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LOWER KIMMERIDGIAN OSTRACODA FROM THE NW BORDER OF  
THE HOLY CROSS MOUNTAINS, POLAND

*Abstract.* — Thirty five Lower Kimmeridgian ostracod species, including 13 new ones, assigned to 9 families, are described. They come from five borings at Strzałków locality (NW border of the Holy Cross Mts.). A subdivision of the Lower Kimmeridgian of this region into 3 ostracod horizons is proposed. The Lower Kimmeridgian ostracod assemblage of this region resembles those of the contemporaneous deposits in Central and Northern France, Southern England, Northwest Germany, Denmark and of the Swiss Jura.

INTRODUCTION

The material for the present study comes from five borings at Strzałków locality (NW border of the Holy Cross Mts. vicinity of Radom):

Strzałków I/2	depth	13.00—15.70 m
Strzałków I/3	„	14.30—16.50 m
Strzałków I/4	„	10.70—39.00 m
Strzałków I/5	„	18.00—34.00 m
Strzałków I/6	„	22.00—62.00 m

The Upper Jurassic deposits found here were divided into the late Upper Oxfordian, Lower Kimmeridgian and early Upper Kimmeridgian, on the basis of the foraminiferans (Małecki, 1966). The adolescent pelecypodes from the same bore-cores were described by Pugaczewska (1971). The lithological characteristics of the Upper Oxfordian and Kimmeridgian deposits of this region have been described by Wyrwicka (1969). Lower Kimmeridgian ostracods were present in all the bore-cores mentioned above; Upper Oxfordian ostracods were found only in the Strzałków I/6 bore-core; Upper Kimmeridgian ostracods were not found in any of the borings. The ostracod collection described in the present paper is stored in the Palaeozoological Institute of the Polish Academy of Sciences, Warszawa (ZPAL). The material was kindly provided by Prof J. Małecki (Academy of Mines and Metallurgy, Cracow), to whom the present authors

Table 1  
DISTRIBUTION OF THE DESCRIBED OSTRACODS IN THE UPPERMOST OXFORDIAN AND KIMMERIDGIAN OF NW EUROPE

Species	NW Holy Cross Mts.	Polish Lowlands	S England	NW Germany	Denmark	France		Swiss Jura
						Paris Basin	Normandy	
	J. Blaszyk, W. Bielecka et O. Styk, 1974	W. Bielecka, O. Styk 1966, 1968	T. I. Kilenyi, 1969 O. B. Christensen et T. I. Kilenyi, 1970	H. J. Oertli, 1959 W. Klingler, H. Malz et G. P. R. Martin, 1962 H. Glashoff, 1964	O. B. Christensen et T. I. Kilenyi, 1970	H. J. Oertli, 1957, 1959	J. Guyader, 1968	H. J. Oertli, 1959
<i>Macrocypris</i> sp.	K <sub>1</sub>							
<i>Amphicythere confundens</i> Oertli		K <sub>1,2</sub>	K <sub>1</sub>	O, K <sub>1</sub>		K <sub>1</sub>	K <sub>1,2</sub>	K <sub>1</sub>
<i>Amphicythere delicatipunctata</i> sp.n.	K <sub>1</sub>							
<i>Amphicythere kilenyi</i> sp.n.	K <sub>1</sub>							
<i>Amphicythere ventricostata</i> sp.n.	K <sub>1</sub>							
<i>Polydentina crassicostata</i> sp.n.	K <sub>1</sub>							
<i>Polydentina flabellaticostata</i> sp.n.	K <sub>1</sub>							
<i>Polydentina quadricostata</i> sp.n.	K <sub>1</sub>							
<i>Polydentina rudis</i> Malz	K <sub>1</sub>	K <sub>1</sub>		K <sub>1</sub>	K <sub>1,2</sub>	K <sub>2</sub>	K <sub>1</sub>	
<i>Monoceratina trinodosa</i> sp.n.	K <sub>1</sub>							
<i>Monoceratina</i> sp.	K <sub>1</sub>							

<i>Galliaecytheridea cuneiformis</i> sp.n.	K <sub>1</sub>							
<i>Galliaecytheridea densipunctata</i> sp.n.	K <sub>1</sub>							
<i>Galliaecytheridea dissimilis</i> Oertli	O, K <sub>1</sub>	O, K <sub>1</sub>	K <sub>1 2</sub>	O, K <sub>1</sub>	K <sub>1</sub>	O, K <sub>1</sub>	K <sub>1</sub>	
<i>Galliaecytheridea fragilis</i> Kilenyi	K <sub>1</sub>		K <sub>1</sub>					
<i>Galliaecytheridea inaequalpunctata</i> sp.n.	O, K <sub>1</sub>							
<i>Galliaecytheridea postrotunda</i> Oertli	K <sub>1</sub>	O, K <sub>1</sub>	K <sub>1</sub>	O, K <sub>1</sub>	K <sub>1</sub>	O, K <sub>1</sub>	O, K <sub>1</sub>	O
<i>Galliaecytheridea punctata</i> Kilenyi	K <sub>1</sub>		K <sub>1</sub>					
<i>Galliaecytheridea raripunctata</i> sp.n.	O, K <sub>1</sub>							
<i>Galliaecytheridea wolburgi</i> (Steghaus)	K <sub>1</sub>	K <sub>1 2</sub>	K <sub>1</sub>	O, K <sub>1 2</sub>	?	K <sub>1</sub>	O, K <sub>1 2</sub>	
<i>Nodophthalmocythere pazdroae</i> sp.n.	K <sub>1</sub>	K <sub>1</sub>		K <sub>1</sub>		K <sub>1</sub>	K <sub>1</sub>	
<i>Nodophthalmocythere</i> sp.	K <sub>1</sub>							
<i>Schuleridea strzalkowiensis</i> sp.n.	K <sub>1</sub>							
<i>Orthonotacythere interrupta</i> Triebel	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	O, K <sub>1</sub>	K <sub>1</sub>	O, K <sub>1 2</sub>	O, K <sub>1 2</sub>	
<i>Procytheropteron subtrapezoides</i> sp.n.	K <sub>1</sub>							
<i>Procytheropteron</i> sp.	K <sub>1</sub>							
<i>Lophocythere cruciata kimmeridgiensis</i> Guyader	K <sub>1</sub>	K <sub>1</sub>						
<i>Protocythere furcata</i> Bielecka et Styk	K <sub>1</sub>	K <sub>1</sub>						
<i>Protocythere fusca</i> sp.n.	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	?	K <sub>1</sub>	K <sub>1 2</sub>	K <sub>1</sub>
<i>Protocythere sigmoidea</i> Steghaus	K <sub>1</sub>	K <sub>1 2</sub>	K <sub>1 2</sub>	K <sub>1</sub>	K <sub>2</sub>	K <sub>1</sub>		K <sub>1 2</sub>
<i>Protocythere</i> sp. 1	K <sub>1</sub>							
<i>Protocythere</i> sp. 2	K <sub>1</sub>							
<i>Mandelstamia rectilinea</i> Malz	K <sub>1</sub>		K <sub>1 2</sub>		K <sub>1</sub>		K <sub>1 2</sub>	
<i>Exophthalmocythere fuhrbergensis</i> Steghaus	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>		K <sub>1</sub>	K <sub>1 2</sub>	
<i>Cytherella (Cytherelloidea) weberi</i> Steghaus	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>		K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>

O — Uppermost Oxfordian

K<sub>1</sub> — Lower KimmeridgianK<sub>2</sub> — Upper Kimmeridgian

Table 2

## DISTRIBUTION OF THE OSTRACODS IN THE UPPERMOST OXFORDIAN AND LOWER KIMMERIDGIAN OF N W HOLY CROSS MTS

OXFORDIAN Uppermost	KIMMERIDGIAN Lower			Stage
	I	II	III	Zone
		—	—	<i>Galliaecytheridea dissimilis</i>
		—		<i>Galliaecytheridea inaequalipunctata</i> sp.n.
		—		<i>Galliaecytheridea raripunctata</i> sp.n.
	—	—		<i>Polydentina crassicostata</i> sp.n.
	—		—	<i>Mandelstamia rectilinea</i>
	—			<i>Galliaecytheridea wolburgi</i>
	—	—	—	<i>Galliaecytheridea punctata</i>
	—			<i>Polydentina rudis</i>
	—	—	—	<i>Protocythere fusca</i> sp.n.
	—	—		<i>Galliaecytheridea cuneiformis</i> sp.n.
		—		<i>Monoceratina trinodosa</i> sp.n.
		—		<i>Galliaecytheridea postrotunda</i>
		—		<i>Procytheropteron</i> sp.
		—		<i>Nodophthalmocythere</i> sp.
		—	—	<i>Lophocythere cruciata kimmeridgiensis</i>
		—	—	<i>Cytherella (Cytherelloidea) weberi</i>
		—	—	<i>Protocythere</i> sp. 1
		—	—	<i>Protocythere furcata</i>
		—		<i>Amphicythere ventricostata</i> sp.n.
		—	—	<i>Schuleridea strzalkowiensis</i> sp.n.
		—		<i>Galliaecytheridea densipunctata</i> sp.n.
		—		<i>Amphicythere delicatipunctata</i> sp.n.
		—	—	<i>Exophthalmocythere fuhrbergensis</i>
		—	—	<i>Orthonotacythere interrupta</i>
		—	—	<i>Amphicythere kilenyii</i> sp.n.
		—	—	<i>Polydentina flabellaticostata</i> sp.n.
		—	—	<i>Procytheropteron subtrapezoides</i> sp.n.
			—	<i>Polydentina quadricostata</i> sp.n.
			—	<i>Galliaecytheridea fragilis</i>
			—	<i>Protocythere sigmoidea</i>
			—	<i>Protocythere</i> sp. 2
			—	<i>Amphicythere confundens</i>
			—	<i>Monoceratina</i> sp.
			—	<i>Nodophthalmocythere pazdroae</i> sp.n.
			—	<i>Macrocypris</i> sp.

Table 3

DISTRIBUTION OF THE OSTRACOD SPECIES IN STRZĄKÓW BORE-HOLES  
I/2-6

BORE-CORES (depth in m)			STAGE		
			L.Kim.	L.Kim.	
Strzałków I/2 13,0-14,5					OSTRACOD ZONE
15,7					<i>Galliaecytheridea dissimilis</i> Oertli
Strzałków I/3 14,5-16,5					<i>Galliaecytheridea inaequalipunctata</i> sp.n.
Strzałków I/4 10,7-11,7 11,7-12,5 12,5-14,0 14,0-15,0 21,0-22,0 22,0-23,0 23,0-31,0 33,0-35,0 35,0-37,0 37,0-39,0					<i>Galliaecytheridea raripunctata</i> sp.n.
Strzałków I/5 18,0-20,0 20,0-22,0 22,0-24,0 24,0-26,0 26,0-28,0 28,0-30,0 30,0-32,0 32,0-34,0					<i>Polydentina crassicostata</i> sp.n.
Strzałków I/6 22,0-24,0 30,0-32,0 32,0-34,0 34,0-36,0 36,0-40,0 40,0-42,0 46,0-48,0 48,0-50,0 50,0-52,0 54,0-56,0 56,0-58,0 58,0-60,0 60,0-62,0					<i>Mandelstamia rectilinea</i> Malz
U.Oxfordian	L.Kimmeridgian	L.Kimmeridgian			<i>Galliaecytheridea wolburgi</i> (Steghaus)
					<i>Galliaecytheridea punctata</i> (Kilenvi)
					<i>Polydentina rudis</i> Malz
					<i>Protocythere fusca</i> sp.n.
					<i>Galliaecytheridea cuneiformis</i> sp.n.
					<i>Monoceratina trinodosa</i> sp.n.
					<i>Galliaecytheridea postrotunda</i> Oertli
					<i>Procytheropteron</i> sp.
					<i>Nodophthalmocythere</i> sp.
					<i>Lophocythere cruciata kimmeridgiensis</i> Quayader
					<i>Cytherella (Cytherelloidea) weberi</i> Steghaus
					<i>Protocythere</i> sp.1.
					<i>Protocythere furcata</i> Bielecka et Stvk
					<i>Amphicythere ventricostata</i> sp.n.
					<i>Schulezidea strzalkowiensis</i> sp.n.
					<i>Galliaecytheridea densipunctata</i> sp.n.
					<i>Amphicythere delicatipunctata</i> sp.n.
					<i>Exophthalmocythere fuhrbergensis</i> Steghaus
					<i>Orthonotacythere interrupta</i> Triebel
					<i>Amphicythere kienyii</i> sp.n.
					<i>Polydentina flabellaticostata</i> sp.n.
					<i>Procytheropteron subtrapezoides</i> sp.n.
					<i>Polydentina quadricostata</i> sp.n.
					<i>Galliaecytheridea fragilis</i> Kilenvi
					<i>Protocythere sigmoidea</i> Steghaus
					<i>Protocythere</i> sp.2
					<i>Amphicythere confundens</i> Oertli
					<i>Monoceratina</i> sp.
					<i>Nodophthalmocythere pazdroae</i> sp.n.
					<i>Macrocypris</i> sp.

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POLISH AND WESTERN EUROPEAN LOWER KIMMERIDGIAN  
OSTRACOD ASSEMBLAGES

The Uppermost Oxfordian of the Strzałków region yielded a poor ostracod assemblage (Table 3) containing only three species of the genus *Galliaecytheridea*. Differently, the overlying Lower Kimmeridgian deposits are characterized by numerous ostracod species of the genera: *Galliaecytheridea* (9 species), *Protocythere* (5 species), *Polydentina* (4 species), *Amphicythere* (4 species), *Procytheropteron* (2 species), *Monoceratina* (2 species), *Nodophthalmocythere* (2 species), *Mandelstamia*, *Lophocythere*, *Cytherella*, *Schuleridea*, *Exophthalmocythere*, *Orthonotacythere*, *Macrocypris* (1 species each).

Within the Lower Kimmeridgian of this region, 3 ostracod horizons (I—III) can be distinguished, each with its own species of ostracods (Table 2). In addition to the species which overcome the Upper Oxfordian/Lower Kimmeridgian boundary, some new elements appear in horizon I, which is represented by the genera: *Polydentina*, *Protocythere*, *Mandelstamia* and *Galliaecytheridea*. A characteristic species of horizon I is *Galliaecytheridea cuneiformis* sp. n.

Horizon II contains, in addition to the species present in horizon I, some characteristic species: *Amphicythere ventricostata* sp.n., *A. delicatipunctata* sp.n. and *Galliaecytheridea densipunctata* sp.n. Also present, but only in the Strzałków I/6 boring, are *G. postrotunda*, *Monoceratina trinodosa* sp.n., *Procytheropteron* sp., *Nodophthalmocythere* sp.

Horizon III is distinguished by its own ostracod assemblage represented by *Galliaecytheridea fragilis*, *Polydentina quadricostata* sp.n., *Protocythere sigmoidea*, *P.sp. 2*, *Amphicythere confundens*, *Monoceratina* sp., *Nodophthalmocythere pazdroae* sp. n.

The ostracod assemblage of the NW border of the Holy Cross Mts. has about two thirds of its species in common with the Upper Oxfordian, and especially with the Lower Kimmeridgian of the Polish Lowlands, S England, NW Germany, Denmark, Central and N France and of the Swiss Jura allowing the Polish deposits be correlated with the contemporaneous Western European ones. The remaining third, however, is formed by new species which reflects some extent of endemism of the region under study (Table 1).

In the Upper Oxfordian epicontinental sediments of the border of the Holy Cross Mts., Polish Lowlands, SW Germany and the Paris Basin there are two common species: *Galliaecytheridea dissimilis* and *G. postrotunda*.

They continue also into the Lower Kimmeridgian, at the beginning of which they are joined (both in the area above mentioned, and also in S England and Normandy) by *Amphicythere confundens*, *Galliaecytheridea wolburgi*, *Nodophthalmocythere pazdroae* sp.n., *Exophthalmocythere fuhrbergensis*, *Cytherella (Cytherelloidea) weberi*, *Orthonotacythere interrupta* and *Protocythere sigmoidea*. The latter two species are found also in Denmark. In the Polish Lowlands, S England, Denmark and Normandy *Mandelstamia (Mandelstamia) rectilinea* is a common element. In Poland, NW Germany, Denmark, Paris Basin and Normandy the common species is *Polydentina rudis*; in Poland and England it is *Galliaecytheridea punctata*, and in Poland and Normandy — *Lophocythere cruciata kimmeridgensis*. Some of the above mentioned species are reported also for the Lower Kimmeridgian of the Swiss Jura. They are: *Amphicythere confundens*, *Nodophthalmocythere pazdroae* sp.n., *Protocythere sigmoidea* and *Cytherella (Cytherelloidea) weberi*.

## SYSTEMATIC PART

### Suborder **Podocopina** Sars, 1866

### Family **Macrocyprididae** Müller, 1912

### Genus **Podocopina** Sars, 1866

#### *Macrocypris* sp.

(pl. I, figs 1-2)

*Material.* — Two fairly well preserved carapaces.

Dimensions (in mm):

	ZPAL Nos. 0.X/1 adult	0.X/2 premature
Length of carapace	0.39	0.33
Height of carapace	0.15	0.13
Width of carapace	0.11	0.11

*Description.* — Carapace elongated with slightly convex dorsal area and straight ventral area; right valve larger, overlapping the left one more strongly along the ventral than the dorsal margin; anterior end narrowly rounded; the outermost point of the rather sharp posterior end is slightly above the ventral margin. In dorsal view, right valve contacts left valve along a straight line. Outer surface of carapace smooth.

The premature specimen found (0.X/2) differs from the adult one only in size.

*Remarks.* — The specimens described resemble *Macrocypris aequabilis* Oertli, but differ from the latter in having a straight dorsal margin.

*Occurrence.* — Poland: Lower Kimmeridgian, zone III (Strzałków I/2).

Family **Brachycytheridae** Puri, 1954  
 Genus *Amphicythere* Triebel, 1954  
*Amphicythere confundens* Oertli, 1957  
 (pl. I, figs 3-5)

1957. *Amphicythere* (*Amphicythere*?) *confundens* Oertli, p. 674, pl. 7, figs 219-226.

*Material.* — About 30 well preserved specimens, including carapaces, right and left valves.

Dimensions (in mm):

ZPAL No. 0.X/3

Length of carapace	0.66
Height of carapace	0.44
Width of carapace	0.31

*Remarks.* — Polish specimens differ from the holotype in having smaller pits on the outer surface of the carapace. Male specimens are longer than the females. The specimens described by Kilenyi (1969, pl. 29, figs 25-26) as *A. confundens* cannot be assigned to this species but to *A. kilenyii* a new species, here established (p. 208).

*Occurrence.* — Poland: Lower Kimmeridgian, zone III (Strzałków I/2). France, Paris Basin (boring Vernon 1): basal Lower Kimmeridgian. Switzerland, Jura Mts.: Lower and Middle Kimmeridgian. NW FRG: Lower Kimmeridgian, Middle Coral Oolite.

*Amphicythere kilenyii* sp.n.

(pl. I, figs 6-9, pl. II, figs 1-4, text-fig. 1)

1969. *Amphicythere confundens* Oertli; Kilenyi, p. 146, pl. 29, figs 25, 26.

*Holotype:* ZPAL No. 0.X/7; pl. I, fig. 6

*Type horizon:* Lower Kimmeridgian, zone III.

*Type locality:* borehole Strzałków I/4, depth 12.50—14.00 m.

*Derivation of the name:* in honour of T. J. Kilenyi.

*Diagnosis.* — Valve elongated, cut anterodorsally, posterodorsally and postero-ventrally. Outer surface smooth with large pits placed centrally and small pits on peripheries.

*Material.* — About 200 well preserved carapaces and right and left valves.

