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TWO NEW CRINOIDS FROM THE
DEVONIAN OF MICHIGAN

BY
G. M. EHLERS



UNIVERSITY OF MICHIGAN
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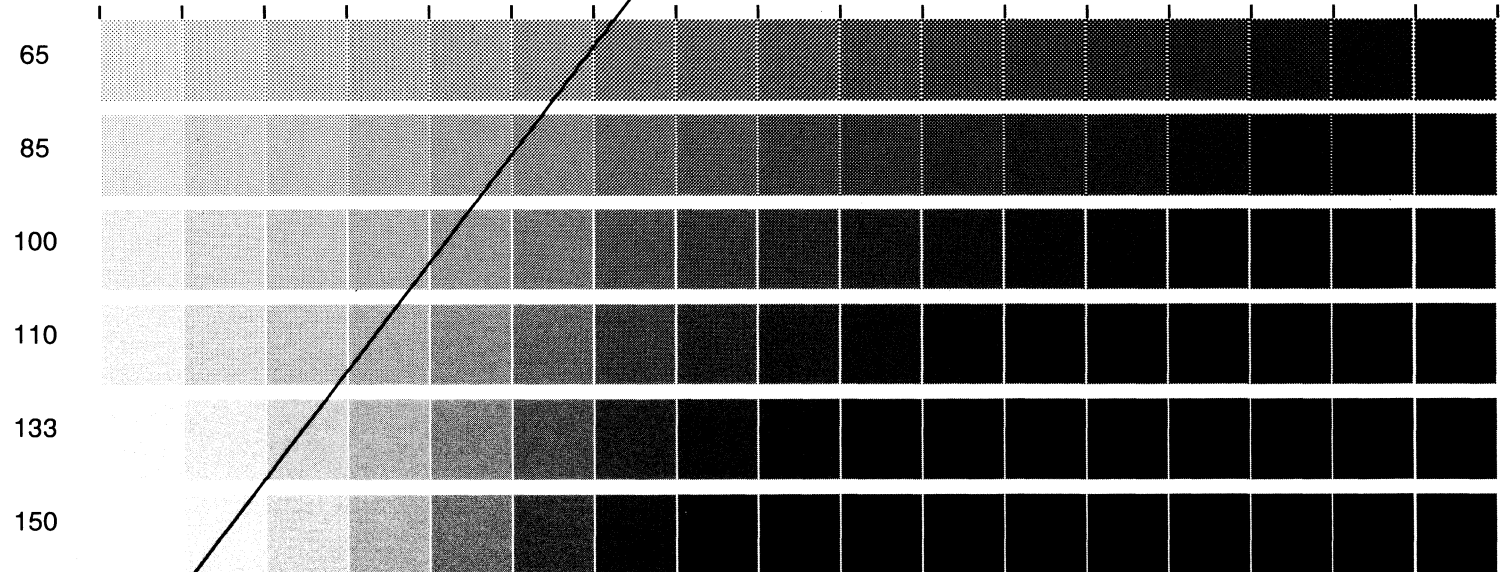
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CONTRIBUTIONS FROM THE MUSEUM OF GEOLOGY

UNIVERSITY OF MICHIGAN

Editor: EUGENE S. McCARTNEY

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TWO NEW CRINOIDS FROM THE DEVONIAN OF MICHIGAN

G. M. EHLERS

INTRODUCTION

THE two crinoids serving as the types of the new species described in this paper are a part of a large and excellent collection of fossils obtained by Mr. H. H. Hindshaw from the Devonian rocks of the region about Alpena, Michigan, and presented by him to the Museum of Geology of the University of Michigan.

The new crinoids belong to genera whose occurrence in the Devonian strata of this State has heretofore been unreported. It is of interest to note that these genera, *Gilbertocrinus* and *Gennaecocrinus*, are represented by species in the rocks of Hamilton age in southern Indiana, the region about Louisville, Kentucky, New York and southwestern Ontario, but seem to be unrepresented in the Devonian rocks of Iowa, which have several species of other crinoid genera in common with strata of similar age in Michigan.¹

Dr. Winifred Goldring of the New York State Museum kindly examined the crinoids, transmitting to the writer her opinion of their relationship to other species. For this aid the writer wishes to acknowledge his indebtedness.

DESCRIPTION AND OCCURRENCE OF CRINOIDS

Gilbertocrinus alpenensis, n. sp.

(Plate I, Figs. 1-2)

Description. — This species is based on an imperfect specimen, consisting of the basal part of a dorsal cup. The arrangement

¹ See Thomas, A. O., *Echinoderms of the Iowa Devonian*: *Iowa Geol. Surv.*, Vol. 29, *Ann. Repts.*, 1919 and 1920, pp. 402-403; distributed Feb. 27, 1924.

of the plates of this part of the dorsal cup is so characteristic that there is no difficulty in distinguishing this species from others of the genus.

