NOTES ON THE FAUNA OF THE CHIPOLA FORMATION – VII

ON THE OCCURRENCE OF THE GENUS *CONCHOLEPAS* (GASTROPODA: THAIDIDAE), WITH THE DESCRIPTION OF A NEW SPECIES

EMILY H. VOKES
TULANE UNIVERSITY

The bizarre gastropod genus *Concholepas* Lamarck, 1801 (type species: *Concholepas peruviana* Lamarck, 1801, = *Buccinum concholepas* Bruguière, 1789) today is confined to the coast of southern Peru and Chile, where it inhabits the same ecologic niche as the abalone further north, and *Purpura patula* (Linné) in the tropics; that is to say, it clings to surf-battered rocks by means of its extremely muscular foot. The gross morphological shape of these three different gastropods also shows a marked convergence, with the aperture being greatly enlarged to accommodate the foot, and the spire being almost totally submerged. Indeed, the resemblance of *Haliotus* (the abalone) and *Concholepas* is remarkable, considering that they are only most distantly related. *Purpura patula* and *Concholepas* are more closely related, being in the same subfamily Thaidinae*, and it is an interesting exercise in evolutionary morphology to compare the shells of *Thais haemostoma, Purpura patula,* and *Concholepas concholepas.* The series of modifications from a "normal" Neogastropod to a patelloid shell are made strikingly clear within the members of this one small group. It is particularly instructive to see the small remnant of the now totally insufficient operculum still retained by *Concholepas.*

Because of this preference for a high-energy environment, fossil specimens of *Concholepas* are rare, the majority being known from late Neogene strata in Peru and Chile, where the sole Recent representatives (probably all members of a single rather variable species) still survive. (At the rate at which the local inhabitants are over-collecting this shellfish, considered a gastronomical treat by some, although not the writer, the threat of extinction is very real.) However, the genus has a respectable geologic history, being represented in the middle Miocene (Helvetian) beds of the Loire Basin of France by the rare species *Concholepas deshayesi* Rambur, 1862; in the equivalent (Balconian) beds of Australia by *C. antiquata* Tate; and in the upper Miocene of New Zealand by *C. pehuensis* (Marwick). The latter two species have been the subject of a recent review by Beu (1970), who noted that, although originally described as coming from Eocene strata, the species *C. antiquata* is actually middle Miocene in age. This error has led to the citation of "Eocene to Recent" for the genus by authors, such as Wenz (1941, p. 1122).

Other than these completely disjunct Miocene occurrences, there are no known species of *Concholepas* outside of western South America. Thus it is totally unexpected and worthy of note to find a representative of the genus in the late lower Miocene Chipola Formation of northwestern Florida, now the oldest reported occurrence of the genus. The Chipola species is much like the other Miocene forms in that the shell is markedly smoother than the Recent form (although the latter is smooth in the juvenile stages in good Haekelian fashion). The logical assumption is that the Chipola species is ancestral to both the Old World species and to the South American one. But considering the sparcity of specimens involved, and the slim chance of finding many more, the true relationships will have to remain little more than speculation.

*The family name Thaididae and the subfamily name Thaidinae have been conserved by action of the International Commission on Zoological Nomenclature (Opinion 886, 1969) in preference to the technically older, but less frequently used Purpuridae and Purpurinae.

Beu (1970, p. 45) noted that the Australasian specimens of *Concholepas* give evidence of having been deposited in deeper water than is normal for the living *Concholepas,* being on the order of 50 fathoms. They are also marked by having much thinner shells than the modern species. The Chipola specimen is also thin-shelled and this may be a factor of its early evolutionary position. The original habitat of the group may not have been as violent, and hence a thick shell would not have been critical to survival. The development of a thickened shell would have permitted the subsequent invasion of the surf-zone by the genus in later times.

It is evident that the ecologic requirements of the genus have changed somewhat through time. Today the group is confined to relatively cool water, as the Humboldt Current brings Antarctic water along the western coast of South America. The Chipola Formation was definitely tropical in its temperature, and the two specimens collected from the Chipola are found in the vicinity of a coral reef (TU 547). Perhaps the early ancestors of the line clung to coral rather than rocky shores. Certainly the expanded aperture indicates that the life-style of the genus was essentially the same, although the precise environment may have been somewhat different.

CONCHOLEPAS DREZI E. H. Vokes, n.sp.

Text figure 1

Diagnosis: Shell thin; protoconch consisting of one and one-half smooth turns; gradually becoming more ornamented to form only two post-nuclear whorls, principally the widely expanding body whorl. Spire not submerged but only slightly extended and below the level of the flaring aperture. Axial ornamentation limited to faint growth lines. Spiral ornamentation consisting of incised grooves that separate the shell into what appear to be flat-topped spiral bands of differing widths. Approximately 36 spiral grooves, which set off about 20 wider bands alternated with narrower ones; on the middle portion of the body whorl the bands regularly alternating wide and narrow, but at either extremity the pattern breaks down. Well-developed siphonal fasciole with a strong ridge curving around the anterior portion of the columellar wall as a result. Aperture oval, appressed to the body whorl at the central part, flaring posteriorly and with a flattened columellar lip at the anterior end; short open siphonal notch. Faint lirations visible on the inside of the shell, reflecting the external spiral grooves.

