NOTES ON THE FAUNA OF THE CHIPOLA FORMATION – XXXVI
TWO NEW SPECIES OF THE GENUS *CALLIOSTOMA* (GASTROPODA:TROCHIDAE)

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Since Julia Gardner completed her publications on the molluscan fauna of the Alum Bluff Group of Florida in 1947 many new forms of gastropods occurring in the Chipola Formation have been discovered. Most of these specimens now reside in the Tulane University Collection or are part of the Hoerle Collection at the United States National Museum. An examination of the *Calliostoma* in these collections has revealed the presence of two new species.

According to Hickman and McLean (1990, p. 109) *Calliostoma* is well represented in the Tertiary faunas, where it has demonstrated an increase in diversity from Paleogene to Neogene time. Gardner (1947, p. 617-619, pl. 60, figs. 34, 35, 37 and pl. 62, fig. 5) lists four species of *Calliostoma* from the Chipola Formation. *Calliostoma ceramicum* Dall, 1892, and *Calliostoma grammaticum* Dall, 1892, are relatively abundant species and can be obtained from most Chipola Formation collecting sites. *Calliostoma ceramicum* is quite variable in its shape and sculpture. Maury (1910, p. 150, pl. 25, fig. 4) mistakenly described a juvenile specimen of this species as *Calliostoma palmeri*. In general, adult specimens of this conical shell possess spiral sculpturing of four squarish ribs on the teleconch whorls with narrower channeled interspaces that are crossed by deeply impressed oblique lines, giving the impression that it is covered by roof tiles (Gardner, 1947, p. 619). With *Calliostoma grammaticum* the spiral sculpturing on the teleconch whorls consists of three to five smooth spiral cords arranged in scalar fashion with sharp-cut interspaces (Gardner, 1947, p. 618).

Both *Calliostoma metrium* Dall, 1892, and *Calliostoma exile* Dall, 1892, appear to be less widely distributed throughout the Chipola deposits. *Calliostoma exile* is a small conical species with smooth body whorls (Gardner, 1947, p. 618). In the Tulane collection there is one specimen from locality TU 555, on the Chipola River, and this investigator has obtained one specimen from TU 831 on Tenmile Creek. *Calliostoma metrium*, which reaches a height of 20.5 mm, is a much larger conical shell whose spiral sculpturing on the teleconch whorls consists of fine, closely set, flattened threads (Gardner, 1947, p. 618). In the Tulane Collection five specimens of this species were collected along the Chipola River (four at TU 547 and one at TU 950) and two specimens from Farley Creek (one at TU 825 and another from TU 828).

The two new species of Chipola *Calliostoma* can be easily differentiated from the four other forms described from this formation. Both appear to be limited in their abundance and distribution. One has been exclusively collected from locality TU 555, a former patch-reef environment situated on the east bank of the Chipola River. The second, except for one specimen collected along Farley Creek at TU 819, has been obtained from a short stretch along Tenmile Creek between TU 546 and TU 830. This area represents a deeper-water coastal environment, whose depth is believed to have been between 20 and 30 meters (Vokes, 1989, p. 15).

CALLIOSTOMA SEXTONI Schmelz, n. sp.
Plate 1, figures 1, 2
Text-figures 1, 2

Description: Shell trochoid in shape. Protoconch submerged; about 1 1/2 whorls. Six teleconch whorls; sculpturing on first teleconch whorl consisting of axial threads that later become intercepted by spiral threads. Beaded sculpturing on later teleconch whorls developing at sites where axial and spiral threads intersect; shoulder appearing on fourth teleconch whorl about half-way between sutures. Edge of shoulder sculptured with one spiral row of prominent beads; beads becoming increasingly larger, reaching their greatest dimension on the body whorl. Suture distinct. Between suture and shoulder of body whorl sculpture of two spiral rows of beads, alternating with faint spiral cords. Aperture subquadrate, about one-third height of shell. Outer lip simple. Columella truncate, thickened and arched inward. Umbilicus absent. Base of shell sculptured with eleven spiral cords crossed by faint growth rugae giving a cross-hatched appearance.

