Homsey Collection Provides New Insight and New Questions About Multiple Little-Understood Species of Cretaceous Gastropods

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Abstract - A recent donation of Upper Cretaceous mollusks from the Mount Laurel Formation in Delaware, USA, contained a large number of specimens attributed to *Laxispira sp.,* Gabb 1876. Although *Laxispira* is divided into two species based on ornament and how tightly the unsutured coils are arranged, all publications prior to 1993 represented both as consistently shaped, with small variations in the shape of the aperture. This lot contains shells suggesting that these species were more varied than even David Dockery III's 1993 paper described, while still sharing certain characteristics, particularly their loosely coiled growth habit. Some of the specimens in the lot closely resemble other species found in the Mount Laurel, including one that was described from a single steinkern. This preliminary report describes the similarities and differences within the lot and compares items in the lot to other described species. More work is required to determine how many species are represented in this lot, if a revised description is called for, or whether some of the similar known species are misidentified *Laxispiras.*

Keywords: Mollusca, gastropod, Late Cretaceous, Delphinula, Laxispira, C&D Canal

INTRODUCTION

Delaware naturalist Sophie Homsey spent decades collecting Upper Cretaceous marine fossils from the Chesapeake and Delaware Canal. She amassed a huge collection of fossil fauna *in situ* from a Mount Laurel Formation exposure in the C&D Canal at the Biggs Farm, near St. Georges, Delaware. Most collecting was done in the decades before 1980, when dredging destroyed the site. The collection consists of thousands of specimens representing hundreds of species. This study was restricted to specimens collected *in situ* before the dredge.

Among the donated items were over 200 specimens that Homesy attributed to *Laxispira sp*. Her specimens are preserved in various states ranging from nearly complete shell preservation to broken steinkern pieces. She donated the bulk of her collection to the Delaware Museum of Nature and Science shortly before her passing in 2019.

Sorting, confirming, and refining Homesy's identification for the *Laxispira* lot proved difficult. At first the lot seemed to contain several disparate species. However, when trying to sort the lot by shape and ornament, they all seemed to blend together. How many species are there in this lot? How many genera?

ABBREVIATIONS USED

DMNH	Delaware Museum of Nature and Science (formerly Delaware Museum of Natural History)
NJSM	New Jersey State Museum
C&D Canal	Chesapeake and Delaware Canal

ANSP Academy of Natural Sciences in Philadelphia/Academy of Natural Sciences at Drexel University

ILLUSTRATIONS

Figure 1: Three views of *Delphinula navesinkensis*, Weller, 1904, NJSM 7577

Figure 2: *Laxispira lumbricalis photo by David T. Dockery, III*

Figure 3: Laxispira sp. from the Homsey Collection at the Delaware Museum of Nature and Science

DISCUSSION

In 1876, William Gabb described *Laxispira lumbricalis.* He based his new species on a single specimen having a "Shell with a circular cross section, whorls about as far apart as the diameter of the whorls, three or four in number; surface marked by numerous small, closely placed revolving ribs." He based his genus *Laxispira* on this and several casts that appeared to belong to the same species. He could not assign his new genus to a family but compared it to the genera *Turritella* and *Delphinula.* (Gabb, 1876)

Since then, specimens of *L. lumbricalis* have been identified in Tennessee (Wade, 1926), Mississippi (Sohl, 1960 and Dockery, 1993), Texas (Sohl, 1964) and Delaware (Owens, et al. 1970). All but Dockery's work show the unwound spire illustrated by Gabb.

Sohl (1964) described a second species in the genus, *Laxispira monilifera*, based on Gabb's description, noting that Gabb's holotypes were already missing (and still are) from their home at the Academy of Natural Sciences in Philadelphia (now Academy of Natural Science at Drexel University). The difference between the two species was the beaded vs. solid lirae and tighter coils.

Homsey's collection lacks any perfect specimens, but the preservation offers information to compare all aspects of the shell, including how it wore. At first glance, as with Sohl's material, her pieces appear so varied as to be several different species. Some are almost completely unwound from the spire at a consistent angle, as Gabb ascribed to *L. lumbricalis*. Some had tight whorls from apex to aperture, but not so close as to have sutures. Some begin with tight, even sutured, whorls, then unwind at differing rates and angles as they extend out to the aperture. Others show a range of shape between the two.

Working from the premise that these were all individual species, I searched for similar gastropods in the literature from across the Upper Cretaceous of North America and Europe, as well as lots in DMNH's modern gastropod collections. *Delphinula navesinkensis*, Weller 1907, is a close match for some. Others appear closer to *Gegania sp.,* Jeffreys 1884, and *Calliomphalus sp.,* Cossmann 1888, although *Gegania and Calliomphalus* are sutured and have more whorls than anything in Homsey's lot. Some resemble *Siliquaria sp.,* Bruguière 1792, with their irregular habit, but *Siliquaria* has a deep groove that runs the length of the teleoconch. All five are found in the Mount Laurel Formation.

Delphinula navesinkensis is a mystery unto itself. The genus and species were described by Weller from a single steinkern. Furthermore, no other specimens were ever reported after Weller's original find. Why?

