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MIDDLE ORDOVICIAN BLACK RIVER OSTRACODS  
FROM MICHIGAN  
PART III, *PLATYBOLBINA*

BY  
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MUSEUM OF PALEONTOLOGY  
THE UNIVERSITY OF MICHIGAN  
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FROM MICHIGAN  
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INTRODUCTION

OF THE PALEOCOPAN ostracods in the Middle Ordovician Bony Falls limestone, nearly half belong in the genus *Platybolbina* Henningsmoen. This is the first occurrence of *Platybolbina* reported from North America. The specimens include valves of several species, of which six are sufficiently well represented to be described as new. All are from unit 4 of the Bony Falls limestone at Bony Falls (see Kesling and others, 1960, pp. 295-96, for details of locality and stratigraphy). They are catalogued and deposited in the Museum of Paleontology of the University of Michigan.

The manuscript of this paper was kindly read by Dr. George M. Ehlers and Dr. Chester A. Arnold.

SYSTEMATIC DESCRIPTIONS

- Suborder PALEOCOPA Henningsmoen, 1953a
- Superfamily Eurychilinaea Ulrich and Bassler, 1923
- Family Eurychiliniidae Ulrich and Bassler, 1923
- Subfamily Chilobolbininae Jaanusson, 1957
- Genus *Platybolbina* Henningsmoen, 1953b

*Type species*.—By original designation, *Primitia distans* Krause, 1889.

*Remarks*.—The complicated history of this genus has been explained by Jaanusson (1957, p. 259). In brief:

1892. Koken (pp. 26-27) proposed the name *Platyhilina* for a Triassic gastropod from the Raibler beds of the Schlern Plateau in the Tirolean Alps, with *P. woehrmanni*

as its type. He also gave a description and designated the type species in Woehrmann and Koken (1892, pp. 195-96).

1933. Kummerow (pp. 44, 45, 53) unaware of Koken's previous use of the name, proposed *Platychilina* for a genus of ostracod. Inasmuch as Kummerow offered no description and designated no type species, his *Platychilina* was not only a junior homonym but also a *nomen nudum*.

1937. Öpik (p. 86) pointed out that *Platychilina* Kummerow was a *nomen nudum*.

1939. Kummerow (p. 19) defined *Platychilina* and designated *Primitia elongata* Krause, 1891, as the type species of that ostracod.

1940. Thorslund (p. 169), unaware of Kummerow's 1939 description and designation of type species, designated *Primitia distans* Krause, 1889, as the type for *Platychilina* Kummerow, 1933. Jaanusson (1957, p. 260) expressed doubt that *Primitia elongata* and *P. distans* are congeneric; if his interpretation is correct, the *Platychilina* referred to by Kummerow in 1939 is a different ostracod from the *Platychilina* referred to by Thorslund in the following year.

1944. Agnew (p. 219) was first to discover that the ostracod genus *Platychilina* Kummerow was a junior homonym of *Platychilina* Koken, 1892.

1949. Hessland (p. 253), unaware of Koken (1892), Kummerow (1939), or Agnew (1944), referred to "*Platychilina* Kummerow 1933, *nomen nudum*; in fact Thorslund 1940."

1953a. Henningsmoen ((p. 227-28, 268) proposed the new name *Platybolbina* to replace *Platychilina* Thorslund, 1940 (*non* Koken, 1892). His *Platybolbina* was a *nomen nudum* at the time of the original publication.

1953b. Henningsmoen (p. 50) repeated his proposal to replace *Platychilina* Thorslund, 1940 (*non* Koken, 1892, *nec* Kummerow, 1933, *nec* Kummerow, 1939) by "*Platybolbina* *nomen nov.*" He designated *Primitia distans* Krause (which previously was designated as type of *Platychilina* by Thorslund, 1940) as the type species of *Platybolbina* Henningsmoen.

The species of *Platybolbina*, including those described in this paper, are compared in Table I. Many have such distinctive ornamentation that they can be distinguished by that characteristic alone. Species also show other consistent differences. A shallow sulcus is present in some, but not in others; a dorsal ridge or plica is developed in only a few species; and the central unornamented spot, referred to as the "muscle spot" and thought to mark the external position of the adductor-muscle scar, differs in size, outline, and convexity.

Adult individuals of certain species of *Platybolbina* from Michigan have a large range in size, indicating, perhaps, that these species were evolving rapidly. In addition, some small, apparently immature, specimens possess the female type of frill. The precocious appearance of dimorphism has already been found in paleocopan ostracods (Spjeldnaes, 1951, p. 751; Martinsson, 1955, pp. 12, 25; 1956, pp. 10-13, 20; 1960, p. 145; Jaanusson, 1957, pp. 206-9), and seems to be present in *Platybolbina ampla* Jaanusson, to judge from the smaller size of one female right valve (No. T228) illustrated by Jaanusson (1957, Pl. 3, Fig. 16).

Because some valves do not cleave cleanly from the matrix, the ornamentation is not equally distinct in all members of a species. Such differences in expression of ornamentation become more pronounced when the specimens are coated with sublimate of ammonium chloride (as in the photographs shown in the plates).

**Platybolbina chalazia**, sp. nov.

(Pl. VII, Figs. 2-5)

*Female*.—Domicilium subquadrate to subelliptical, with greatest height just in front of the muscle spot. S2 developed as a faint groove above the acuminate dorsal end of the muscle spot, becoming indistinct below the dorsal plica. L2 low and indistinct, anterodorsal to muscle spot and adjacent to S2. Dorsal plica formed as a low ridge thickened at its terminations, not reaching either corner; ends turned down abruptly, forming sharp semisulci with the corner areas. Anterior termination of the dorsal plica a small subtriangular prominence.

Muscle spot lacrimiform with a shallow pit near the middle, outlined by a shallow groove, distinctly subcentral on the domicilium. Arc between muscle spot and ventral border of the domicilium in the central ventral and posteroventral areas, subparallel to the ventral border, expressed as a narrow groove (Pl. VII, Fig. 3), a shallow groove (Pl. VII, Fig. 5), or a very shallow groove with a double row of very small punctae (Pl. VII, Fig. 2). Lateral surface, except for smooth corner areas and muscle spot, ornamented with a deep, rather small-meshed reticulation and scattered tubercles.

Frill gently convex, its width more than half the height of the domicilium, ventrally of uniform width, anteriorly tapering gradually toward the anterior corner, posteriorly abruptly decreasing to a narrow ridge; ends of velate structure not clearly shown in any specimen. Surface of frill with striae, distinct in some (Pl. VII, Fig. 3) but obscure in others (Pl. VII, Fig. 5), and short concentric crests, not continuous from one radial element to the next. Measurements in Table II.

*Immature instar*.—Similar to adult female in shape and ornamentation, but with narrower frill (width about one-third the height of the domicilium). Measurements in Table II.

*Remarks*.—The ornamentation in this species is closest to that of *P. kapteyni* (Bonnema), as illustrated by Jaanusson (1957, Pl. IV, Figs. 1-3), in that both species have scattered tubercles and reticulation. The ornamentation of *P. chalazia*, sp. nov., however, has finer and deeper reticulation and more prominent and numerous tubercles. In addition, *P. chalazia* has a wider frill in the female, narrower radial elements in the

TABLE I  
 COMPARISON OF SPECIES OF *Platybolbina*

<i>Platybolbina</i> Species	Length (mm)	Development of S2	Development of L2	Dorsal Plica
<i>P. distans</i> (Krause, 1889) †	1.2	Sulcal depression above muscle spot	None reported in literature	None
<i>P. plana</i> (Krause, 1889)	2.0	"Very faint and diffuse sulcoid depression" ‡	None or very slight	None
<i>P. elongata</i> var. <i>obliqua</i> (Steusloff, 1894) §	1.2	Shallow groove, distinct	Slight elevation in front of S2	Apparently none
<i>P. elongata</i> var. <i>semicircularis</i> (Steusloff, 1894) §	1.6	Weakly developed	None known	Apparently none
<i>P. kapteyni</i> (Bonnema, 1909)	1.05-1.16	Surface depressed above muscle spot	Slight elevation	Figs.    show faint narrow ridge; not described
<i>P. lunulifera</i> Henningsmoen, 1954b	1.50-1.60	None	None	None
<i>P. temperata</i> Sarv, 1956	1.91-2.15	None	None	None
<i>P. ampla</i> Jaanusson, 1957	1.29-1.50	None	None	None
<i>P. inflata</i> Jaanusson, 1957	0.96-1.04	None	None	None
<i>P. maslovi</i> Sarv, 1959	1.80	None	None	None
<i>P. orbiculata</i> Sarv, 1959	1.90	None	None	None
<i>P. chalazia</i> , sp. nov.	1.56-1.70	Faint groove	Low, indistinct	Low ridge
<i>P. compsa</i> , sp. nov.	1.94	None	None	None or faint
<i>P. dictyota</i> , sp. nov.	1.43	Shallow	Very slightly elevated area with faint ornamentation	Low, rounded ridge
<i>P. omphalota</i> , sp. nov.	1.40-1.88	Distinct, narrow above muscle spot flaring dorsally	Distinct low lobe	Smooth ridge
<i>P. psedna</i> , sp. nov.	1.40-1.54	None	None	Small ridge, ends turned sharply down and conspicuous
<i>P. schadidea</i> , sp. nov.	1.46-1.72	None	None	None or faint

\* Fractions in parentheses are ratios of the width of the frill to the height of the domicilium.