Holotype: USNM 476001; height 9.5 mm, maximum diameter 8.3 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 476002; height 10.5 mm, maximum diameter 9.0 mm; locality TU 546, Tenmile Creek, Calhoun County, Florida.

Additional paratypes: Three specimens from TU 830 (Tulane Collection); three specimens from TU 546 (two from the Hoerle Collection and one from the Tulane Collection); two specimens from TU 998 (Hoerle Collection) and one specimen from TU 819 (Tulane Collection).

Occurrence: Chipola Formation, Calhoun County, Florida.

Discussion: This shell's trochoid shape, beaded sculpturing, subquadrate aperture, truncate and thickened columella clearly indicate that it belongs to the genus *Calliostoma*. Scanning electron microscope (SEM) photographs were taken of the protoconch and early teleconch whorls to see if the characteristic honeycomb pattern was present on the protoconch, in addition to the prominent axial sculpturing on the early teleconch whorls (text-figs. 1, 2). According to Hickman and McLean (1990, p. 109) these are key diagnostic features exhibited by members of the genus *Calliostoma*. The protoconch showed no evidence of the honeycomb pattern, but the typical axial sculpturing was visible. Similar photographs were taken of a second new species described in this paper (text-fig. 3) and identical results were obtained. The absence of the honeycomb pattern on the protoconchs of both shells may have been caused by erosion. It is also possible that the honeycomb pattern did not appear until later in this group's evolutionary development.

Although most of the specimens of *C. sextoni* collected by this investigator, as well as those examined from the Tulane Collection and the Hoerle Collection at the U.S. National Museum, are small, one very large, but incomplete, example of *C. sextoni* was unearthed at TU 830. This specimen, if complete, would measure approximately 17 mm in height and demonstrates that *C. sextoni* achieved a size comparable to larger examples of *C. ceramicum*.

Calliostoma sextoni is a unique species for which the investigator has found no comparable counterparts among fossil or Recent forms. It has been named after Mr. Cecil Sexton in appreciation for his generous hospitality and gracious permission to collect on his property.

CALLIOSTOMA CUSPIDATUM Schmelz, n.sp.
Plate 1, figures 3, 4
Text-figures 3, 4

Description: Shell turbinate in shape. Protoconch submerged; about 1 1/2 whorls. Teleconch with 6 1/2 slightly convex whorls. Sculpturing on first teleconch whorl beginning with wavy axial threads that become intercepted by spiral threads; points where these threads intersect prominent cusp-like beads developed. Body whorl sculpturing of six cusp-like beaded spiral cords, sometimes separated by less distinct beaded spiral threads. Suture indented, but relatively obscure. Aperture subquadrate, about one-third height of shell. Outer lip simple. Columella arched and thickened. Umbilicus relatively narrow. Base of shell slightly convex in adult specimens; sculptured with 13 beaded spiral cords.

Holotype: USNM 476003; height 13.1 mm, maximum diameter 11.3 mm (Hoerle Collection).

Type locality: TU 555; Chipola Formation, east bank of Chipola River, about 1000 feet above Fourmile Creek (SW 1/4 Sec. 29, T1N, R9W), Calhoun County, Florida.

Paratype A: USNM 476004; height 13.8 mm, maximum diameter 12.0 mm; locality TU 555, Chipola River, Calhoun County, Florida (Hoerle Collection).

Additional paratypes: Eighteen specimens from TU 555 (Hoerle Collection) and two broken specimens from TU 555 (Tulane Collection).

Occurrence: Chipola Formation, Calhoun County, Florida.

Discussion: This shell is named for its cusp-like beaded cords (text-fig. 4). There are a number of similar fossil and Recent species. The closest fossil form is *Calliostoma grabaui* Maury (1917, p. 155, pl. 24, fig. 19), from the Late Miocene Cerado

Text-figures 1, 2. *Calliostoma sextoni* Schmelz, n. sp.; USNM 476001 (holotype); locality TU 951.

