

north line, Sec. 20, T19N., R20E., northeastern Oklahoma.

*Holotype*.—To be deposited in the U. S. National Museum.

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BARTLESVILLE, OKLAHOMA

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## HYBOCRINUS CRINERENSIS, NEW SPECIES FROM THE ORDOVICIAN OF OKLAHOMA

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ABSTRACT. *Hybocrinus crinerensis*, new species from the Bromide formation of the Criner Hills near Ardmore, Oklahoma, provides some additional information and increased geologic and geographic range for this unique genus.

TWO magnificent specimens from the collection of Wm. T. Watkins of San Antonio, Texas, are presented as *Hybocrinus crinerensis*, new species. They were collected several years ago by Watkins at Rock Crossing, Criner Hills, southwest of Ardmore, Oklahoma, from the Bromide forma-

tion (Ordovician), and consist of a splendid dorsal cup with tegmental structure in excellent preservation, and a larger cup with arms attached which is the holotype.

### HYBOCRINUS CRINERENSIS, new species

Plate 1, Figs. 4-8

Dorsal cup conical shaped, ratio of height to maximum breadth about 2:2.2. BB are large, spread rapidly from the small stem impression. RR are large elongate elements with the exception of r. post. R which is small and rests on the right shoulder of the large RA. Articular facets are small, constricted, and are devoid of articular ridges and grooves. Anal X is small, not elevated, and rests against the l. post. R, with support to the right by the left shoulder of RA and lateral side of r. post. R. There is an opening behind the anal X bounded by the posterior oral. No evidence of minute covering plates for the anal aperture has been found in either specimen, however, they might not be preserved.

There are five orals, the larger being posterior in position and attaining a greater height than approached by the others. A pronounced madreporite is present on post. O. Ambulacral grooves rest on the surface of the tegmen and converge to the center. Small covering plates are present but are mostly disturbed from their normal positions.

The five rami appear weak but seem to have attained considerable length. They are composed of rounded elements with sutures impressed. No pinnular structure has been observed.

Stem cicatrix is round, devoid of crenulations, and is pierced by a small pentalobate canal.

All plates are strongly porous, including the orals and rami.

#### *Measurements.*—

|   | Holotype | Paratype |
|---|----------|----------|
| Maximum height of dorsal cup . . . . .                              | 13.0 mm. | 9.6 mm.  |
| Maximum width of dorsal cup . . . . .                               | 12.2 mm. | 8.9 mm.  |
| Length of r. ant. B . . . . .                                       | 11.9 mm. | 4.2 mm.  |
| Width of r. ant. B . . . . .  | 4.8 mm.  | 3.5 mm.  |
| Length of suture between BB . . . . .                               | 4.5 mm.  | 2.9 mm.  |
| Length of ant. R (to proximal edge of<br>articular facet) . . . . . | 5.5 mm.  | 5.0 mm.  |
| Width of ant. R . . . . .   | 5.8 mm.  | 5.5 mm.  |

*Measurements.*—continued

|                                    | Holotype | Paratype |
|------------------------------------|----------|----------|
| Length of anal X .....             | 3.6 mm.  | 2.0 mm.  |
| Length of RA .....                 | 6.0 mm.  | 4.6 mm.  |
| Width of RA .....                  | 7.4 mm.  | 6.1 mm.  |
| Diameter of stem impression .....  | 2.4 mm.  | 1.3 mm.  |
| Width of arm articular facet ..... | 2.6 mm.  | 2.0 mm.  |
| Length of arms (Maximum preserved) | 16.3 mm. | —        |

*Remarks.*—*H. crinerensis* is close to the genotype species. *H. conicus* Billings, differing mainly in the following respects: more obliquely placed anal X; a broader, fuller dorsal cup; lower placement of anal opening; less protrusion of r. post. R. The right posterior portion of *H. conicus* is very distended, causing an asymmetrical appearance to the cup, particularly when viewed from the summit. Although the r. post. R of *H. crinerensis* has a high position in the cup, and there is a mild protrusion, no decided appearance of irregularity is attained.

A peculiar twist to the dorsal cup in the basal area is of conjectural value. When the cup is viewed from the posterior side, the basal elements twist from left to right and slightly forward. This same development is found in *H. conicus* and indicates a directional leaning. Possibly the lack of pinnular appendages forced the forms to adopt a permanent leaning attitude into the current to augment their food gathering powers. The writer has noticed this slight basal twist in a later (Pennsylvanian) non-pinnular form, *Allagecrinus*, wherein the column is normally curved in the proximal region and sporadic arm development is prevalent.

*Occurrence and horizon.*—Bromide formation, Ordovician; Rock Crossing, Criner Hills, southwest of Ardmore, Oklahoma.

*Types.*—To be deposited in the U. S. National Museum.

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