Dimensions (in mm):

ZPAL Nos.	0.X/7	0.X/11	0.X/14	0.X/8	0.X/10
	adult ♀	adult ♂	premature ♂	premature ♀	juvenile ♀
Length of right valve	0.68	—	—	—	—
Length of carapace	—	0.72	0.64	0.60	0.54
Height of right valve	0.40	—	—	—	—
Height of carapace	—	0.42	0.36	0.40	0.36
Width of carapace	—	0.36	0.30	0.34	0.30



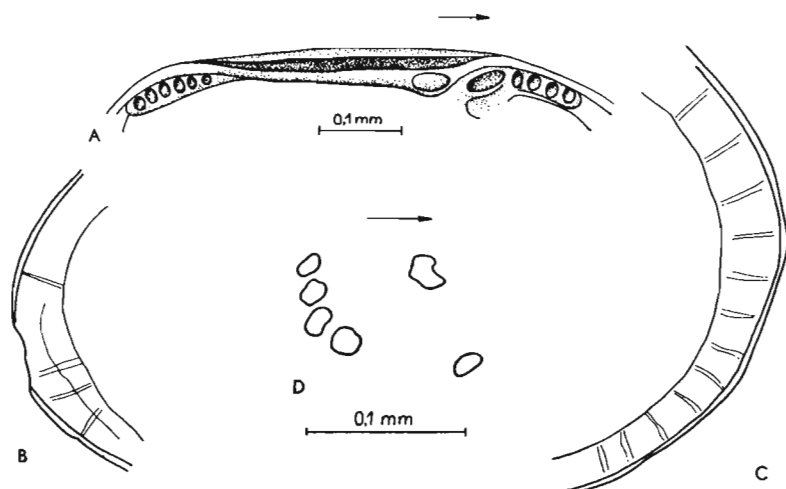


Fig. 1. *Amphicythere kilenyii* sp.n.: A left valve ♂, ZPAL No. 0.X/16; A hinge, B posterior radial pore canals, C anterior radial pore canals, D muscle scars.

**Description.**—In addition to the characters mentioned in diagnosis the following features can be noted: dorsal margin almost straight, ventral margin bent; anterior end rounded, posterior end elongated and slightly rounded; pits on outer surface irregularly spaced, except for the anterodorsal part below a distinct ocular tubercle, where they are arranged more or less concentrically. As seen from the inner side, middle part of contact margin bent inwards, whereas the posterior part is almost straight and convergent with dorsal margin; 4 adductor muscle scars slightly forward of center; anterior marginal zone broader than the posterior; radial pore canals straight. Paramphidont hinge of right valve with 4 small teeth and 1 large tooth in anterior hinge area, with anteriorly widened groove in interangular hinge area and with 6 teeth in posterior hinge area. Valves of the premature carapace (ZPAL 0.X/8) uniformly convex, in dorsal view; contact line bent towards left valve centrally; dorsal marginal surface smooth (without pits). In ventral view, contact line straight; ventral marginal surface devoid of pits, sometimes with fine longitudinal ribs, two on each valve. Sexual dimorphism distinctly pronounced.

**Remarks.**—Specimens illustrated as *A. confundens* by Kilenyi (1969, pl. 29, figs 25, 26) do not differ from *A. kilenyii* sp.n. *A. kilenyii* exhibits a variable arrangement of pits; from irregular to concentric. The slightly more horizontal arrangement of the pits in posterior area of valves of the specimens illustrated by Kilenyi (*l.c.*) falls within the limits of individual variability of *A. kilenyii*.

**Occurrence.**—Poland: Lower Kimmeridgian, zone II (Strzałków I/5), zones II—III (Strzałków I/4). England, Dorset: Kimmeridge Clay.

### *Amphicythere delicatipunctata* sp.n.

(pl. II, figs 5-8)

**Holotype:** ZPAL No. 0.X/18; pl. II, fig. 5.

**Type horizon:** Lower Kimmeridgian, zone II.

**Type locality:** borehole Strzałków I/4, depth 12.50—14.00 m.

**Derivation of the name:** Lat. *delicatus* — fine, *punctatus* — punctured; carapace covered with fine pits.

*Diagnosis.* — Valve elongated, cut posterodorsally and posteroventrally. Outer surface smooth covered with fine pits decreasing in size and gradually disappearing towards peripheries. A single pit placed on mid-anterior lateral surface area of valve. Hinge paramphidont.

*Material.* — 40 well preserved carapaces and right and left valves.

Dimensions (in mm):

ZPAL Nos.	0.X/18 adult ♀	0.X/22 adult ♂	0.X/24 juvenile ♂	0.X/20 premature ♀	0.X/21 juvenile ♀
Length of carapace	—	0.66	—	—	—
Length of right valve	—	—	0.50	—	0.40
Length of left valve	0.63	—	—	0.52	—
Height of carapace	—	0.36	—	—	—
Height of right valve	—	—	0.29	—	0.27
Height of left valve	0.40	—	—	0.34	—
Width of carapace	—	0.31	—	—	—

*Description.* — In addition to the features mentioned in diagnosis, the species exhibits: almost straight dorsal margin and bent ventral margin; anterior end of valve rounded, whereas posterior end is elongated and slightly rounded; pits on outer surface of valve irregularly arranged; ocular tubercle distinct, placed anterodorsally. On inner surface of valve middle part of ventral contact margin bent inwards, posterior part of the margin almost straight and convergent with dorsal margin; 4 adductor muscle scars shifted somewhat anteriorly from the centre of valve; anterior marginal zone broader than the posterior; pore canals straight. Paramphidont hinge of left valve with 4 small sockets and one large socket in anterior hinge area, with anteriorly broadened hinge list in interangular hinge area and with 6 sockets in posterior hinge area. Valves of carapace ZPAL 0.X/22 uniformly convex, in dorsal view; contact line bent towards left valve medially; dorsal marginal surfaces smooth (without pits). In ventral view, contact line straight; ventral marginal surfaces smooth, devoid of pits.

*Remarks.* — *Amphicythere delicatipunctata* sp.n. differs from *A. kilenyii* sp.n. in having a valve that is rounded anterodorsally in outline and in having much smaller pits on the outer surface.

*Occurrence.* — Poland; Lower Kimmeridgian, zone II (Strzałków I/4, I/5).

### *Amphicythere ventricostata* sp.n.

(pl. III, figs 1-2)

*Holotype:* ZPAL No. 0.X/25; pl. III, fig. 1.

*Type horizon:* Lower Kimmeridgian, zone II.

*Type locality:* borehole Strzałków I/5, depth 24.00—26.00 m.

*Derivation of the name:* Lat. *venter* — belly, *costatus* — ribbed; carapace ribbed ventrally.

*Diagnosis.* — Carapace elongated, cut posterodorsally and anteroventrally, left valve larger than the right one. Outer surface smooth with fine pits decreasing in size peripherally and with transverse crook-like depression. Ocular tubercle distinct. Hinge paramphidont.

*Material.* — Two carapaces and 6 valves, badly preserved.

Dimensions (in mm):

ZPAL Nos.	0.X/25 adult	0.X/26 premature
Length of carapace	0.60	—
Length of left valve	—	0.51
Height of carapace	0.36	—
Height of left valve	—	0.31
Width of carapace	0.32	—

*Description.* — In addition to the characters mentioned in the diagnosis the species is characterized by the almost straight dorsal margin of carapace and the outwardly bent ventral margin; anterior end rounded, posterior end elongated. In dorsal view, convexity of left and right valve gently diminishes backwards, but forwards it diminishes more rapidly, forming here an obtuse angle; medially the contact margin is slightly bent towards left valve. In ventral view, three longitudinal ribs present on peripheral surface of each valve. The straight portion of crook-like depression present on outer surface of valve is half as long as the valve height and placed somewhat anteromedially; the bent portion of the depression ends below ocular tubercle. Paramphidont hinge in left valve contains: 4 small sockets and 1 large socket anteriorly, a hinge bar broadened at anterior end medially, and 6 sockets posteriorly.

*Remarks.* — *A. ventricostata* sp. n. differs from *A. delicatipunctata* sp.n. in having larger pits, a transverse crook-like depression on outer surface of valve and longitudinal ribs on peripheral ventral surface. It differs from *A. semisulcata* Triebel, 1954 in lacking oblique list running from the ocular tubercle and in the presence of a crook-like depression.

*Occurrence.* — Poland: Lower Kimmeridgian, zone II (Strzałków I/5).

### Genus *Polydentina* Malz, 1958

#### *Polydentina rudis* Malz, 1958

(pl. III, fig. 3)

1958. *Macrodentina (Polydentina) rudis* Malz, p. 31, pl. 4, figs 57—64.

*Material.* — Three specimens.

Dimensions (in mm):

	ZPAL No.	0.X/27 adult ♀
Length of left valve		0.60
Height of left valve		0.32

*Remarks.* — Polish specimens differ from the holotype in smaller length. They differ from the specimens of this species described from England (Barker, 1966) in having distinctly pronounced ribs in the posterior portion of the valve.

*Occurrence.* — Poland: Lower Kimmeridgian, zone I (Strzałków I/6). NW Germany: upper Middle Kimmeridgian, Upper Kimmeridgian. England, Dorset: Portlandian.

*Polydentina crassicostata* sp. n.

(pl. III, figs 4-10, pl. IV, figs 1-5, text-fig. 2)

*Holotype*: ZPAL No. 0.X/28; pl. III, fig. 8.*Type horizon*: Lower Kimmeridgian, zone II.*Type locality*: borehole Strzałków I/5, depth 24.00—26.00 m.*Derivation of the name*: *Lat. crassus* — thick, *costatus* — ribbed; valves covered with thick ribs.*Diagnosis*. — Carapace irregularly trapezoidal, cut posterodorsally and anterodorsally. Surface of carapace transversely ribbed, ventral area longitudinally ribbed. Left valve larger than the right. Hinge paramphidont.*Material*. — 40 well preserved specimens including carapaces, left and right valves. Dimensions (in mm):

ZPAL Nos.	0.X/28 adult ♀	0.X/30 premature ♀	0.X/32 juvenile ♀	0.X/31 juvenile ♀
Length of carapace	0.55	0.50	0.45	—
Height of carapace	0.36	0.31	0.27	—
Width of carapace	0.32	0.27	0.24	—
Length of left valve	—	—	—	0.43
Height of left valve	—	—	—	0.27

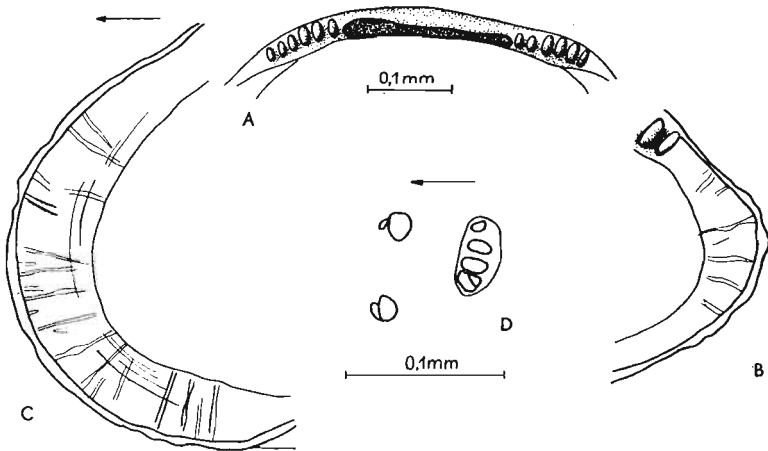


Fig. 2. *Polydentina crassicostata* sp.n., *a* right valve, ZPAL No. 0.X/33; *A* hinge, *B* posterior radial pore canals, *C* anterior radial pore canals, *D* muscle scars.

*Description*. — In addition to the diagnostic characters, the species is characterized by rounded anterior and obtuse posterior end; dorsal margin almost straight on right valve, but slightly bent on left valve; ventral margin gently arched to the posterior end. In dorsal and ventral views, both valves uniformly convex and their outline weakly narrows forwards and backwards. Dorsal contact line slightly bent towards left valve medially. Dorsal marginal surface of both valves smooth, slightly thickened on left valve; ventral marginal surface narrow, smooth. Ventral contact line straight, slightly bent inwards medially. Ventral surface of each valve covered with 4 equally long ribs, numerous pits present between these ribs. Dorsomedial area of the lateral surface of carapace covered with thick, numerous transverse ribs con-

verging at three quarters of valve height; abundant pits present between the ribs. Four adductor muscle scars present in central portion of valve. Anterior zone of radial pore canals broader than the posterior zone; radial pore canals straight.

*Remarks.*—For differences with *P. flabellaticostata* sp.n. see p. 213.

*Occurrence.*—Poland: Lower Kimmeridgian, zones I—II (Strzałków I/5), zones I—II (Strzałków I/6).

*Polydentina flabellaticostata* sp.n.

(pl. IV, figs 6-8, text-fig. 3)

*Holotype:* ZPAL No. 0.X/41; pl. IV, fig. 8.

*Type horizon:* Lower Kimmeridgian, zone III.

*Type locality:* borehole Strzałków I/4, depth 12.50—14.00 m.

*Derivation of the name:* Lat. *flabellum* — fan, *costatus* — ribbed; because of the fan-like arrangement of ribs.

*Diagnosis.*—Carapace irregularly oval, cut posterodorsally and anterodorsally. Lateral surface covered with ribs in a fan-like arrangement, ventral area longitudinally ribbed. Left valve larger than the right. Hinge paramphidont.

*Material.*—About 100 well preserved specimens, including carapaces as well as left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/41
	adult ♀
Length of carapace	0.59
Height of carapace	0.39
Width of carapace	0.32

*Description.*—In addition to the characters mentioned in the diagnosis, carapace exhibits rounded anterior and elongated posterior end; dorsal margin almost straight, ventral margin gently arched towards posterior end. In dorsal and ventral views, both valves uniformly convex, their outline sharply bent anteriorly and gently narrowing posteriorly. Dorsal contact line slightly bent towards left valve medially. Dorsal marginal surface of both valves smooth, somewhat thickened on left valve. Ventral contact line straight, slightly bent inside the carapace medially. Ventral marginal surface narrow, smooth. Four longitudinal ribs on the ventral area of each valve; inner ventral rib a third shorter than the other three; numerous pits between ventral ribs. Ribs of lateral surface are broad, flat and have a fan-like arrangement; they diverge at the dorsal margin, ending slightly below mid-height of valve; pits between the ribs numerous. Anterior and posterior part of carapace smooth with numerous pits, smaller than those between the ribs. Four adductor muscle scars visible in the center of the valve. Anterior and posterior marginal zones almost equally wide with straight radial pore canals (text-fig. 3a,b).

*Remarks.*—*Polydentina flabellaticostata* sp.n. differs from *P. crassicosata* sp.n.: in having fewer and thinner ribs, which are also wider and flatter on the mediodorsal area of the valve, as well as in the lack of ribs on the anterior and posterior parts of the valves. The outline of the carapace is also less oval in *P. flabellaticostata* than in *P. crassicosata*.

*Occurrence.*—Poland: Lower Kimmeridgian, zones II—III (Strzałków I/4), zone III (Strzałków I/2).

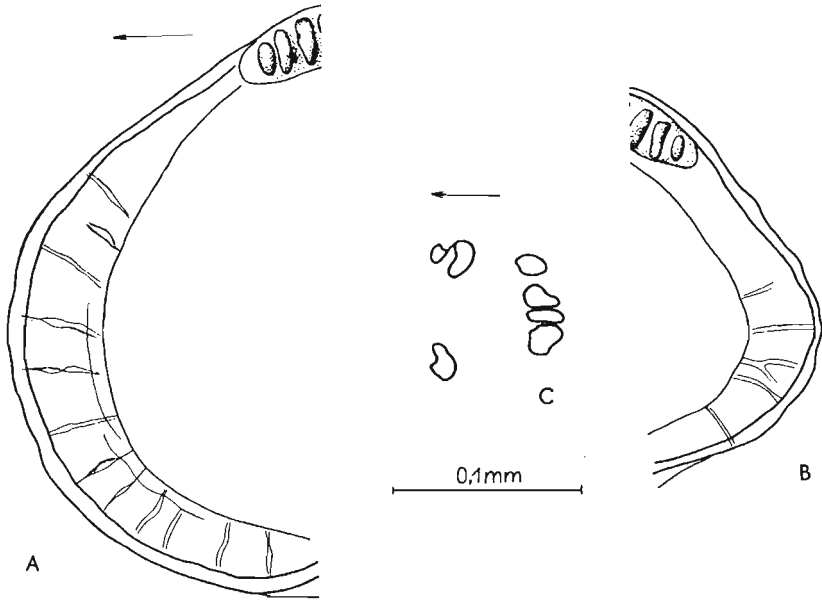


Fig. 3. *Polydentina flabellaticostata* sp.n., right valve: A anterior cardinal pore canals, B posterior radial pore canals, C muscle scars. ZPAL No. 0.X/49.

*Polydentina quadricostata* sp.n.  
(pl. V, figs 1-5)

*Holotype*: ZPAL No. 0.X/44; pl. V, fig. 5.

*Type horizon*: Lower Kimmeridgian, zone III.

*Type locality*: borehole Strzałków I/4, depth 12.50—14.00 m.

*Derivation of the name*: *Lat. quadri*—four, *costatus*—ribbed; having four ribs on lateral surface of valve.

*Diagnosis*.—Carapace irregularly oval, cut anterodorsally and posterodorsally. Lateral surface transversely ribbed, ventral area longitudinally ribbed posteriorly. Left valve larger than the right. Hinge paramphidont.

*Material*.—25 well preserved specimens including carapaces, as well as left and right valves.

Dimensions (in mm):

	ZPAL Nos.	0.X/44 adult ♀	0.X/48 juvenile ♀	0.X/47 premature ♀
Length of carapace		0.60	—	—
Height of carapace		0.39	—	—
Width of carapace		0.32	—	—
Length of left valve		—	—	0.52
Height of left valve		—	—	0.35
Length of right valve		—	0.43	—
Height of right valve		—	0.27	—

*Description.*— Besides the specific diagnostic characters carapace exhibits a straight dorsal margin and ventral margin gently arched posteriorly. In dorsal and ventral views, both valves uniformly convex; outline of valves sharply bent anteriorly, gently narrowing posteriorly. Dorsal contact line bent towards left valve medially. Dorsal marginal surface of both valves smooth, slightly thickened on left valve. Ventral contact line straight deepened inside the carapace medially. Ventral marginal surface narrow, smooth. Three longitudinal ribs present on posterior part of ventral area of each valve; they are almost equal in length except the inner one which does not reach the end of the valve; between the ribs, as well as on the smooth anterior part of carapace, numerous pits are present. Four flat, wide ribs extend between dorsal and ventral margin on the mediodorsal area of the lateral surface of the carapace; the first and the two last ribs are short and arched, the second is long and straight; the shorter ribs end at the mid-height of the valve. Anterior and posterior area of lateral surface of the carapace smooth and covered with numerous pits smaller than those between the ribs of the medial area. Four adductor muscle scars situated in the medial part of the valve. Radial pore canals straight.

*Ontogeny.*— From our incomplete ontogenetic series juvenile and premature stages can be distinguished. Differences between them concern mainly the development of the ribs on the mediodorsal area. In juveniles the second, longest rib only is present, the three side ones are still lacking. They are present, although very finely pronounced, in the premature stage.

*Remarks.*— The species described here differs from *P. flabellaticostata* sp.n. in having carapaces with flatter, wider and less distinct ribs on the mediodorsal area, and in lacking longitudinal ribs on the anterior part of the carapace as seen in ventral view.

*Occurrence.*— Poland: Lower Kimmeridgian, zone III (Strzałków I/4).

### Family *Bythocytheridae* Sars, 1926

#### Genus *Monoceratina* Roth, 1928

#### *Monoceratina trinodosa* sp.n.

(pl. V, figs 6-7)

*Holotype:* ZPAL No. 0.X/50; pl. V, fig. 6.

*Type horizon:* Lower Kimmeridgian, zone II.

*Type locality:* borehole Strzałków I/6, depth 32.00—34.00 m.

*Derivation of the name:* *Lat. tri*—three, *nodus*—knot; having three nodes on lateral surface of valve.

*Diagnosis.*— Carapace strongly elongated, with rounded anterior and elongated posterior end. Three large ribbed nodes present on the lateral surface. Left and right valve equal in size.

*Material.*— One carapace and 2 right valves.

