During the Revolution, the Delaware denied they were in any way under Five Nations' domination and joined the colonists in fighting the English and their Five Nation allies. Finally, as an anticlimactic gesture, at the close of the Revolution, the Iroquois conceded that the Delaware were no longer women but men.

In the sexual symbolism of the feminizing, we recognize unfathomed depths in native philosophy. Whether the figurative deprivation of the Delaware of their male accoutrements, both physiological and cultural, had its origin in literal practices remains unknown. Brinton claims, quoting Hammond, that young men of some of the western tribes were deprived of their virility, clothed like women, and assigned to women's work.[33] The institution of the berdache or transvestite was widespread among American tribes, which attests to its antiquity, and it is well known from the Plains. However, the feminizing of the Delaware, which follows similar lines of thought, is the outstanding recorded instance of its kind in the East. It is probably the only time that the rite was so institutionalized as to affect the status of an entire tribal group.

[33] Brinton, *op. cit.:* 110.

PALEONTOLOGY.—Thyridocrinus, *a new inadunate crinoid genus from the Silurian.*[1] EDWIN KIRK, U. S. Geological Survey.

In 1908, Slocum described a crinoid from the Niagaran of Illinois as *Achradocrinus patulus*. This is the first recorded occurrence of a crinoid referable to the family Gasterocomidae in the Silurian. In 1926, Springer described a crinoid from the Middle Silurian of Tennessee, which he placed with doubt in the genus *Lecythiocrinus*. He specifically states that the form could not be referred to the Gasterocomidae. In the present paper both of these species are included in a new genus *Thyridocrinus*, which is placed in the Gasterocomidae.

Thyridocrinus, n. gen.

Genotype.—Lecythiocrinus? *problematicus* Springer.

Only the theca is known, but this is in an excellent state of preservation. Both species referred to the genus are small.

Dorsal cup. Low, broadly turbinate, composed of very heavy plates.

IBB. Three elements. The unfused *IB* is right-posterior in position.

BB. Small, except the posterior, which is considerably larger than the others in the type species. In the type species the distal face of *post B* forms the lower margin of the exposed lateral opening. In *T. patulus* a plate is interposed between *post B* and the opening.

RR. Large, with very large articulating faces. The arms must have been very heavy and directed nearly horizontally outward, closely simulating *Arachnocrinus*. The articulating face is pierced by a submedian axial canal. The distal portions of the radials form a broad shelf, leaving a relatively small area to be covered by the tegminal plates. The two posterior radials meet above the lateral opening.

Post IR. As noted above, in the type species the lateral opening is bounded below by the *post B*. In *T. patulus* a plate rests on the truncated distal face of *post B*, and this in turn forms the lower margin of the lateral opening. The significance of this plate and the nature of the lateral opening will be discussed later.

Tegmen. The greater part of the tegmen consists of a somewhat elevated rosette of irregularly disposed plates. At a lower level, between the rosette and the inner margins of the radials, are small groups of tegminal plates lying in the interambulacral areas. Each interambulacral area has from one to three of these plates. The rosette consists in the main of five orals. The posterior oral is large and is probably a madreporite, although pores cannot be made out with certainty. Radiating from the periphery of the rosette and covering the ventral groove of each radial is a double row of covering plates

[1] Published by permission of the Director, U. S. Geological Survey. Received August 30, 1944.

having a biserial arrangement. These doubtless extended outward, covering the ventral groove of the arm.

Column. Lumen circular, as judged by the perforation of the *IBB*.

Geological range.—*Thyridocrinus* is known at present only in the Middle Silurian of Illinois and Indiana.

Species referred to the genus.—

Thyridocrinus problematicus (Springer), n. comb.

(?) *Lecythiocrinus problematicus* Springer, 1926, p. 133, pl. 31, figs. 11, 11a, 11b: "Laurel limestone, Niagara, St. Paul, Indiana."

As photographed and described by Springer the type specimen of *T. problematicus* had the infrabasals intact. When first seen by me the specimen was mounted, base down, on a bit of plasticine affixed to a strip of light cardboard. Upon detaching the specimen it was found that the *IBB* were missing. The contact faces of the surrounding basals are perfectly clear and show that the arrangement of the *IBB* was that described and figured by Springer. The one missing structure is the lumen.

Thyridocrinus patulus (Slocum), n. comb.

Achradocrinus patulus Slocum, 1908, p. 288, pl. 85, figs. 1–4: "Clay pockets of the Niagara limestone at Romeo [Illinois]."

Elsewhere, pages 273–275, Slocum explains that these silicified fossils found at Romeo came from postglacial clays filling erosion channels in the Niagaran dolomite. The original source of the crinoid and associated fossils was a limestone near Lemont, Ill., some 5 miles distant. This limestone in place yielded a fauna that Slocum considered very much like that of the Silurian at St. Paul, Ind. (Laurel limestone).

