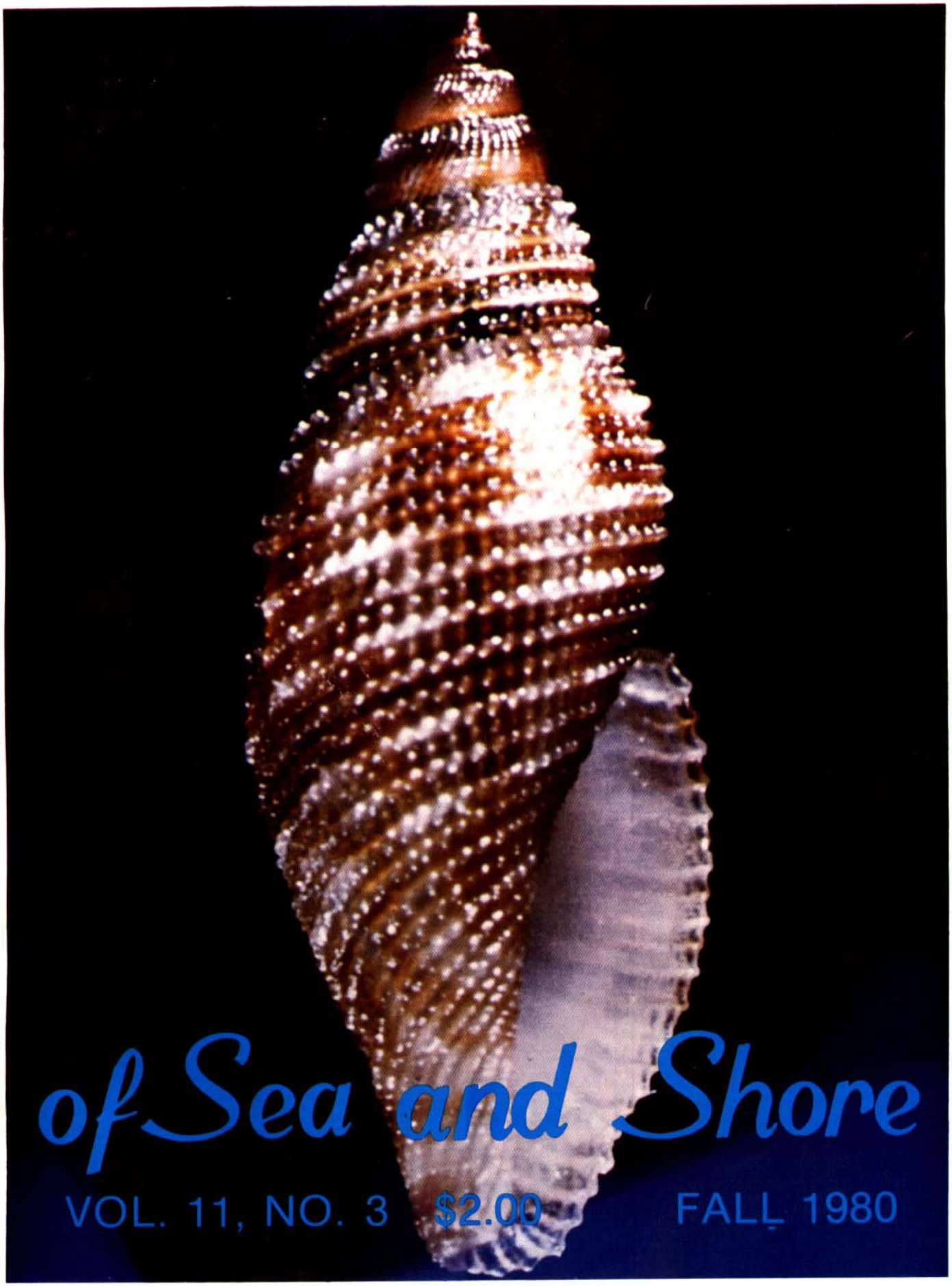

# of Sea and Shore

VOL. 11, NO. 3 $2.00 FALL 1980

. No. 2 Summer 1980

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OUR COVER

Our cover features a photograph by B. C. Draper and shows a Turridae taken from the spines of a *Spondylus princeps* taken in the Gulf of California, near La-paz, Baja California, Mexico. Specimen shown measures 10 mm in length. More of Bert Draper's photographic talents are shown on page 85, in this issue.

SUBSCRIPTION BLANK PG 127

OF SEA AND SHORE Magazine is published four times each year by Of Sea and Shore Publications; P.O. Box 33; Port Gamble, Washington U.S.A. 98364. Subscriptions are $7.50 per year in the U.S. and territories; $9.50 elsewhere. Write for special First Class and Air Mail rates. Individual copies are $2.00 each. Copyright 1979 by Of Sea and Shore Publications; any portion of this magazine may be reprinted ONLY with the written permission of the

EDITOR: THOMAS C. RICE

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FROM THE EDITOR'S DESK

First of all my apologies for the late arrival of this issue of our magazine! A number of things added up to make this issue late, but trust you will find it worth waiting for - we hope to regain our schedule with the next issue or two. Thank you for your patience and understanding!

I really had a wonderful time this past winter, making the shell show circuit in Florida. Along with seeing all sorts of fascinating exhibits and amazing shells, I was able to meet many of our subscribers and others with whom I have had correspondence over the years and, as I have stated before, shell collectors have to be amongst the nicest people on earth! Everywhere I went I was made to feel at home and I only wish I could have taken advantage of all of the invitations to stop by and visit. But that proved impossible. Maybe next time.

Many have inquired about the effects of Mount St. Helens on our area. We have been able to watch at least one eruption, but no ash has fallen in our area - and in the areas where ash has fallen it has been cleaned up quite well. So if you're planning a visit to our area, don't hesitate - come on!

I am currently working on the seventh edition of our "A Sheller's Directory of Clubs, Books, Periodicals and Dealers" and would appreciate any additions you might have come across in your shell dealings - or if you've discovered that a club or dealer listed is no longer in existence, please let me know! Appreciate your help! The new edition will be out early in 1981.

That blank page in our last issue certainly brought a response beyond all my hopes! My thanks to all of you who have contributed articles to this issue - and to those whose articles will appear in our next number. But we still want articles! So send us that story of your recent collecting trip, favorite shell or that cleaning technique you've discovered.

Until the next issue - happy shelling.

Tom

TOM RICE, EDITOR

ABOUT COLOR PAGE 84

Numerous artists have turned to shells as subjects for their paintings. On color page 84 we have examples of works by two popular Arizona artists.

#1 is entitled SPIRAL FORM, done in 1972 by Ursula Jacobson. It measures 15 by 22 inches.

#2 is a relief print, entitled "VIEW OF A COCKLE", also by Ursula Jacobson. It measures 22 by 30 inches and was painted in 1972.

#3 is GIANT CLAM, a water color and blk chalk done in 1979 by Art Jacobson. The work measures 30 by 40 inches.

#4 is entitled SPIDER CONCH II, a 1979 work in watercolor and blk chalk, also by Art Jacobson. 30 by 41½ inches.

#5 is another watercolor and blk chalk, entitled BULLMOUTH. Also by Art Jacobson, it measures 29½ by 41½ inches.

ABOUT COLOR PAGE 88

Members of the Family Marginellidae are features on color page 88 of this issue. All photograph are by Phillip W. Clover (see more of Phil's work on page 140) who is working on a new book covering these molluscan shells.

1. is *Marginella cornea* Lamarck. 22 mm in length, from Gambia.
2. *Marginella glabella* Linnaeus; on eggs in natural habitat at Dakar, Senegal.
3. *Marginella aurantia* Lamarck; 20 mm. This was the first photograph of the live animal, taken in 1972 at Point Almadies, Senegal.
4. *Marginella persicula* Linnaeus; 20mm; Niodior, Senegal.
5. *Marginella miliaris* Linnaeus; 4 mm; from Cadiz, Spain.
6. *Marginella adansoni* Kiener; 22 mm; from Niodior, Senegal.
7. *Marginella amygdala* Kiener; 18 mm on sand; Senegal.
8. *Marginella cingulata* Dillwyn; Dakar, Senegal.

WITH THE CLUBS

GUAM

The GUAM SHELL FAIR will be held from October 5th through the 11th at the Port Authority, Cabras Island.

CINCINNATI

On October 3, 4 & 5, 1980, the Cincinnati Shell Club will host the First Tri-State Shell Show at the Northgate Mall in that city. Set-up is Friday and judging will be Saturday morning. Sunday begins with a buffet brunch and awards ceremony at The Forum Cafetaria at the Mall. The Cincinnati Shell Club invites all interested persons to contact Pat Horwitz, Show co-ordinator at 1881 Keys Crescent; Cincinnati, Ohio 45206, phone (513) 281-2212 for more information.

BRUSSELS

The Societe Belge de Malacologie will hold its second great shell exhibition between October 21 and November 8, 1980 in the Woluwe Shopping Center, Boulevard de la Woluwe, Woluwe St. Lambert (Brussels) daily from 9 a.m. to 20 p.m.

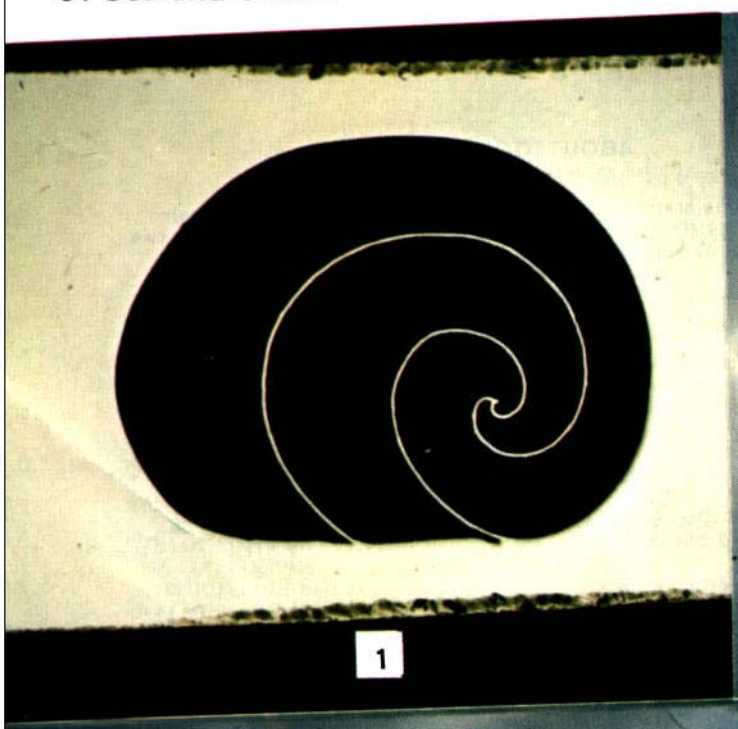
Your Club's news and show announcements should appear here with the rest - drop us a note concerning the activities of your Club - Of Sea & Shore; Port Gamble, Washington 98364.

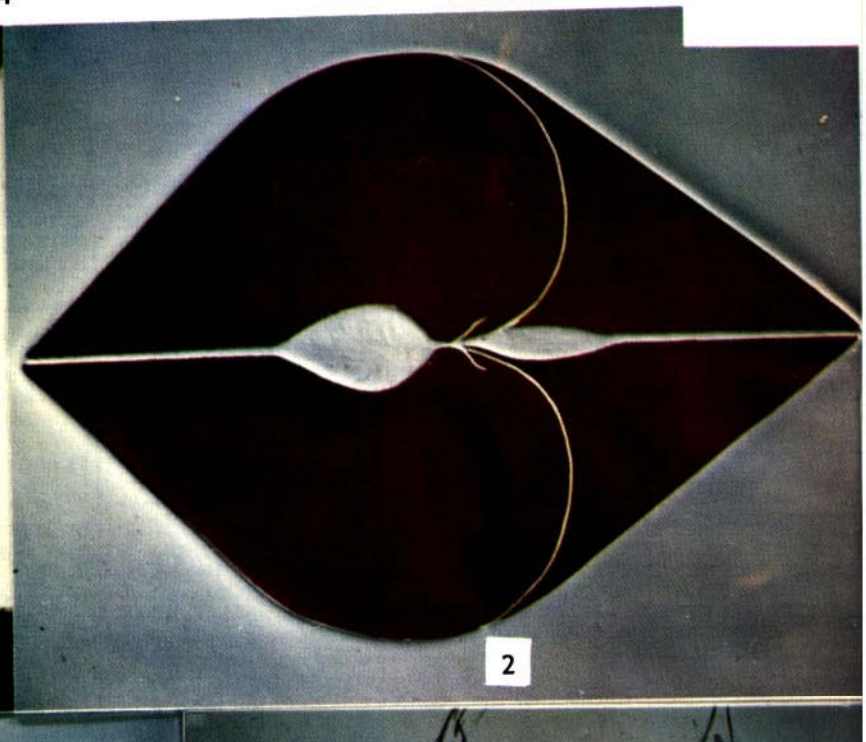
FLORIDA SHELL SHOWS

January 9, 10, 11 - Southwest Florida Conchologists Society; Fort Myers, Florida.
January 16, 17, 18 - Astronaut Trail Shells Club; Merritt Island, Florida
January 29, 30, 31 and February 1st - Sarasota Shell Club, Sarasota, Florida
February 6, 7, 8 - Broward County Shell Club - Fort Lauderdale, Florida area
February 7 and 8 or 14 and 15 - Fort Myers Shell Club, at the beginning or end of annual Edison Pageant in Ft. Myers
February 13, 14, 15 - Palm Beach County Shell Club, West Palm Beach, Florida
February 20, 21, 22 - Naples Shell Club, Naples, Florida
February 26, 27, 28 - St. Petersburg Shells Club, St. Petersburg National Guard Armory, St. Petersburg, Florida
March 5, 6, 7, 8 - Sanibel-Captiva Shell Club participates in annual Shell Fair, Community Center, Sanibel Island
End of July or beginning of August - Jacksonville Shell Club, Jacksonville, Florida.

