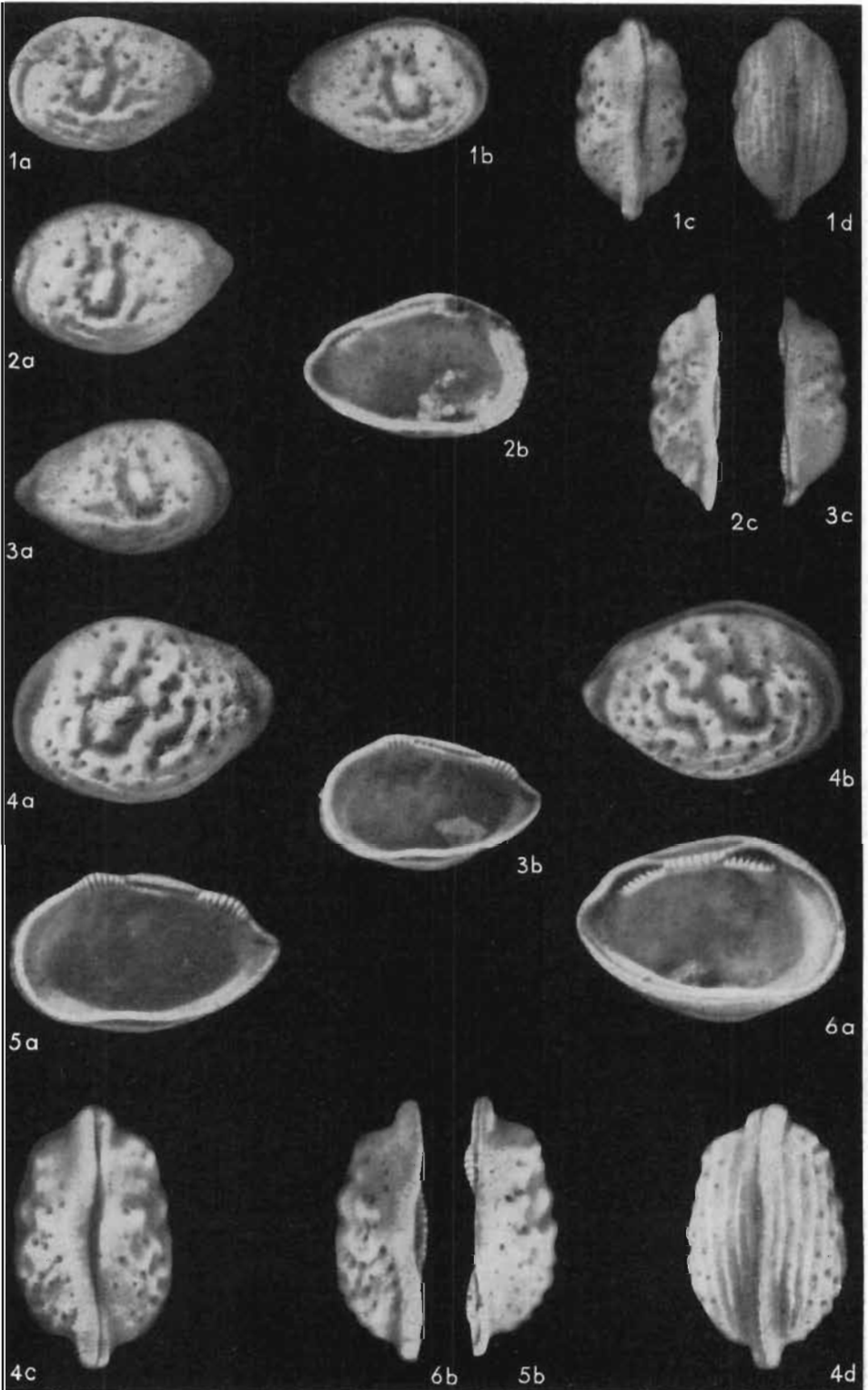


Plate XIV

Glyptocythere tuberosa angularis n. subsp.
(Jaworznik, 27.0 m, Middle Bathonian)

- Fig. 1. C ♀ (0.53)—LA: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/114.
- Fig. 2. ♀ (0.57)—LA: *a* LV lateral view, *b* LV internal view, *c* LV dorsal view; O.IV/115.
- Fig. 3. ♀ (0.56)—LA: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/116.
- Fig. 4. C ♀ (0.63)—Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/117.
- Fig. 5. ♀ (0.62)—Adult: *a* RV internal view, *b* RV dorsal view; O.IV/118.
- Fig. 6. ♀ (0.63)—Adult: *a* LV internal view, *b* LV dorsal view; O.IV/119.