† Possibly a junior synonym of *P. plana* (Krause, 1889, p. 5, Pl. I, Figs. 1a-b) according to Henningsmoen (1954a, pp. 87, 89), but considered to be distinct by Jaanusson (1957, p. 260).

‡ Henningsmoen (1954a, p. 88).

Ornamentation	Anterior Corner Area	Frill*	Muscle Spot
Tuberculation coarser than in <i>P. ampla</i>	No raised area shown in figs.	Female relatively narrow (about 1/4)	Nearly central, large
Smooth or finely granulate, rarely pitted	Plain	Female more or less convex, about 2x width of male	Not raised, nearly central, large
Not described, probably finely tuberculate (as in <i>P. elongata</i> )	No indication of raised area	Probably incomplete in type (at least 1/5)	None reported or shown
Not described, probably finely tuberculate (as in <i>P. elongata</i> )	None mentioned or illustrated	(Apparently about 1/5)	Weakly developed
Rather coarse, distinct reticulation and small scattered tubercles	Smooth, triangular area	Male moderately broad (1/6), female wide (about 1/3-1/4)	Low on domicilium, center apparently flat
Fairly coarsely pitted	?	Female incurved (about 1/2), male less than half as wide	Distinctly subcentral, smooth, convex in female
Fine reticulation of small punctae	?	Male very narrow, female broad (about 1/3)	Much smaller than in <i>P. inflata</i> , nearly flat
Tuberculation finer than in <i>P. distans</i>	Not differentiated from rest of valve	Male broad (1/3-1/4), female moderately broad (1/4-1/6)	Nearly central, larger than in <i>P. kapteyni</i>
Distinct, small, closely spaced pits	Not differentiated	Male narrow, ridgelike, female strongly convex, inflated	Nearly central, large
Coarse reticulation	Small smooth crescentic area	From anterior corner to posteroventral, ending in spine, female convex	Even with surrounding area
Nearly smooth	Smooth	Female slightly incurved (about 1/4)	Inconspicuous
Reticulation and scattered tubercles	Small, prominent end of dorsal plica	Gently convex, concentrically elongate granules on striae (1/2+)	Lacriform with shallow central pit, surrounded by shallow groove
Reticulation coarse and irregular, shallow groove below muscle spot	Smooth, not raised	Very wide (2/3-3/4) with low concentric elements	Large, indented by distinct radiating grooves
Fine and even reticulation	Large, slightly raised	Ventral section convex as in <i>Laccochilina</i> (about 1/2)	Low, bounded by punctae slightly larger than those of reticulation
Distinct, fine, deep reticulation	Smooth, confluent with dorsal plica	Concentric little crests on radial elements (more than 1/2)	Lacriform with deep subcentral pit, surrounded by deep groove
Smooth, with curved groove between muscle spot and frill	Part of dorsal plica	Distinctly striate, faint concentric lines (about 1/2)	Slightly raised, delineated only by shallow radiating grooves
Reticulation of polygonal tubercles with punctae at interstices	Large smooth, raised	Distinct concentric ornament, female wide (1/2-2/3), immature narrow (1/5-1/4)	Buttonlike, raised above ornamented area with distinct boundary

§ Henningsmoen (1954a, pp. 87, 89) considered that *P. distans*, *P. elongata* var. *semicircularis*, and *P. elongata* var. *obliqua* might be synonymous. Jaanusson (1957, p. 260) thought them separate species.

|| Jaanusson (1957, Pl. IV, Figs. 1-3).

† Strongly resembles *Oepikella*.

frill, and a muscle spot that is more acuminate dorsally and bears a distinct shallow pit near its middle.

The convex frill leads me to believe that all adult valves found are females. The male is unknown.

The name of this species is derived from the Greek word *χαλαζιος* ("full of clots, tubercles, or tumors") and refers to the tubercles on the lateral surface of the domicilium.

*Types*.—Holotype, a female left valve, UMMP 37363. Paratypes, two female right valves, UMMP 37356 and 37374, and an immature right valve, UMMP 37197.

### ***Platybolbina compsa*, sp. nov.**

(Pl. IV, Figs. 1-3)

*Female*.—Domicilium subelliptical, nearly bilaterally symmetrical, with greatest height at the middle. No development of S2, L2, nor dorsal plica.

Muscle spot subcentral, rather large, convex, suboval, its border indented by radiating grooves (Pl. IV, Fig. 2). Small, subtriangular, smooth anterior corner area. Shallow groove between muscle spot and frill, continuous with a band of punctae extending nearly to the posterior corner. Rest of lateral surface of domicilium covered by a coarse, irregular reticulation.

Frill very broad ventrally, tapering gradually to the anterior corner, abruptly decreasing posteroventrally and becoming a narrow, rounded ridge to the posterior corner. Thus, anterior border of frill evenly round and posterior border distinctly indented. Frill radially striate and ornamented with fine continuous low concentric crests. Measurements in Table II.

*Remarks*.—This large distinctive species has an unusually broad frill. Its reticulation somewhat resembles that of *P. kaptayni* and *P. maslovi* (see Table I), but it is coarser and more irregular than that of *P. kaptayni* and not as deep as that of *P. maslovi*. Furthermore, it differs from both those species in having a less convex and broader frill and a more convex muscle spot. Unlike *P. kaptayni*, the new species lacks tubercles on the domicilium and any trace of S2; and unlike *P. maslovi*, it has no spinous prolongation of the posteroventral part of the frill.

If the specimen described below as *P. sp. cf. P. compsa* should prove to belong to this species, then the specimens assigned to *P. compsa* would be immature valves.

The name of this species is derived from the Greek word *κομψος* ("elegant") and refers to the development of the frill.



TABLE II  
MEASUREMENTS OF SPECIMENS USED IN THIS STUDY

Platybolbina Species	No.	Domicilium		Width of frill† (mm)	Illustrated		Remarks
		Length (mm)	Height (mm)		Pl.	Fig.	
<i>P. chalazia</i>	37197	0.96	0.54	0.14	VII	4	Immature
	37356	1.26	0.70	0.34	VII	5	Female
	37363*	1.31	0.70	(0.36)	VII	3	Female
	37374	1.39	0.76	0.42	VII	2	Female
<i>P. compsa</i>	37200*	1.42	0.88	0.60	IV	1	Female
	37246	1.40	0.80	0.41	IV	3	Female
<i>P. dictyota</i>	37207*	1.18	0.62	0.32	VII	1	Female
<i>P. omphalota</i>	37245	1.32	0.74	(0.41)	VIII	5	
	37352	1.32	0.72	(0.20)	VIII	6	
	37355*	1.54	0.80	(0.33)	VIII	4	
<i>P. psedna</i>	37250*	1.20	0.70	(0.26)	VIII	1	
	37272	1.20	0.72	0.32	VIII	2	
	37353	1.19	0.76	0.38	VIII	3	
<i>P. schadidea</i>	37198	1.32	0.75	0.41	I	5	Female
	37199*	1.26	0.71	0.39	VI	7	Female
	37204	1.27	0.74	0.40	I	1	Female
	37205	1.36	0.79	0.36	I	3	Female
	37206	1.20	0.68	0.30	VI	6	Female
	37211	1.15	0.70	0.37	VI	4	Female ?
	37212	1.28	0.74	0.36	I	4	Female
	37249	1.25	0.72	0.40	I	2	Female
	37251	1.06	0.64	0.14	II	4	Immature (male ?)
	37257	1.04	0.66	0.16	II	5	Immature (male ?)
	37260	1.21	0.70	0.28	VI	5	Female
	37261	1.20	0.71	0.33	II	8	Female
	37262	1.09	0.69	0.17	II	6	Immature (male ?)
	37264	1.30	0.75	0.38	II	7	Female
	37266	1.03	0.62	0.22	II	1	Immature female
37267	1.34	0.83	0.44	II	2	Female	
37275	0.95	0.60	0.11	II	3	Immature (male ?)	
<i>P. sp. cf.</i> <i>P. compsa</i>	37271	1.78	0.96	0.66	VI	1	Adult female ?
<i>P. sp. cf.</i> <i>P. dictyota</i>	37208	0.74	0.42	0.06	VI	2	Immature ?
<i>P. sp.</i>	37371	1.02	0.62	0.07	VI	3	Male or immature

\* Holotype.

