

DESCRIPTION OF NEW GENERA AND SPECIES OF FOSSILS FROM
THE MIDDLE CAMBRIAN.

BY CHARLES D. WALCOTT.

In a collection of Middle Cambrian fossils, sent to me for study by Dr. Karl Rominger, I find several new forms, which he permits me to describe. With these, two other species are described—one collected by Dr. Cooper Curtice, in northern Georgia, and the other by me in Newfoundland.

It is my intention to fully illustrate the species described in this paper in a review of the Middle Cambrian fauna.

Lingulella mcconnelli n. sp.

Shell subspatulate, height and breadth as 7 to 4½. Ventral valve subattenuate towards the apex, broadest midway, with the sides converging slightly towards the front and rather rapidly towards the apex; front broadly rounded. Dorsal valve short, height and breadth subequal; the broad front is squarely rounded, and the apex broadly rounded.

The specimens are somewhat flattened in the shale, but the rather strong shell preserves a moderate convexity. Surface marked by concentric striæ of growth and radiating longitudinal lines.

Formation and locality: Middle Cambrian, 2,000 feet above the Olenellus zone, Mt. Stephen section, British Columbia. Collection of Dr. Karl Rominger.

Crania (?) *columbiana* n. sp.

Shell small, circular or slightly longer than wide; apex central or nearly so. Surface marked by fine costæ that radiate from the apex to the margin. Traces of fine spines appear about the margin. Diameter 2^{mm}.

The generic reference is made on account of the surface characters being more like those of shells referred to *Crania* than to those of other genera: *Crania grayi* Davidson, *Crania lalia* Hall (24th Rep. N. Y. State Cab. Nat. Hist., p. 220, pl. 7, fig. 16).

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Acrotreta gemma var. *depressa* n. var.

The specimens from Mt. Stephen are relatively much lower and broader in proportion to the height than the typical forms of *A. gemma*. On this account they are considered as a variety.

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Linnarssonia sagittalis Salter (sp.).

A beautifully preserved interior of the dorsal valve of this species came from the same locality as the preceding species.

Orthisina alberta n. sp.

Shell transversely suboval, front broadly rounded; the straight hinge line is shorter than the full breadth of the valve; area of the central valve high, bent backward from the hinge line, divided by a large foramen that is covered by a convex deltidium. The area of the dorsal valve slopes back at about a right angle to the valve. The broad, short foramen appears to have been covered by a low deltidium.

Surface marked by radiating costæ, five in a distance of 3^{mm} on the frontal margin.

This species recalls *Orthis lindstromi* Linnarsson, from the Paradoxides zone of Sweden.

Formation and locality: Middle Cambrian, 2,000 feet above the Olenellus zone, Mt. Stephen section, British Columbia. Collection of Dr. Karl Rominger.

Platyceras romingeri n. sp.

Shell small, apex incurved, body whorl expanding rapidly on the outer half of the volution; dorsum broad, subangular (?) on the right side; left side concealed in the matrix. The body volution is marked by concentric undulations, aperture and peristome broken. Surface marked by concentric striæ of growth. A second specimen, that is pressed flat in the shale, shows the outer volution quite regularly rounded, the aperture subcircular and the peristome smooth.

Formation and locality: Middle Cambrian, 2,000 feet above the Olenellus zone, Mt. Stephen section, British Columbia. Collection of Dr. Karl Rominger.

The Genus OLENOIDES Meek.

It is unfortunate that genera occurring in the three divisions of the Cambrian system have names so liable to be confused; viz, Olenus, Olenellus, and Olenoides. Olenus and Olenellus are respectively typical genera of the Upper and Lower Cambrian, and Olenoides attains its greatest development in the Middle Cambrian, in areas where the characteristic Atlantic province genus Paradoxides is absent. All three of the names have been used in published memoirs, and students will be obliged to distinguish them despite of their similarity.

The genus Olenoides was proposed by Mr. B. F. Meek¹ for a species which he provisionally referred to the genus Paradoxides—*P.(?)nevadensis*. In the description of the Middle Cambrian fauna² the type specimen

¹ Geol. Expl. Fortieth Par., vol. iv, pt. 1, p. 25.

² Bull. U. S. Geol. Survey, No. 30, p. 180, 1886.

is illustrated and other species referred to the genus, some of which were subsequently separated and placed under the genus *Zacanthoides*.¹ I mentioned, when the latter name was proposed, that *Dorypyge*, Dames was congeneric with *Olenoides* of Meek. Before I had met with the proposed name *Olenoides*, I had given a provisional generic name in manuscript to the group of species which were subsequently placed under *Olenoides*, in 1886.² This was before I knew of the proposed genus *Dorypyge*, although the latter was published in 1883.³

A comparison of the figures illustrating the type of the genus *Dorypyge*, *D. richthofeni*,⁴ with *Olenoides nevadensis*, *O. quadriceps*,⁵ *O. wasatchensis*, and *O. curticei*, shows that they are congeneric, although the surface of *D. richthofeni* is granulated and the test of the other species is very thin and smooth, as far as known.

