

is known about the relationships within this family, it cannot with certainty be placed in any named genus. Barnard (1958, p. 13) stated that "although Watson said the aspect of the shell suggested an *Admete*, the presence of a radula shows that he placed the species in the correct genus." The presence of a radula, as the family is presently understood, serves only to separate *Cancellaria* from *Admete*, and does not offer, *per se*, any assistance in placement within the complex of *Cancellaria* s.l.

Type: BM(NH) 1887.2.2.940.

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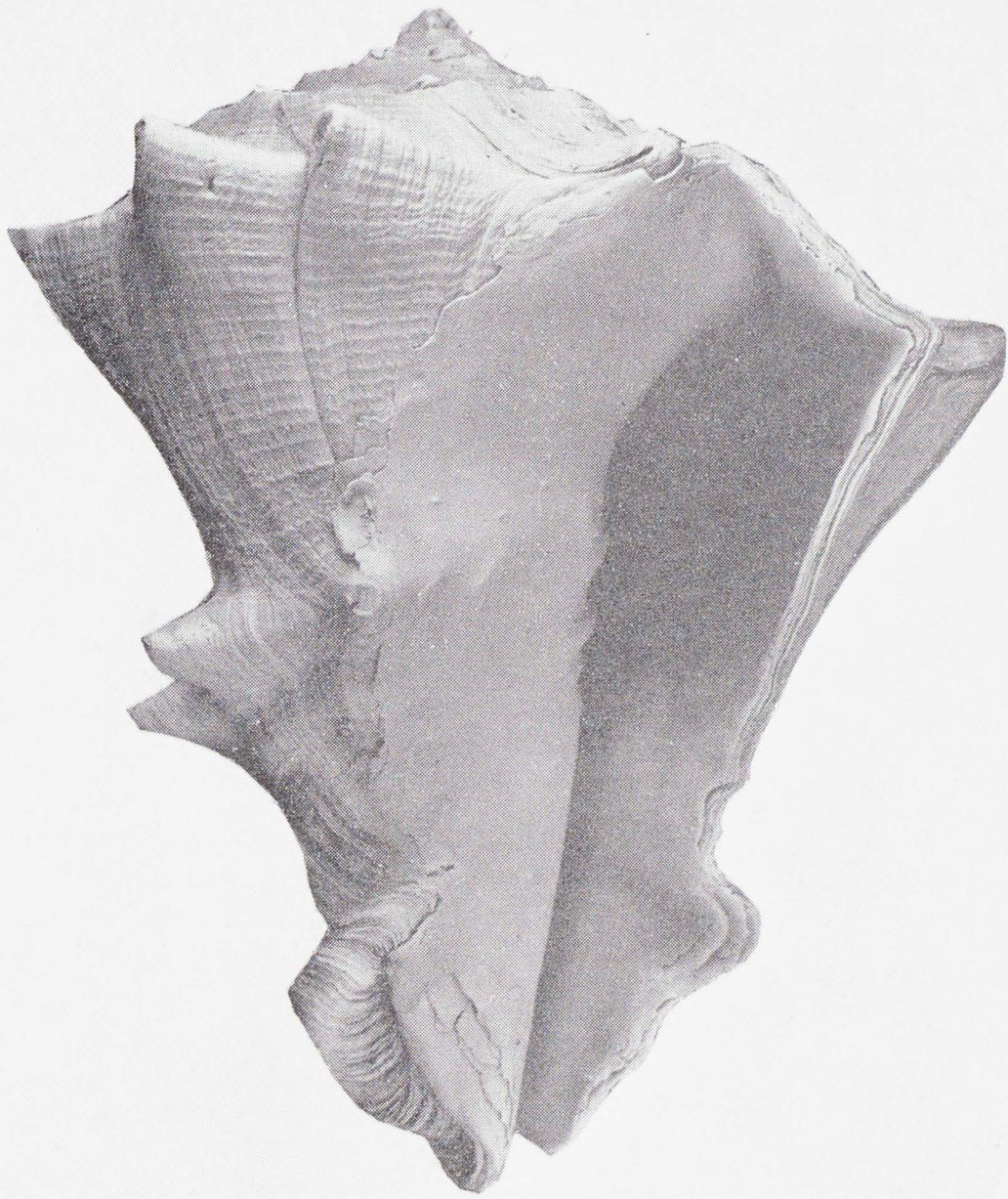
June 17, 1970

NOTES ON THE FAUNA OF THE CHIPOLA FORMATION—III TWO NEW SPECIES OF *VASUM* (MOLLUSCA: GASTROPODA), WITH COMMENTS ON *VASUM HAITENSE* (SOWERBY)