† Measurements in parentheses probably do not include the full width of the frill.

*Types*.—Holotype, a female right valve, UMMP 37200. Paratype, a female left valve, UMMP 37246.

*Platybolbina* sp. cf. *P. compsa*, sp. nov.

(Pl. VI, Fig. 1)

A very large incomplete left valve shows certain similarities to *P. compsa*, particularly in the width of the frill and the spacing in the ornamentation. The ornamentation on the domicilium lacks raised ridges and the frill lacks concentric crests like those found in *P. compsa*. It is possible, however, that both differences can be attributed to the worn condition of the specimen.

If the valve proves to be *P. compsa*, then the two type specimens of that species are immature, since they are considerably smaller (see Table II).

Illustrated specimen.—Female left valve, UMMP 37271.

*Platybolbina dictyota*, sp. nov.

(Pl. V, Fig. 1; Pl. VII, Fig. 1)

*Female*.—Domicilium elongate subquadrate, with greatest height slightly anterior. S2 shallow and poorly defined, between muscle spot and dorsal plica. L2 a very slightly elevated area with faint ornamentation. Dorsal plica developed as a low, rounded ridge, narrow in its central part and expanded at both ends.

Muscle spot relatively large, subovate, low, outlined by small pits slightly larger than those forming the reticulation. Short, subhorizontal, shallow fissure between muscle spot and ventral border of the domicilium. Large subcrescentic to subtriangular smooth areas at the corners, both confluent with the dorsal plica, the anterior one larger and slightly raised. The rest of the lateral surface, an elliptical area, ornamented with a very fine and even reticulation; ornamentation faint on L2.

Frill with a ventral "sausage-shaped" convex section, similar in shape to that in *Laccochilina*, rather wide, its width about three-fifths the height of the domicilium. Frill continuous posteriorly with a narrow velate ridge extending to the corner, as in *P. schadidea*, sp. nov. Radial striae faint and shallow; no conspicuous concentric ornament on the frill. Measurements in Table II.

*Remarks*.—Because only one specimen has been found, nothing is known of the variations in the species.

*Platybolbina dictyota* has certain resemblances to *P. temperata* Sarv, particularly in the size of reticulation. It differs, however, in having shal-

lower reticulation, more elongate domicilium, a dorsal plica, and a "sausage-shaped" section of the female frill.

The name of this species is derived from the Greek word δΙΚΤΥΩΤΟΣ ("netted, latticed, reticulate") and refers to the ornamentation.

*Type*.—Holotype, a female left valve, UMMP 37207.

*Platybolbina* sp. cf. *P. dictyota*, sp. nov.

(Pl. VI, Fig. 2)

A right valve, presumably immature, with narrow frill, strongly resembles *P. dictyota* sp. nov., in shape of the domicilium, dorsal plica, muscle spot, and pattern of ornamentation. It has weaker ornamentation and only a faint groove between the muscle spot and the frill. Inasmuch as the ontogenetic changes in *P. dictyota* have not been established, this specimen cannot definitely be assigned to it. Measurements in Table II.

*Illustrated specimen*.—A right valve, UMMP 37208.

***Platybolbina omphalota*, sp. nov.**

(Pl. V, Fig. 3; Pl. VIII, Figs. 4-6)

*Description*.—Domicilium elongate, its anterior end subround, its posterior border forming an acute angle with the dorsal border, its greatest height near the middle. S2 distinct, narrow above the muscle spot and flaring dorsally, terminated by the dorsal plica. L2 a distinct but low lobe situated anterodorsal to the muscle spot. Dorsal plica a long smooth ridge, narrow through most of its length but expanded at the ends.

Muscle spot subcentral, lacrimiform, dorsally attenuated, surrounded by a deep groove, its lower half containing a deep, elongate, oblique pit. Anterior corner area smooth, suboval, confluent with the dorsal plica. Rest of lateral surface ornamented with distinct, fine, deep reticulation; elements of the reticulation forming radiating grooves around the muscle spot.

Frill broad, its anterior border round and its posterior indented, becoming narrow and ridgelike along the posterior border. Radial striae; concentric little crests on the radial elements of the frill, apparently not continuous. Measurements in Table II.

*Remarks*.—The dimorphism has not been established in this species. The frills of the type specimens are flaring rather than convex, more nearly like those of males than of females in other species. The subcentral muscle spot is sufficient to distinguish this species from all others; its pit is much deeper than that in *P. chalazia*.

The name of this species is derived from the Greek word ὀμφαλος, m. ("navel") and refers to the distinctive muscle spot.

*Types*.—Holotype, an adult right valve, UMMP 37355. Paratypes,

an immature right valve, UMMP 37245, and an immature left valve, UMMP 37352.

**Platybolbina psedna**, sp. nov.

(Pl. V, Fig. 2; Pl. VIII, Figs. 1-3)

*Description*.—Domicilium subelliptical, nearly bilaterally symmetrical but slightly more rounded anteriorly, with greatest height central. No S2 or L2. Dorsal plica a small ridge with ends turned down sharply and conspicuously.

Muscle spot subcentral, suboval, slightly raised, delineated only by shallow radiating grooves. Lateral surface smooth with only a few scattered, very shallow, inconspicuous punctae. Curved groove between muscle spot and frill, long, subparallel to free border of the domicilium, extending to central posterior area of valve; in holotype about midway between muscle spot and frill, in paratypes nearly tangent to lower edge of muscle spot.

Frill broad and slightly flaring, its anterior border round; very low velate ridge along posterior edge of valve. Frill distinctly striate, concentric markings faint. Measurements in Table II.

*Remarks*.—Only two other species of *Platybolbina* have nearly smooth domicilia, *P. plana* (Krause) and *P. orbiculata* Sarv. Neither of these species has a dorsal plica. In addition, *P. plana* has a shallow S2, and *P. orbiculata* has an inconspicuous muscle spot, a nearly semicircular domicilium, and no groove between the muscle spot and the frill.

The dimorphism in *P. psedna*, sp. nov., has not been established. From the flaring form of their frills, I am led to believe that the type specimens are males.

The name of this species is derived from the Greek term ψεδνός ("bald, bare") and refers to the smooth domicilium.

*Types*.—Holotype, a left valve, UMMP 37250. Paratypes, a left valve, UMMP 37272, and a right valve, UMMP 37353.

**Platybolbina schadidea**, sp. nov.

(Pl. I, Figs. 1-5; Pl. II, Figs. 1-8; Pl. III; Pl. V, Fig. 4; Pl. VI, Figs. 4-7)

*Female*.—Domicilium suboval, anterior end round, posterior end rather blunt; its greatest height in front of the muscle spot. S2 absent in most valves, but very slightly developed as a flaring shallow groove above the muscle spot in a few (Pl. I, Fig. 5; Pl. II, Figs. 1, 7; Pl. VI, Fig. 6). No L2. No dorsal plica.

Muscle spot prominent, convex, subovate with smaller end uppermost, nearly central on domicilium. Anterior corner area large, raised, subtri-

angular, smooth, like a shoulder; posterior corner area less conspicuous, slightly smaller, not raised, marked by finer ornamentation than the adjacent part of the lateral surface. Ornamentation very distinctive (Pl. III), consisting of a reticulation made of low polygonal tubercles separated by narrow well-defined grooves, with small punctae at the interstices; reticulation coarsest in the central area, gradually decreasing in size toward the edges of the domicilium.

