NERITA EXUVIOIDES TRECHMANN (MOLLUSCA:GASTROPODA) FROM THE GATUN FORMATION OF PANAMA

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Due to their preference for a rocky littoral habitat, examples of fossil nerites rank a close second to hen's teeth. Therefore, it was a pleasant surprise to see a rather well-preserved specimen found in the Gatun Formation of Panama by Robert H. Stewart, formerly geologist for the Panama Canal Company (now retired). First examination of the specimen yielded even more remarkable results for it became obvious that it is not even vaguely related to any New World members of the genus now living but is most closely related to the Philippine *N. exuvia* Linn., a form with extremely heavy spiral cords. The specific name that immediately came to mind was *"exuvioides."*

A perusal of the literature quickly revealed that not only was the species already described — it had been named *exuvioides* by Trechmann (1935), based upon a single poor specimen from "St. Helene Point" (*i.e.*, Point Saint Hilaire), Carriacou. Jung, in studying the Carriacou fauna, noted that the holotype (which he refigured) is "an incomplete specimen unsuitable as type material" (1971, p. 175) and subsequent collecting has added only one additional fragmentary topotype. The apertural features of the holotype being unknown, the specimen was assigned to the subgenus *"Nerita?"* by Jung. The aperture of the Panama specimen, although not perfect, is sufficiently well-preserved to observe that it is undoubtedly a member of the subgenus *Theliostyla* Mörch, characterized by having pustules on the apertural platform and very fine denticulations on the labial margin.

In the New World there are only three species referable to this subgenus: *N. funiculata* Menke, 1851, in the eastern Pacific; and *N. tessellata* and *N. fulgurans*, both of Gmelin, 1791, from the western Atlantic. All three of these species are similar in appearance with only fine spiral cords and all have a completely different appearance from the heavily ribbed fossil shell.

In the Recent fauna *N. funiculata* and *N. fulgurans* most nearly resemble each other externally, both with a color pattern of indistinct gray and yellow blotches. *Nerita tessellata* has a peculiar color pattern of black and white checks, in which the white parts often are eroded, making a pattern of raised black blocks, interspersed with white grooves. In apertural features *N. funiculata* and *N. tessellata* are most alike, having more numerous denticulations on the outer lip, as many as 18, in contrast to about 12 in *N. fulgurans*.

Nerita tessellata and *N. fulgurans* are closely related but Russell, in his study of the western Atlantic nerites, observed that "the aperture is wider in relation to its length in *N. fulgurans* and the columellar teeth are more prominent" (1941, p. 364). Although they are indistinct in the Gatun specimen, the parietal teeth do more nearly resemble those of *N. fulgurans* (here figured, pl. 1, fig. 3) than those of *N. tessellata*, which are often no more then small rounded pustules.

However, externally, the fossil shell with its heavy spiral cords bears no resemblance whatsoever to the American species, its nearest relative being, as noted above, the Philippine *N. exuvia*. Due to the limited amount of material available the limits of variability cannot be ascertained. The type specimen has 12 spiral cords; the Panama specimen has only 11. In the living *N. exuvia* the number of cords ranges from 13 to 15, with new cords added by intercalation as the shell gets larger. Not surprisingly the color pattern of the fossil (as typical of Archeogastropoda, still visible) is also similar to that of *N. exuvia*, the common name of which is the "snake-skin* nerite" in reference to the color pattern of black and white zigzags that mark the shell.

The strong resemblance of the American fossil to the living Indo-Pacific species is not to be taken as indicating any remarkable trans-Pacific contacts, but rather as descent from a common ancestor far back in the Tertiary. In the early Miocene we see a similar form in *N. plutonis* Basterot, 1825, from the Aquitanian to Helvetian of

**exuvia* is Latin for a cast-off skin, as in a snake.

Europe. Even farther back, there is *N. caronis* Brongniart, 1823, from the Tongrian, which is also (as best can be ascertained from the illustrations, at least) similar. The genus *Nerita* has an extended geological history dating back into the Mesozoic and, thus, it is not surprising to find these disjunct remnants.

The exact age of the fossil species is somewhat uncertain. Trechmann described *N. exuvioides* from the tuffaceous beds at Point Saint Hilaire, Carriacou, assigning a lower Pliocene age. This age has been followed by most subsequent authors and would correlate with the occurrence in the Gatun Formation, also believed to be lower Pliocene in age.

