

## PAGECRINUS, A NEW CRINOID GENUS FROM THE AMERICAN DEVONIAN

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Among the unworked and unstudied material of the Springer collection in the United States National Museum a tray of erinoids was found representing a new and interesting genus. The material was apparently acquired by purchase, but from what collection it came can not be determined. The original locality label bears the legend "Niagara group, St. Paul, Ind." A label in Mr. Springer's handwriting gives the horizon as "Onondaga Gr." and the locality as "Near St. Paul, Ind." This change in horizon was probably based on information acquired subsequent to the purchase while Mr. Springer was making an intensive study of the Silurian erinoids. The Onondaga age of the material is further assured through the determination of a number of well-preserved Bryozoa associated with the erinoids by Dr. R. S. Bassler.

### PAGECRINUS, new genus

The genus is represented by a single known species, *Pagecrinus gracilis*, new species, and of necessity the generic diagnosis is drawn up from information furnished by this form.

*Pagecrinus* is a dicyelic inadunate erinoid, the affinities of which seem closest with the family group Botryocrinidae as defined by Bather. The relatively huge basals, the structure of the posterior interradius and ventral sac, and the arm structure are strikingly like the Carboniferous genus *Belemnocrinus*. *Belemnocrinus* is generally considered a monocyclic genus, but it may eventually prove a pseudo-monocyclic form derived from just such a Devonian ancestor as *Pagecrinus* by the apparent elimination of the infrabasals.

The genus will probably be found to comprise only species of small size. The dorsal cup is high, subcylindrical in form, and of small diameter. The infrabasals are relatively large. The basals in proportion to the dimensions of the cup are very large. The radials are very small. In the type species the arms bifurcate typically on

the fourth primibrach, though one arm of each of two specimens has the bifurcation on the third primibrach. The two rami thus formed are of equal size and remain simple. Long, stout ramuli are borne by the rami on alternate sides on each second brachial. The food-grooves of the arms are covered by two rows of small interlocking ambulacrals. In the posterior interradius there is one anal plate in the cup. This is plate X, which is of approximately the same size and proportions as the adjacent radials. The ventral sac is relatively heavy and round in cross section. In its basal portion on the posterior side there is a median line of heavy plates, four or five in number, scarcely to be distinguished from brachials except for the fact that they are somewhat narrower. It is only by careful cleaning and examination that X with its sequence of heavy median tube plates can be distinguished from a radial and its series of primibrachs. The surest test in these small specimens is the relation of plate X to the basals. The radials, of course, alternate with the basals, while X rests squarely on the upper truncated face of the posterior basal. The column is round and tapers slightly for a short distance distad. It then maintains a uniform diameter so far as seen. The column is composed of alternating thick and thin columnals, with a tendency toward a grouping into nodals and internodals.

*Genotype*.—The genotype is *Pagecrinus gracilis*, new species, the only known species referable to the genus.

*Horizon*.—The type species is from the Middle Devonian of Indiana.

PAGECRINUS GRACILIS, new species

Of this form four reasonably complete crowns in an excellent state of preservation, two less perfect crowns, and several fragmentary specimens showing details of arm-structure are available for study.

The species is a small one, one of the largest crowns giving a height over all of but 20 millimeters. In this specimen the dorsal cup is 5.5 millimeters in height. Further measurements of this specimen are as follows:

	mm.
Diameter of dorsal cup at base of arms.....	2.3
Diameter at base of dorsal cup.....	1.6
Height of IBB.....	1.9
Width of IBB.....	1.1
Height of BB.....	2.7
Width of BB.....	1.3
Height of RR.....	1.2
Width of RR.....	1.1
Height of anal X.....	1.1
Width of anal X.....	.9

As shown by measurements, the dorsal cup is slender and tapers slightly from the upper margin to the base.