(Above dates taken from Southwest Florida Shell News, the excellent publication of the Southwest Florida Conchologists Society of Fort Myers.)

New of a contest for shell clubs in our next issue!



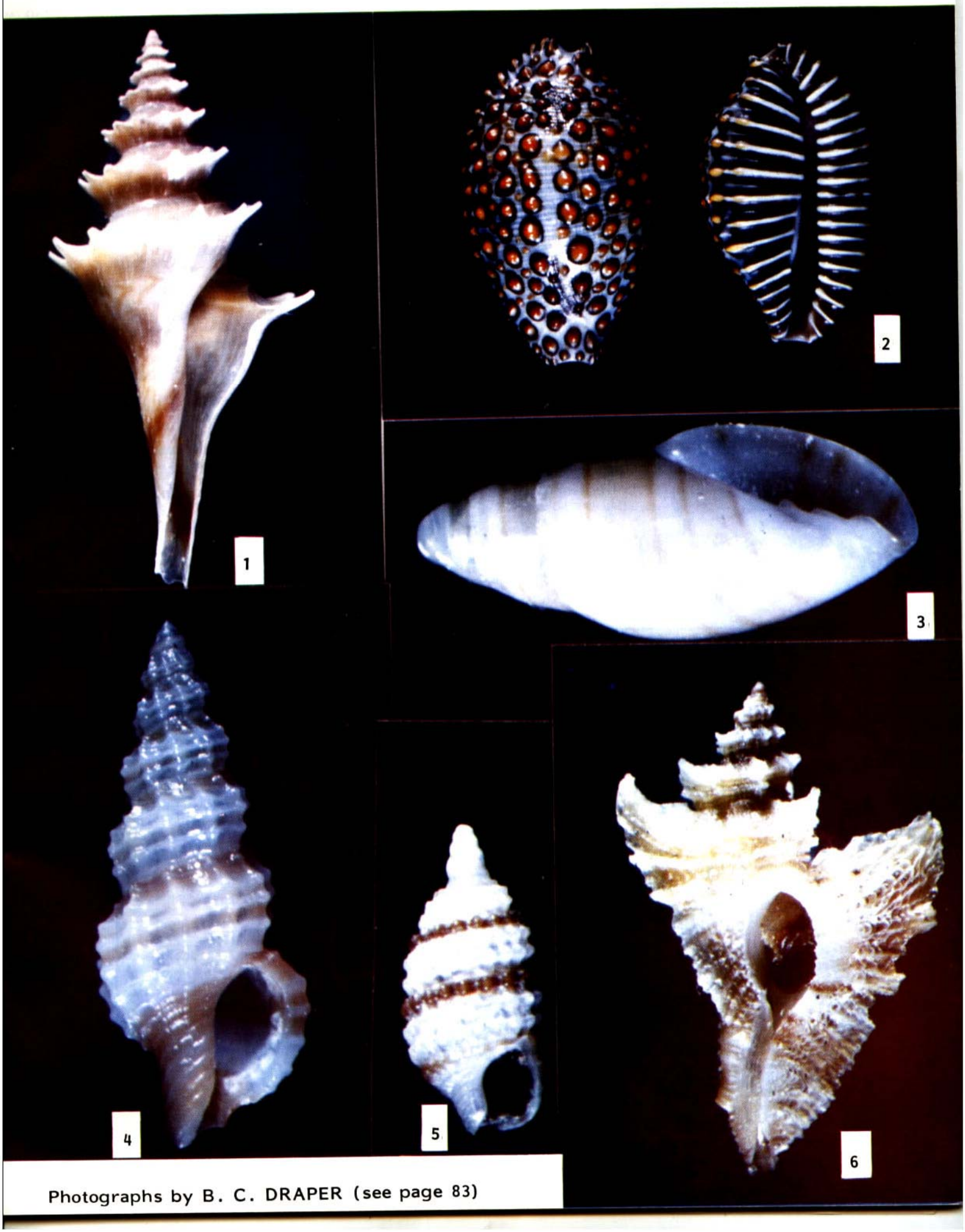








Paintings by URSULA JACOBSON and ART JACOBSON (see page 83)



Photographs by B. C. DRAPER (see page 83)

COLOR PAGE 85 LEGEND

Photographs by Bert Draper

1. *Cochlespira cedonulli* (Reeve, 1843) 17 fm San Carlos Bay, Mexico; Poorman, Apr. 1978; 18 mm; Draper collection.
2. *Jenneria pustulata* (Lightfoot, 1786) Shark's Bay, near San Luis Gonzaga, Mexico; 25 mm; Draper collection. 25 mm
3. *Dentimargo eremus* (Dall, 1919); Bahia Jobo, Costa Rica;, 3.7 mm Los Angeles County Museum of Natural History coll.
4. *Nassarina vespera* Keen, 1971 Ft. Amador, Panama; C. Skoglund Mar. 1972; 8 mm; Draper collection.
5. *Cerithiopsis sorex* Carpenter, 1857 Herradura, Costa Rica; 1972; 1.8 mm.; Los Angeles County Museun of Natural History collection.
6. *Ocenebra vokesae* (Emerson, 1964) pilings, Long Beach, California; 1960; 17 mm; B. C. Draper collection



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american malacologists P O BOX 2255 MELBOURNE, FLORIDA 32901
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Hydatina vesicaria

BEATRICE E. WINNER

Phylum : Mollusca Cuvier, 1797

Class : Gastropoda Cuvier, 1797

Sub-class : Opisthobranchia

Order : Tectibranchia

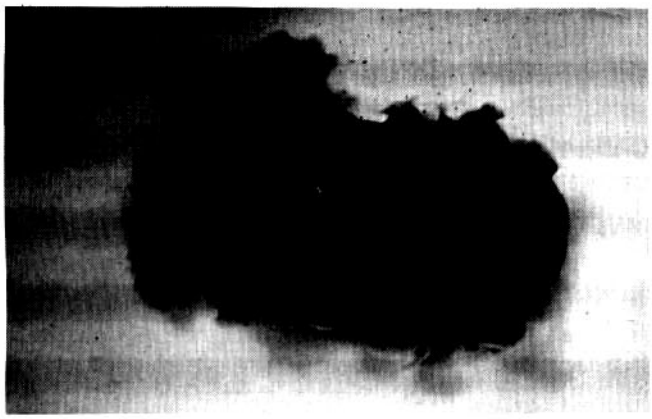
Family : Aplustridae Gray, 1847
[Synonym: Hydatinidae Pilsbry, 1895]

Genus: *Hydatina* Schumacher, 1817

Hydatina vesicaria (Lightfoot, 1786)
(Formerly listed as *H. physis* Linne)

Locality: South half of Florida, to Brazil. Bermuda. Found in shallow warm waters.

Reproduction: Hermaphroditic, that is, each individual has a set of both male and female organs capable of producing eggs.



The above photograph of *Hydatina vesicaria*, commonly called the Brown Paper Bubble, is of a specimen found laying eggs inside a dead pen shell in the Intercoastal, north of the Blue Heron Bridge in July of 1979 at low tide.

These snails have rather large bodies that envelope the shell. The shell is very fragile. Their colorful bodies act as a protection, by camouflage, as it resembles marine vegetation to a predator.

This species produces jelly-like ribbons in which are imbedded many thousands of eggs. (Fig. A) The encased eggs are protected by an extremely gelatinous substance. A fractional portion was difficult to spread out without rupturing the eggs. (Fig. B)

Using photomicrography I obtained the photograph (Fig. C) of the eggs. There was an average of 15 to 20 eggs within a cell. These eggs are bathed in albumen, and further protected by a thin, clear membrane surrounding the cell. Development takes place by oblique cleavage within the cell. (Oblique cleavage results in a spiral arrangement of the dividing cells.)

The trochophore is the next stage of development. (Fig. D) This stage takes place within the cell as well as the last stage called

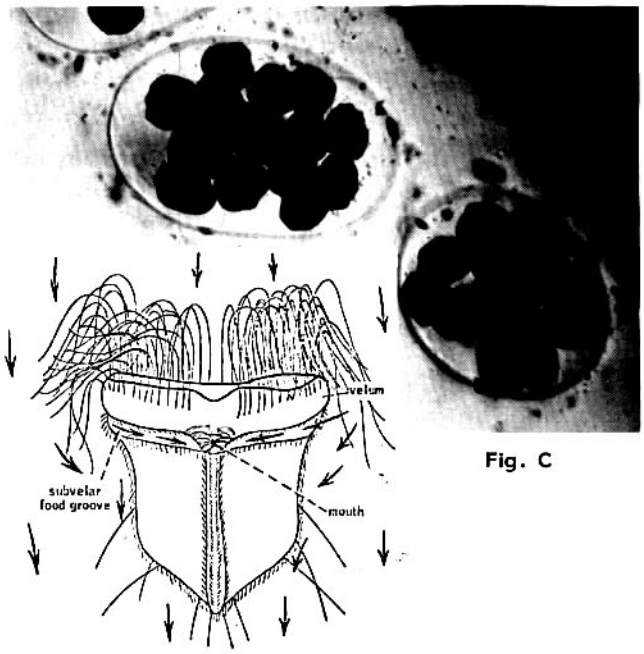


Fig. C

Fig. D

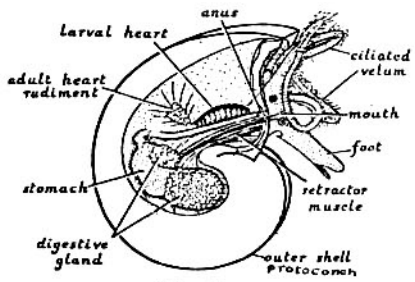


Fig. E

the veliger. (Fig. E) The beating of the long velor cilia in the trochophore larva brings suspended particles in contact with the shorter cilia of the subvelor food groove. Within the food groove particles become entangled in mucus and are conducted to the mouth.

The veliger represents a more complex stage of development much more advanced than the trochophore. The foot, tentacles, eyes, and the tiny early shell called the protoconch appear. The most characteristic feature is the large paddle-like lobes of the velum that sweeps food into its mouth. Gradually the velum becomes smaller and drops off. Finally, the animal crawls out of the cell case, and with luck will reach maturity