However, in 1972, Robinson and Jung described the stratigraphy of Carriacou and named a new Grand Bay Formation. According to these authors, the age of the Grand Bay at the type locality, as determined by foraminiferal assemblages is N.9 to N.11 (or early middle Miocene). On the basis of conspecificity of mollusk species they concluded that the Saint Hilaire beds are the same age, noting that the differences in the two faunas can be accounted for by assuming facies control. According to Jung (1971, p. 153) in the total Grand Bay Formation (as considered by Robinson and Jung) there are 109 molluscan species, of which 39% occur in the typical sandy facies, 29% are confined to the tuffaceous beds, and 32% are found in both facies. These figures are not so compelling to remove any question about the correlation.

As Jung notes (*ibid.*, p. 160) the problems of correlation utilizing the macrofauna of the Grand Bay Formation with other faunas in the Caribbean is hindered by the poor preservation of the Carriacou fauna. Therefore, no conclusion is possible, but it is worth noting the possibility of a younger age for the tuffaceous beds. On the other hand, the presumed ancestral species in Europe have a long geologic range and it is entirely reasonable that the species ranges from the early middle Miocene into the lower Pliocene — that is, after all, only about ten million years, less than the range of *N. plutonis*.

Genus NERITA Linnaeus, 1758

Nerita LINNAEUS, 1758, Syst. Nat., ed. 10, p. 776.

Type species: *Nerita peloronta* Linnaeus, 1758 (sub. des., Montfort, 1810).

Subgenus THELIOSTYLA Mörch, 1852

Theliostyla MÖRCH, 1852, Cat. Yoldi, pt. 1, p. 167.

Type species: *Nerita albicilla* Linnaeus, 1758 (sub. des., Kobelt, 1879).

NERITA (THELIOSTYLA) EXUVIOIDES Trechmann

Nerita exuvioides TRECHMANN, 1935, Geol. Mag., v. 72, no. 12 (No. 858), p. 551, pl. 20, fig. 30.

NOT *Nerita (Nerita) exuvioides* ? Trechmann. JUNG, 1969, Bulls. Amer. Paleontology, v. 55, no. 247, p. 424, pl. 42, figs. 12, 13 [? = *N. fulgurans* Gmelin].

Nerita (Nerita?) exuvioides Trechmann. JUNG, 1971, Bulls. Amer. Paleontology, v. 61, no. 269, p. 175, pl. 6, figs. 1,2 (holotype).

Description: "Shell thick with spire depressed, the last whorl large and inflated. Decoration on the body-whorl consists of twelve rounded spiral ridges with hollow interspaces rather wider than

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PLATE 1

Figures

1. *Nerita (Theliostyla) exuvioides* Trechmann (×1½)
   USNM 365135; height 28.5 mm, diameter 33.0 mm
   Locality: TU 1432. Gatun Formation, Panama
2. *Nerita (Theliostyla) exuvia* Linnaeus (× 2)
   USNM 819922; height 22.5 mm, diameter 25.9 mm
   Locality: Mambajao, Camiguin Isl., Philippine Islands
3. *Nerita (Theliostyla) fulgurans* Gmelin (×1½)
   USNM 819923; height 32.5 mm, diameter 30.2 mm
   Locality: TU R-215, Kingston, Jamaica