Text-figures 3, 4. *Calliostoma cuspidatum* Schmelz, n. sp.; USNM 476003 (holotype); locality TU 555.

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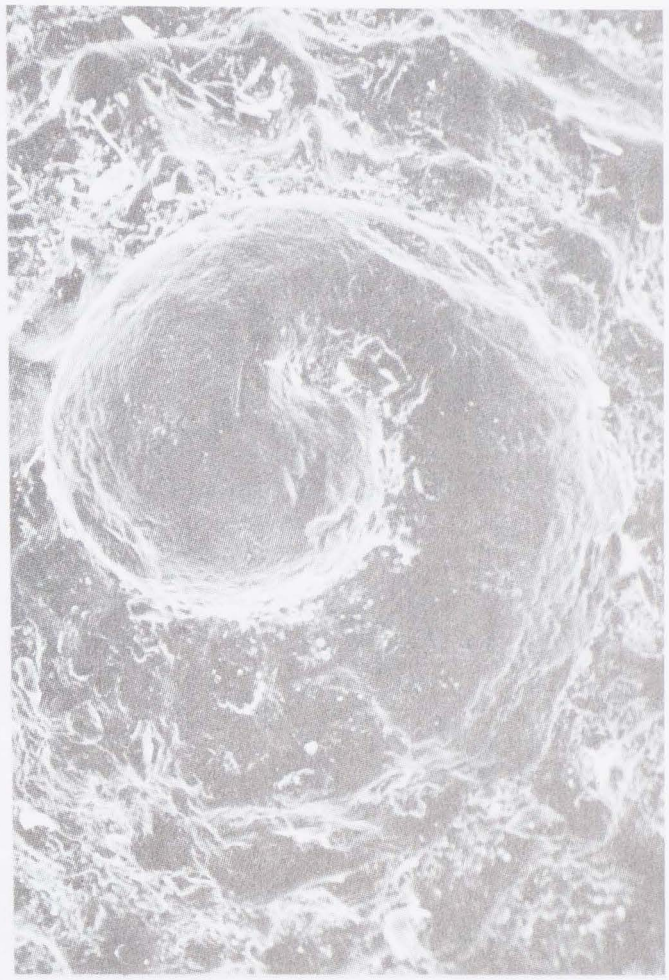

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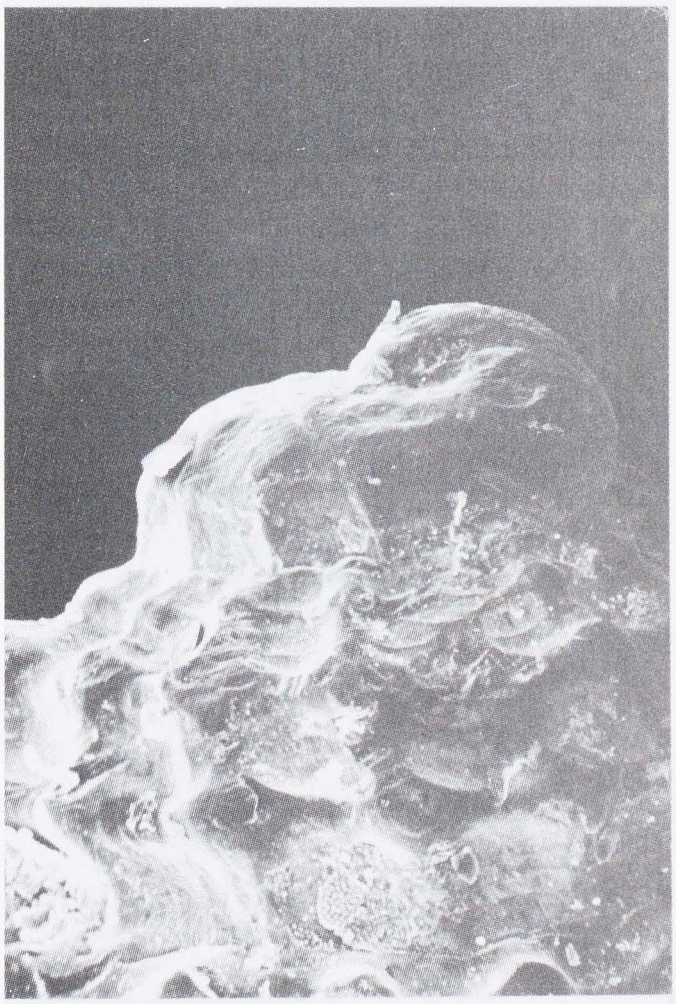