Dimensions (in mm):

	ZPAL No. 0.X/50
	adult
Length of carapace	0.58
Height of carapace	0.27
Width of carapace	0.27

*Description.*— Besides the specific diagnostic characters the carapace exhibits an almost straight, posteriorly slightly declined dorsal margin; ventral margin somewhat bent in ventroposterior part. In dorsal view, outline of carapace slightly bent

inwards centrally, gradually narrowing anteriorly and abruptly narrowing posteriorly towards the protruded posterior end. Dorsal contact line straight and depressed inwards, except in its dorsoanterior part, where it protrudes and bends abruptly towards the right valve. Dorsal marginal surface of both valves covered with pits and bordered from the outside by a longitudinal rib. In ventral view, the contact line is straight and protruding along its entire length. Ventral marginal surface smooth. On the dorsoposterior, ventroposterior and anterior areas of the carapace three large longitudinal nodes are present. The flattened and smooth surface, between the longitudinal dorsal rib and dorsoposterior and anterior nodes, passes into a deep sulcus on the centrodorsal area of the valve; nodes covered with longitudinal, arched ribs; these on dorsoposterior and anterior nodes extend towards the dorsal margin, while those of the ventroposterior node extend towards the ventral margin. Numerous pits, rounded to angular, present between the ribs. Hinge elements and adductor muscle scars only just visible.

*Occurrence.* — Poland: Lower Kimmeridgian, zone II (Strzałków I/6).

*Monoceratina* sp.

(pl. V, fig. 8)

*Material.* — Two badly preserved left valves.

Dimensions (in mm):

	ZPAL No.	0.X/52
Length of left valve		0.55
Height of left valve		0.27

*Description.* — Valve strongly elongated with straight dorsal margin and almost straight ventral margin; anterior end rounded, posterior end elongated. Anterior and posterior part of valves slightly flattened and smooth, rest of the surface covered with numerous, small pits; mediodorsal part with weakly pronounced sulcus. Ventral part of valve convex and overhung. Hinge elements as well as adductor muscle scars only just visible.

*Remarks.* — *Monoceratina* sp. differs from *M. trinodosa* sp.n. in lacking large nodes on the lateral surface of the valve and in having a less depressed sulcus on the mediodorsal part. It differs from *M. vulsa* (Jones & Sherborn, 1888), as described by Whatley (1970), in having a shallower depression on the mediodorsal part of valve, less elongated posterior end and a ventral portion of the valve that is overhung.

*Occurrence.* — Poland: Lower Kimmeridgian, zone III (Strzałków I/2).

Family **Cytherideidae** Sars, 1925  
 Subfamily **Cytherideinae** Sars, 1925  
 Genus **Galliaecytheridea** Oertli, 1957  
*Galliaecytheridea dissimilis* Oertli, 1957  
 (pl. V, fig. 9, pl. VI, figs 1-7)

1957. *Galliaecytheridea dissimilis* Oertli, p. 655, pl. 1, figs 32-49, pl. 2, figs 40-44.

*Material.* — 300 well preserved specimens including carapaces and left and right valves.

Dimensions (in mm):

	ZPAL Nos.	0.X/59 juvenile ♀	0.X/58 juvenile ♀	0.X/51 premature ♀	0X/55 adult ♀
Length of carapace		0.45	0.49	0.57	0.65
Height of carapace		0.30	0.34	0.38	0.40
Width of carapace		0.22	0.26	0.28	0.29



*Ontogeny.*—In juvenile specimens, the hinge contains fewer elements in its anterior and posterior portions.

*Remarks.*—The specimens of *Galliaecytheridea dissimilis* found in Poland are larger than the holotype and have carapaces which are more elongated posteriorly. The latter character distinguishes the Polish specimens from representatives of the species described by Kilenyi (1969).

*Occurrence.*—Poland: Upper Oxfordian (Strzałków I/6), Lower Kimmeridgian, zones I, II (Strzałków I/5, I/6), zone III (Strzałków I/4). France, Paris Basin: Upper Oxfordian, lower part of Lower Kimmeridgian. England, Dorset: Lower Kimmeridgian — *Pictonia baylei*, *Rasenia cymodoce*, *R. mutabilis*, *Aulacostephanus pseudomutabilis* Zones. NW Germany: Lower Kimmeridgian.

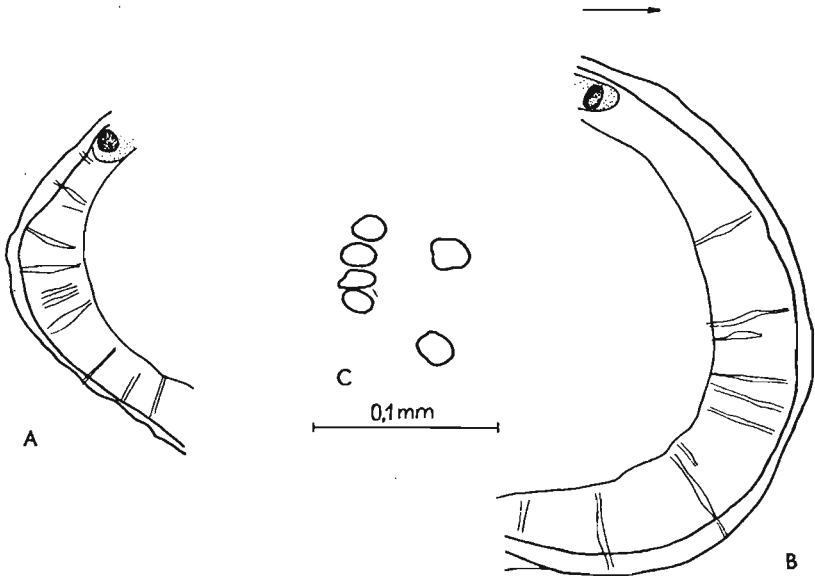


Fig. 4. *Galliaecytheridea fragilis* Kilenyi, 1969; left valve ♀: A posterior cardinal pore canals, B anterior cardinal pore canals. ZPAL No. 0.X/66.

*Galliaecytheridea fragilis* Kilenyi, 1969  
(pl. VII, figs 1-5, text-fig. 4)

1969. *Galliaecytheridea fragilis* Kilenyi: p. 139, pl. 27, figs 17-24.

*Material.*—40 well preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/63
	adult ♀
Length of carapace	0.50
Height of carapace	0.27
Width of carapace	0.22

*Remarks.* — The Polish specimens of this species do not differ from the holotype.

*Occurrence.* — Poland: Lower Kimmeridgian, zone III (Strzałków I/4). England: Lower Kimmeridgian, *Rasenia cymodoce* Zone.

*Galliaecytheridea postrotunda* Oertli, 1957

(pl. VII, figs 6-9)

1957. *Galliaecytheridea postrotunda* Oertli: p. 656, pl. 2, figs 45-55.

1966. *Galliaecytheridea postrotunda* Oertli; Barker, p. 450, pl. 3, figs 1-4.

1973. *Galliaecytheridea postrotunda* Oertli; Masumov, p. 98, pl. 11, figs 1-3.

*Material.* — 26 specimens including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No.	0.X/67
		adult ♀
Length of carapace		0.52
Height of carapace		0.29
Width of carapace		0.24

*Remarks.* — The Polish specimens of this species are shorter than the holotype and shorter and higher than those described by Kilenyi (1969); they differ from the specimens of *G. postrotunda* described by Masumov (1973) in having higher posterior portion of the carapace.

*Occurrence.* — Poland: Lower Kimmeridgian, zone II (Strzałków I/6). France, Vernon I. Upper Oxfordia — Middle Kimmeridgian. Switzerland, Blauen, Villingers "Argovian", "Sequanian". England: Lower Kimmeridgian — *Pictonia baylei* Zone. USSR, S Priuralie, Chimbay: Titonian.

*Galliaecytheridea wolburgi* (Steghaus, 1951)

(pl. VIII, figs 1-4)

1951. *Cyprideis wolburgi* Steghaus: p. 213, pl. 14, figs 24, 25, pl. 15, fig. 26.

1957. *Galliaecytheridea wolburgi* Steghaus; Oertli, p. 657, pl. II, figs 56-60, pl. 3, figs 61-68.

1966. *Galliaecytheridea wolburgi* Steghaus; Barker, p. 450, pl. 2, figs 1-8.

1969. *Galliaecytheridea wolburgi* Steghaus; Kilenyi, p. 121, pl. 24, figs 21-27.

1973. *Galliaecytheridea wolburgi* Steghaus; Masumov, p. 96, pl. 10, figs 4-8.

*Material.* — 44 well preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No.	0.X/73
		adult ♀
Length of carapace		0.75
Height of carapace		0.47
Width of carapace		0.38

*Remarks.* — The Polish specimens of *G. wolburgi* have longer and wider carapaces than those described by Oertli (1957), and the posterior portion of the valves is higher than in those described by Kilenyi (1969). They are larger than the specimens of this species described by Masumov (1973).

*Occurrence.* — Poland: Lower Kimmeridgian, zone I (Strzałków I/6). France, Paris Basin: Lower Kimmeridgian. NW Germany: Kimmeridgian. England, Dorset: Kimmeridgian — *Pictonia baylei*, *Rasenia cymodoce*, *R. mutabilis* Zones, Portlandian. USSR, S Priuralie: Tithonian.

*Galliaecytheridea punctata* Kilenyi, 1969  
(pl. IX, figs 1-4)

1969. *Galliaecytheridea punctata* Kilenyi: p. 121, pl. 25, figs 1-4.

*Material.* — 150 well preserved specimens including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/77
	adult ♀
Length of left valve	0.73
Height of left valve	0.43

*Remarks.* — The Polish specimens are longer than the holotype. Sexual dimorphism is very distinct in this species, the males being longer and more slender than the females.

*Occurrence.* — Poland: Lower Kimmeridgian, zones I, II (Strzałków I/3, Strzałków I/6), zone III (Strzałków I/3, Strzałków I/4). England, Dorset: Lower Kimmeridgian — *Pictonia baylei* and *Rasenia cymodoce* Zones.

*Galliaecytheridea densipunctata* sp.n.  
(pl. IX, fig. 5, pl. X, figs 1-4)

*Holotype:* ZPAL No. 0.X/80; pl. X, fig. 1.

*Type horizon:* Lower Kimmeridgian, zone II.

*Type locality:* borehole Strzałków I/5, depth 18.00—20.00 m.

*Derivation of the name:* *Lat. densus* — dense, *punctatus* — punctured; lateral surface of carapace densely pitted.

*Diagnosis.* — Carapace egg-shaped, cut dorsoanteriorly and dorsoposteriorly. Lateral surface smooth with numerous small pits. In dorsal and ventral views, the valves are strongly inflated. Ventral surface longitudinally ribbed. Left valve larger than the right. Hinge hemimerodont.

*Material.* — 30 well preserved specimens including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/80
	adult ♀
Length of carapace	0.72
Height of carapace	0.49
Width of carapace	0.45

*Description.* — In addition to the characters mentioned in the diagnosis the following features may be noticed: the anterior end of carapace is cut and slightly rounded; the dorsal margin is straight, the ventral margin somewhat curved. In dorsal and ventral views, the valves are strongly inflated centrally; forwards and backwards their outline is almost straight and converges; the contact line is S-shaped,

bent towards the left valve. Ventrally, the valves contact each other along a straight line, which is somewhat bent anteriorly inside the carapace. Three longitudinal ribs are present on the ventral surface of each valve. The left valve is larger, and overlaps the right one along the whole dorsal margin. Outer surface is smooth with numerous fine pits becoming smaller towards the edges of the valve. Hemimerodont hinge well developed, in the right valve it contains a very narrow, straight groove medially and 7 denticles in the posterior and anterior hinge portions, which are bent downwards. Four muscle scars arranged in a transverse row are present on the adductor muscle field. Anterior and posterior marginal zones narrow with numerous straight radial pore canals. Sexual dimorphism distinct, with males longer and more slender than females.

*Occurrence.*— Poland: Lower Kimmeridgian, zone II (Strzałków I/5).

*Galliaecytheridea inaequalipunctata* sp.n.

(pl. XI, figs 1-4, pl. XII, figs 1-4)

*Holotype:* ZPAL No. 0.X/84; pl. XI, fig. 1.

*Type horizon:* Upper Oxfordian.

*Type locality:* Strzałków borehole I/6, depth 60.00—62.00 m.

*Derivation of the name:* Lat. *inaequalis* — unequal, *punctatus* — punctured; surface of carapace covered with pits of variable size.

*Diagnosis.*— Carapace egg-shaped, cut dorsoposteriorly and bluntly rounded dorsoanteriorly. Lateral surface smooth with larger medial and smaller peripheral pits. In dorsal and ventral views, the valves of carapace are uniformly convex. Left valve is larger than the right. Hinge hemimerodont.

*Material.*— 400 well preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No.	0.X/84
		adult ♀
Length of carapace		0.75
Height of carapace		0.49
Width of carapace		0.39

*Description.*— In addition to the characters mentioned in the diagnosis, the species exhibits: anterior end bluntly rounded; posterior end elongated; dorsal margin almost straight, ventral margin slightly curved. Contact line straight, slightly bent inside the carapace ventromedially. Ventral surface smooth. Left valve larger than the right and overlapping the latter along the whole dorsal and ventroanterior margin. Lateral surface smooth with numerous pits which are larger centrally and decrease in size peripherally. The hinge is hemimerodont; its right half has sockets in the anterior and posterior portions of the hinge and a delicately granulated hinge bar in the middle; 4 adductor muscle scars are arranged transversely in the middle of the valve and close to each other. The anterior and posterior marginal zones are well developed with numerous, radial pore canals.

*Remarks.*— The species described here exhibits uniformly inflated valves, in which it differs from *G. densipunctata*, having the valves strongly inflated centrally; the pits are also less numerous in *G. inaequalipunctata* than in the latter species and it also lack longitudinal ribs on the ventral surface.

*Occurrence.*— Poland: Upper Oxfordian (Strzałków I/6), Lower Kimmeridgian, zone I (Strzałków I/5, I/6), zone II (Strzałków I/4, I/5, I/6).

*Galliaecytheridea raripunctata* sp.n.  
(pl. XIII, figs 1-6)

*Holotype*: ZPAL No. 0.X/92; pl. XIII, fig. 1.

*Type horizon*: Upper Oxfordian.

*Type locality*: Strzałków borehole I/6, depth 50.00—52.00 m.

*Derivation of the name*: *Lat. rarus*—rare, *punctatus*—punctured; surface of valves sparsely pitted.

*Diagnosis*.—Carapace elongated, narrowing posteriorly, cut dorsoanteriorly and dorsoposteriorly. Lateral surface smooth with sparse pits. Valves uniformly convex. Longitudinal ventral ribs visible; in ventral view they extend from posterior end to mid-length of carapace. Left valve slightly larger than the right. Hinge hemimerodont.

*Material*.—170 poorly preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/92
	adult ♀
Length of carapace	0.64
Height of carapace	0.39
Width of carapace	0.35

*Description*.—In addition to the characters mentioned in diagnosis the species exhibits the following features: posterior end of carapace blunt, anterior end rounded; dorsal margin straight, the ventral is slightly curved medially and the ventro-posterior part converges with the dorsal margin; contact line S-shaped towards the left valve. The contact line of each valve is straight, but depressed in the posterior section; anteriorly the contact line is on the same level as the valve surfaces and bordered by fine lists of the left and right valves. The anterior portion of ventral surface is smooth with sparse pits, while the posterior portion bears 3 longitudinal ribs; the lateral surface is also smooth with sparse pits, these are however regularly arranged in the vicinity of the adductor muscles. The hinge is hemimerodont; the left valve in male individuals has 7 sockets anteriorly and posteriorly, and a smooth hinge bar medially. The accommodation groove is very narrow. Marginal zone very narrow. Sexual dimorphism distinct, males being longer and more slender than females, which are very convex when seen dorsally.

*Remarks*.—The carapace outline of *Galliaecytheridea raripunctata* sp.n. is similar to that in *G. punctata* Kilenyi 1969, but all the other characters are different.

*Occurrence*.—Poland: Upper Oxfordian (Strzałków I/6), Lower Kimmeridgian, zone II (Strzałków I/5, Strzałków I/6).

*Galliaecytheridea cuneiformis* sp.n.  
(pl. XIV, figs 1-9)

*Holotype*: ZPAL No. 0.X/102; pl. XIV, fig. 5.

*Type horizon*: Lower Kimmeridgian, zone I.

*Type locality*: Strzałków borehole I/5, depth 28.00—30.00 m.

*Derivation of the name*: *Lat. cuneus*—wedge; carapace wedge-shaped.

*Diagnosis*.—Carapace wedge-shaped in lateral view, strongly elongated posteriorly, cut dorsoanteriorly and dorsoposteriorly. Surface smooth, very densely pitted. Left valve slightly larger than the right. Hinge hemimerodont.

*Material.* — 200 poorly preserved specimens including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/102
	adult ♀
Length of carapace	0.53
Height of carapace	0.33
Width of carapace	0.26

*Description.* — In addition to the diagnostic specific characters the species exhibits the following features: posterior end of carapace is pointed and provided with two short spines ventrally; anterior end rounded. Dorsal margin straight; ventral margin slightly curved medially and convergent with dorsal margin posteriorly. Hinge line weakly S-shaped towards left valve; contact line straight, slightly bent inside the carapace medioanteriorly. Carapace surface smooth very finely and densely pitted. The hemimerodont hinge in left valve has 6 sockets anteriorly and posteriorly and has a smooth fine hinge bar medially; the accommodation groove is very narrow and delicate. Anterior and posterior marginal zones have straight radial pore canals. Sexual dimorphism distinct, males being longer and more slender than females.

*Ontogeny.* — Numerous adolescents have been found and provide an incomplete ontogenetic sequence, from stage IV up to adults. Carapaces representing different growth stages differ only in size.

*Remarks.* — *Galliaecytheridea cuneiformis* sp.n. differs from all the other representatives of the genus in its wedge-like shape in lateral view and in its very elongated posterior end.

*Occurrence.* — Poland: Lower Kimmeridgian, zones I—II (Strzałków I/5), zones I—II (Strzałków I/6).

### Genus *Nodophthalmocythere* Malz, 1958

#### *Nodophthalmocythere pazdroae* sp.n.

(pl. XV, fig. 1)

*Holotype:* ZPAL No. 0.X/107; pl. XV, fig. 1.

*Type horizon:* Lower Kimmeridgian, zone III.

*Type locality:* Strzałków borehole I/2, depth 15.70 m.

*Derivation of the name:* in honour of Polish micropalaeontologist prof. dr Olga Pazdro.

*Diagnosis.* — Valve elongated. Anterior end cut and rounded, the posterior tapering. Median part of lateral surface area reticulated, bounded by dorsal and ventral ribs.

*Material.* — 8 well preserved specimens, including left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/107
	adult ♂
Length of left valve	0.59
Height of left valve	0.28

*Description.* — In addition to the diagnostic specific characters the species exhibits the following features: dorsal and ventral margins almost straight; anterior end slightly cut at dorsal margin and rounded ventrally; posterior end slightly elongated; 4 spine-like thick processes on each, ventroanterior and ventroposterior margin; arched ribs bounding reticulated medial portion of lateral surface dorsally and ventrally, with tubercles on their tops; a large tubercle is present on the medio-

anterior area of the valve, while on the posterior area, where dorsal and ventral ribs converge, there is a short thick process; two other processes, the larger one closer to the ventral margin, occur in the ventroanterior area; each has opening of a normal pore canal at its tip. A rib at anterior margin of the valve and parallel to it joins the ocular tubercle on the dorsoanterior area. Internal surface with depressions corresponding to the tubercles on lateral surface. The merodont-entomodont hinge contains in left valve anteriorly and posteriorly 6—7 sockets and a fine, granulated bar medially; the accommodation groove is narrow. Anterior and posterior duplicature wide.

*Remarks.*—The new species described here differs from *N. vallata* Malz, 1958 in the reticular ornamentation of the median surface area of the valve, longer dorsal rib, reaching almost the ocular tubercle and the presence of processes in the posterior and ventromedial part of the valve.

*Occurrence.*—Poland: Lower Kimmeridgian, zone III (Strzałków I/2).

*Nodophthalmocythere* sp.

(pl. XV, fig. 2)

*Material.*—2 poorly preserved left valves.