Basal part of the dorsal cup pentagonal in cross-section, with the angles at the first primabrachs. Cup widest at the first primabrachs. Surface above these plates slopes inward and upward, indicating that the complete dorsal cup was probably constricted between the first primabrachs and the arm bases.

Infrabasals small, hidden within a deep basal pit by a part of the column. Basals comparatively large, hexagonal and forming the sides of the basal pit.

Radials heptagonal and slightly larger than the basals. First primabrachs hexagonal, about the size of the basals, but considerably larger than the primaxils. Both radials and first primabrachs are slightly longer than wide, the former being greater in width than the latter. One primaxil is missing; the other four are more or less broken. Primaxils seemingly heptagonal.

Secundibrachs not preserved.

Primary interbrachial somewhat smaller than the basals; hexagonal, resting between the radials upon the truncated basals. Only the lower rows of interbrachials above the primary interbrachials are preserved. In three interrachial areas the primary interbrachials are followed by three rows of interbrachials composed respectively of 3, 3 and 2 plates; in the other areas enough interbrachials are present to indicate that the primary interbrachials were originally followed by two rows of interbrachials of 3 plates each.

Column round; the nodes longer and wider than the internodes. Projecting margins of nodes crenulated.

This species is ornamented with prominent spines on the radials and first primabrachs. A prominent ridge connects the spines of contiguous radials and first primabrachs; it extends upward as a very low ridge upon the primaxil, apparently bifurcating on this plate. Some of the interbrachials above the primary interbrachial have an extremely low node at their centers. The outer surfaces of the plates of the dorsal cup exhibit an exceedingly fine granulation.

Occurrence. — According to Mr. Hindshaw's label, the crinoid was collected from calcareous shales of the Traverse group (apparently from the so-called Thunder Bay Series of this group) exposed on the bank of the Thunder Bay River near the Four Mile Dam about 4 miles upstream from Alpena, Michigan. The exposure is said to be located on the Potter farm.

Type. — The holotype is preserved in the Museum of Geology of the University of Michigan, where it bears the number 9433.

Remarks. — This species is very similar to *Gilbertsocrinus spinigerus* (Hall)² from the Hamilton of New York, Ontario and Indiana and to *Gilbertsocrinus greenei* Miller and Gurley³ from the Hamilton of Clark County, Indiana. It differs from these species in not possessing spines on the primary interbrachials. *Gilbertsocrinus greenei* differs further in that the first primabrachs do not bear spines. Less striking differences between these three species also exist and facilitate the separation of the species.

Gennaeocrinus goldringae, n. sp.

(Plate I, Figs. 3-6)

Description. — This species is based on a dorsal cup, which has been crushed laterally at a small angle to a plane passing through the anterior ray and anal interradius.

Calyx unusually small for species of *Gennaeocrinus*. Dorsal cup broadly urn-shaped, probably wider than high when uncrushed, decidedly lobed in the region of the arm bases and composed of relatively thin plates.

Basals missing. Radials five in number, hexagonal, as long as wide, bearing 2×5 primabrachs, which gradually decrease in size until the second primabrachs are about half the size of the radials.

First primabrachs, with the exception of the one in the left posterior radius, hexagonal; the one in the left posterior radius

² The description of *Gilbertsocrinus spinigerus* (Hall) and its relationship to other species is well given by Dr. Winifred Goldring on pages 97-98 of her excellent monograph on the Devonian Crinoids of New York, recently published (1923) as Memoir 16 of the New York State Museum.

³ This species is described on pages 35-38 of Bulletin 6 of the Illinois State Mus. Nat. Hist. (published April 5, 1895).

pentagonal, resulting possibly from a slightly greater development of the adjoining plates of the anal or posterior interradius. Second primabrachs axillary, the uppermost side of each plate quite small and in contact with an intersecundibrach; all are hexagonal with the exception of the one in the left posterolateral radius, which is octagonal.

Secundibrachs 1×10 , axillary, pentagonal or hexagonal and about one third to one half the size of the axillary primabrachs. In the type the secundibrach on the right side of the axillary primabrach of the anterior ray is missing.

The series of tertibrachs above the axillary secundibrachs is incomplete, some of the highest plates of this series being broken or lost in the region of the arm bases. However, if plates are counted for spaces once occupied by them, it is found that two tertibrachs with little doubt followed each axillary secundibrach both on the inner and outer sides of the ray, thus making a total of forty tertibrachs. Most of the tertibrachs are hexagonal, a few being pentagonal or heptagonal. Two upper pentagonal tertibrachs, one nearest the median line of the right posterior radius and on the side towards the posterior interradius and one nearest the median line of the left anterolateral radius and on the side towards the left anterior interradius, are truncated on their upper edges and hence seem to be of axillary nature.

No quartibrachs are present in the type. Their former presence, however, is suggested by the axillary nature of the two truncated tertibrachs. Quartibrachs may also have followed some of the missing tertibrachs.

