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The Club will convene on the customary fourth Thursday, usual place and time (S. E. Branch Public Library <https://www.google.com/maps?q=10599+Deerwood+Park+Blvd+Jacksonville+FL+32256&iwloc=A&hl=en> ; 7:00 PM) for each of the next two monthly meetings. On the 28th of May Brian Marshall will present the Shell-of-the-Month, *Vexillum stainforthi* (Reeve, 1842}; see< http://www.jaxshells.org/stainfor.htm>. This is one of Peter Dance's fifty rare shells and a was very elusive collector's item until its implausible habitat was discovered by divers, including Brian, in Okinawa. Harry Lee will present a discussion of selected heterobranch snails collected from the 3,000,000 year-old Pinecrest Beds of Sarasota County, FL. Most of the species are very small, so the scanning electron microscope is often put to use in capturing their images. Although about 70% of the group is extinct, a fair number survive in our local waters to this day.

The June meeting will begin at the usual time and place on June 25. As Shells-of-the-Month, Harry Lee will present the seven local species of the landsnail genus *Vertigo*, four of which occur in his backyard. Although quite tiny (1.5 to 2.5 mm in height), they are quite intricately-formed, especially with regard to the "teeth" in their apertures. Afterwards, Rick Edwards will take us on a trip to "Underwater Aruba." Rick and his wife Roz, sometimes accompanied by son William, have logged thousands of nautical miles aboard cruise ships plying Caribbean waters. As if inexorably beckoned back to the sea, Rick spends a part of his "shore leave" submerged in salt water pursuing photogenic biota, especially mollusks. If you've not be treated to one of his presentations, take our word, you'll go home gruntled and informed.

"Dear JSC Members,

There is not much activity to mention for the club over the next couple of months, we are currently cruising in idle mode. Summer is almost upon us and for all of us currently living in Florida, the past few days have already brought on that incredibly warm and humid feeling. With that said, I am dreaming of shelling on the beach for some marine snails on a warm sunny day, shelling in the bush for some land snails after a good rain, or cruising down a nice cool river or creek with my snorkeling gear looking for some aquatics! I'd probably enjoy self propelling a jet back through the breeze, but it seems there have been no flying snails discovered as of yet, so I'll pass on that adventure for the time being. If there is anything I have learned, there is always something new to be discovered and "you don't know, if you don't go". Please feel free to join us at our meetings, we hold no secrets and are always looking forward to sharing with you where you just might find that shell you have been dreaming about!"

Brian Marshall - JSC President

Dolphins living in Shark Bay, Australia have become shell-collectors.

The dolphins are using their snouts to pick up and transport large conchs. They also seek out the shells to hunt fish that are sheltering within. It is likely that the dolphins originally chased the fish into the conchs, and have now learned to bring the shells to the surface, where they can flush out and eat their prey.

The foraging tactic is "quite spectacular", say researchers, who have published photographs and details of the behavior in the journal Marine Mammal Science.

A conch collector

Once they reach the surface, the dolphins shake the shells to make the water and fish spill out.

"Shark Bay dolphins are known as clever inventors, showing a remarkable range of foraging tactics, which are unprecedented in other cetacean populations," says biologist Dr. Michael Krützen of the University of Zurich, Switzerland.

The dolphins appear to be hunting fish that have taken refuge inside the shells, as evidenced by photographs showing a relatively large fish falling from a conch being shaken by one dolphin (see above).

The researchers suspect the dolphins are pursuing fish into the shells, due to the dolphins' erratic swimming before reaching the conchs and rapid surfacing once they have located the shells.

Once they reach the surface, the dolphins shake the shells to make the water and fish spill out.

