

A SECOND WESTERN ATLANTIC SPECIES OF *VITULARIA* (MOLLUSCA:GASTROPODA)

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In 1967 the writer reported the occurrence of the gastropod *Vitularia* in the Pinecrest Beds of southern Florida. This marked the first knowledge of the genus in the western Atlantic fauna, the only previously known New World species being from the eastern Pacific. Consequently, it was with great delight that a second western Atlantic species was recognized in collections made during the Summer, 1976, in the Gurabo Formation of the Dominican Republic.

Although the Tertiary molluscan fauna of the island of Hispaniola (Santo Domingo) has been known since G. B. Sowerby described several new species in 1850, little paleontologic work has followed, the major exception being the Maury expedition of 1916 (Maury, 1917). This is, in large measure, due to the more or less permanent state of political unrest that until recently plagued that area. But over the last ten years the government has achieved a stable condition to the point that the Dominicans are actively soliciting tourist business. Certainly our visit was a vast improvement over the one described by Maury during which the party was harassed by revolutionaries, slept in hen houses and suffered all manner of deprivation. Perhaps this explains why we found a large number of undescribed forms, which will be dealt with in future papers.

The genus *Vitularia* first occurs in the Oligocene of France, with the species *V. linguabovis* (Basterot, 1825), the only Old World fossil form, which persisted up through the middle Miocene of the Aquitaine and Vienna basins. The oldest reported occurrence in the New World is *V. equadorana* Marks, 1951, described from the middle Miocene Daule Formation of Ecuador. However, this assignment was determined by comparison with the fauna of the "middle Miocene" Gatun Formation of Panamá and the upper beds of the Tuberá Group of Colombia. These units are at least upper Miocene, if not lower Pliocene in age, so that *V. equadorana* is probably not as old as

formerly believed. The only other occurrences in the New World are the living West Coast *V. salebroso* (King and Broderip, 1832) and a similar form in the Pliocene Charco Azul Formation of western Costa Rica (Olsson, 1942, p. 170).

The first western Atlantic species described was *V. linguabison* (Vokes, 1967, p. 91) and since the initial discovery of the type lot only one other specimen has appeared in Florida. This came from a site (TU 1177) some 30 miles to the east-northeast of the type locality. But a number of specimens have been taken from the time-equivalent Agueguexquite Formation of southern Veracruz, Mexico (TU 638, 1046). From these a better idea of the species can be ascertained and the nature of the protoconch can be determined. A juvenile shell with a well preserved protoconch is figured here (text figures 4a, 4b) from the Mexican material. Not surprisingly *V. linguabison* proves to have a protoconch very much like that of the Recent *V. salebroso*, its presumed descendant, with three and one-half conical whorls that rise above the apex of the shell (compare text figures 4b and 5).

