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DECADOCRINUS HUGHWINGI, A NEW MIDDLE DEVONIAN CRINOID FROM THE SILICA FORMATION IN NORTHWESTERN OHIO

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VOLUME XIX

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ABSTRACT

Decadocrinus hughwingi, a new crinoid from the Middle Devonian Silica Formation in northwestern Ohio, is characterized by vermiculate to striate plates in the bowl-shaped dorsal cup, hemicylindrical *RR* nearly the same size and shape as *PBrBr* and smaller than the bulbous *BB,* short and axillary $PBrBr_2$, pentalobate columnals, and a row of stout spines on the ornate anal sac.

CONTENTS

INTRODUCTION

A NEW CRINOID has been discovered in the Middle Devonian Silica Formation exposed in the North Quarry of the Medusa Portland Cement Company at Silica, Lucas County, Ohio, by Mr. Hugh Wing of Detroit, Michigan. Only the holotype is known. It consists of a few columnals, the dorsal cup, the bases of the arms, and the contorted anal sac.

Exposures of the Silica Formation in the two quarries operated by the Medusa Company have been the source of well-preserved fossils for nearly forty years. In recent years, numerous fossil hunters visit the South Quarry almost daily and hordes scour both quarries each week end, except when the strata are blanketed with snow. In view of the intensive collecting in the Silica Formation, the discovery of a new crinoid becomes a tribute to the perspicacity of Mr. Wing. With pleasure I name the species in his honor.

As presented to the Museum of Paleontology by Mr. Wing, the specimen displayed only the general form of the dorsal cup and essential features of the anal sac. Intricate details of ornamentation were obscured by the matrix of soft bluish-gray shale. All cleaning was done under binocular microscopes at about × 30 magnification. After initial cleaning with fine needles, the specimen was further exposed by application of a tiny jet of S. S. White Airbrasive Powder No. 2 (dolomite) blasted at 100 p. s. i. by an Airdent Unit. The fragile nature of the arm bases precluded cleaning of the ventral surfaces of the brachials.

Professor Lewis B. Kellum and Professor Chester A. Arnold critically read this paper. Mrs. Helen Mysyk typed the final draft. Mr. Karoly Kutasi assisted in photography of the specimen.

The holotype is deposited and catalogued in the Museum of Paleontology of The University of Michigan as No. 30528.

LOCALITY

North Quarry of Medusa Portland Cement Company, west of Centennial Road and north of Brint Road, about 2¼ miles north-northwest of Silica, Lucas County, northwestern Ohio. Specimen found along road leading from quarry to processing plant, almost certainly fallen from one of the quarry trucks while in transit. Matrix of soft bluish-gray shale. From nature of matrix and stage of quarrying operations at the time, I would estimate that the specimen came from strata above the "Blue Limestone" member of the Silica Formation, perhaps from Unit 9 of Ehlers, Stumm, and Kesling (1951, pp. 19–20). Specimen found by Mr. Hugh Wing during winter of 1963–64, presented to the Museum in April, 1964.

SYSTEMATIC DESCRIPTION

Subclass INADUNATA Wachsmuth and Springer
Order CLADOIDEA Moore and Laudon
Suborder DENDROCRINOIDEA Bather
Family Scytalocrinidae Bather

(*Nom. correct.* Moore and Laudon, 1943, p. 59, *pro* Scytalacrinidae Bather, 1899, p. 922)

Moore and Laudon (1943, p. 59) gave the following diagnosis of the family:

> Dicyclic; crown slender; cup conical to truncate bowl-shaped; IBB 5, typically visible from side; 3 XX in cup, anal sac tall, slender; R facets wide, bearing transverse ridge and ligament pits; arms branching isotomously on PBr_1 or unbranched, pinnulate.

Again (p. 61) they stated: "Arms stout, round, uniserial, branching once isotomously on PBr_1."

These statements should be altered to delete reference to the place of branching, since *Decadocrinus* and *Histocrinus* typically have two *PBrBr* in each ray, *Phacelocrinus* has one or two, and *Pegocrinus* may have two or even three. The characteristic that holds for the family is branching isotomous, not more than once.

Genus *Decadocrinus* Wachsmuth and Springer 1879

Decadocrinus hughwingi, sp. nov.

