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Ordovician *Megalaspis*-limestone of
Estonia and Russia

BY

A. ÖPIK

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Ostracoda from the lower
Ordovician Meekapõis-limestone of
Estonia and Russia

Est. A

Tartu Riikliku Ülikooli
Raamatukogu
31961



Ostracoda from the lower Ordovician *Megalaspis*-limestone of Estonia and Russia.

By A. Öpik.

The Estonian Ostracoda described below have been collected for the most part by the author. The Russian specimens form a collection by J. Bock from 1866, which is kept in the Geological Museum of the University of Tartu. This collection is mentioned in J. Bock's papers of from 1867 and 1869 and contains the originals and types of his *Beyrichia* (= *Tetradella*) *grewingki*. It is an unknown species, not mentioned in the later literature of the Ostracoda.

Tetradella grewingki (Bock) and *Primitiella glauconitica* Kummerow (3) are certainly the only ostracode species hitherto known from the Baltic *Megalaspis*-(Glauconitic) limestone.

The newly observed Estonian species occur mostly in the upper part of the *Megalaspis*-limestone, in the BII_γ beds or zone with the *Asaphus lepidurus* and *Megalaspis gibba* of Lamansky (cf. 4, 5). In both the lower zones of this formation the Ostracoda are not sufficiently preserved for a precise determination. For example, in the middle zone of the *Megalaspis*-limestone (BII_β) there are occasionally observed *Ceratopsis* sp. (abundant in the exposures at the Keila-Joa water-fall), and small *Primitiella glauconitica*-like valves.

The Ostracoda of Bock's collection from Russia for the most part are found in the exposures of Obuchowo at river Wolchow, in the glauconitic limestone, evidently in the upper zone (BII_γ) of the *Megalaspis*-limestone and probably in the lower part of the next *expansus*-limestone (BIII_α), according to modern terminology.

Our ostracode fauna from the Baltic *Megalaspis*-limestone is doubtless the oldest known fauna from the Ordovician of Europe containing *Eurychilina*, and *Beyrichidae* like *Ceratopsis* and *Tetra-*

della. The presence of these genera indicates at least the advanced Ordovician age of the *Megalaspis*-limestone. According to Ulrich (6), p. 73, the Baltic *Megalaspis*-limestone can be correlated with the Upper Canadian to the Lower Buffalo River formations of the U. S. A. But the Canadian of America is without *Beyrichidae*; *Ceratopsis* appears in the Black River (according to Ulrich and Bassler (7), p. 300), and *Tetradella* in America is a genus of the Middle to the Upper Ordovician age.

Evidently the Baltic *Megalaspis*-limestone is younger than the Upper Canadian and Buffalo River formations, and corresponds probably to a part of the Stone River group. Even in the latter case the *Tetradella* and *Ceratopsis* of the *Megalaspis*-limestone are older than the known American species of this *Beyrichidae*. This circumstance evidently indicates a migration of the *Beyrichidae* from the Baltic region to America in the Lower Ordovician time.

List of Ostracoda here described.

1. *Conchoprimitia gammae* n. gen. n. sp.
2. " *glauconitica* (Kummerow).
3. *Primitia zonata* n. sp.
4. *Primitiella* aff. *unicornis*.
5. Primitiide of uncertain generic position.
6. *Eurychilina estonula* n. sp.
7. *Tetradella grewingki* (Bock).
8. *Tetradella primaria* n. sp.
9. *Ceratopsis bocki* n. sp.
10. *Steusloffia mitis* n. sp.

Fam. Primitiidae Ulrich & Bassler.

Gen. *Conchoprimitia* nov. gen.

Diagnosis. Small (1.5 to 3 mm. length) Primitiidae with a straight hinge line, with one or two pairs of bands, limited by grooves resembling the growth lines of shells or brachiopods more or less developed.

Genotype: *Conchoprimitia gammae* n. sp.

Eridoconcha Ulrich and Bassler, Fam. Aparchitidae, has the concentric grooves also, but differs in having a very short hinge, and a pelecypod-like acuminate dorsal edge of the valves.

The concentric grooves of both genera are not true growth lines, because the growth of the Ostracoda takes place by the shedding of the skin.

As in *Primitia mundula* [Genotype of *Primitia* cf. Kummerow (10), p. 43 Fig. 1], *Primitia tolli* Bonnema (8) and *Leperditella*, the left valve of *Conchoprimitia* is the large one; it overlaps the right valve along the ventral margin and has a marginal groove to fit the free edge of the right valve (cf. Pl. I, Fig. 2 and Fig. 1 in the Text). The outline is leperditoid.