Dimensions (in mm):

	ZPAL No. 0.X/108
	adult ♂
Length of left valve	0.59
Height of left valve	0.31

*Description.*—Valve oval, rounded at the posterior and anterior ends; dorsal and ventral margins almost straight; 4 short, thick spine-like processes present ventrally along margins of each anterior and posterior end; lateral surface ornamented with 2 thick ribs and an irregular reticulation between them; a tubercle on medioanterior area. Ventral rib extends all the way from the posterior portion of the valve to the medioanterior tubercle; a second rib runs from the ocular tubercle on the dorsoanterior area, parallel to the anterior margin. A large node with a very wide base is present on the dorsoposterior area; fine thickenings extend from the node backwards as well as towards the medioanterior tubercle. On the centrodorsal surface of the valve a smooth, blunt tubercle is present, which is half as small as the dorsoposterior tubercle. Depressions corresponding to the ribs and tubercles of the outer surface are present on the inner surface of the valve. Hinge merodont-entomodont; anterior and posterior sections distinctly bent with 6—7 sockets each (in left valve); median portion of hinge in the form of a fine, granulated bar, strongly protruding above the posterior and anterior hinge portions; accommodation groove deep, narrow. Marginal zones of pore canals wide.

*Remarks.*—*Nodophthalmocythere* sp. differs from *N. pazdroae* sp. n. in the lack of a dorsal rib, and in having a higher valve and more rounded posterior end.

*Occurrence.*—Poland: Lower Kimmeridgian, zone II (Strzałków I/6).

*Schuleridea strzalkowiensis* sp.n.

(pl. XV, figs 3-9, text-fig. 5)

*Holotype:* ZPAL No. 0.X/114; pl. XV, fig. 5.

*Type horizon:* Lower Kimmeridgian, zone II.

*Type locality:* Strzałków borehole I/5, depth 24.00—26.00 m.

*Derivation of the name:* found in Strzałków.

**Diagnosis.**— Carapace suboval with strongly arched dorsal margin. Lateral surface densely and finely pitted. Left valve larger than the right. Hinge merodont.

**Material.**— About 215 well preserved specimens including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/114.
	adult ♀
Length of carapace	0.53
Height of carapace	0.37
Width of carapace	0.31

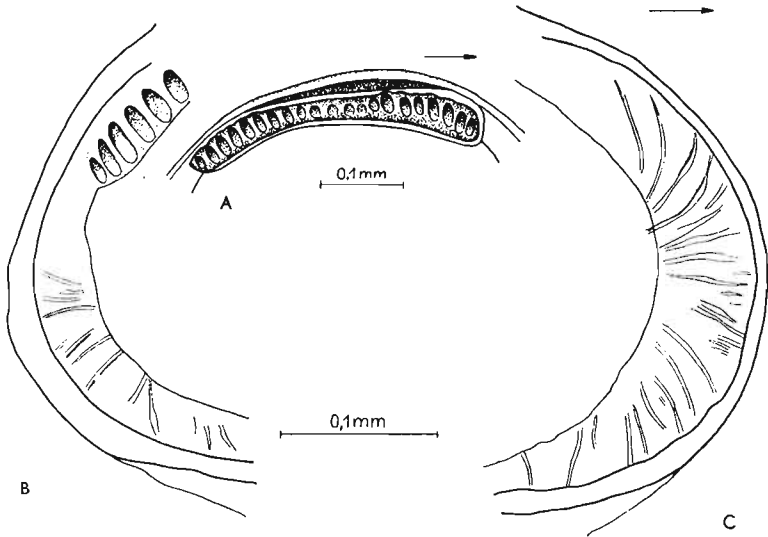


Fig. 5. *Schuleridea strzalkowiensis* sp.n., left valve; A hinge, B posterior radial pore canals, C anterior radial pore canals, ZPAL No. 0.X/116.

**Description.**— In addition to the characters mentioned in the diagnosis the species exhibits the following features: carapace slightly cut dorsoanteriorly and dorsoposteriorly; left valve strongly overlapping the right one along the whole margin; anterior end of valve slightly rounded, posterior one somewhat elongated; ventral margin weakly arched towards posterior end; in dorsal and ventral views, both valves convex, uniformly tapering anteriorly and posteriorly. Dorsal contact line bent towards left valve medially; ventral contact line almost straight. Hinge merodont. Four adductor muscle scars present in medial portion of valve. Anterior marginal zone wider than the posterior, with somewhat arched radial pore canals (text-fig. 5). Sexual dimorphism distinctly pronounced; males longer and more slender than females, dorsal margin more strongly arched in these latter than in males.

**Remarks.**— *Schuleridea strzalkowiensis* sp.n. differs from *S. danuvica* Oertli, 1965 in having its posterior end less trapezoidal and dorsal margin more arched, less straight ventral margin; maximal height of valve shifted slightly forwards; also the valve narrows less abruptly towards the front, in dorsal view and is larger. It is smaller than *S. moderata* Christenses & Kilenyi, 1970, also the valve narrows less sharply at the posterior end and the ventral margin is slightly more arched.

**Occurrence.**— Poland: Lower Kimmeridgian, zone II (Strzałków I/4, I/5), zone III (Strzałków I/2, I/3, I/4).



Family *Cytheruridae* Müller, 1894  
 Genus *Orthonotacythere* Alexander, 1933  
*Orthonotacythere interrupta* Triebel, 1941  
 (pl. XVI, figs 1-5; text-fig. 6)

1941. *Orthonotacythere interrupta* Triebel: p. 394, pl. 4, figs 31, 32.

1969. *Orthonotacythere interrupta* Triebel; Kilenyi, p. 143, pl. 28, figs 25-29.

*Material*.—About 100 well preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/117 adult
Length of carapace	0.50
Height of carapace	0.28
Width of carapace	0.27

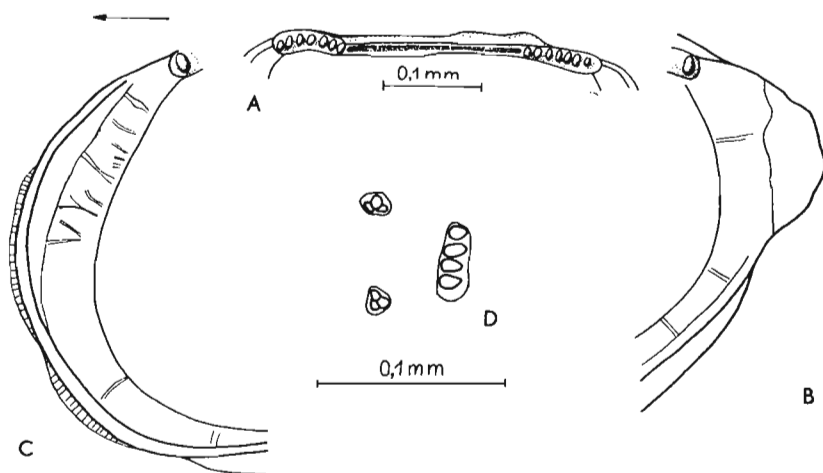


Fig. 6. *Orthonotacythere interrupta* Triebel, 1944; right valve: A hinge, B posterior radial pore canals, C anterior radial pore canals, D muscle scars. ZPAL No. 0.X/122.

*Remarks*.—Among the specimens of this species found in Strzałków there is a relatively large individual variability which concerns mainly the ornamentation of the valves, as well as the outline of the anterior end; the anterior end is bluntly rounded (pl. XVI, fig. 1, 4, 5) or rounded (pl. XVI, fig. 2, 3).

The fossae of reticulation are very deep, bounded by sharp edge (pl. XVI, fig. 3, 4, 5) or are shallow, bounded by blunt edge (pl. XVI, fig. 2). The specimens of this species found in Strzałków do not differ from the holotype in general structure, except for some slight differences due to individual variability. Also they do not differ from the English specimens of *Rasenia cymodoce* and *R. mutabilis* Zones (Kilenyi, 1969) and from the Upper Oxfordian-Lower Kimmeridgian French specimens (Oertli, 1957).

*Occurrence*.—Poland: Lower Kimmeridgian, zone II (Strzałków I/4, I/5), zone III (Strzałków I/2, I/4). F.R.G.: Lower Kimmeridgian. England: Lower Kimmeridgian—*Rasenia cymodoce* and *R. mutabilis* Zones. France; Paris Basin: Upper Oxfordian-Lower Kimmeridgian.

Genus *Procytheropteron* Ljubimova, 1955  
*Procytheropteron subtrapezoides* sp.n.  
(pl. XVI, figs 6-9; text-fig. 7)

*Type horizon*: Lower Kimmeridgian, zone II.

*Holotype*: ZPAL No. 0.X/123; pl. XVI, fig. 6.

*Type locality*: Strzałków borehole I/4, depth 12.50—14.00 m.

*Derivation of the name*: *Lat. subtrapezoides* — having almost trapezoidal shape of carapace.

*Diagnosis*. — Carapace subtrapezoidal. Anterior end bluntly rounded, the posterior strongly elongated, pointed and directed upwards. Ventral portion overhanging. Lateral surface with large tubercle placed medioanteriorly and with transverse ribs on medioposterior area; surface between ribs pitted. Hinge hemimerodont. Left valve larger than the right.

*Material*. — 7 well preserved specimens including 1 carapace, 4 left and 2 right valves.

Dimensions (in mm):

	ZPAL No. 0.X/123 adult
Length of carapace	0.46
Height of carapace	0.26
Width of carapace	0.25

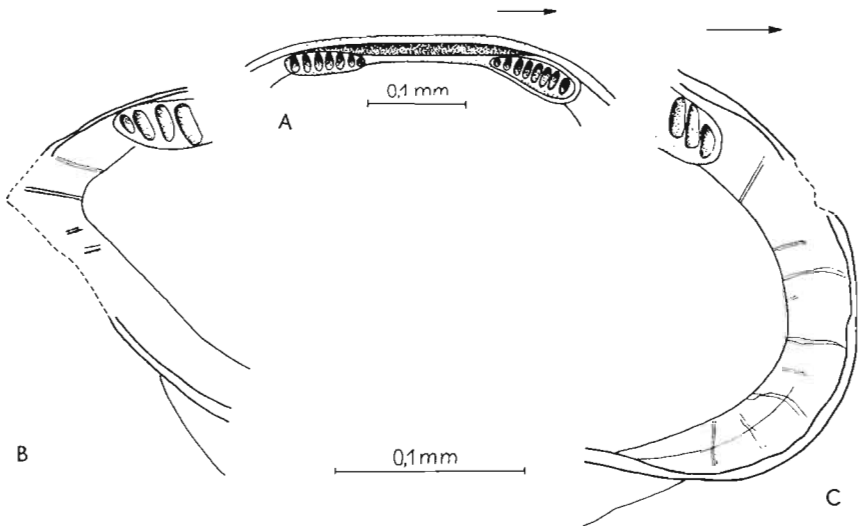


Fig. 7. *Procytheropteron subtrapezoides* sp.n., left valve: A hinge, B posterior radial pore canals, C anterior radial pore canals. ZPAL No. 0.X/127.

*Description*. — In addition to the diagnostic specific characters the species exhibits: ventral margin of carapace slightly curved inwards, lateral surface ornamented with posterior part flattened and smooth and prolonged into an elongated spine that is often broken off; a distinct transverse furrow is present medially, bounding a large medioanterior tubercle; the tubercle bears shallow depressions; in the dorsoanterior part there is a distinct ocular tubercle from which a thickening runs parallel to the anterior margin; it ends at the greatest length of the carapace; ocular

tubercle bounded medioanteriorly by a deep groove. In dorsal view, carapace strongly convex; from the straight contact line distinct depressions diverge, one towards the medial lateral surface, the other towards the anterior lateral surface. In ventral view, contact line is straight, only slightly deepened medially; when seen ventrally, the ventral surface is covered with longitudinal, arched ribs, 4 on each valve. On the inner surface of the valve, depressions corresponding to the ocular and antero-medial tubercles are visible. The hemimerodont hinge with 6–8 sockets anteriorly and 6–7 sockets posteriorly, in left valve; smooth hinge bar present medially; accommodation groove distinct. Anterior and posterior marginal zones well developed, narrow with straight pore canals.

*Remarks.* — *Procytheropteron subtrapezoides* sp.n. resembles a form described by Kilenyi (1969) as *Procytheropteron* sp. 1, but it differs from the latter in the trapezoidal lateral outline of the carapace as well as in ornamentation.

*Occurrence.* — Poland: Lower Kimmeridgian, zones II and III (Strzałków I/4).

*Procytheropteron* sp.  
(pl. XVI, fig. 10)

*Material.* — 2 badly preserved left valves.

Dimensions (in mm):

	ZPAL No. 0.X/128
	premature
Length of left valve	0.40
Height of left valve	0.24

*Description.* — Valve subtrapezoidal with straight dorsal and slightly curved ventral margin; ventral portion of valve overhanging; anterior end bluntly rounded, posterior one elongated, pointed directly upwards, reaching the level of dorsal margin. Lateral surface uniformly convex, covered with numerous pits; ocular tubercle placed dorsoanteriorly and separated by broad depression from the lateral surface; a thickening extends from ocular tubercle to mid-height of valve; posterior portion of valve very thin, flat and smooth. On inner surface a depression present corresponding to ocular tubercle on outer surface. The hemimerodont hinge bears 5–6 sockets in each, anterior and posterior portion; a smooth hinge bar present medially. Anterior and posterior marginal zones of pore canals narrow with straight radial pore canals.

*Remarks.* — *Procytheropteron* sp. described above differs from *P. subtrapezoides* sp. n. in the ornamentation which consists of numerous pits. It differs from *P. obesum* Ljubimova, 1955 in having a shorter valve, and posterior end elongated up to the level of dorsal margin.

*Occurrence.* — Poland: Lower Kimmeridgian, zone II (Strzałków I/6).

Family **Progonocytheridae** Sylvester-Bradley, 1948  
Subfamily **Progonocytherinae** Sylvester-Bradley, 1848  
Genus *Lophocythere* Sylvester-Bradley, 1948  
*Lophocythere cruciata kimmeridgiensis* Guyader, 1966  
(pl. XVI, figs 11–13, text-fig. 8)

1966. *Lophocythere cruciata kimmeridgiensis* Guyader. p. 47, pl. 1, figs 16–20.

1966. *Lophocythere* cf. *cruciata oxfordiana* Lutze, 1960; Bielecka & Styk, p. 355, text-pl. 3, fig. 15.

1968. *Lophocythere cruciata kimmeridgiensis* Guyader, p. 210, pl. 32, figs 6–9.

*Material.* — 60 well preserved specimens including carapaces, left and right valves.  
Dimensions (in mm):

	ZPAL No. 0.X/129
	adult ♂
Length of carapace	0.53
Height of carapace	0.29
Width of carapace	0.21

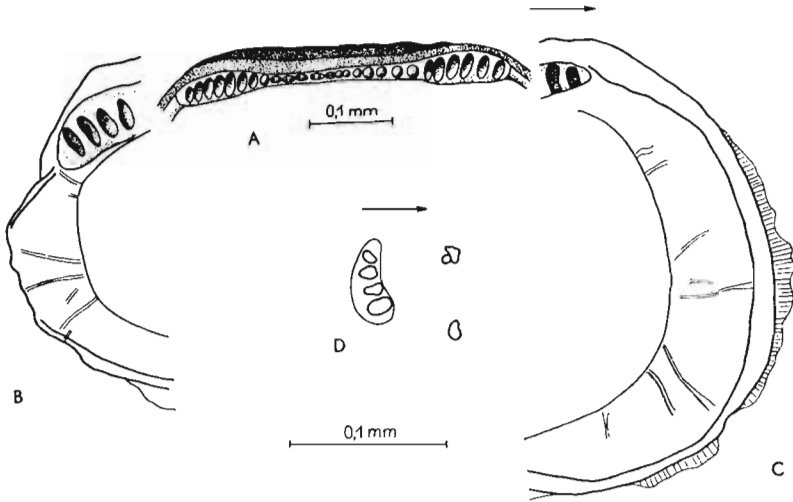


Fig. 8. *Lophocythere cruciata kimmeridgiensis* Guyader, 1966, left valve; A hinge, ZPAL No. 0.X/130; B posterior radial pore canals, C anterior radial pore canals, D muscle scars. ZPAL No. 0.X/132.

*Remarks.* — The specimens of *Lophocythere cruciata kimmeridgiensis* found in Strzałków do not differ from these described from France.

*Occurrence.* — Poland: Lower Kimmeridgian, zone I (Strzałków I/5), zone II (Strzałków I/4, I/5, I/6), zone III (Strzałków I/4). France, Paris Basin: Lower Kimmeridgian.

Subfamily **Protocytherinae** Ljubimova, 1955  
Genus *Protocythere* Triebel, 1938  
*Protocythere furcata* Bielecka & Styk, 1966  
(pl. XVII, figs 1-2, text-fig. 9)

1966. *Protocythere furcata* Bielecka & Styk: p. 361, pl. I, fig. 1.

*Material.* — 60 well preserved specimens including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/133
	adult ♀
Length of carapace	0.50
Height of carapace	0.31
Width of carapace	0.24

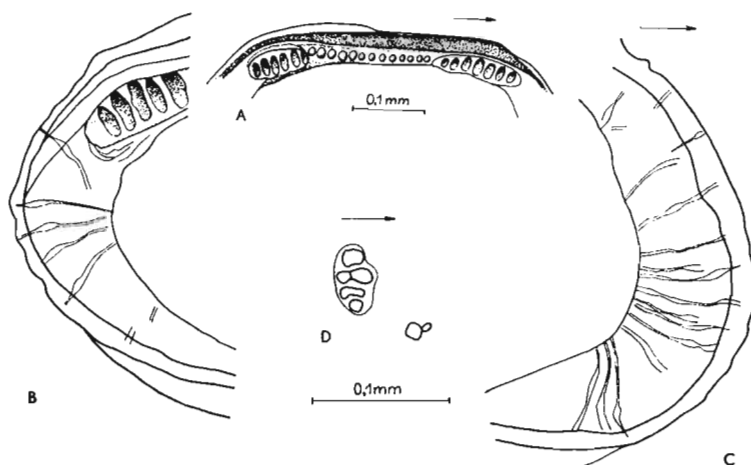


Fig. 9. *Protocythere furcata* Bielecka & Styk, 1966, left valve ♀: A hinge, B posterior radial pore canals, C anterior radial pore canals, D muscle scars. ZPAL No. 0.X/135.

**Remarks.**—The specimens of *Protocythere furcata* Bielecka & Styk found in Strzałków differ from the holotype in having thinner ribs, uniform pits on lateral surface and in lacking distinctly developed ribs on the ventral surface of the carapace, as seen ventrally. The specimens of this species coming from the type locality are very variable. The Strzałków specimens fall within the variability range of this species.

**Occurrence.**—Poland: Lower Kimmeridgian, zone II (Strzałków I/4, I/5, I/6), zone III (Strzałków I/4); Lower and Upper Kimmeridgian (Polish Lowlands, Bartoszyce).

*Protocythere fusca* sp.n.  
(pl. XVII, figs 3-6, text-fig. 10)

**Holotype:** ZPAL No. 0.X/136; pl. XVII, fig. 3.

**Type horizon:** Lower Kimmeridgian, zone II.

**Type locality:** Strzałków borehole I/4, depth 22.00–23.00 m.

**Derivation of the name:** Lat. *fuscus* — dark; because the carapaces are darkly coloured.

**Diagnosis.**—Carapace suboval, with rounded anterior and bluntly rounded posterior ends. Lateral surface with a dorsal rib and two thick, anteriorly converging ribs. Abundant fine pits present on ribs as well as in fossae between the ribs. Left valve larger than the right.

