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LOGOCRINUS BRANDONI, A NEW INADUNATE CRINOID
FROM THE MIDDLE DEVONIAN SILICA SHALE OF OHIO

BY

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LOGOCRINUS BRANDONI, A NEW INADUNATE CRINOID FROM THE MIDDLE DEVONIAN SILICA SHALE OF OHIO

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ABSTRACT—A small dicyclic inadunate crinoid from the Silica Shale of northwestern Ohio is a new species of *Logocrinus*. From a composite of five known specimens, the following characters can be shown: smooth subconical to bell-shaped cup flaring in the RR circllet, containing large IBB and rather short RR; anal sac long and well developed, supported by a strong anal series of plates on the posterior side; arms tapering from high PBrBr₁, more than seven times the height of the cup, branching isotomously at about PBrBr₃, with every other SBr bearing alternating pinnules; and subpentagonal heteromorphic column confluent with cup.

INTRODUCTION

SIMULTANEOUS RECOGNITION of a new species by independent workers happens with surprising frequency. If it were not so, taxonomy would be burdened with fewer homonyms. In the case of this paper, we were fortunate to discover our duplication before publication. As a result we were able to pool our observations and produce a much more thorough description of a new species of *Logocrinus*. Briefly, the story is this.

Donald White found the holotype and with James Sigler wrote a description. Mr. Jack Floyd photographed the specimen, Miss Nancy Baron typed the manuscript, and Professor Richard D. Hoare critically reviewed the work. The paper was mailed to Robert Kesling for publication in the *Contributions*.

Meanwhile, Mr. Larry Magrum had visited the Museum of Paleontology with four specimens of the same crinoid, which he had purchased from Mr. Jeff Aubrey. Three he donated to the Museum and the fourth he wished to keep for his collection. At the very moment when the Sigler & White manuscript was delivered to Kesling, he was discussing the new species with Mrs. Ruth Berner Chilman, Research Associate at the Museum, and one of the specimens was under the microscope in front of him. This was a highly opportune coincidence. Quick inspection revealed that the holotype described by Sigler & White was the largest specimen, but it lacked most of the arms and anal sac; two paratypes at the Museum (both embedded on a small slab of shale) had nearly complete arms but did not show the posterior side of the cup; the third paratype (free of matrix) was smaller than the holotype and no more complete; and the specimen retained by Mr. Magrum pre-

sented the anal sac and the series of plates leading to it.

Now, the new crinoid could be described in its entirety, and part of its ontogeny was available for analysis. Kesling and Sigler revised the paper, preparing a new plate analysis and adding sections on the arms and anal sac. To get uniform figures in the plates, Mr. Karoly Kutasi photographed all the types. Mrs. Helen Mysyk typed the new manuscript, and Mrs. Gladys Newton supervised galley and page proof. This paper is our cooperative effort.

