



SHELL-O-GRAM

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Although meetings were suspended for over a year, we are now back in session. 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 the next day and sent to about 200 individuals who have demonstrated an interest in malacological research. These pdf's (ISSN 2472-2782) have also been posted to <<http://jaxshells.org/letters.htm>> since November, 1998. We encourage members and 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 and author should receive a copy of the republication. 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 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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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/TBA) in Function Room D of the Southeast Branch, Jax Public Library <<https://www.jaxpubliclibrary.org/locations/southeast-regional>>. At the time of this *Shell-O-Gram* issue, the library continues giving us the go-ahead to reprise our in-person meetings. Of course, everyone in attendance is expected to have been fully vaccinated, be feeling well, and to comply with CDC recommendations for masking and social distancing. Our March meeting will convene on the 24th at 7:00 PM. For the main program Rick Edwards will report his experiences during a live-aboard dive trip to the waters of Belize, the only Central American country with only a Caribbean coastline. He teamed up with son Williams last October for the expedition, and all underwater equipment (including cameras) were operative. Harry Lee will discuss a few members of the very large landsnail family, the Clausiliidae, or Doorsnails. These interesting critters range from the Caribbean islands and South America through Eurasia to Australasia and a small portion of E and S Africa. (cont'd, next page)

CONCHOLOGISTS OF AMERICA 50th Anniversary

COA 2022



Galveston, Texas

Howdy Y'all

May 31 – June 4, 2022

- ❖ 50 years of fabulous memories
- ❖ Terrific convention locations
- ❖ Outstanding dealer bourses and opportunities to purchase shells for our collections
- ❖ Educational programs
- ❖ Beautiful banquets with delicious entrees
- ❖ And, last but not least, all the wonderful long time friendships



COA GUEST RATE AT MOODY GARDENS

- ❖ \$179.00 per night plus tax
- ❖ Rates good for 2 days pre and/or post the convention
- ❖ Guest rooms consist of One King or Two Queens
- ❖ Rate is good for 1-4 guests per room



TENTATIVE SCHEDULE OF EVENTS

Tuesday, May 31 – Opening Ceremonies, COA Board Meeting, Programs, Silent Auctions, and Welcome Party

Wednesday, June 1 – Programs, Silent Auctions, and Oral Auction

Thursday, June 2 – Programs, Silent Auctions, and Banquet

Friday, June 3 – Club Rep Breakfast, Programs, Silent Auctions, Bourse

Saturday, June 4 - Bourse



Upcoming meetings, continued from p. 3: April

We will meet again on April 28, 2022. Paul Jones will present the genus *Panopea*, the geoducks. Inspired by his finding a *P. bitruncata* (see Nov.-Dec., 2020 *Shell-O-Gram*) and abetted by fellow JSC expeditioner, Dr. David Davies, he will tell us a bit about these giant clams, nine species of which survive to present. The main program will deal with a recently excavated fossil bed rich in nonmarine remains. Harry Lee will demonstrate this unusual fauna composed mainly of a very few freshwater mollusk species but also with a more diverse, if less common, land shell element. Over three dozen species have been culled and imaged. Some species appear to be extinct, and one is a “lost species” with an intriguing backstory.

***Bulimulus guadalupensis* (Bruguère, 1789): a unique left-handed specimen**



This species is native to the Windward Is. of the Lesser Antilles but appeared in Hialeah, FL decades ago. It is now well-established in the southernmost part of the state. Our website illustrates and discusses occurrences in Broward, Miami-Dade, and Collier Cos. Despite the typical abundance of specimens, most notably empty ones in accessible human-altered habitats, your editor is unaware of any published record of a sinistral specimen. The above 20mm shells (sinistral on the **R**) were collected on Christmas Day, 2021 by Cuban land snail authority and author of iconographies of the tree snails *Polymita* and *Liguus*, Adrián González-Guillén.

Reversal of coil in gastropods

by Harry G. Lee

I would like to present a case for sympatric speciation based on direction of shell coiling (chirality) in gastropods.

