SHELL·O·GRAM
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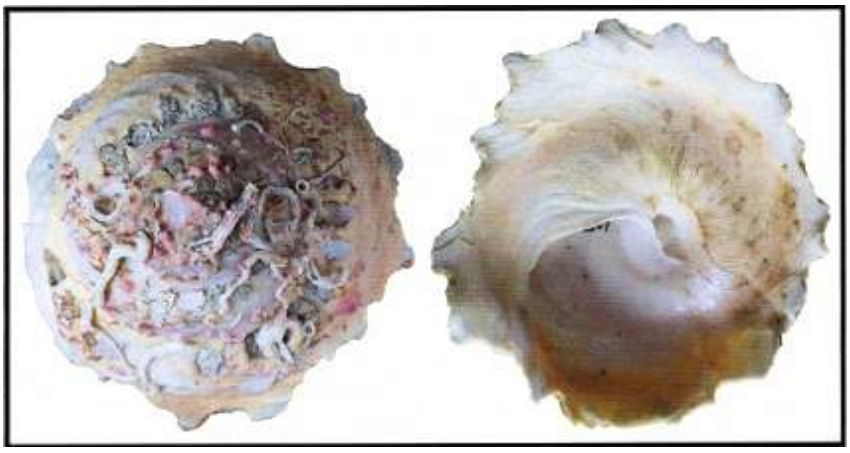
July-August, 2023 _____ Volume 64 (no. 4)

Upcoming meetings

The Jacksonville Shell Club, Inc. (JSC) customarily meets on the **fourth** Thursday of each month except for November (a week earlier due to Thanksgiving) and December (traditional Xmas get-together) at 7:00 PM in Function Room D of the Southeast Branch, Jacksonville Public Library https://www.jaxpubliclibrary.org/locations/southeast-regional. The main program on **July 27th** is will be presented by **Tammy Myers** on shell finery. She'll provide us with a window into the natural, aesthetic, and economic world of precious pearls and other shell jewelry. Whether cultured or natural, perfectly spherical, or baroque, pearls are unique among gems in owing their provenance to living animals. They have caught the fancy of our species since antiquity. Other mollusk-created jewelry and accessory components include cameo, mostly from helmet shells, mother of pearl (pearl oysters, *Trochus* and *Turbo* snails), iridescent/colored nacre (abalone and freshwater mussels) used in leis, belts, purses, etc. Tammy promises plenty of examples will illuminate the talk. **Mary Warren** open the program with her first shell-of the month; perhaps she'll select a hot topic like *Nerita versicolor* (see pp. 2-3).

On **August 24th** we'll convene at the customary time and venue. In lieu of the shell-of-the-month, we'll hear a report from **David Davies** on the Shell Club Representatives' meeting, which went down on Saturday, June 3 at the end of the COA Convention in Wilmington, NC. A number of topics were discussed, and most are familiar..



On the other hand, novel approaches to remedies for continuing problems and ideas to enrich our programs and extend our outreach were put forth. Harry Lee will follow with a recap of the field trips, 19 live presentations, auctions, and other activities that he experienced during the nearly week-long get-together with over 200 fellow conchologists. On **L** is *Aspidophoreas lamberti* (Souverbie, 1871), which fetched the highest hammer price of any shell at this year's COA oral auction – over $1,000.00.

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The club customarily meets monthly at the Southeast Branch of the Jacksonville Public Library, 10599 Deerwood Park Blvd,, Jacksonville, Florida https://www.jaxpubliclibrary.org/locations/southeast-regional. Please address any correspondence to the club's address above. Annual membership dues are $15.00 individual, $20.00 family (domestic) and $25.00 (overseas). Lifetime membership is available. Please remit payment for dues to the address below and make checks payable to the Jacksonville Shell Club. The club's newsletter and scientific journal, the *Shell-O-Gram* (ISSN 2472-2774) is issued bimonthly and mailed to an average of 15 regular members and friends by specific request and no less than ten scientific institutions with permanent libraries. An electronic (pdf) version, identical except for "live" URL's and color (vs. B&W) images, is issued about two days later and sent to about 200 individuals who have demonstrated an interest in malacological research and/or Florida mollusks. These pdf's (ISSN 2472-2782) have also been posted to http://jaxshells.org/letters.htm since November, 1998. We encourage members and other friends to submit articles for publication. Closing date for manuscript submission is two weeks before each month of publication. Articles appearing in the *Shell-O-Gram* may be republished provided credit is given the author and *Shell-O-Gram* Editor-in-Chief. As a courtesy, the editor should receive a copy of the republished version. Contents of the *Shell-O-Gram* are intended to enter the permanent scientific record. The club is a chartered corporation in the State of Florida and a non-profit educational organization under the provisions of Section 501(c)(3) of the US IRS Code.