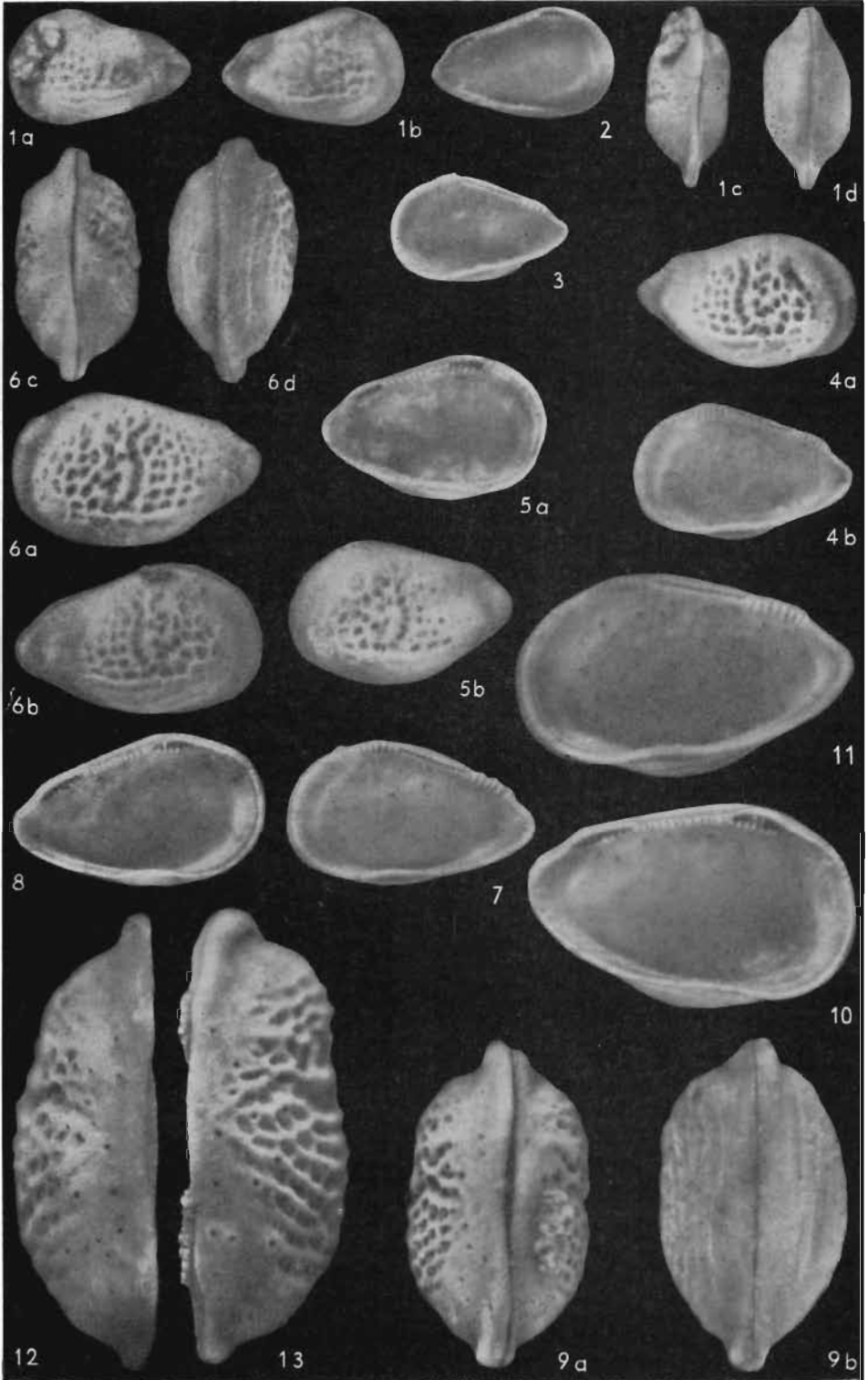
(see also Plate XIII)

Plate XV

Glyptocythere perpolita magna n. subsp.
(Jaworzniak, 72.2 m, Middle Kuiavian)