**Material.**—About 80 well preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/136 adult ♀
Length of carapace	0.56
Height of carapace	0.34
Width of carapace	0.27

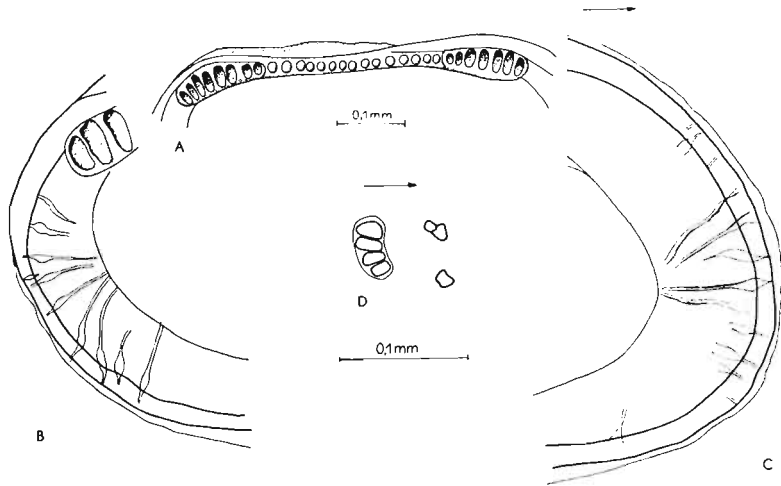


Fig. 10. *Protocythere fusca* sp.n., left valve ♂: A hinge, B posterior radial pore canals, C anterior radial pore canals, D muscle scars. ZPAL No. 0.X/140.

*Description.*— Besides the specific diagnostic characters the following features can be noticed: dorsal and ventral margins almost straight; lateral surface flattened, with three longitudinal ribs; the medial rib is strongly inflated, forming a node on the medioanterior part of valve; the dorsal one, which is slightly arched, converges with it on dorsoposterior surface of valve, but fades out anteriorly before reaching the distinct ocular tubercle. The ribs, surface between ribs, and part of the ocular tubercle are reticulated, the meshes being subrectangular; several fine pits are present in each mesh. On the inter-rib surface additional tubercles occur, two of them placed between the medial and ventral rib, and up to four between the medial and dorsal rib; tubercles of similar size are present at the anterior and posterior margins of the valve. In dorsal view, contact line slightly bent inwards medially; on ventral surface, as seen ventrally, 4 longitudinal, fine ribs on each valve. On inner surface of valve distinct ocular depression. Anterior and posterior marginal zones wide; radial pore canals straight, distinctly widening close to aperture. Adductor muscle scars pronounced. Hinge merodont-entomodont.

*Remarks.*— The posterior end of the valve of *Protocythere fusca* sp.n. is more rounded than in *P. rodewaldensis* (Klinger, 1955) and also differs from it in the presence of fine pits within meshes, on the whole surface of the valve.

*Occurrence.*— Poland: Lower Kimmeridgian, zone I (Strzałków I/6), zone II (Strzałków I/4, I/5), zone III (Strzałków I/4).

*Protocythere sigmoidea* Steghaus, 1951  
(pl. XVII, figs 7-9, pl. XVIII, figs 1-2)

1951. *Protocythere sigmoidea* Steghaus: p. 219, pl. 15, figs 42-45.

1969. *Protocythere sigmoidea* Steghaus; Kilenyi, p. 139, pl. 27, figs 27-29.

*Material.*— About 30 well preserved specimens, including carapaces, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/141
	adult ♂
Length of left valve	0.59
Height of left valve	0.29

*Remarks.* — The specimens of *Protocythere sigmoidea* Steghaus found in Strzałków do not differ from the holotype.

*Occurrence.* — Poland: Lower Kimmeridgian, zone III (Strzałków I/2, I/4). NW Germany: Middle Malm. France, Paris Basin: Lower and Middle Kimmeridgian. Switzerland, Jura: Lower Kimmeridgian and Lower Portlandian. England, Dorset: Kimmeridgian.

*Protocythere* sp. 1  
(pl. XVIII, figs 3-4)

*Material.* — 3 well preserved specimens, including a carapace and left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/145
	adult ♀
Length of carapace	0.48
Height of carapace	0.28
Width of carapace	0.23

*Description.* — Carapace suboval with almost straight dorsal and ventral margin; posterior end slightly elongated, anterior rounded. Lateral surface weakly convex with numerous pits; two thin ribs, parallel to each other run along the lateral surface of the valve, converging anteriorly and posteriorly; the third one, somewhat arched, runs along the dorsal portion of the valve and fades out before reaching a distinct ocular tubercle. In dorsal view, anterior portion of contact line is slightly bent towards right valve while the posterior portion is almost straight and runs in a depression formed between two short ribs, one on each valve; these ribs are bordered on both sides by a row of pits. On the ventral surface, as looked at ventrally, two longitudinal ribs can be seen on each valve, and some rows of pits are visible between them. Left valve slightly larger than the right; inner surface bears an ocular depression. Anterior and posterior marginal zones narrow. Hinge merodont-entomodont.

*Remarks.* — The above described form resembles in its outline *Protocythere sigmoidea* Steghaus but differs from it in the presence of thin, parallel, lateral ribs and numerous, distinct pits on the surface.

*Occurrence.* — Poland: Lower Kimmeridgian, zone II (Strzałków I/4), zone III (Strzałków I/4), zone II (Strzałków I/6).

*Protocythere* sp. 2  
(pl. XVIII, figs 5-6)

*Material.* — One well preserved carapace and a right valve.

Dimensions (in mm):

	ZPAL No. 0.X/147
	adult ♂
Length of carapace	0.60
Height of carapace	0.31
Width of carapace	0.22

*Description.* — Carapace suboval, with almost straight dorsal and ventral margin; anterior end rounded, posterior slightly elongated and rounded. Lateral surface with two longitudinal, subparallel ribs, which converge posteriorly and join each other at an angle, anteriorly forming a rib, which ends at the anterior margin; dorsal rib slightly arched posteriorly joins the longitudinal ribs, but tapers anteriorly reaching the distinct ocular tubercle; a rib extends from the latter, parallel to the anterior margin, and breaks up into a row of tubercles. Whole lateral surface of carapace covered with shallow pits, those between ribs being twice as large as those on the ribs. In dorsal view, hinge line S-shaped and margins of both valves thickened. In ventral view, contact line straight and ventral surface covered with two longitudinal ribs on each valve; they are bounded by a row of pits. Hinge merodont-entomodont.

*Remarks.* — The form described above resembles *Protocythere sigmoidea* Steghaus in lateral outline; it differs from the latter species in having finer ribs, which join up differently, in the presence of numerous shallow pits on the surface, and in the presence of the rib extending from the ocular tubercle, along the anterior margin.

*Occurrence.* — Poland: Lower Kimmeridgian, zone III (Strzałków I/2).

#### Family uncertain

#### Genus *Mandelstamia* Ljubimova, 1955

#### Subgenus *Mandelstamia* (*Mandelstamia*) Ljubimova, 1955

#### *Mandelstamia* (*Mandelstamia*) *rectilinea* Malz, 1958

(pl. XVIII, fig. 7)

1958. *Mandelstamia rectilinea* Malz: p. 38, pl. 11, figs 58-63.

1969. *Mandelstamia* (*Mandelstamia*) *rectilinea* Malz; Kilenyi, p. 133, pl. 29, figs 1-6, text-fig. 4a, b.

*Material.* — 4 well preserved left valves.

Dimensions (in mm):

	ZPAL No.	0.X/149
		adult ♀
Length of left valve		0.54
Height of left valve		0.30

*Remarks.* — The specimens of this species found in Strzałków are less rounded at the posterior end of the valve than the holotype.

*Occurrence.* — Poland: Lower Kimmeridgian, zone I (Strzałków I/5, I/6), zone III (Strzałków I/2). England, Dorset: Lower Kimmeridgian — *Rasenia mutabilis* Zone. France, Normandy: Lower Kimmeridgian, Denmark: Borglum Formation, Lower Kimmeridgian — *Galliaecytheridea dissimilis* and *G. elongata* Zones.

#### *Exophthalmocythere fuhrbergensis* Steghaus, 1951

(pl. XVIII, figs 8-9, text-fig. 11)

1951. *Exophthalmocythere fuhrbergensis* Steghaus: p. 220, pl. 15, figs 46-48.

1969. *Exophthalmocythere fuhrbergensis* Steghaus; Kilenyi, p. 152, pl. 28, figs 12, 13.



**Material.** — 7 well preserved specimens, including left and right valves.  
Dimensions (in mm):

	ZPAL No. 0.X/150
	adult
Length of left valve	0.65
Height of left valve	0.35

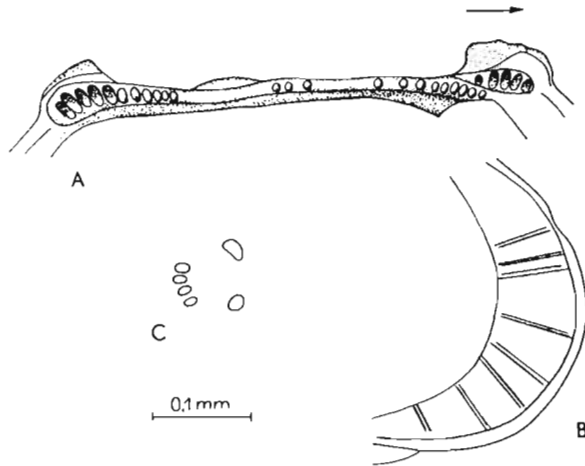


Fig. 11. *Exophthalmocythere fuhrbergensis* Steghaus, 1951, left valve: A hinge, B anterior radial pore canals, C muscle scars. ZPAL No. 0.X/150.

**Remarks.** — The specimens of *Exophthalmocythere fuhrbergensis* Steghaus found in Strzałków do not differ from the holotype.

**Occurrence.** — Poland: Lower Kimmeridgian, zone II (Strzałków I/5), zones II and III (Strzałków I/4). NW Germany: Middle Kimmeridgian. France, Paris Basin: Lower Kimmeridgian. England, Dorset: Lower Kimmeridgian. USSR, Uljanovsk: Upper Kimmeridgian.

Suborder **Platycopina** Sars, 1866

Family **Cytherellidae** Sars, 1866

Genus *Cytherella* Jones, 1849

Subgenus *Cytherella* (*Cytherelloidea*) Alexander, 1929

*Cytherella* (*Cytherelloidea*) *weberi* (Steghaus, 1951)

(pl. XVIII, figs 10-11)

1951. *Cytherelloidea weberi* Steghaus: p. 207, pl. 14, figs 4-6.

1969. *Cytherelloidea weberi* Steghaus; Kilenyi, p. 115, pl. 23, figs 6, 7.

**Material.** — 8 well preserved specimens, including a carapace, left and right valves.

Dimensions (in mm):

	ZPAL No. 0.X/152
	adult
Length of right carapace	0.58
Height of right valve	0.33

*Remarks.* — The specimens of *C. (Cytherelloidea) weberi* (Steghaus) found in Strzałków do not differ from the holotype.

*Occurrence.* — Poland: Lower Kimmeridgian, zone II (Strzałków I/6), zone III (Strzałków I/4), zone III (Strzałków I/2). France, Paris Basin: Lower Kimmeridgian. Switzerland, Jura: Lower Kimmeridgian. NW Germany: Lower Kimmeridgian. England, Dorset: Lower Kimmeridgian — Kimmeridge Clay, *Rasenia mutabilis* Zone.

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#### REFERENCES

- BARKER, D. 1966. Ostracodes from the Portland Beds of Dorset. — *Bull. Brit. Mus. (Nat. Hist.) Geol.*, **11**, 9, 147—157.
- BIELECKA, W. & STYK, O. 1966. Mikrofauna malmu południowej części syneklizy perybałtyckiej. — *Kwart. Geol.*, **10**, 2, 350—366.
- CHRISTENSEN, O. B. & KILENYI T. I. 1970. Ostracod Biostratigraphy of the Kimmeridgian in Northern and Western Europe. — *Geol. Surv. Denmark*, **2**, 95, 1—65.
- GLASHOFF, H. 1964. Ostracoden-Faunen und Paläogeographie im Oxford NW-Europas. — *Paläont. Ztschr.* **38**, 1/2, 28—65.
- GUYADER, J. 1966. Contribution à l'étude des Ostracodes du Jurassique Supérieur de la Basse-Seine. — *Bull. Soc. Géol. Normandie*, **56**, 45—50.
- 1968. Le Jurassique supérieur de la baie de la Seine — étude stratigraphique et micropaléontologique. Thèses, l'Université de Paris, 1—269, Havre.
- KILENYI, T. I. 1969. The Ostracoda of the Dorset Kimmeridge Clay. — *Palaeontology*, **12**, 1, 112—160.
- KLINGLER, W. 1955. Mikrofaunistische und stratigraphisch-fazielle Untersuchungen im Kimmeridge und Portland des Weser-Aller-Gebietes. — *Geol. Jb.*, **70**, 167—246.
- LUBIMOVA, P. S. (ЛЮБИМОВА, П. С.) 1955. Остракоды мезозойских отложений сяднего Поволжа и Общего Сырта. (в: Любимова, П. С., и Хаабарова, Т. Н.) *Тр. „ВНИГПИ”*, **84**, 1—163.
- LUTZE, G. F. 1960. Zur Stratigraphie und Paläontologie des Callovien und Oxfordien in Nordwest-Deutschland. — *Geol. Jb.*, **77**, 391—532.
- MALZ, H. 1958. Die Gattung *Macrodentina* und einige andere Ostracoden-Arten aus dem Oberen Jura von NW-Deutschland, England und Frankreich. — *Abh. senckb. natur. Ges.*, **497**, 1—67.
- 1958. *Nodophthalmocythere* n.gen. (Ostrac., Ob. Jura), nebst einer Abgrenzung gegen ähnliche Gattungen. — *Senckenberg. Leth.*, **39**, 1/2, 119—133.
- MAŁECKI J. 1966. Stratygrafia wierceń przez utwory jurajskie w Strzałkowie. — M. S. on file at Akad. Gór.-Hutn. Kraków.
- MASUMOV, A. S. (МОСУМОВ, А. С.) 1973. Юрские остракоды Узбекистана. Издательство „ФАН”, Узбекской ССР, 1—157, Ташкент.

- OERTLI, H. J. 1957. Ostracodes du Jurassique Supérieur du Bassin de Paris (Sondage Vernon 1). — *Rev. Inst. Franc. Petr.*, **12**, 6, 647—695.
- 1959. Malm-Ostracoden aus schweizerischen Juragebirge. — *Denkschr. Schweiz. Natur Ges.*, **83**, 1, 1—44.
- 1965. Ostracoden der Neuburger Bankkalke (Mittl. Tithon) von Neuburg an der Donau, Südbayern, Mittl. Bayer., Staatssamml. — *Paläont. hist. Geol.*, **5**, 127—135.
- PUGACZEWSKA, H. 1971. Jurassic Ostreidea of Poland. — *Acta Pal. Pol.*, **16**, 3, 193—311.
- SCHMIDT, G. 1955. Stratigraphie und Mikrofauna des mittleren Malm im nordwestdeutschen Bergland. — *Abh. senckb. natur. Ges.*, **491**, 1—76.
- STEGHAUS, H. 1951. Ostracoden als Leitfossilien im Kimmeridge der Ölfelder Wietze und Fuhrberg bei Hannover. — *Paläont. Ztschr.*, **24**, 201—224.
- TRIEBEL, E. 1941. Zur Morphologie und Ökologie der fossilen Ostracoden mit Beschreibung einiger neuen Gattungen und Arten. — *Senckenbergiana*, **23**, 294—400.
- 1954. Malm, Ostracoden mit amphidonten Schloss. *Senckenberg. Leth.*, **35**, 1/2, 3—16.
- WHATLEY, R. G. 1970. Scottish Callovian and Oxfordian Ostracoda. — *Bull. Brit. Mus. (Nat. Hist.) Geol.*, **19**, 6, 300—358.
- WYRWICKA, K. 1969. Surowce węglanowe malmu Gór Świętokrzyskich — ich zastosowanie i perspektywy. — *Kwart. Geol.*, **13**, 2, 357—369.

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WANDA BIELECKA, JANUSZ BŁASZYK & OLGA STYK

MAŁŻORACZKI DOLNEGO KIMERYDU Z NW OBRZEŻENIA  
GÓR ŚWIĘTOKRZYSKICH, POLSKA

*Streszczenie*

Opracowano małżoraczki dolnego kimerydu z wierceń I. G. w rejonie Strzałkowa NW obrzeżenie Gór Świętokrzyskich. Z pośród opisanych 35 gatunków małżoraczek należących do 14 rodzajów — 13 jest nowych (tabela 2). Na podstawie analizy zasięgów występowania wyróżniono osady najwyższego oksfordu i dolnego kimerydu. W obrębie dolnego kimerydu ustalono 3 małżoraczkowe poziomy biostratygraficzne I—III (tabela 2). Przedstawiono rozprzestrzenienie małżoraczek w osadach najwyższego oksfordu i dolnego kimerydu w poszczególnych otworach wiertniczych (tabela 1). Przeprowadzono również porównania zespołów małżoraczek najwyższego oksfordu i dolnego kimerydu NW obrzeżenia Gór Świętokrzyskich, Niżu Polski oraz Europy Zachodniej (tabela 3).

ОСТРАКОДЫ НИЖНЕГО КИМЕРИДЖА В СЕВЕРО-ЗАПАДНОМ ОБРАМЛЕНИИ  
СВЕНТОКШИСКИХ ГОР (ПОЛЬША)

## Резюме

Исследовались остракоды нижнего кимериджа по материалам буровых скважин Геологического института, пройденных в районе местности Стшалкув в северо-западном обрамлении Свентокшиских гор. В числе описанных 35 видов, принадлежащих 14 родам, 13 видов новых (табл. 2). Путем анализа интервалов распространения остракод были определены отложения, относящиеся к верхам оксфорда и к нижнему кимерджу. В толще нижнего кимерджа установлены 3 остракодовых биостратиграфических горизонта I—III (табл. 2). Описано распространение остракод в верхнеоксфордских и нижнекимериджских отложениях по разрезам отдельных скважин (табл. 1). Проведено сравнение остракодовых сообществ верхов оксфорда и нижнего кимериджа, распространенных в северо-западном обрамлении Свентокшиских гор, на Польской низменности и в Западной Европе (табл. 3).

## EXPLANATIONS OF PLATES

Abbreviations used: C = carapace, RV = right valve, LV = left valve, A = adult, PR = premature, JS = Juvenile stage, IT = instar.

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

Magnifications of all figures — approximately  $\times 70$ .

## Plate I

*Macrocypris* sp.

Fig. 1. C. (0.39) A: a LV lateral view, b RV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/1, 32.00—34.00 m.

Fig. 2. C. (0.33) PR: a LV lateral view, b RV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/2, 15.70 m.

Borehole Strzałków I/2, Lower Kimmeridgian

*Amphicythere confundens* Oertli, 1957

Fig. 3. C. ♀ (0.66) A: a LV lateral view, b RV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/3, 15.70 m.

Fig. 4. ♀ (0.65) A: LV internal view; ZPAL No. 0.X/4, 15.70 m.

Fig. 5. ♂ (0.70) A: a RV internal view, b RV lateral view; ZPAL No. 0.X/6, 15.70 m.

Borehole Strzałków I/2, upper part of the Upper Oxfordian

*Amphicythere kilenyii* sp.n.

Fig. 6. ♀ (0.68) A: a RV lateral view, b RV internal view; ZPAL No. 0.X/7, holotype, 12.50—14.00 m.

- Fig. 7. C. ♀ (0.60) PR: a RV lateral view, b LV lateral view; ZPAL No. 0.X/8, 12.50—14.00 m.
- Fig. 8. C. ♀ (0.54) JS: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/10, 12.50—14.00 m.
- Fig. 9. C. ♂ (0.72) A: dorsal view; ZPAL No. 0.X/11, 12.50—14.00 m.  
Borehole Strzałków I/4, Lower Kimmeridgian

## Plate II

*Amphicythere kilenyii* sp.n.

- Fig. 1. C. ♂ (0.72) A: a RV lateral view, b LV lateral view, c ventral view; ZPAL No. 0.X/11, 12.50—14.00 m.
- Fig. 2. ♂ (0.71) A: RV a lateral view, b RV internal view; ZPAL No. 0.X/12, 12.50—14.00 m.
- Fig. 3. ♂ (0.74) A: LV internal view; ZPAL No. 0.X/13, 12.50—14.00 m.
- Fig. 4. C. ♂ (0.64) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/14, 12.50—14.00 m.

