CHESTERAN INADUNATE CRINOIDS FROM THE FLOYD SHALE, FLOYD COUNTY, GEORGIA

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A diverse fauna of Chesteran Age occurs in the Floyd Shale near the east base of Johns Mountain at 34° 24′ 47″ N and 85° 10′ 8″ W. Of the fossils present, the most significant elements are pelmatozoan echinoderms, and especially crinoids of the subclass Inadunata. References to species originally described prior to 1897 are not given in the Literature Cited of this paper but may be found in the Bibliographic Index by Weller (1898).

STRATIGRAPHIC POSITION

The Floyd Shale is the term used for the Mississippian strata above the Fort Payne Chert which occupy the Floyd Syncline in the Valley and Ridge Province of northern Georgia and Alabama. In Georgia, the Floyd is a dark gray, argillaceous limestone and calcareous shale containing a prominent sandstone unit which, at the location, is stratigraphically below the crinoid-bearing limestone. The formation was estimated by Hayes (1891) to be 2500 feet thick, and more recently by Butts and Gildersleeve (1948) to be 1500 feet thick.

The Floyd is regarded as the shoreward facies of the Upper Mississippian rocks in northwestern Georgia above the Fort Payne Chert which include, in ascending order: the St. Louis and Ste. Genevieve Limestones of Meramecan Age, and the Gasper and Golconda Limestones, the Hartselle Sandstone, the Bangor Limestone (restricted), and the Pennington Shale of Chesteran Age.

LITHOLOGY

The elements of the fauna are silicified (the exception being external molds of fenesterellate ectoprocts), and are primarily found in the deeply weathered portions of a dark gray, argillaceous limestone. A dissolved sample of the limestone yielded 49.7 per cent insoluble residue containing chlorite, illite, and possible kaolinite, with some silicified fossil fragments.

PALEONTOLOGY

Crinoidea (Plate I)

The genus *Phanocrinus* Kirk, 1937 is represented by two species, of which *P. alexanderi* Strimple, 1948 is represented by a