- Fig. 1. C ♂ (0.44) — Instar III: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/120.
Fig. 2. ♂ (0.44) — Instar III: LV internal view; O.IV/121.
Fig. 3. ♂ (0.43) — Instar III: RV internal view; O.IV/122.
Fig. 4. ♂ (0.53) — Instar IV: *a* RV lateral view, *b* RV internal view; O.IV/123.
Fig. 5. ♂ (0.54) — Instar IV: *a* LV internal view, *b* LV lateral view; O.IV/124.
Fig. 6. C ♂ (0.60) — Instar V: *a* LV lateral view, *b* RV lateral view, *c* dorsal view, *d* ventral view; O.IV/125.
Fig. 7. ♂ (0.59) — Instar V: RV internal view; O.IV/126.
Fig. 8. ♂ (0.60) — Instar V: LV internal view; O.IV/127.
Fig. 9. C ♂ (0.81) — Instar VI: *a* dorsal view; *b* ventral view; O.IV/128.
Fig. 10. ♂ (0.80) — Instar VI: LV internal view; O.IV/129.
Fig. 11. ♂ (0.79) — Instar VI: RV internal view; O.IV/130.
Fig. 12. ♂ (1.20) — Adult: LV dorsal view; O.IV/131.
Fig. 13. ♂ (1.20) — Adult: RV dorsal view; O.IV/132.

(see also Plates XVI and XVII)



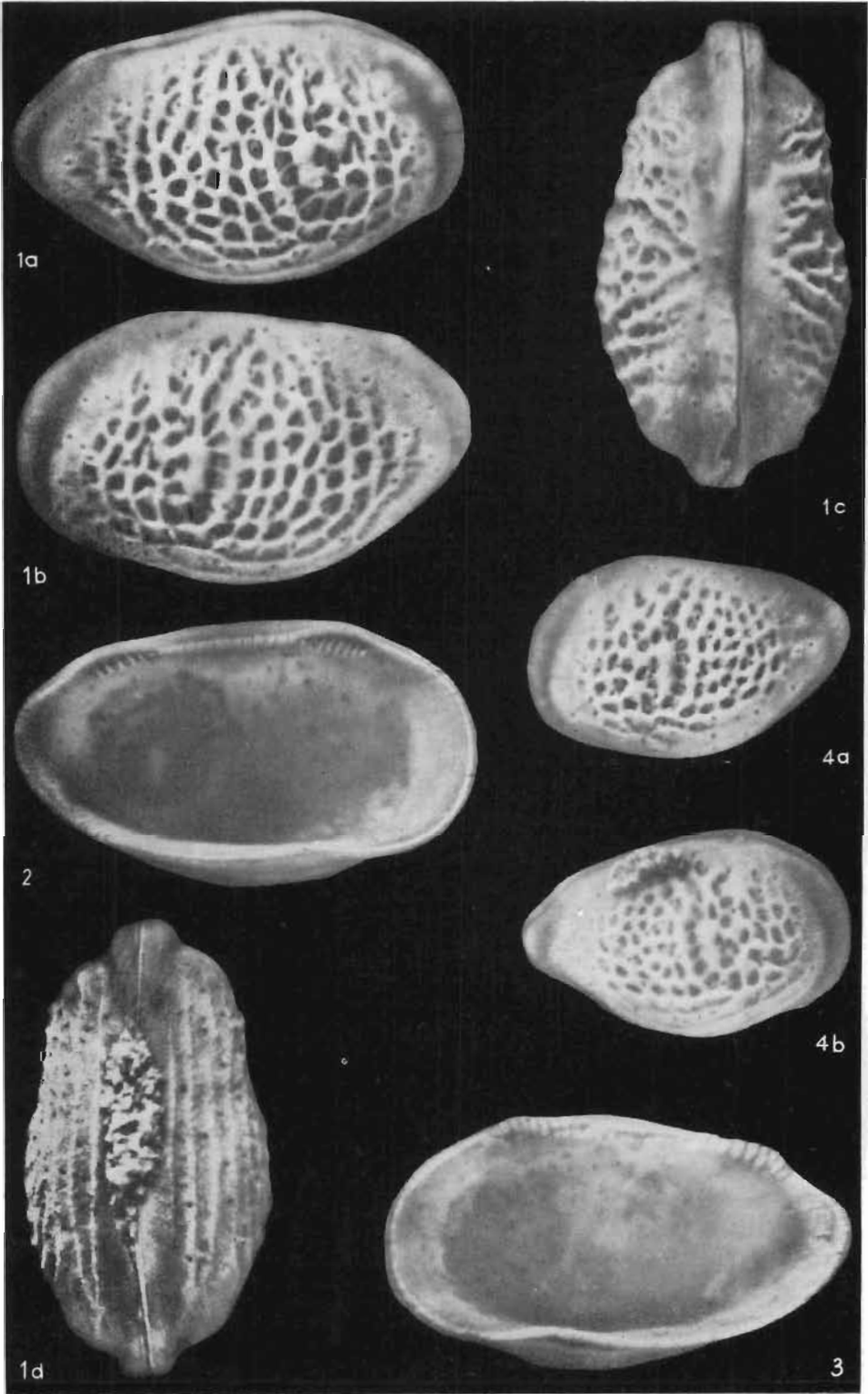


Plate XVI

Glyptocythere perpolita magna n. subsp.
(Jaworznik, 72.2 m, Middle Kuiavian)

- Fig. 1. C ♂ (1.20) — Adult: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/133.
Fig. 2. ♂ (1.20) — Adult: LV internal view; O.IV/131.
Fig. 3. ♂ (1.20) — Adult: RV internal view; O.IV/132.
Fig. 4. C. ♂ (0.81) — Instar VI: *a* LV lateral view, *b* RV lateral view; O.IV/128.