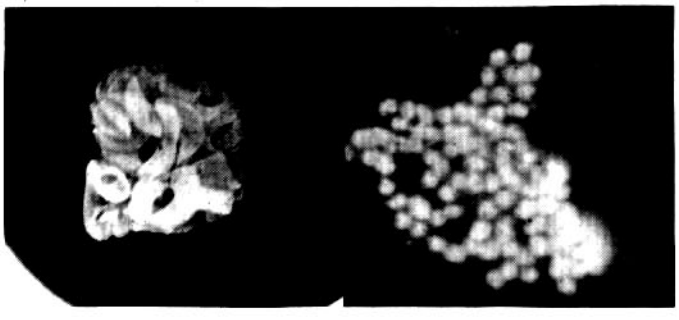


Fig. A Fig. B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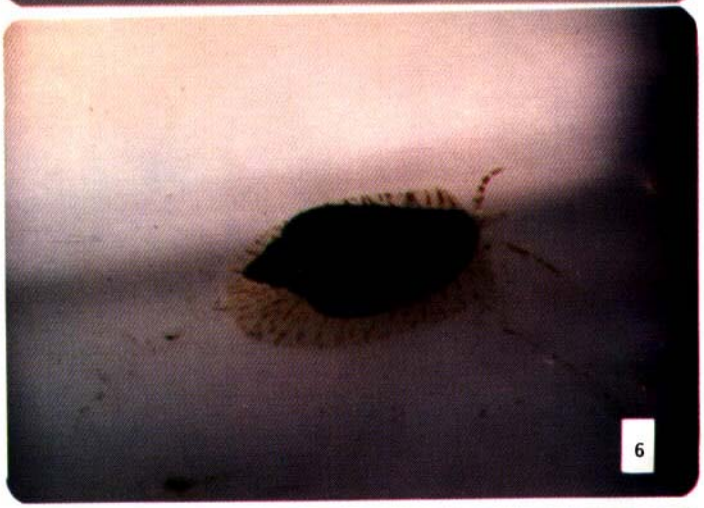
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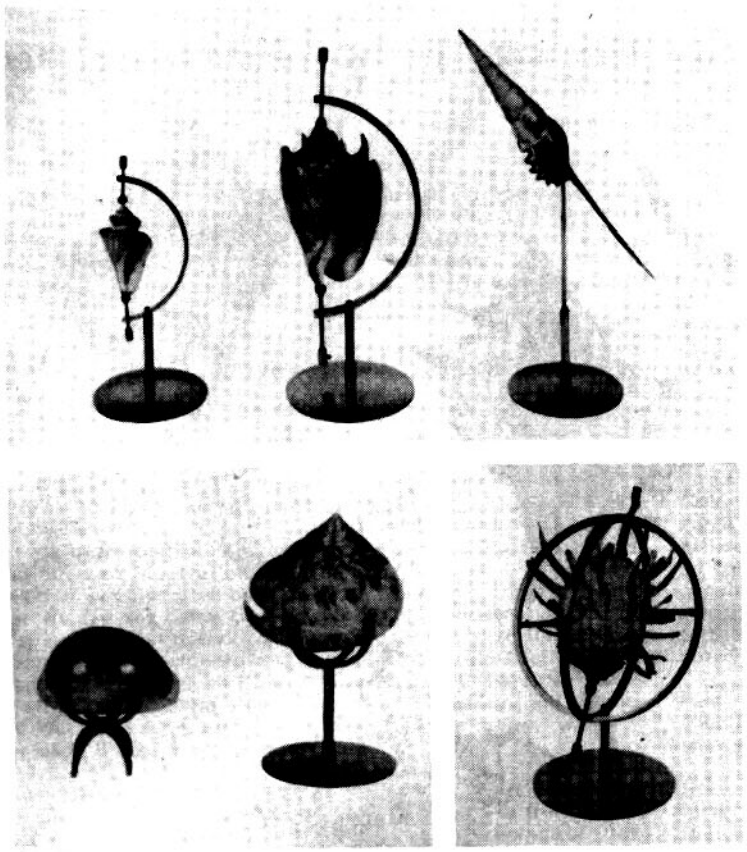

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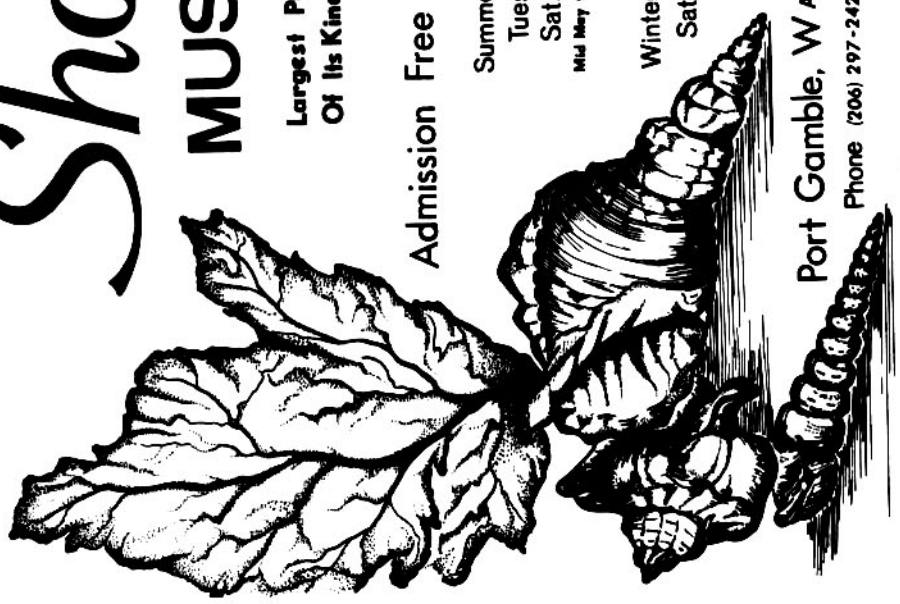

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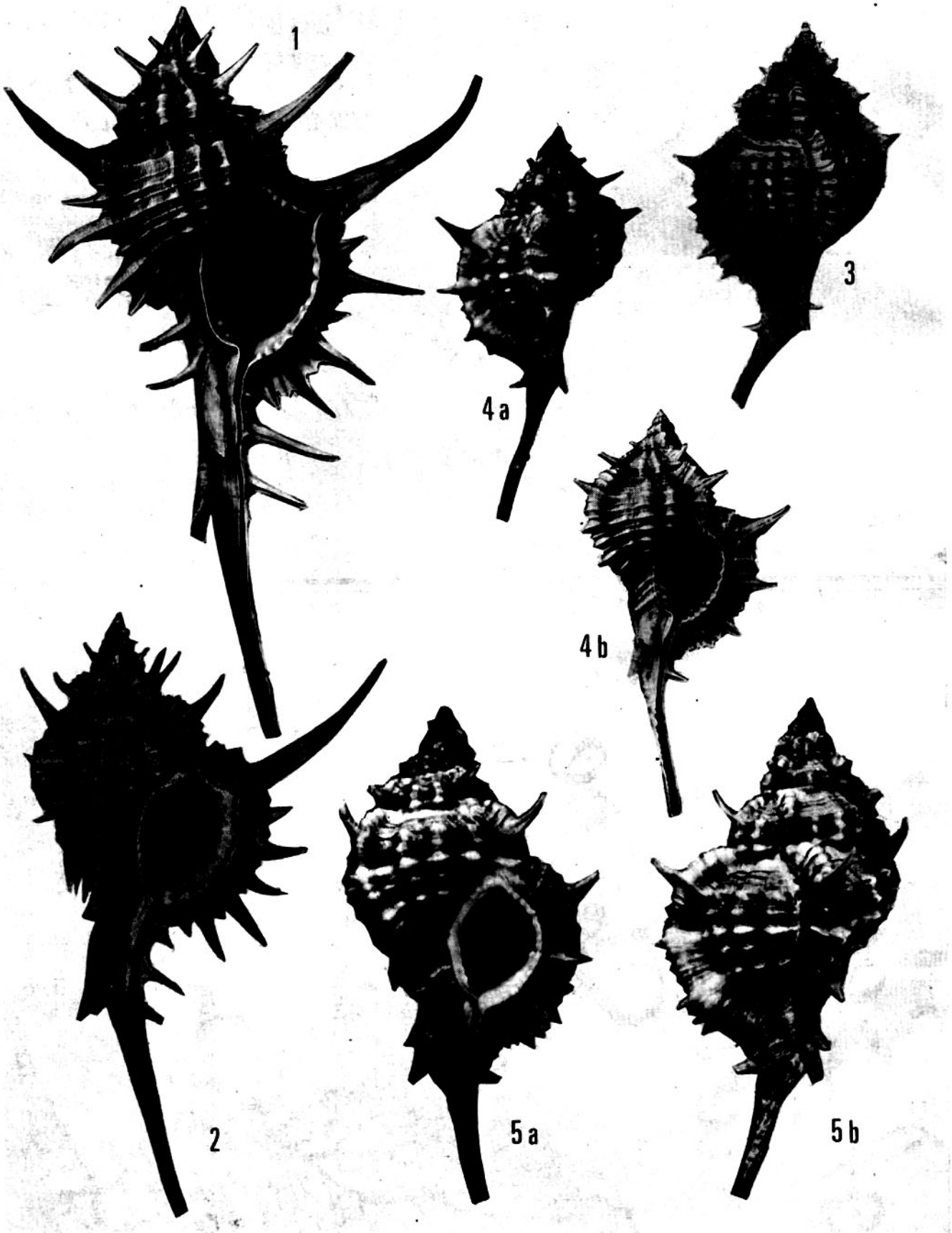
1
2
3
4a
4b
5a
5b

What is my name? Or, will the real Murex antillarum please stand up!

EMILY H. VOKES

Recently a number of examples of an unusual muricid have been coming onto the market from fish-traps off Puerto Rico. The question arose as to the identity of the mystery shell and it proves to be an unusually brightly colored variant of *Chicoreus (Siratus) articulatus* (Reeve), a species that is often confused with *C. (S.) formosus* (Sowerby).

Both of these taxa have particularly convoluted nomenclature. Sowerby was the first to recognize that there are two forms involved and in the Conchological Illustrations (1841) he named and figured both "*Murex*" *formosus* (his fig. 112, reproduced here) and another, which he called only "*Murex montacilla* var." (his fig. 69, also reproduced here). But, in 1843 Kiener figured (Pl. 11, fig. 1) the species that Lamarck had described as *Murex rarispina* in 1822, and there is no doubt that it is the same as Sowerby's *formosus*. Unfortunately, back in 1822 when Lamarck described *Murex rarispina* he did not figure it but instead cited an illustration in Chemnitz (1777, v. 3, pl. 113, fig. 1056) that was also cited by Roding for his *Murex trapa*. In hindsight we can see Lamarck chose the wrong illustration for his *rarispina* but that doesn't change the rules, and so *Murex rarispina* must be considered a synonym of the Indo-Pacific *trapa*, regardless of what shell Kiener illustrated as Lamarck's species. But all of this had the effect of making subsequent authors ignore the name *formosus* as a synonym of *rarispina*, which in turn made it also a synonym of *trapa*.

In 1844 Hinds described *Murex antillarum*, without illustration, a species, he stated, he was "strongly disposed to think ... is meant to be represented in fig. 69 of the 'Conchological Illustrations'." The species was not illustrated until 1879 when Sowerby's Thesaurus Conchyliorum (fig. 209) and there it is the one that Sowerby had separated as his "*montacilla* var." but it is not the type specimen of Hinds' species.

The description given by Hinds leads one to think that his species is the same as that figured in Sowerby's fig. 69. He states that his shell is marked by "lineis transversis fuscis penicillatis" [transverse threads darkly pencilled], which strongly suggest the decoration of *articulatus* and not *formosus*. His specimen was said to be "18 lines" or 38 mm in height, which also suggests the smaller form. Unfortunately the type specimen of Hinds' *M. antillarum* is lost. Dr. John Taylor, Curator of Mollusks at the British Museum, where Hinds' types are supposed to be, writes (in litt., May 21, 1980) that although an extensive search was was made in their collections no specimen matching Hinds' description could be found. Thus, we have no way of being certain which species was involved.

The following year (1845) Reeve, in the Conchologia Iconica refigured Sowerby's *formosus* under the name *rarispina*, using what seems to be the same specimen that Sowerby originally figured (Reeve's illustrations were also made by Sowerby, incidently). He then named Sowerby's "*motacilla* var." as *Murex articulatus* on the explanation to pl. 22 (in the discussion of *motacilla*). Two months later, on plate 25, he named *Murex nodatus*, which he said was the shell figured in the Conchological Illustrations as "a variety of the *Murex motacilla*." Fortunately, the name *Murex nodatus* is preoccupied by that of Gmelin, 1791, and so at least we can forget this added complication. But the real question is - is *antillarum* the same as *articulatus*? Without Hinds' type we cannot say for sure.

In the last of the great iconographies, the Thesaurus Conchyliorum (1879), Sowerby went even farther and figured three species: *formosus* (his fig. 6); *nodatus* (his fig. 28); and *antillarum* (his fig. 209), which he attributed to A. Adams. The latter he remarked is close to *nodatus* but is "more compact, with the varices hollowed at the back." Perhaps he was distinguishing the large variant coming from off Cabo Rojo, Puerto Rico (fig. 5) in contrast to the smaller form, which is more like Sowerby's original fig. 69 (here figured, fig. 4)

*Dept. Geology; Tulane University, New Orleans, Louisiana

Although these early workers were convinced that there were at least two forms involved, when Clench and Perez Farfante (1945) monographed the Muricidae of the western Atlantic, they combined "*montacilla* var.", *nodatus*, and *articulatus* under the name *antillarum*, figuring a beautiful example of *formosus* (their pl. 6), but they did not mention that name. On the assumption that this synonymy was correct Clench subsequently (1955) then gave the poor species yet another name - *Murex finlayi*. In their synonymy of "*antillarum*" Clench and Perez Farfante also included *Murex gundlachi* Dunker, which is yet another name for this same rather variable species.

More recently Radwin and D'Attilio (1976) have figured both forms correctly: *formosus* (their pl. 17, fig. 9) and *articulatus* (ibid. figs. 2, 3) but they added *Murex aguayoi* Clench and Perez Farfante to the synonymy of *formosus*, as well as *finlayi*. Although "*M.*" *aguayoi* is similar to *articulatus*, it is distinguished by an even more deflected canal, and especially by a very peculiar heterostrophic protoconch, which is reminiscent of *Turbonilla* or the like, with a first whorl that is set off at an angle to the remainder of the shell. *Murex finlayi*, as we have already noted is a synonym of articulatus.

Fair, in The Murex Book (1976) correctly illustrated *aguayoi* (her fig. 71, the holotype), *formosus* (fig. 56) and *articulatus* (her fig. 58 is the same specimen here figured from Jamaica).

