CHIONE (CHIONE) CRASPEDONIA DALL IN THE CRYSTAL RIVER FORMATION (EOCENE) IN PENINSULAR FLORIDA

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The youngest beds of the Crystal River Formation in peninsular Florida are generally considered to be late Eocene in age. The presence of the following genera and subgenera: *Asterocyclina, Hantkenina, Cribrogloborotalia, Pseudophragmina (Proporocyclina),* among the foraminiferids; the annelid worm *Rotularia;* the echinoid genera *Wythella, Weisbordella, Eurhodia, Phymosoma;* clearly indicate an Eocene age for these strata (Nicol, *et al.*, 1976, p. 143). The beds are referred the *Rotularia vernoni* zone (Nicol and Jones, 1982) and are equivalent to Puri's *Asterocyclina-Spirolaea* [sic] *vernoni* faunizone. It has been suggested by Druid Wilson (personal communication) that these beds may be reworked Oligocene strata; however, in the vicinity of Gainesville, Florida, there is no indication that the beds have been reworked. Isolated silicified boulders of Suwannee Limestone represent the only Oligocene material near Gainesville, and the sole Oligocene fossil that has withstood long erosion and reworking is the robust irregular echinoid *Rhyncholampas gouldii* (Williams, *et al.*, 1977).

Chione (Chione) craspedonia Dall, 1903, is a species that is abundant in rocks of Oligocene age in the Gulf Coast, but it is also the most common pelecypod in the *Rotularia vernoni* zone and occurs sparsely in the *Nummulites vanderstoki-Hemicythere* faunizone. Although Palmer (1927, 1929) does not report the genus *Chione* from Eocene beds in the eastern United States, it now appears that this genus is present in beds of late Eocene age in peninsular Florida. The molluscan fauna of the *Rotularia vernoni* zone in the Crystal River Formation has been virtually unstudied.

At least two other stocks of pelecypods that first appear in the *Rotularia vernoni* zone in peninsular Florida are well represented in Oligocene strata in the United States. One of these is a species that has tentatively been identified as *Chlamys (Lyropecten) incertae* Tucker-Rowland, which can be allocated to the subgenus *Anatipopecten*. This subgenus was also reported from the lower bed near Bainbridge, Georgia. The second is a distinctive split-ribbed species of *Glycymeris* that closely resembles *Glycymeris intercostata* (Gabb) and *Glycymeris cookei* Dall. The latter species was also reported by Dall (1916) from the lower bed at Bainbridge, Georgia, and it is likely that this lower bed is partly equivalent to the *Rotularia vernoni* zone in peninsular Florida. This group of split-ribbed glycymeridids consists of about ten species, is confined to the tropical western hemisphere, and ranges from late Eocene to Recent. The sole living species is *Glycymeris multicostata* (Sowerby), which is confined to the tropical eastern Pacific.

Beginning with Puri's *Nummulites vanderstoki-Hemicythere* faunizone, which is immediately below the *Rotularia vernoni* zone, invertebrate stocks with Oligocene affinities begin to appear in peninsular Florida, and the stocks with Tethyan affinities nearly disappear (Cheetham, 1963; Nicol, *et al.*, 1976; Jones, 1982). In the *Rotularia vernoni* zone the stocks with Tethyan affinities have disappeared, and the character of the invertebrate fauna becomes much more provincial.

The span of time between the latest Eocene in peninsular Florida, which is represented by the *Rotularia vernoni* zone, and the Red Bluff, Forest Hill, and

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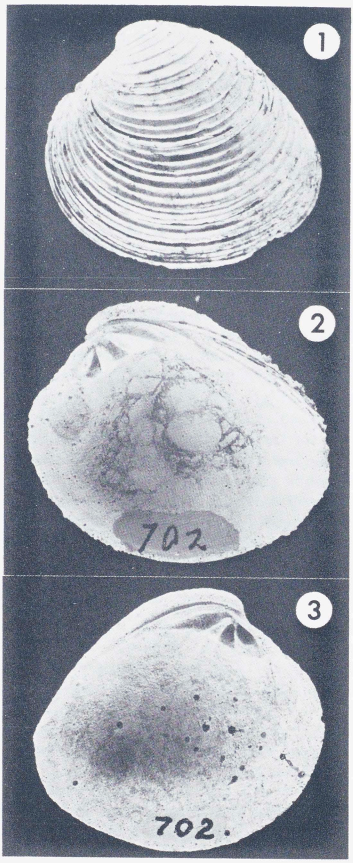
Mint Spring formations of the lower part of the Vicksburg Group in Mississippi probably represents no more than four million years and possibly no more than two or three million years (A. Palmer, 1983, p. 504). It is not surprising, then, that some molluscan species in the *Rotularia vernoni* zone of the Crystal River Formation are very similar or identical to those in older beds of the Vicksburg Group in Mississippi.