Frill well defined, with a narrow peripheral rim; ventral part broad and convex; anterodorsal part narrow, ridgelike, nearly straight, flared out sharply (Pl. I, Fig. 4; Pl. II, Fig. 8; Pl. VI, Fig. 5); posterior part tapering abruptly and becoming straight or slightly concave, ridgelike, flared out sharply (Pl. I, Figs. 1, 5; Pl. II, Fig. 7; Pl. VI, Figs. 5, 7). Posterior and dorsal borders forming a sharply defined angle of 95 to 115 degrees. Radial striae of frill distinct, evenly spaced; concentric ornament fine. Measurements in Table II.

*Immature female*.—Right valve, by its size in the ultimate immature instar (Pl. II, Fig. 1). Frill convex but narrower than that in adult, its width about one-third the height of the domicilium. Other characteristics like those of adult female. Measurements in Table II.

*Ultimate immature instar (presumably male)*.—Four valves, by their size in the ultimate immature instar, differing from immature female in the form of the frill (Pl. II, Figs. 3–6). Similar to adult female and immature female except that the frill is narrow and flared sharply outward throughout its length. Measurements in Table II.

*Remarks*.—This species cannot be confused with any previously described, because of its very unusual ornamentation on the domicilium. All of the adults appear to be females. Strangely, no adult male was found; presumably, the male would resemble the ultimate immature instars shown in Pl. II, Figs. 3–6, except for size. The majority of specimens of *Platybolbina* in the Bony Falls limestone belong to this species.

The name of this species is derived from the Greek words σχαδων, f. (“honeycomb”) and -ειδης (“resembling”), and refers to the pattern of ornamentation.

*Types*.—Holotype, a female left valve, UMMP 37199. Paratypes, five female right valves, UMMP 37198, 37206, 37211, 37212, and 37264; six female left valves, UMMP 37204, 37205, 37249, 37260, 37261, and 37267; one immature female right valve, UMMP 37266; and four immature left valves, presumably males, UMMP 37251, 37257, 37262, and 37275.

*Platybolbina* sp.

(Pl. VI, Fig. 3)

One specimen seems to belong to an undescribed species. It is probably immature, and may not show all of the critical features of the species.

It is elongate suboval, with a narrow flared frill. A narrow dorsal plica is expanded at the ends to form slightly elevated smooth areas, of which the anterior is larger and more conspicuous. The muscle spot is ovate, central. The rest of the lateral surface of the domicilium is covered with a very fine distinct, shallow reticulation. There is no development of S2 or L2. A very shallow, indistinct groove extends from midway between the muscle spot and the frill to the central posterior area of the valve.

*Illustrated specimen.*—Left valve, UMMP 37371.

## LITERATURE CITED

- AGNEW, A. F. 1944. Addenda and Errata to Bibliography of Paleozoic Ostracodes. *Journ. Paleontol.*, Vol. 18, No. 2, pp. 218–19.
- HENNINGSMOEN, GUNNAR. 1953*a*. Classification of Paleozoic Straight-hinged Ostracods. *Norsk Geol. Tidsskr.*, Vol. 31, pp. 185–288, 2 pls., 12 figs.
- 1953*b*. The Middle Ordovician of the Oslo Region. 4. Ostracoda. *Ibid.*, Vol. 32, No. 1, pp. 35–56, 5 pls.
- 1954*a*. Upper Ordovician Ostracods from the Oslo Region, Norway. *Ibid.*, Vol. 33, Nos. 1–2, pp. 69–108, 6 pls.
- 1954*b*. Silurian Ostracods from the Oslo Region, Norway. *Ibid.*, Vol. 34, No. 1, pp. 15–71, 8 pls., 5 figs.
- HESSLAND, IVAR. 1949. Investigations of the Lower Ordovician of the Siljan District, Sweden. I. Lower Ordovician Ostracods of the Siljan District, Sweden. *Bull. Geol. Instit. Univ. Uppsala*, Vol. 33, pp. 97–408, 26 pls., 3 figs.
- JAANUSSON, VALDAR. 1957. Middle Ordovician Ostracodes of Central and Southern Sweden. *Ibid.*, Vol. 37, pp. 173–442, 15 pls., 45 figs. [Also reprinted as *Publ. Palaeontol. Instit. Univ. Uppsala*, No. 17.]
- KESLING, R. V., CRAFTS, F. S., DARBY, D. G., SHUBAK, K. E., and SMITH, R. N. 1960. Middle Ordovician Black River Ostracods from Michigan, Introduction and Part I, The Nature of *Macronotella*. *Contrib. Mus. Paleontol. Univ. Mich.*, Vol. 15, No. 13, pp. 293–314, 3 pls.
- KOKEN, E. 1892. Ueber die Gastropoden der rothen Schlernschichten nebst Bemerkungen über Verbreitung und Herkunft einiger triassischer Gattungen. *Neues Jahrb. Mineral., Geol. und Paläontol.*, 1892, Pt. 2, pp. 25–36. [Preliminary note; extended descriptions and figures in Woehrmann and Koken, 1892.]
- KRAUSE, A. 1889. Ueber Beyrichien und verwandte Ostracoden in untersilurischen Geschieben. *Zeitschr. Deutsch. Geol. Gesell.*, Vol. 41, No. 1, pp. 1–26, Pls. 1–2.
- KUMMEROW, EGMONT. 1933. Zur Paläobiologie der Ostrakoden und Trilobiten. *Centralblatt Mineral.*, Jahrg. 1933, Abt. B, No. 1, pp. 42–53, 12 figs.
- 1939. Die Ostrakoden und Phyllopoden des deutschen Unterkarbons. *Preuss. Geol. Landesanst., Abh., Neues Folge*, No. 194, 107 pp., 7 pls., 20 figs.

- MARTINSSON, ANDERS. 1955. Studies on the Ostracode Family Primitiopsidae. Bull. Geol. Institut. Univ. Uppsala, Vol. 36, pp. 1-33, 2 pls., 6 figs. [Also reprinted as Publ. Palaeontol. Institut. Uppsala, No. 4.]
- . 1956. Ontogeny and Development of Dimorphism in some Silurian Ostracodes, A Study on the Mulde Marl Fauna of Gotland. *Ibid.*, Vol. 37, pp. 1-42, 5 pls., 10 figs. [Also reprinted as Publ. Palaeontol. Institut. Univ. Uppsala, No. 14.]
- . 1960. The Primitiopsid Ostracodes from the Ordovician of Oklahoma and the Systematics of the Family Primitiopsidae. *Ibid.*, Vol. 38, pp. 139-54, 3 pls., 3 figs. [Also reprinted as Publ. Palaeontol. Institut. Univ. Uppsala, No. 24.]
- ÕPIK, A. A. 1937. Ostracoda from the Ordovician Uhaku and Kukruse Formations of Estonia. Loodusuurijate Seltsi Aruanded, Vol. 43, pp. 65-138, 15 pls., 8 figs. [Also reprinted as Publ. Geol. Institut. Univ. Tartu, No. 50, pp. 1-74, Pls. 1-15, 8 figs.]
- SARV, L. I. 1956. Novie Vidy Ostrakod iz Vazalemmaskogo Horizonta (Verchny Ordovik Estonskoi CCP). Akad. Nauk Eston. CCP, Trudy Institut. Geol., Vol. 1, pp. 30-40 [not seen].
- . 1959. Ostrakody Ordovika Estonskoi CCP. Akad. Nauk Eston. CCP, Trudy Institut. Geol. (Eesti NSV Teaduste Akad. Geol. Institut. Uurimused), Vol. 4, 210 pp., 32 pls., 15 figs. [Russian with Estonian and English summaries.]
- SPJELDNAES, NILS. 1951. Ontogeny of *Beyrichia jonesi* Boll. Journ. Paleontol., Vol. 25, No. 6, pp. 745-55, Pls. 103-4, 3 figs.
- STEUSLOFF, A. 1894. Neue Ostrakoden aus Diluvialgeschieben von Neu-Brandenburg. Zeitschr. Deutsch. Geol. Gesell., Vol. 46, No. 4, pp. 775-87, Pl. 58.
- THORSLUND, PER. 1940. On the Chasmops Series of Jemtland and Södermanland (Tvären). Sver. Geol. Unders., Avh., Stockholm, Ser. C, No. 436 (Årsb. 34, No. 6), pp. 3-191, Pls. 1-15, 58 figs.
- WOEHRMANN, S. von, and KOKEN, E. 1892. Die Fauna der Raibler Schichten vom Schlernplateau. Zeitschr. Deutsch. Geol. Gesell., Vol. 44, pp. 167-223, 11 pls. [Preliminary note on new gastropod genera appeared in Koken, 1892.]
- ULRICH, E. O., and BASSLER, R. S. 1923. Paleozoic Ostracoda: Their Morphology, Classification and Occurrence. In: Maryland Geol. Surv., Silurian Vol., pp. 271-391, Figs. 11-25.