In conclusion we can see that there are, indeed, two very similar forms in the Caribbean. The primary distinguishing character that separates them is the angle of the siphonal canal, that of one being more deflected than the other. The one with the straighter canal, usually larger, and usually an overall tan or brown is *Chicoreus (Siratus) formosus* (Sowerby). But the other, usually smaller and striped in some sort of brown and white bands with reddish-brown spiral threads, is burdened with more than the usual number of names. In chronological order these are:

? Murex antillarum Hinds, 1844

Murex articulatus Reeve, 1845

Murex nodatus Reeve, 1845 *non M. nodatus* Gmelin, 1791

Murex gundlachi Dunker, 1883

Murex finlayi Clench, 1955

Since there is no way of ascertaining what is the correct identity of *Murex antillarum* Hinds, the best solution is to consider it is a *nomen dubium*, or dubious name, and ignore it completely. Thus the names that have lately come to be associated with the two species -- *formosus* and *articulatus* -- can stand without threat.

A number of specimens of *C. articulatus* have been appearing on the commercial market in recent years. Most are from fish traps and usually rather deep water. The records I have include: 90 fms, Ile de la Gonave, Haiti; 100 fms, Bahia de Anasco, Puerto Rico; 75 fms, off Panama; off Ocho Rios, Jamaica, no depth; and 130-170 fms, off Cabo Rojo, Puerto Rico. The type lot of *Murex finlayi* Clench is from 100 fms, off Matanzas, Cuba.

Records for "*M. antillarum*" given by Clench and Perez Farfante (1945, p. 14) range from 27 fms to 190 fms but these are questionable due to the confusion between the two species. From all evidence both *formosus* and *articulatus* occur in approximately the same depths, about 100 fms, in the area of the Greater Antilles.

I would like to express my deep appreciation to Al and Beverly Deynzer of Showcase Shells, Sanibel Island, Florida, for the masses of specimens provided when I expressed a need "to see

Continued on the next page

more specimens" before I came to any conclusion on the identity of the Puerto Rican species; to Jo Bennett, Fort Myers, Florida, the "middle-man", who matched my needs with the Deynzer's shells; and Kirk Anders, Fort Lauderdale, Florida, who originally raised the question. I alsothankDr. John Taylor, British Museum (Natural History), for the search for Hinds' type, unsuccessful tho it was, and Earl Reed, Springfield (Mass.) Science Museum, who provided the specimen of *C. articulatus* from Jamaica figured here.

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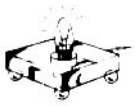

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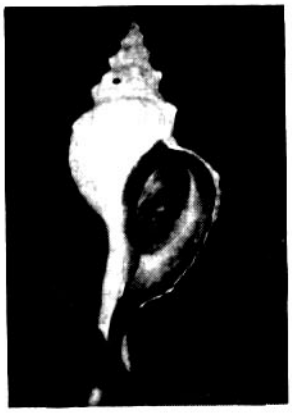

It was a hot Thursday afternoon in late June of 1979 as my son Greg, and I loaded the gear into our pickup truck/camper in preparation for our fourth annual shell collecting vacation to Florida. We left our home in Celina, Ohio, picked up my wife, Lucille, after work, and headed down south. Greg and I alternated the driving chores while Lucille kept us supplied with coffee, sandwiches and cold sodas. By midnight we had managed to make it to Georgia where we stopped to get several hours of sleep.

After a quick breakfast of coffee and sweet rolls, we were again on our way. By 6:30 p.m. that evening we arrived at the State Campground on Long Key, Florida. We quickly set up camp, ate, did a little beachcombing and retired early in anticipation of the real beginning of our vacation.

Rising early, Greg and I grabbed our masks, snorkels and flippers and headed for the water, while Lucille waded and did the beachcombing. The shelling was not as good as it had been in previous years, but after several days we managed to collect one nice *Conus spurius*, three *Strombus raninus*, some *Melongena corona bicolor*, numerous *Janthina janthina* and *Spirula spirula*, from the beach litter, plus various nerites, chitons and *Littorina* from the surf rocks. Lucille came dragging in the biggest prize of all, a beautiful 19¼ inch horse conch, *Pleuroploca gigantea*. Apparently Greg and I waded right by it while looking for shells - a typical case of not being able to see the trees for the forest - much to our embarrassed pleasure of course.

Due to the gasolene shortage out on the Keys, we were unable to roam around as much as we usually do, so we decided to head north to Marco Island. Several years ago Marco was one of the seven wonders of the shelling world. Now it is riddled with channels, the waterfront is lined with man-made atrocities, the once clean beaches are choked with smelly silt caused by dredging and the public beach accesses are becoming as extinct as the sea and mollusk life. After several hours of playing a game called "follow the missing beach signs", which kept leading us to a dead end, we asked directions and finally found the beach(?). Several wasted, disappointing hours later we departed, poorer but wiser. It will be many years before nature can even begin to clean up this mess and hopefully restore the sea life to even a shadow of its former self.

As we departed Marco Island, we stopped by the new bridge near Goodland to collect a few *Littorina angulifera* from the roots of the mangrove trees. With our spirits again on the rise, we traveled north along the Gulf coast, stopping wherever we could find an access to the beach. We worked our way to Sanibel Island where we spent the better part of a day, collecting several nice *Strombus alatus* from the surf, a large *Fasciolaria tulipa* and various other shells. Leaving Sanibel, we headed for Gasparilla Island to spend the night and the next several days.

Shelling on Gasparilla proved to be some of the best on the entire trip. This island is just beginning to feel the building boom so nearly all the beaches are still accessible to the general public. Lucille likes to collect beach shells for her jewelry projects, so during the high tide periods we walked the beaches. At low tides Greg and I either waded or snorkeled, where we observed numerous *Busycon contrarium* of various sizes, and one albino which Greg found for my collection. We also found a few *Pleuroploca gigantea* and numerous *Fasciolaria hunteria*, which I sorted through. I walked along with several in my hand at all times, comparing and releasing the less desirable ones, finally ending up with five excellent specimens during our two day visit. It was nice to be able to be so selective.

Leaving Gasparilla, we traveled on north to Sarasota Beach, where we strained through the sand, looking for fossil shark teeth. After several hours and about a hundred teeth we departed with sore backs and high spirits as we headed for Clearwater to visit our friends, Don and Dot Clemmons.

Don is an old fishing and turtle-hunting buddy of mine and we have had many escapades together. The next few days were spent shark fishing and shelling in and around Tampa Bay. Don has a small boat so we fish at high tide and when the tide drops we wade along, dragging the boat, and hunt for seashells. During our stay we collected, or saw, numerous *Atrina rigida, Melongena corona, Fasciolaria hunteria, Busycon contrarium, Fasciolaria tulipa, Aequipecten irradians, Mercenaria campechiensis, Tellina lineata, Modiolus demissus* and *Chione cancellata*, plus many other species in lesser numbers.

Our vacation time was drawing to an end as we headed northwest into the Florida panhandle. Traveling along Route 98, we stopped in Medart, Florida long enough to purchase an acre of land on which we hope to retire some day. Moving west we went to the state's campground at St. Joseph Peninsula, staying for two days. We collected some nice *Oliva sayana* and *Terebra salleana* on the side facing the Gulf of Mexico, and on the Bay side of the peninsula we saw about the same shells that we had found at Tampa Bay. We collected a few shells, but mostly we just observed and added some valuable information to my field notes.

We retraced our route back towards our property, stopping along the way to check out the territory. It just happened that we ended uo at Alligator Point at low tide. Now I have found a few Sand Dollars before, but we saw sand dollars that would number in the many thousands. Lucille wanted some souvenirs to take back home for her friends at work, so we gathered a bucket full, which wasn't too many as they were over six inches in diameter and fully an inch thick. It took several gallons of bleach and many rinses of fresh water to get all the iodine out of them. We also found many *Natica duplicatus* and *Terebra displocata*.

The next morning we had to head home so another of our memorable vacations had to be logged into the history book.



N.W. Coast Impressions

FAYE FROST

We knew shelling would be bleak, but a meeting in Banff lured us back via the coast line. No shells, only broken sand dollars and smashed *Siliqua patula*. Drizzle, fog and rain sombered the skies and turned the green forest sullen. Two days of sun drew incessant wind and chilled the late June. In the beauty of giant red-woods we scanned a massive trunk, but clouds obliterated all the rest of that splendor.

Retired and camping, we drove into most of the Oregon, Washington and California State Parks north of San Francisco. So did everyone else. Behemoth campers lined the turn-outs, the vistas, the park sites and monopolized the roads. We felt crowded, herded, overwhelmed by sheer numbers of people.

Have you considered the hazards of even reaching a beach? One cove offered a quarter-mile of sand and a stream to cross first. Try making head-way through sand. A cliffy beach dropped sharply down with mud oozing at the bottom. I slid. Another pard defied us with boulders clogging access to black, sea-weeded rocks. One park hugged precipitous cliffs. Some coastal roads ribboned narrow, winding and breathless. Too high above the sea. Careful, here comes a caravan of campers. And one day 104 logging trucks whizzed by!

On a Washington beach alone for 7 minutes, I found small pieces of pumice. Mount St. Helens, the phenomenon of the century, spewed these down river and the ocean waves tossed the weightless bits back to shore.

One grade-A gray day through curtains of fog a sign read "Crescent Beach". Aha, we must hunt sea shells wherever possible. In the drizzle I carefully paced the water's edge. Not a thing, not even a shell or sand dollar fragment. The map exposed it as an inland, freshwater lake.

Then I spotted small rocks far out at low tide. It was early morning and only 9 people ambled this cove. "Hey Arthur, stop. Look at all those rocks to hunt under." Plod through the sand. It fills my shoes. Hurry, take them off, for the tide moves in fast. Race for the water, then look under the holdfasts of stormed kelp. Sure enough, a plump mussel. Nostalgically I recalled searching the holdfasts of soft coral on St. Croix to happily find a white-frilled *Chama* swathed in pink.

Final Finds:

1 Pacific Razor Clam, slightly chipped
3 soft shell clams, abandoned by mollusk-eaters
2 hard shell clams, ditto
4 oysters, again, ditto
1 sand dollar, nipped
2 *Haliotis* fragments
1 *Pododesmus*, old and, surprisingly, hinged
3 small drills
9 limpets
Penitella penita, in clay

So a highlight of the trip came in meeting Tom Rice, Curator of the shell museum at Port Gamble, Washington. Besides his extensive displays, Tom has specimen shells to sell. For a friend and us we purchased a *Strombus listeri*, a *Murex alabaster* and a *Conus gloriamaris*. Joy.

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Dear Editor:

J. A. ELLUL

Dear Editor,

What is to follow is not meant to be a criticism of authors of shell books, but rather an assist to the average collector. I would like to introduce my formula on classification of shells which will retain the old names as a reference. Let's call it the "Ellul Formula". (I might as well get into the act.)

I would like to give some examples of confusion, but at the same time want to make it clear that I respect and commend the authors of the latest books on the market. I would like to start with the Murex Shells of the World by George E. Radwin and Anthony D'Attilio.

Example: in plate 10, fig. 8: *Murex tribulus*.

To most collectors this particular *Murex* (as shown on the plate) was known as *M. nigrispinosus* Reeve. In addition, *Murex tribulus* equals *M. pecten; M. ternispina; M. aduncospinosus; M. carbonieri* and so on. If one had to buy these shells, the prices are different for each type - they run from $1.00 up to $25.00 (for the *M. carbonieri* from the Red Sea area), depending upon which one you are looking for.

Now I would like to go to another recent book, Cone Shells by J. G. Walls. Although this book is the best ever published on the group, it created a lot of confusion among collectors and professionals as well. This is not construed to mean that we should become stale and stick to old standards. On the contrary, Mr. Walls should be held in high esteem for bringing us up-to-date. We don't agree with every little item in the book, but just the same it takes a lot of energy and hard work to publish a book that we have been needing for many years. Although, too, some of the names are changed, I am willing to comply with his rules. There are some who have criticized portions of the book, particularly pages 982-84. This portion shows the cone names used by dealers versus names used in the book. The saying goes that for the past twenty years the dealers and collectors used the names of shells as prescribed in shell books published by respected authors such as Abbott, Clench, Melvin, Habe, Kira, to name a few. To consolidate 11 different cone names into one for those with large collections is ridiculous.

Example: *Conus tinianus* Gwass (in Bruguiere)

Conus moluccensis Kuster, 1838. It would have helped if the species from the New Guinea - New Britain areas were shown, for which there are three that don't look the same as those illustrated on page 472. (See Shells of New Guinea and the Central Indo-Pacific by A.G. Hinton, page 89, plate 43, figs. 21, 22 and 23. Also see Cones of the World by Marsh and Rippingale, page 129, plate 19, figure 15.)

Formula: To nake it easier for everyone (dealer and collector), I suggest the following: to separate one *Murex* or cone from one another, use the word forma immediately following the accurate name. In the case above, *Murex tribulus* Linnaeus, 1758 forma *nigrispinosus* Reeve. Or *Murex tribulus* Linne, 1758 forma *ternispina* Lamarck; *Conus gubernator* Hwass, 1792 if the Indian species, will become *Conus gubernator* Hwass, 1792 forma *pramparti*. For *Conus eburneus* if *polyglottus*, will become *Conus eburneus* Hwass, 1792 forma *polyglottus* Weinkauff.