The species included under the genus are *Olenoides nevadensis* Meek, *O. quadriceps* H. & W., *D. wasatchensis* H. & W. *O. curticei* n. sp., *O. marcoui* Whitfield, an undescribed species from northern Arizona, and one from the Coosa Valley, Alabama. Of the seven species *O. marcoui* and *O. quadriceps* are in association with the genus *Olenellus*. The undescribed species from Arizona is from strata high up in the Cambrian, and the remaining four are from strata between the Lower Cambrian or *Olenellus* zone and the Upper Cambrian or *Dicellosephalus* (*Olenus*) zone.

Olenoides nevadensis Meek.

Paradoxides? nevadensis Meek, 1870. Proc. Acad. Nat. Sci. Phil. vol., xxii, p. 62; *idem*, 1877. Geol. Expl. Fortieth Par., vol. iv, p. 23, pl. 1, fig. 5.

Olenoides nevadensis Walcott. Bull. U. S. Geol. Survey, No. 30, p. 181, pl. xxv, fig. 7, 1886.

The type specimen was found in a bluish-gray calcareous shale, at Antelope Spring in the House Range of western Utah. Mr. McConnell, Mr. Otto J. Klotz, and Dr. Rominger collected the species from a bluish-gray calcareous shale at Mt. Stephen, in the Rocky Mountains of British Columbia, on the line of the Canadian Pacific Railway.

Olenoides curticei n. sp.

This is a large, fine species that approaches *O. nevadensis* in its general characters, and differs in the details of the head and pygidium, as shown in the accompanying figure.

O. curticei was collected by Dr. Cooper Curtice in the Cambrian

¹ Am. Jour. Sci., 3d ser., vol. xxxvi, p. 165, 1888.

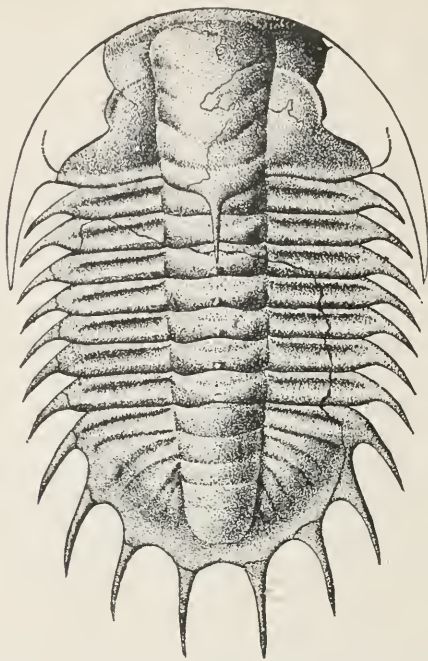
² Bull. U. S. Geol. Survey, No. 30, p. 181, 1886.

³ China, Richthofen, vol. iv, p. 24. The work containing it was not accessible to me until late in the year 1885, after the text of Bulletin No. 30 had been printed (Bull. U. S. Geol. Survey, No. 30, p. 221, 1886).

⁴ China, Richthofen, taf. 1 figs. 1a-6.

⁵ Bull. U. S. Geol. Survey, No. 30, pl. xxix, figs. 1-c.

shales of Coosa Valley, near Blaine post-office, Cherokee County, Ala., where it occurs on the surface of dark flint nodules.



Olenoides curticei.

Olenoides sp. undet.

A second species of *Olenoides* was found by Dr. Curtice in an argillaceous shale, on the Edward's farm, near Craig's Mountain, Cherokee County, Ala. It differs, in the parts available for comparison, from *O. curticei* in having a larger number of spines on the margin of the pygidium, and the postero-lateral limb of the head is shorter back of the eye.

The pygidium is much like that of *O. nevadensis*, but, until more perfect specimens are obtained, I will not attempt to name or compare the species.

The associated fossils are *Lingulella* (?), *Aerotreta*, *Scenella*, *Stenotheca*, *Hyalithes*, and *Ptychoparia* three sp., etc.

Karlia n. gen.

Form elongate-oval, convex. Head longitudinally semicircular, deeply marked by the dorsal furrows. Glabella clavate, broadly expanded in front, with or without faint glabellar furrows. Occipital furrow well defined. Fixed cheeks subtriangular; posterior furrow broad; eye lobe small; free cheeks narrow. Hypostoma with a thick, rounded anterior margin that is extended into the large lateral wings, the sides of which extend one-half way back on the oval, convex body; posterior

marginal rim strong and separated from the body by a well defined sulcus.

