NOTES ON THE FAUNA OF THE CHIPOLA FORMATION–XXXV
A NEW SPECIES OF THE GENUS *MODULUS* (MOLLUSCA: GASTROPODA)

GARY W. SCHMELZ
NAPLES, FLORIDA

The genus *Modulus* has existed in America since the Cretaceous Period (Dall, 1892, p. 293). Recent adult specimens living in the Atlantic are small, with widths ranging from 9 to 16 mm and heights of 9 to 17 mm (Abbott, 1944; Petuch, 1987). Keen (1971) lists three species living in tropical west America. Like their Atlantic counterparts, they are small gastropods with widths of 15 to 17 mm and heights of 12 to 17 mm.

To date, three species have been identified from Chipola deposits (Gardner, 1947, p. 581-582, pl. 55, figs. 19, 26, 27). Two of these, *Modulus compactus* Dall, 1892, and *Modulus biconicus* Gardner, 1947, are relatively small forms with respective maximum diameters of 8.0 and 7.8 mm and heights of 9.0 and 9.5 mm. The third, *Modulus willcoxii* Dall, 1892, is over twice as large with a reported maximum diameter of 17.8 mm and a height of 20 mm. A specimen of the latter species collected from TU 830 attained a height of 23 mm (personal communication, Emily Vokes, 1991).

A new species of *Modulus* has been recognized in the Chipola Formation. It is not at all rare; in the combined collections of Tulane University and the Hoerle Collection at the United States National Museum there are over 50 specimens from a number of localities, as follows: Chipola River – locs. TU 458-1, 547-22, 554-2, 555-3, 1050-1; Farley Creek – TU 818-1, 819-1, 820-8, 821-3, 825-10, 1048-1; Tenmile Creek – TU 546-1, 951-1. In addition, there is also one USNM specimen from the Chipola beds at Alum Bluff (USNM 114116, loc. USGS 2211).

The new species represents a relatively large example of the genus. The holotype collected by the investigator from TU 951 attained a diameter of 31 mm and a height of 35.5 mm; paratype A collected by Emily Vokes at TU 546 has a diameter of 27.6 mm and a height of 30.5 mm.

MODULUS (?) IMITATUS
Schmelz, n. sp.
Text-figures 1-3

Description: Shell trochoid in shape. Protoconch smooth, about 1 1/2 whorls; tip submerged. Protoconch gradually developing poorly defined spiral threads. Six teleconch whorls. A shoulder appearing on the first teleoconch whorl about midway between the sutures; the angle of the shoulder progressively more acute and step-like. On the second teleoconch whorl small nodules appearing along the edge of the shoulder; nodules becoming increasingly larger, reaching their greatest dimension on the body whorl with nine to thirteen nodules on the body whorl.

A well developed suture between the body and penultimate whorl. A single, progressively broader, spiral cord situated below the suture; extending from this cord a series of alternating thin and wider spiral cords, which continue to the edge of the shoulder. Below the shoulder an alternating pattern of spiral cords and costae; the first spiral costa intercepting the aperture and continuing above the suture as two closely spaced spiral cords. Faint growth rugae between and across the spiral cords and costae.

Aperture about half the height of the shell; its adapical end situated slightly below the nodular shoulder. Lip of the aperture crenulate with the abapical portion extending below the base of the shell; a series of irregularly spaced lirae extending from the lip of the aperture partway into the mouth; parietal wall smooth. Columella arched and terminated by a tooth-like lamella. Siphonal canal short. Umbilicus covered by the parietal callus.

Holotype: USNM 459088; height 35.5 mm, maximum diameter 31 mm.

Type locality: TU 951; Chipola Formation, Tenmile Creek, about 1 1/2 miles west of Chipola River (SE 1/4 Sec. 12, T1N, R10W), Calhoun County, Florida.

Paratype A: USNM 459089; height 30.5 mm, maximum diameter 27.6 mm; locality TU 546, Tenmile Creek, Calhoun County, Florida.

