

**BULLETIN NO.6. OF THE ILLINOIS
STATE MUSEUM OF NATURAL
HISTORY. DESCRIPTION OF NEW
SPECIES OF PALÆOZOIC
ECHINODERMATA**

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DESCRIPTION OF NEW SPECIES OF PALÆOZOIC
ECHINODERMATA.

BY S. A. MILLER AND WM. F. E. GURLEY.

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DESCRIPTION OF NEW SPECIES OF PALÆOZOIC
ECHINODERMATA.

BY S. A. MILLER AND WM. F. E. GURLEY.

SUBKINGDOM ECHINODERMATA.

CLASS CRINOIDEA.

ORDER PALÆOCRINOIDEA

FAMILY ACTINOCRINIDÆ.

BATOCRINUS SPINOSUS, n. sp.

Plate I, Fig. 1, azygous side; Fig. 2, opposite view; Fig. 3, basal view of the same specimen, azygous side down.

This species is above medium size. The calyx is short, three times as wide as high, subpentagonal in outline. The vault is high and inflated. All the plates of the body are produced in wedge-shaped, irregular spines, part of which are broken off our specimen.

Basals short and forming a low, saucer-shaped cup, with a moderately concave depression below, for the attachment of the column. First primary radials twice as wide as long, and each bearing a transverse, wedge-shaped spine, directed downward, that extends lower than the facet for the columnar attachment. Second primary radials short, about three times as wide as long, quadrangular. Third primary radials, wider than long, pentagonal, axillary, and in four rays there is a single secondary radial upon one superior sloping side which is axillary and bears upon each upper side three tertiary radials, and upon the other superior side there are three secondary radials, which arrangement gives to each of the four rays three arms. In the ray opposite the azygous area, the third primary radial bears upon each upper side three secondary radials and consequently has only two arms. There are, there-

fore, fourteen arms, in this species, and fourteen ambulacral openings to the vault.

The regular interradial areas are not exactly alike. In two of them there is a single plate and in the other two areas a small plate follows the first one. In the azygous area, the first plate is in line with the first radials and it is followed by three plates of nearly equal size, giving to this area a subquadrate outline.

The vault is enormously developed, most tumid opposite the azygous area and covered with large, polygonal, unequal, and remarkably heavy spinous plates. The proboscis is large, subcentral and slightly curved back from the azygous side. There are two pores that penetrate the vault between each of the arms or twenty-eight of these passages in the species.

This species is distinguished by the development of each radial series at the periphery of the calyx which gives to the calyx its subpentagonal outline; by the great development of the vault; by the robust spinous plates and fourteen arms. It has some resemblance to *Eretmocrinus prægravis*, which is a twelve armed species and has more plates in the azygous and regular areas. It may be said to be constructed upon a similar plan, though not to be mistaken for that species. We think that *Eretmocrinus prægravis* should be referred to *Batocrinus*, and possibly the genus *Eretmocrinus* abandoned, at least, the large proboscis, no matter how much it may be curved, will not alone distinguish *Eretmocrinus*.

Found by Prof. A. G. Wetherby, in the Keokuk Group, on Little Barren River, Kentucky, and now in the collection of Wm. E. E. Gurley.

BATOCRINUS CURIOSUS, n. sp.

Plate I, Fig. 4, azygous side; Fig. 5, opposite view; Fig. 6, basal view.

Species large, vault exceeding the calyx in dimension. Calyx more than twice as wide as high, truncated below, regularly expanding to the first tertiary radials, and then spreading nearly horizontally to the free arms. Ambulacral openings directed horizontally. Each primary, secondary, tertiary and quaternary radial series consists of a sharp ridge that slopes laterally to the sutures, the sharp angularity increases from the first primary to the last quaternary plate, each plate also bears a sharp central node or tubercle. All other plates of the calyx are tumid and each bears a central node. Surface granular. Column large and contains a large canal.