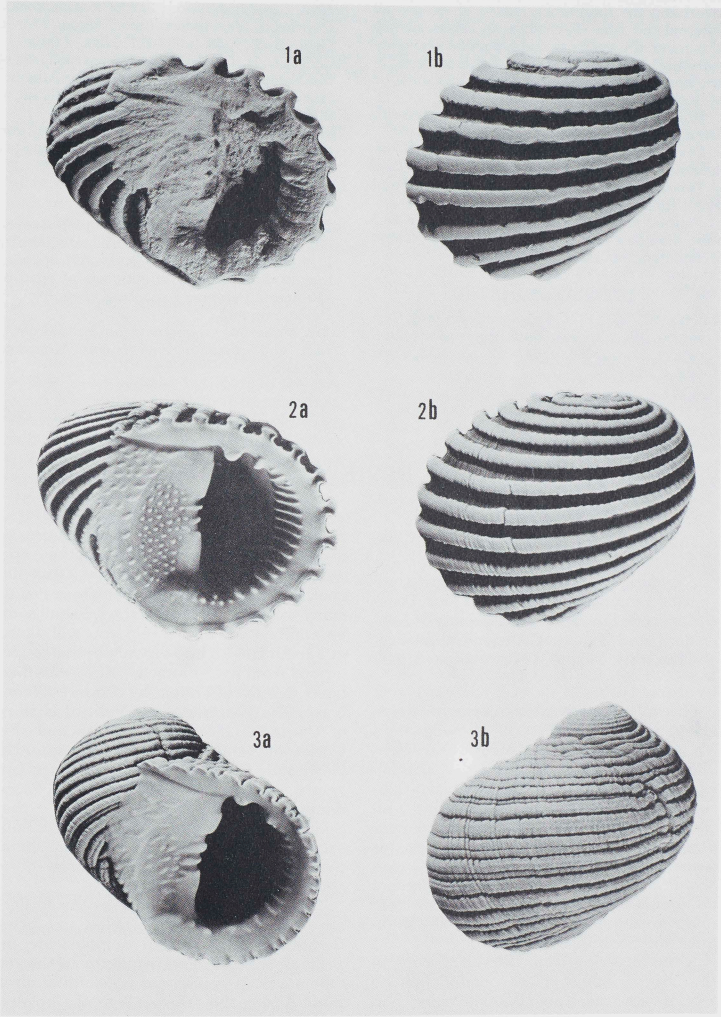

PLATE 1

the ridges, the sides of each ridge tending to overhang the intervening space; there are no intercalated ribs. The inner lip slopes steeply down into the aperture and is papillated and apparently bluntly toothed. The shell is damaged at the apex and the edge of the inner lip cannot be well seen." (Trechmann, 1935)

Holotype: British Museum (Natural History), Dept. Paleontology no. GG 4503.

Dimensions of holotype: height 22.5 mm, diameter 27.2 mm (*fide* Jung, 1971, p. 175).

Type locality: "St. Helene Point" (= Point Saint Hilaire), Carriacou, Grenadines.

Figured specimen: USNM 365135; height 28.5 mm, diameter 33.0 mm; locality TU 1432, Gatun Formation, Panamá.

LITERATURE CITED

JUNG, PETER, 1971, Fossil mollusks from Carriacou, West Indies: Bulls. Amer. Paleontology, v. 61, no. 269, p. 143-262, pls. 1-22, 2 text figs., 1 table.

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RUSSELL, H. D., 1941, The Recent mollusks of the Family Neritidae of the western Atlantic: Harvard Mus. Comp. Zool., Bull., v. 88, no. 4, p. 345-404, pls. 1-7, 4 text figs.

TRECHMANN, C. T., 1935, The geology and fossils of Carriacou, West Indies: Geol. Mag., v. 72, no. 12 (No. 858), p. 528-555, pls. 20-22.

LOCALITY DATA

1432. Gatun Fm., north side Boyd-Roosevelt Highway, clearing behind Residential Martin Luther King (former Palo Quemado), approximately 1.5 km east of junction of road to "Refinería Panamá, S. A.," at Cativá, Prov. of Colón, Panamá.

R-215. Mangrove swamp between Palisados Airport and road to Port Royal, Kingston, Jamaica.

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REVIEW

ADAM SEDGWICK: Geologist and Dalesman, 1785-1873; a Biography in Twelve Themes, by Colin Speakman. Published jointly by The Broad Oak Press Limited, The Geological Society of London, and Trinity College, Cambridge, 1982, xii + 145 pp., 18 figs., paper $15.00

This volume comprises a series of twelve essays on various aspects of Sedgwick's life, his forebears, his academic and scientific life, his association with Murchison followed by the crisis of the Cambrian-Silurian Controversy, his association with Charles Darwin followed by his confrontation with Darwin's *Origin of Species*, his association with Prince Albert and Queen Victoria, and his later years. They present additional insight into Sedgwick as a man and the significance of his scientific influence and accomplishments.

After receiving from Darwin, a copy of the *Origin*, Sedgwick responded that he read it with "more pain than pleasure" and "parts I read with absolute sorrow, because I think them utterly false and mischievous." Darwin was deeply hurt by Sedgwick's "severe disapprobation and ridicule" and replied: "I do not think my book will be mischievous; for there are so many works that, if I be wrong, I shall soon be annihilated; and surely you will agree that truth can be known only by rising victorious from every attack." Sedgwick had been deeply offended by Robert Chambers's *The Vestiges of the Natural History of Creation* (1844) and he attacked this work indignantly at every opportunity. He viewed the *Origin* as another *Vestiges*, but "more expert and, therefore, more dangerous." Speakman states that Sedgwick "was, in fact, because of his honesty, integrity and fine scientific mind perhaps the most serious antagonist of the *Origin*."

This collection of essays, as the foregoing example shows, helps to bring Sedgwick "to life" and demonstrate his prominence as a central figure in the development of geology as a scientific discipline during the "Heroic Age of Geology" and his contributions to the study and teaching of the geosciences.

—H.C.S.