Membership Dues are payable in **September** each year.
Many of you have complied, but if you're in arrears, please send in your dues:
Individual $15.00; Family $20.00, to
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Paul Jones finds a *Nerita versicolor* at Matanzas Inlet.

On June 18 a few of us JSC members received an email from Paul Jones, who wrote "While perusing the base of the rock jetties on the west bank of Matanzas Inlet at low tide yesterday afternoon, I spotted this little nerite, fresh dead and empty among the rock and oyster rubble …. My first thought was that it looked mighty odd for *Nerita fulgurans* and actually reminded me more of *Nerita versicolor* (Four-Toothed Nerite)!

Here's three close up images of it, whatcha think?" On **R** is Paul's 17.94mm shell in apertural view. It's hard to mistake this species; Paul nailed the ID. Did you know *N. versicolor* hasn't been reported this far north in well over a century? We'll examine these records more closely in the Sept.-Oct. issue.

Florida Mollusca Exotica: Part 3, (first of two installments): Freshwater Gastropods

by Robert R. Fales (fales@verizon.net)

In this part of our series, we transition from marine and brackish water gastropods to those that primarily inhabit fresh water. The ten "species" summarized below derive from two subclasses (Caenogastropoda, Heterobranchia) and four families (Thiaridae, Viviparidae, Ampullariidae, Planorbidae). They employ a variety of reproductive and feeding strategies, and range from serious pests to essentially benign actors with respect to crops, horticultural plants, and aquatic vegetation. Depending on their life habits, they may have a negative effect on native species.

The area of greatest potential veterinary and medical concern is the role that they (along with the terrestrial gastropods that we shall see later) may play as natural intermediate hosts in the life cycles of parasites, predominantly trematodes (flatworms, Phylum Platyhelminthes) and nematodes (roundworms, Phylum Nematoda), that can infect a number of definitive (natural final) hosts including fish, reptiles, amphibians, birds, wild and domestic mammals, and man. These parasites target many organs, such as the lungs, liver, biliary tract, intestines, brain, and kidneys, leading to overactive immune responses, cancers, organ failure, infertility, and even death.[1] So as to be able to appreciate the interactions of the parasite/host relationships, a brief summary is provided,[2] eaders should avail themselves of the opportunity to learn more. The rat lungworm nematode, *Angiostrongylus cantonensis* is used as a specific example, because (1) infection can result in the devastating effects of eosinophilic meningitis (neuroangiostrongyliasis) in incidental hosts, e.g., humans, and (2) the nematode has now been shown to be established in Florida throughout the state.[3] Other parasites have different absolute cycles, but, in general, follow the same form.

Four types of hosts are recognized for *A. cantonensis*: two types that are part of the natural life cycle – definitive and intermediate; and two that are not - paratenic and incidental (accidental).