*Received for publication August 20, 1960*

PLATES

## EXPLANATION OF PLATE I

(All figures  $\times 25$ )

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FIGS. 1-3. Lateral stereograms of three female left valves, paratypes, UMMP 37205, 37249, and 37204. The thickness of the frill can be seen in Fig. 3.	
FIGS. 4-5. Lateral stereograms of two female right valves, paratypes, UMMP 37212 and 37198.	



PLATE I

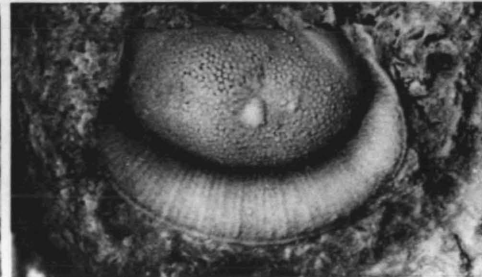
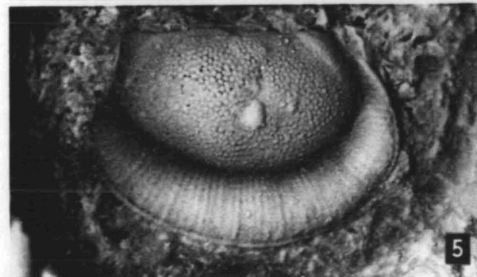
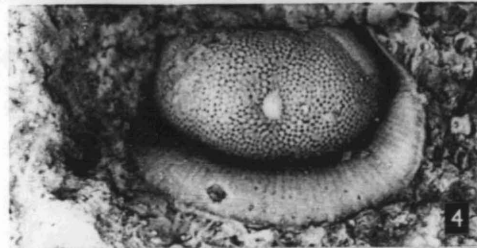
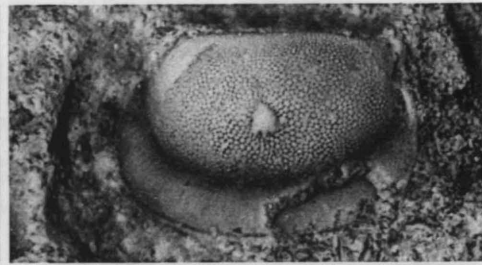
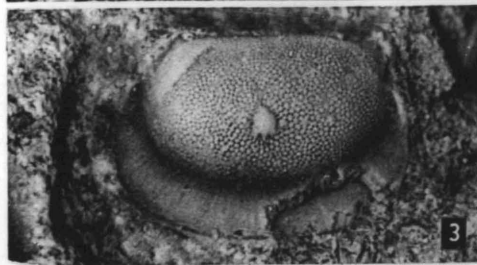
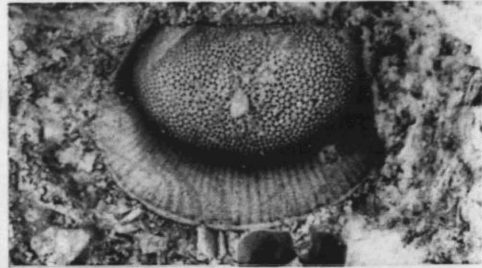
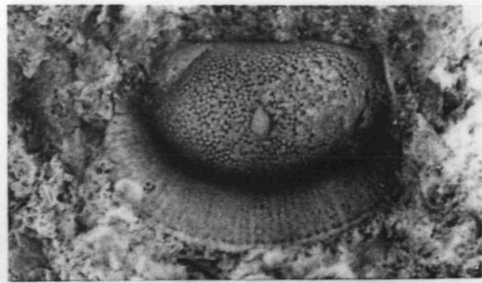
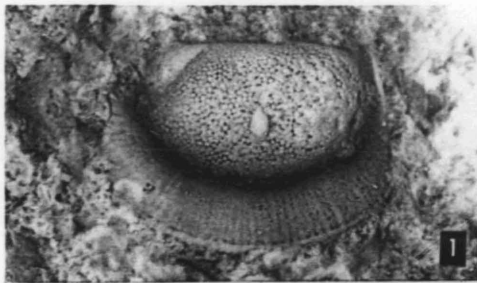
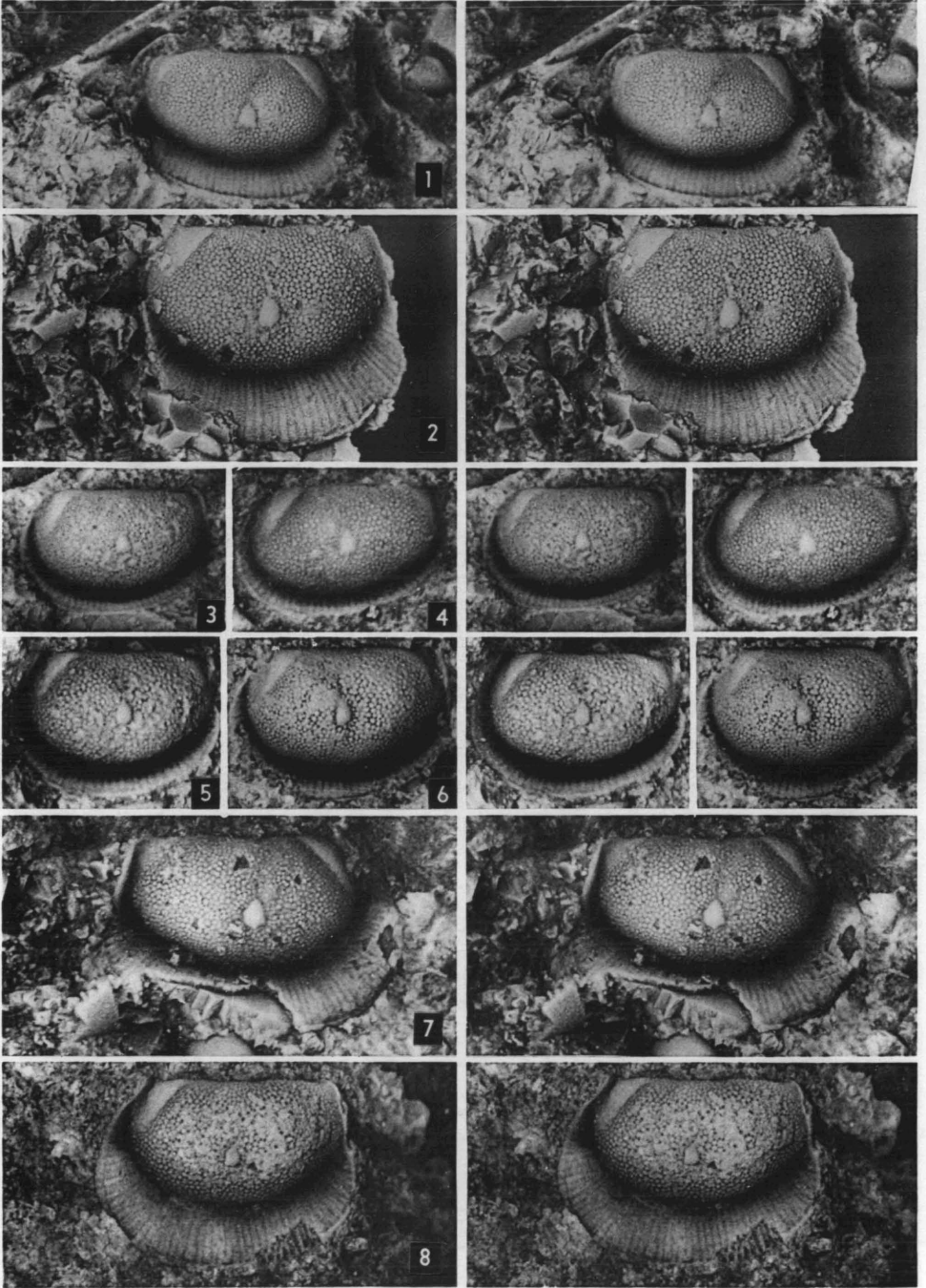


PLATE II



## EXPLANATION OF PLATE II

(All figures  $\times 25$ )

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<i>Platybolbina schadidea</i> , sp. nov. ....	374
Figs. 1, 7. Lateral stereograms of two female right valves, paratypes, UMMP 37266 and 37264. Although UMMP 37266 displays a frill of the female type, it is probably an ultimate immature instar.	
Figs. 2, 8. Lateral stereograms of two female left valves, paratypes, UMMP 37267 and 37261. An enlarged view of UMMP 37267 is shown in Plate III.	
Figs. 3-6. Lateral stereograms of four immature left valves (male type), paratypes, UMMP 37275, 37251, 37257, and 37262.	