Following this formula will not deviate from authorized malacological standards and, at the same time, will assist everyone in general to know which is which. This will also settle that matter of saying, by some, that the name of a particular shell has been changed and therefore not valid.

I discussed the above with three PhD's and they don't disagree, since it will help the collector and the dealer. It would be interesting to see in print some comments in reference to this suggestion.

Marine Life Uses in Medicine

GRACE JOHNS

The sea promises a vast source of chemically active drugs for treating human illnesses and afflictions. Biochemists, and others in the medical field, are experimenting with various extracts from sea life for treatment of cancer, polio, nervous system disorders, influenza, high blood pressure, tooth decay, food processing, brain disorders and diabetes, to name a few. This research for drugs from the sea is a relatively recent undertaking. A symposium held in 1960 brought researchers together for the first time. Since then workers in many areas have become involved in this medical frontier.

The majority of the drugs now under study may be divided into two broad classes: the antibiotics, which are used to destroy the organisms that cause diseases, and the systemic drugs which act directly on parts of the body. The information in this report is based on a summary of various drug symposia reports, Sea Grant bulletins, medical research laboratory bulletins and publications by the researchers.

In the 1960s, it was discovered that extracts of the clam *Mercenaria mercenaria* was a strong growth-inhibitor of experimental cancer in mice. This extract was named mercenine. This discovery was the result of studies initiated by Sister M. Rosarii Schmeer, of the Biology Department, College of St. Mary's of the Springs, Columbus, Ohio. Dr. C. P. Li of the National Institute of Health, extracted a substance he named Paolin from abalones such as *Haliotis rufescens*. Paolin has also been extracted from the oyster *Crassostrea virginica*, and from the Queen Conch, *Strombus gigas*. Experiments have proved this extract shows activity against influenza and polio.

The poison from *Neptunea antigua*, called tetramine, has proven to be a powerful muscle relaxant. Tetramine is the major component of the salivary gland poison of the edible *Naptunea arthritica*. This poison is present in the gland throughout the year, and removal of the gland, therefore, can protect consumers from food poisoning.

A substance names Murexine is present in the purple gland of *Murex trunculus*. This is being used experimentally as a muscle relaxant. Aqueous extracts of the hypobranchial gland of *Thais lapillus*, and *Thais floridana*, are similar to Murexine, but not as potent.

Acrycholine has been isolated from the gland of *Buccinum undatum*. It causes contraction of smooth musculature, hypotension in mammals, and exerts a weak neuromuscular blocking action.

The venom of fourteen species of Conidae were tested on a variety of animals. Ironically, only the cones with the deadliest venom hold possibility of remedies for man. *Conus geographus*, probably the most deadly of cones, has a venom that is used in studies as a muscle relaxant. *Conus magus* produces a spastic or rigid paralysis in its victims. A drug from this venom shows promise as a muscle stimulator.

Guluronic acid is obtained by using enzymes of the pancreas of *Haliotis discus*. This is used to prevent the internal absorption of radioactive strontium.

A study of a substance from *Tegula funebralis* shows it may be useful in immunity to diseases.

The lowly sea mussel, such as *Mytilus edulis*, is now lending valuable help to scientific medical research in various fields. It is being used in the research for treatment of multiple sclerosis. Dentists are studying the secretion that mussels use to adhere to rocks and pilings for a material to use in filling teeth. And, because it is a filter feeder, it is useful as a pollution indicator.

Sinum perspectivum, the Common Baby's Ear shell, has a huge foot which encases the shell. It produces a copious mucus that is useful as a soothing and healing lotion for hands.

At the New York Sea Grant Institute's Agricultural Experiment Station in Geneva, researchers isolated an enzyme from the digestive system of surf clams that holds promise for dissolving dental plaque, and breaking up the mold in the blood vessels of burn victims. Such surf clams include *Spisula solidissima* and *Mactra fragilis*.

Extracts of *Macrocallista nimbosa*, and *Turbo stenogyrus* are effective against experimentally induced lymphocytic leukemia in mice.

The Red Tide produces poisons which kill fish and other sea life. One such poison, called *Gonyaulas catenella*, has been the object of much study by drug researchers as a possible anti-hypertension drug. This poison is identical to the poisoning agent in California mussels and the Alaskan Butter Clam, *Saxidomus giganteus*. This poison has proved potent against a wide range of bacteria. It is also being used in studies as an anti-hypertension drug.

A compound, called Eledosin, taken from the salivary toxins of *Octopus joubini*, and others, is being used in the manufacture of a hypotensive medicine.

An extract called Holothurin from sea cucumbers has shown great medicinal potential in treatment of cancer and some heart conditions. This extract is a poisonous substance that protects the animal. It acts similar to digitalis, and may be even more effective in treatment of heart patients.

Experiments with extract of sea squirts show potential for curing leukemia, and also possibilities as a good candidate for aiding the human body to accept a transplanted organ. Sea squirts are of the tunicate family. Another member of that family, called sea pork, stores up a concentrate called Vanadium, a rare chemical element, in their blood cells. This is used in steel alloys and in the production of aniline black and other dying materials.

The sea hare looks like such a useless form of life. Yet, because they have a simple nervous system composed of large, easily accessible nerves, they made ideal subjects for neurological research. In the studies of this animal, researchers hope to gain insight into nerve functioning on a simple level, and apply the knowledge to the functioning of the human nervous system.

The eggs and sperm of sea urchins have been the subject of important basic research about the structure and chemistry of cells: how their membranes function, how they divide, and how their genes are regulated during the development of the fertilized egg into an embryo. The understanding of these processes may lead to the understanding of cancer. Another line of investigation that began on sea urchin eggs is now leading toward the important possibility of fertility control.

The starfish has the amazing ability to regenerate itself. Cut an arm off a starfish, and it grows another. More significant, the arm sprouts nerves and muscles, and becomes another starfish. Biochemists are studying the special hormones and enzymes secreted by the starfish cells. Perhaps this research will lead to discovery of how to use the starfish's regenerating ability to stimulate the growth of new limbs in human amputees. In another area of research, insulin, vital in the control of diabetes, has been extracted from starfish.

Elkhorn coral and the black sea rod, *Plexaura homamalis*, produce an important pharmaceutical product called prostoglandin. This is the basis for the once-a-month birth control pills, and is also used in abortive miscarriages. Just what a gorgonian and a coral do with a mammalin hormone-stimulating chemical is still a mystery which biochemists hope to solve. Japanese researchers are using Elkhorn coral in experiments with the possible use of coral in the construction of false teeth.

Continued on the next page.

Balanus eburneus and *Balanus improvisus*, two common barnacles have been grown on human teeth and the bond strength developed. This substantiated the possibility of a new dental restorative material. Also barnacle research is turning up information that could make it possible to develop chemical coatings for ship bottoms that would repel the clinging marine growths that plague owners of sea-going vessels.

Pharmaceutical manufacturers have made available a line of products in which the basic ingredient is calcium carbonate from oyster shells.

A cosmetic company has added "natural sea moss massage cream with collagen" and a "spot massager natural sea moss soap" to its line of products.

The Horseshoe crab, *Limulus polyphemus*, donates its blue blood to research. This blood contains a clotting agent called lysate. It is now being used as an ultra sensitive agent in detecting the presence of bacteria in preparations used for injections. The Giant Keyhole Limpet, *Megathura cernulata*, also shows indications that it has this same clotting agent.

The chemical Bonellinin, extracted from certain marine worms, shows possibility of an important cancer-inhibiting agent.

Many marine sponges, especially some from tropic waters, are virtually immune to bacterial infection. Numerous substances with antibiotic properties have been discovered and research has led to the synthesis of a compound that doctors now use to combat leukemia. A Yale University scientist was surprised to discover that a dead sponge immersed in fresh water resisted bacterial decay for more than five years. The study of these antibiotic mechanisms has now proven valuable in fighting human illnesses.

Products from marine mammals that are useful in medicine include spermaceti from the head of the sperm whale. This substance serves as a stiffening agent in ointments. A substance extracted from the stomach of Antarctic penguins shows promise in use against destroying Staphylococcus.

An Italian professor found a marine fungus which produced an antibiotic activity in 1945. This discovery eventually led to the drug called Cephalesporium, which is now being used in a wide range of antibiotics by one of the largest pharmaceutical manufacturers in the world.

The Hagfish, an eel-like animal, has three independent hearts. As a result of research on this animal, a biochemical called Eptatretin was discovered. This discovery shows potential in regulating the heartbeat of people with cardiac irritability.

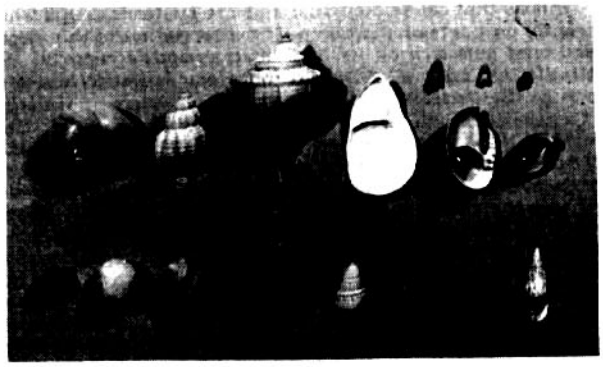
The Electric Eel has given us the potent antidote for certain types of insecticide poisoning in humans. Another extract from this eel may prove valuable in the fight against muscular distrophy.

Another area of concentrated interest is in the medical uses for poisons excreted by sea creatures. Many of these toxins are extremely potent, as mentioned about the *Conus geographus*, and *Neptunea arthritica*. A chemical extracted from the virulent venom of the Weeverfish slows animal heartbeats to a few throbs. Such a drug could prove a boon for surgery. A chemical from the Stonefish's poison lowers high blood pressure in animals. This drug might prove to be a remedy for hypertension. Tetrodotoxin from the Pufferfish is now used in Japan as a narcotic to relieve the agony of terminal cancer. Other poisonous marine life which offer glimpses of medicinal uses include sea snakes and sea wasps.

Marine animals, and other sea life, have played a traditional role in biochemical research, but their great potential in the existing fast-moving area of drug research never have been truly realized. Today, with the rapid advances in technology and increased emphasis on the effective use of the sea, the role of marine organisms in health oriented research is becoming dynamic and vital. What a huge and fascinating task scientists and biochemists face as they struggle to unravel the mysteries wrought by the Great and All-Wise Creator!



1



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3

Fig. 1. Typical beach drift sample, collected in June at Harbor Beach.

Fig. 2. Typical gastropods of Harbor Beach area. Top row: (left to right) *Polinices duplicatus, Urosalpinx cinereus, Busycon canaliculatum, Crepidula plana, Crepidula fornicata, Crepidula convexa*. Upper right corner: *Cerithiopsis subulata, Bittium alternatum, Mitrella lunata*. Bottom row: *Littorina saxatalis, L. obtusata, L. littorea, Ilyanassa obsoleta, Nassarius trivittatus, N. vibex, Anachis avara* and *Anachis translirata*.

Fig. 3. Typical bivalves of the Harbor Beach fauna. Top row: (left to right) *Mercenaria mercenaria, Petricola pholadiformis, Anadara transversa, Aequipecten irradians*. Middle row: *Modiolus modiolus, M. demissus, Mytilus edulis, Tagelus divisus, Anomia simplex, Cumingia tellinoides*. Bottom row: *Ensis directus, Tellina agilis, Crassostrea virginica* and *Laevicardium mortoni*.

PHOTOGRAPHS BY PAUL MONFILS.

See article, RIGHT PLACE, RIGHT TIME, on page 97.

Right Place, Right Time

STEVEN ROSENTHAL



Harbor Beach, eastern end



Harbor Beach, note beach grass patches at right

Having collected shells at various sites in Rhode Island and southern Massachusetts during all seasons of the year for the past three years, I have decided that the best collecting is definitely seasonal. It seems that whenever I tell someone that I can take him or her to a given spot where they will be able to observe or collect a nice variety of shells (based on my past experiences at said site), the opposite frequently results. However, I am willing to take a chance and guarantee anybody that if they visit Harbor Beach, in Mattapoisett, Massachusetts, during the spring, they will be in for a real treat.

Several times, most memorably in late May of the past two years, shelling buddy Paul Monfils, from Providence, Rhode Island, and I have made the trip to Harbor Beach, and each time we have seen and collected an interesting variety of shells. Paul has been collecting in New England for several years and he seems to know all the right spots. Invariably, on our way to Harbor Beach, we make a stop at Fort Phoenix Beach, in nearby Fairhaven. This is a fine place for drift collecting, and among the flotsam and jetsam we have made many interesting discoveries. Nosing through the piles of mud snails and slipper shells that characterize the local beaches, we have found some of the more interesting (and less frequent) shallow water shells of the northeast. Such finds have included *Cerithiopsis subulata* and *Seila adamsi*, both with small, turret-like shells; the flattened bivalve *Pandora gouldiana*, and, most recently, several fresh specimens of *Nucula proxima*, and a lone specimen of the wentletrap *Epitonium rupicola*. Dove shells are extremely common here, and both Paul and I have collected many fine specimens of *Anachis avara* and *Mitrella lunata*. Actually, the "find" I most vividly recall at this spot occurred last winter, when Paul waded out in a meter of ice-cold water to retrieve a fresh specimen of *Buccinum undatum*. That's determination!