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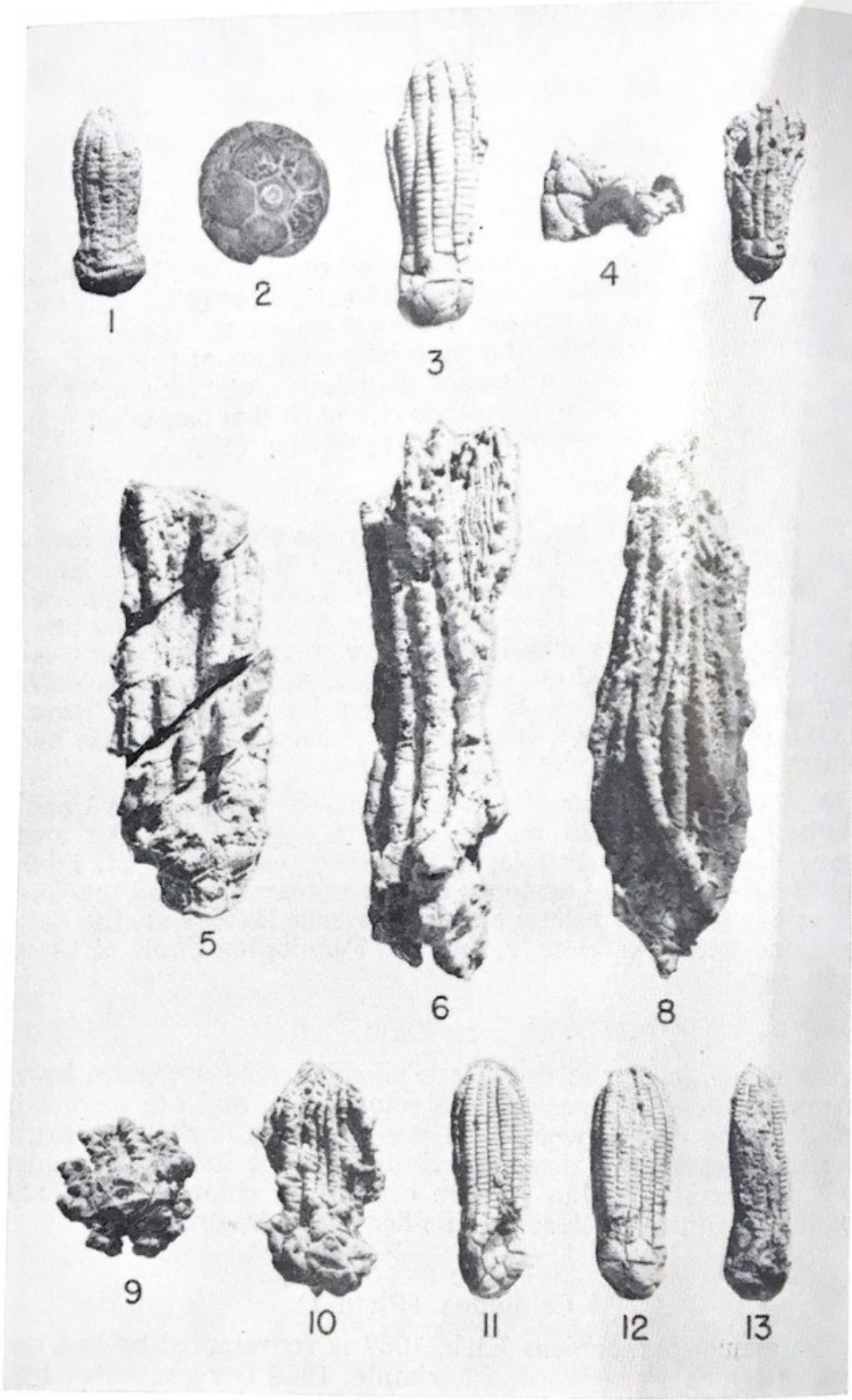

PLATE I

single crown. The numerous examples of *P. formosus* (Worthen, *in* Meek and Worthen, 1873) Kirk, 1937 include thirty-one partial crowns, four cups in which arms and stems have been disarticulated, and twenty-six arm fragments which are similar to the genus.

One crown of *?Pentaramicrinus fragosus* (Sutton and Winkler, 1940) Burdick and Strimple, 1969 is nearly complete. A partial cup of *Zeacrinites* sp. shows evidence of arm and stem disarticulation.

The genus *Aphelecrinus* Kirk, 1944 is represented by three species. Of the two specimens of *A. bayensis* (Meek and Worthen, 1865) Kirk, 1944 one is a partial crown with a portion of the anal sac visible. The other is an aberrant specimen in which the left arm of the LPR bifurcates at the sixth IIBr. *A. popensis* (Worthen, 1883) Burdick and Strimple *in* Furnish, *et al.*, 1971 is represented by one crown and two similar sections of arms. *A. randolphensis* (Meek and Worthen, 1873) Kirk, 1944 is represented by a single crown showing pinnules and a portion of the anal sac.

Other crinoids include *Linocrinus* sp., the single crown of which exhibits incurved arms with a few exposed pinnules. *Tholocrinus wetherbyi* (Wachsmuth and Springer, 1886) Kirk, 1939 is represented by two crowns and a similar section of arms. *Ulrichicrinus chesterensis* Strimple, 1949 is represented by one crown in which the arm configuration is: RPR-3, RAR-3, AR-2, LAR-3, LPR-4, for a total of 15. The species is originally reported to have "normally 13 pinnular bearing arms" (Strimple, 1949).

Crinoidea from the Floyd Shale. All specimens shown are reposited in the collections of the University of Iowa, Iowa City, Iowa, and bear collection numbers (SUI) of that institution. Magnifications are 1x, except Figures 2 and 4 (2x), and Figure 8 (0.9x).