## EXPLANATION OF PLATE III

(Figure  $\times$  100)

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Lateral view of female left valve, paratype, UMMP 37267. Valve is slightly inclined to show the width of the frill. A lateral stereogram of this specimen is shown in Pl. II, Fig. 2.	

PLATE III

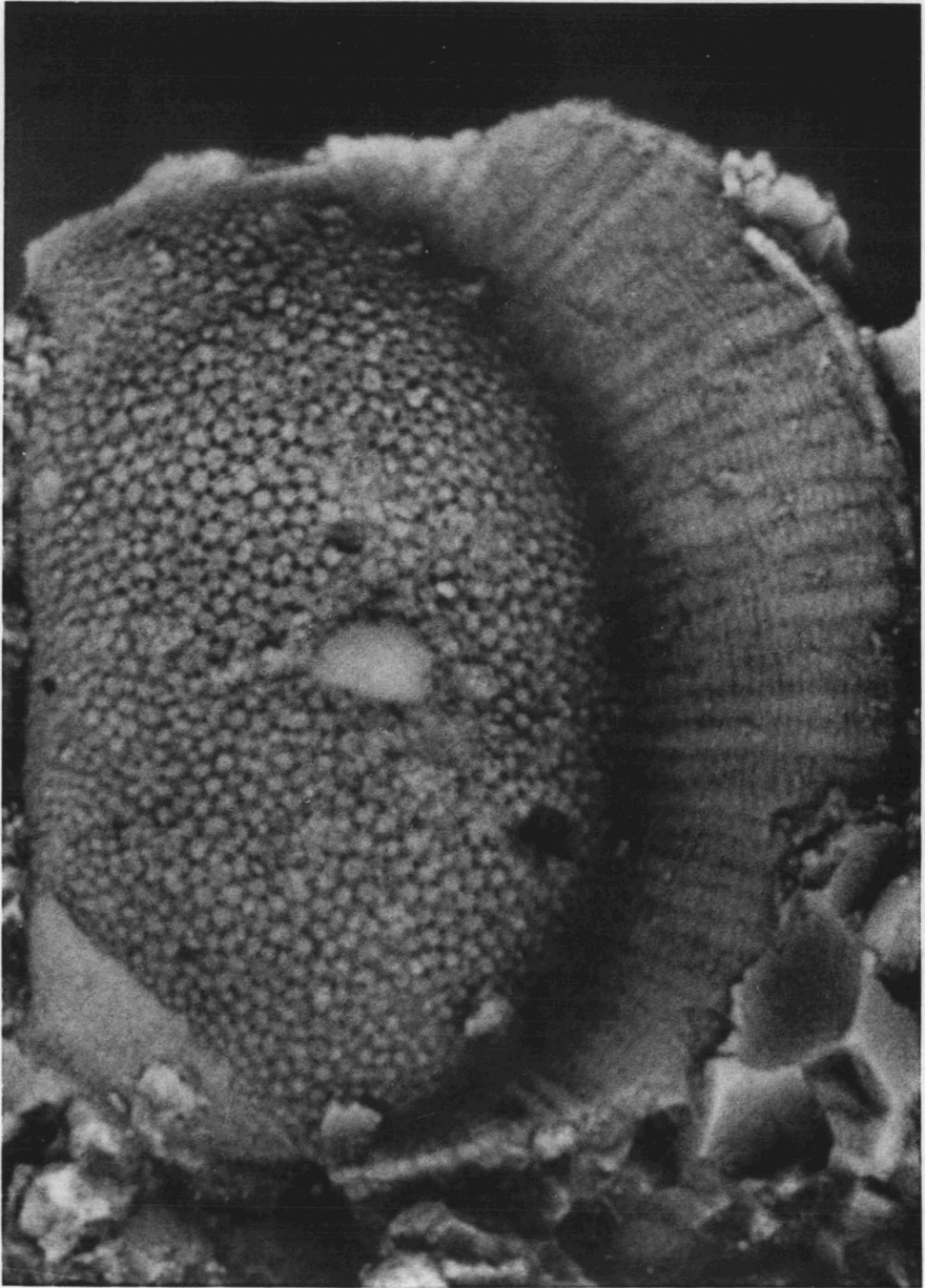
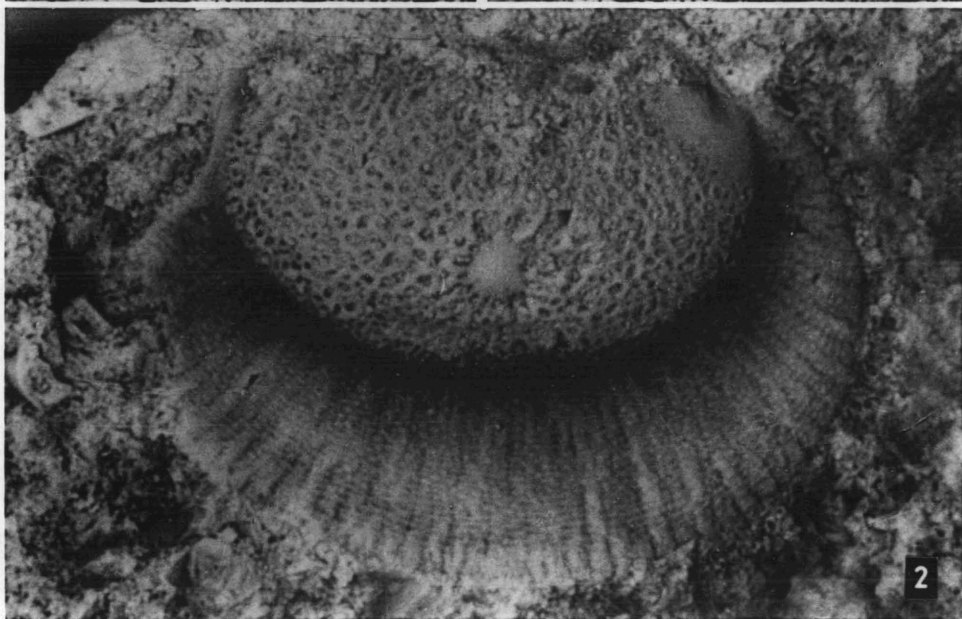
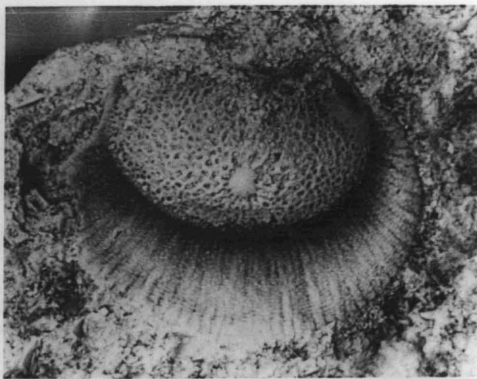
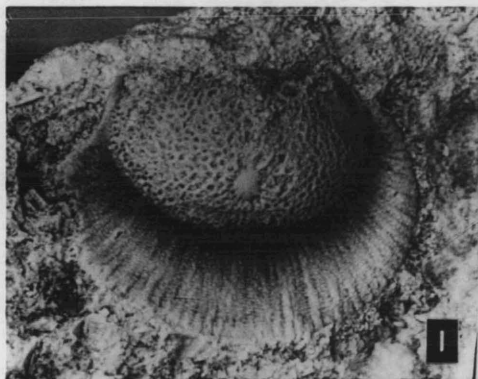


PLATE IV



EXPLANATION OF PLATE IV

	PAGE
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FIGS. 1-2. Lateral stereogram ( $\times 25$ ) and lateral view ( $\times 50$ ) of female right valve, holotype, UMMP 37200.	
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(All figures  $\times 50$ )

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FIG. 3. Lateral view of female right valve, paratype, UMMP 37245. A lateral stereogram of this specimen is shown in Pl. VIII, Fig. 5.	
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PLATE V