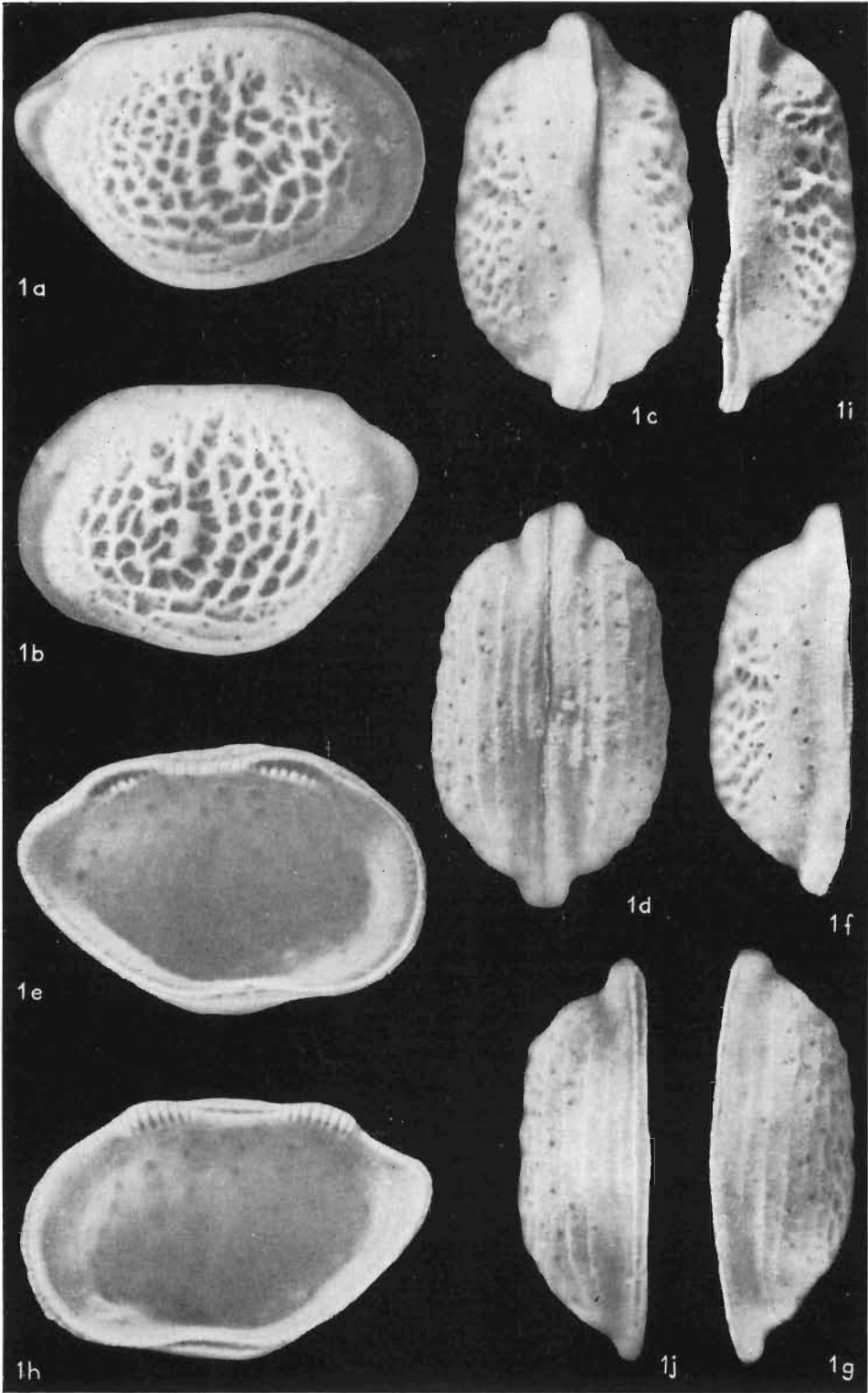
(see also Plates XV and XVII)

Plate XVII

Glyptocythere perpolita magna n. subsp.
(Jaworzniak, 72,2 m, Middle Kuyavian)

Fig. 1. C ♀ (0.99) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view, *e* LV internal view, *f* LV dorsal view, *g* LV ventral view, *h* RV internal view, *i* RV dorsal view, *j* RV ventral view; O.IV/134.