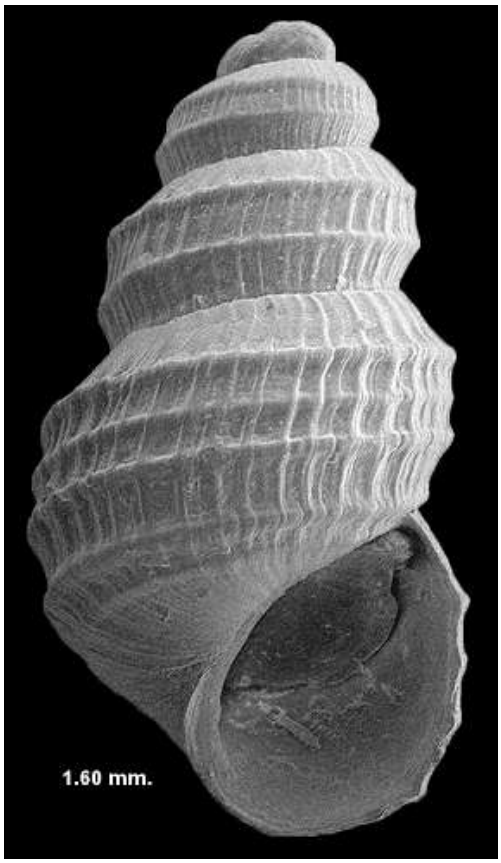
- Definitive hosts (rats [e.g., *Rattus* spp.] in this case) are those in which the worm can reach maturity and reproduce, and are infected by ingesting intermediate or paratenic hosts that contain third-stage (L3) larvae. The worms mature and produce eggs that hatch into first-stage (L1) larvae that make their way to the gastrointestinal tract. The L1 larvae are shed in feces of the definitive host, and are intended to be ingested by snail intermediate hosts.
- Intermediate hosts are those in which L1 larvae develop into infective L3 larvae, but cannot reach adult form until the intermediate host is eaten by a definitive host, completing the natural life cycle.
- Paratentic hosts are those not part of the natural life cycle that ingest an infected intermediate or other paratenic host containing L3 larvae. The larvae become quiescent and do not develop further. Freshwater prawns or shrimp, frogs, toads, lizards, land crabs, centipedes, and planarians can serve as paratenic hosts for *A. cantonensis*.

- Incidental (accidental) hosts are those not part of the natural life cycle that become infected by eating raw or undercooked intermediate or paratenic hosts containing L3 larvae, or otherwise ingesting L3 larvae (e.g., drinking from a garden hose in which an infected intermediate host has sequestered itself). The L3 larvae are not quiescent, and attempt to complete the life cycle by migrating first to the central nervous system where they usually die, leaving physical damage and a resulting immune reaction that has negative effects on the brain, spinal cord, and peripheral nerves. Humans, dogs, horses, birds, opossums and other marsupials, non-human primates, and fruit bats have all been recorded as incidental hosts. Experimentally, calves, cats, guinea pigs, rabbits, and pigs have also been infected. Incidental hosts cannot pass the parasite on to any other organism; thus, they are "dead-end" hosts for the parasite.

These various parasite infections have been extremely rare in the United States (although not in underdeveloped countries where they can be a serious health issue), but care should be taken when handling snails in or taken from the wild.

With that background, we launch into summaries of the ten freshwater species addressed here.

Caenogastropoda, order unassigned (superfamily Cerithioidea), **Thiaridae**[4,5]
The following three taxa are "Old World" cerith-like snails that have found their way to the United States, most likely through the aquarium trade. Reproduction is ovoviviparous, and entirely to predominantly parthenogenic, with a single female snail potentially able to start a new, clonal population. They are potential natural intermediate hosts for many parasites, especially trematodes, some of which can infect humans.



Melanoides tuberculata* (O. F. Müller, 1774)**[6] (Red-rim Melania): Broad native range throughout subtropical/tropical Africa, Middle East, East Asia, and Australia. Introduced to inland and estuarine waters around the world. Although primarily a freshwater species, it may tolerate a marine environment, and has reached high densities in mangrove swamps. It is widespread in the United States. First collected in Florida in Miami-Dade County in 1966, then Hillsborough County in 1969; now established in many counties. The snail grazes on microalgae and detritus, but does not feed on the leaves of larger plants. In some habitats, it is known to outcompete native snails for algal resources. Thus, for instance, starting in 1973 the snail was imported into Martinique where it caused the extinction of *Biomphalaria glabrata* (Say, 1818) (see below), a known vector of the significant trematode parasite *Schistosoma mansoni*. ***Melanoides tuberculata is itself an intermediate host to more than 30 different parasites, and has been a vector for the introduction of at least three species of trematodes into the United States, one of which, the liver fluke *Haplorchis pumilio*, does infect humans who have eaten raw fish (another intermediate host between snails and the final hosts, which are birds and mammals). A juvenile shell collected by Rick Edwards in Blowing Rocks State Park on Jupiter Sound is shown on the **L** (SEM by H.G. Lee and Ann Heatherington)

Tarebia granifera* (Lamarck, 1816)**[7] (Quilted Melania): ***Tarebia granifera is native to regions of Southeast Asia and Oceania, including India and Sri Lanka east to Indonesia, the Philippines, and Papua New Guinea; now widespread among Pacific islands, the Caribbean, Mexico to South America, and South Africa. Although predominantly a freshwater species, it may also occur in tidal oligohaline to mesohaline tributaries. Reportedly first imported by an aquarium dealer in Tampa in 1937; collected in the wild in Hillsborough County in 1947, and spread from there. Like ***Melanoides tuberculata, this species*** grazes on microalgae and detritus, but does not feed on the leaves of larger plants. In Florida, this species has reached high densities, potentially competing with native species, but no major ecological or economic impacts have been reported. **L** is an image of a 22mm adult shell lifted from Wikipedia.