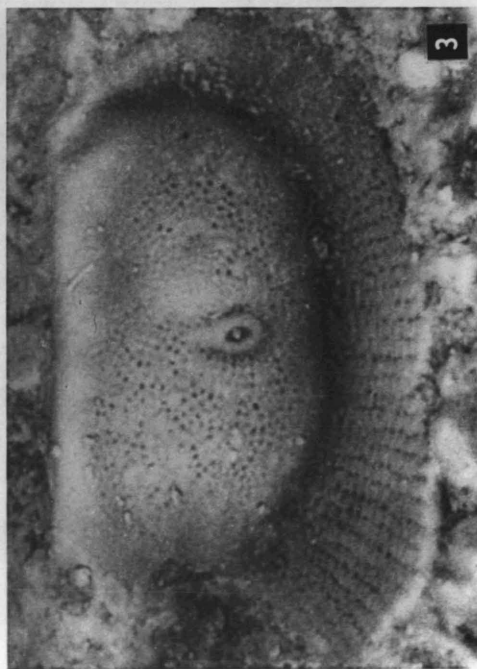
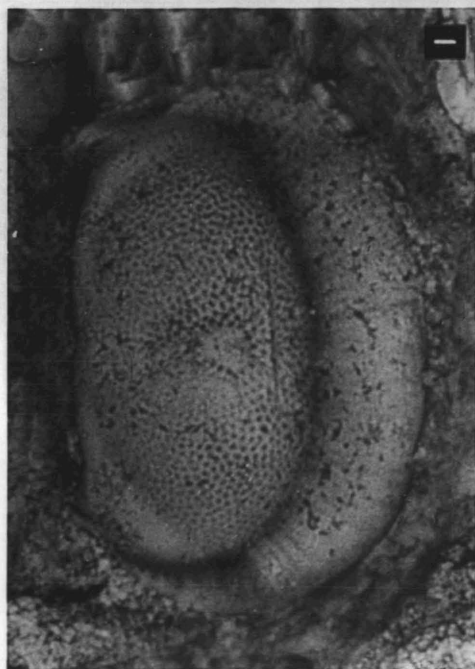
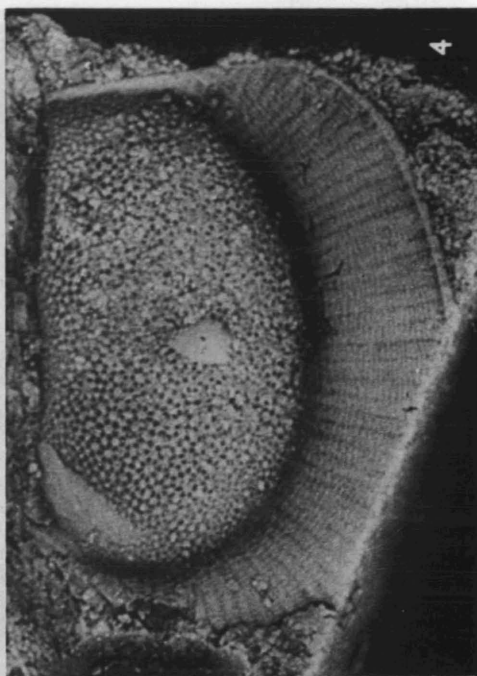
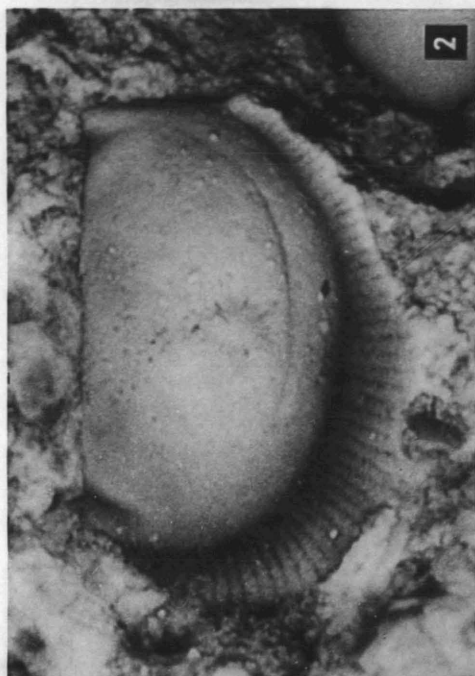
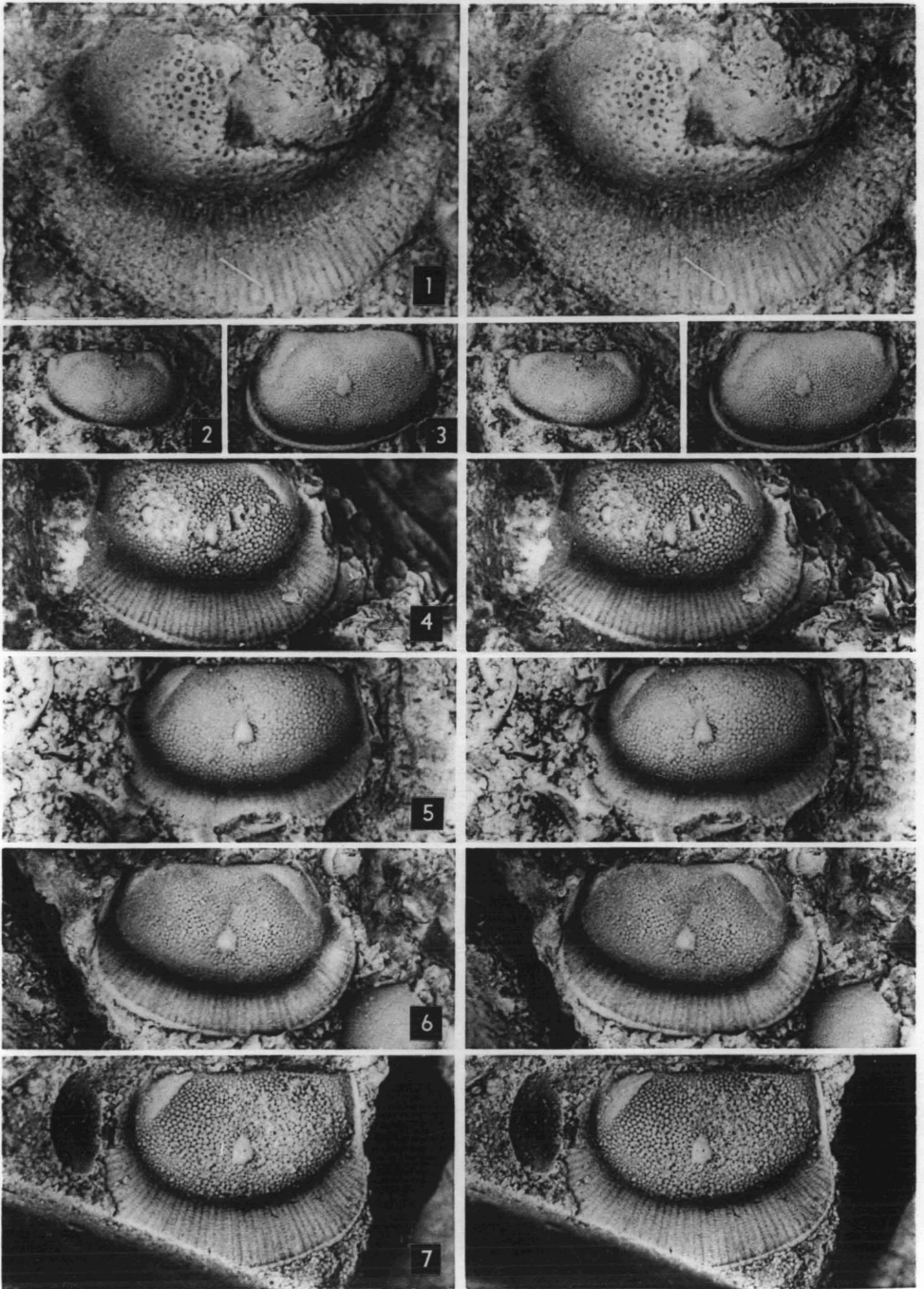


PLATE VI



## EXPLANATION OF PLATE VI

(All figures  $\times 25$ )

	PAGE
<i>Platybolbina</i> sp. cf. <i>P. compsa</i> , sp. nov. ....	372
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FIGS. 4-6. Lateral stereograms of female right, left, and right valves, three para- types, UMMP 37211, 37260, and 37206.	
FIG. 7. Lateral stereogram of female left valve holotype, UMMP 37199. An en- larged lateral view of this specimen is shown in Pl. V, Fig. 4.	

