

A possible Laurentian volchoviid ophiocistioid from the Katian of southwestern Ohio

William I. Ausich¹  and Jeffrey R. Thompson²

¹The Ohio State University, School of Earth Sciences, 125 South Oval Mall, Columbus, OH 43210, USA. <ausich.1@osu.edu>

²University College London, Department of Genetics, Evolution and Environment, Darwin Building, Gower Street, London WC1E 6BT. <jeff.thompson@ucl.ac.uk>

The Cincinnatian (Katian) of the Cincinnati Tri-State area is widely regarded as one of the most fossiliferous sections known (Meyer and Davis, 2009). Echinoderms from these strata include well-described asteroids, crinoids, cyclocystoids, edrioasteroids, glyptocystoids, mitrates, and ophiuroids. John Pope discovered a partially articulated echinoderm in float from the Fairview Formation that does not correspond to any known Cincinnatian echinoderm. Although mentioned in Ubaghs (1966, as a presumable personal communication from Pope, 1960), Haude and Langenstrassen (1976), Reich (2001), and Reich and Haude (2004), this specimen at the Cincinnati Museum Center (CMCIP 51316) has neither been described nor illustrated; yet, these authors attributed it to *Volchovia* Hecker, 1938 in the Class Ophiocistioidea. Questions swirl around this fossil: what is its complete morphology; does it belong to *Volchovia*; whether or not it can be assigned to *Volchovia*, is it an ophiocistioid? The first step to understand this enigmatic echinoderm is to illustrate and describe the specimen, which is the objective of this note.

The specimen in question was collected in 1957 from the upper part of the Fairmount Member, Fairview Formation (Ordovician, Katian) in the Emming Street Quarry, Cincinnati, Ohio (this information is recorded on the specimen label). The morphologies of Cincinnatian echinoderms are typically well understood, and none of these has plating similar to *Volchovia*, except perhaps CMCIP 51316. *Volchovia* is reconstructed as having a dome-shaped test with pointed marginal plates (yielding a periphery with a serrated appearance) and central plates of variable sizes and shapes. The periproct and a sutural pore between two posterior marginal plates are also present on the aboral test surface of *Volchovia* (Ubaghs, 1966, fig. 135).

CMCIP 51316 is an incomplete, partially articulated specimen interpreted to be approximately half of the outer rim of a specimen and thought to have been subcircular in outline (Fig. 1.2). The specimen is ~11 mm long, ~8 mm wide, and has a dome-shaped test (Fig. 1.1). It is primarily formed of thin marginal plates that are of different sizes. The abaxial (outer) edge of the specimen is serrated because the outer edge of each marginal plate ends in a point (Fig. 1.2, 1.3). One large plate is interpreted to be a plate from the central portion of the specimen. Perhaps much smaller polygonal plates from the central portion are present, but it is unclear whether these smaller plates belong to this specimen or if they are part of the matrix in which this specimen was buried. No evidence for a periproct or other opening is present. Different sized

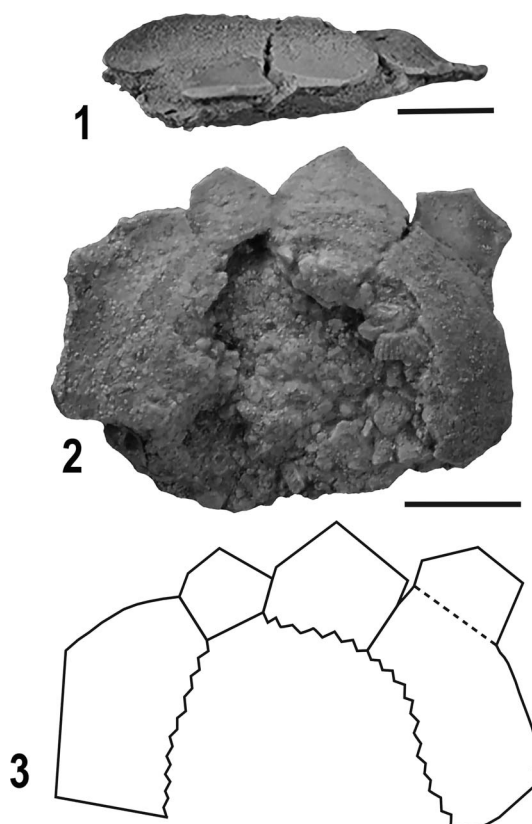


Figure 1. *Volchovia?* sp. from the Fairview Formation (Katian); CMCIP 51316, scale bars 2.5 mm. (1) Lateral view of test, marginal plates projecting out of the photograph (note domed structure of test), specimen coated with ammonium chloride; (2) aboral view of specimen, coated with ammonium chloride; (3) camera lucida drawing of preserved plating.

marginal plates distinguish this specimen from reconstructions of *Volchovia* (Hecker, 1938, 1940; Ubaghs, 1966).

Notes from echinoderm workers who have examined this specimen expressed varying opinions about its systematic placement but urged its illustration. Thus, this specimen is illustrated for the first time. As noted, the outer rim of plates is not identical to either *V. mobilis* Hecker, 1938 or *V. norvegica* Regnéll, 1948. The marginal plates are less regular in size and shape than those in *V. norvegica*, *V. volborthi* Hecker, 1938, and *V. mobilis*. CMCIP 51316 is also smaller than specimens of *V. norvegica* (50–70 mm), *V. mobilis* (60–70 mm), and *V. volborthi* (80–90 mm). Despite these differences, the morphology of CMCIP 51316 is more similar to these taxa than to any other Cincinnatian echinoderm.

If this Katian specimen is a *Volchovia*, it would also be the stratigraphically youngest of the species mentioned above. *Volchovia mobilis* (Volkhov–Kunda Baltic Regional Stages, Estonia) is Dapingian–early Darriwilian, *V. volborthi* (Kunda Baltic Stage, Estonia) is Darriwilian, and *V. norvegica* (Lysaker Member, Huk Formation, Norway) is Darriwilian (Kröger, 2012). Furthermore, if specimen CMCIP 51316 is determined to be *Volchovia*, it would prove to be the first definitive occurrence of this genus (and the family Volchoviidae Hecker, 1938) outside of Baltica (Lefebvre et al., 2013).

Until the morphology of this unusual echinoderm is more fully understood, we cannot determine whether this enigmatic echinoderm belongs to *Volchovia*. Thus, we refer to this fossil, herein, as a volchoviid-like echinoderm.

Acknowledgments

We thank B. Hunda of the Cincinnati Museum Center for access to the specimen. Discussions with U. Toom and J.W. Kallmeyer helped us to understand Ordovician stratigraphy of Estonia and Cincinnati echinoderms, respectively; and the manuscript was greatly improved by helpful comments from R. Mooi, M. Reich, T.E. Guensburg, and an anonymous reviewer. JRT was supported by a Royal Society Newton International Fellowship.

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Accepted: 15 March 2021