After we have thoroughly scoured the drift, we head for Harbor Beach, which we can usually find without trouble, unless someone has pulled down the roadsigns again. I remember my first impression of Harbor Beach: shell-wise, it looked perfect. Harbor Beach is a somewhat crescent-shaped expanse of sand that quickly grades into sandy mud as one enters the water. The water is generally warm, shallow, and calm, as the beach is sheltered from the open ocean. Strewn among the muddy flats are numerous small rocks and pebbles and, at various places, still in shallow water, there are many large boulders.

It soon became apparent that the most unique feature of Harbor Beach was found well above the mean tideline, where it could have easily been overlooked if there was not a shell collector as experienced as Paul around. I am referring to some large patches of beach grass, that serves as a "trap" for all kinds of debris. Pushing aside the stems, and glancing downward, we discovered piles of beached shells that, as far as I have seen, are the northeast's closest rivals to Sanibel's. It became apparent that the stems, densely crowded together, formed a natural sieve for all kinds of beached material, and it was also obvious that springtime was breeding time for a lot of mollusks, because we were finding plenty of dead juvenile shells right alongside the adults. To add to the excitement, many of the shells we found were "firsts" for me. On our last trip the most abundant find of the day was the Awning Clam, *Solemya velum*, a protobranch bivalve with a raggedy periostracum that overhangs the edges of the fragile shell. Alongside these we found the "jacknife" clams: *Ensis directus* and *Tagelus divisus*, with its tinge of violet. Less frequent finds in the drift included the chalky-white clam *Cumingia tellinioides*, *Tellina agilis* and the exceedingly fragile *Lyonsia hyalina*. Other, more robust bivalves wash up here, such as the Horse Mussel *Modiolus modiolus*, still with its periostracum, and the ark shells *Anadara transversa* and *Anadara ovalis*, often still attached to the same seaweeds that helped anchor them in the mud, during more favorable days. *Macoma balthica* and *Aequipecten irradians* are two more bivalves that often occur in pairs in the drift. Sue Dunn, a newcomer to shelling, joined us on our last outing (it was her first) and, while going through the drift (like an old pro, I might add), she found a minute specimen of a *Turbonilla*. Apparently the beach grass can trap anything, large or small.

After surveying the drift, we turn our attention to the water itself. Numerous mud snails wander about on the warm, shallow bottom, and on many of the pebbles or rocks one can find specimens of the Jingle shell, *Anomia simplex*, or the slipper snails *Crepidula fornicata* and *Crepidula convexa*. Inside large, dead whelk shells one often finds the White Slipper Shell *Crepidula plana*. One can also find representatives of some of the bivalves that were found dead in the drift, alive in the sand or mud. *Laevicardium mortoni*, *Mya arenaria*, *Venus mercenaria* and *Ensis directus* are often found totally exposed or partially buried.

Turning our attention towards the boulders and their attached seaweeds, we usually find live *Bittium alternatum* and *Mitrella lunata*. On the boulders themselves we find large, finely sculptured, clean *Urosalpinx cinerea*, preying on barnacles alongside the more peaceable periwinkles and mussels. On our last trip I

Continued on page 120



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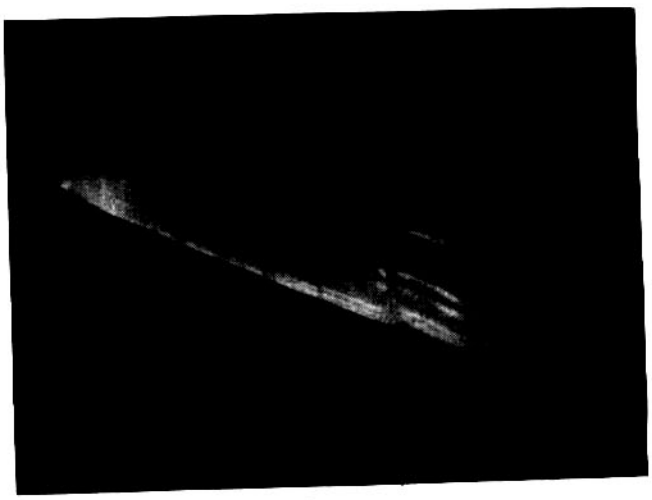

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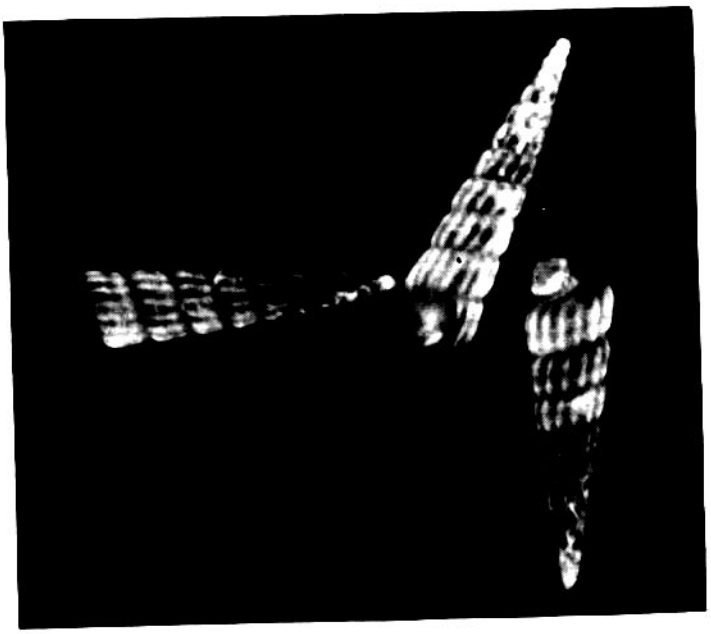


5



3 4

1. *Haminoea succinea* Conrad, 1846
   ¼ - ½" in length
2. *Balcis intermedia* Cantraine, 1835
   ½", in sand, Sarasota Bay
3 & 4 *Mitrella lunata* Say, 1826
   ¼", grass, Sarasota Bay
5. *Turbonilla dalli* Bush, 1899
   ¼", Sarasota Bay, sand
6. *Diastoma varium* Pfeiffer, 1840
   4 mm; grass, Sarasota Bay



6

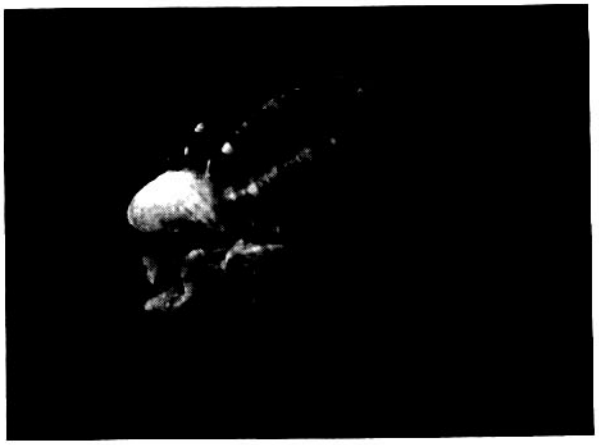
See FOR THE LOVE OF MINIS by Peggy Williams on page 99 for more information.

For the Love of Minis

PEGGY WILLIAMS



Cochliolepsis striata Dall, 1889; ¼"; Bahamas, 60', sand



Nassarius consensus Ravenel, 1861; ¼"; Venice, Florida, 30', sand, near reef (diving)

As a child in Florida, I spent many happy hours wading the shallow waters of Sarasota Bay, examining shells and whatever else came to my notice. When I was grown and had learned to scuba dive, I found meself re-infected with the shelling bug. I soon collected many of the larger molluscs available in nearby Florida waters, but I was later to be exposed to an even more addiciting malady - collecting miniature shells.

When I set up my first salt water aquarium, I was given some coral sand brought up from about 15 feet in the Florida Keys. As I washed the sand, preparing it for the aquarium, I noticed some little red specks in the dazzlingly white background, and, on closer examination, I was amazed to see they were shells! Actually, they were *Tricolia species*, and I was in possession of my first miniature, full-grown shells.

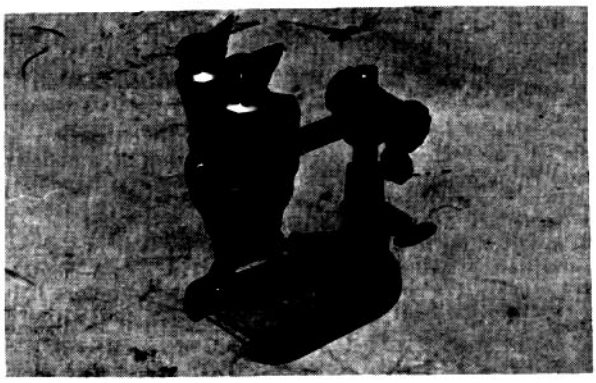
My diving buddies soon got used to the crazy things I learned to do -- I always carry zip-lock bags with me when I dive, and when I find a good looking area of sand, I scoop some into the bags. Then, when I surface and go home, I spend happy hours searching through the sand for shells. (I also frequently grab a rock just before I surface and search its face for shells, then later break it apart for *Gastrochaena, Petricola, Lithophaga* and *Rupellaria* species.) I soon found that I couldn't see all the shells without help, so I bought a headpiece magnifying glass to wear. I also got tired of wrinkled fingers from pushing around wet sand and got a pair of tweezers to sort the sand and also to pick up the shells. I usually sort the sand while it is wet (adding water to it as needed), so the particles don't stick together. Also, if the sand comes from the shore, I can wash away the dead algae and other plant matter that I usually manage to pick up with the sand, I must be careful, though -- some shells are so light weight that they will float away with the wash water! This is especially true of shells in the high drift line of shore.

To identify my shells, I at first used a variety of magnifying lenses, sometimes several at once. Then I discovered the stereoscopic microscope at the home of another miniature lover. I bought a cheap one (a real find), then saved my pennies and finally invested in a fairly good one. There is another problem to identification, however, and that is the general lack of literature including miniatures, since the field requires special photographic techniques, detailed study and an interest not shared by many who write and read the books on identification.

For a long time, I was the only person I knew lugging around bags of sand and straining my eyes looking through it. Then,

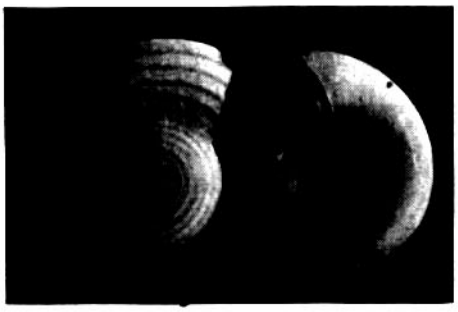


Grundge and my head magnifier.



Stereoscopic Microscope

on a trip to the Florida Keys, I met Margaret Teskey, who lent my endeavors legitimacy because she does the same thing! She also had a name for my sand -- "grundge" -- very appropriate,



Cyclostremiscus beauii Fischer, 1857
0.3"; Gulf of Mexico, 100' on wreck, by diving

I think. Now, grundge is not just any sand from anywhere. It is judiciously chosen from areas likely to hold shells: drift areas on shore or just at the water's edge, scooped-out places at the base of rocks or reefs, or beneath loose rocks on the reef. One develops an eye for the sand that is most likely to yield shelly material, and this takes practice. I discovered that Margaret has been practicing a long time! In fact, she now sells shells, but none over one inch long.

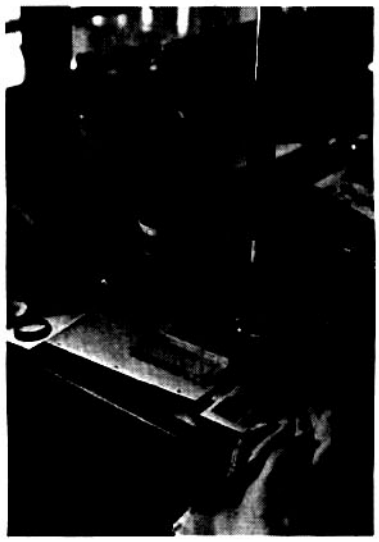
After further long experimentation, I began to discover where the molluscs I was hunting were while alive. The grundge I collect contains mostly dead specimens, but, wonder of wonders, once when I looked through fresh sand, I found some of the shells still wandering around. Thus began another hobby: photographing the miniature molluscs before they die. I discovered many of them living on grasses in shallow water. Some inhabit rocky areas, on or under rocks. A great many hide inside large dead clam or pen shells in intertidal grass flats and may even be found in beer cans and coke bottles. (When you pick up these hiding places, be sure not to rinse them in the water until you've looked them over carefully!) Many of these tiny creatures crawl around actively, posing for my camera.