## EXPLANATION OF PLATE VII

(All figures  $\times 25$ )

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FIG. 3. Lateral stereogram of female left valve, holotype, UMMP 37363.	
FIG. 4. Lateral stereogram of immature right valve, paratype, UMMP 37197.	

PLATE VII

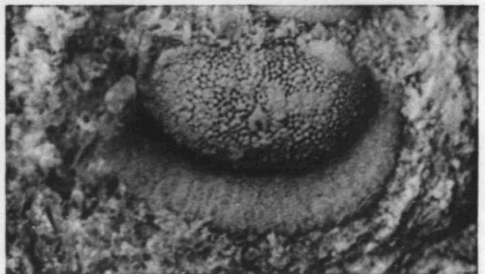
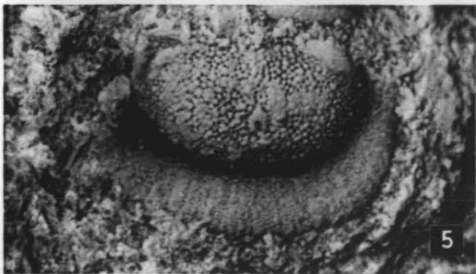
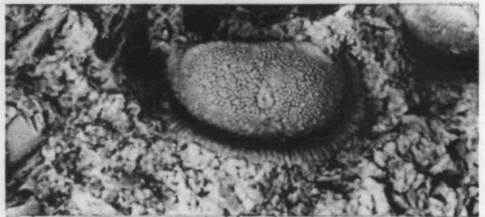
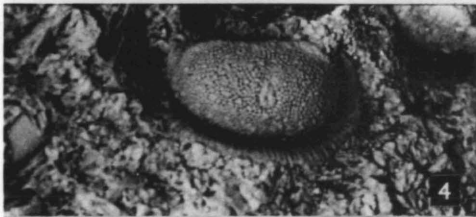
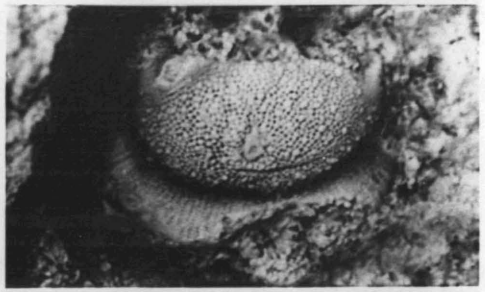
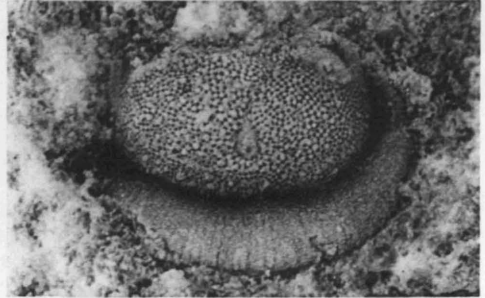
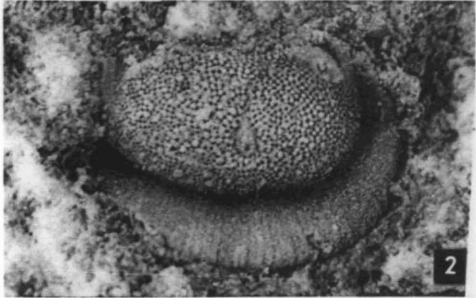
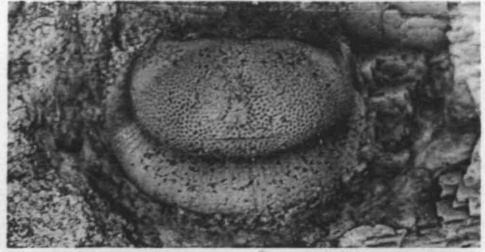
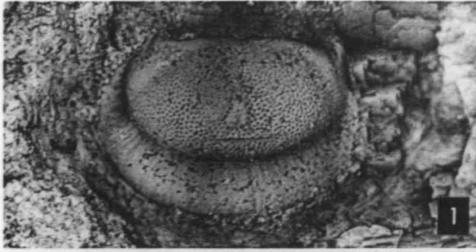
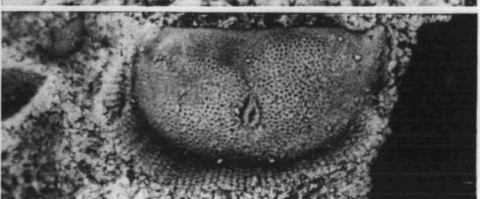
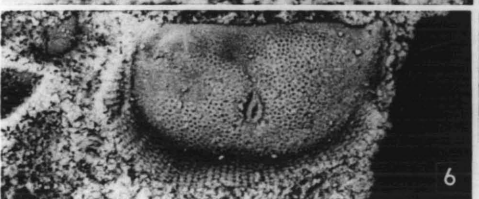
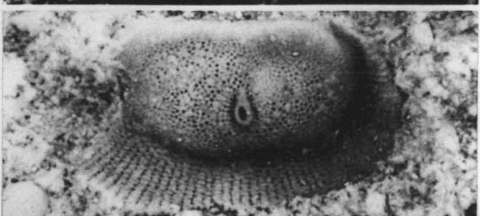
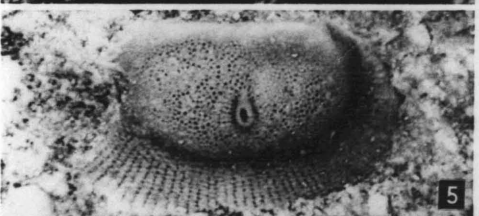
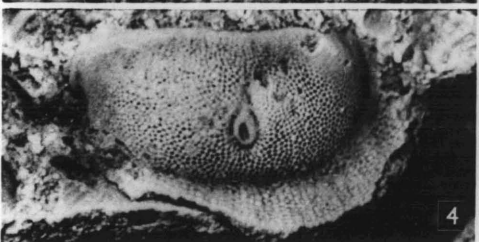
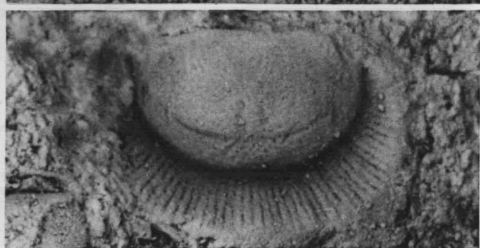
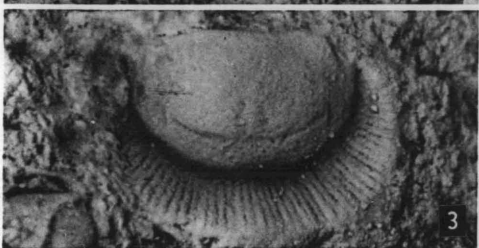
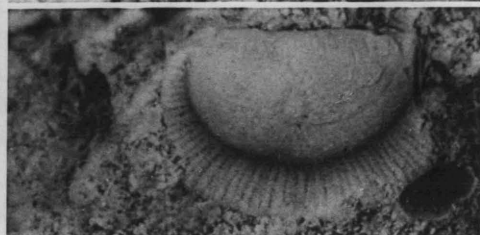
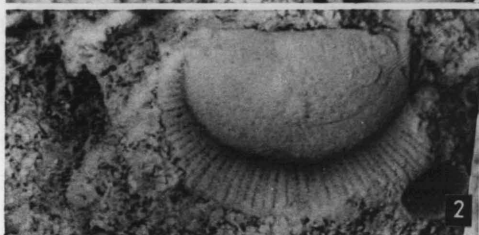
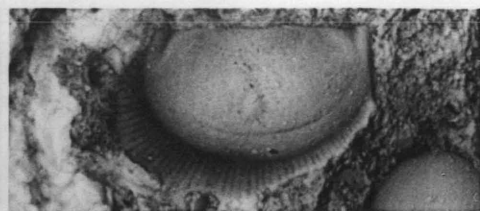
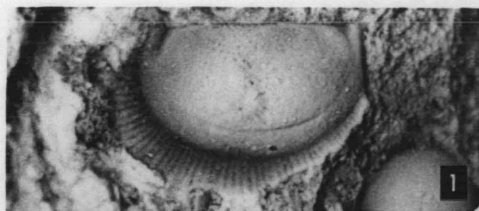


PLATE VIII



## EXPLANATION OF PLATE VIII

(All figures  $\times 25$ )

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FIG. 1. Lateral stereogram of left valve, holotype, UMMP 37250. An enlarged lateral view of this specimen is shown in Pl. V, Fig. 2.	
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