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New Occurrence of *Aulocopella winnipegensis* Rauff, 1895, in Western Montana

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INTRODUCTION

A new specimen of the rare Ordovician sponge *Aulocopella winnipegensis* Rauff, 1895, was recently collected from road gravel in western Montana, near the community of Darby. The species has been reported previously only from the Lake Winnipeg area of Manitoba. The genus and species were first described by Rauff (1895) from material collected from the Cat Head Member of the Ordovician Red River Formation, at Cat Head, along the west central shore of Lake Winnipeg, in southern Manitoba.

Rauff (1895) designated *Aulocopella* as a subgenus of *Aulocopium*, based on the position of the point from which the skeletal structure radiates, from the base of the sponge in *Aulocopium*, but from within the lower sponge body in *Aulocopella*. Whiteaves (1897) separated the forms into two genera, a classification followed by Bassler (1915), De Laubenfels (1955), and most recently by Rigby (1971) and Rigby and Leith (1989).

The Montana specimen of the sponge was collected by Ernest Johnson from road gravel along a driveway that leads off of Gorus Lane, which connects the old Darby Road to U.S. Highway 93, 3 1/2 miles north of Darby, Montana (Fig. 1). The driveway where the sponge was found is located in the north-central part of Section 35, T. 4 N, R. 21 W. on the Darby, Montana 7 1/2-minute quadrangle. Darby is 64 miles south of Missoula in the west-central part of the state.

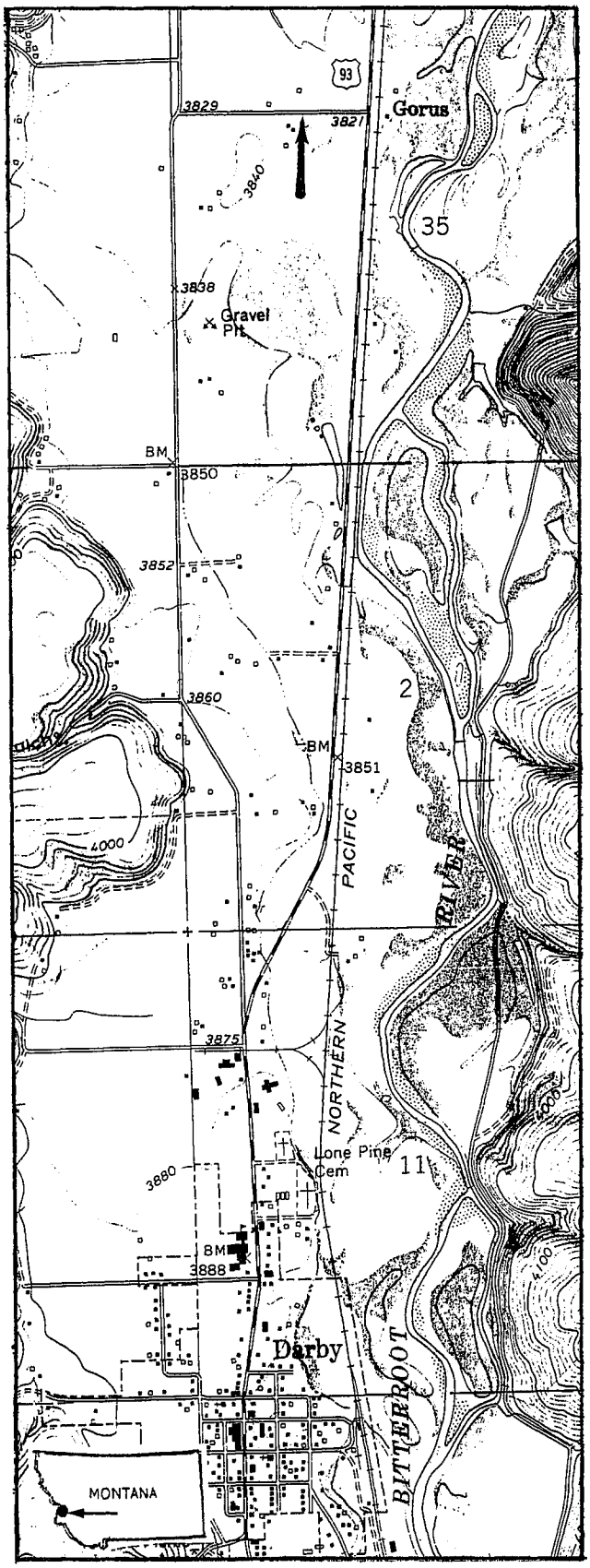
This is only the third specimen of the species known, and it is a more nearly complete sponge than the original type material. The Montana sponge is preserved as chalcedony, much like the type material, and appears to be a water-worn rounded clast. Because it was recovered from road gravel, the formation of its origin is unknown, although it probably came from Ordovician rocks exposed in the Bitterroot Range, to the west of the Bitterroot Valley where the sponge was found.