Dimensions of holotype: 33.5 mm, diameter 30.6 mm.

Holotype: USNM 646937.

Type locality: TU 459, east bank of Chipola River, steep bank about 1500 ft. above mouth of Taylor Lake Branch (NW ¼ Sec. 29, T1N, R9W), Calhoun County, Florida.

Occurrence: Chipola Formation, Florida; late lower Miocene.

Figured specimen: USNM 646937 (holotype). Other occurrence: TU locality 555.

Discussion: Concholepas drezi, n. sp., is much like the two middle Miocene species *C. deshayesi* and *C. antiquata.* It differs from *C. deshayesi* in having the spire more extended and in the greater development of the siphonal fasciole and notch. *C. deshayesi* is almost equal anteriorly and posteriorly and has no siphonal notch whatsoever. The Australian *C. antiquata* is nearer to our species but differs in having a more extended spire and a ridge at the "shoulder" that forms what is presumed to be an anal notch in the flaring aperture. In this latter trait *C. drezi* differs from both *C. antiquata* and the upper Miocene *C. pehuensis,* as both demonstrate this sinus, and it is more like the Recent *C. concholepas,* which also lacks the notch. *C. deshayesi* shows this ridge in the early stages of shell development but there is no sinus in the edge of the aperture. The nature of the spiral ornamentation is almost identical in *C. drezi, C. antiquata,* and *C. deshayesi,* differing sharply from the elaborately frilled Recent specimens. (Compare text figs. 1 and 2.) The upper Miocene *C. pehuensis* is even smoother than the early species and clearly represents a side branch that led nowhere.

It is a pleasure to name this remarkable species after Mr. Paul Drez, presently of Ft. Walton Beach, Florida (Eglin Air Force Base), who collected the type specimen. A second, incomplete, shell had previously been taken near the type locality (TU 555) but at this writing these two examples are the sole record of the genus in North America.

LOCALITY DATA

459. Chipola Fm., east bank Chipola River, steep bank about 1500 ft. above mouth of Taylor Lake Branch (NW ¼ Sec. 29, T1N, R9W), Calhoun Co., Florida.

547. Chipola Fm., west bank of Chipola River, about 2000 feet above Four Mile Creek (SW ¼ Sec. 29, T1N, R9W), Calhoun Co., Florida.

555. Chipola Fm., east bank of Chipola River, about 1000 feet above Four Mile Creek (SW ¼ Sec. 29, T1N, R9W), Calhoun Co., Florida.

LITERATURE CITED

BEAU, A. G., 1970, Taxonomic position of *Lippistes pehuensis* Marwick, with a review of the species of *Concholepas* (Gastropoda: Muricidae): Malac. Soc. Australia, v. 2, no. 1, p. 39-46, pl. 4.

WENZ, WILHELM, 1941, Handbuch der Paläozoologie, v. 6, pt. 1, Gastropoda: Part 1, Prosobranchia; Lief. 5, p. 949-1200, illustrated.

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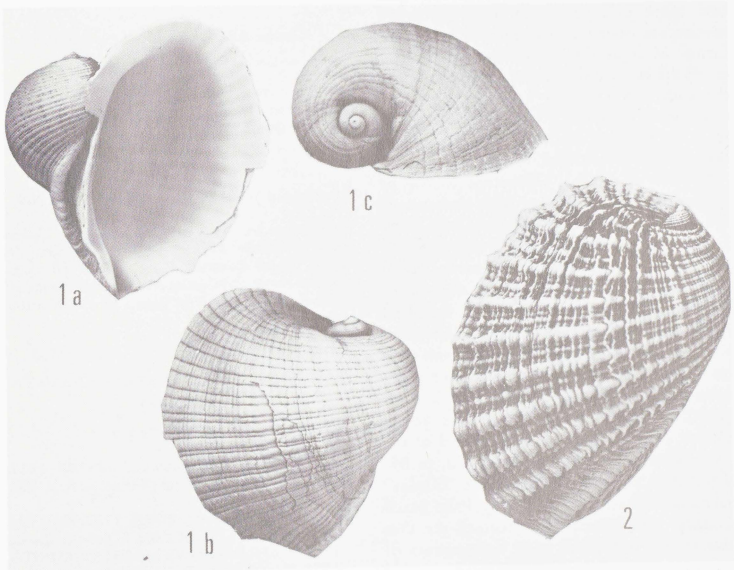

Text figure 1. *Concholepas drezi* E. H. Vokes, n. sp.; USNM 646937 (holotype); height 33.5 mm, diameter 30.6 mm; locality TU 459 (X 1½). Text figure 2. *Concholepas concholepas* (Bruguière); USNM 707684; height 47.3 mm, diameter 35.0 mm; locality TU R-226, Antofagasta, Chile, on rocks (X 1½).