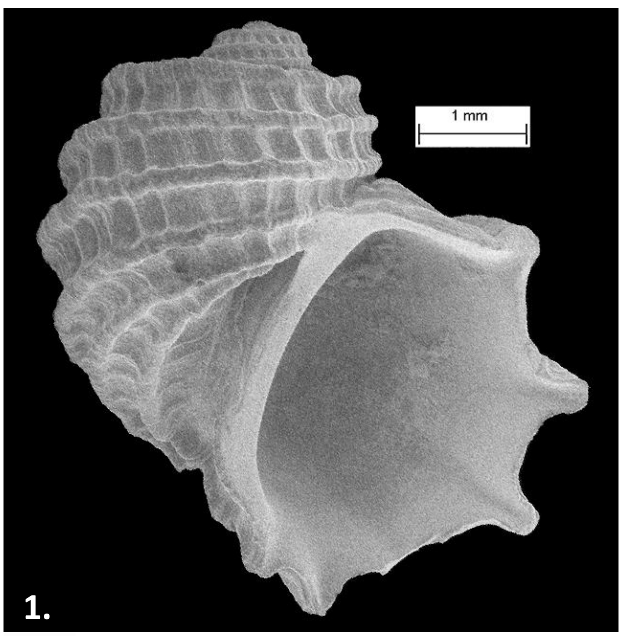
"It's quite surprising that they are apparently manipulating such large, heavy, cumbersome objects in such a way as to secure a meal. I think the behavior is quite unusual, otherwise it would presumably have been seen more often." As yet, there is no evidence that the behavior is being culturally transmitted between dolphins, but I'd say we were lucky enough to witness a dolphin being innovative," says Dr. Michael Krützen.

Peregrinations of two little fossils through the annals of gastropod systematics

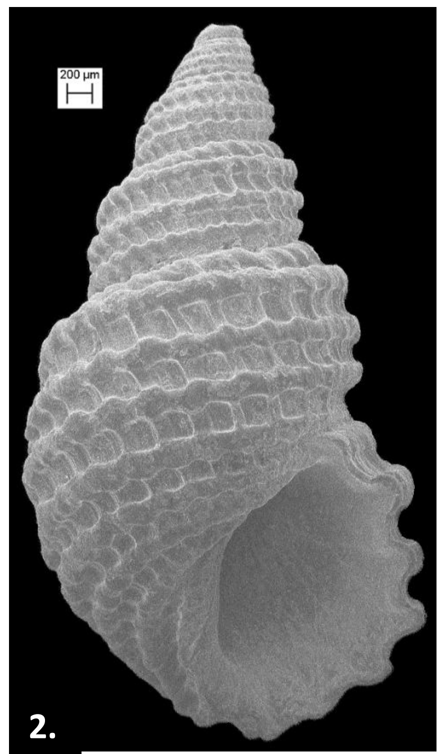
by Harry G. Lee MD, FLS

In the course of our study of the 3,000,000 year-old Pinecrest mollusk fauna collected at the SMR Phase 10 Sand and Shell Mine near Sarasota, I have come across two quite interesting marine snails, each described from a shell fragment collected in Virginia by a Philadelphia Quaker - and less than a decade apart. These substantial commonalities failed to protect the two species from involvement in a game of taxonomic musical chairs spanning most of Nineteenth and Twentieth Centuries, as they were reassigned to various different generic, familial, ordinal and even subclass taxa with considerable frequency and apparent abandon - their taxonomic paths sometimes convergent, yet again separate. The players are

- ***Delphinula lyra* Conrad, 1834**: 141-142 <http://www.biodiversitylibrary.org/item/79407#page/171/mode/1up> found in Suffolk, VA (? Pliocene), first figured by the author a dozen years later (Conrad, 1846: pl. 2, fig. 27 **[Fig. 3; next page]** <http://www.biodiversitylibrary.org/item/70706#page/37/mode/1up>); probable syntype ANSP 30371. Synonyms include *Delphinula globulus* H.C. Lea, 1845, *D. quadricostata* Emmons, 1858, *Adeorbis* (sp.) Emmons, 1858; and *Carinorbis lyra* Conrad, 186 *fide* Dall (1892: 322). **[Fig. 1; below]**



1.



2.