My latest collecting aid is a hand dredge that my husband and I devised. Its frame is aluminum, the sack is nylon window screening and the handle is a paint roller handle onto which I can screw a roller extension handle from the paint store. The extension handle is wooden and comes in three pieces. The whole thing is quite light weight and easy to pack. (See article on page)

My hand dredge provides me with many delightful specimens as I drag it through sandy areas and over grass flats. In fact, I can hook it under my arm and pull it along behind me as I search for larger shells (yes, I collect them too). Every once in a while I dump the material in the dredge into a small bucket over my arm and I keep salt water in the bucket so the shells will still be active when I get them home to my camera. When in a sandy area the dredge digs deep into the sand and I can swish it through the water to empty out everything but the best grundge. This dredge has found miniature *Marginella* as small as one millimeter and even some living tusk shells.

To photograph my miniatures, I use my Nikon camera with a 105mm lens and closeup equipment consisting of a bellows and closeup rings or lenses, in various combinations depending on the size of the shell and the available light. I have a copy stand with gooseneck lights that I can adjust as I need. I put the shells in salt water in a small, transparent glass or plastic aquarium and wait sometimes hours, for them to begin movement. Then I quickly turn on the lights, aim and shoot before (I hope) they react to the heat and light of the bulbs and withdraw again.

The amazing and addictive qualities of miniature shells are their beauty, intricacy, and perfection, even at such a small scale. There are many more species of molluscs sized less than an inch than there are larger ones, yet most collectors overlook their exquisite beauty and there is no way to adequately display them for the casual visitor. I hope, through photography, to share these tiny gems with others.



Camera Set-up



On October 1, 1980, Mauritius will commemorate the centenary of the Mauritius Instituteby issuing four stamps, one of which we illustrate here - showing *Conus milneedwardsi*, the largest specimen known is housed in the Institute.



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Two Visits to the Ontong Java Atoll

ANN M. KENGALU

The Ontong Java atoll is one of the largest atolls in the world. It lies north of Santa Ysabel, in the Solomons group, at about 5° South. It is inhabited by Polynesians even though it is in Melanesia. Most of the small outlying islands of the Solomons are Polynesian. The Melanesians are traditionally great gardeners and would be disinclined to settle on coral islets. The Polynesians, however, can keep wonderfully healthy on a diet of fish, coconuts, sea birds and their eggs, turtles and their eggs, shell fish and a wild taro that grows on some of the larger islands. There are only two villages at Ontong Java, one at either end of the lagoon, but, despite the fact that there is no real water supply, the people go to their own islands all round the lagoon to make copra and dive for beche-de-mer. The Government vessel visits there once every six weeks and sometimes a trading ship visits to pick up the copra.

The first time I visited was in 1977. We disembarked at Luaniua at the southern end of the lagoon and, after a few days, traveled by outrigger canoe with an outboard engine to my husband Johnson's little island thirty miles up the lagoon. It took six hours for we stopped along the way. The lagoon was perfectly calm and a silken sheen seemed to be spread over the water. Flying fish and porpoises flicked and played about the canoe as we cut smoothly through the water. It was enchantment all the way. On our left we passed a succession of long, thin islands strung like beads on a chain. These islands were on the outer rim of the lagoon. On our right the islands were further away and appeared and disappeared. Each one must have been surrounded by a ring of haze for they seemed to be floating just above the surface of the sea. I asked Johnson if that was the edge of the lagoon, but he said that the islands we could see were actually in the lagoon and that the islands at the edge were still farther out. Each little island seemed to be directly out of a story book. Graceful coconut palms holding out their huge leaves effortlessly to the Pacific sun and winds, emerald green trees and undergrowth, white coral sand and a ring of turquoise water where it was shallow over the reef. But that wasn't all. Streamlined seabirds went about their business between their territorial trees and the great ocean which they seem to prefer to the lagoon.

We called in to see relations making copra on some of the islands on the way. At one stop we loaded up with paw paws. I am sorry to say there are no paw paw trees there now, but we will keep taking the seeds to try to grow them again sometime. We picked up people, caught up with the latest lagoon news and continued on our way. Lunch, at one little island, was pumpkin mixed with rice and coconut cream. Here, everybody was very sad for we brought news of the death of a young relation in Honiara.

Towards the end of the journey, the tide was running out and someone had to stand on the front of the canoe and direct Johnson, at the engine, as we crossed the submerged reefs in our approach to Lopaha, our destination. I shall never forget that approach. The beauty of the lagoon, the beauty of the coral under the water, the beauty of the Polynesian figure standing casually and perfectly balanced at the front of the canoe were mixed with our excitement at going to our own little island. The ancient hand and arm signs, without words and without any looking back, directed us through the passage without any wasted movement or worry to the quiet shore.

As you can easily guess, I became a shell dealer because I married Johnson. You could say I became a shell dealer without really trying. While at Luaniua, I had seen a lot of *Lambis lambis* lying about on the beach - discarded with the rubbish, to be washed away at high tide. I thought they were beautiful and I thought the tourists would also think them beautiful, so I told Johnson I was going to put some in our little trading store in Honiara. Johnson didn't think the tourists would want to buy such rubbish, but I continued to collect nevertheless.

When we went to Lopaha, I was intrigued with the creations the hermit crabs were wearing. At this stage, of course, I was unversed in the subtleties of live and dead shells, gems, perfect lips, etc. At my request, my children whistled the hermit crabs out of the particularly pretty shells and I put them in a box at the door of our little coconut-leaf house. The next day I added some more and was surprised to see that the ones I had picked up yesterday were not pretty at all, in fact, some even had holes in them! The following day, when I added some more I began to wonder about my sanity - there was nothing beautiful in the box at all. The mystery was solved before long. One night I was standing by the door when I heard a little rustle. I looked down. In the box several little movements were going on. And then I understood. Little hermit crabs with drab, inadequate housing were coming in and exchanging their homes for the more delightful creations I had already stolen from their unfortunate little owners. Who was I to complain? I didn't have the heart to eject any more little hermit crabs after that.

I took my sea clutter back to Honiara and put it in the shop. It sold, but what got the shell business going was that youths who had been diving with professional divers from time to time, found they had an outlet for their shells. They knew what to bring in for collectors and told me what price "Mr. Brian" paid. "Mr. Brian" remained a mystery for quite some time, but finally I met him. A quiet, shy Australian who is Brian Bailey, the authority on shells in the Solomons.

What brought some sort of order to the business was my discovery in the bookshop one day of Alan Hinton's Shells of New Guinea and the Central Indo-Pacific. That book is still in daily use and always available for customers who spend hours poring over it. The next important event was the arrival of Mr. A. Hrdlicka from Los Angeles on his way back to the Red Sea. He said I needed Tom Rice's catalog of prices and obtained it for me. It came with a note about other publications I could get. I sent Tom some money and back came some wonderful books and copies of Of Sea and Shore. Since then the business has been growing and I have been learning.

Well, back to Lopaha. Johnson and I and the two youngest children have just returned from a four week holiday there. This time I went down full of curiosity to see what was on "our" reef. After a cyclone once, I was sent dead specimens of *Cypraea childreni, C. mariae, C. bistrinotata*, etc. Mr. Geoff Dennis, a long time collector of shells in the Solomons, had told me that he didn't think that a live *Cypraea mariae* had ever been found, though many excellent specimens had been found during, and immediately after, storms. It was my dearest desire to find out where that little fellow was hiding. While we were there the weather was perfect every day except for onewhen a "barge" came with 50 44-gallon drums of fuel for outboard engines. Johnson had ordered it for his store on Lopaha. As the barge entered the lagoon through a passage at the end of Lopaha a squall came up. The rain poured down and the wind blew like fury as the drums were rolled into the sea at the edge of the reef. Everybody, but me, ran laughing into the sea to push the drums in and the ship took shelter. Later, I said to Johnson how extraordinary that the only time it had rained or blown during our holiday was when the drums were being unloaded. Johnson, however, was not surprised. "It always does that when a ship enters the lagoon for the first time," he explained and, indeed, the M.V. Vali had never come to Ontong Java before.

There is a variety of reefs at Ontong Java. The reefs on the ocean side of the islands take the force of the Pacific Ocean as it rolls in in its mighty way every day. The reefs in the lagoon can also take a bashing if there is a storm, but, generally, if they are attached to an island, they afford more shelter for the little creatures living there. There are also reefs that have no island for shelter, some entirely in the lagoon and some with one side in the lagoon and the other side to the open sea. Some reefs, where the passages are, have a tremendous surge of

water swirling in at high tide and pouring out at low tide. To find a little hole to hide in is certainly necessary if you are a mollusk.

The Ontong Java men don't really take shell collecting seriously even from a commercial point of view, unless it is *Trochus*, and I couldn't find a diver. Everybody was up early and off in the canoes to dive for beche-de-mer which is at present fetching $3.50 a pound for 1st grade in Honiara. On a good day the men were earning about $70 - $100 and on a bad day about $30, so I had some competition. I told them to keep a lookout for shells and a nice triton came in and a really beautiful *Bursa bubo*, with a bright orange aperture. One day the tide was extremely low and everybody went diving for *Trochus*. I received a *Cypraea tigris*, *C. carneola*, *C. depressa* and *Pleuroploca filamentosa*.

Mostly, though, I could see that I would have to collect my own shells. Low tide exposed the reefs on both sides of the island and my first venture was on the ocean reef. Lopha is only a— about half a mile long, but it is growing wider. The sea is piling up billions of tons of coral along the shore and coconuts, pandanus and other hardy plants are taking root and advancing. I trudged across this coral to look at the sea. At first, all I could see was more coral under the water. Not pretty coral, just loose coral rocks and stones. I poked gingerly at the rocks, wary of sea snakes. Actually, I don't think there are any there, although there are plenty of harmless eels which I don't like either. I couldn't find anything. Surely, I thought, in all these acres of coral, being washed over by the sea, where no one has ever collected before, there must be some sea shells! I walked along for a while in about 3" of water and, not finding anything, I thought I would look up on the dry coral bank to see if the storms had put anything interesting there. There was nothing there either. I continued on for a while, then something made me look out to sea again. My heart stopped. The tide had gone right out and left exposed a coral garden glistening in the sunshine. Pink, rose, white, purple and apple-green were the colours. Beautiful little round clumps of coral held up their delicate pink fingers tipped with lilac and blue. I climbed down and gazed. As I walked about I noticed small clam shells open to catch food in the occasional wave that washed across them. Some were emerald green, some royal blue and some brilliant yellow, I cannot say if they were all the same variety, as they were too embedded in their holes to prise out.

The first shell I found was a *Conus distans*. After a few minutes I noticed a *Latirus nodatus* lying with some coral bits and pieces in a small hollow. I picked it up expecting it to be dead, but no, the operculum drew shut showing a brilliant cerise aperture. There were more *nodatus* lying scattered about. I collected a few and then I found a *Conus miles*, but, shortly, the tide said "Enough!" and took back the sea garden and its treasures, out of my reach.

Most of the shells I found were heavily encrusted with lime and small shells, and there were no gems among the cones or *L. nodatus*. On the whole the cones were smaller than the average sizes given in shell books. I didn't find *Cypraea mariae* or *C. childreni*.

The following is a list of what I did find and also a list of dead shells that I have seen in the area:

Lagoon Reefs

Strombus lentiginosus
Strombus gibberulus
Turbo chsysostoma
Chicoreus brunneus
Vasum ceramicum
Mitra mitra
Mitra stictica
Mitra pterydactylus
(in sand & weed)
Conus mqrmoreus
Conus imperialis
Conus distans
Conus flavidus
Conus vexillum
Conus miles
Conus tulipa
Conus lividus
Conus frigidus
Conus sugillatus
Cerithium nodulosum
Cerithium aluco
Cypraea caputserpentis
Cypraea erosa
Cypraea arabica
Cypraea talpa
Cypraea moneta
Cypraea depressa
Terebra maculata
Terebra dimidiata
Lambis lambis
Lambis chiraga
Lambis truncata
Lambis crocatus
Hippopus hippopus
Fimbria fimbriata
Fragum unedo
Vasticardium pulicarium

Sea Reefs

Trochus niloticus
Trochus pyramis
Trochus maculatus
Chicoreus ramosus
Vasum ceramicum
Conus marmoreus
Conus imperialis
Conus distans
Conus flavidus
Conus capitaneus
Conus tulipa
Cypraea capurserpentis
Cypraea arabica
Cypraea moneta
Cypraea annulus
Cypraea depressa
Latirus nodatus
Strombus lentiginosus
Bursa bufonia
Conus vexillum
Conus miles

Reefs Exposed to Sea and Lagoon

Cypraea argus
Cypraea carneola
Cypraea lynx
Cypraea vitellus
Cypraea caputserpentis
Cypraea tigris
Cypraea annulus
Cypraea magnificus
Charonia tritonis
Purpura persica
Distorsio anus
Bursa bubo
Cypraea arabica
Cypraea moneta
Cypraea depressa
Cypraea mauritiana

Dead Shells Seen in the Area

Turbo petholatus
Cypraea aurantium
Cypraea stolida
Cypraea mariae
Cypraea childreni
Cypraea bistrinotata
Cypraea nucleus
Cypraea globulus
Architechtonica perspectiva
Harpa major
Harpa amouretta
Conus geographus
Conus auratus
Conus episcopus
Chicoreus triqueter
Cypraea margarita

Some day Johnson and I hope to build a home at Lopaha and if we do, I will have paying shell-collecting guests. They will need to be rich and retired, for it is expensive to get to the Solomons and ships do not run to schedule, but if some kindred spirits start saving, I hope to be able to advertise in about four years time!