(Pl. I, Figs 1–4; Fig. 1)

Dorsal cup.—Cup bowl-shaped; its base formed by a small circlet of *IBB*; its bottom part full and strongly convex, lobate because of bulbous *BB*; its upper part flared by outward inclination of *RR* (Pl. 1, Fig. 1). Posterior (CD) much wider than other interrays (Pl. I, Fig. 3). Height from base of *IBB* to top of *RR*, 3.8 mm; diameter of *IBB* circlet, 3.8 mm; diameter of *BB* circlet, 6.0 mm; and diameter across *RR*, 8.8 mm.

Five *IBB*, approximately equal, projecting perceptibly beyond column, their edges crenulate. Circlet of *IBB* conforming to the shape of the pentalobate column below and the *BB* above; hence, each *IB* indented in the middle, just below the juncture of the two adjacent *BB* (Pl. I, Fig. 3), with a notch in the outer edge at this point, so that the circlet at first appears to be composed of ten small crenulate plates (Pl. I, Fig. 4). Greatest width of *IB*, 2.5 mm; greatest height (median), 0.8 mm.

BB bulbous; *BB* of BC and CD interrays septagonal, *BB* of other interrays hexagonal and slightly smaller, as common in the genus (Fig. 1). Height and width of each *B* nearly equal. *B-IB* sutures depressed, *B-B* sutures deeply depressed, and *B-R* sutures arched athwart broad gentle ridges extending from *RR* onto *B*. Surface ornamented with raised vermiculate crests, more or less irregular but with marginal elements tending to be normal rather than parallel to plate borders (Pl. I, Fig. 3).

RR nearly equal, smaller than *BB*; each *R* pentagonal, nearly hemicylindrical with short arched lateral extensions to adjacent *RR* (Pl. I, Fig. 4). *R* of C ray bounded by *R* of B ray, *B* of BC interray, *RA*, X_2 and PBr_1; other *RR* each bounded by two *BB*, two *RR*, and PBr_1. Height of each *R* definitely less than width. Surface ornamented with crests tending to be aligned longitudinally, producing striate pattern. No *IBrBr* plates.

Anal series prominent. *RA* pentagonal, strongly convex, about the same size as the adjacent *R* of the C ray, its lower apex inserted between *BB* with even sides (Fig. 1). Corners deeply depressed; surface vermiculate, like that of *BB*. X_1–X_5 decreasing very gradually, arranged biserially; each plate convex to subcylindrical, nearly equidimensional but because of convexity appearing higher than wide. X_1 (anal *x*) only slightly smaller than

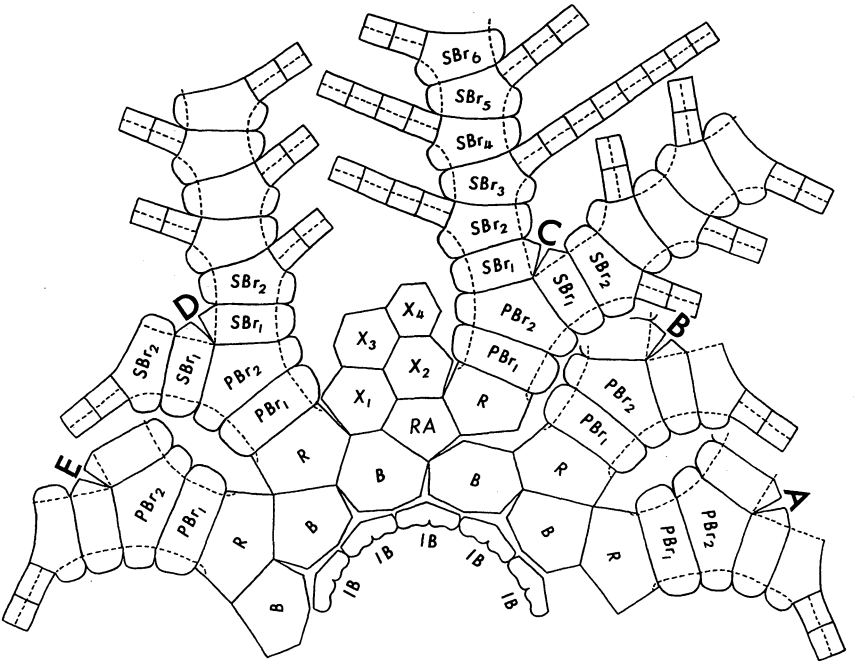

FIG. 1. *Decadocrinus hughwingi,* sp. nov. Labeled diagram of plates of the dorsal cup and arms. Plate symbols in italics, rays in bold roman letters. Arms of C and D rays restored in agreement with the pattern present in other species of the genus; arms present in holotype only as far as SBr_2 and pinnules as far as the second pinnular.