- ***Actaeon* [sic; subsequent incorrect spelling of *Acteon*] *globosus* H.C. Lea, 1843** [description republished and shell first figured in Lea, 1845: 29 <http://www.biodiversitylibrary.org/item/70706#page/37/mode/1up>, pl. 36, fig. 55 **[Fig.4; next page]** <http://www.biodiversitylibrary.org/item/70706#page/61/mode/1up>;] found somewhere between the mid-Miocene to mid-Pliocene strata (Calvert to Yorktown beds) in Petersburg, VA. Synonyms include *Fossarus anomalus* (C.B. Adams, 1850); *Isapis anomala* (C.B. Adams, 1850); *Narica anomala* C.B. Adams, 1850; *Dolium octocostatum* Emmons, 1858; and *Isapis caloosaensis* Dall, 1890 (Rosenberg (2009). **[Fig. 2; above]** Since its description, each nominal species has gathered three synonyms, which duplication isn't much over par for the course. Much less usual is their placement in nine different genera (eight if we exclude the homonymous *Isapis*), but truly astounding is the their landing of one or both in seven different superfamilies,


3.


4.

five different orders and three different gastropod subclasses. Lets look at these Chinese Fire Drill generic assignments by parsing, in alphabetical order, each **genus** thrown in the mix:

***Acteon* Montfort 1810** Type Species (TS) *Bulla tornatilis* Linnaeus, 1758 by original designation (OD) (Heterobranchia: Acteonoidea).
***Adeorbis* S. Wood, 1848** TS *Helix subcarinata* Montagu, 1803 OD Objective junior synonym of *Tornus* Turton and Kingston, 1830 (Caenogastropoda: Littorinimorpha: Truncatelloidea)
***Carinorbis* Conrad, 1862** TS *Delphinula lyra* Conrad, 1834 OD. Originally placed in the Trochoidea Rafinesque, 1815 (Vetigastropoda) but transferred to Amathinidae (Heterobranchia: Pyramidelloidea)
***Delphinula* Lamarck, 1804** TS *Turbo delphinus* Linnaeus, 1758 by subsequent designation (SD). Objective synonym of *Angaria* Röding, 1798; type genus of Angarioidea J.E. Gray, 1857 (Vetigastropoda).
***Dolium* Lamarck, 1801** TS *Buccinum galea* Linnaeus, 1758 OD. Objective junior synonym of *Tonna* Brünnich, 1772; see Suter (1913) {Caenogastropoda: Littorinimorpha: Tonnoidea).
***Fossarus* Philippi, 1841**: 42-46 <http://www.biodiversitylibrary.org/page/9706902#page/50/mode/1up> TS *F. adansoni* Philippi, 1841 [*Idem*] OM Holocene, E. Atlantic [= *Helix ambigua* Linnaeus, 1758: sp. 622 <http://gdz.sub.uni-goettingen.de/dms/load/img/?PPN=PPN362053006&DMDID=DMDLOG_0047&LOGID=LOG_0047&PHYSID=PHYS_0779> *fide* Warén and Bouchet, 1988] Holocene Mediterranean [now known to be Amphiatlantic].Type genus of Fossarinae A. Adams, 1860 (Caenogastropoda: Littorinimorpha: Cerithioidea: Planaxidae).
***Isapis* H. and A. Adams, 1853**: 320 <http://www.biodiversitylibrary.org/item/23923#page/368/mode/1up> TS *Narica*(?) *anomala* C.B. Adams, 1850: 109 <http://www.biodiversitylibrary.org/item/48996#page/119/mode/1up> by original monotypy (OM). Holocene, Jamaica. Description republished and lectotype (MCZ 186034) figured by Clench and Turner, 1950: 256 <http://www.biodiversitylibrary.org/item/32851#page/274/mode/1up>; pl. 39, fig. 14 <http://www.biodiversitylibrary.org/item/32851#page/401/mode/1up>. Originally placed in the Littorininoidea Children, 1834 TS *Turbo littoreus* Linnaeus, 1758 (Caenogastropoda: Littorinimorpha) but transferred to Amathinidae (Heterobranchia: Pyramidelloidea).
***Iselica* Dall, 1918** <http://www.biodiversitylibrary.org/item/22865#page/175/mode/1up>; replacement name for *Isapis* H. and A. Adams, *non* Doubleday, 1847 [Lepidoptera]. Currently placed in Amathinidae Ponder, 1987 (Heterobranchia: Pyramidelloidea).
***Narica* d'Orbigny, 1842** TS *Sigaretus cancellatus* Lamarck, 1822 OD Holocene [*Sigaretus* is in the Naticidae, but we'll grant an indulgence]: ?Indian Ocean. Objective junior synonym of V*anikoro* Quoy and Gaimard, 1832: Type genus of Vanikoroidea J.E. Gray, 1840 (Caenogastropoda: Littorinimorpha),