Paratype B: USNM 337658; height 34.3 mm, maximum diameter 20.4 mm; locality TU 547 (Hoerle Collection), Chipola River, Calhoun County, Florida.

Discussion: The sculpture on the body whorl of this new species of *Modulus* is considerably different from the three known species reported from the Chipola formation by Gardner (1947, p. 581-582, pl. 55, figs 19, 26, 27). All of the known Chipola species are smaller and lack the nodular step-like shoulder.

Several other Miocene representatives of this genus have been recorded. *Modulus basteroti* Benoist, 1825, is listed by Cossmann and Peyrot (1922, p. 319, pl. 5, figs 6-10) from the French Aquitaine Basin. This species is small (diameter 7.0 mm; height

7.5 mm) and is sculptured with strong cords and axial nodules. Like its Chipola counterparts it lacks the nodular, step-like shoulder on the body whorls. *Modulus tamanensis* Maury, 1925, comes from the Miocene deposits of Trinidad (Maury, 1925, p. 239, pl. 40, figs. 2-3). According to Gardner (1947) this shell reaches a height of 29 mm. It is a stout, broadly conical, representative of this genus with a strong cord-like carina on the body whorl and more closely resembles *Modulus willcoxii* Dall, 1892.

Modulus turbinatus (Heilprin, 1886) is a medium-sized representative of this genus with a maximum recorded diameter and height of 20 mm (Heilprin, 1886, p. 114, pl. 16, fig. 57). It was collected from the Late Oligocene Tampa Limestone of Ballast Point, Tampa Bay, Hillsborough County, Florida. Initially assigned to the genus *Pseudotrochus*, this specimen most closely resembles the new Chipola species. Both species have a trochoid shape and more closely resemble members of the family Turbinidae. However, both have an arched columella that is terminated by a tooth-like lamella. The sculpture on the body whorl of *Modulus turbinatus* differs from the Chipola species in that the whorls of the spire are crenulated immediately above the suture, and there is no step-like nodular shoulder like the one found in the Chipola specimens.

It is possible, because of its large size and turbinate characteristics, that the new species of *Modulus* should be assigned to a new genus. However, this investigator feels that these differences are insufficient to justify such action. Consequently, he has chosen to retain the generic assignment of *Modulus* primarily because of the shell's other morphological features such as its truncate base, short siphonal canal, and tooth-like lamella.

LOCALITY DATA

The following localities are all in the Chipola Formation, Calhoun County, Florida.

458. East bank of Chipola River, above Farley Creek (SW 1/4 Sec. 20, T1N, R9W).
546. Tenmile Creek, about 1 3/4 miles west of Chipola River (NE 1/4 Sec. 12, T1N, R10W), (= USGS 2212, "one mile west of Bailey's Ferry").
547. West bank of Chipola River, about 2000 feet above Fourmile Creek (SW 1/4 Sec. 29, T1N, R9W).
554. East bank of Chipola River, at power line crossing (SW 1/4 Sec. 17, T1N, R9W).
555. East bank of Chipola River, about 1000 feet above Fourmile Creek (SW 1/4 Sec. 29, T1N, R9W).
818. Farley Creek, 0.1 mile west of bridge of Florida Highway 275 (SW 1/4 Sec. 21, T1N, R9W).
819. Farley Creek, 0.2 mile west of bridge of Florida Highway 275 (SW 1/4 Sec. 21, T1N, R9W).
820. Farley Creek, at bridge of Florida Highway 275 (SW 1/4 Sec. 21, T1N, R9W).
821. Farley Creek, 0.1 mile east of bridge of Florida Highway 275 (SW 1/4 Sec. 21, T1N, R9W).
825. Farley Creek at abandoned mill about 1/4 mile west of bridge of Florida Highway 275 (SW 1/4 Sec. 21, T1N, R9W).
951. Tenmile Creek, about 1 1/2 miles west of Chipola River (SE 1/4 Sec. 12, T1N, R10W).
1048. Farley Creek, about 0.8 mile east of bridge of Florida Highway 275 (NE 1/4 Sec. 21, T1N, R9W).
1050. West bank of Chipola River immediately below power line crossing and directly across river from loc. TU 554 (SW 1/4 Sec. 17, T1N, R9W).

