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VIII.—Notes on the Palæozoic Bivalved Entomostraca.—No. XXXI. Some Devonian species

Professor T. Rupert Jones F.R.S. F.G.S.
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10. Maxilla, $\times 380$. 11. Anterior foot-jaw, $\times 380$. 12. Posterior foot-jaw, $\times 380$. 13. Foot of first pair of swimming-feet, $\times 253$. 14. Foot of fourth pair, $\times 253$. 15. Foot of fifth pair, $\times 330$. 16. Abdomen and caudal stylets, dorsal view, $\times 126$.

Pseudonectwoodia major, sp. n.

Fig. 17. Female, seen from the side, $\times 64$. 18. Anterior antenna, $\times 253$. 19. Foot of first pair of swimming-feet, $\times 253$. 20. Foot of fifth pair, $\times 190$.

Hantemania jadensis, S. A. Poppe.

Fig. 21. Anterior antenna, female, $\times 253$. 22. Foot of first pair of swimming-feet, $\times 253$.

VIII.—Notes on the Palæozoic Bivalved Entomostraca.—
No. XXXI.* *Some Devonian Species.* By Professor T.
RUPERT JONES, F.R.S., F.G.S., &c.

[Plate VII.]

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I. Introduction.

In the 'Jahrbücher des Nassauischen Vereins für Naturkunde,' Jahrgang xlii. 1889, Dr. Fridolin von Sandberger, treating of the lower division of the Devonian System in Nassau, enumerated certain fossil Entomostraca from the Lower Spirifer-Sandstone of Offdillen (or Offdilln), in the north part of the Dillenburg District, at pages 33, 34, 37, 38, and 95, namely:—

* No. XXX. was published in the Ann. & Mag. Nat. Hist. ser. 6, vol. ix. 1892, pp. 302–307.

1. *Beyrichia strictisulcata*, Sandberger, MS.
2. — (*Bollia*) *obliqua*, Sandb. MS., corrected in 1890 to *devonica*, Jones.
3. — (*Streptula*) *annulata*, Sandb. MS.
4. *Primitia sacculus*, Sandb. MS.

Dr. F. von Sandberger some time since favoured me with either specimens or drawings of these and some other Devonian forms, namely:—

5. *Bollia varians*, Sandberger, MS. Dillenburg.
6. *Drepanella serotina*, Sandb. MS. Dillenburg.
7. *Entomis nitida* (F. A. Roemer). Altenau, Harz.
8. — ? *semen*, Sandb. MS. Brünn, Moravia.
9. — *serratostrata* (Sandb.). Cabrières, France.
10. — ? *laevigata*, Sandb. MS. Armenia.
11. *Aparchites reticulatus*, sp. n. Armenia.

II. Description of the Species.

1. *Aparchites reticulatus*, sp. n.
(Pl. VII. figs. 4 a, 4 b, 4 c.)

Length. millim.	Height. millim.	Thickness of carapace. millim.
1·1	·65	·5

Somewhat scaphoid and leperditoid in shape, but without distinct dorsal angles, and thicker at the smaller than at the other end*. This has evidently alliances with the Lower-Silurian *Aparchites mutus*, Jones (*Cytheropsis concinna*?, Jones, Ann. & Mag. Nat. Hist. ser. 3, vol. i. 1858, p. 254, pl. ix. fig. 3; *Primitia muta*, Jones and Holl, *op. cit.* vol. xvi. 1865, p. 425; *Aparchites mutus*, Jones, *op. cit.* ser. 6, vol. iii. 1889, p. 385), with the Devonian *A. mitis*, Jones (Contrib. Canad. Micropal., Part III., 1891, p. 91, pl. xi. fig. 15); and with the Upper-Silurian *Aparchites concinnus*, Jones (*Cytheropsis*, Ann. & Mag. Nat. Hist. ser. 3, vol. i. 1858, p. 249, pl. x. figs. 3, 4; *Primitia*, *op. cit.* vol. xvi. 1865, p. 424, collated with *P. minuta*† (Eichwald), Quart. Journ. Geol. Soc. vol. xlvi. 1890, p. 7, pl. iii. figs. 18–23).

* The greater convexity at the higher end of the valve is an unusual feature. It occurs in *Primitia scitula*, Jones, and in *Bythocypris indianensis*, Ulrich. The lower and more compressed end of the carapace is the anterior end in most of the Ostracoda; but the above-mentioned species and others seem to be exceptions to this rule.