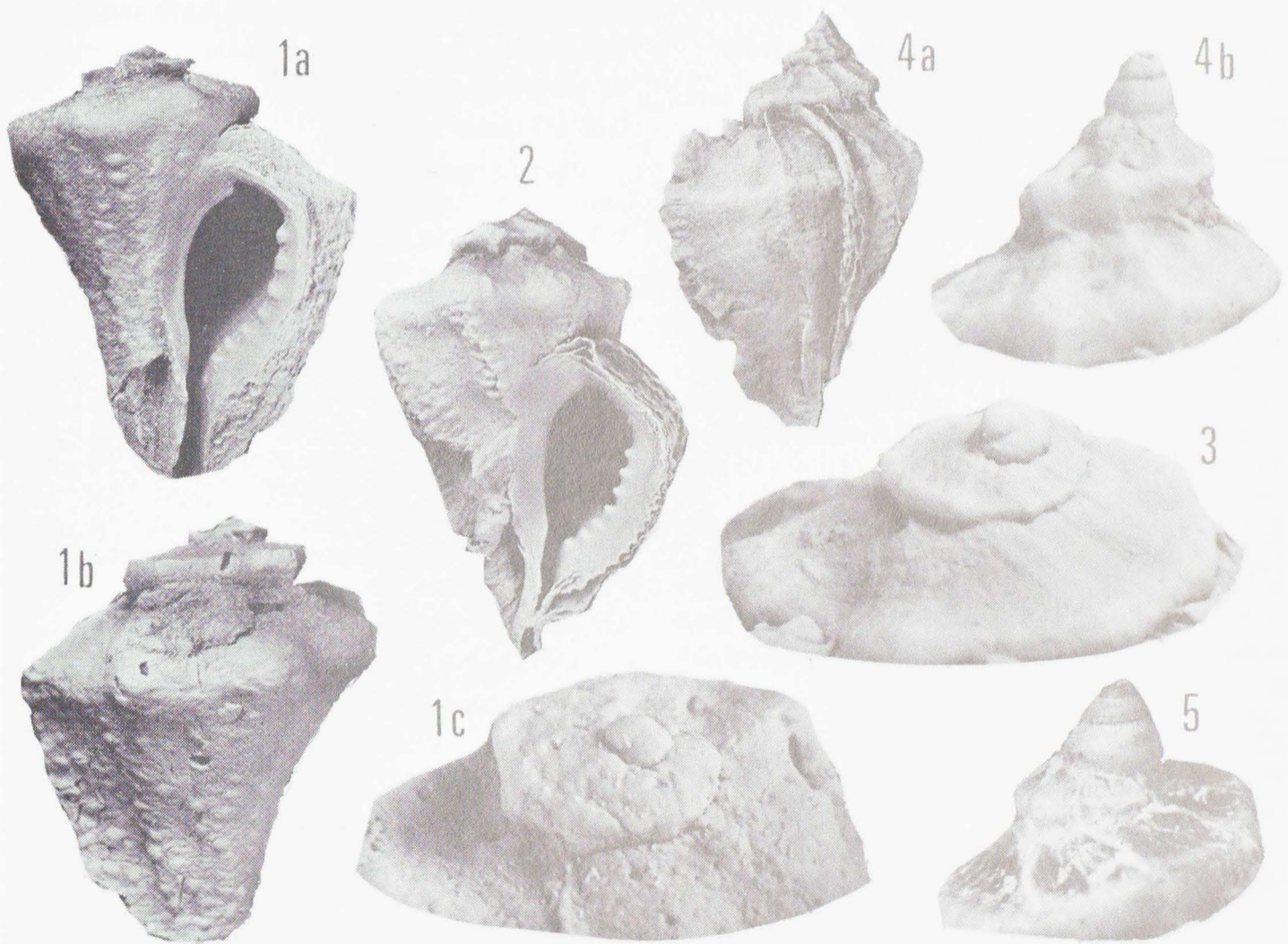
The *Vitularia* from Santo Domingo is of particular interest as it more nearly resembles the Recent Indo-Pacific *V. miliaris* (Gmelin, 1791)*, than it does any of the New World forms. The new species has a protoconch like that of *V. miliaris*, consisting of one and one-half almost submerged whorls, barely visible above the top of the shell (compare text figures 1c and 3). The pustulose surface that is characteristic of the

*Radwin and D'Attilio (1976, p. 173) have placed all of the Indo-Pacific species of *Vitularia* in synonymy with *V. miliaris*. Considering the great variability seen in this group they are probably correct, with the possible exception of *V. crenifer* Montrouzier, 1861. The original illustration of this species shows a marked anal tooth, much like our Dominican shell, and if so, it is probably a valid form. The writer has never seen such a specimen from the Indo-Pacific area.

Old World *V. linguabovis* and *V. miliaris*, but almost lacking in the New World *V. linguabison* and *V. salebrosa*, is strongly developed in the Dominican shell. However, it has the strong anal tooth of the New World forms, not seen in *V. miliaris*. This is probably a primitive structure as *V. linguabovis* has the strongest anal tooth of all the species.