*Amphicythere delicatipunctata* sp. n.

- Fig. 5. LV ♀ (0.63) A: a lateral view, b internal view; ZPAL No. 0.X/18, holotype, 12.50—14.00 m.
- Fig. 6. RV ♀ (0.56) PR: a lateral view, b internal view; ZPAL No. 0.X/19, 12.50—14.00 m.
- Fig. 7. C. ♂ (0.66) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/22, 12.50—14.00 m.
- Fig. 8. LV ♂ (0.49) JS: internal view; ZPAL No. 0.X/23, 12.50—14.00 m.  
Borehole Strzałków I/4, Lower Kimmeridgian

## Plate III

*Amphicythere ventricostata* sp.n.

- Fig. 1. C. (0.60) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/25, holotype, 18.00—20.00 m.
- Fig. 2. LV (0.51) PR: a lateral view, b internal view; ZPAL No. 0.X/26, 22.00—24.00 m.  
Borehole Strzałków I/5, Lower Kimmeridgian

*Polydentina rudis* Malz, 1958

- Fig. 3. LV (0.60) A: lateral view; ZPAL No. 0.X/27, 36.00—40.00 m.  
Borehole Strzałków I/6, Lower Kimmeridgian

*Polydentina crassicostata* sp.n.

- Fig. 4. RV ♂ (0.45) JS: a lateral view, b internal view; ZPAL No. 0.X/34, 22.00—24.00 m.
- Fig. 5. C ♀ (0.45) JS: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/32, 24.00—26.00 m.
- Fig. 6. LV ♀ (0.43) JS: a lateral view, b internal view; ZPAL No. 0.X/31, 22.00—24.00 m.
- Fig. 7. C ♀ (0.50) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/30, 22.00—24.00 m.
- Fig. 8. C ♀ (0.55) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/28, holotype, 22.00—24.00 m.
- Fig. 9. LV ♀ (0.53) A: a lateral view, b internal view; ZPAL No. 0.X/29, 22.00—24.00 m.

Fig. 10. RV ♀ (0.50) A: a lateral view, b internal view; ZPAL No. 0.X/33, 22.00—24.00 m.

Borehole Strzałków I/5, Lower Kimmeridgian

#### Plate IV

##### *Polydentina crassicosata* sp.n.

Fig. 1. C ♂ (0.42) JS: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/39, 32.00—34.00 m.

Fig. 2. RV ♂ (0.53) PR: a lateral view, b internal view; ZPAL No. 0.X/38, 32.00—34.00 m.

Fig. 3. C ♂ (0.55) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/37, 32.00—34.00 m.

Fig. 4. LV ♀ (0.44) JS: a lateral view, b internal view; ZPAL No. 0.X/36, 46.00—48.00 m.

Fig. 5. C ♀ (0.56) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/35, 46.00—48.00 m.

Borehole Strzałków I/6, Lower Kimmeridgian

##### *Polydentina flabellaticostata* sp.n.

Fig. 6. RV ♀ (0.50) PR: a lateral view, b internal view; ZPAL No. 0.X/43, 12.50—14.00 m.

Fig. 7. LV ♀ (0.57): A: a lateral view, b internal view; ZPAL No. 0.X/42, 12.50—14.00 m.

Fig. 8. C ♀ (0.59) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/41, holotype, 12.00—14.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

#### Plate V

##### *Polydentina quadricostata* sp.n.

Fig. 1. RV ♀ (0.43) JS: a lateral view, b internal view; ZPAL No. 0.X/48, 12.50—14.00 m.

Fig. 2. LV ♀ (0.52) PR: a lateral view, b internal view; ZPAL No. 0.X/47, 12.50—14.00 m.

Fig. 3. LV ♀ (0.59) A: a lateral view, b internal view; ZPAL No. 0.X/45, 12.50—14.00 m.

Fig. 4. RV ♀ (0.56) A: a lateral view, b internal view; ZPAL No. 0.X/46, 12.50—14.00 m.

Fig. 5. C ♀ (0.60) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/44, holotype, 12.50—14.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

##### *Monoceratina trinodosa* sp.n.

Fig. 6. C (0.58) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/50, holotype, 32.00—34.00 m.

Fig. 7. RV (0.51) PR: a lateral view, b internal view; ZPAL No. 0.X/51, 32.00—34.00 m.

Borehole Strzałków I/6, Lower Kimmeridgian

##### *Monoceratina* sp.

Fig. 8. LV (0.55) A: a lateral view, b internal view; ZPAL No. 0.X/52, 17.50 m.

Borehole Strzałków I/2, Lower Kimmeridgian.

*Galliaecytheridea dissimilis* Oertli, 1957

Fig. 9. C ♂ (0.57) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/53, 60.00—62.00 m borehole Strzałków I/6, Lower Kimmeridgian.

## Plate VI

*Galliaecytheridea dissimilis* Oertli, 1957

- Fig. 1. C ♂ (0.68) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/54, 60.00—62.00 m.  
 Fig. 2. C ♀ (0.45) JS: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/59, 24.00—26.00 m.  
 Fig. 3. C ♀ (0.49) JS: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/58, 24.00—26.00 m.  
 Fig. 4. LV ♀ (0.49) JS: a lateral view, b internal view; ZPAL No. 0.X/60, 22.00—24.00 m.  
 Fig. 5. C ♀ (0.57) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/51, 60.00—62.00 m.  
 Fig. 6. C ♀ (0.65) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/55, 60.00—62.00 m.  
 Fig. 7. LV ♀ (0.65) A: a lateral view, b internal view; ZPAL No. 0.X/56, 60.00—62.00 m.

Figs 2-4: borehole Strzałków I/5, Lower Kimmeridgian

Figs 1, 5-7: borehole Strzałków I/6, Lower Kimmeridgian

## Plate VII

*Galliaecytheridea fragilis* Kilenyi, 1969

- Fig. 1. C ♂ (0.55) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/61, 12.50—14.00 m.  
 Fig. 2. LV ♂ (0.54) A: a lateral view, b internal view; ZPAL No. 0.X/62, 12.50—14.00 m.  
 Fig. 3. C ♀ (0.50) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/63, 12.50—14.00 m.  
 Fig. 4. LV ♀ (0.48) A: a lateral view, b internal view; ZPAL No. 0.X/64, 12.50—14.00 m.  
 Fig. 5. RV ♀ (0.48): a lateral view, b internal view; ZPAL No. 0.X/65, 12.50—14.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

*Galliaecytheridea postrotunda* Oertli, 1957

- Fig. 6. C ♀ (0.52) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/67, 32.00—34.00 m.  
 Fig. 7. RV ♀ (0.52) A: a lateral view, b internal view; ZPAL No. 0.X/68, 32.00—34.00 m.  
 Fig. 8. C ♀ (0.41) IG: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/69, 32.00—34.00 m.  
 Fig. 9. RV ♀ (0.41) JS: a lateral view, b internal view; ZPAL No. 0.X/70, 32.00—34.00 m.

Borehole Strzałków I/6, Lower Kimmeridgian

## Plate VIII

*Galliaecytheridea wolburgi* (Steghaus, 1951)

- Fig. 1. LV ♀ (0.75) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/74, 38.00—40.00 m.
- Fig. 2. C ♀ (0.75) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/73, 38.00—40.00 m.
- Fig. 3. LV ♂ (0.88) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/72, 32.00—40.00 m.
- Fig. 4. C ♂ (0.87) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/71, 32.00—40.00 m.

Borehole Strzałków I/6, Lower Kimmeridgian

## Plate IX

*Galliaecytheridea punctata* Kilenyi, 1969

- Fig. 1. C ♂ (0.90) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/75, 60.00—62.00 m, borehole Strzałków I/6, Lower Kimmeridgian.
- Fig. 2. RV ♂ (0.90): A: *a* lateral view, *b* internal view; ZPAL No. 0.X/76, 60.00—62.00 m, borehole Strzałków I/6, Lower Kimmeridgian.
- Fig. 3. LV ♀ (0.73) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/77, 60.00—62.00, borehole Strzałków I/6, Lower Kimmeridgian.
- Fig. 4. C ♀ (0.68) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/78, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

*Galliaecytheridea densipunctata* sp.n.

- Fig. 5. LV ♀ (0.70) A: *a* lateral view, *b* dorsal view; ZPAL No. 0.X/79, 18.00—20.00 m, borehole Strzałków I/5, Lower Kimmeridgian.

## Plate X

*Galliaecytheridea densipunctata* sp.n.

- Fig. 1. C ♀ (0.72) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/80, holotype, 18.00—20.00 m.
- Fig. 2. C ♀ (0.60) JS: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/81, 18.00—20.00 m.
- Fig. 3. C ♂ (0.85) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/82, 18.00—20.00 m.
- Fig. 4. RV ♂ (0.79) A: *a* internal view, *b* dorsal view; ZPAL No. 0.X/83, 18.00—20.00 m.

Borehole Strzałków I/5, Lower Kimmeridgian

## Plate XI

*Galliaecytheridea inaequalipunctata* sp.n.

- Fig. 1. C ♀ (0.75) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/84, holotype, 60.00—62.00 m.
- Fig. 2. LV ♀ (0.75) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/85, 60.00—62.00 m.
- Fig. 3. C ♀ (0.64) PR: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/86, 60.00—62.00 m.
- Fig. 4. C ♂ (0.93) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/87, 60.00—62.00 m.

Borehole Strzałków I/6, Lower Kimmeridgian



## Plate XII

*Galliaecytherides inaequalipunctata* sp.n.

- Fig. 1. RV ♂ (0.91) A: a lateral view, b internal view; ZPAL No. 0.X/88, 60.00—62.00 m.
- Fig. 2. LV ♂ (0.91) A: a lateral view, b internal view; ZPAL No. 0.X/89, 60.00—62.00 m.
- Fig. 3. C ♂ (0.71) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/91, 40.00—42.00 m.
- Fig. 4. LV ♀ (0.74) A: a posterior radial pore canals, b anterior radial pore canals; ZPAL No. 0.X/90, 60.00—62.00 m.

Borehole Strzałków I/6, Lower Kimmeridgian

## Plate XIII

*Galliaecytheridea raripunctata* sp.n.

- Fig. 1. C ♀ (0.64) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/92, holotype, 50.00—52.00 m.
- Fig. 2. C ♀ (0.58) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/93, 50.00—52.00 m.
- Fig. 3. RV ♀ PR: internal view; ZPAL No. 0.X/94, 50.00—52.00 m.
- Fig. 4. C ♂ (0.75) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/95, 50.00—52.00 m.
- Fig. 5. LV ♂ (0.73) A: internal view; ZPAL No. 0.X/96, 50.00—52.00 m.
- Fig. 6. C ♂ (0.68) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/97, 22.00—24.00 m, borehole Strzałków I/5, Lower Kimmeridgian.

Except for the fig. 6, all specimens from the borehole Strzałków I/6, Lower Kimmeridgian

## Plate XIV

*Galliaecytheridea cuneiformis* sp.n.

- Fig. 1. C ♀ (0.33) IT IV: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/98, 28.00—30.00 m.
- Fig. 2. C ♀ (0.38) IT V: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/99, 28.00—30.00 m.
- Fig. 3. RV ♀ (0.39) IT V: a lateral view, b internal view; ZPAL No. 0.X/100, 28.00—30.00 m.
- Fig. 4. LV ♀ (0.44) PR: a lateral view, b internal view; ZPAL No. 0.X/101, 28.00—30.00 m.
- Fig. 5. C ♀ (0.53) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/102, holotype, 28.00—32.00 m.
- Fig. 6. LV ♀ (0.52) A: a lateral view, b internal view; ZPAL No. 0.X/103, 28.00—30.00 m.
- Fig. 7. LV ♂ (0.60) PR: a lateral view, b internal view; ZPAL No. 0.X/104, 28.00—30.00 m.
- Fig. 8. C ♂ (0.60) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/105, 28.00—30.00 m.
- Fig. 9. C ♂ (0.75) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/106, 28.00—30.00 m.

Borehole Strzałków I/5, Lower Kimmeridgian

## Plate XV

*Nodophthalmocythere pazdroae* sp.n.

Fig. 1. LV ♂ (0.59) A: a lateral view, b internal view; ZPAL No. 0.X/107, holotype, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

*Nodophthalmocythere* sp.

Fig. 2. LV ♂ (0.59) A: a lateral view, b internal view; ZPAL No. 0.X/108, 32.00—34.00 m, borehole Strzałków I/6, Lower Kimmeridgian.

*Schuleridea strzalkowiensis* sp.n.

Fig. 3. C ♀ (0.46) PR: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/109, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

Fig. 4. RV ♀ (0.45) PR: a lateral view, b internal view; ZPAL No. 0.X/110, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

Fig. 5. C ♀ (0.53) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/114, holotype, 24.00—26.00, borehole Strzałków I/5, Lower Kimmeridgian.

Fig. 6. LV ♀ (0.52) A: a lateral view, b internal view; ZPAL No. 0.X/115, 24.00—26.00 m, borehole Strzałków I/5, Lower Kimmeridgian.

Fig. 7. C ♂ (0.57) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/111, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

Fig. 8. LV ♂ (0.56) A: a lateral view, b internal view; ZPAL No. 0.X/112, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

Fig. 9. RV ♂ (0.53) PR: a lateral view, b internal view; ZPAL No. 0.X/113, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

## Plate XVI

*Orthonotacythere interrupta* Triebel, 1941

Fig. 1. C (0.50) A: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/117, 29.00—31.00 m, borehole Strzałków I/4, Lower Kimmeridgian.

Fig. 2. RV (0.48) A: a lateral view, b internal view; ZPAL No. 0.X/118, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

Fig. 3. RV (0.48) A: lateral view; ZPAL No. 0.X/119, 35.00—37.00 m, borehole Strzałków I/4, Lower Kimmeridgian.

Fig. 4. LV (0.48) A: internal view; ZPAL No. 0.X/120, 22.00—24.00 m, borehole Strzałków I/5, Lower Kimmeridgian.

Fig. 5. C (0.40) JS: a lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/121, 22.00—23.00 m, borehole Strzałków I/4, Lower Kimmeridgian.

*Procytheropteron subtrapezoides* sp.n.

Fig. 6. C (0.46) A: a RV lateral view, b LV lateral view; c dorsal view, d ventral view; ZPAL No. 0.X/123, holotype, 12.50—14.00 m.

Fig. 7. RV (0.45) A: a lateral view, b internal view; ZPAL No. 0.X/124, 35.00—37.00 m.

Fig. 8. LV (0.41) PR: a lateral view, b internal view; ZPAL No. 0.X/125, 35.00—37.00 m.

Fig. 9. RV (0.39) PR: a lateral view, b internal view; ZPAL No. 0.X/126, 35.00—37.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

*Procytheropteron* sp.

Fig. 10. LV (0.40) PR: *a* lateral view, *b* internal view; ZPAL No. 0.X/128, 32.00—34.00 m, borehole Strzałków I/6, Lower Kimmeridgian.

*Lophocythere cruciata kimmeridgiensis* Guyader, 1966

Fig. 11. C ♂ (0.53) A: *a* lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/129, 22.00—23.00 m.

Fig. 12. LV ♂ (0.56): A: *a* lateral view, *b* internal view; ZPAL No. 0.X/130 m, 22.00—23.00 m.

Fig. 13. RV ♂ (0.53) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/131, 22.00—23.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

## Plate XVII

*Protocythere furcata* Bielecka & Styk, 1966

Fig. 1. C ♂ (0.50) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/133, 12.50—14.00 m.

Fig. 2. LV ♀ (0.53) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/134, 12.50—14.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

*Protocythere fusca* sp.n.

Fig. 3. C ♀ (0.56) A: *a* lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/136; holotype, 22.00—23.00 m.

Fig. 4. LV ♀ (0.57) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/137, 22.00—23.00 m.

Fig. 5. C ♂ (0.66) A: *a* lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/138, 22.00—23.00 m.

Fig. 6. LV ♂ (0.66) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/139, 22.00—23.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

*Protocythere sigmoidea* Steghaus, 1951

Fig. 7. LV ♂ (0.59) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/141, 15.70 m.

Fig. 8. RV ♂ (0.59) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/142, 15.70 m.

Fig. 9. LV ♀ (0.47) A: internal view; ZPAL No. 0.X/143, 15.70 m.

## Plate XVIII

*Protocythere sigmoidea* Steghaus, 1951

Fig. 1. LV ♀ (0.47) A: lateral view; ZPAL No. 0.X/143, 15.70 m.

Fig. 2. RV ♀ (0.47) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/144, 15.70 m.

Borehole Strzałków I/2, Lower Kimmeridgian

*Protocythere* sp. 1

Fig. 3. C ♀ (0.48) A: *a* RV lateral view, *b* LV lateral view, *c* dorsal view, *d* ventral view; ZPAL No. 0.X/145, 12.50—14.00 m.

Fig. 4. LV ♀ (0.49) A: *a* lateral view, *b* internal view; ZPAL No. 0.X/146, 35.00—37.00 m.

Borehole Strzałków I/4, Lower Kimmeridgian

*Protocythere* sp. 2

Fig. 5. C ♂ (0.60) A: a RV lateral view, b internal view, c dorsal view, d ventral view; ZPAL No. 0.X/147, 15.70 m.

Fig. 6. RV ♀ (0.48) A: a lateral view, b internal view; ZPAL No. 0.X/148, 15.70 m.

## Borehole Strzałków I/2, Lower Kimmeridgian

*Mandelstamia (M.) rectilinea* Malz, 1958

Fig. 7. LV ♀ (0.54) A: a lateral view, b internal view; ZPAL No. 0.X/149, 15.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

*Exophthalmocythere fuhrbergensis* Steghaus, 1951

Fig. 8. LV (0.65) A: a lateral view, b internal view; ZPAL No. 0.X/150, 12.50—14.00 m, borehole Strzałków I/4, Lower Kimmeridgian.

Fig. 9. RV (0.63) A: a lateral view, b internal view; ZPAL No. 0.X/151, 22.00—24.00 m, borehole Strzałków I/5, Lower Kimmeridgian.

*Cytherella (Cytherelloidea) weberi* (Steghaus, 1951)

Fig. 10. RV (0.58) A: a lateral view, b internal view; ZPAL No. 0.X/152, 12.50—14.00 m, borehole Strzałków I/4, Lower Kimmeridgian.

Fig. 11. C (0.45) JS: a RV lateral view, b LV lateral view, c dorsal view, d ventral view; ZPAL No. 0.X/153, 12.70 m, borehole Strzałków I/2, Lower Kimmeridgian.