Although a potential intermediate host for trematode parasites, *T. granifera* has been found to have benefits in controlling another trematode parasite, ***Schistosoma mansoni***, by competition and egg-predation on the host snail ***Biomphalaria glabrata*** (Say, 1818) (see below), and has been introduced to many streams in the Caribbean as a biocontrol agent.

***Mieniplotia scabra* (O. F. Müller, 1774)**[4,8] (Pagoda Tiara): Native to south and southeast Asia, the Indo-Australian Archipelago, and western Pacific Islands; spotty introductions elsewhere. Although primarily a freshwater species, it can tolerate brackish conditions. First recorded in Florida in Martin County in 2006, and in Hendry and Lee Counties in 2018; currently restricted to south Florida. Impact of introduction is unknown at this time; however, this species is susceptible, albeit at a low rate, to trematode infections. Little information is available.

Caenogastropoda, Architaenioglossa, Viviparidae[9-12]

The following two taxa are also “Old World” species that have been introduced to the United States via the aquarium trade and as food items, particularly in Chinese markets. The sexes are separate, and eggs are brooded in a uterus, with the young being hatched and released during the warmer months. Both species are potential natural intermediate hosts for trematode and nematode parasites, some of which can infect humans.

***Cipangopaludina chinensis* (J. E. Gray, 1833)**[9,10] (Chinese Mystery Snail): This is a large freshwater snail with populations in estuarine and tidal regions. It is native to China, but the extent of its range is not clear, owing to confused taxonomy with the Japanese Mystery Snail (see below). It has become widespread in ponds, lakes and reservoirs throughout North America, and has also been found in Hawaii and The Netherlands. First recorded in Florida in 1965 in Pinellas and Polk Counties, and more recently in Hillsborough and Lee Counties.

Cipangopaludina chinensis feeds non-selectively on organic and inorganic bottom material as well as benthic and epiphytic algae, mostly by scraping, but diatoms are probably the most nutritious food it ingests at sites in eastern North America. This species is abundant in some regions, but has been regarded as a relatively benign invader, with little known about its ecological impacts. The snail is, however, host to many parasites: e.g., the

common native trematode ***Aspidogaster conchicola (***can be spread to native unionid mussels***)***, the human intestinal trematodes ***Echinostoma cinetorchis*** and *Echinostoma macrorchis*, and the nematode rat lungworm, ***Angiostrongylus cantonensis***.

Cipangopaludina japonica* (E. von Martens, 1861)**[11,12] (Japanese Mystery Snail): *Cipangopaludina **japonica is native to Japan, Korea, and Taiwan, but introduced ranges are poorly known because of taxonomic confusion with the Chinese Mystery Snail. It has spotty distribution in 23 eastern and midwestern states, but save for a questionable observation in San Francisco Bay, is not found in western states. It has not been found in brackish habitats. First recorded in Florida in Orlando, Orange County, in 1994; no recent record. Foods include bottom detritus and benthic microalgae. The snail can reach high densities and become an ecological nuisance, and can be an intermediate host for the trematode parasite *Aspidogaster conchicola* and the nematode parasite ***Angiostrongylus cantonensis***.

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Local, and regional records of mutant reverse-coiled gastropods (Part 2 of 3)

Field work by members of the Jacksonville Shell Club has been rather provident and impactful over the last several decades as attested by the over 800 species of marine and estuarine species chronicled in Lee (2009). Yet, there is another metric by which we have made our mark in the annals of malacology. The discovery of an exceedingly rare mutant snail (terrestrial, aquatic, marine, living or fossil) is a delight to most any shell collector anywhere, and this occurrence has befallen at least four of our number over the last half-century (Charlotte Thorpe, the editor, and our departed friends, Betty Hunter and Bill Frank).