1. *Phanocrinus alexanderi* Strimple, 1948, anterior view (SUI 35503).
2. *Phanocrinus formosus* (Worthen, *in* Meek and Worthen, 1873) Kirk, 1937, basal view (SUI 35504).
3. *?Pentaramicrinus fragosus* (Sutton and Winkler, 1940) Burdick and Strimple, 1969, right posterior view (SUI 35505).
4. *Zeacrinites* sp., basal view of partial cup (SUI 35506).

5-6. *Aphelecrinus bayensis* (Meek and Worthen, 1865) Kirk, 1944, 5. Anterior view (SUI 35507); 6. Aberrant specimen showing elongate pinnules where left arm of LPR bifurcates (SUI 35508).

7. *Aphelecrinus popensis* (Worthen, 1883) Burdick and Strimple, *in* Furnish *et al*, 1971, anterior view (SUI 35509).
8. *Aphelecrinus randolphensis* (Meek and Worthen, 1873) Kirk, 1944, posterior view (SUI 35510).
9. *Linocrinus* sp., basal view (SUI 35511).
10. *Tholocrinus wetherbyi* (Wachsmuth and Springer, 1886) Kirk, 1939, right posterior view (SUI 35512).

11-13. *Ulrichicrinus chesterensis* Strimple, 1949, 11. Posterior view showing three arms of RPR and four of LPR; 12. Anterior view showing three arms of RAR, two of AR, and two of the three in LAR; 13. Left anterior view showing three arms of LAR and two of four in LPR (SUI 35513).

Other Elements

Numerically, the bulk of the echinoderms are blastoids of the genus *Pentremites* Say, 1820. Among these are numerous examples of *P. godoni* (DeFrance, 1819) and *P. pyriformis* Say, 1825. Significantly present, in the excess of 200 specimens, are five examples with intact portions of brachioles.

Ectoprocts include both ramous and fenestrellate types (unidentifiable due to the recrystallization of the former and the external molds of the latter). Coelenterates include *Conularia* sp. and a few solitary rugose corals. Mollusks are uncommon, found only as gastropods, and include two high-spired forms, and two bellerophontids.

Articulate brachipods are numerous and include *Dielasma* sp.?, *Beecheria* sp.?, *Girtyella* sp.?, *Dictyoclostus inflatus* (McChesney, 1860), *Echinoconchus* cf. *E. alternatus* (Norwood and Pratten, 1855), *Eumetria* sp., *Spirifer increbescens* Hall, 1858, *S. leidyi* Norwood and Pratten, 1855, *Spiriferina transversa* McChesney, 1860, *Reticulariina spinosa* (Norwood and Pratten, 1855). *Cleiothyridina sublamellosa* (Hall, 1858), and *Composita* sp.

Paleoecology

The circumstances involved in the destruction of the living fauna were probably catastrophic in nature. Evidence for this is present in many elements of the fauna. The presence of such delicate structures as crinoid pinnules and blastoid brachioles indicates that sedimentation at the time of death was rapid. Such a quiet water environment as would be needed for this preservation at normal rates of sedimentation would not be conducive to these sessile life forms. Furthermore, fracturing (rather than disarticulation) of most stems below the calices of crinoids and blastoids indicates that attached portions of stems are numerous. Those few specimens showing disarticulation are thought to have been dead prior to the catastrophe.

Furthermore, among the brachiopods, no distarticulated valves were found, and the predominant form of damage is crushing which occurred prior to preservation. Also, many of the crinoids and a few blastoids exhibit compression parallel to the vertical axis.

Summary

The specific age of the assemblage is not readily determinable, although the brachiopods are quite similar to those found in the Gasper Limestone, suggesting a possible correlation. From the presence of delicate structures and evidences of compression, it is inferred that the biotope was destroyed by the weight and volume of rapidly deposited clastic sediments. This assemblage

presently stands as the largest and most varied crinoid population yet described from the state of Georgia.

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