Other species of this genus are *Primitia conchoides* Hadding (9), which differs in having a sulcus-like depression near the dorsal border of the anterior part of the valve, and *Primitiella glauconitica* Kummerow (3), with an indistinct concentric groove.

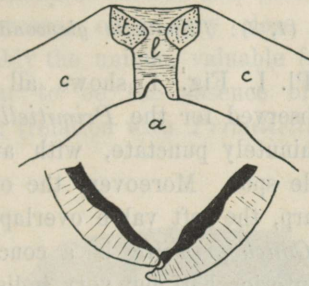


Fig. 1. *Conchoprimitia glauconitica*, construction of the free edge (below), anterior view. Magn. about $\times 20$. The groove of the left valve (at the right) is formed by a thickening of the nonprismatic (dark) substance. The upper drawing shows the probable construction of the hinge (cross section) magn. near $\times 100$. *a* — interior space of the shell; *c* — the valves; *t* — small hinge teeth for affixing the hinge ligament; *l* — hinge ligament, for opening the shell. The cross-sections of specimens from Hundikuristik at Tallinn clearly show the step-shaped hinge with the teeth and the ligament-like dark substance in the space between the hinge lines of both valves. The shell must have been opened by contraction of the larger upper part of this ligament between the teeth.

Conchoprimitia gammae n. sp.

Pl. I, Fig. 3a—3c; Pl. II, Fig. 4.

The specimen of Pl. I, Fig. 3a—3c is the holotype, from the B_{II}-bed of the *Megalaspis*-limestone, Hundikuristik near Tallinn, Estonia. Measurements of the holotype: length 1,75 mm.; height 1,2 mm.; thickness 1 mm.; length of the hinge line 1 mm.

The outline is leperditoid, with convex anterior and posterior edges, with a flattened narrow dorsal margin, an acute ventral edge, and with the greatest height in the posterior half of the valves. The surface appears smooth and non-punctate. Two concentric grooves adorn the sides of both valves. The exterior groove is more deeply impressed and sharper than the interior.

Conchoprimitia gammae is a common microfossil in all Estonian exposures of the top of *Megalaspis*-limestone (B_{II7}) and is represented also in Bock's collection from Obuchovo at Wolchow, Russia.

Conchoprimitia glauconitica (Kummerow).

Pl. I, Fig. 1, 2; Pl. II, Fig. 5; Fig. 1 in the text.

Leperditia n. sp. Bock (1, 2); *Primitiella glauconitica* Kummerow (3).

Our specimen Pl. I, Fig. 1 shows all the features which Kummerow (3) observed for the *Primitiella glauconitica*. The carapace is oblong, minutely punctate, with an indistinct, slightly elevated central muscle spot. Moreover, the outline is leperditoid, the dorsal margin sharp, the left valve overlaps the right. Distinctive for the genus *Conchoprimitia* is a concentric groove. It is well marked in the anterior half but very indistinct in the posterior part of the valve. A bit toward the anterior end appears a slightly pronounced small, narrow, vertical ridge. That is the place for the sulcus and nodes of *Primitia*.

The construction of the ventral closure can be seen in the cross section Pl. I, Fig. 2. As in *Primitia mundula*, *P. tolli*, and the species of *Conchoprimitia*, the left valve has a marginal groove for the reception of the marginal edge of the right valve. The interior ridge of this groove is formed by a non-prismatic, darker substance of the interior face of the valves.

The probable construction of the hinge is given in Fig. 1 in the text.

Very numerous specimens of this species were collected by J. Bock ("*Leperditia* n. sp." Bock) in the exposures of Obuchovo at Wolchow. But the preservation of this material is very bad, as can be seen on Pl. II, Fig. 5.

Measurements of the specimen Pl. I, Fig. 1: length 3 mm.; height 1,8 mm.; length of the hinge line 1,7 mm.; thickness 1,4 mm.

Occurrence: common in B₁₁₇ of Estonia, in association with *Conchoprimitia gammae*.

Gen. *Primitia* Jones.

The usual definition of this genus, as proposed by Ulrich (11) and Ulrich and Bassler (12) is incomplete. Moreover [cf. Bonnema (8a, b)], the valves of *Primitia* are unequal in size, the left valve is larger than the right one and the right marginal edge is precisely adapted for the marginal groove in the left valve. This structure can be observed on the type-species of *Primitia* — *P. mundula* Jones [cf. Kummerow (10), p. 43, Fig. 1].