Class DEMOSPONGEA Sollas, 1875
Order LITHISTIDA Schmidt, 1870
Suborder ORCHOCLADINA Rauff, 1895
Family ANTHASPIDELLIDAE Miller, 1889
Genus *AULOCOPELLA* Rauff, 1895
AULOCOPELLA WINNIPEGENSIS RAUFF, 1895
Plate 1, figs. 1–3, Text-figs. 2,3

Description.—The new specimen is a rounded clast approximately 65 mm high and 95 mm in diameter that contains a gear-shaped, silicified, sponge. Its seven vertical outer blades or fins radiate from a central, moderately thin-walled, obconical spongocoel, which is now largely filled with matrix. The straight to gently curved fins are more or less uniformly spaced, as seen from above. From below, there are only six such skeletal fins developed below the spongocoel margin in the slightly uparched base, which is also partially covered by matrix. The spongocoel is 33 x 39 mm in diameter at the summit of the sponge, and is approximately 40 mm deep, with a smooth unfolded spongocoel margin and a rounded base. It is surrounded by a wall 13 to 20 mm thick in the rounded grooves between the radiating skeletal fins.

Individual fins are up to 35 mm long, as preserved, but originally probably extended an additional 10–15 mm before they were partially eroded. They are 10–12 mm wide where they are initially differentiated from the wall around the spongocoel, in the upper part of the sponge. They thicken more or less uniformly vertically and radially, to where they are up to 29 mm thick or wide at their outer preserved edges. One of the six proximal fins in the base is subdivided into two fins near the outer margin of the sponge so that seven fins show on the edge and summit of the specimen. Outer preserved edges of the fins are separated by wedge-shaped matrix fillings up to 26 mm wide. Matrix filling between blades of the subdivided fin is only to 9 mm wide, where widest at the circumference of the sponge.

Coarse excurrent canals are exposed as tubular openings in sections in weathered surfaces of the fins, and in vertical sections of the sponge interior where the sponge has been broken and the interior structure is exposed. These canals arch upward from an initial outer subvertical orientation, in lower and oldest, first-formed canals, to



become essentially horizontal where they empty into the spongocoel. These canals are also commonly on or near the axial plane of the radiating fins, where they are vertically stacked 3–4 canals per cm, in concentric-appearing series. Similar excurrent canals occur lateral to these and gently converge upward and inward where they commonly merge with the axial series. These lateral canals are also uparched, even in upper parts of the fin, where inner ones may empty directly into the spongocoel. These excurrent canals are the coarsest in the silicified skeleton and range from 1.4 mm to 2.1 mm in diameter.

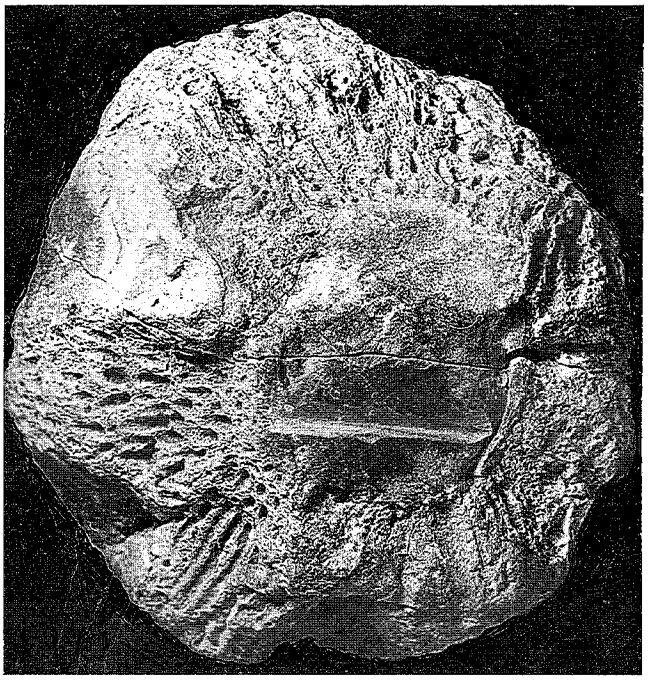
Similar canals empty vertically to subvertically into the base of the spongocoel. These 12–14 canals have their origins near the skeletal radiante, the point in the lower part of the skeleton from which the skeletal structure radiates. Canals radially from these converge toward the spongocoel at decreasing angles until those from the lower to upper parts of the spongocoel pierce the gastral wall more or less horizontally.