Primary interbrachials hexagonal and slightly larger than the first primabrachs. Many of the succeeding interbrachials are missing. A complete series of interbrachials is fortunately preserved, however, in the left posterolateral interradius. The primary interbrachial in this interradius is followed in the second row by two rather large plates, one hexagonal and the other heptagonal; in the third row by three considerably smaller plates, one pentagonal and two hexagonal; and in the fourth row by two small hexagonal plates; the interbrachials of the fourth row with little doubt were originally followed by interambulacrals. A

sufficient number of plates are preserved in the right posterolateral interradius to show that the primary interbrachial of this interradius is similarly followed by two plates in the second row and three in the third; in all probability two plates were originally present in the fourth row, as is the case in the left posterolateral interradius. The primary interbrachial of the left anterior interradius is also followed by two plates in the second row and three in the third; possibly two occur in the fourth row, but the crushed condition of the plates of this interradius makes this indeterminable.

Primary anal hexagonal, followed originally by three plates in the second row; in the type the middle plate of the second row is missing. A plate of the third row and another of the fourth are present one above the other and are in contact with the brachials of the right posterior radius. When the sizes of these plates are compared with the spaces available for the other plates of the third and fourth rows, it seems quite certain that three plates were originally present in the third row and two or three in the fourth. Sufficient space is present to accommodate a fifth row of two plates.

A rather large intersecundibrach follows the axillary primabrach in each ray except in the anterior one; in the latter ray all plates above the axillary primabrach are missing with the exception of one secundibrach. The intersecundibrachs of the right posterior and right anterolateral radii are octagonal and are followed by a row of three plates; in the former radius, this row is followed by another of two plates. The intersecundibrach of the left anterolateral radius and seemingly that of the left posterior radius are heptagonal; the intersecundibrach of the former radius is followed by a row of two plates.

With the exception of the anterior radius each radius exhibits a small intertertibrach between the two rows of tertibrachs following each axillary secundibrach.

A few small plates of the tegmen are preserved in the arm regions.

There were at least four arms to each of four rays; very likely the fifth anterior ray, largely destroyed, had the same

number. This would give twenty arms to the crown. The seeming axillary nature of two of the tertibrachs may indicate the presence of more than four arms to the ray. The arm bases are arranged close together forming clusters, the clusters of each ray being far apart.

Two columnals, a nodal and an internodal, are present at the base of the type; another internodal seems to be imbedded in the shale matrix above the nodal. The nodal is thin, circular in outline, its outer edge being quite sharp; it has a diameter of 2.5 mm. and hence is quite large when compared with the internodal below, whose diameter is slightly more than 1.25 mm. The internodal below the nodal has a low ridge on its periphery, a circular opening for the axial canal and crenulations on the outer margins of its circular face.

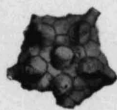
The ornamentation of the plates of the dorsal cup is characteristic. The large plates of the lower half of the dorsal cup, consisting of the radials, first primabrachs, primary interbrachials, primary anal and the three plates of the row following the primary anal, have prominent spines at or near their centers. The higher interbrachials and apparently the remaining plates of the anal interradius are ornamented with low, centrally situated nodes. Extremely faint ridges radiate from these nodes to the middle of the sides of these plates. A strong ridge extends up the radial series to the bases of the arms, becoming more prominent above the primary primabrach. The surfaces of the plates of the dorsal cup seem very minutely granulose.

Occurrence. — Same as that stated for *Gilbertsocrinus alpenensis*.

Type. — The holotype is preserved in the Museum of Geology of the University of Michigan, where it bears the number 9434.

Remarks. — This species is characterized by its small size, small number of arms (better preserved specimens, however, may show that more than twenty are present) and peculiar ornamentation of the plates of the dorsal cup. The species is named after Dr. Winifred Goldring, who has made a most valuable contribution to the knowledge of American fossil crinoids in her recent memoir on the Devonian crinoids of New York.

PLATE I



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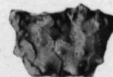
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EXPLANATION OF PLATE

(*Figures are natural size.*)

Gilbertsocrinus alpenensis, n. sp.

1. Basal view, showing pentagonal outline of the lower part of the dorsal cup, the prominent spines of the radials and first primabrachs, and a part of the column in the deep basal pit.
2. Lateral view, showing spines and prominent connecting ridges and a series of interbrachials.

Gennaecrinus goldringae, n. sp.

3. View of right anterolateral radius, showing size, shape and ornamentation of some of the plates of the radial series.
4. Basal view, showing crushed condition of dorsal cup and large, spinose radial and primary anal plates. The primary anal plate is shown above and a little to the left of the nodal and internodal columnals.
5. View of posterior side, showing lobate nature of the dorsal cup in the region of the arm bases. The primary anal plate is the first plate to the left of the middle of the base.
6. View of anterior side, showing incomplete anterior ray on the left, left anterolateral ray on the right and primary interbrachials. The four arm bases and the ornamentation of the plates of the left anterolateral ray are well shown.