The same structure is described for the aparchitide genus *Leperditella* [cf. Ulrich (11) and Ulrich and Bassler (12)]. The latter has a primitioid habitus and can be placed in the fam. Primitiidae, because of a very close similarity to *Primitia* sensu stricto. Probably the unique, valuable features of *Leperditella* and *Primitia* appear to be the absence of nodes, and the more elongated shell form (relation with *Primitiella*) of *Leperditella*.

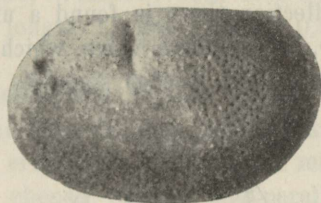


Fig. 2. *Primitia tolli* Bonnema, an old specimen from the Kukruse stage (C₂, "Kukersit") for comparison with *Primitia zonata* n. sp. pl. I, fig. 8. Magn. $\times 20$.

***Primitia zonata* n. sp.**

Pl. I, Fig. 8.

The specimen on Pl. I, Fig. 8, a right valve from the B₁₁₇-beds of Ülgase, Estonia is the holotype. Measurements: length 1 mm.; height 0,7 mm., length of hinge 0,75 mm.

This species is distinguished by a crescent like marginal band separated from the rest of the valve by a low concentric depression. The sulcus is low, and the nodes on both sides are very indefinite.

The surface appears impunctate. The concentric depression suggests some similarity to the concentric grooves of *Conchoprimitia*.

Closely related to *Primitia zonata* are *Primitia tolli* Bonema, and *Primitia sulcata* Krause (14). But both these species have the marginal zone or band very indistinctly separated from the clearly punctate central part of the lateral face.

Occurrence. Rare in the B_{IIY} of Ülgase, Estonia.

Gen. *Primitiella* Ulrich.

Primitiella aff. *unicornis* Ulrich (11) resp. *cornuta* Kummerow (3).

Pl. II, Fig. 3.

In J. Bock's collection are found many fragments of a minutely punctate primitioid ostracode provided with a short spine in the posterior part of the valve. Doubtless it represents a new, but unfortunately badly preserved species.

Primitiide of uncertain generic position.

Pl. II, Fig. 6.

In Bock's collection there is found a unique fragment of a solid, widely punctate, or reticulate valve, which resembles a *Hallimella*, but the denticulate, false border suggests a reticulate member of *Eurychilinae*.

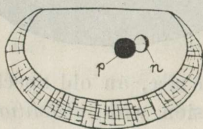


Fig. 3. *Eurychilina estonula* n. sp., reconstruction, magn. $\times 40$. *p* — the pit and *n* — the node. conf. Pl. I, Fig. 6 and 7.

Gen. *Eurychilina* Ulrich.

Eurychilina estonula n. sp.

Pl. I, Fig. 6, 7 and fig. 3 in the text.

The isolated valve pl. I, Fig. 6 from the upper *Megalaspis* limestone (B_{IIY}) of Ülgase, Estonia is the holotype. Measurements: length 1,3 mm.; length of the hinge line 0,8 mm.; height 0,85 mm.

Our new species differs from most of the members of the genus *Eurychilina* in having a short hinge and a rounded subcentral pit as representative of the normal sulcus of *Eurychilina*. Other features, as the convex, frill-like, radially striated border and the node beside the pit are typical. The surface appears minutely granulated. *Eurychilina kukersiana* (Bonniema) has a pit also, but its hinge line is larger, and the surface appears reticulate.

Eurychilina estonula is a rare species. Only four specimens have been found, all in Ülgase, Estonia.

Fam. Beyrichidae Jones.

Gen. *Tetradella* Ulrich.

Tetradella grewingki (Bock).

Pl. II, Fig. 1 a—1 b.

Beyrichia grewingki Bock (1, 2), *Beyrichia erratica* Krause (13), partim.

The specimen on Pl. II, fig. 1 a—1 b, from the "Glaucopit limestone" (probably upper *Megalaspis* — (Bily) or lower *expansus*-limestone) of Obuchowo, Wolchow. Coll. J. Bock is the Lectotype.

Measurements: length 1,3 mm.; height 0,9 mm., length of the hinge 0,9 mm.