(see also Plates XV and XVI)



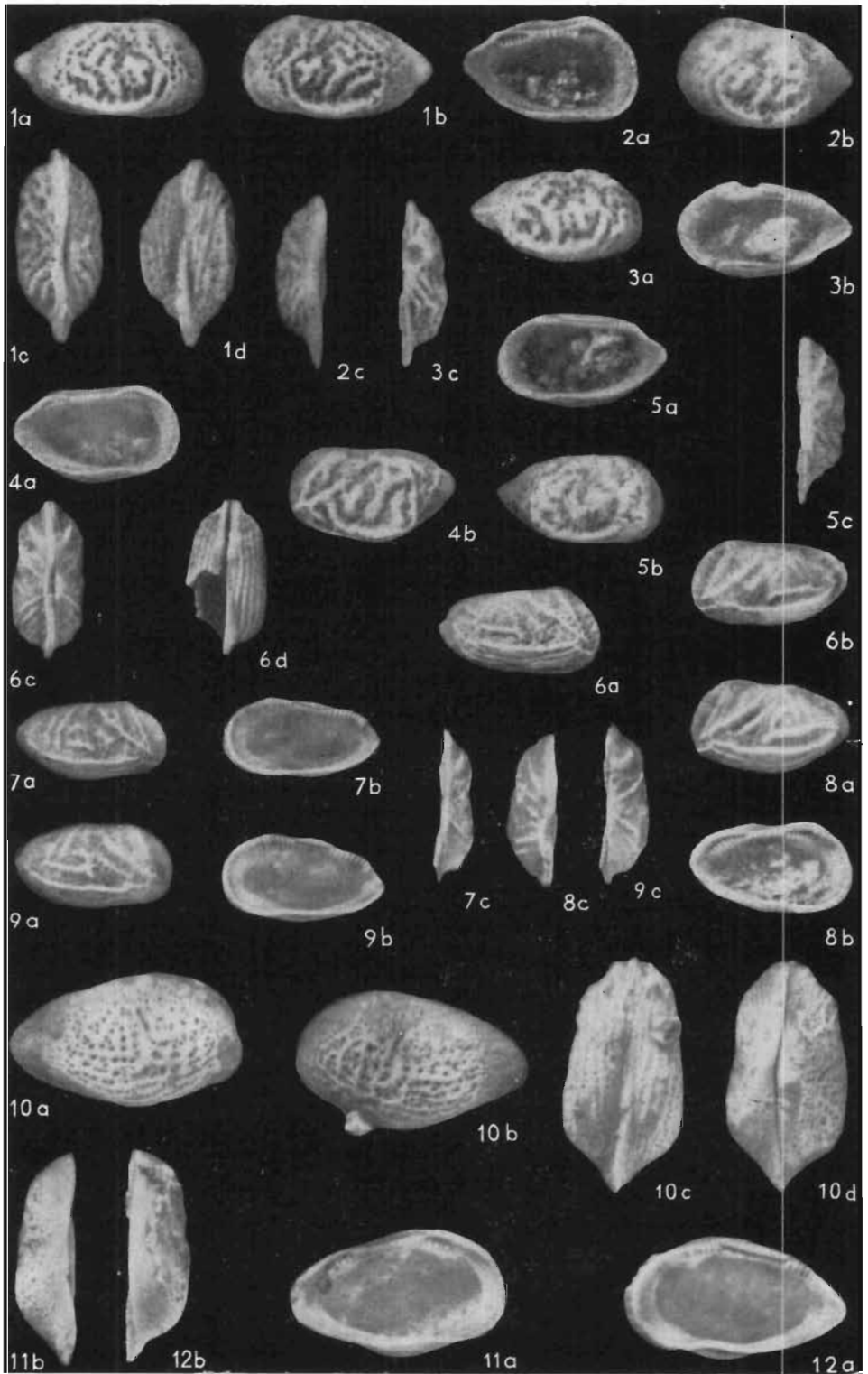


Plate XVIII

Ektyphocythere nucleopersica n. sp.
(Jaworznik, 34.0 m, Middle Bathonian)

- Fig. 1. C ♂ (0.46) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/135.
Fig. 2. ♀ (0.43) — Adult: *a* LV internal view, *b* LV lateral view, *c* LV dorsal view; O.IV/136.
Fig. 3. ♀ (0.42) — Adult: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/137.