The specimens studied for this paper consist of about 200 siliceous pseudomorphs that come from one locality near Gainesville, Florida, in the *Rotularia vernoni* zone, and three of the best specimens are figured herein. The locality is in the Gainesville West Quadrangle in a shallow quarry 0.5 mile south of the intersection of State Road 26 and I-75, west of Gainesville, Alachua County, Florida (SW ¼Sec. 4, T10S, R19E). Most of the specimens are so poorly preserved that only a generic identification could be made. Some of the valves have been bored by gastropods. *Chione (Chione) craspedonia* does occur, however, at many other localities in peninsular Florida as casts and molds in limestone.

The specimens we have of *Chione (Chione) craspedonia* are the same size and shape as the specimens measured and figured by Dockery (1982, p. 94, pl. 48, figs. 4-9, text figs. 47, 3-4). They are also like Dall's (1903, p. 1300, pl. 55, fig. 2) original description of this species. The concentric ribs are more widely spaced on small specimens and on the umbonal region of adult forms. There is no indication of radial ribs on any of our specimens. The interior ventral margin is finely crenulated, and fine crenulations also occur on the anterior dorsal border above and anterior to the cardinal teeth. The lunule is set off by a furrow that runs from the beak to the dorsal margin. The furrow becomes wider toward the dorsal margin, but the lunule inside the furrow is not sunken.

Chione (Chione) craspedonia can be readily separated from *Chione (Chione) bainbridgensis* Dall, 1916, by the lack of ra-



Figures 1-3. *Chione (Chione) craspedonia* Dall. (All specimens in the Invertebrate Paleontology collection at the Florida State Museum.) 1. Exterior, right valve (hypotype-cat. No. 5702); length 21.8 mm, height 19.0 mm. 2. Interior, right valve (hypotype-cat. No. 5701); length 27 mm, height 23.2 mm. 3. Interior, left valve (hypotype-cat. No. 5703); length 22.6 mm, height 20.4 mm.

dial ribs on the former species. Dockery (1982, p. 94, 96) has explained how to differentiate *Chione (Chione) craspedonia* from two other similar species, *Chione (Chione) perbrevisformis* Dockery and *Chamelea mississippiensis* (Conrad).

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LITERATURE CITED

CHEETHAM, A. H., 1963, Late Eocene zoogeography of the eastern Gulf Coast region: Geol. Soc. Amer., Mem. 91, p. 1-113, pls. 1-3.

DALL, W. H., 1903, Contributions to the Tertiary fauna of Florida: Wagner Free Inst. Sci. Philadelphia, Trans., Vol. 3, Part 6, p. 1219-1654, pls. 43-60.

DALL, W. H., 1916, A contribution to the invertebrate fauna of the Oligocene beds of Flint River, Georgia: U. S. Natl. Mus., Proc., Vol. 51, no.2162, p. 487-524, pls. 83-88.

DOCKERY, D. T., III, 1982, Lower Oligocene Bivalvia of the Vicksburg Group in Mississippi: Mississippi Bureau Geol., Bull. 123, p. 1-261, pls. 1-77.

JONES, D. S., 1982, Some considerations of the late Eocene faunas of northwest peninsular Florida *in* Cenozoic vertebrate and invertebrate paleontology of north Florida: Southeastern Geol. Soc., Guidebook no. 24, p. 14-29.

NICOL, DAVID, and D. S. JONES, 1982, *Rotularia vernoni*, an annelid worm tube from the Eocene of peninsular Florida: Florida Scientist, Vol. 45, no. 2, p. 139-142.

NICOL, DAVID, G. D. SHAAK, and J. W. HOGANSON, 1976, The Crystal River Formation (Eocene) at Martin, Marion County, Florida: Tulane Studies Geol. Paleont., Vol. 12, no. 3, p. 137-144.

PALMER, A. R., 1983, The decade of North American Geology; 1983 Geologic time scale: Geology, Vol. 11, No. 9, p. 503-504.

