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A NEW CRINOID FAUNA FROM MONTICELLO, IOWA.

A. O. THOMAS.

The purpose of this paper is two-fold: first, to bring briefly before the members of the Academy the story of the discovery and a general description of an interesting but little known crinoid or sea-lily found some years ago near Monticello, and second, to call attention in a few words to some new inadunate crinoids recently collected by the writer in an outcrop of Silurian rocks at the same locality.

The first-mentioned crinoid is the wonderful petal-crinoid, *Petalocrinus mirabilis* Weller, and is the most remarkable member of this new fauna. It was first collected near Monticello, Jones county, by Mrs. A. D. Davidson and was named and described by Professor Stuart Weller¹ of the University of Chicago. Two years later Dr. F. A. Bather² of the British Museum, London, published a most exhaustive and excellent paper on the same crinoid and its relatives.

Petalocrinus instead of having arms with free branches has all the divisions of each arm united into a solid fan-shaped piece. The calyx is depressed globular in shape and is about the size of a small slightly flattened pea; its plates are minute and firmly joined together. In life it was united below to a slender, jointed stem perhaps several inches in length and this was fastened by its lower end to the sea bottom. The five arm-fans, when attached, form a circle around the calyx at the same level near its top. On their upper or ventral surfaces the fans are ridged and grooved while their lower surfaces are smooth. Since the fans are curved dorsally or downwards instead of being flat a complete specimen may be likened somewhat to a tiny umbrella with the stem for its handle or perhaps to a small rose with five drooping petals.

In the fossil state the arm-fans are usually detached and scattered and may be found highly silicified and adhering firmly to masses of fossiliferous chert scattered over the nearly driftless, thin-soiled hills of the region. Mrs. Davidson and also Dr.

¹Jour. Geol., Vol. iv, (1896) pp. 166-173.

²Quart. Jour. Geol. Soc. London, Vol. 54 (1898), pp. 401-441.

Weller found not only detached arms but also a few specimens in which the five arm-fans are still attached to the calyx. Two or three years later, in 1899, the late Professor Samuel Calvin found a very fine specimen retaining the arm-fans; this at present is the most perfect specimen in the University collection.

The description of the complete crinoid by Weller gave Bather a clue to some similar arm-fans which had been collected in the Silurian on the island of Gotland in the Baltic Sea and which are in the Riksmuseum at Stockholm, Sweden. The Gotland arm-fans, together with a part of the Weller-Davidson collection and other material from Jones county, as well as a single arm-fan from St. Paul, Indiana, furnished the basis for Bather's paper cited above. From this material six species were described; three from Gotland, two, including Weller's species, from Jones county, and one from Indiana. It is interesting to note that only at these widely separated localities have specimens of *Petalocrinus* ever been found.

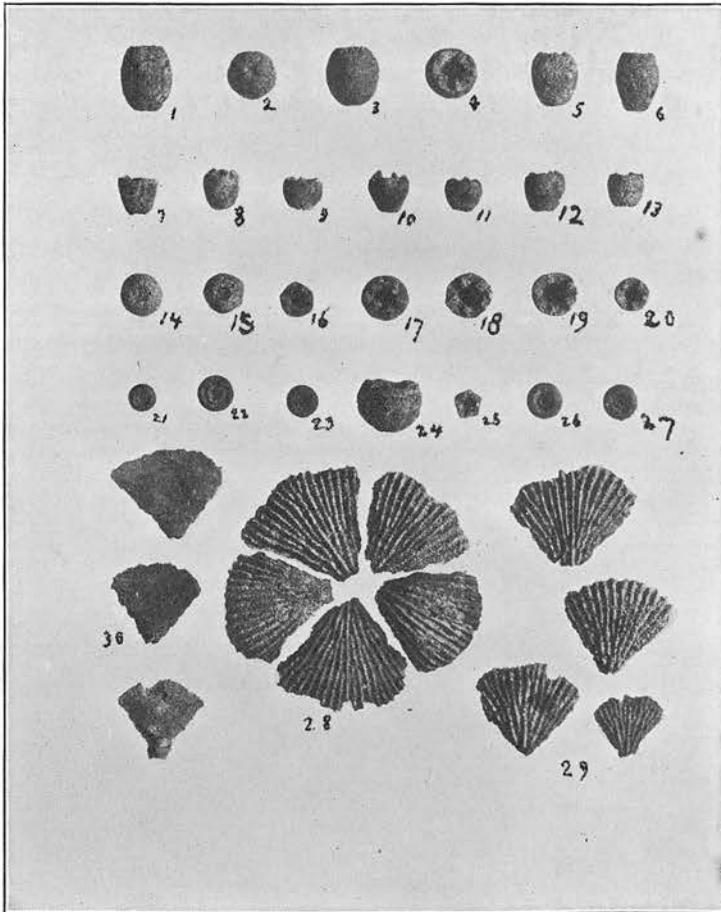
Several other fossils associated with *Petalocrinus* in Iowa are associated also with its relatives in Gotland. That the shore line along which this fauna lived and migrated in Silurian times was continuous from the Baltic across the present Atlantic to Iowa is very probable.

