MIDDLE ORDOVICIAN BLACK RIVER OSTRACODS FROM MICHIGAN
PART III, PLATYBOLBINA

BY
ROBERT V. KESLING

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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 Eurychilinacea Ulrich and Bassler, 1923
Family Eurychilinidae 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 Platychilina for a Triassic gastropod from the Raibler beds of the Schlern Plateau in the Tirolean Alps, with P. woehrmanni

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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. Opik (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 lacriform 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
**ROBERT V. KESLING**

**TABLE I**

**COMPARISON OF SPECIES OF Platybolbina**

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

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

§ 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.

II 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. kapteyni* and *P. maslovi* (see Table I), but it is coarser and more irregular than that of *P. kapteyni* 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. kapteyni*, 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 κόμψος ("elegant") and refers to the development of the frill.
## TABLE II
### MEASUREMENTS OF SPECIMENS USED IN THIS STUDY

<table>
<thead>
<tr>
<th><em>Platybolbina</em> Species</th>
<th>No.</th>
<th>Domicilium Length (mm)</th>
<th>Domicilium Height (mm)</th>
<th>Width of Illustrated Pl.</th>
<th>Illustrated Fig.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>P. chalazia</em></td>
<td>37197</td>
<td>0.96</td>
<td>0.54</td>
<td>0.14</td>
<td>VII</td>
<td>4 Immature</td>
</tr>
<tr>
<td></td>
<td>37356</td>
<td>1.26</td>
<td>0.70</td>
<td>0.34</td>
<td>VII</td>
<td>5 Female</td>
</tr>
<tr>
<td></td>
<td>37363*</td>
<td>1.31</td>
<td>0.70</td>
<td>(0.36)</td>
<td>VII</td>
<td>3 Female</td>
</tr>
<tr>
<td></td>
<td>37374</td>
<td>1.39</td>
<td>0.76</td>
<td>0.42</td>
<td>VII</td>
<td>2 Female</td>
</tr>
<tr>
<td><em>P. compsa</em></td>
<td>37200*</td>
<td>1.42</td>
<td>0.88</td>
<td>0.60</td>
<td>IV</td>
<td>1 Female</td>
</tr>
<tr>
<td></td>
<td>37246</td>
<td>1.40</td>
<td>0.80</td>
<td>0.41</td>
<td>IV</td>
<td>3 Female</td>
</tr>
<tr>
<td><em>P. dictyota</em></td>
<td>37207*</td>
<td>1.18</td>
<td>0.62</td>
<td>0.32</td>
<td>VII</td>
<td>1 Female</td>
</tr>
<tr>
<td><em>P. omphalota</em></td>
<td>37245</td>
<td>1.32</td>
<td>0.74</td>
<td>(0.41)</td>
<td>VIII</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>37352</td>
<td>1.32</td>
<td>0.72</td>
<td>(0.20)</td>
<td>VIII</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>37355*</td>
<td>1.54</td>
<td>0.80</td>
<td>(0.33)</td>
<td>VIII</td>
<td>4</td>
</tr>
<tr>
<td><em>P. pseudna</em></td>
<td>37250*</td>
<td>1.20</td>
<td>0.70</td>
<td>(0.26)</td>
<td>VIII</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>37272</td>
<td>1.20</td>
<td>0.72</td>
<td>0.32</td>
<td>VIII</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>37353</td>
<td>1.19</td>
<td>0.76</td>
<td>0.38</td>
<td>VIII</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>37198</td>
<td>1.32</td>
<td>0.75</td>
<td>0.41</td>
<td>I</td>
<td>5 Female</td>
</tr>
<tr>
<td></td>
<td>37199*</td>
<td>1.26</td>
<td>0.71</td>
<td>0.39</td>
<td>VI</td>
<td>7 Female</td>
</tr>
<tr>
<td></td>
<td>37204</td>
<td>1.27</td>
<td>0.74</td>
<td>0.40</td>
<td>I</td>
<td>1 Female</td>
</tr>
<tr>
<td></td>
<td>37205</td>
<td>1.36</td>
<td>0.79</td>
<td>0.36</td>
<td>I</td>
<td>3 Female</td>
</tr>
<tr>
<td></td>
<td>37206</td>
<td>1.20</td>
<td>0.68</td>
<td>0.30</td>
<td>VI</td>
<td>6 Female</td>
</tr>
<tr>
<td></td>
<td>37211</td>
<td>1.15</td>
<td>0.70</td>
<td>0.37</td>
<td>VI</td>
<td>4 Female ?</td>
</tr>
<tr>
<td></td>
<td>37212</td>
<td>1.28</td>
<td>0.74</td>
<td>0.36</td>
<td>I</td>
<td>4 Female</td>
</tr>
<tr>
<td><em>P. schadidea</em></td>
<td>37249</td>
<td>1.25</td>
<td>0.72</td>
<td>0.40</td>
<td>I</td>
<td>2 Female</td>
</tr>
<tr>
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* 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. compta*, sp. nov.
(Pl. VI, Fig. 1)

A very large incomplete left valve shows certain similarities to *P. compta*, 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. compta*. It is possible, however, that both differences can be attributed to the worn condition of the specimen.

If the valve proves to be *P. compta*, 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 ἄκτυωτος ("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, lacriform, 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. chalasia*.

The name of this species is derived from the Greek word οφαλος, 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 ψεδνος ("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 σχαδώνων, f. ("honeycomb") and -είδης ("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.
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.

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PLATES
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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.
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