LITERATURE CITED

ABBOTT, R. T., 1944, The Genus *Modulus* in the Western Atlantic: Johnsonia, v. 1, no. 14, p. 1-6, pls. 1-2.

COSSMANN, A.E.M., and A. PEYROT, 1922, Conchologie néogénique de 1' Aquitaine; Tome 4. Gastropodes: (Extract from Actes Soc. Linn. Bordeaux, v. 73): p. 1-322, pls. 1-7.

DALL, W. H., 1892, Contributions to the Tertiary fauna of Florida: Wagner Free Inst. Sci., Trans., v. 3, pt. 2, p. 201-471, pls. 13-22.

GARDNER, JULIA, 1947, The molluscan fauna of the Alum Bluff Group of Florida: U.S. Geol. Surv., Prof. Paper 142-H, p. 493-656, pls. 52-62.

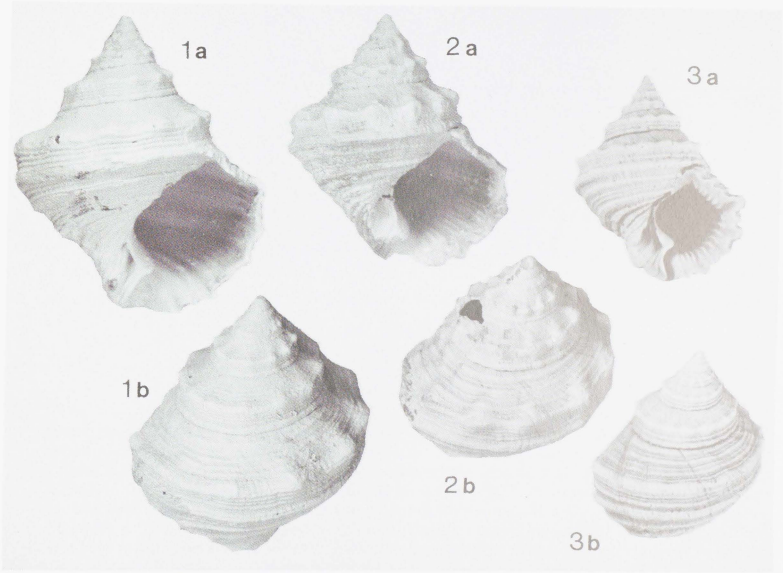
HEILPRIN, ANGELO, 1886-1887, Exploration on the West Coast of Florida and in the Okeechobee Wilderness: Wagner Free Inst. Sci., Trans., v. 1, 134 p., 19 pls. (p. 65-127, 1886; remainder 1887).

KEEN, A. M., 1971, Sea shells of tropical West America: 2nd ed., Stanford Univ. Press, xiv + 1064 p., 22 color pls., *ca.* 4000 figs., 6 maps.

MAURY, C. J., 1925, A further contribution to the paleontology of Trinidad (Miocene horizons): Bulls. Amer. Paleontology, v. 10, no. 42, p. 153-402, pls. 12-54.

PETUCH, E. J., 1987, New Caribbean molluscan faunas. Coastal Educ. & Resh. Found. (CERF), Charlottesville, Virginia, 154 + 4 p., 29 pls., 1 text-fig.

October 9, 1991



Modulus (?) *imitatus* Schmelz, n. sp. Text-figure 1, USNM 459088 (holotype); height 35.5 mm, maximum diameter 31 mm; locality TU 951. Text-figure 2, USNM 459089 (paratype A); height 30.5 mm, maximum diameter 27.6 mm; locality TU 546. Text-figure 3, USNM 337658 (paratype B); height 24.3 mm, maximum diameter 20.4 mm; locality TU 547 (Hoerle Collection). (All X 1 1/2)