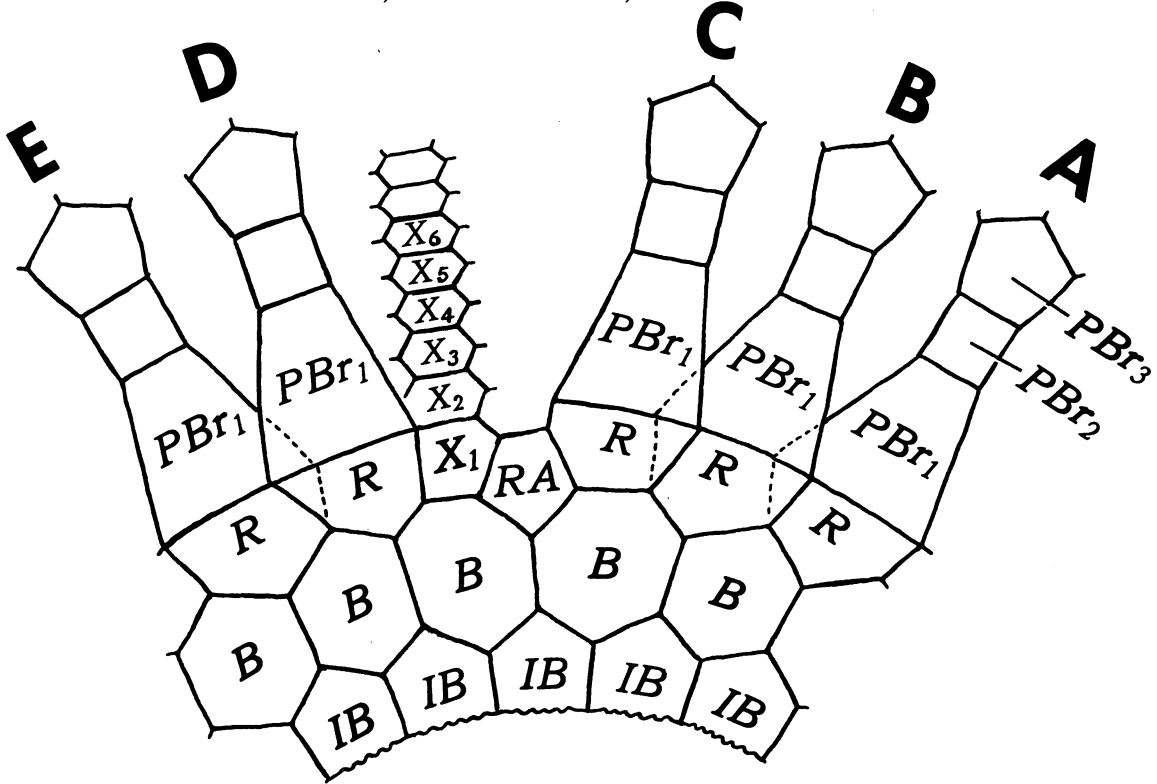
LOCALITY

North Quarry of Medusa Portland Cement Company (recently abandoned), just north of Brint Road and west of Centennial Road, about three miles west-southwest of Sylvania, Lucas County, Ohio, about two miles south of the Ohio-Michigan border. Middle Devonian Silica Shale; from the lithology of the matrix in which two paratypes are embedded, it would appear that they, and possibly the other specimens, came from unit 11 (Ehlers, Stumm, & Kesling, 1951).

SYSTEMATIC DESCRIPTION

Subclass INADUNATA
Order CLADOIDEA Moore & Laudon
Suborder DENDROCRINOIDEA Bather
Family SCYTALOCRINIDAE Bather
Genus LOGOCRINUS Goldring

The new species is the fourth to be definitely assigned to *Logocrinus*. Goldring created the genus (1923, p. 437) for crinoids with a calyx like *Scytalocrinus* but with pinnules from every pair of BrBr "alternately on each side"; she also indicated a round column for the genus but pointed out (1923, p. 439) in her type



TEXT-FIG. 1.—*Logocrinus brandoni* n. sp. Diagram of cup plates and PBrBr. In diagram, flared RR and attached PBrBr₁ are overlapped so that they fit against BB plates of the cup.

species that the column is "slightly pentagonal just at the base of the calyx, but quickly becomes round."

The type species, *L. geniculatus*, features a bell-shaped cup with IBB wider at the top than at the base and over half the height of BB and with flared RR. *L. injundibuliformis*, also described by Goldring (1923, p. 440), has a funnel-shaped cup. *L. conicus* Kesling (1968, p. 164) has a cup shaped like the frustrum of a narrow cone, absolutely confluent with the tapering column. Of these species, our new one most closely resembles *L. geniculatus*, differing primarily in the tapering base of the cup and in proportions of plates.

LOGOCRINUS BRANDONI n. sp.

Text-figs. 1, 2; pl. 1, figs. 1-6; pl. 2, figs. 1-6

Cup.—Cup dicyclic, subconical to bell-

shaped, flaring in the RR circlet. Cup at top of RR circlet with diameter less than its height, tapering to less than one-third this diameter at the base of IBB (pl. 1, figs. 1-4, 6; pl. 2, figs. 2-4, 6). Plates unornamented, sutures only slightly depressed, outline smoothly curved. Three anal plates incorporated in cup (RA, X₁, RX₁) with no noticeable bulge (pl. 1, fig. 1). Cup confluent with subpentagonal tapering column (pl. 1, figs. 1-4, 6; pl. 2, fig. 6).

IBB relatively large; the circlet of plates having a rounded subpentagonal junction with the column (pl. 1, fig. 5; pl. 2, fig. 5). Each IB pentagonal, with slightly divergent sides and an extremely broad apex to adjacent BB; somewhat higher than wide.