Basals very short, wide, truncated below, lateral sutures deep, superior face of each concave, truncated face about twice the diameter of the column, the facet for which is only moderately concave and radiately furrowed. First primary radials of unequal size, from two to four times as wide as long, superior face concave, three hexagonal, two heptagonal, and each bears three nodes, one central from which the angular radial ridge arises, and one on each prolonged lateral side. Second primary radials of unequal size, from one and a half to two and a half times as wide as long, quadrangular. Third primary radials about one half larger than the second, pentagonal, axillary and support on each upper sloping side, two secondary radials. The secondary radials are as large as the second and third primaries. The second secondary radials are axillary, and, in three rays, bear upon one of the superior sloping sides two tertiary radials, the second one of which is axillary and bears upon each superior sloping side three quaternary radials, and upon the other side of the second secondary radials, which are the proximal sides, four tertiary radials, which arrangement gives to each of the three rays six arms. In the ray opposite the azygous area and in one of the lateral rays each second secondary radial is axillary and bears upon each upper sloping side four tertiary radials, and consequently these rays have four arms. There are, therefore, twenty-six arms in this species and twenty-six ambulacral openings to the vault. There are no intersecondary or intertertiary plates.

In two of the regular interradial areas there is one large plate followed by a small one, and in the other two areas there is a large plate followed by two small ones. These plates are tumid and each bears a central node. The azygous area is somewhat trapezoidal in outline and contains seven plates. The first one is in line with the first primary radials, but is much larger than either of them and bears a large transverse wedge-shaped spine. It is followed by three tumid, nodose plates in the second range, and these, in turn, by two plates, one of which is quite small, and above the larger plate, in the third range, there is a small plate in the fourth range, which is immediately below the angle formed by the union of the first quaternary plates.

Vault high, broadly rounded, most tumid opposite the azygous side and covered with polygonal, nodose plates. The larger plates bear two, three or more nodes, but the smaller ones bear a single central node. The proboscis is subcentral on the azygous side. There are narrow, elongated plates at the base of the vault, between the plates covering the ambulacral furrows, except between

the furrows belonging to the quaternary series of radials, and at the inferior angles of these elongated plates there are pores penetrating the vault, making, in all, forty of these so-called ovarian orifices.

This species is distinguished by its general form, sharp radial ridges, tumid and nodose plates, and twenty-six arms. It is not necessary to make any special comparison with any heretofore described.

Found by Prof. A. G. Wetherby in the Keokuk Group, in Allen County, Kentucky, and now in the collection of Wm. F. E. Gurley.

BATOBRINUS CASULA, n. sp.

Plate I, Fig. 7, azygous view; Fig. 8, side view of the same specimen, part being broken away opposite the azygous side

Species large, calyx and vault subequal in size. Calyx one-half wider than high, bowl-shaped, most rapidly expanding above the secondary radials, and ambulacral openings directed nearly horizontally. Radial ridges angular and in the tertiary and quaternary series embracing the entire plates to the lateral sutures, and each plate bears a central node. All the plates of the calyx are tumid and each bears one or more nodes. Surface granular. Column large.

Basals short, twice as wide as high, bear a tubercle at each side, and form a low hexagonal disc, one-half wider than the column, each superior face concave and lateral sutures deep. First primary radials of unequal size, from one-half wider to twice as wide as long, superior face transverse or slightly concave, three hexagonal, two heptagonal and each bears a central node, and the larger ones have small lateral nodes. Second primary radials comparatively small, quadrangular, and about one-half wider than high. Third primary radials about one-half larger than the second, pentagonal, axillary, and support on each upper sloping side two secondary radials, and in one of the rays in our specimen there are three secondary radials. The secondary radials are larger than the second and third primaries, and the last one is axillary in all the rays. Above this some of the rays are injured in our specimen. The lateral ray shown in figure 8 has four tertiary radials upon each upper sloping side of the last secondaries which gives to this ray four arms. The ray shown on the right of the azygous area in figure 7 has four tertiary radials on each of the upper proximal sides of the second secondaries, and two tertiary radials on each of the upper distal sides, the last of which is axillary and supports upon each upper side three quaternary radials,