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Formation of the Dominican Republic. The new species differs from the latter in that it has a more pronounced cusp-like beading on the teleconch whorls, a narrower umbilicus, 13 instead of ten spiral cords on the base, and pronounced beading on all of the basal cords.

Two other similar species are *Calliostoma eremum* Woodring (1957, p. 63, pl. 22, fig. 3), from the Pliocene of the middle part of the Gatun Formation near the Panama Canal Zone and *Calliostoma mancinella* Olsson (1922, p. 164, pl. 15, figs. 9, 10), from uncertain age Gatun stage deposits along

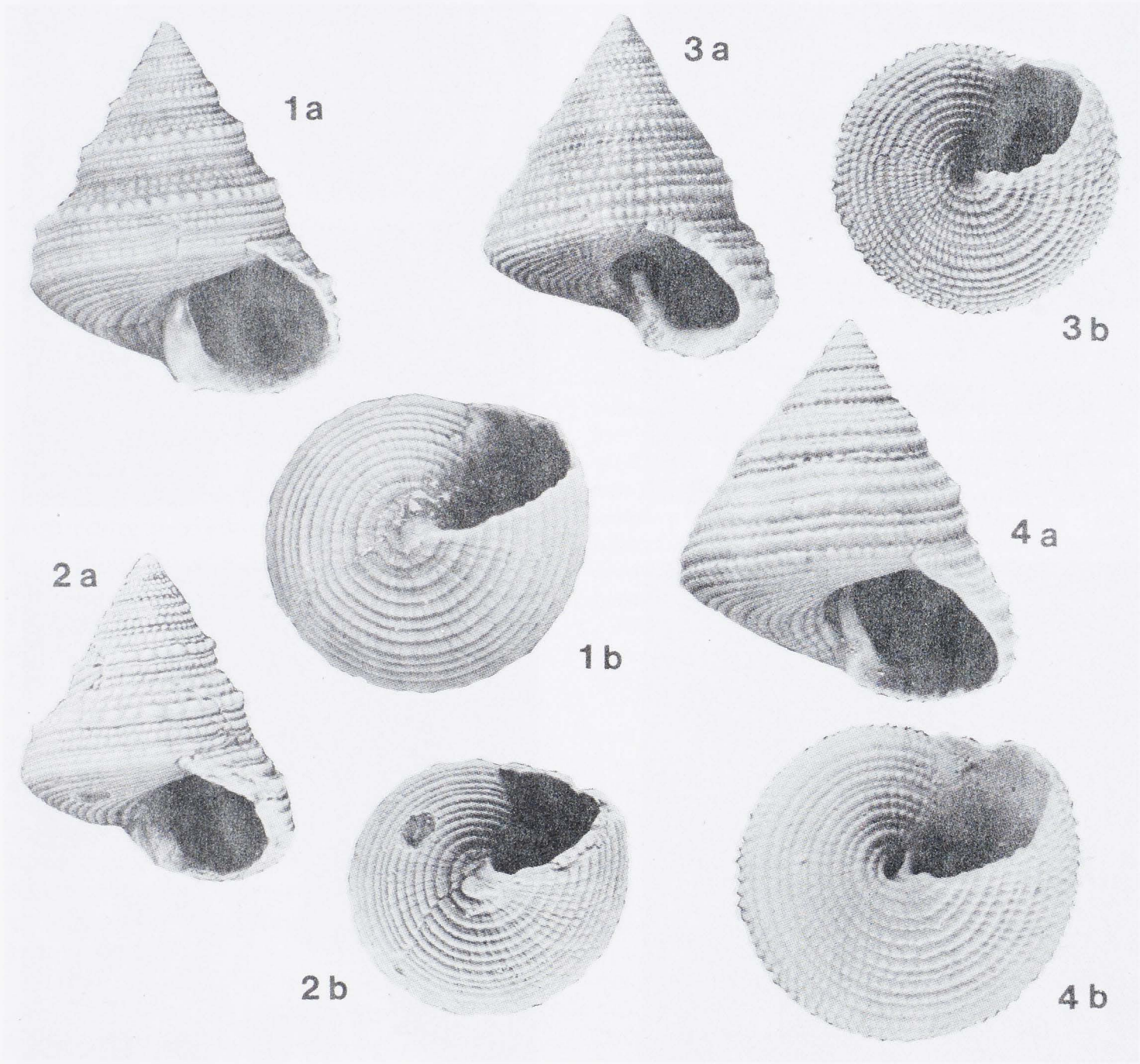

PLATE 1

Figures

1, 2. *Calliostoma sextoni* Schmelz, n. sp. (X 4)
   1. USNM 476001 (holotype); height 11.2 mm, diameter 9.4 mm. Locality: TU 951, Chipola Formation, Florida.
   2. USNM 476002 (paratype A); height 9.5 mm, diameter 8.3 mm. Locality: TU 546, Chipola Formation, Florida.

3, 4. *Calliostoma cuspidatum* Schmelz, n. sp. (X 3)
   3. USNM 476003 (holotype); height 13.1 mm, diameter 11.3 mm. Locality: TU 555, Chipola Formation, Florida.
   4. USNM 476004 (paratype A); height 13.8 mm, diameter 12.0 mm. Locality: TU 555, Chipola Formation, Florida.

Old Man Sam Creek in Costa Rica. The new species differs from the former in that it has fewer noded spiral cords on the penultimate whorl (6 compared to 9), a narrower umbilicus and 13 versus 10 or 11 beaded spiral cords on the base.

Compared to the Chipola species, *Calliostoma mancinella* Olsson, 1922, is a squattier, low-spired form whose diameter is greater than its height. It also differs from the new species by possessing a large beaded cord just below the suture of each whorl and has 12 instead of 13 spiral cords on the base. Only four or five of the spiral cords surrounding the umbilicus of this species are beaded; the remaining cords are smooth.