BB heptagonal in BC (pl. 1, fig. 1; pl. 2, fig. 4) and CD (pl. 1, fig. 4; pl. 2, fig. 2) interrays; other BB hexagonal. BB about one-third

EXPLANATION OF PLATE 1

Specimens lightly coated with ammonium chloride; all figures $\times 8$

FIGS. 1-6—*Logocrinus brandoni* n. sp. 1-5, holotype UMMP 57883; 1-4, lateral views centered on BC interray, A ray, DE interray, and CD (posterior) interray respectively; 5, basal (dorsal) view. 6, paratype UMMP 57885b, crown and part of attached column embedded on slab with A ray (anterior) uppermost.

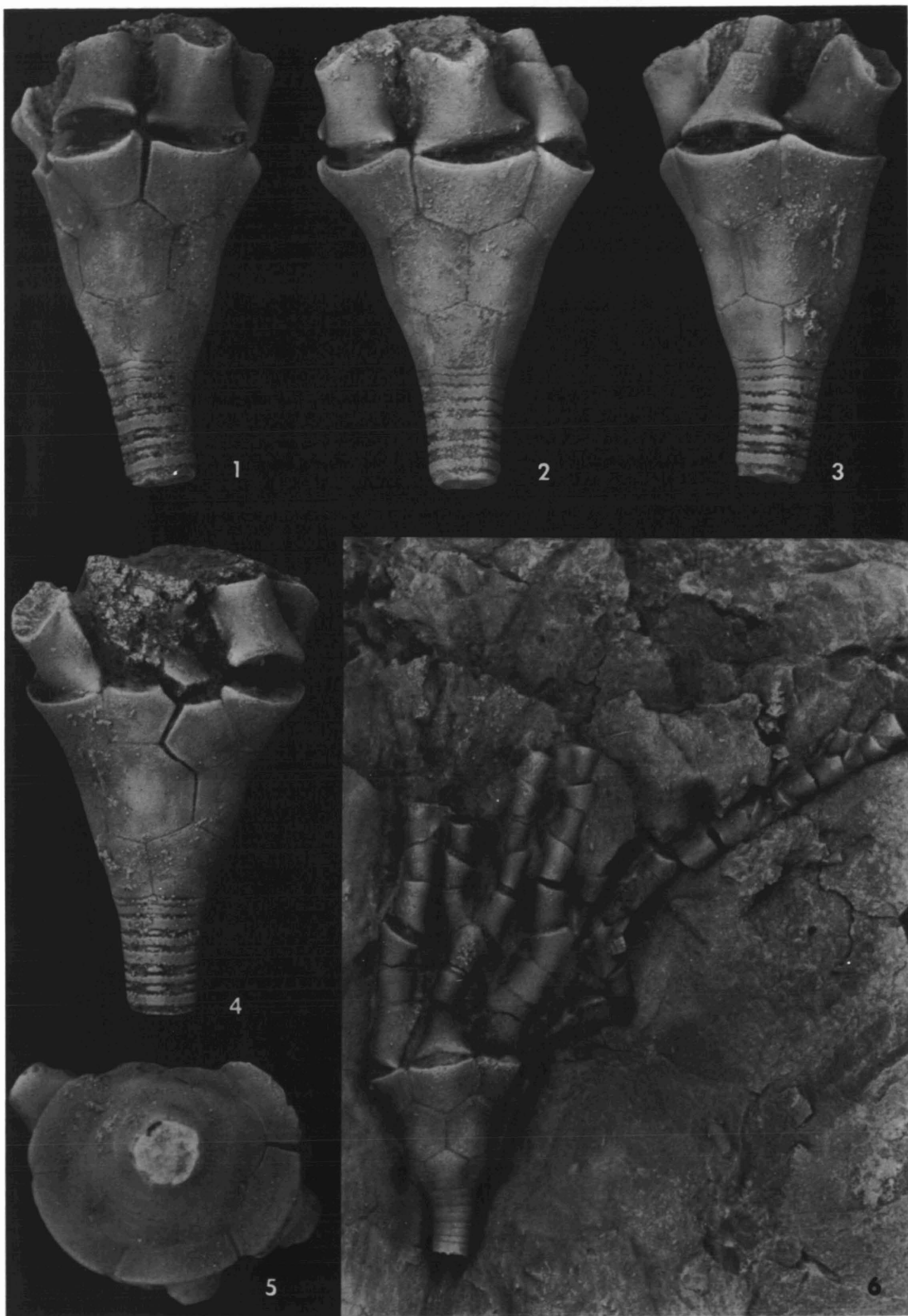


PLATE 1

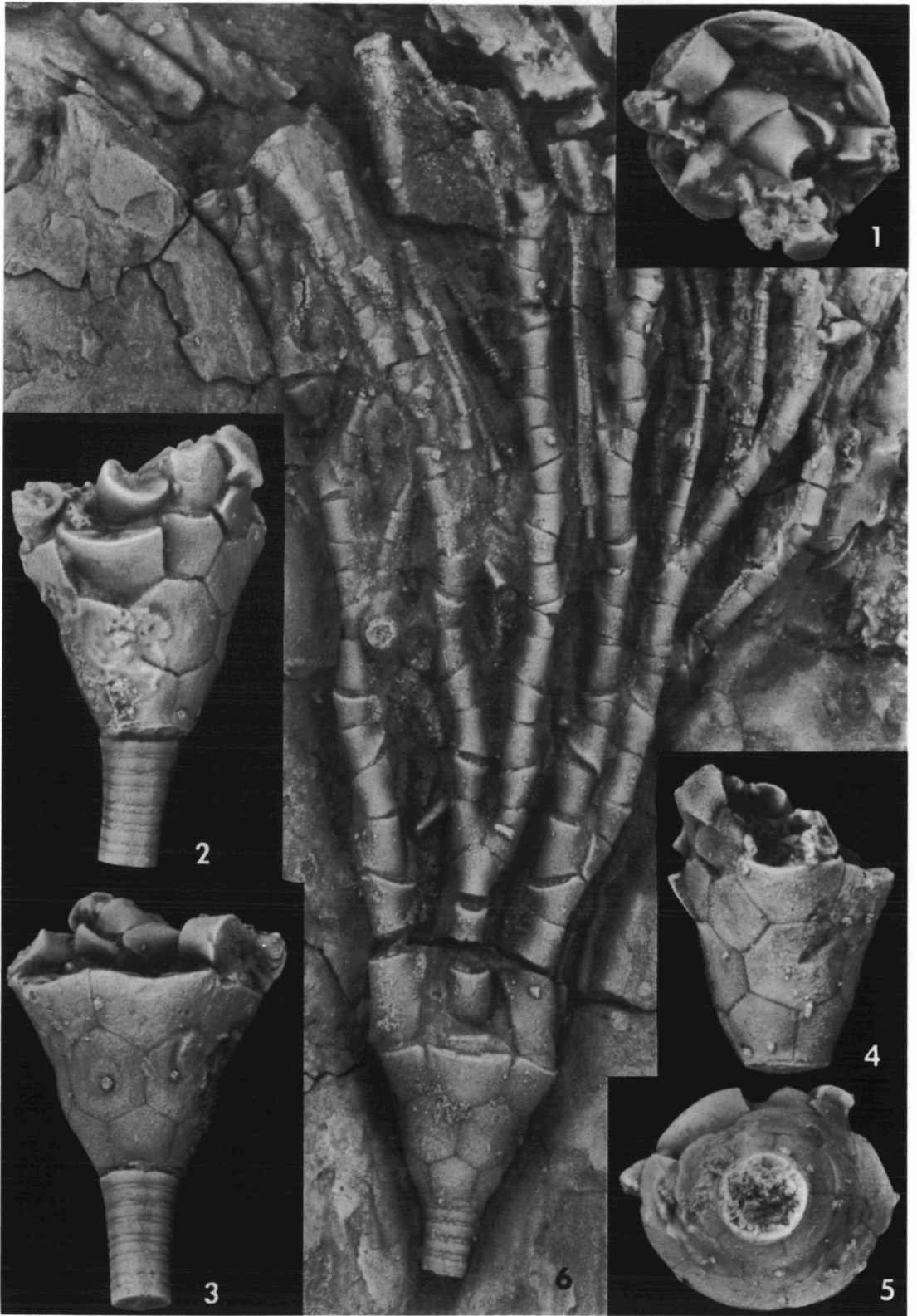
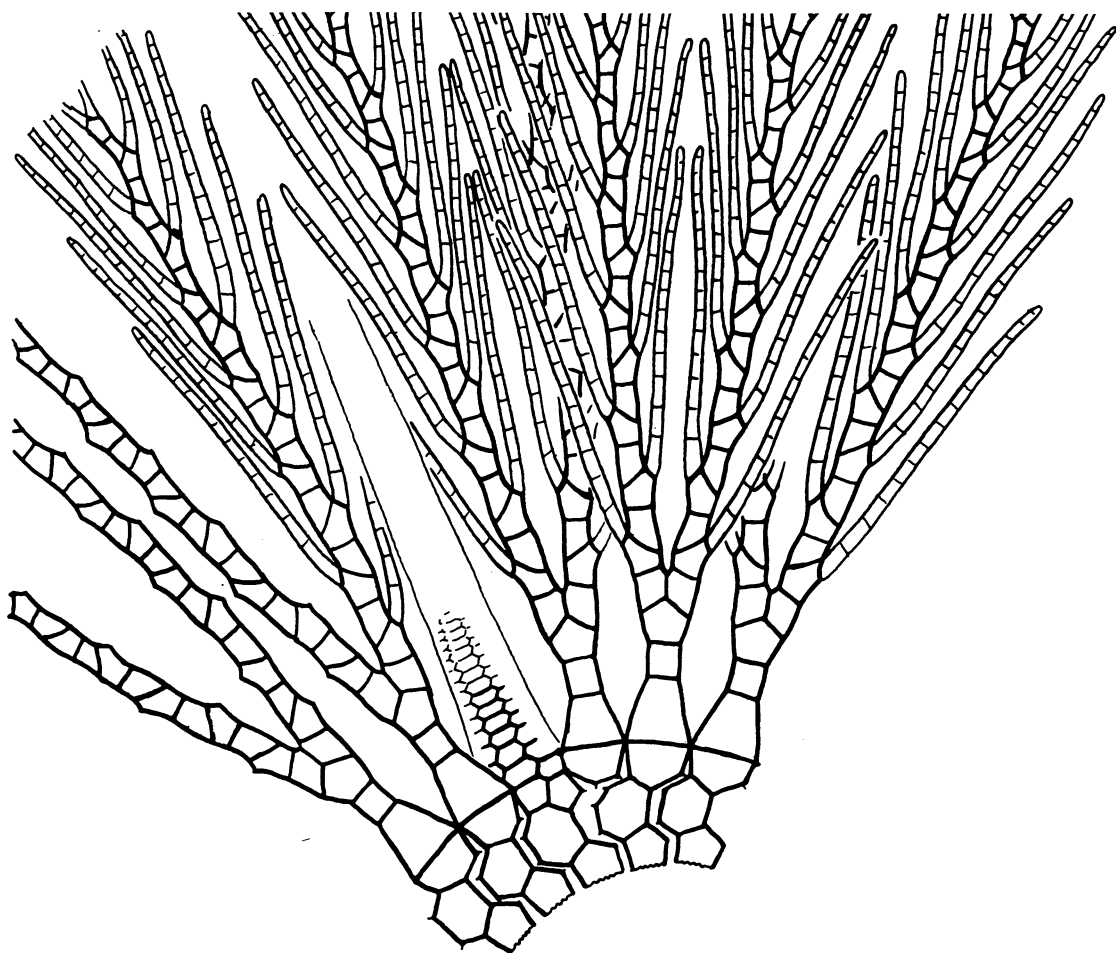