Ektyphocythere pteriformis n. sp.
(Jaworznik, 38.4 m, Lower Bathonian)

- Fig. 4. (0.41) — Adult, holotype: *a* LV internal view, *b* LV lateral view; O.IV/138.
Fig. 5. (0.40) — Adult: *a* RV internal view, *b* RV lateral view, *c* RV dorsal view; O.IV/139.

Ektyphocythere renatae n. sp.
(Iwanowice Wielkie, 29.7 m, Upper Bathonian)

- Fig. 6. C ♂ (0.38) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; O.IV/140.
Fig. 7. ♂ (0.36) — Adult: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/141.
Fig. 8. ♀ (0.37) — Adult: *a* LV lateral view, *b* LV internal view, *c* LV dorsal view; O.IV/142.
Fig. 9. ♀ (0.37) — Adult: *a* RV lateral view, *b* RV internal view, *c* RV dorsal view; O.IV/143.

Procytheridea czestochowiensis n. sp.
(Choroń, 60.0 m, Middle Kujavian)

- Fig. 10. C (0.55) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/144.
Fig. 11. (0.54) — Adult: *a* LV internal view, *b* LV dorsal view; O.IV/145.
Fig. 12. (0.54) — Adult: *a* RV internal view; *b* RV dorsal view; O.IV/146.

Plate XIX

Eucytherura rectodorsalis n. sp.

(Iwanowicie Wielkie, 35.3 m, Upper Bathonian)

- Fig. 1. C (0.30) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* ventral view; O.IV/147.
Fig. 2. C (0.30) — Adult: *a* LV internal view, *b* LV dorsal view; O.IV/148.
Fig. 3. (0.30) — Adult: *a* RV internal view, *b* RV dorsal view; O.IV/149.

Hutsonia? iwanowicensis n. sp.

(Iwanowicie Wielkie, 35.3 m, Upper Bathonian)

- Fig. 4. (0.32) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* dorsal view; O.IV/150.
Fig. 5. (0.32) — Adult: RV internal view; O.IV/151.
Fig. 6. (0.32) — Adult: LV internal view; O.IV/152.

Cytheropteron (Cytheropteron) tenuis n. sp.

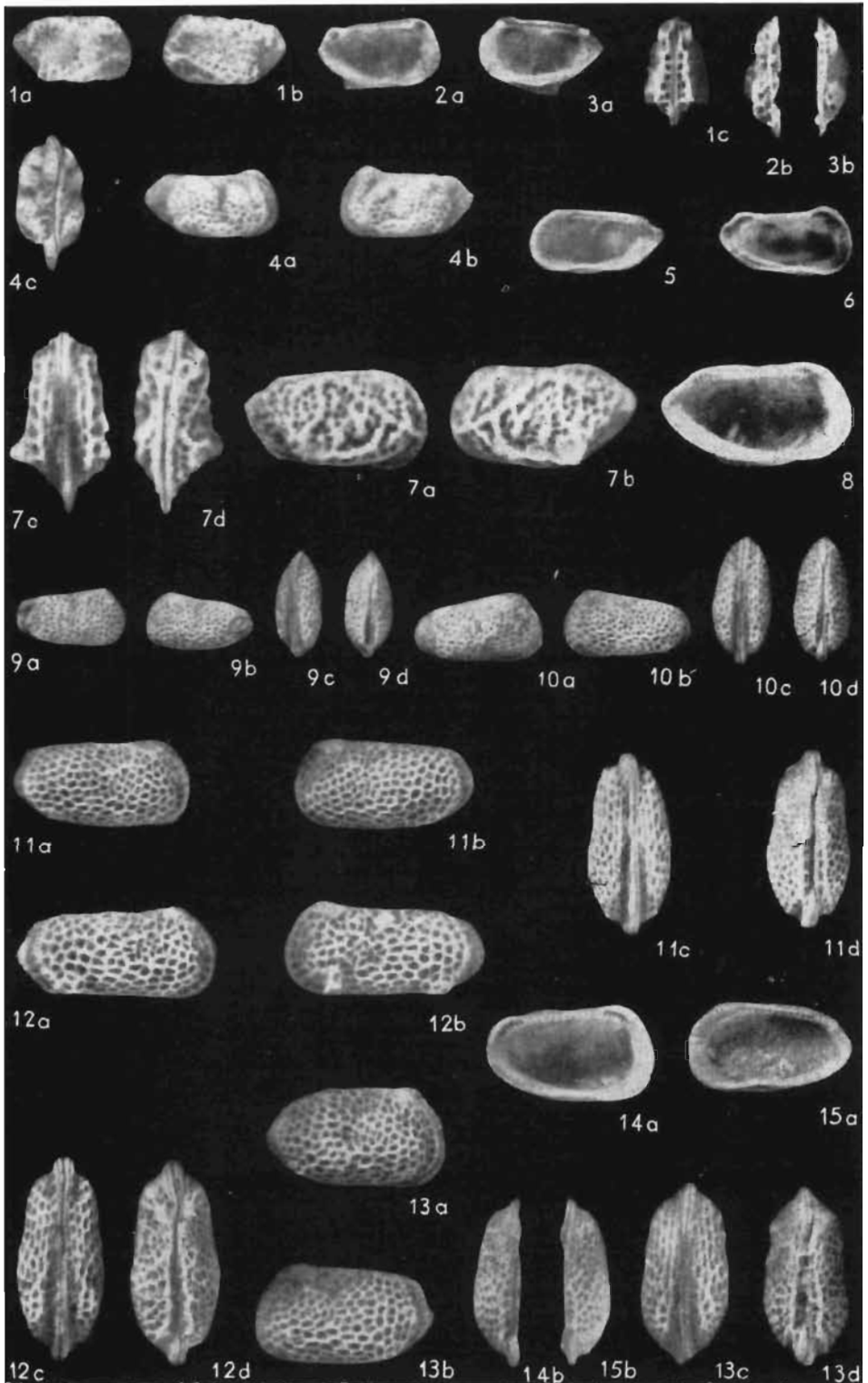
(Choroń, 81.0 m, Middle Kuiavian)