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Phot: M. Radzikowska

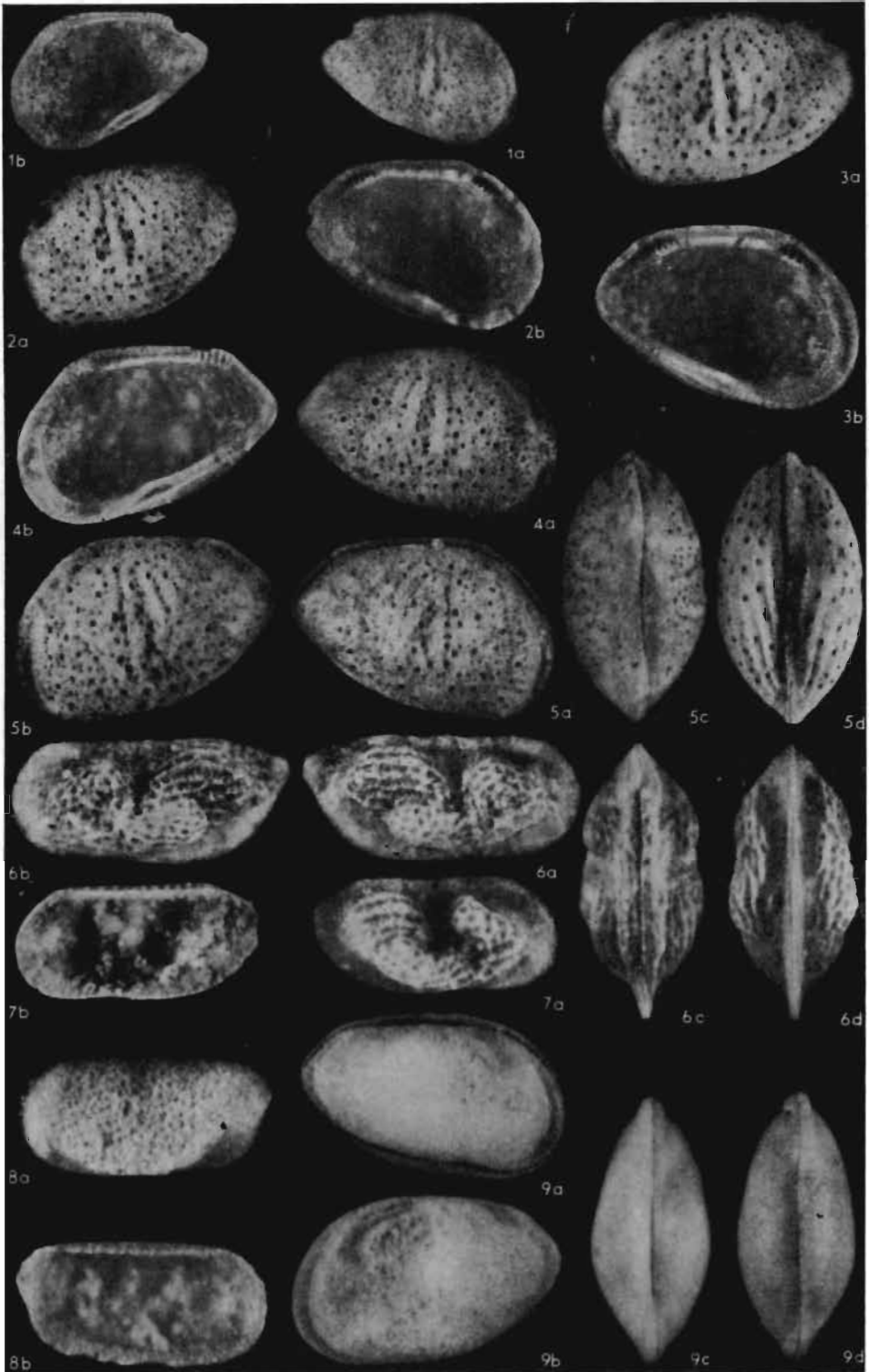


Phot. M. Radzikowska

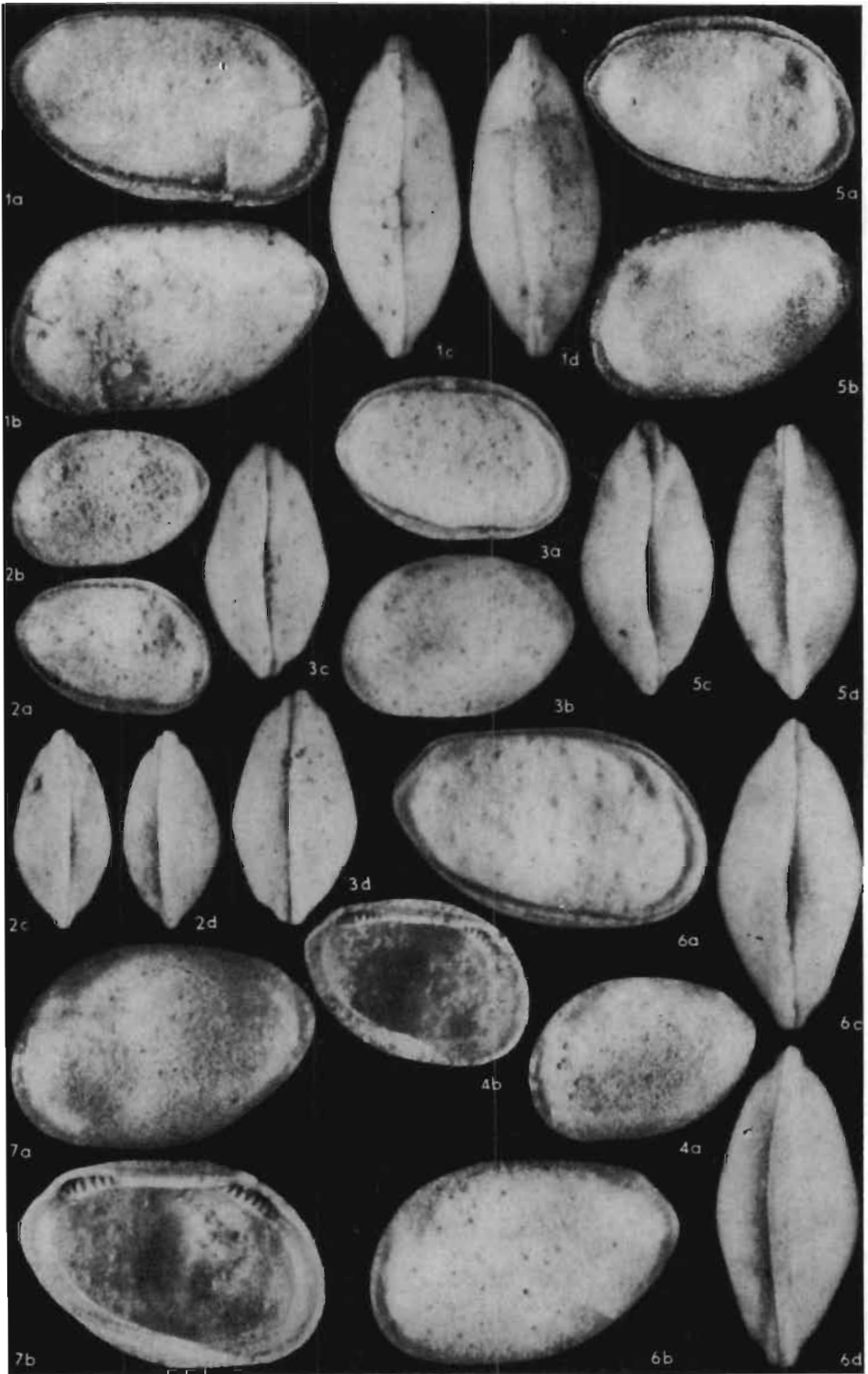


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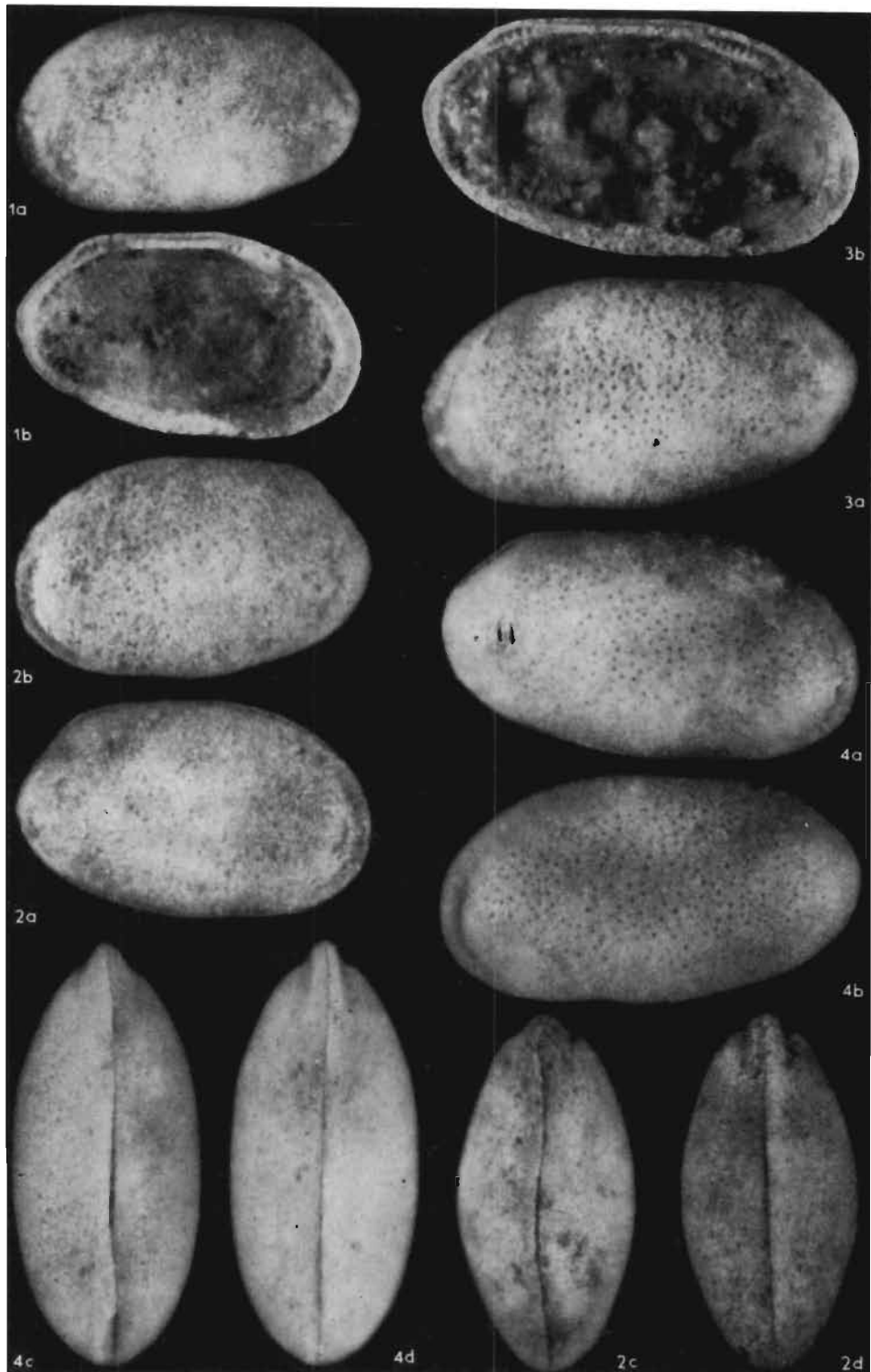
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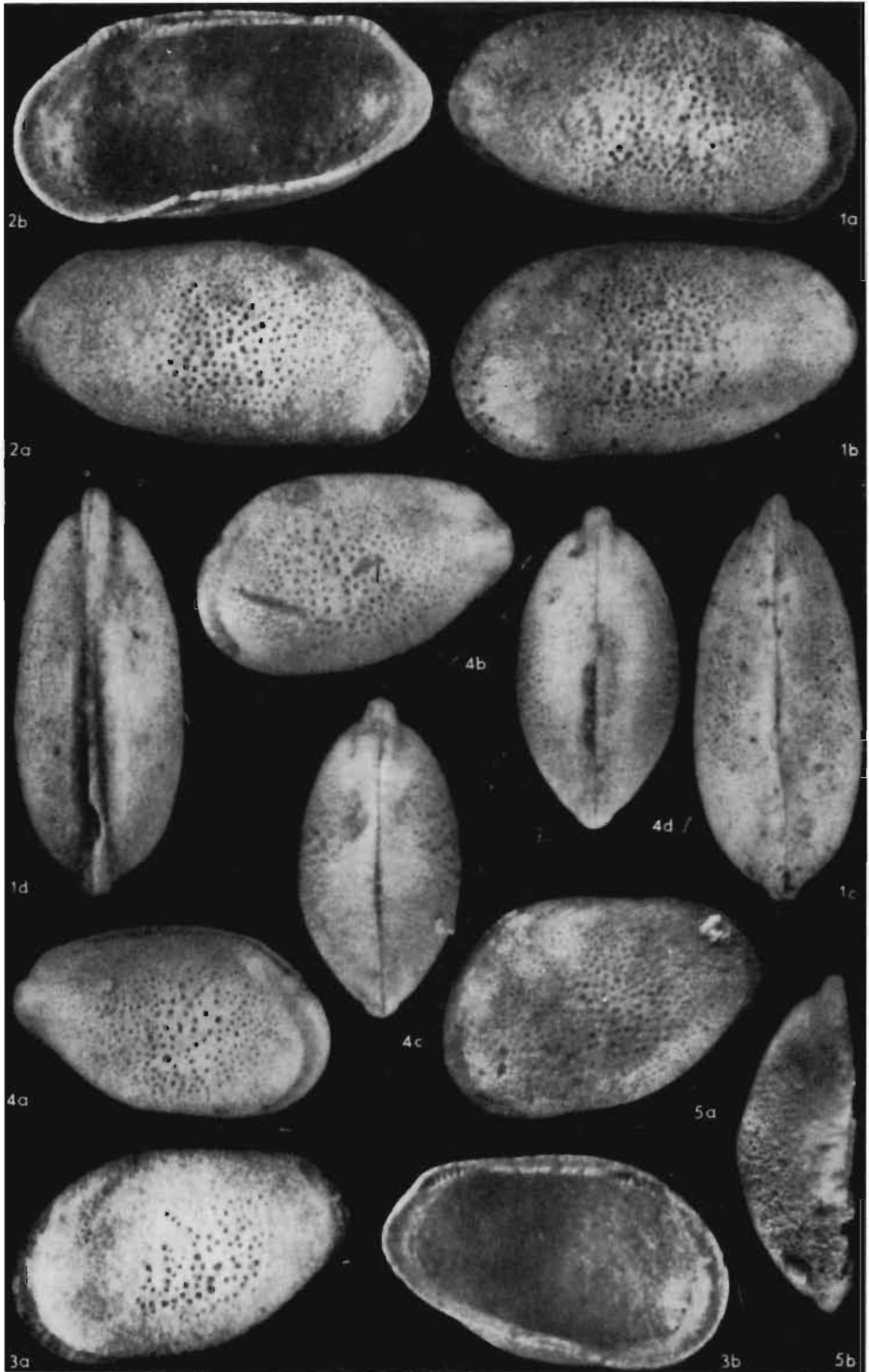
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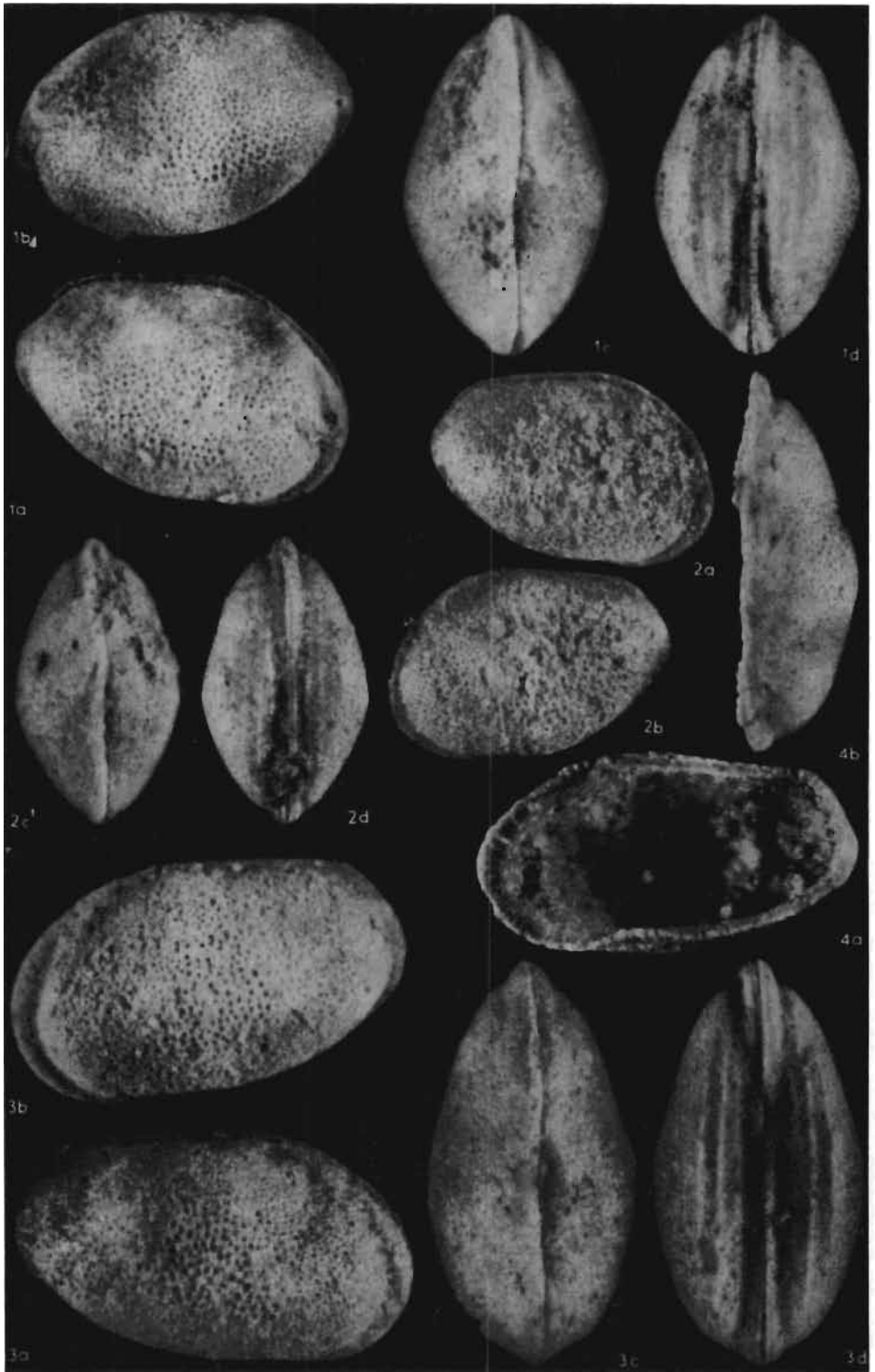
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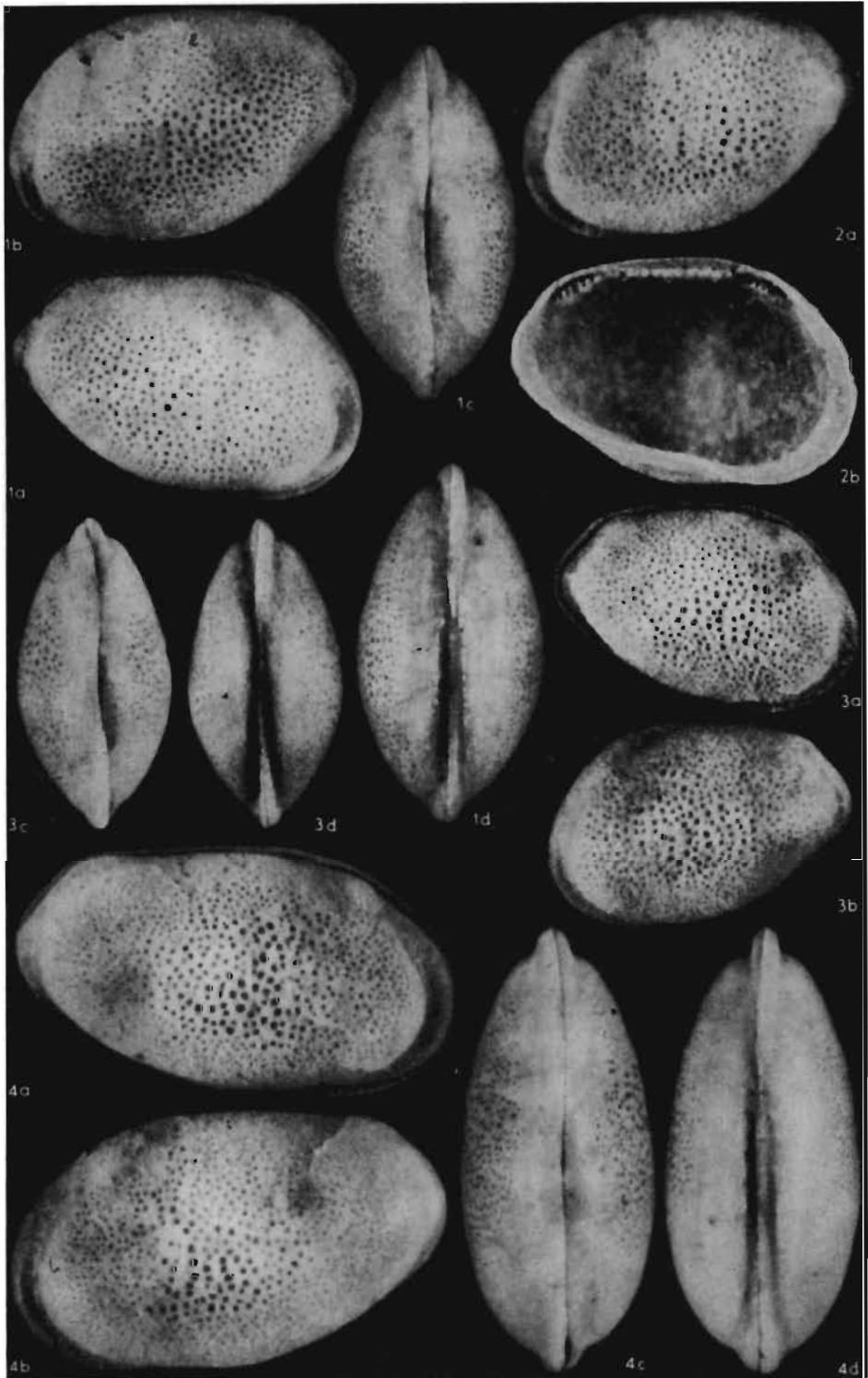
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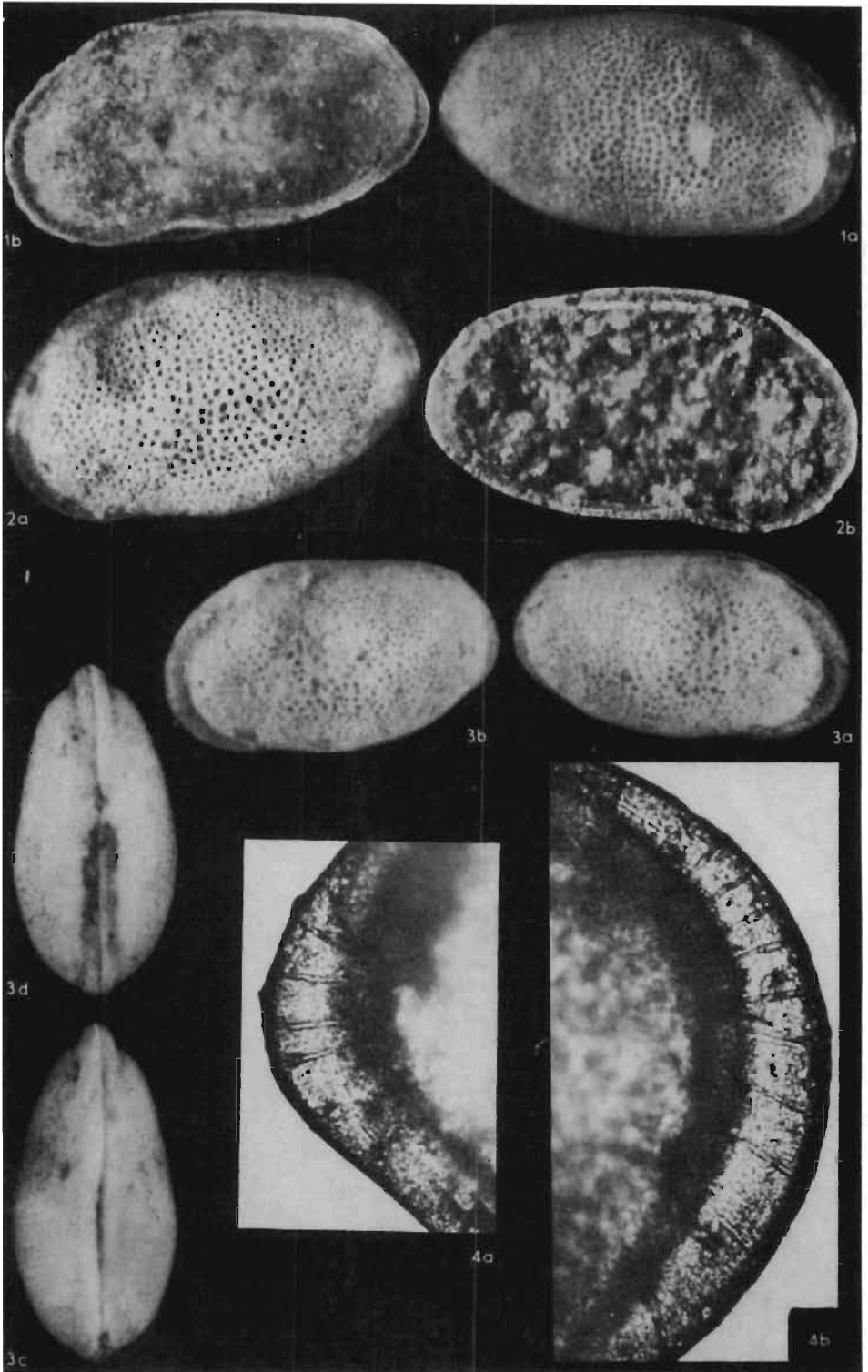
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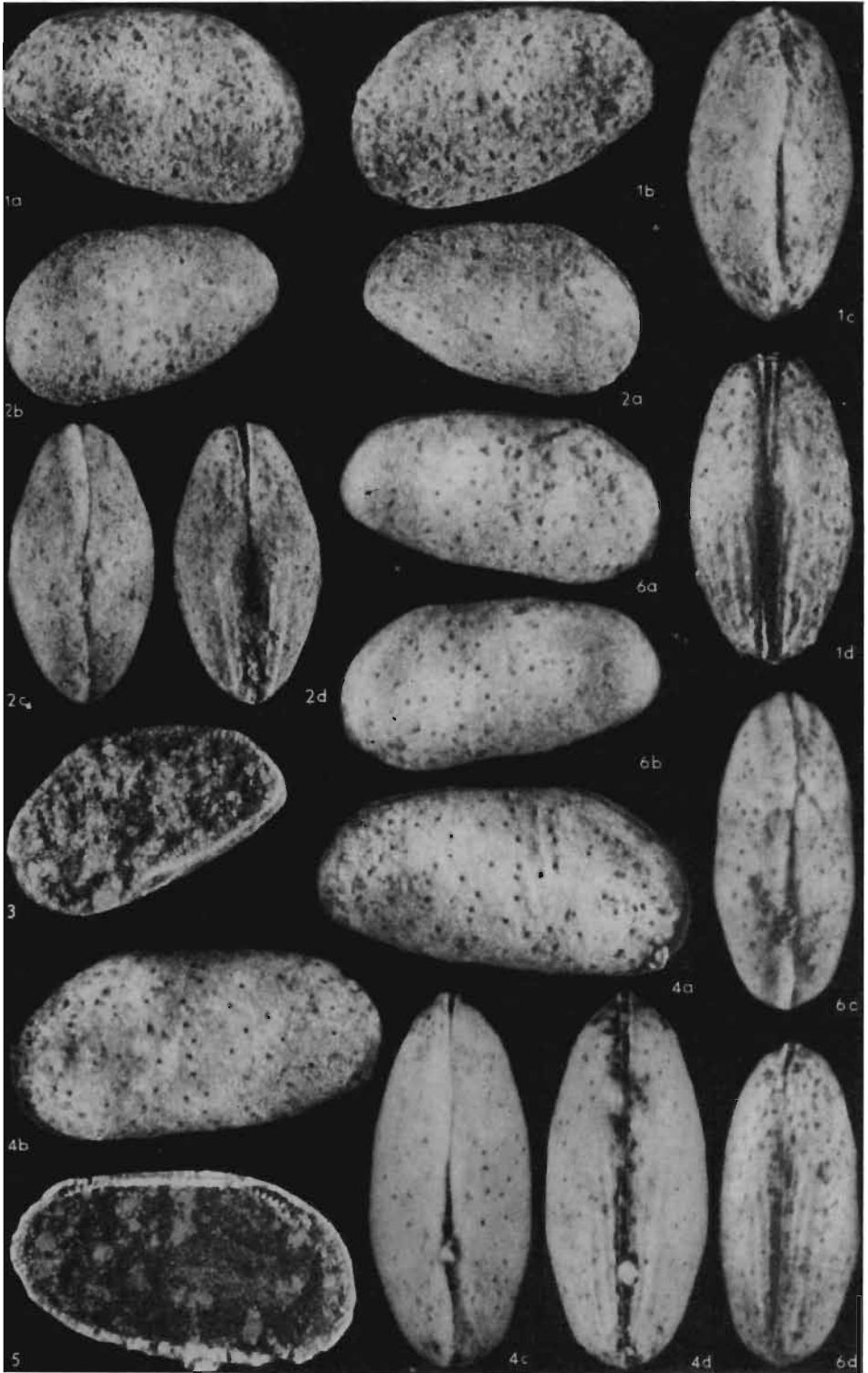