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When the writer (Vokes, 1966) published a monograph on the genus *Vasum* in the western Atlantic there were two species of *Vasum* known from the Chipola Formation of northwestern Florida. Since then, additional collecting has revealed two new species in this formation, plus many more and better examples of one of the previously described forms, *Vasum haitense* (Sowerby). The second described form, *V. chipolense* Vokes, remains a mystery, with no new material being discovered in spite of extensive

additional collecting. Since 1966, collections from 26 new Chipola localities have been added, plus much more material from previous localities. Ironically, the two new species are from one of the oldest known Chipola sites, the "One mile west of Bailey's Ferry, on Ten Mile Creek" (USGS 2212) of Dall and Gardner. One of the most fascinating aspects of the Chipola fauna is its incredible variety. Every collecting trip adds a number of new species and this particular place is one of the richest and most exciting of all of the pres-



Text figure 1. *Vasum haitense* (Sowerby) ($\times 1$); USNM 646454; height 111 mm, diameter 97.2 mm. Locality: TU 458.

ently known Chipola localities, which number 48 at this writing.

An unresolved problem in the *Vasum* monograph was whether the Tampa Limestone specimen figured by Dall (1915, pl. 11, figs. 2, 3) was of the same species as specimens from the Chipola, named *V. engonatum* by Dall, but synonymized with *V. haitense* by Vokes (1966, p. 10). This specimen was refigured (Vokes, *loc. cit.*, pl. 4, fig. 3) and it was concluded that until better material was discovered it was best not to separate the two forms. No new material has been found of the Tampa species but several very large Chipola specimens are now available, which seem to indicate conclusively that the two are not the same. Prior to this report the largest

known specimen of *V. haitense* from Florida was Dall's type specimen for *V. engonatum*, measuring 95 mm in height. In the Tulane collections there are now four large specimens: the one here figured (text fig. 1) from TU 458 is 111 mm; a second from TU 458 is 95 mm; a third from TU 950 is 98 mm; and a fourth from TU 806 is approximately 100 mm (canal broken). These four specimens are all comparable in size to the Tampa specimen, which measures 109 mm in height, and they are consistently different from it. In the Tampa specimen the spines on the spire are separate and distinct from the suture, giving a "Christmas Tree" appearance to the upper part of the shell. In all of the adult Chipola specimens seen, some 30 in number from 14

localities, the spines are enveloped by the succeeding whorl forming a zig-zag suture and giving the spire a very flattened appearance. It is thus concluded that the Tampa specimen is not *V. haitense* but is a new species; however, until a better type specimen is discovered for the Tampa species this writer will not name it.

Quality of the type specimens is not a problem with the two new Chipola species. In spite of the rarity of the two forms the holotypes are so well preserved that there is no doubt about their identification as new taxa.

VASUM TRIBULOSUM E. H. Vokes, n. sp.

Plate 1, figs. 1a, 1b

Description: Shell sub-triangular in outline, eight post-nuclear whorls in holotype, nuclear whorls unknown. Spire angle steep on early whorls, becoming flatter with later whorls. Axial ornamentation of about nine small nodes on early whorls developing sharp pointed spines on median and later whorls. Entire shell corrugated by growth lines. Spiral ornamentation on early whorls of five beaded threads on the shoulder, between the suture and the extended spines at the periphery; these threads are bunched together between the spines and flared out in the area adjacent to the spine, giving an odd "puckered" appearance to the subsutural spirals. On the body whorl an additional eight to ten scabrous major spiral cords and eight to ten minor threads, alternating in size; the two on the anterior canal larger and bearing stubby spines, which correspond to the shoulder spines. Suture appressed but with a small channel on the body portion of the shell; spines projecting over the immediately adjacent suture, causing the suture line to be undulated by their presence. Aperture elongated, flaring at the posterior end. Outer lip polished and slightly crenulated into the major and minor spirals; columellar wall with a moderately heavy callus, bearing three plications, of which the posteriormost is the widest, the anteriormost the narrowest; a space between the two posterior plications suggesting

the location of an intermediate smaller plait but it is not developed. Anterior canal straight with a large umbilicus.

Dimensions of holotype: height 87 mm, diameter 62 mm.

Holotype: USNM 646452.

Type locality: TU 546, Ten Mile Creek, north bank, about 1½ miles west of Chipola River (NE ¼ Sec. 12, T1N, R10W), Calhoun County, Florida.

Occurrence: Chipola Formation, Florida; (?) late lower Miocene.

Figured specimen: USNM 646452 (holotype).

Discussion: This new species is based on two beautifully preserved specimens from the classic locality "one mile west of Bailey's Ferry" (USGS 2212). Correctly, it is approximately one and three-quarters miles northwest of "Bailey's Ferry," as it is almost exactly on the quarter-section line between the northeast and northwest quarter sections of Sec. 12, while "Bailey's Ferry" was at the mouth of Ten Mile Creek, in the northwest quarter of Sec. 17, T1N, R9W.