† Such of these individuals as have a slight mid-dorsal depression belong to E. O. Ulrich's new genus *Leperdit[i]ella* ('Lower-Silurian Ostracoda of Minnesota,' 1894, p. 636). A good account of *Aparchites* is given at p. 643 of this memoir.

E.C.Knight del.et lith.

West, Newman imp.

Devonian Ostracoda.

The foregoing have a smooth surface, as is usual with this genus; whereas the specimen under notice has a minutely reticulate ornament. It occurs with *Primitia lævigata* (fig. 3) in a micaceous and calcareous shale, thin, hard, brittle, and brownish, from the Arpatschai Valley in Armenia; collected by Dr. G. Sievens during a journey in the Caucasus (see Dr. Fr. v. Sandberger's note in the 'Neues Jahrb. f. Min., &c., 1873, p. 58), where these and probably other species are associated with *Spirifer calcaratus*, J. Sow. (= *Sp. Verneuilii*, Murchison), and *Rhynchonella cuboïdes*.

The reticulation much resembles that of *Bythocypris? favulosa*, Jones, Americ. Geol., December 1889, p. 338, figs. 1 and 2. The latter is figured with its convex border upwards, and is more oblique and much narrower.

2. *Primitia mundula*, Jones, var. *sacculus*, nov.
Sandberger, MS. (Pl. VII. fig. 7.)

Length. millim.	Height. millim.
·8	·5

Beyrichia mundula, Jones, Ann. & Mag. Nat. Hist. ser. 2, vol. xvi. 1855, pp. 90 and 174, pl. v. fig. 23, and pl. vi. fig. 26 ("simplex, var."), and figs. 28-31.

Primitia mundula, Jones and Holl, ibid. ser. 3, vol. xvi. 1865, p. 419.

Primitia mundula, Jones, Proceed. Geol. Assoc., "Palæoz. Biv. Entom.," 1869, pp. 8, 10, and 13, figs. i. and ii.

Primitia mundula, Jones, Ann. & Mag. Nat. Hist. ser. 6, vol. iii. 1869, pp. 375 and 378, pl. xvi. figs. 1 and 2, 4-9, pl. xvii. fig. 1, and woodcut, fig. 2, p. 376.

Primitia mundula, Jones, Americ. Geologist, December 1889, p. 337.

Primitia mundula, var., Jones, Quart. Journ. Geol. Soc. vol. xlv. 1890, p. 5, pl. iv. fig. 7.

Primitia mundula and varieties, Jones, Contrib. Canad. Micropalæont., Part III., 1891, p. 64, pl. x. figs. 8 and 9, and p. 72.

Primitia mundula, Krause, Zeitsch. Deutsch. geol. Gesell. vol. xliii. 1891, p. 495, pl. xxx. figs. 5-7.

Primitia mundula and varieties, Jones, Quart. Journ. Geol. Soc. vol. xlix. 1893, pp. 291 and 299, pl. xii. figs. 2-6, and pl. xiii. figs. 11-15.

This hollow cast of the right-hand valve of *Primitia* is rather more oval than the typical form (see Ann. & Mag. Nat. Hist. ser. 6, vol. iii. p. 376, woodcut, fig. 2, and pl. xvi. fig. 9). Among the many varieties that have been noticed, modifications in the outline of the valves and in the dimensions of the sulcus are frequent. In this instance the sub-oblong valve (its edges seem to be fully represented in the intaglio cast) has the ends not quite equal in curvature, but more so than in the type-form; and the sulcus stretches

further across the valve. It is not very different from *P. nitida*, figs. 1 and 2 of the accompanying Plate.

This specimen occurs (with *Spirigerina reticularis*?) in a dark grey, fine-grained, Lower-Devonian sandstone, belonging to the Spirifer-Sandstone of Offdillen, in the north part of the Dillenburg District, Nassau. It is the form referred to as *Primitia sacculus* by Prof. F. von Sandberger in the 'Jahrbuch. Nassau. Naturk.,' Heft 42, 1889, pp. 33, 34, 37, 38; and from Prof. v. Sandberger's information I gather that a similar form occurs in the Lower Devonian at Stadtfeld, in the Eifel.

There are other Primitian forms in this hand-specimen, rather obscure, but longer and more reniform than fig. 7; and *Beyrichia strictisulcata*, fig. 11, is present in some abundance.