It was while searching for specimens of *Petalocrinus* that the writer came upon a small area of residual soil unusually rich in fossils. In origin the soil is the "product of secular rock decay" as expressed by Calvin³ who has written an excellent description of the fossiliferous geest of Jones county. This particular stony plot, its lean soil filled with chips and nodules of chert, proved a collector's bonanza. Weathered-out corals, brachiopods, crinoids, and other forms were common. The region, as far as known, had never yielded an arm-fan of *Petalocrinus* free from the stony matrix, but here scores of them lay on the surface, many of them practically perfect.

The finding of so many weathered-out arm-fans inspired the hope that by close search some of the calyces might be secured and though none were found the search was not in vain for in all some thirty or forty dorsal cups of other small crinoids were obtained. They are well preserved although silicification has largely obscured the sutures between the plates; fortunately, a few individuals preserve these diagnostic features quite well.

³Iowa Geol. Surv., Vol. v (1895), pp. 62, 63.

PLATE XXXII.



They belong chiefly to the genus *Pisocrinus*, the pea crinoid. This genus has not been reported before from the Silurian of Iowa but it is significant that it is abundantly represented in the Silurian fauna of Gotland⁴ and also in the Silurian at St. Paul and vicinity, Indiana.⁵ It will be recalled that these are the only localities, except at Monticello, where *Petalocrinus* has been found. The finding of *Petalocrinus* and *Pisocrinus* together in Iowa is only what reasonably might have been expected.

It is quite likely when this new material has been studied carefully and some comparisons have been made that other genera will be recognized and that some of them will include more than one species. The writer hopes to have ready for publication soon a detailed description of the species represented in the new material. A photograph of some of the specimens found is appended to this paper but complete identification has not been attempted.

PLATE XXXII.

NEW CRINOIDS FROM MONTICELLO.

Figures are Natural Size.

- Figs. 1-5. Several views of an oval, cask-shaped species.
 Fig. 6. Quite similar to numbers 1 to 5, but pyriform.
 Figs. 7-13. Side views of several individuals of the genus *Pisocrinus*.
 Figs. 14, 15. Basal view of *Pisocrinus* sp.
 Figs. 16-20. Cups of *Pisocrinus* sp., seen from above.
 Figs. 21-23, 26, 27. Segments of a small stem.
 Fig. 24. Side view of a broad, bowl-shaped cup; probably *Pisocrinus*.
 Fig. 25. A small pentangular cup seen from above.
 Fig. 28. *Petalocrinus mirabilis* Weller. Ventral view of five arm-fans, from different individuals, arranged in a relation similar to that which they retained in life.
 Fig. 29. Four fans of *Petalocrinus*, ventral aspect, showing different sizes.
 Fig. 30. Three fans of *Petalocrinus*, dorsal aspect, showing the smooth surfaces.

⁴F. A. Bather. The Crinoidea of Gotland. Part I, the Crinoidea Inadunata (1893), pp. 22-35.

⁵C. S. Beachler, Amer. Geol., Vol. 7 (1891), p. 178.