As with the *Bulimulus guadalupensis* reported on the preceding page, the vast majority of the many accounts of mutant reverse-coiled individual specimens have been in land pulmonates - unparalleled among all gastropod taxa through time and space. Data from Zilch (1959, 1960), analyzed by Asami, Cowie, and Ohbayashi (1998) show that both sinistral and dextral species **normally** occur in 35 (of 899) genera belonging to 14 (of 46) families in nine (of 12) superfamilies in the Stylommatophora, the group constituting nearly all the land-dwelling pulmonates). This pattern of occurrence strongly suggests multiple independent evolutionary events, and it has invited speculation as to nature of these process whereby reversal of coil can become entrenched in the genome/phenotype of an evolving lineage.

Citing a rather obscure report by Alexandrov and Sergievsky (1979), Gittenberger (1988) produced a trenchant analysis of the model of sympatric speciation. The former authors had put forth a four-step hypothesis for the process: "1) mutant recessive genes for opposite coil are only present in heterozygotes and do not manifest themselves; 2) the opposite phenotype appears; 3) a stable population is formed; and 4) a new species may enlarge its range." The recessive gene concept finds its basis on the analyses of inheritance of coiling in the



pulmonate taxa *Partula* Férussac, 1821 [L], *Lymnaea peregra* (Müller, 1774) and *Laciniaria biplicata* (Montagu, 1803) [below R] and seems consistent with observations by field, laboratory, and

museum malacologists. The pattern of emergence and establishment of the opposite coiling phenotype, although uncommon, is quite consistent with observations of living populations of stylommatophorans - examples of clusters, demes, and populations of oppositely-coiled individuals have been documented in a number of phylogenetically diverse stylommatophorans [several European helicids; *Bradybaena similis* (Férussac, 1821); *Cepea nemoralis* (Linnaeus, 1758); and a few western U.S. pupillids, etc.]. The process may advance to change a species into a balanced mixture of sinistral and dextral individuals; such has apparently happened in genera as diverse as *Liguus*, *Achatinella*, *Amphidromus*, and *Partula*, each of which contains one to dozens of these so-called enantiomorphic species (as well as pure dextral, and in the latter three cases, pure sinistral species).



Now, I have a little trouble with step 4) of Alexandrov and Sergievsky but prefer to rephrase it: "the new population further differentiates itself from the parent stock so as to reach species-level recognition." It is know from that laboratory and field that there are strong mechanical factors operating against successful mating of dextral and sinistral snails of otherwise identical

genetic constitution. That this varies with shell-form (taller species are less inhibited, but still not very efficient) has been demonstrated most recently by Asami, Cowie, and Ohbayashi (1998) in the lab. These authors also analyzed coiling reversal across all the Stylommatophora and demonstrated convincingly that taller taxa produced expressed a higher percentage of coiling reversal at all higher (it is overwhelmingly clear for species) taxonomic levels - from genera to superfamilies - than did taxa with short shells (diameter greater than height). Taking the two factors: (1) the overall tendency to diminish the likelihood of snails of opposite coil from interbreeding and (2) the inference that taxa in which the infrequent inter-chiral interbreeding is slightly more likely have apparently generated new species from oppositely-coiled ancestors, one appreciates that there is always a powerful force favoring genetic isolation, but little interbreeding, at least initially, may be (have been) good for the long-term prosperity of the new cluster of snails with opposite coil.

One condition not directly treated by Asami, Cowie, and Ohbayashi (1998) was the zoogeography of reverse-coiled snail taxa. Even without a rigorous analysis, one can easily appreciate the preponderance of reversals (basically sinistral and enantiomorphic taxa; the Clausiliidae are normally sinistral and don't affect any of the data above) of insular (Hawaiian Is., Polynesia, Indonesia) faunas. Why so? Well, as first suggested by Darwin with the Galapagos, remote islands tend to be colonized by a few living animals and plants, and the descendants of these organisms are faced with more available niches. The result is a high rate of speciation - considered sympatric by most (although this is a relative phenomenon) with a rapid origination of new life forms adapting to the unexploited habitats.