3. *Primitia nitida* (F. A. Roemer).

(Pl. VII. figs. 1 *a*, *b*, 2 *a*, *b*.)

	Length. millim.	Height. millim.	Thickness of carapace. millim.
Fig. 1:	1·3	1·0	·5
Fig. 2:	2·0	1·4	1·0

Cypridina nitida, F. A. Roemer, Palæontographica, vol. iii. part ii. 1852, p. 28, pl. iv. figs. 20 *a*, *b*.

Suboblong, rounded at the ends, boldly curved on the ventral and nearly straight on the dorsal border; surface convex, more so behind than before, black and shining, but minutely pitted with a delicate reticulation, such as is seen on *P. mundula* (Ann. & Mag. Nat. Hist. 1889, iii. pl. xvi. figs. 2 *a* and 6 *a*), and much smaller than fig. 4 *c* of the present Plate. It bears also the usual sulcus, more exactly mid-dorsal (fig. 2 *a*) than in *P. mundula*, and reaching to the centre of the valve, where it slightly expands (fig. 1 *a*), and in a larger (older?) shell it has contracted in its middle and left a round pit where it terminated (fig. 2 *a*). These features are liable to much modification, and Roemer's representation of the little tubercle and pit at the end of the furrow may be sufficiently accurate, as, indeed, is his general description.

P. nitida has nearly the shape of *P. mundula* (Ann. & Mag. Nat. Hist., Sept. 1855, pl. vi. fig. 29 *a*), but has a more reniform outline, longer sulcus, and apparently no marginal rim.

The two specimens here figured occur with several others in a piece of black limestone (with *Pterinea ventricosa*, Goldfuss, and *Cardiola retrostriata*, Buch), belonging to the Upper-Devonian Goniatiten-Kalk, at Altenau, in the Harz. It was sent by F. A. Roemer to Fr. von Sandberger, but does not seem to contain the specimen figured by Roemer.

4. *Primitia laevigata* (Sandberger, MS.), sp. n.
(Pl. VII. figs. 3 a, b.)

Length. millim.	Height. millim.	Thickness of carapace. millim.
·9	·55	·4

Scaphoid in outline, with straight back, obliquely curved ventral margin, semicircular hinder and contracted front margin, sloping upwards (broken). Sulcus on the anterior third, relatively large. Surface gently and uniformly convex, smooth, as far as shown by the small remaining patches of the test.

This occurs, together with *Aparchites reticulatus* (fig. 4), in the little piece of thin Upper-Devonian limestone from Armenia, referred to at page 61.

5. *Entomis serratostrata* (Sandberger).
(Pl. VII. figs. 6 a, 6 b.)

Length. millim.	Height. millim.	Thickness of carapace. millim.
1·6	·95	·6

Ann. & Mag. Nat. Hist. ser. 6, vol. vi. 1890, p. 320 (for synonyms),
pl. xi. figs. 1 a, b, 2 a, b.

The form of these little fossil valves is so often and so much modified by pressure that it is difficult to define their exact shape. The specimen here figured is probably as near to the original form as any we have met with.

It occurs (with *Spirigerina reticularis*? and *Pterinea ventricosa*?) in a dark grey Upper-Devonian Limestone (weathering ferruginous), from Cabières, near Montpellier, France.

6. *Barychilina? semen*, Sandberger, MS., sp. n.
(Pl. VII. figs. 5 a, 5 b.)

Length. millim.	Height. millim.
·95	·6

This little oval striated valve has the aspect of being a near relative to *Entomis serratostrata*, but it has no furrow, only a central pit, and its superficial ornament differs in having rows of definite meshes between the striæ, some rectangular in single rows, and some in double rows, with a line of angular (vandyke) junction. This ornament reminds us of that of *Entomis* (*Barychilina*?) *variostrata*, Clarke (Ann. & Mag.

Nat. Hist., October 1890, p. 323, pl. xi. fig. 6 *b*). Possibly this species (*ibid.* figs. 5–8) should be separated from *Entomis*. Fig. 8 *a* has a resemblance to the form distinguished by E. O. Ulrich as *Barychilina* (Journ. Cincinnati Soc. N. H. vol. xiii. 1891, p. 199, pl. xiii. figs. 1–4), which has longitudinal and sinuous striæ, with pitted interstices, unequal and thick valves, without a mid-dorsal furrow, though Ulrich's fig. 2 *a* seems to have a trace of it. *E. variostrata* in its younger stages has the definite Entomidian sulcus, and, as other species of this genus occasionally exchange the furrow for a pit, it would not be necessary to make a separate genus on that ground. The different style of ornament, however—prickly ridges in one and meshed interstices in the other—may be a reason, as well as the coarser growth of the valves.