The original description of this species is as follows: „Die *Beyrichia Grewingki* wird dadurch gekennzeichnet, dass auf ihren breiten, gewölbartig erhobenen Ventralsaum mit oval verlaufendem Rande ein ungefähr ebenso breiter und paralleler, z. T. flachvertiefter, z. T. erhobener Gürtel folgt, an welchen sich eine schmale, stark hervortretende halbkreisförmige Wulst legt, die von ihrem Gunde zwei wenig gebogene, etwas breitere Wülste zum geraden Dorsalrande entsendet und auf diese Weise zur Bildung dreier absonderter Vertiefungen zwischen den Wülsten Veranlassung gibt, welche diese Art von allen übrigen Beyrichien und namentlich von der ihr am nächsten stehenden *B. complicata* (Salter) und deren *Var. decorata* (Jones) leicht unterscheiden lässt. Den Randsaum ausgenommen, ist die ganze Oberfläche der Schalen mit Würzchen bedeckt. Die grössten Exemplare erreichen nur 1,1 Mm. Länge, 0,7 Mm. Breite und 0,1 Mm. Dicke.“

The distinctive features of this species are the granulated sculpture, the large false border, the very narrow ridges, the ciliate

or denticulate anterior and posterior edges. *Tetradella grewingki* somewhat resemble the *T. subquadrans* Ulrich.

T. grewingki has not yet been found in the Estonian *Megalaspis*-limestone. The additional specimen of the *Beyrichia erratica* Krause [Krause (13) Pl. II, Fig. 6] is doubtless identical with Bock's species; the Holotype (Lectotype) of *Beyrichia erratica* Krause (13), Pl. II, Fig. 7 [same drawing in Ulrich & Bassler (7), fig. 37] is a true *Tetradella*. Cf. also below, under *Steu-sloffia mitis* n. sp.

Tetradella primaria n. sp.

Pl. I, fig. 4.

The specimen Pl. I, Fig. 4 from the upper part of the *Megalaspis*-limestone (B₁₁₇), in a deep boring of Ubja, Estonia is the holotype. Measurements: length 1,1 mm.; height 0,7 mm., length of the hinge line 0,8 mm.

Tetradella primaria differs from the other species of the same genus in having narrow anterior and large posterior lobes; both the middle lobes are independently joined into a *Bollia*-like horse-shoe-shaped ridge, slightly elevated over the level of the other ridges. A concentric groove of the false border surrounds the base of the marginal ridge. The surface is smooth.

Tetradella primaria is found in the B₁₁₇-limestone of Ülgase, Ubja (boring) and Ontika, Estonia. It is a rare species.

Gen. *Ceratopsis* Ulrich.

Ceratopsis bocki n. sp.

Pl. II, fig. 2.

The specimen Pl. II, Fig. 2 from the "Glaucopitic limestone" of Obuchowo at Wolchow, coll. J. Bock is the holotype. Length 0,75 mm., height 0,5 mm.

The new one differs from the other species of this genus in having a more prominent, bulbous posterior lobe (resp. anterior) or "spine", a relatively large anterior lobe, a crescent-shaped posterior ridge of the divided anterior lobe, and a smooth surface. The marginal false border is very narrow. Known only from Bock's collection.

Gen. *Steusloffia* Ulrich et Bassler.*Steusloffia mitis* n. sp.

Pl. I, Fig. 5 and Fig. 4 in the text.

The specimen Pl. II, Fig. 5 from the B_{IIY}-limestone of Ülgase, Estonia is the holotype. Length 0,6 mm.; height 0,4 mm. The new one is distinguished from the other species of *Steusloffia* by the very well developed *Beyrichia*-like trilobation and the position of the crests. The nearly isolated, small bulbous anterior node, the large middle lobe, and the flattened posterior lobe limited on each

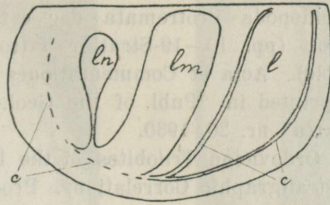


Fig. 4. *Steusloffia mitis*, schematic drawing of the holotype (Pl. I, fig. 5). *ln* — the posterior node; *lm* — the middle and *l* — the posterior lobe; *c* — the crests or elevated ridges forming the distinctive features of the *Steusloffia*.

border by a elevated ridge (crest) are distinctive of the *Steusloffia mitis*. The surface is smooth. *Beyrichia erratica acuta* Krause, a true *Steusloffia*, of the same group is a clearly separate species in having a different distribution of the lobes and different sculptures. In the same group can be placed *Beyrichia erratica* Krause (13), pl. II, Fig. 8 but not fig. 6, which represents the true *Tetradella grewingki*; also not Fig. 7 or — the Holotype of *erratica*, probably likewise a true *Tetradella*. This position of the *Beyrichia erratica* [evidently the specimen Pl. II, Fig. 8 of Krause (13)] was suspected by Ulrich & Bassler (7), p. 295.