How then do selective factors foster the survival of the newly-propagated population of reversed snails vis-a-vis the parent stock? The answer isn't at all fully apparent, but a study on a group of terrestrial **prosobranchs**, *Diplommatina* Benson, 1849 [*sensu lato*] sheds some light on the process. Peake (1973) studied the size and shape of these tiny (1.5 to 5 mm) operculate snails (with - you guessed it - lots of left and lots of right-handed species) and related shell characters to their occurrence in a number of collecting stations at various stations in the Solomon Is. (nine apparent species; five dextral, four sinistral) and among limestone hills in Malaya (essentially insular habitats - the surrounding valleys are poor habitat for these calciphilic species - 9 dextral and 7 sinistral *in toto*). Many stations produced up to five species, and there was a good level of vicariance (species diversity from one station to the next). Despite this richness and diversity, the author found that each species at any Solomon Is. station supporting more than one species fell into one of four exclusive size ranges, and there was never more than one species per size range - that is with one exception - sinistral and dextral species of the same size cohabited in six of the 15 stations. Likewise in each 28 productive Malayan stations species at any station could be separated consistently by size except in six instances involving five different species pairs - all involving sinistral and dextral cohabitants! These data from the two study areas contrasted with many dozens of other occurrences of the 14 dextral and 11 sinistral species at numerous stations without any other instance of size range overlap. What does this mean for sympatric speciation? Well, the

"hypothesis" put forth by the author was that differences in shell shape (here read chirality) are important in maintaining isolation between sympatric species.



Admittedly there are significant differences in reproductive habits between the hermaphroditic but essentially always cross-fertilizing Stylommatophora and the separate-sexed operculates (prosobranchs). Yet the sinistral-rich pulmonate groups (*Achatinella*, *Liguus*, *Amphidromus* [L], and *Partula*) and likewise-coiling *Diplommatina* (s. l.) may well use the same mechanics in copulation,

and they have common traits - insular habitat with obvious recent species radiation and a similar "tall" height-width ratio. Under these circumstances, a simple mutation in chirality might just produce a new species.

Now this is discussion began with poecilogony [both crawl-away and swim-away larvae in a single taxon] and sympatric marine snail speciation; how to reconcile the thread? Well, Marien Faber wrote (see above): "There are only very few cases in which sinistrality succeeded in the development of a new species," and that certainly can be applied to marine gastropods (in stark contrast to the non-marine taxa discussed above). Yet the conditions confronting the terrestrial **prosobranch** *Diplommatina* (s. l.) seem to have generated multiple lines of opposite-coiling species. Can such a process be operating today for any **marine prosobranchs**?

First let's look again at the process Alexandrov and Sergievsky (1979) hypothesized: "1) mutant recessive genes for opposite coil are only present in heterozygotes and do not manifest themselves; 2) the opposite phenotype appears." While there have been well over a hundred species of Recent marine prosobranchs documented as uniquely to rarely occurring as mirror-image mutants (see <<http://jaxshells.org/reverse.htm>>), a cluster of such mutant forms is almost unheard of. An the exception is a pair of reports which happen involve living sinistral *Conus ventricosus* Hwass, 1792 (see <<http://jaxshells.org/sincon2.htm>>)¹ The first is Valero, D., 1972. Discovery of sinistral *Conus ventricosus* (Hwass in B.) from the Cote d'Azur, France. *Hawaiian Shell News* 20(3): 6. March. The author reports finding **nine** living specimens in a small area under one meter of water, 200 meters from shore at Cap Benat, near Toulon at 8:00 AM on 8/28/67. Most were small, and sizes are given. The other is Donati, G., S. Gargiulo, and B. Porfirio, 1984. Finding 11 sinistral specimens of *Conus mediterraneus* Hwass in Bruguière [sic: circumflex] 1792. *La Conchiglia* 182-3: 21-23. May-June. The title indicates the find; the place was Mebida, Cagliari, Sardinia, where five specimens were found under one meter of water in 1973. The larger find was over a two day campaign in April, 1981. These observations suggest some level of propagation of the sinistral phenotype in the populations cited. As Marien stated, however, "an individual [or small group of individuals] does not a species make (famous last words of the Dodo)." One might equate the status of these clusters equivalent to colonies of *Arianta arbustorum* (Linnaeus, 1758), *Cornu aspersum* (Müller, 1774) <<http://www.jaxshells.org/817a.htm>> and *Helix pomatia* Linnaeus, 1758 <<http://www.jaxshells.org/817f.htm>> in a certain few European gardens - certainly not ready for Alexandrov and Sergievsky's final steps "3) a stable population is formed; and 4) [my edition] "the new population further differentiates itself from the parent stock so as to reach species-level recognition."