In the last issue we presented NE Florida snails collected by the Bill Frank or the editor belonging to nine species: seven terrestrial [nine specimens] and two marine - one Recent and one fossil - of reverse chirality, each "left-handed." As advertized in the May-June *SOG*, we now discuss the remainder of the regional inventory - three specimens of **freshwater** snails, one a dextral mutant of a normally sinistral species, the other two specimens of a species coiling like a mirror image of its normal "right-handed" condition. Unlike the first nine species, these were collected somewhat outside our immediate jurisdiction (NE FL) but in less than a three hour drive.

Returning from the Sarasota Shell Show on Valentines Day, 2010, your editor punctuated the trip by collecting in Sumter County in pursuit of a living Panasoffkee Liptooth [<http://jaxshells.org/cfpen.htmet seq.]. After finding only a few empty shells at a half-dozen stations, the final (pre-ordained) site, where CR 48 crosses Jumper Creek, just W of Center Hill and about six miles E of Bushnell, was reached. Here John Slapcinsky and François Michonneau of the Florida Museum of Natural History had found specimens of the target species (UF 392539) two years earlier. There being no evidence of the target species in the grassy areas nearby, I clambered down the embankment and checked out Jumper Creek. Therein were several "snags," and surrounding each was an accumulation of whitish granular material. Thinking the stuff was degenerated Styrofoam®, I nonetheless approached this flotsam and discovered the white stuff was actually tens of thousands of empty Ghost Rams-horn shells [**L**], ¼ to ½ inch in diameter, aptly-dubbed, yet more formally known as *Biomphalaria obstructa* (Morelet, 1840), a native air-breathing

freshwater species. Lee (2010b) treats this snail and its discovery in some detail. I filled largest Ziploc® bag on which I have ever laid hands with the flotsam for continuing investigation.

Five to six weeks later the several liter harvest of the *B. obstructa*-dominated shell flotsam had survived the drying process (and no little neglect). Upon careful review, It yielded 21 species of land and freshwater mollusks including 284 of the normally sinistral aquatic snail presently identified as *Physa heterostropha* (Say, 1817), of which one was of reversed chirality [**R: on R**]. Further details of this extra-ordinary find are chronicled in Lee (2010a); suffice it to say that the odds against such an encounter are on the order of one in a million, and the find was exhilarating.

A few decades before the Jumper River escapade, Henry McCullagh and I were in Doctortown, GA working the floodplain and sandbars along the left bank of the Altamaha River in search of the several pearly freshwater mussels endemic to that great watershed. Although there weren't many mussels in the extensive, boggy overbank near the northeast rampart of the US 301 bridge, there were plenty of terrestrial and aquatic snails, many freshly dead from flooding and/or stranding (to be concluded in the Sept.-Oct. issue)

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A Tale of Two Tortured Tornid Taxa

Hazards of eponymous species-level taxa: the case of *bartschi* tornids

In exploring the nomenclatorial history of two tiny Florida fossil shells, I had to negotiate a devilish minefield of nomenclatural and taxonomic glitches en route to a more perfect understanding of each's natural history. Beyond the biological clarification, I think there may be some entertainment value in a chronicle of this search, so I present the tortuous and intertangled itinerary of *Cyclostremiscus bartschi* and *C. euglyptus* below. To assist the reader, URLs of images of the key species are provided, and the valid taxa appear in **boldface**.

* The first of the topical species was born *Cyclostrema bartschi* Mansfield, 1930 from the Jackson Bluff Formation of FL. Now it's ***Cyclostremiscus bartschi* (Mansfield, 1930)**: only the bottom five images at <http://www.jaxshells.org/bart11.htm>**.** It is probably extinct; see paragraph six and footnote no.[1].

** Cyclostremiscus bartschi* Strong & Hertlein, 1939 [Recent: Panamic] is a secondary junior homonym of the Mansfield taxon; its replacement name is *Cyclostrema veleronis* Strong & Hertlein, 1947, now ***Cyclostremiscus veleronis* (Strong & Hertlein, 1947).**

***** *Cyclostremiscus bartschi* Pilsbry & Olsson, 1945 [Recent: Panamic] is a secondary junior homonym of the Mansfield taxon and a primary junior homonym of *Cyclostremiscus bartschi* Hertlein & Strong, 1939. Its replacement name is ***Cyclostremiscus pauli* Pilsbry & Olsson, 1952**.