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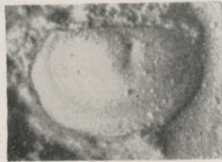
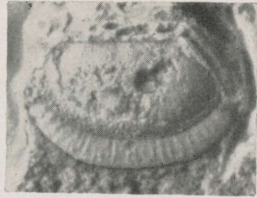
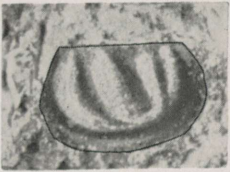
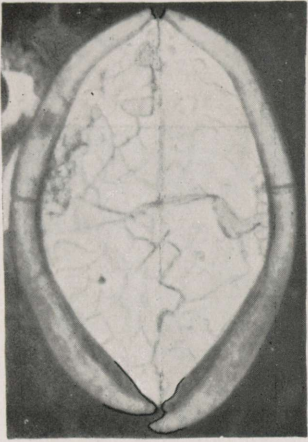
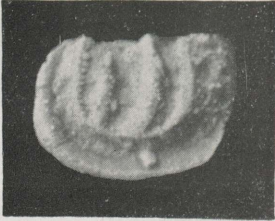
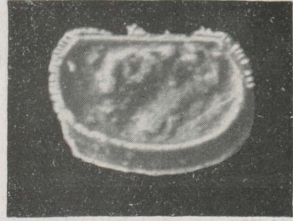


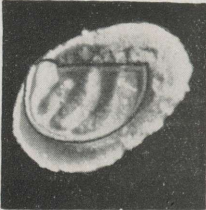
Plate II.



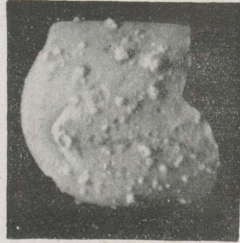
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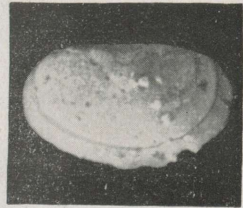
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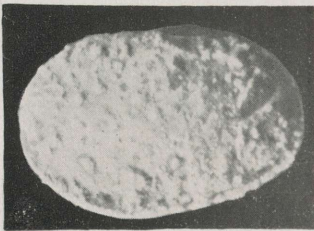
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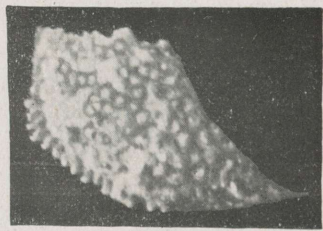
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Photo A. Ö.

Explanation of the plates.

All the specimens are kept in the Geol. Museum of the University of Tartu. The photographs, except Pl. I, Fig. 2, are magnified 20 diam.

I.

All the specimens, except Fig. 4, were collected by the author.

- Fig. 1—2. *Conchoprimitia glauconitica* (K u m m e r o w).
Fig. 1 — a well preserved specimen, view from the right. The concentric groove is visible in the anterior part. Near the dorsal margin, an indistinct narrow vertical node; posterior dorsal angle appears flattened. BИГ from Hundikuristik near Tallinn, Estonia.
Fig. 2. Microphotograph of a thin cross-section, magn. x 30. cf. Fig. 1 in the text. Same species pl. II, Fig. 5.
Fig. 3a—3c. *Conchoprimitia gammae* n. sp., from BИГ, Hundikuristik, Estonia. Holotype. Same species Pl. II, Fig. 4.
Fig. 4. *Tetradella primaria* n. sp., Holotype. BИГ from a deep boring, of the Kunda Cement Factory, Ubja, Estonia.
Fig. 5. *Steusloffia mitis* n. sp., BИГ-limestone, near the phosphorite works of Ülgase, Estonia. Cf. fig. 4 in the text.
Fig. 6—7. *Eurychilina estonula* n. sp., both from BИГ, Ülgase, Fig. 6 is the Holotype, fig. 7 is a cast of the exterior.
Fig. 8. *Primitia zonata* n. sp., holotype. BИГ of Ülgase.

II.

All specimens from J. Bock's collection, "Glaucanitic limestone". Obuchowo on the Wolchow river, Russia.

- Fig. 1a—1b. *Tetradella grewingki* (B o c k), lectotype.
Fig. 2. *Ceratopsis bocki* n. sp., holotype.
Fig. 3. *Primitiella* aff. *unicornis* or *cornuta*.
Fig. 4. *Conchoprimitia gammae* n. sp., a left valve.
Fig. 5. *Conchoprimitia glauconitica* (K u m m e r o w).
Fig. 6. A fragment of a primitioid Ostracode with reticulate sculpture and denticulate false border.

Tartu Ülikooli Geoloogia-Instituudi Toimetused.

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