Smaller diameter incurrent canals pierce the somewhat more densely spiculed outer or dermal part of the sponge and converge toward the exhalant system. These incurrent canals range from approximately 0.9 mm to 1.1 mm in diameter. They are usually only a few mm long.

Skeletal pores within the anthaspidellid structure range up to 0.6–0.8 mm in diameter and locally interconnect openings in both the incurrent and excurrent canal systems where those canals are closely spaced.

The skeletal net is typically anthaspidellid, with prominent rodlike trabs that are cross-connected by small dendroclones in the ladder-like structures of the skeleton. Trabs radiate from a radiante that is centrally located and 8–9 mm below the base of the spongocoel and above the invaginated base of the sponge. Trabs are arranged in upward and outward curving pinnate fashion in each of the radiating fins. As in the type specimen, there are two surfaces seen in vertical sections from which the trabs diverge, one in the medial part of the spongocoel wall, and the other a more or less horizontal plate out from the radiante. Trabs in the spongocoel wall arch toward both margins and meet gastral and dermal surfaces at high angles in areas between radiating fins. Below the lower plane, trabs arch downward to meet the base of the sponge at moderately high angles. Above it they arch upward and outward to meet the outer surface of the sponge at high angles. Trabs also are arranged in pinnate fashion when viewed in horizontal sections of the radial blades. They

Figure 1. Index map to the locality (arrows) where the loose specimen of Aulocopella winnipegensis *RAUFF, was collected from road gravel near Gorus, north of Darby, Montana (base map, Darby 7 1/2-minute quadrangle, Montana).*



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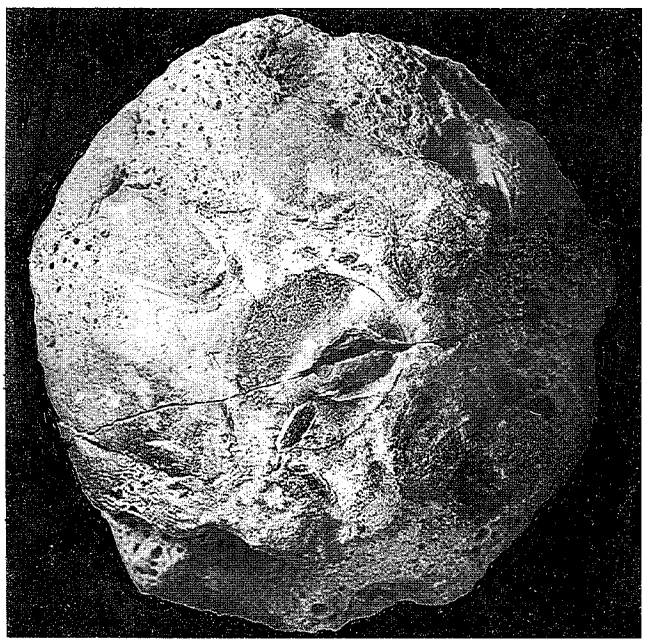

B

Figure 2. Aulocopella winnipegensis *RAUFF, 1895, USNM 480604. A. View from above shows coarsely canalled radial fins diverging from thin wall around circular spongocoel, which is filled with dark matrix, natural size. B. View from below shows lower part of radial fins diverging from circular matrix filling of invaginated base, natural size.*

arch laterally from the medial planes to meet sides of blades at high angles too.

Trabs are 0.1–0.2 mm in diameter and are spaced approximately 0.3–0.4 mm apart throughout the sponge skeleton. I-shaped dendroclones are occasionally preserved in the chalcedonic replacement. They are spaced approximately 0.1 mm apart in the ladder-like structure. Details of their ray terminations that united to produce the trabs are largely lost in the siliceous preservation.

Discussion.—Provenance of the Montana sponge is in question because it is a transported clast recovered from road gravel, and because the species has been reported previously only from the Lake Winnipeg area. It is highly unlikely, however, that it was transported as an erratic into westernmost intermontane Montana by Pleistocene continental ice. Bedrock around the Darby region and in headwaters of the Bitterroot River is dominated by igneous rocks of the Idaho Batholith and Precambrian units. There is no obvious Ordovician bedrock source. It is possible that the sponge was brought into the area by a collector and subsequently discarded.

Depository.—U. S. National Museum 480604.

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