Of his lone steinkern *Delphinula* cast, Weller said this:

"The dimensions of the type specimen are: height, 10 mm.; maximum diameter, 15 mm. The shell has a low spire, with about two full volutions shown in the internal cast, with the suture well defined and with a broad, open umbilical cavity. The first volution increases rather rapidly in size, but the enlargement of the outer volution is very gradual, its outer portion appearing, from the cast, to be free for a short distance. In the inner portion of the shell the exposed surface of the volutions is rounded, but in the outer volution, especially towards the aperture, a strong revolving angle is developed a little above the mid-height of the volution.

Remarks - A single nearly perfect internal cast of this species has been observed, and from the cast alone its generic position cannot be determined with entire satisfaction. It is evidently a low-spired form with a broad umbilicus and without columellar folds."

Figure 1: Three views of Delphinula navesinkensis, Weller, 1907, NJSM 75577

Of course, with no shell material attached to Weller's *Delphinula navesinkensis* there is always some doubt about the nature of the animal.

In 1993, David Dockery III examined preserved shells from the Coffee Sands of Mississippi and offered a new description of *L. lumbricalis* that combined both species:

"The protoconch is trochoid in shape and consists of three convex whorls, the second of which has rows of very fine punctae. The terminus of the protoconch shows the outline of a subsutural sinus. After this terminus, the shell becomes widely uncoiled. The teleoconch consists of three or three and one half broadly uncoiled whorls sculptured with closely spaced spiral lirae that are slightly beaded where crossed by faint growth lines. The inner side of the whorls opposite die axis of coiling is smooth. Growth lines of the juvenile shell indicate a sinus that follows the whorl's upper surface. The aperture is circular."

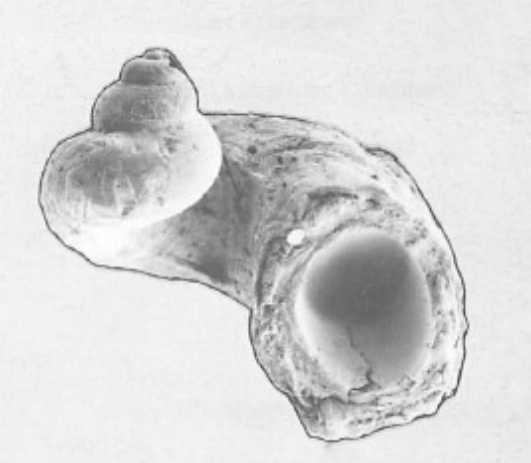

***Figure 2: SEM photo of Laxispira lumbricalis*, Gabb 1876, by David Dockery III**

One of his illustrations, although much smaller than Weller's specimen, bears a striking resemblance to the lone *Delphinula.* It also introduces more variation in *Laxispira's* unwinding habit than was originally observed.

Figure 3 shows a representative sample of Homesy's specimens. All but one of the shells shown retained some partial ornamentation, although it may not be visible in the photograph. The whorls are generally sharply angled at the top and rounded on the bottom, but the exact angle and point at which the slope begins to curve inward varies from one individual to the next. The resulting apertures range from circular to elliptical. Some of the shells exhibit solid lirae, like the original description of *L. lumbricalis*. The number of lirae in the Homsey specimens ranges from about 12 to 16. Some have solid lirae but show lirae that are broken by growth lines in the areas of least wear. Others are beaded overall, resembling *L. imbricata*.

However, all share certain traits. All have three to four whorls. Those most closely resembling Gabb's original description lack any sutures, but all lack sutures after the first two whorls. The convex whorls expand rapidly after the apex. Shells are thin. Apertures, where visible, are thin, circular to elliptical, with smooth interior. Ornaments are tightly spaced, spiral lirae. Taken together, I was unable to find any firm way to delineate between the various forms.

CONCLUSIONS

When seen together, comparing ornament, unwinding habits, and internal molds exposed by missing sections of shell, Homsey's specimens suggest not several genera, but rather one or two highly variable species within one genus. Within a set of 211 specimens from a single locality, with enough retained external ornamentation to be comfortably assigned to any species, there seems to be a continuum of variations in an overall pattern.

The observations here are only preliminary. To date, this study brings up more questions than answers. Just how diverse were *Laxispira's*? Are there two species? More or less? Is *Delphinula navesinkensis* a misidentified *Laxispira*? Do the shells that begin tightly coiled and then unwind represent a completely different, as yet undescribed animal? Are the most tightly wound shells more closely related to *Calliomphalus*? Are some *Calliomphalus* misidentified *Laxispira?* Why do some uncoil in a consistent manner while others are irregular? Why do they uncoil at all? More investigation is required to answer these questions.

Figure 3: Laxispira sp. from the Homsey Collection at the Delaware Museum of Nature and Science: Row 1: DMNH249264a, DMNH249264b, DMNH249266, DMNH249265, DMNH249275; Row 2: DMNH249270, DMNH249276, DMNH249271, DMNH249264c, DMNH249276; Row 3: DMNH249331 DMNH249274, DMNH249264d, DMNH249273, DMNH249273; Row 4 DMNH249264e, DMNH249264f, DMNH249264g, DMNH249267, DMNH249268

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