RA, bounded by *R* of *D* ray, *B*, *RA*, X_2, X_3, PBr_1, and possibly by a small accessory anal plate (Pl. I, Fig. 4). All *XX* irregularly striate.

Arms.—Each PBr_1 hemicylindrical with large lateral flanges (Pl. I, Figs. 3–4), only slightly smaller than *R*, longitudinally striate. Each PBr_2 pentagonal, axillary, about the same size and shape as *R* except for large flat lateral flanges like those of PBr_1 (Pl. I, Fig. 4).

SBrBr known only as far as SBr_2 (on C and E rays). Each plate a little narrower than *PBrBr,* provided with flat lateral flanges; irregularly striate. Pinnule on SBr_2 of left half-ray of C ray represented by two large equidimensional pinnulars, with strong dorsal ridge (Pl. I, Fig. 4). No *ISBrBr* (Fig 1).

Anal sac.—Large, strongly constructed but flexible, many times higher than dorsal cup. As preserved, anal sac contorted and twisted, its precise course not established with certainty (Pl. I, Fig. 2). Original form apparently almost a hexagonal prism, tapering very gradually. Anus not seen.

Sac reinforced by a network of ridges oriented in three major directions and passing through centers of the hexagonal sac plates. Each plate with three pairs of ridges radiating from the center to the six sides, each pair forming part of a major ridge on the sac by alignment with ridges of adjacent plates. Sac with twelve longitudinal ridges, six strong ridges along the edges of the prism and six lesser ridges along the sides (Pl. I, Figs. 2, 4). Smaller ridges set at 60 degrees to longitudinal ridges, acting as struts between them.

One of the strong ridges bearing flattened spines at the centers of the sac plates, resembling a row of cockscombs through much of the length. As preserved, the spines along the distal border of the contorted sac much stronger and larger than the other spines (Pl. I, Fig. 2), suggesting that the twisting of the sac occurred when the animal was young.

Diameter of anal sac about 6 mm, the length estimated to be at least 70 mm. No other tegminal plates seen.

Column.—Columnals pentalobate, of three sizes cyclically disposed, apparently in series of small, medium, small, large (Pl. I, Fig. 1). Articulating facets pentagram-shaped, their margins bearing short ridges normal to the border (Pl. I, Figs. 3, 4). Central conduit small.

Remarks.—Decadocrinus hughwingi, sp. nov., is compared with other Middle Devonian crinoids of the genus in Table I. In having ornamented plates in the dorsal cup, it is readily distinguished from the four species from the Cedar Valley Formation, *D. stewartae* from the Silica Formation, *D. wrightae* from the Arkona Shale, and *D. oaktrovensis* from the English Givetian. Other species having ornamented plates are *D. multinodosus, D. nereus,* and *D. ornatus,* all from the Moscow strata of New York. The new crinoid differs from *multinodosus* by the form of its *BB*, which are bulbous but lack central projecting nodes. It differs from *nereus* in having nearly the same kind of ornamentation on *BB* and $PBrBr_1$, greater convexity of *BB*, edges of *IBB* crenulate instead of nearly smooth, and relatively much shorter $PBrBr_2$. *D. hughwingi* has a bowl-shaped dorsal cup, strongly convex *BB,* crenulate edges on *IBB,* and vermiculate ridges on the *BB,* whereas *D. ornatus* has a conical cup, very slightly convex *BB*, and concentric rows of small tubercles on both *IBB* and *BB*.

Another species which shows some resemblance to *Decadocrinus hughwingi* is the Upper Devonian *D. rugistriatus* Goldring 1923, from the Portage Group in New York. In *D. hughwingi* the ornamentation on plates of cup and arms differs very little in degree and the *BB* are larger than the *RR*, but in *D. rugistriatus* the cup plates are smooth to weakly striate, the brachials are strongly striate, and the *BB* are smaller than the *RR*.