* *Pleuromalaxis pauli* Olsson & Mc Ginty, 1958: 30, pl. 3, 3a [Recent: Caribbean Panama] should be reassigned: *Cyclostremiscus pauli* (Olsson & Mc Ginty, 1958) based on shell characters. This reassignment makes it a secondary junior homonym of the preceding taxon, *Cyclostremiscus pauli* Pilsbry & Olsson, 1952. Furthermore, herein I deem this Olsson and McGinty species a junior synonym of our second topical taxon, ***Cyclostremiscus euglyptus* Aguayo & Borro, 1946** <http://www.jaxshells.org/51315.htm>, described from the Pliocene El Abra Formation (Fm.) of Cuba and later found commonly along that island's south coast leading to the impression that it was a 'Cuban endemic' (Rubio *et al., op. cit*.: 105-106). Applying this new synonymy, Caribbean Panama and Colombia (Olsson & McGinty, *loc. cit.*) can be added to its range. Furthermore, my colleague David Kirsh and I have found it occurs in the Pliocene Tamiami (FL) and Raysor (SC) Fms. plus the Recent of Sarasota, Monroe, Broward, and Palm Beach Cos. [two records], but that's a story for later on.

* Finally, as if the above presentation was insufficiently obfuscatory, *Teinostoma bartschi* Vanatta, 1913: 26, 27; pl. 2, figs. 9, 11 is now *Solariorbis bartschi* (Vanatta, 1913) and a junior synonym of *Adeorbis infracarinata* Gabb, 1881, now ***Solariorbis infracarinatus* (Gabb, 1881)** [both Carolinian/Caribbean Province]. Rubio *et al*. (2011: 96) mistook the record of *S. bartschi* in Rios (2009: 102) for our topical *Cyclostremiscus bartschi* (Mansfield, 1930) and thereby erroneously placed the latter in the Recent fauna.[1] To further confuse things, the companion figure in Rios (*loc. cit.*) is neither of these species,[2] and the next species he treats is *S. infracarinatus,* without mention of the established synonymy of the two nominal taxa.

Summarizing this chronicle, I encountered five Paul Bartsch tornid eponyms (***C. pauli*** included), two of which are invalid due to homonymy and one consequent to synonymy. Of the two valid taxa, one is a senior homonym (a consequence of his first name being shared by a McGinty brother [homonymy on another level]), and the other being mistaken for valid namesake in another genus with spurious stratigraphic implications. This predicament demonstrates the kind of mayhem eponymous taxonomy can generate. Very recently a paper strongly discouraging this nomenclatorial practice (Guedes *et al*., 2023) caught my attention. If you're thinking it sprang from **this** kind of confusion, you'd be wrong; its essence was a modernist polemic against cultural imperialism! One might argue that this is an instance, like homonymy, of one bit of nomenclatorial convention being the target of two separate reporters.

[1] The only other Recent records for *Cyclostremiscus bartschi* (Mansfield, 1930) cited by Rubio *et al*. (*loc. cit.*) was based on single specimens from 28 and 30 fathoms in Gulf of Mexico, N of Yucatan (Treece, 1980: 559). These were discounted by Rosenberg et al. (2009: 582), who opined:

> Treece (1980) reported from off Yucatán 2 species of Mesozoic and Paleozoic limpets: *Scurriopsis hennocquii* Terquem, 1855, described from the Lower Jurassic of France, and *Lepetopsis levettei* White, 1882, [sic; no parens] described from the Mississippian of Alabama [*error pro* Indiana]. Such implausible identifications suggest lack of rigor in applying names to specimens; therefore, all records in Treece (1979, 1980) have been rejected.

[2] The companion figure, in umbilical view only, appears to be a *Cochliolepis* species.

Acknowledgments
David Kirsh of Durham, NC collected critical FL specimens that proved the impetus for this report. Dr. Ann Heatherington, University of Florida [UF] Department of Geological Sciences, supervised the SEM imaging used in the linked webfeatures, and the late Bill Frank (Jacksonville) assisted in the editing thereof. Roger Portell (Florida Museum [UF]) and Dr. Manuel Ituralde-Vinent (Havana, Cuba) provided stratigraphic insights. Finally, Dr James Carlton, Emeritus Director of the Williams College-Mystic Seaport Maritime Studies Program [now the Coastal & Ocean Studies Program], Mystic, CT kindly provided needed literature.

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