Yet it seems likely that these steps **were** taken by the extinct *Contraconus* Olsson and Harbison, 1953 species or succession thereof: first named *Conus tryoni* Heilprin, 1886 [1887 is incorrect] of the Plio-Pleistocene, *C. adversarius* Dall, 1890 of the Miocene, and possible Plio-Pleistocene stragglers (Petuch, 1994). This appears to be the only substantive excursion by the Conidae into sinistral coiling.

Closely related to the Conidae are the Turridae (definitions may vary; here lumped in the into the classical assortment), the Recent marine snail family with the richest evolutionary history of sinistrality. On no less

¹ There are a few Recent species besides *C. ventricosus* in which an individual specimen or a few have been discovered (*C. anabathrum* Crosse, 1865; *C. baccatus* G.B. Sowerby II, 1877; *C. furvus* Reeve, 1843; *C. infrenatus* Reeve, 1843; *C. infrenatus* Reeve, 1848; and *C. tinianus* Hwass, 1792; see <<http://www.jaxshells.org/reverse.htm>>.

than six separate occasions have the turrids produced a sinistral taxon (Borsoninae: *Sinistrella* Mayer, 1887 [Eocene, U.S.A. to Recent, West Africa]; *Borsonia brasiliiana* Tippett, 1983 [Recent, Brasil]; Turrinae: *Antiplanes (Antiplanes)* Dall, 1902 [Recent, Northern Pacific]; *Eopleurotoma perversa* (Philippi, 1846) [Eocene to Early Miocene, Northern and Eastern Europe]; Clavatulinae: *Clavatula aralia* (Luković, 1924) [Late Eocene to Early Miocene, northern and eastern Europe]; *Scaevatula pellisserpentis* Gofas, 1990 [Recent, West Africa].



Interestingly one west African borsoninine turrid which has appeared only recently in collections, *Aesthenotoma lamothei* (Dautzenberg, 1910) [L], has been found in both dextral and sinistral condition - and in a frequency approaching 50 percent (personal observation in the marketplace and personal communication Franco Gubbioli). Some years ago, after borrowing a few extra specimens belonging to Donn Tippett, a USNM expert on the family, I examined ten shells (five left- and five right-handed), and, even with inversion of photographic diapositives, I could not tell any of the dextral specimens from the sinistrals. Had Alexandrov and Sergievsky's steps 3) and 4) been actualized in this instance?

Well, Gofas (1989) discussed the similarities between the sinistral west African (sympatry again) species *Sinistrella sinistralis* (Petit de la Saussaye, 1839), which is certainly what we have called the "sinistral

Aesthenotoma lamothei," and a typical (dextral) *A. lamothei*. He conceded that the shells were very similar, but he was able to dissect out the *Conus*-type radulae of both the specimen of *A. l.* figured in Dautzenberg (1910) and that of a freshly-collected *S. s.* and show some differences.

Have we witnessed an evolutionary event here? Are the two taxa *Sinistrella sinistralis* (Petit de la Saussaye, 1839) and *Aesthenotoma lamothei* (Dautzenberg, 1910) different at the species level (or generic level as Gofas suggested)? I personally think the shells are too similar to reasonably support a non-congeneric relationship. If this west African sinistral turrid is truly evolved from a sinistral Eocene ancestor, *Sinistrella americana* (Aldrich, 1885), is the dextral *A. lamothei* derived from it, rather than vice-versa? Could this be an exceptional instance of convergent evolution?

Certainly a closer examination of the radula (could 3/4 of a century have altered the morphology of Dautzenberg's specimen?) and other taxonomic markers (**molecular**, other elements of the anterior digestive tract, etc.) is imperative before a plausible (maybe unique) evolutionary scenario can be constructed [or dismantled]. Not only is this an important question to pose, the answer is well within the realm of possibility.

We started out with Andrew Grebneff's instant speciation hypothesis and have spent a lot of time getting toward, but scarcely reaching, a solution. My apologies for what may be a bit of a wild goose chase, but, maybe one or more of our colleagues on the other side of the pond can set me straight and/or advance a taxonomic study such as the one in the paragraph above.

As Andrew suggested, the protoconchs of the sinistral *Sinistrella sinistralis* (Petit de la Saussaye, 1839) and dextral *Aesthenotoma lamothei* (Dautzenberg, 1910) are clearly of the lecithotrophic (crawl-away hatchlings) type.