V. tribulosum is clearly ancestral to the *V. muricatum* line, differing primarily in the stronger, more scabrous nature of the spiral ornamentation. There are only three columellar plications in *V. tribulosum* but it is obvious that they will give rise to the five of the younger species. There is a space between the two posterior folds that will accommodate the smaller intercalary fold and a suggestion of an anterior fold that will become the strong anteriormost fold seen in *V. muricatum*.

This new species is probably also ancestral to the *Hystrivasum* line as it markedly resembles some members of the group, especially juveniles of *V. jacksonense*, from the upper Miocene Jackson Bluff Formation (= Choctawhatchee Formation, in part). However, it lacks the doubled row of spines that separates the subgenus *Hystrivasum* from *Vasum* s.s.

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PLATE 1

Figures

- | | Page |
|--|------|
| 1. <i>Vasum tribulosum</i> E. H. Vokes, n. sp. (× 1) | 90 |
| USNM 646452 (holotype); height 87 mm, diameter 62 mm. | |
| Locality: TU 546. Chipola Fm., (?) lower Miocene. | |
| 2. <i>Vasum elongatum</i> E. H. Vokes, n. sp. (× 2) | 92 |
| USNM 646453 (holotype); height 42 mm, diameter 21.5 mm. | |
| Locality: TU 546. Chipola Fm., (?) lower Miocene. | |



PLATE 1

VASUM ELONGATUM E. H. Vokes, n. sp.

Plate 1, figs. 2a, 2b

Description: Shell biconic, eight post-nuclear whorls in adult; nucleus of one and one-half smooth, polished, slightly bulbous whorls. Spire angle steep, approximately 60° , remaining constant for the entire development of the shell. Axial ornamentation beginning gradually with six or seven small nodes, which increase in size but do not change in number up to the adult shell. On the median whorls a small open spine is formed at the shoulder on each node, but these become obsolete on the body whorl of the adult. Numerous fine axial growth lines. Spiral ornamentation on early whorls of two major cords, with two smaller threads between the posterior cord and the suture; smaller intercalary threads added subsequently. On body whorl ten major cords and ten alternating smaller threads, varying in strength, some almost as large as the major cords. The major spiral cord circling the anterior canal bearing small rudimentary spinelets, which correspond to the shoulder spines. Suture markedly appressed; a raised ridge following the suture line, which is sinuated by the axial nodes. Aperture pear-shaped, rounded at the posterior end and elongated into the anterior canal. Outer lip bearing about eight long ridges, corresponding to the area between the external major spirals, outer edge of lip crenulated by the major and minor spirals. Columellar lip bearing a heavy callus, with three equi-sized plications. Anterior canal long, straight, with only a small umbilicus.

Dimensions of holotype: height 42 mm, diameter 21.5 mm.

Holotype: USNM 646453.

Type locality: TU 546, Ten Mile Creek, north bank, about $1\frac{1}{2}$ miles west of Chipola River (NE $\frac{1}{4}$ Sec. 12, T1N, R10W), Calhoun County, Florida.

Occurrence: Chipola Formation, Florida; (?) late lower Miocene.

Figured specimen: USNM 646453 (holotype). Other occurrences: TU locality nos. 547, 830.

Discussion: *V. elongatum* is based on five specimens, two from the type locality, one from another Ten Mile Creek locality, and two from a third locality on the Chipola River. The holotype is the best preserved of

the type lot, but it is not adult; one paratype measures 54 mm in height. The holotype does not have a complete aperture so that the description is taken in part from paratype material.

This new species is of the *V. capitellum* line and is most closely related to *V. gurabicum* Maury, from the Gurabo Formation of Santo Domingo. It differs from both of these species in lacking the four heavier spiral ribs with their long spines. The ornamentation of *V. elongatum* is very subdued in its overall aspect, the shell bearing a strong resemblance to a *Polygona* such as *Latirus (Polygona) maxwelli* or *L. (P.) mcgintyi*, both of Pilsbry. However, the differences in the columellar plaits and the umbilicus indicate that this resemblance is coincidental.

LOCALITY DATA

458. Chipola Fm., east bank of Chipola River, above Farley Creek (SW $\frac{1}{4}$ Sec. 20, T1N, R9W), Calhoun Co., Florida.

546. Chipola Fm., Ten Mile Creek, about $1\frac{1}{2}$ miles west of Chipola River (NE $\frac{1}{4}$ Sec. 12, T1N, R10W), Calhoun Co., Florida.

547. Chipola Fm., west bank of Chipola River, about 2000 ft. above Four Mile Creek (SW $\frac{1}{4}$ Sec. 29, T1N, R9W), Calhoun Co., Florida.

806. Chipola Fm., west bank of Chipola River, about one mile below powerline crossing (NW $\frac{1}{4}$ Sec. 20, T1N, R10W), Calhoun Co., Florida.

830. Chipola Fm., Ten Mile Creek, at power line crossing about one mile west of Chipola River (SE $\frac{1}{4}$ Sec. 12, T1N, R10W), Calhoun Co., Florida.

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