Among present day forms the new species looks most like *Calliostoma euglyptum* A. Adams 1854, listed for the western Atlantic by Clench and Turner (1960, p. 48, pl. 32). It differs, however, from this species in that it lacks an umbilicus, is sculptured with more rounded beaded cords, has 6 1/2 instead of 7 1/2 teleconch whorls, and there are 13 instead of 12 beaded spiral cords on the base.

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LOCALITY DATA

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

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. Chipola River, west bank, about 2000 feet above Fourmile Creek (SW 1/4 Sec. 29, T1N, R9W).
555. Chipola River, east bank, about 1000 feet above Fourmile Creek (SW 1/4 Sec. 29, T1N, R9W).
819. Farley Creek, 0.2 mile west 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).
828. Farley Creek, just upstream from mouth of unnamed tributary about 3/4 mile downstream from bridge of Florida Highway 275 (SE 1/4 Sec. 20, T1N, R9W).
830. Tenmile Creek, at power line crossing about one mile west of Chipola River (SE 1/4 Sec. 12, T1N, R10W).
831. Tenmile Creek (lowest Chipola beds exposed), slightly less than one mile west of Chipola River (SW 1/4 Sec. 7, T1N, R9W).
950. Chipola River, west bank, about 2000 feet above Farley Creek (SW 1/4 Sec. 20, T1N, R9W).
951. Tenmile Creek, about 1 1/4 miles west of Chipola River (SE 1/4 Sec. 12, T1N, R10W).
998. Tenmile Creek, about 1 1/4 miles west of Chipola River (SE 1/4 Sec. 12, T1N, R10W).

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