Slocum's reference of his species to *Achradocrinus* is quite understandable but can not be maintained. Shultze's figures of *Achradocrinus ventrorsus* (1866, pl. 12, figs. 6, 6a) could be interpreted as showing the radial facets pierced by axial canals. His diagram, page 101 (213), fig. 19, and his description on the same page unequivocally indicate the presence of such canals. The actual type specimen (M.C.Z. 1238) shows that such is not the case, however. The specimen has been treated with acid, but the dark matrix filling the ventral grooves of the radials has not been removed in some cases. It is clearly shown that there is a deep, fairly narrow, open groove without a separate axial canal. Again, the articulating facets of the radials are small and quite unlike those of *Gasterocoma* or *Thyridocrinus*. Incidentally, the lumen of the column is pentagonal.

T. patulus agrees well with *T. problematicus* except for the presence of the supplementary plate in the *post IR*. This will be discussed later. Slocum (p. 288) assumed anchylosis of the *IBB*. In closely united circlets of plates the presence or absence of sutures is often a matter of personal opinion, and in silicified specimens such as this usually no sound judgment can be formed.

Relationships.—The most obvious difference between *Thyridocrinus* and *Gasterocoma* is the possession of three infrabasal elements in the former as against the anchylosed circlet in the latter. The well-defined rosette of apposed orals of *Thyridocrinus* is quite at variance with any known tegminal structure in species referred to *Gasterocoma*. The apparently circular columnar lumen of *Thyridocrinus* as judged by the perforation of the *IBB* is quite unlike the quadripartite perforation of *Gasterocoma*. As to the presence of peripheral canals in *Thyridocrinus*, no information is to be had.

Remarks.—Springer (1926, p. 133) recognized a "superficial resemblance" of his species to the Gasterocomidae but stated that "it is definitely excluded from them by its lack of undivided infrabasal disk and peripheral axial canals." On the contrary, the form seems to be linked closely to the Gasterocomidae and furnishes a logical Middle Silurian ancestral structure for the Middle Devonian genera. The tripartite infrabasal circlet is the customary intermediate stage between five *IBB* and an anchylosed ring. The central lumen of the column with peripheral canals occurs elsewhere among the Inadunata and, although interesting structurally, is of doubtful value in defining systematic units. In any event, we do not know the column of *Thyridocrinus*, and the fact that no signs of peripheral canals are shown on the *IBB* is inconclusive, to say the least. In my opinion, the species has no relationship to *Lecythiocrinus*, with which it agrees only in the possession of three infrabasal units and a lateral opening.

Apart from the immediate consideration of structure as applied to *Thyridocrinus* the struc-

ture of the posterior interradius of the Gasterocomidae has far wider implications. We have in effect in these forms an incipient anal tube. We find one or more of the proximal tube plates enlarging and becoming incorporated in the cup. In the case where a single tube plate hypertrophies and becomes fixed in the cup one has a structure that is certainly analogous to that in *Cyathocrinus* and its near allies. Personally, I believe the plates in the two cases to be homologous.

An examination of Schultze's (1866) figures of *Gasterocoma* or, of course even better, an examination of actual specimens will show a great variation in the supplementary plates of the posterior interradius. In the type species, *G. antiqua*, almost any specimen will show one or more plates attached to the *post B* or to the *RR* at the margins of the lateral opening. In better preserved specimens a complete ring of plates is shown, and in one specimen that I have examined the entire opening is covered. In this specimen there is a nipple-like protuberence composed of small plates. The tip is fractured, but evidently there is a small opening that is the anal opening proper. I suspect that a similar structure obtains in Schultze's (1866) plate 12, figure 1C, where both in the figure and in the explanation of the plate the small anal opening is given as piercing the posterior basal.

There is considerable variation in the size and arrangement of these covering plates. In *G. antiqua* the posterior basal seems most often to support two plates. Three plates are occasionally found, and in some specimens there is a single plate extending the full width of the distal face of the basal. The simple plate structure is well shown by Schultze (1866) in pl. 12, fig. 2, in another species, *G. mülleri*. Such a plate is, I believe, comparable to the single plate shown in *T. patulus*, and such a structure does not militate against the inclusion of *patulus* within the genus *Thyridocrinus*. As a matter of fact, *T. problematicus* may have had a similar plate, not so well developed nor so thoroughly incorporated in the cup.

Some years ago (1934, p. 6), in the description of the genus *Corynecrinus* and the establishment of the family Lecythocrinidae, I suggested that the anal tube of *Lecythocrinus* and *Corynecrinus* might well be derived from an incipient anal tube such as is shown in *Gasterocoma*. In these two genera and in *Cestocrinus* from the Mississippian subsequently described (1940) two subequal tube plates rest on *post B*. Whether an anal tube be short or long is of little consequence. The fundamental structures are there in any event. Now I would go even further. In the case of many crinoids with a single plate in the posterior interradius, such as *Cyathocrinus* proper, I think the weight of evidence is strongly in favor of considering it as originally a proximal tube plate. In describing the genus *Zygotocrinus* (1943, p. 644) I stated my belief that the so-called *RA* and *RT* of *Parisocrinus* were originally tube plates. I shall now add the *X* of *Parisocrinus* as having a like origin.

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