That's eight superfamilies, Acteonoidea, Angarioidea, Cerithioidea, Pyramidelloidea, Tonnoidea, Trochoidea, Truncatelloidea, and Vanikoroidea, in three subclasses: Caenogastropoda, Heterobranchia, and Vetigastropoda that one or both of the species have called home. By any measure, that kind of paper trail attests to the perplexing conchology of these two species, which, with the benefit of 20:20 hindsight and close examination of their immersed (heterostrophic) protoconchs, may be best classified as the congeners:

- ***Iselica (Carinorbis) lyra*** **(Conrad, 1834) [Figs. 1, 3]**
- ***Iselica (I.) globosa*** **(H.C. Lea, 1843) [Figs. 2, 4]**,

and systematically placed thus: Gastropoda: Heterobranchia: Pyramidelloidea: Amathinidae; see Lee (2011).

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I thank Bill Frank for image editing, Rick Edwards for helping sift through gallons of matrix in pursuit of shells like these, Roger Portell for logistical support, and Dr. Ann Heatherington for performing the SEM's used in this report.

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Did ocean acidification from asteroid impact that killed the dinosaurs cause extinction of marine molluscs?

Date: May 11, 2015; **Source:** University of Southampton

Summary:

New research has questioned the role played by ocean acidification, produced by the asteroid impact that killed the dinosaurs, in the extinction of ammonites and other planktonic calcifiers 66 million years ago.

Large fossilized ammonite. About 50cm across.
Credit: © marcel / Fotolia

Ammonites, which were free-swimming molluscs of the ancient oceans and are common fossils, went extinct at the time of the end-Cretaceous asteroid impact, as did more than 90 per cent of species of calcium carbonate-shelled plankton (coccolithophores and foraminifera).

Comparable groups not possessing calcium carbonate shells were less severely affected, raising the possibility that ocean acidification, as a side-effect of the collision, might have been responsible for the apparent selectivity of the extinctions.

Previous CO_2 rises on Earth happened so slowly that the accompanying ocean acidification was relatively minor, and ammonites and other planktonic calcifiers were able to cope with the changing ocean chemistry. The asteroid impact, in contrast, caused very sudden changes.

In the first modelling study of ocean acidification which followed the asteroid impact, the researchers simulated several acidifying mechanisms, including wildfires emitting CO_2 into the atmosphere (as carbon dioxide emissions dissolve in seawater they lower the pH of the oceans making them more acidic and more corrosive to shells) and vaporisation of gypsum rocks leading to sulphuric acid or 'acid rain' being deposited on the ocean surface.

The researchers concluded that the acidification levels produced were too weak to have caused the disappearance of the calcifying organisms.

Professor Toby Tyrrell, from Ocean and Earth Science at the University of Southampton and co-author of the study, says: "While the consequences of the various impact mechanisms could have made the surface ocean more acidic, our results do not point to enough ocean acidification to cause global extinctions. Out of several factors we considered in our model simulation, only one (sulphuric acid) could have made the surface ocean severely corrosive to calcite, but even then the amounts of sulphur required are unfeasibly large.

"It throws up the question, if it wasn't ocean acidification what was it?"

Possible alternative extinction mechanisms, such as intense and prolonged darkness from soot and aerosols injected into the atmosphere, should continue to be investigated.

The study, which is published in the *Proceedings of the National Academy of Sciences (PNAS)*, involved researchers from the University of Southampton and the Leibniz Center for Tropical Marine Ecology. The project received funding from the European Project on Ocean Acidification and funding support from NERC, Defra and DECC to the UK Ocean Acidification programme (grant no. NE/H017348/1).