- Fig. 7. C (0.46) — Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/153.
Fig. 8. (0.46) — Adult: LV internal view; O.IV/154.

Parariscus octoporalis n.sp.

(Choroń, 81.0 m, Middle Kuiavian)

- Fig. 9. C (0.25) — Instar III: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/155.
Fig. 10. C (0.31) — Instar IV: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/156.
Fig. 11. C (0.44) — Instar V: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/157.
Fig. 12. ♂ (0.50) — Adult: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/158.
Fig. 13. C ♀ (0.43) — Adult, holotype: *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/159.
Fig. 14. ♀ (0.43) — Adult: *a* IV internal view, *b* LV dorsal view; O.IV/160.
Fig. 15. ♀ (0.43) — Adult: *a* RV internal view, *b* RV dorsal view; O.IV/161.



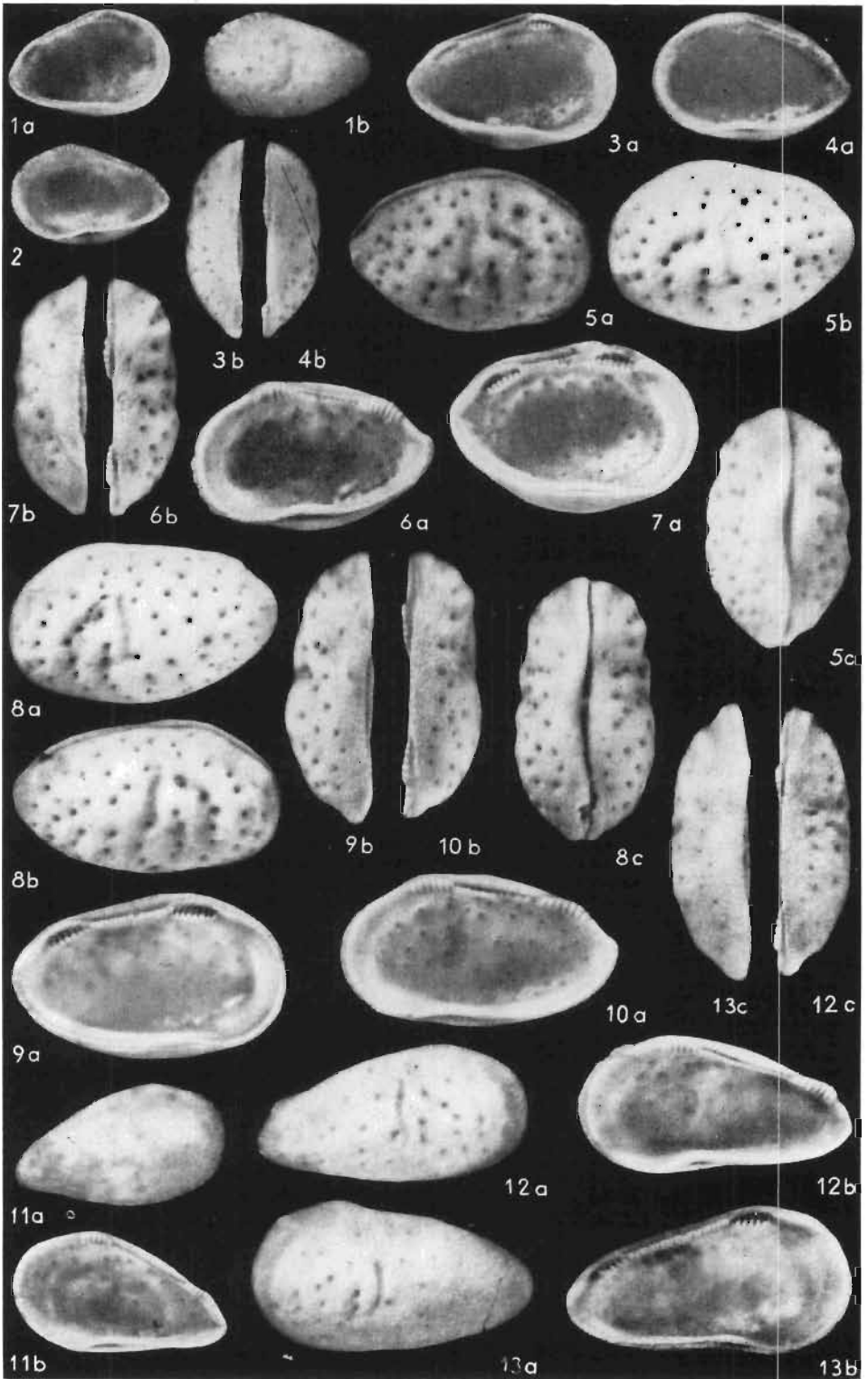


Plate XX

Progonocythere? convexa n. sp.

(Iwanowice Wielkie, 29.7 m, Upper Bathonian)

- Fig. 1. (0.38) — Instar IV: a LV internal view, b LV lateral view; O.IV/162.
Fig. 2. (0.37) — Instar IV: RV internal view; O.IV/163.
Fig. 3. (0.48) — Instar V: a LV internal view, b LV dorsal view; O.IV/164.
Fig. 4. (0.47) — Instar V: a RV internal view, b RV dorsal view; O.IV/165.
Fig. 5. C ♀ (0.58) — Adult: a RV lateral view, b LV lateral view, c dorsal view; O.IV/166.
Fig. 6. ♀ (0.57) — Adult: a RV internal view, b RV dorsal view; O.IV/167.
Fig. 7. ♀ (0.58) — Adult: a LV internal view, b LV dorsal view; O. IV/168.
Fig. 8. ♂ (0.66) — Adult, holotype: a LV lateral view, b RV lateral view, c dorsal view; O.IV/169.