I have looked at my *Calliostoma (Sinutor) incertum* (Reeve, 1863) and cannot say much about protoconch morphology as the apices of these shells are worn smooth - apparently post-mortem. Perhaps our colleague, Dr. Bruce Marshall, who wrote the list: "..... incidentally, I have animals of it [*Sinutor incertus*] and similar dextral spp" can tell us about the protoconch morphology. It appears that lecithotrophy would be a trait favoring the creation of a reverse-coiled (sinistral in this case) sister species.

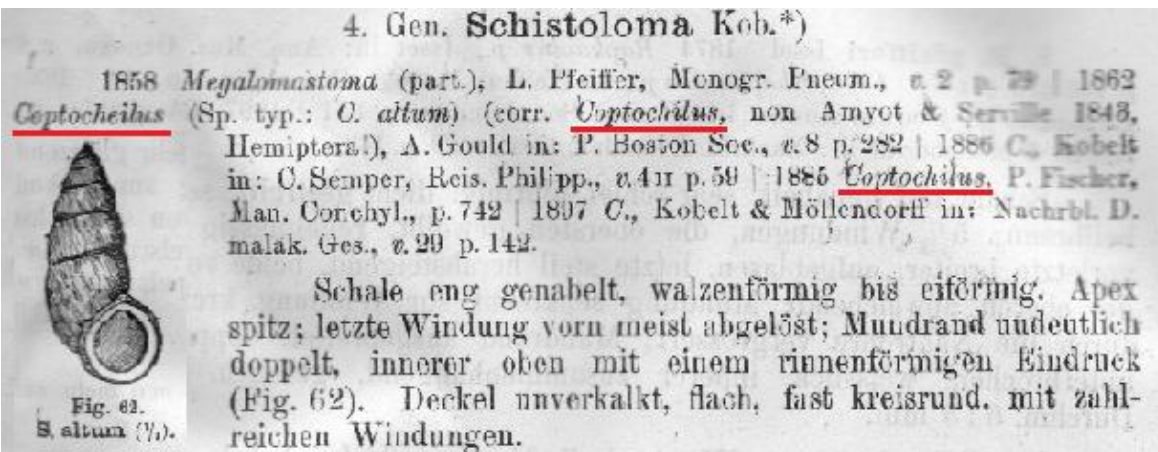
I read that the sexes are separate in this superfamily (Trochoidea) but that fertilization may be internal, as in *C. zizyphinum* (Linnaeus, 1758)², or external. If we extend the paradigm of the stylommatophoran mating behavior - the less personal the erotology, the better the chances for the sinistral gene to be perpetuated.

² Some authors treat this specific epithet as an appositional noun, i.e., *Calliostoma zizyphinus*, and they seem to be correct per *The Code* as it was a noun, never properly adjectivized, in the Latin and Greek languages.

Ed. Note: This essay was adapted from a serialized post to the Conchologists of America (COA) list-serve, Conch-L, on October 25 & 26, 2003. Regrettably, most of the citations were abbreviated for that readership.

Letter to the editor; a response

In my decades of serving in one capacity or another with the *Shell-O-Gram*, I can count the number of formal letters-to-the editor on one hand, and none was previously suitable for publication. Thus my interest was



piqued when reader Kurt Auffenberg contested my use of the genus name *Schistoloma* in the last issue (sinistral operculate land shells). Wilhem Kobelt (1902: 278 L) proposed the name to replace

Coptochilus Gould, 1862: 282 on the grounds that it was a junior homonym of the insect genus *Coptochilus* Amyot & Serville, 1848 and thus permanently invalid. However, under the current provisions of Article 53.2 of *The Code* <<https://www.iczn.org/the-code/the-code-online/>>, Kobelt's action was unnecessary since the Gould name differed, **albeit by only one letter**, from that of the bug. These two epithets, however, are considered homonymous if they were used a **species** name (Article 58.2)! **Short version: *Comptocheilus* Gould, 1862 [+ *Schistoloma* Kobelt, 1902]**.... a bit confusing for most of us, but apparently not for Kurt!

Gould, A.A., 1862. Descriptions of new genera and species of shells. *Proceedings of the Boston Society of Natural History* 8: 280-284. <<https://www.biodiversitylibrary.org/page/9492694>>.



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