PLATE 2



TEXT-FIG. 2—*Logocrinus brandoni* n. sp. Diagram of crown. Anal sac extends at least to ends of arms. Based on paratypes UMMP 57885a and 57885b.

larger in each dimension than IBB, each higher than wide. Each B-B junction nearly vertical in direct lateral view of cup, the five junctions only slightly divergent in three dimensions.

RR circlet interrupted by RA, X_1 , and RX_1 (pl. 1, fig. 4; pl. 2, fig. 2). RR pentagonal, shorter than BB and distinctly wider, producing a flare at the top of the cup. RR of C and D rays smaller than others. RR facets extremely large, extending nearly total width of plates (pl. 2, fig. 1).

RA pentagonal, about two-thirds the size of an average R, bordered by R of C ray, BB of BC and CD interrays, X_1 , and RX_1 . Anal series well developed, with stout plates grading upward on posterior side of anal sac. X_1 smaller than RA, pentagonal, having horizontal base and top, vertical suture with R of D ray, and moderately broad angular insertion between RA and RX_1 ; top of X_1 about level with top of RR circlet (pl. 1, fig. 4). RX_1 slightly smaller than X_1 , hexagonal, its upper edge above RR

EXPLANATION OF PLATE 2

Specimens lightly coated with ammonium chloride; all figures $\times 10$

FIGS. 1-6—*Logocrinus brandoni* n. sp. 1-5, paratype UMMP 57884; 1, top (ventral) view showing wide articular surfaces of RR; 2-4, lateral views centered on D ray, A ray, and C ray, with all but proximal columnal removed in the last; 5, basal (dorsal) view of cup with only proximal columnal retained. 6, paratype UMMP 57885a, crown with part of attached column embedded on slab with A ray (anterior) uppermost; anal sac (at top of crown) pyritized to obliterate plate boundaries.

circlet (pl. 2, fig. 2). X_2 through at least X_6 gradually diminishing in size but still larger than bordering RXX and LXX (text-fig. 1). Other plates of anal sac regularly hexagonal but not reinforced by radial ridges. Anal sac elongate, extending beyond limits of arms, perhaps eight times the height of the cup.

Arms.—Arms more than seven times the height of the cup. Each arm branching isomorphously on an axillary PBr, giving rise to two long equal uniramous branches of SBrBr. Combined PBrBr in each ray nearly $1\frac{1}{3}$ times the height of the cup. PBr_1 large, subtrapezoidal, at least as high as wide, tapering upward from its extremely wide articulation with R. One arm (pl. 2, fig. 6, left) noted without intervening plate between PBr_1 and the axillary PBr; all other arms with quadrate (nearly square) PBr_2 about two-thirds the width of PBr_1 , possibly narrower. PBr_3 axillary, subpentagonal, its sides flared upward, relatively short, its height nearly equal to its maximum width, its distal end obtusely acuminate at junction with paired SBrBr₁. All BrBr with outer surface strongly curved around sides, hence U-shaped in cross section.

SBrBr₁ with large articulating surfaces with underlying PBr_3 and with adjoining SBr₁ of the ray, the latter extending nearly to distal end of plate. Ten uniramous branches in the crown (two per ray), long, tapering very gradually. SBrBr in series of synarthrial pairs. In each branch, every other SBr bearing a stout pinnule; pinnules alternating on inner (adradial) and outer (abradial) sides of ray. Each branch a mirror image of the other branch in the ray; SBr₂ bearing outer pinnule, SBr₄ bearing inner pinnule, SBr₆ outer, SBr₈ inner, etc.; SBr₃, SBr₅, SBr₇, etc. without pinnules. About 30 SBrBr in each branch; hence, about 8 outer pinnules and 7 inner pinnules per branch, and about 150 pinnules in the entire crown. Distal ends of non-pinnulate SBrBr with straight sutures; distal ends of pinnule-bearing SBrBr forming zigzag pattern, each suture sloping upward toward the side with attached pinnule (pl. 2, fig. 6).

Pinnules tapering, each containing about 14 segments, the first segment about as long as the adjoining SBr, the remainder gradually diminishing in length. Tips very thin. Sides of pinnules broad, forming walls of deep ambulacral grooves.

Column.—Tapering down from cup, its total length unknown but impression of column in two specimens extending for distance more than five times the height of the cup. No constriction or demarcation of any kind at junction with cup. Sutures between column and cup and between columnals strongly crenulate (pl. 1, figs. 2–4). Column heteromorphic, longer subpentagonal columnals alternating with shorter subpentastellate columnals. Apices of both kinds of columnals rounded, each apex aligned with an IB-IB suture in the cup. To judge from impressions of columns, distal sections may become nearly round.

Remarks.—The new species differs from *Logocrinus geniculatus* in lacking any bulge at the base of the cup. It is more readily distinguished from *L. infundibuliformis* Goldring and *L. conicus* Kesling in having flared RR. The species is named in honor of P. Brandon Sigler, whose understanding help and unselfish cooperation in years past allowed interests in paleontology to be maintained.

Types.—Holotype UMMP 57883, a large (presumably mature) cup with attached proximal part of column, $PBrBr_1$, one PBr_2 , and anal series only to RX_1 (pl. 1, figs. 1–5). Paratype UMMP 57884, smaller than holotype but about as much preserved, except that $PBrBr$ are dislodged (pl. 2, figs. 1–5). Paratypes UMMP 57885a and 57885b, two immature specimens on one slab, both retaining much of the arms and the proximal part of the column (with impression of more of the column), both with anterior side of cup exposed (pl. 1, fig. 6; pl. 2, fig. 6).

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