At the time of the description of *V. linguabison* the writer expressed doubts over the placement of the genus *Vitularia* in the Muricidae, suggesting perhaps it was more closely related to the Purpuridae (now Thaididae, ICZN Opinion 886, 1969). Radwin and D'Attilio (1976, p. 173, fig. 113) have recently given an illustration of the radula of *V. miliaris* and on the basis of similarity to other radulae have assigned

Vitularia to the subfamily Muricopsinae. This is a difficult assignment to accept. Conchologically there is little in common between *Vitularia* and the typically fimbriate shells of the Muricopsinae, which includes such genera as *Murexiella*, *Muricopsis*, *Murexsul*, and *Favartia*. The operculum of *Vitularia* is of the purpuroid type rather than the muricoid one seen in the Muricopsinae. Thus, the implication is that perhaps we are seeing convergence in the radulae. Certainly any organ that is as likely to be affected by external factors, in this case feeding habit, as is the radula, seems an untrustworthy indicator of close relationship. (Compare, for example, the molars of the pig and man, both omnivores, which are strikingly similar; yet no one puts the two in the



Text figure 1, *Vitularia dominicana* E. H. Vokes, n. sp.; USNM 247902 (holotype). Figure 2, *V. miliaris* (Gmelin); Natal Museum H 218. Figure 3, *V. miliaris* (Gmelin); Natal Museum H 220. Figure 4, *V. linguabison* Vokes; USNM 247903. Figure 5, *V. salebrosa* (King and Broderip); USNM 770607. (Figures 1a, 1b, 2, and 4a, X 1½; figures 1c, 3, 4b, and 5, X 10.)

same family because of it.) There are many groups in the Thaididae that have a radula much akin to the Muricinae, especially *Morulina* (see Arakawa, 1965, pl. 14, figs. 7-14), but conchologically no one would put them anywhere except in the Thaididae. Therefore, it seems probable in this case that the radula is a false clue to the placement of the group and this writer still is of the opinion that the genus *Vitularia* is more likely a member of the Thaididae than of the Muricidae. Conchologically the only other group to which *Vitularia* may be related is the genus *Crassilabrum* Jousseume, 1880, which Radwin and D'Attilio presumably place in the Thaididae (it is not treated in their work). *Crassilabrum*, *Thais*, and *Purpura* all have a strongly recurved median cusp on the rachidian tooth, not greatly different from *Vitularia*.

Genus VITULARIA Swainson, 1840

Type species: Vitularia tuberculata Swainson, 1840, by monotypy (*V. tuberculata* Swainson = *Murex miliaris* Gmelin, 1791).

VITULARIA DOMINICANA

E. H. Vokes, n. sp.

Text figures 1a, 1b, 1c

Diagnosis: Four post-nuclear whorls, plus a protoconch of one and one-half smooth submerged whorls. Spire greatly flattened. No surface ornamentation visible except seven or eight swollen knobs, which appear around the shoulder. No varices except at the aperture, where a fimbriate surface is developed between the outer surface of the shell and the inner side of the aperture. Surface of the body whorl covered with a pustulose surface, randomly arranged. Aperture ovate, slightly patulate; inner lip smooth, except for a moderately strong anal tooth, well within the posterior fold of the aperture. Inside of outer lip bearing seven large denticles. Anterior canal short, straight, with a broad siphonal fasciole.

Dimensions of holotype: height 28.2 mm, diameter 23.5 mm.

Holotype: USNM 247902.

Type locality: TU 1210, Rio Gurabo, east bank, first bluff below the bridge on the road from Los Quemados to Sabaneta, Dominican Republic (= USGS 8544 and Maury's Zone B — her Pl. 3, fig. B, is probably this locality).

Discussion: At the time of the description of *V. linguabison* the age of the Pinecrest

Beds was thought to be upper Miocene. Since then work on the planktonic foraminifers and nannofossils by Akers (1972, 1974) has demonstrated that the Pinecrest and the Agueguexquite formations are both Zone N 20, middle Pliocene, in age. The age of the Gurabo Formation has been considered to be middle Miocene, but Seiglie and Cucurullo (1971) have dated the Mao Adentro Limestone and the Mao Clay of Santo Domingo as Zones N 18 and N 19 (lower Pliocene), respectively. These two formations immediately overly the Gurabo Formation, in an unbroken sequence (although Seiglie and Cucurullo suggest a time gap between the two upper members), and it seems evident that the Gurabo is gradational into the Mao Adentro. According to Dr. Akers (personal communication) the age of the beds at TU 1210 is between Zones 17 and 19, unfortunately the necessary index fossils are lacking for a more precise determination. By process of elimination, Zone N 17 is indicated, or a late Miocene age.