PALMER, K. V. W., 1927, 1929, The Veneridae of eastern America, Cenozoic and Recent: Palaeont. Amer., Vol. 1, no. 5, 319 p., 35 text figs. (1927), 45 pls. (1929).

PURI, H. S., 1957, Stratigraphy and zonation of the Ocala Group: Florida Geol. Survey, Geol. Bull. 38, p. 1-248, pls. 1-15.

WILLIAMS, K. E., DAVID NICOL, and A. F. RANDAZZO, 1977, The geology of the western part of Alachua County, Florida: Florida Geol. Survey, Report of Investigations No. 85, p. 1-98.

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REVIEW

IT BEGAN WITH A STONE: a History of Geology from the Stone Age to the age of Plate Tectonics, by Henry Faul and Carol Faul. Published by John Wiley & Sons, New York, Chichester, Brisbane, Toronto, and Singapore, 1983, xvii + 270 pp., 51 figs., $38.95

Henry Faul died as his book neared completion; Carol finished the task Henry had begun. Thus, this volume represents Henry's final comments on the history of geological thought. He collected early geological books with great dedication. This led him to write on the history of geol-

ogy and to begin lecturing on this subject at the University of Pennsylvania and elsewhere including Shiraz, Iran, where he and Carol taught during a sabbatical leave in 1974, and where the writing of this book was begun.

It is exceedingly difficult to trace the development of geological thought chronologically through the centuries. This is particularly so after 1450 due to several factors including the near-exponential increase in the number of authors who recorded their geological observations in printed books and the progressive separation of natural philosophy into the several sciences and the development of subdisciplines within each of the major subdivisions of science. The development of geological thought and the ultimate "birth" of geology as a separate discipline is intimately related to each of the sciences and their subdivisions. The authors of *It Began with a Stone* address this difficulty with a more-or-less geographical organization of their narrative after an overly brief chapter on *Antiquity* followed by an even briefer one on *The Middle Ages.*

Thus, the third chapter is headed *Geology was Born in Italy.* This reviewer is forced to disagree with this statement just as he would with *Geology was Born in Greece* if such had been their choice. Recognizing that the argument is largely semantic; that is, dependent upon what one defines as "geology" in order to trace its "birth," it is felt that the case for Italy as the "birthplace" of geology is weak. Observations recorded in Leonardo da Vinci's notebooks were brilliant to be sure but their importance remained unrecognized until much later. The only scientist who contributed clear and coherent geological observations at an early date was Niels Stensen, a Dane attached to the Medici Court in Florence (now Italy) as court physician. During the several years he resided in Florence, Stensen formulated three fundamental principles of historical geology. However, the first of his two major geological works, *Canis Carchariae Dissectum Caput* (1667), was appended to his treatise on musculature, and the second, *De Solido Intra Solidum Naturaliter Contento Dissertationis Prodromus* (1669), as the title implies is a long summary of the full treatise he later planned to write. Thus, it was a full century later that a new science, geology, emerged to be recognized as a separate activity and discipline. Aside from the work of Stensen which has been given full and proper attention by previous historians of geology, contributions from observers in Tuscany and other city states within what is now known as Italy have been somewhat underemphasised, but overstatement of their importance should be avoided.

Succeeding chapters include *The French Connection, The Detour Via Freiburg, The Quiet in Britain, Geology Comes of Age in Britain, The French Reaction, Provincial Beginnings in America,* several chapters on the state and western surveys and expeditions, and *The Physico-chemical View.* The concluding chapters are *Cooling Earth, Flexing Continents, Radioactivity;* and, *Continental Drift, Subsiding Ocean Basins, Things to Come.* The contributions of the French and German schools are reviewed, followed by consideration of the British geologists. The role of the latter is somewhat understated except for the contributions of Sir Charles Lyell. The development of geology in America is elucidated far beyond that of most previous authors. The final chapters are a brief, tantalizing glimpse of the importance of Continental Drift and Plate Tectonics to geological thought. Considering Henry Faul's expertise in geophysics, this reviewer had hoped for more on these absorbing topics.

This is a good, useful, readable book. We can be gratified that Henry's lectures on history of geology have been preserved. There is much to be learned from them, and the fresh insight into the work of past geological observers is worthwhile. The more than 550 references are exceedingly useful though the citations are distressingly brief in places. Perhaps this could not be avoided. This volume is recommended for both the historian and the working geologist.

—H.C.S.