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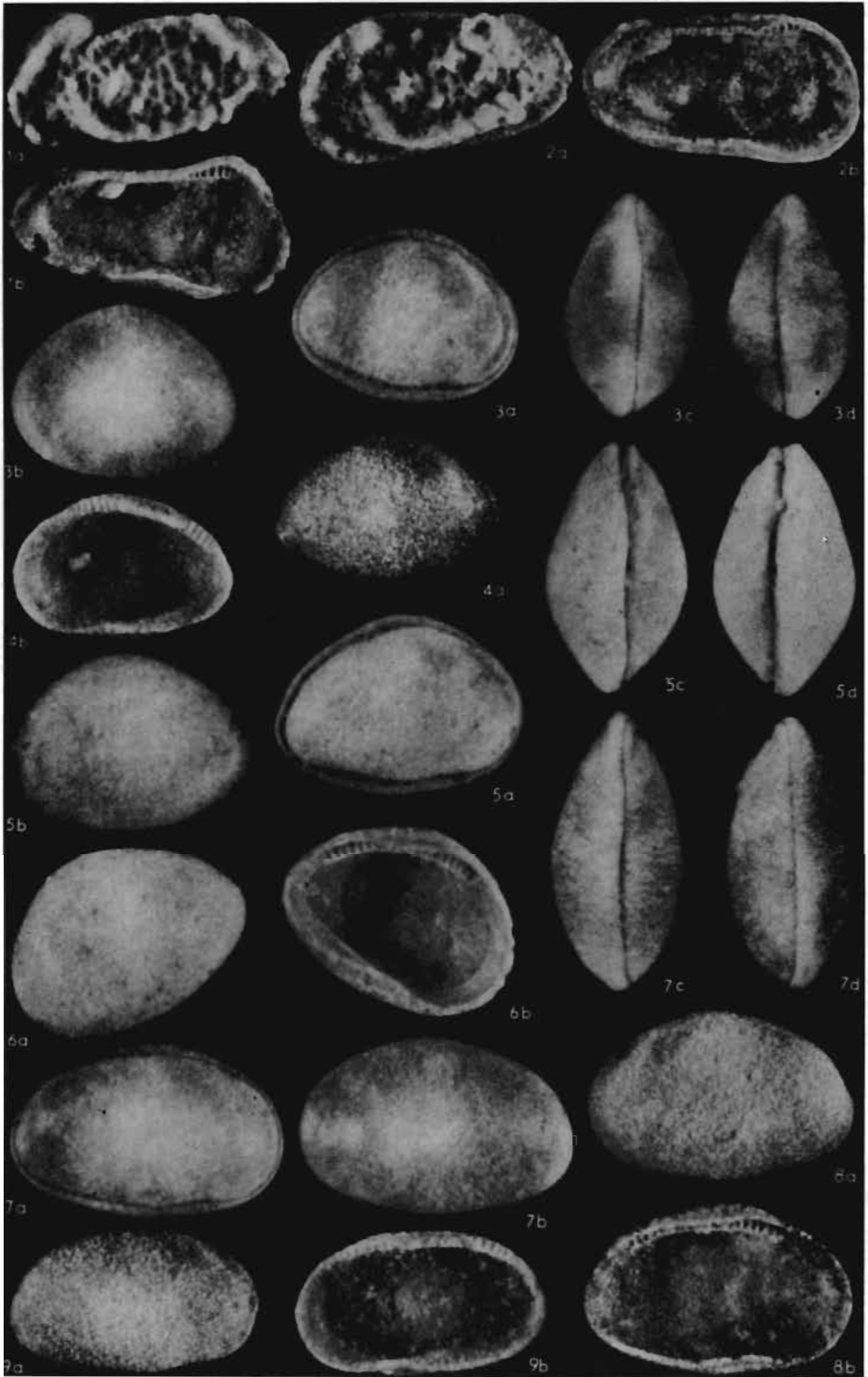
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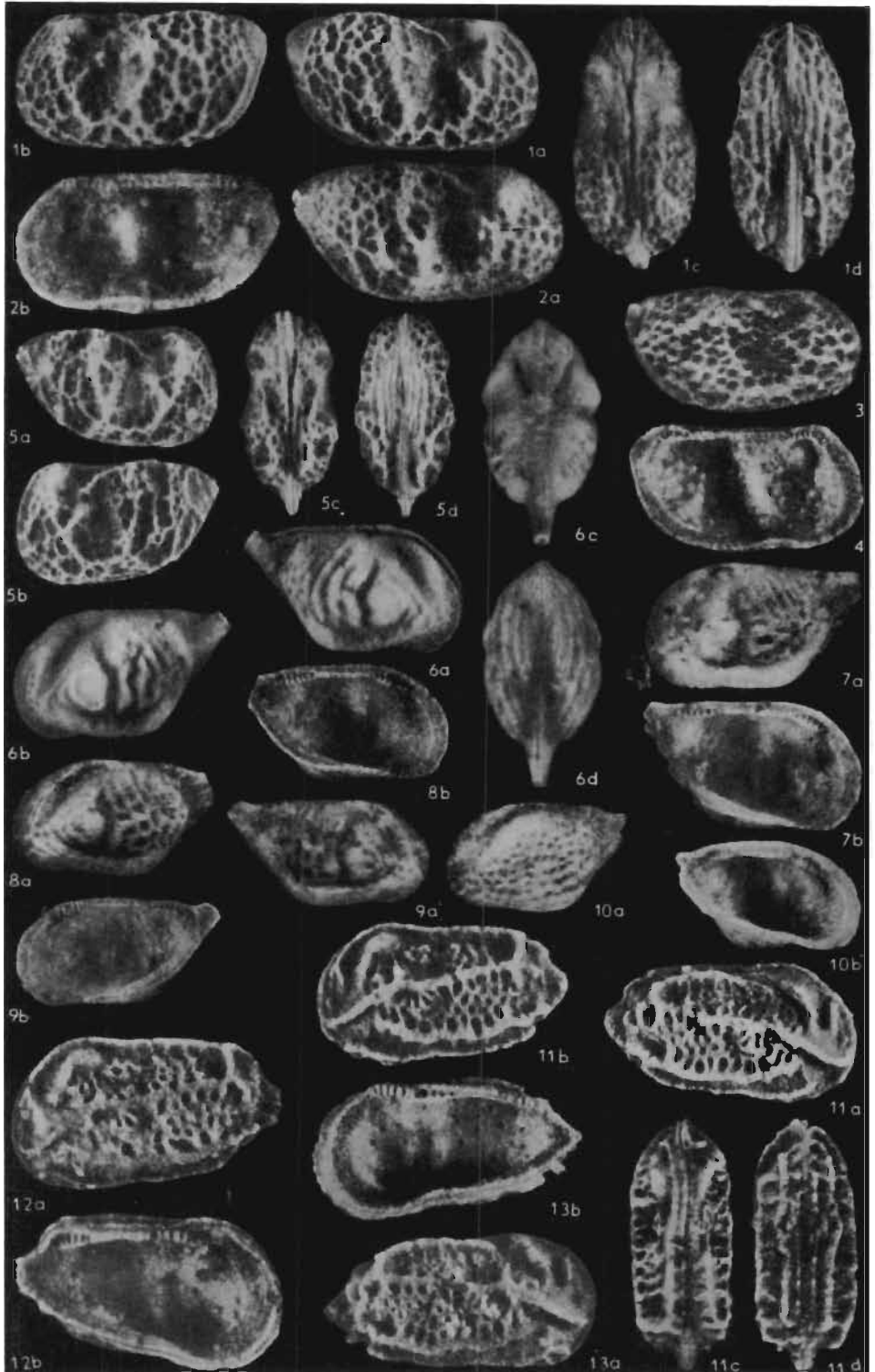




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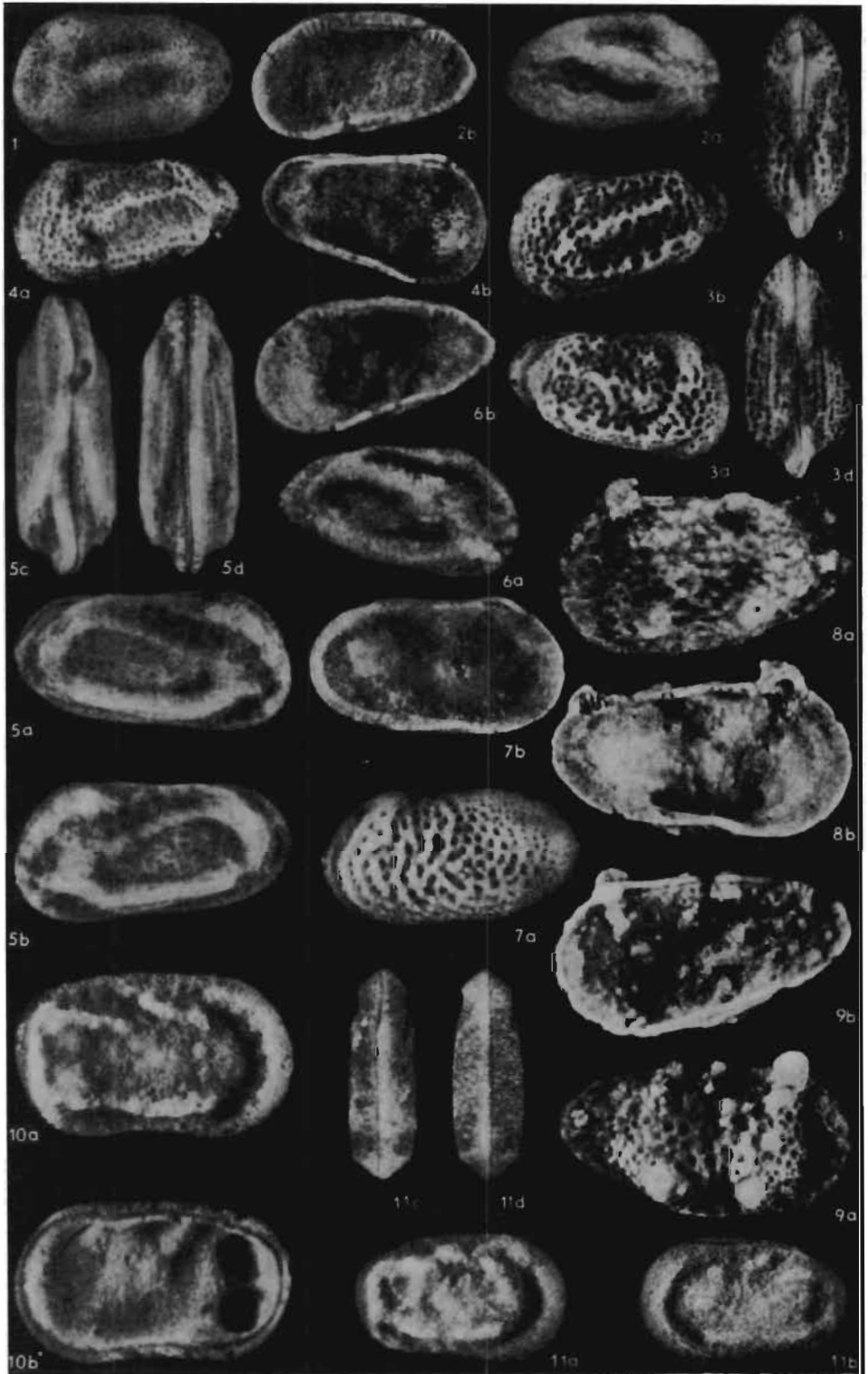
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