TABLE I

COMPARISON OF SOME MIDDLE DEVONIAN SPECIES OF *DECADOCRINUS*

Species and Occurrence	Ornamentation of Cup Plates	Surface of *BB*	Sutures of Cup	Size compared to that of *RR*	
				BB	*PBrBr*$_1$
hughwingi, sp. nov. Silica Fm., Ohio	Vermiculate to striate	Bulbous	Deeply depressed	Larger	About same
crassidactylus Laudon 1936 Cedar Valley Fm., Iowa	Smooth	Nodose	Deeply depressed	Smaller	Slightly smaller
multinodosus Goldring 1923 Moscow (Kashong Fm.), N.Y.	Wrinkled lines or striae	Strong nodes	Depressed	About same	Slightly smaller
nereus (Hall, 1862) Moscow Sh., N.Y.	Granulose to striatogranul.	Gently convex	Slightly depressed	Larger	Smaller
oaktrovensis Webby 1961 Givetian beds, England	Smooth	Convex	Deeply indented	About same	As large
ornatus Goldring 1954 Moscow (Kashong Fm.), N.Y.	Concent. rows of tubercles	Gently convex	Slightly indented	About same	Unknown
pachydactylus Laudon 1936 Cedar Valley Fm., Iowa	Smooth	Convex	Deeply depressed	Smaller	About same
spinulifer Laudon 1936 Cedar Valley Fm., Iowa	Smooth, *RR* also nodose	Nodose	Depressed	Smaller	Smaller
stewartae Kier 1952 Silica Fm., Ohio	Smooth	Gently convex	Depressed	Slightly smaller	About same
vintonensis Thomas 1920 Cedar Valley Fm., Iowa	Smooth	Convex	Depressed	About same	About same
wrightae Goldring 1954 Arkona Sh., Ontario	Smooth	Gently convex	Slightly indented	Smaller	Same

LITERATURE CITED

BATHER, F. A. 1899. A Phylogenetic Classification of the Pelmatozoa. Rept. Brit. Assoc., 1898, pp. 916–23.

EHLERS, G. M., STUMM, E. C., and KESLING, R. V. 1951. Devonian Rocks of Southeastern Michigan and Northwestern Ohio. Prepared for the Stratigraphic Field Trip of the Geological Society of America, Detroit Meeting, November 1951. Ann Arbor, Mich.: Edwards Brothers, Inc. vi + 40 pp., 5 pls., 3 figs., map.

GOLDRING, WINIFRED. 1923. Devonian Crinoids of New York. N.Y. State Mus., Mem. 16, 670 pp., 60 pls.

——— 1954. Devonian Crinoids: New and Old, II. N.Y. State Mus., Circular 37, 51 pp., 6 pls.

HALL, JAMES. 1862. Preliminary Notice of Some of the Species of Crinoidea Known in the Upper Helderberg and Hamilton Groups of New York. N. Y. State Cabinet Nat. Hist., Ann. Rept., Vol. 15, pp. 115–44, Pl. 1.

KIER, P. M. 1952. Echinoderms of the Middle Devonian Silica Formation of Ohio. Contrib. Mus. Paleontol. Univ. Mich., Vol. 10, No. 4, pp. 59–81, 4 pls.

LAUDON, L. R. 1936. Notes on the Devonian Crinoid Fauna of the Cedar Valley Formation of Iowa. Journ. Paleontol., Vol. 10, No. 1, pp. 60–66, 15 figs.

MOORE, R. C., and LAUDON, L. R. 1943. Evolution and Classification of Paleozoic Crinoids. Geol. Soc. Amer., Spec. Papers, No. 46, x + 153 pp., 14 pls., 18 figs.

THOMAS, A. O. 1920. Echinoderms of the Iowa Devonian. Iowa Geol. Survey, Vol. 29, pp. 387–567, Pls. 29–54, Figs. 55–80.

WEBBY, B. D. 1961. A Middle Devonian Inadunate Crinoid from West Somerset, England. Palaeontol., Vol. 4, Pt. 4, pp. 538–41, Pl. 67, 1 text-fig.

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PLATE

EXPLANATION OF PLATE I

(Holotype, UMMP No. 30528; all figures × 3)

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FIG. 1. Stereogram centered on posterior (CD) interray, showing crenulate edges of *IBB,* bulbous *BB,* and plates of anal series.

FIG. 2. Ventrally inclined stereogram on anterior (A) ray, showing contorted anal sac and its ornamentation.

FIG. 3. Dorsal stereogram with CD interray uppermost, showing face of columnal, plates of dorsal cup, and part of anal sac. Distal columnal displaced toward A ray, lying on side of column.

FIG. 4. Dorsally inclined stereogram on posterior (CD) interray, showing base of stout, sharp-edged pinnule on SBr_2 of C ray. X_1 (anal x), X_2, X_3, and X_4 very similar in size and shape.

PLATE I