Some of the Devonian *Entomides* appear to have had simple and smooth striæ (for instance, figs. 9 and 18, pl. xi., Ann. & Mag. Nat. Hist. ser. 5, vol. iv. 1879); but *E. serratostrata* had prickles along its costulæ or raised striæ (see page 521, Ann. & Mag. Nat. Hist. ser. 6, vol. vi. 1890), indications of which are little pits in the hollow casts or impressions (intaglio) of the valves, and not filling the breadth of the interspaces. *E. variostrata*, on the contrary, shows a square meshwork (fig. 6 *b*, pl. xi., *op. cit.*), of relatively large pattern, filling the space between the striæ.

Among the more or less modified specimens of *E. serratostrata* (Ann. & Mag. Nat. Hist. ser. 5, vol. iv. 1879, p. 104, pl. xi.) fig. 9 shows the pit only; in figs. 2 and 14 a faint trace of the sulcus accompanies the central spot; and in fig. 9 both are absent. The collocation, however, and general mutual resemblance of the numerous specimens support the idea that they are congeneric and specifically the same.

In well-preserved specimens *E. variostrata*, Clarke (*ibid.* vol. vi. 1890, p. 323, pl. xi. fig. 8 *a*), has the pit instead of the sulcus, whilst figs. 5–7 show the sulcus only. So also in *Primitia* we may have—(1) the furrow, (2) furrow and pit, (3) pit only.

On account of the different style of ornament and the coarser growth of the valves there is reason for making the separate genus (*Barychilina*); and, even if it has no sulcus at right angles with the hinge-line, but only a central pit, we find that some allied genera have similar modifications.

Barychilina semen is from the Devonian Limestone with *Clymenia annulata*, Münster, at Hadiberg, near Brünn, Moravia.

7. *Beyrichia strictisulcata*, Sandberger, MS., sp. n.
(Pl. VII. fig. 11.)

Length. millim.	Height. millim.
·66	·43

This oblong *Beyrichia* is allied to *B. Klædeni* by its well-developed three ridges, which, as in somewhat similar forms, stand out nearly equal, equidistant, and almost parallel. It is sufficiently distinct, however, to bear Prof. von Sandberger's proposed name of *strictisulcata*.

It occurs, together with *Atrypa* and *Primitia sacculus*, in the dark grey, fine-grained sandstone at Offdillen above mentioned, and is fairly abundant.

8. *Bollia varians*, Sandberger, MS., sp. n.
(Pl. VII. figs. 8-10.)

	Length. millim.	Height. millim.
Fig. 8:	·93	·5
Fig. 9:	·96	·43 (distorted)
Fig. 10:	·73	·36

This characteristic *Bollia* is longer and more nearly oblong than the majority of the published figures of this genus. The form most closely allied is *Bollia ungula* (Claypole, MS.), Jones, Amer. Geologist, December 1889, p. 338, figs. 10-13. The chief differences are :—(1) in the Nassau specimens here figured the inner, semicircular, or horse-shoe ridge is not so thick and is more open ; (2) the dorsal end of one half of the horse-shoe forms a knob in figs. 8 and 10 ; (3) the second ridge is larger and more distinct than in *B. ungula*, though (as in the Penusylvanian examples here referred to) its ventral portion is sometimes evanescent.

B. unguloidea and *subæquata*, Ulrich, and *B. semilunata*, Jones, are shorter, rounder, and otherwise different ; so also is *B. Hindei*, Jones, in which both tops of the horse-shoe ridge are contracted to knobs ; and this is a feature with one of the tops in both *unguloidea* and *subæquata*.

The specific characters of these German specimens (figs. 8-10) are well marked, and the unstable features of the curved ridges support Prof. von Sandberger's suggested name of *variens* for this species, which is rather rare in the Lower Devonian of Offdillen, Dillenburg, Nassau.

9. *Drepanella serotina*, Sandberger, MS., sp. n.
(Pl. VII. fig. 12.)