The infrabasals are pentagonal in outline and are relatively large. The basals are very large in proportion to the size of the cup and the other constituent plates. All are hexagonal in outline except the posterior, which is heptagonal. In the case of the posterior basal the normal acute angle above is truncated to act as a base of support for plate  $\times$ . The radials are pentagonal in outline and are relatively very small in size. The radial facet extends the full width of the radial and shows at the surface as a straight horizontal line. Anal  $\times$  is of about the same height as the radials and somewhat narrower. It is quadrangular in outline. In one specimen there appears to be a low plate equal in width to  $\times$  and lying between  $\times$  and the posterior basal. This plate may not have an existence in fact but be due to a very regular horizontal fracture of  $\times$ . There are no signs of it in any other specimen where the posterior interradius is shown.

The arms bifurcate regularly on the fourth primibrach, giving rise to two equal rami, which in turn bear ramuli. In the right anterior ray of one specimen the arm branches on the third primibrach, and in another specimen the third primibrach is axillary in the right posterior ray. This seems to be a sporadic variation, not having been seen in any other specimens examined. The ramuli are long and stout and are borne on alternate sides on each second secundibrach. The ventral groove of the arm is covered by two rows of small slightly overlapping and interlocking ambulacrals. They average about three in number to each side of an arm ossicle.

The ventral sac is of about the length of the arms and in its distal portion is stout and circular in section. In its proximal portion on the dorsal side is a median row of heavy plates, scarcely to be distinguished from arm ossicles, except that they are somewhat narrower and shorter. Above, the tube is made up of five or six vertical rows of fairly large plates. In one specimen the ventral sac apparently curves outward between the arms and extends some 7 millimeters beyond the crown. Whether this is normal can not be told. This specimen was lifted from the rock in an effort to determine its structure, but without success. In another specimen which has its posterior interradius exposed the ventral sac can be traced for a distance of 9 millimeters. It then apparently plunges downward into the rock as if assuming a horizontal attitude. It seems probable that the ventral sac does normally have this flexed form and assumes a horizontal attitude at about one-half its height.

*Horizon and locality.*—All of the known specimens come from the Jeffersonville limestone (of Middle Devonian—Onondaga age) near St. Paul, Ind.

*Types.*—The types are in the Springer collection in the United States National Museum.

## EXPLANATION OF PLATE

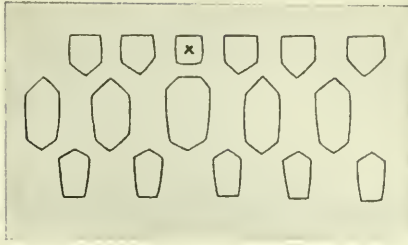
*Pagecrinus gracilis*, new genus and species

- FIG. 1. Large specimen  $\times 2$ , view from the left posterior radius, showing the striking similarity of the basal portion of the ventral sac and the arms.
2. Specimen  $\times 2$  showing proximal portion of the column and three primibrachs in the right anterolateral radius.
3. Specimen  $\times 2$  as seen from the posterior interradius showing basal portion of ventral sac and three primibrachs in the right posterior radius.
4. Specimen  $\times 2$  showing ventral sac curving outward and extending for some distance horizontally beyond the arms.
- 5-6. Details of arm fragments  $\times 3$ , showing ramules.
7. Generic diagram of cup-plates  $\times 4$ .





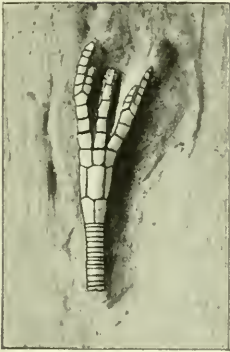
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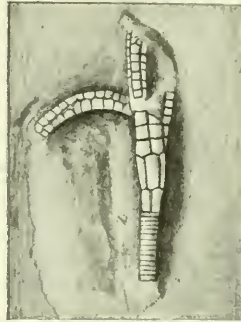
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6



3



4



1



2

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FOR EXPLANATION OF PLATE SEE PAGE 4