Thorax with seven segments; axis with a central spine on each segment; pleural lobes with a broad groove; anterior lateral ends of pleuræ faceted.

Pygidium short, transverse, four to five segments in the axis, lateral lobes slightly grooved.

Surface granulose.

Types: *Karlia minor* and *K. stephenensis*. Generic name proposed in honor of Dr. Karl Rominger.

Karlia minor n. sp.

Form elongate-oval, convex. Average size, 7^{mm} in length by 3^{mm} in breadth. Head longitudinally semicircular, convex; frontal rim a narrow margin which passes into a stronger rim on the sides. Glabella clavate, expanding from the base to twice the width in front, marked by four pairs of short, faint glabellar furrows; occipital furrow deep; occipital ring strong and with a sharp, slight node at the center. The broad, deep, dorsal furrows unite with the posterior furrows to separate the strongly convex, subtriangular fixed cheeks; eye lobe short, narrow, and defined by a well-marked groove from the cheek; the groove extends forward to the dorsal furrow. Free cheeks narrow; marginal rim round and strong; posterior angle pointed, but not known to be extended into a spine.

Thorax with seven segments; median lobe convex and with a very short node or spine at the center of each segment; pleural lobes flat to the geniculation of the pleuræ, where the outer half of the segments are bent obliquely downward and slightly backward; pleural groove the full width of the segment to the geniculation, where it abruptly tapers to a point by the cutting in of the facet on the anterior side of the segment.

Pygidium of medium size, transversely semicircular; axis convex and crossed by three or four rings and the terminal lobe; the rings are extended out on the lateral lobes as broad, low ridges trending obliquely backward to the rounded margin.

Surface of the head granulated; thorax and pygidium apparently smooth.

All the specimens seen are sma'l, none exceeding 10^{mm} in length.

Formation and locality: Middle Cambrian; Manuel's Brook, Conception Bay, Newfoundland. This species is associated with *Microdiscus punctatus*, *Paradoxides davidis*, etc.

Karlia stephenensis n. sp.

Menocephalus salteri (?) Rominger, 1887. Proc. Acad. Nat. Sci. Phila., pt. 1, p. 16 pl. i, fig. 6.

This species differs from the *K. minor* in its greater size, 40^{mm} in length by 30^{mm} in breadth; the fixed cheeks are wider and the grooves

on the pleuræ are narrower. In one of the large specimens the surface of the glabella is covered with fine, irregular elevated striae.

Through the kindness of Dr. Karl Rominger I have the opportunity of studying this species.

Formation and locality: Middle Cambrian, 2,000 feet above the Olenellus zone, in the Mt. Stephen section, British Columbia.

Bathyriscus (*Kootenia*) *dawsoni* n. sp.

Bathyriscus (?) Rominger 1887. Proc. Acad. Nat. Sci. Phila., pt. 1, p. 18, pl. i, fig. 8.

General form ovate, broadest across the back of the head, strongly trilobed, although flattened in the shale. Head broad, semicircular in outline. Glabella broadly rounded in front; sides subparallel; surface convex and not showing any lateral furrows; occipital furrow and ring well defined. Frontal rim very narrow. Fixed cheek broad, and crossed by a narrow ocular ridge that extends obliquely forward from the eye to near the anterior angle of the glabella; postero lateral limbs large, subtriangular; anterior lateral limb short. Eye lobe small. Free cheeks unknown.

Thorax with seven segments; median lobe convex and with a spine at the center of each segment; pleuræ flattened two thirds of their length and then bend downward and outward to their rounded ends; pleural grooves broad to the point of tapering from the geniculation outward; anterior lateral facet slightly developed.

Pygidium large; median lobe prominent and extending the entire length to the posterior margin; it is crossed by fine rings that have a spine at the center of each; the terminal ring is short; lateral lobes with four anchylosed segments, distinctly outlined; margin narrow.

This species is a link between the genera *Protypus* and *Asaphiscus*. It has the type of head of the former and the thorax and pygidium of the latter.

The subgeneric name, *Kootenia*, will probably be raised to a genus in a final report. The specific name is given in honor of Dr. George M. Dawson, of the geological survey of Canada.

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Ogygopsis n. gen.

This genus is founded on the species *Ogygia klotzi* Rominger.¹ It differs from *Ogygia* in having a well-defined ocular ridge and in the narrow palpebral lobe. In other respects it is identical with *Ogygia*, as represented by *O. buchi*.

¹ Proc. Acad. Nat. Sci. Phila., pt. 1, 1887, pp. 12, 13, pl. i, fig. 1.