Figured specimens: Fig. 1, *Vitularia dominicana* n. sp.; USNM 247902 (holotype). Fig. 2, *V. miliaris* (Gmelin); Natal Museum H 218; height 29.0 mm, diameter 21.6 mm; Conducia Bay, Mozambique. Fig. 3, *V. miliaris* (Gmelin); Natal Museum H 220; height 16.5 mm, diameter 14.6 mm (protoconch only figured); Memba Bay, Mozambique. Fig. 4, *V. linguabison* Vokes; USNM 247903; height 27.1 mm, diameter 17.3 mm; locality TU 1046. Fig. 5, *V. salebrosa* (King and Broderip); USNM 770607; height 6.4 mm, diameter 3.2 mm (protoconch only figured); locality TU R-250, Salina Cruz, Oaxaca, Mexico.

LOCALITY DATA

The following are Tulane University fossil locality numbers.

- 638. Agueguexquite Fm., roadcut and quarry on Mexico Highway 180, 14 miles (22.4 km) east of junction with side road into Coatzacoalcos, Veracruz, Mexico.
- 1046. Agueguexquite Fm., road cuts both sides Mexico Highway 180, 7.5 miles (12.1 km) east of junction with side road into Coatzacoalcos, Veracruz, Mexico (= locality of Perrilliat Montoya, 1960, Paleont. Mex., no. 8).
- 1177. Pinecrest Beds, "Mule Pen Quarry," north side of Florida Highway 846, 9.1 miles east of U.S. Highway 41 at Naples Park (SE ¼ Sec. 24, T48S, R26E) Collier Co., Florida.

1210. Gurabo Fm., Rio Gurabo, east bank, first bluff below the bridge on the road from Los Quemados to Sabaneta, Dominican Republic (= USGS 8544; Maury's Zone B).

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NOTES ON THE FAUNA OF THE CHIPOLA FORMATION—XXII
ON THE OCCURRENCE OF *DOLICHO LATIRUS* (MOLLUSCA:GASTROPODA)

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The small genus-group for which the name *Dolicholatirus* is now employed has a lengthy geologic history, dating back to the late Cretaceous Owl Creek Formation of Mississippi. Here we see a curious species, named *Dolicholatirus torquatus* by Sohl (1964, p. 209, pl. 26, figs. 9, 10, 16, 17), that is to all indications a good case of ontogeny *anticipating* phylogeny. The juvenile paratype (*ibid.*, figs. 9, 10) is apparently a good *Dolicholatirus*, with two faint columellar plications. The columellar lip, if it was ever present, has been broken away, leaving behind a *Fasciolaria*-like aperture, but the overall shell shape is identical to the modern members of *Dolicholatirus*. However, the adult holotype (*ibid.*, figs. 16, 17) has no visible plications as far into the aperture as it

is possible to see without breaking away the shell and has an expanded body whorl that externally looks exactly like *Fasciolaria* (*Triplofusus*). This subgenus (type species: *Fasciolaria gigantea* Kiener) has three small plications at the anterior end of the columella, which is bent. The adult *D. torquatus* has a straight columella more like *Dolicholatirus*. Perhaps it is the ancestor to both lines.

Certainly by the Eocene the modern genus-group is well established. In the United States we see from the middle Eocene: "*Latirus*" *singleyi* Harris, 1895, and "*L.*" *obtusus* Johnson, 1899; from the upper Eocene, "*L.*" *leaensis* Harris, 1897; and from the Oligocene, "*Turbinella*" *perexilis* Conrad, 1847. In the Paleogene of Europe there are numerous species, including "*Fusus*"