

They are all newcomers and, except *Cardium taphrium* Dall, which is rare in the Shoal River, no trace of them has been detected in any later formation. . . .

The Shoal River fauna is more complex than that of either the Chipola or the Oak Grove and shares some of the characters of both. The number of species is slightly increased, and several of them, such as *Conus waltonensis* Aldrich, a new *Cancellaria* and *Turritella*, and *Glycymeris waltonensis* Gardner [fig. 18, no. 3], are as prolific as the abundant species in the Oak Grove. Apparently the waters continued to be relatively cool, for *Astarte*, which occurs chiefly in northern and temperate waters, is represented by three species, whereas in the Oak Grove there is only one and in the Chipola none at all. On the other hand, the southern element did not submit without a struggle. The West Indian assemblage is suggested by such forms as *Spondylus* sp. cf. *S. bostrychites* Guppy and the diversity of the Cancellarias. . . . Although none of the Alum Bluff faunas are in any sense of the word deep-water faunas, the Shoal River includes a larger number of characteristic littoral and between-tide genera than either of the other two.

The molluscan fauna of the Hawthorn formation, which was included in the Chipola fauna by Gardner, is much less rich and varied. On Sopchoppy River only about 50 species have been identified, and of these the only common forms are large *Ostreas*, *Pectens*, and *Anomias*, an assemblage that is characteristic of oyster reefs (Gardner, 1926, p. 2). *Ostrea normalis* "Dall" Gardner (fig. 18, nos. 3,4) and *Pecten akani-kos* Gardner (fig. 19, no. 3; fig. 20, no. 5) are the most widely distributed species. Sirenian ("manatee") ribs are rather common in the Hawthorn, and the fuller's earth mines near Quincy have yielded several skeletons of *Hesperosiren cra-taegensis* Simpson (1932). This was a large strictly aquatic mammal related to the dugong. Bones of several land mammals have been reported from the Hawthorn, but these may have been derived from deposits of Tampa age.

Cushman and Ponton (1932) recognize 132 species of Foraminifera in the Alum Bluff group, of which 60 species have not been found in the Duplin marl. Thirty-nine species from the Chipola formation are not known from other Miocene formations in Florida; but the absence of most of them has no temporal significance, for 22 of them are identified as still living species.

Scutella floridana Cooke (1942) from the Hawthorn formation on Sopchoppy River, and *Clypeaster gatuni* Jackson