Fig. 9. ♂ (0.66) — Adult: a LV internal view, b LV dorsal view; O.IV/170.
Fig. 10. ♂ (0.65) — Adult: a RV internal view, b RV dorsal view; O.IV/171.

Progonocythere? posteriohumilis n. sp.

(Jaworzniak, 29.2 m, Middle Bathonian)

- Fig. 11. (0.50) — LA: a RV lateral view, b RV internal view; O.IV/172.
Fig. 12. ♂ (0.67) — Adult: a RV lateral view, b RV internal view; O.IV/173.
Fig. 13. ♂ (0.68) — Adult, holotype: a LV lateral view, b LV internal view; O.IV/174.

Plate XXI

Progonocythere polonica Błaszyk
(Jaworznik, 38.4 m, Lower Bathonian)

- Fig. 1. ♀ (0.65) — Adult: LV internal view; O.IV/175.
Fig. 2. ♀ (0.64) — Adult: RV internal view; O.IV/176.
Fig. 3. C ♀ (0.65) — Adult: dorsal view; O.IV/177.

Monoceratina cf. *vulsa* (Jones & Sherborn)
(Choroń, 91.7 m, Middle Kuiavian)

- Fig. 4. C (0.53) — Adult: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/178.

Monoceratina? *amygdaliformis* n. sp.
(Jaworznik, 31.5 m, Middle Bathonian)

- Fig. 5. C (0.27) — Instar III: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/179.
Fig. 6. C (0.32) — Instar IV: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/180.
Fig. 7. C (0.40) — Instar V: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/181.
Fig. 8. C ♀ (0.48) — Adult, holotype: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/182.
Fig. 9. C ♂ (0.50) — Adult: *a* LV lateral view, *b* RV lateral view, *c* ventral view, *d* dorsal view; O.IV/183.

Genus and species indet.
(Jaworznik, 73.4 m, Middle Kuiavian)

- Fig. 10. C (0.63) — *a* RV lateral view, *b* LV lateral view, *c* ventral view, *d* dorsal view; O.IV/184.