Length.	Height.
millim.	millim.
·76	·46

For an account of the genus *Drepanella* see Ulrich's memoirs (Journ. Cincinn. Soc. N. H. vol. xiii. 1890, p. 117, and Geol. Surv. Minnes., Last Report, vol. iii. 1894, p. 670). The present form may look upon *D. ampla*, Ulrich (1890, p. 120, pl. viii. fig. 2), as a near ally, although the sickle-shaped ridge on the ventral region is shortened to a straight thick ridge, and the two pointed knobs above are represented by two unequal roundish tubercles. Hence the species is different for the German form; and von Sandberger's name *serotina* may well be adopted for this *late*, if not *last*, representative of the genus.

Drepanella seems to have been an outcome of *Bollia* rather than of *Beyrichia*; but its evolution is not a matter for discussion at present.

From the Lower Devonian of Offdillen, Dillenburg, Nassau.

10. *Strepula? annulata*, Sandberger, MS., sp. n.
(Pl. VII. fig. 13.)

Length.	Height.
millim.	millim.
·63	·36

This very curious little unique form was found on a large block of the *Orthoceras*-Schiefer (Lower Devonian) at Offdillen; and fig. 13 is copied from the drawing supplied by Prof. von Sandberger. The outer ridges and central elevations are not quite comparable with the features of any known *Strepula*, but to that genus the present example seems to have the nearest affinity.

EXPLANATION OF PLATE VII.

[The figures 1-7 are magnified 20 diameters, excepting figs. 4 *c* and 5 *b*, which are $\times 60$. Figs. 8-13 $\times 30$ diam.]

Fig. 1. <i>Primitia nitida</i> (F. Roemer). <i>a</i> , left valve; <i>b</i> , edge view.	} Altenau, Harz.
Fig. 2. The same, an older individual. <i>a</i> , left valve; <i>b</i> , edge view.	
Fig. 3. <i>Primitia laevigata</i> , sp. n. <i>a</i> , left valve; <i>b</i> , edge view.	} Armenia.
Fig. 4. <i>Aparchites reticulatus</i> , sp. n. <i>a</i> , right valve; <i>b</i> , edge view; <i>c</i> , portion of ornament.	

- Fig. 5. *Barychilina?* *semen*, sp. n. *a*, right? valve; *b*, portion of ornament. Moravia.
 Fig. 6. *Entomis serratostrata* (Sandb.). *a*, left valve; *b*, edge view. France.
 Fig. 7. *Primitia mundula*, var. *sacculus*, nov. Hollow cast of right valve.
 Fig. 8. *Bollia varians*, sp. n. Right valve.
 Fig. 9. The same. Left valve.
 Fig. 10. The same. Right valve.
 Fig. 11. *Beyrichia strictisulcata*, sp. n.
 Fig. 12. *Drepanella serotina*, sp. n.
 Fig. 13. *Strepula?* *annulata*, sp. n.
- Offdillen, Dillenburg, Nassau.

IX.—*Descriptions of new Coleoptera from New Zealand.*

By Captain THOS. BROWN.

[Continued from vol. xiv. p. 428.]

List of Species.

Group PSELAPHIDÆ.

Pselaphus ventralis.
Bryaxis Hectori.
Sagola rugifrons.
 — *spinifer*.
 — *eminens*.
Euplectus tumipes.
 — *parvulus*.
 — *modestus*.
 — *arohaensis*.
 — *foveiceps*.
 — *semiopacus*.
 — *pusillus*.

Group SILPHIDÆ.

Silphotelus nitidus.
Bæosilpha rufescens.
Mesagyrtes scabripes.
Choleva marginalis.
— suturalis.

Group COLYDIIDÆ.

Coxelus thoracicus.

Group BOTHRIDERIDÆ.

Bothrideres obsoletus.

Group LATHRIDIIDÆ.

Lathridius sulcifrons.
Corticaria clarula.

Group COPRIDÆ.

Saphobius tibialis.

Group LUCANIDÆ.

Mitophyllus cylindricus.
— *angusticeps.*

Group MELOLONTHIDÆ.

Psilodontria viridescens.
Pœcilodiscus pulcher.
Odontria obscura.

Group ELATERIDÆ.

Lomemus puncticollis.
Zeaglophus pilicornis.

Group DASYLLIDÆ.

Cyprobius terrenus.
Veronatus amplus.
Cyphon McKerrowi.

Group MELYRIDÆ.

Dasytes nigripes.

Group CIOIDÆ.

Cis fulgens.
 — pygmæus.
 — lobipes.