Sea Atlanta
Lenox Square
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Shelling Amongst the Ruins in Ancient Greece

GERTRUDE MOLLER



Gertrude Moller (left) and fellow traveler Jayne Takato (right)



The Parthenon on the Acropolis, Athens, Greece

Just about the most wonderful birthday present I have ever received, was the one from my husband, Knud, last year: A sensational 16-day trip to magical, mythical, ancient Greece. Along with 29 other members of the Jacksonville (Florida) Art Museum, we left New York, via Olympic Airways, on April 29th. On our itinerary was the very beautiful and educational "$4-Day Classical Tour" and a marvelous 7-day cruise to the various Greek islands, and Kusadasi and Istanbul, Turkey.

Arriving in Athens on Monday, April 30, we stayed at the lovely Attica Palace Hotel. (From whose rooftop we could view this magnificent capital of antiquity, including the monumental Acropolis with its Parthenon and, not far away, Mount Lycabettus.) This first day we mostly rested and recuperated from "jet lag" ... but anxious to dine that evening in one of Athen's splendid restaurants. (I thoroughly enjoyed the snails, clams and octopus at one of the many seaside, outdoor sidewalk "tavernas" ...)

The next day, after a "continental" breakfast at our hotel, we boarded the bus to visit Athen's ancient Acropolis, which is situated on a rocky hill of calcareous origin, and covers a surface of 270 x 156 meters and rises 50 meters above the plain of Athens. (Today, more than ever, the Acropolis remains a sacred place in the culture of the Greek people, of juridical revelations and spiritual greatness, and Greek ancient history represents the most fascinating period of human civilization. Athens remains the most illustrial city of the classical world. It is the center of Greek and Roman culture ...) It is here that stands the Parthenon, the great temple which Pericles dedicated to Athena Parthenos, and it represents the most fascinating classical construction of Greek art. We noted, while visiting here, that the majority of the tourists were Americans (many various groups), then the Germans, the French and then the English and the Italians ... I would say in that order. Most of us were engaged in taking photographs of all the beauties surrounding us, not to mention the lovely red poppies we encountered everywhere and whose indomitable spirit drove them upwards through the many cracks and crevices of the-now-rocks and antiquities. It would seem that by now most of us had succumbed to the aesthetic and ethereal beauty of all that surrounded us, and we became captives of what was, and still is, magical.

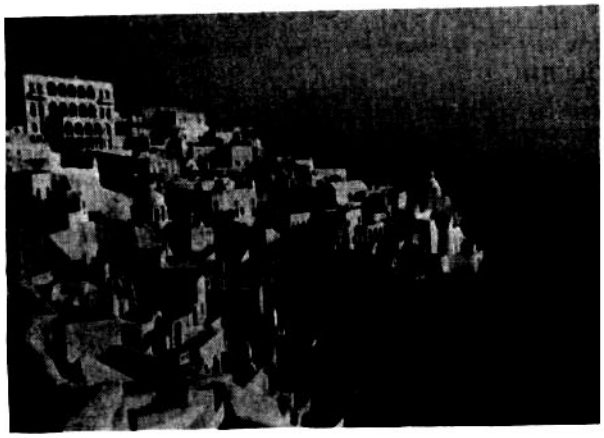
Wednesday, May 2nd; some leisurely hours in the a.m., which



The author collecting land snails in Greece.



Land snails amongst the Corinth ruins; first shells found by the author on her Greek tour.



The village of Thira, on the island of Santorini, Greece



A Greek land snail explores author's watch.

we took advantage of by shopping in the various nearby shops. Every other store, we noted, was a jewelry store, and especially the gold jewelry here was beyond description, as the Greeks are truly noted artisans in this field. As for other handmade crafts such as embroidered blouses and crotcheted caftans, etc. they had them, but they were more plentiful in the various villages we visited during the next two weeks. In the afternoon we toured, by bus, along the coastal road on the Saronic Gulf (with its beautiful beaches) to breathtaking Cape Sounion, located at the southern tip of the Greek mainland, 50 kilometers from Athens. It is here that the ancient Temple of Poseidon, a landmark for 2500 years, stands.They say this location was an obvious choice for a sanctuary where the sailors might offer a last sacrifice to propitiate the mighty God of the Sea, before leaving the comparative safety of the Saronic Gulf for the perils of the open archipelago. This archaic temple was destroyed by the Persians in 480 B.C. and rebuilt by Pericles.

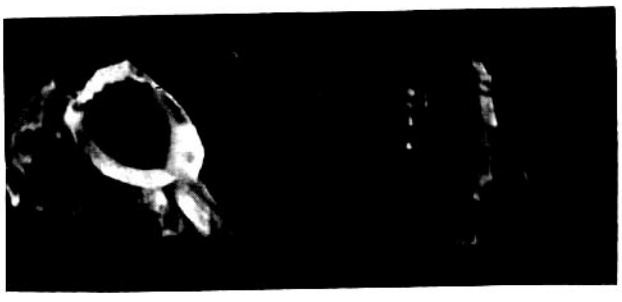
On Thursday we left Athens (bag and baggage) by air-conditioned motor coach on our "Four-day Classical Tour", beginning with our visit to ancient Corinth. (As we crossed the famous Corinth Canal, I couldn't help but think, at that moment, "little did I dream that I would ever be close to this famous lamdmark, much less take photos of it", The canal was begun in 1882 and completed by a French company in 1883 - the idea of cutting a canal through the narrow neck of the isthmus which joins the Peloponnese to the rest of Greece, was conceived in classical times and seriously investigated by several Roman emperors. The present canal is four miles long, its width is 75.6 feet and, as at Suez, the depth of water is 26.3 feet. It shortens the voyage between the Gulf of Corinth and the Saronic Gulf.) Corinth was famous for its skilled workers in bronze and clay and for its naval architects. Its Temple of Apollo is one of the oldest in all of Greece, dating back to between 550 and 525 B.C. The Romans destroyed the city in 146 B.C., but later rebuilt it by order of Julius Caesar. Saint Paul visited Corinth in A.D. 51 and founded a church there. American archaeologists began excavations there in 1896. (It was here, in the ruins of Corinth, that I found my first land snails: *Rumina decollata*, *Helicalda*, *Cionella*, *Clausilia* and *Otala lactea*.) It was because of my foraging between and under the rocks here, that I missed seeing the Corinth Museum. (But those lovely little specimens were worth it!)

After Corinth we visited ancient Mycenae, where the reputed tombs of Agamenon and Clytemnestra are located as well as the remains of palaces and aqueducts. (Here, amongst the rubble and lovely poppies, I found only one snail, the same species as in Corinth: *Otala lactea*.) Mycenae was destroyed in 470 B.C., but its civilization was an important one, dating back to 2000 B.C. After lunch at a lovely hotel in Nauplia, we drove 30 km to Epidaurus to visit the famous, and well-preserved, Theatre of Epidaurus, built in the 4th century B.C. It is situated in a cool, peaceful valley, at the foot of Mount Knyortion. It was the sanctuary of Asclepius, the God of healing. The reputation of god's miraculous powers brought thousands of sick people here; supplicants from all over the world, in quest of health. This is how Epidaurus became the most important religious center in ancient times. Today it is a temple of Greek drama, with regular performances each year by the Royal Theatre Company. The theatre is the oldest and largest in the world, seating over 14,000 spectators. (I can attest to the glorious accoustics here, as I was asked by my "gang" to "sing", and with a little more "prodding" from the "upper gallery" I complied and it was to be a thrilling and never-to-be-forgotten experience - the song? Victor Herbert's "Italian Street Song", from his operetta "Marietta".) Returning from Epidaurus we stayed the night at a new modern hotel in Nauplia, situated on the peaceful coast of Argos and is 146 km due south of Athens. Nauplia was the first capital of Greece and it was here that the first Greek school and the first Greek parliament were established. We all enjoyed the lovely little shops which we perused after a delicious dinner.

Early Friday morning we arrived in Olympia, located in the western Peloponneae and lies in the peaceful and pine-clad valley of the river Alpheos. It gained its fame as a sanctuary of Zeus and Hera, but the site also contains a wealth of other small shrines, gymnasiums and sculptors' workshops. It was in the stadium



Murex trunculus rivalis Monterosato; Corfu, Greece



Murex trunculus turritanus-fasciatus Requier; Salamis, Greece



Helicella, Cionella, Clausilia from ruins ar Corinth, Greece



Color variations of *Pecten glaber* Lamarck

that the Olympic games were founded, in 776 B.C. and it is from here that the sacred torch is still carried to whatever corner of the world the modern Olympics are held. The period of the games was always marked by a sacred truce, during which all people of Greek ancestry forgot their differences and united for a while in the spirit of Helleism. (It is here, at these ruins, that I noted entire walls of limestone, "pockmarked" in appearance, and upon closer inspection, detected various dead minute marine shells imbedded therein. After questioning our guide, we learned that those walls and other antiquities were built by the ancients "piece meal" by somehow moving huge chunks of this limestone from the nearby Alpheos River.

Saturday we left Olympia to continue on to Patras and Rion, where we crossed the Corinthian Gulf by ferry to Antirion.The largest ferry, by far, that we had ever seen, carried numerous busses and even rock-laden trucks, as well as several hundred people. The air was brisk, and those all-weather coats were put to use for the first time; the warming sun was most welcome.

Arriving in Antirion, we continued on through a few delightful seaside villages, such as Nafpaktos, and finally, arrive in beautiful Delphi, home of Apollo's Oracle. Delphi is perched, like an eagle's nest, on a saddle of rock on the barren slopes of Mount Parnassus, and surrounded by sacred valleys strewn with olive trees, with the Gulf of Itea glistening below in the distance. (I learned there are 40 species of olive trees in Greece, including wild ones.) Next to the Acropolis in Athens, Delphi is the site which most impresses the visitor to Greece. The mountainous scenery here was absolutely breathaking and it felt like I was "standing on top of the world". (No, I found no snails here, in the ruins ... could it be the altitude?)

We stayed the night in Delphi, at another new and modern hotel, and the food here was delicious. Some of the lovliest shops we visited on the whole trip were here in Delphi. They displayed many handcrafted items, including needlepoint rugs and gold jewelry. The people were most friendly and helpful and there was so much to see that we were reluctant to board the bus and return to the hotel.

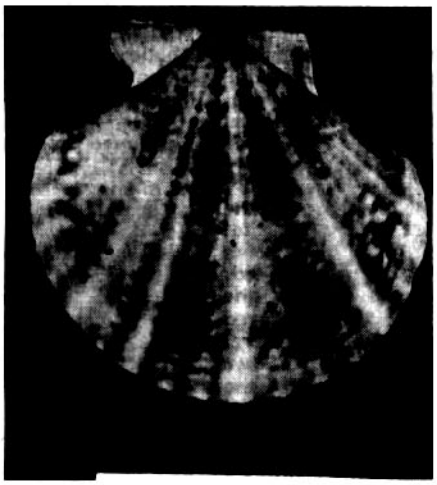
On Sunday, May 5th, after an early breakfast and seeing our luggage safely on the bus, we visited the famous Delphi Museum. This is the home of the unique bronze sculpture, The Charioteer, circa 478 B.C., to name just one. Visitors from many countries were seen here. It was with much reluctance that we boarded the bus for our next destination. None of us will ever forget Delphi.

Stopping briefly at the ancient, magnificent monastery of Ossios Loukas, we saw one of the most brilliant monuments of Byzantine Art. The monastery was built in the 11th century on the slopes of Mount Helicon.

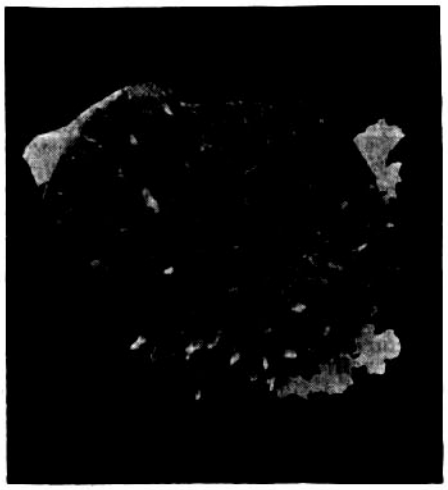
Monday, after a much needed rest at our Athen's Hotel and some last minute shopping, we welcomed being able to board the luxurious Cruise Ship Stella Solaris for our seven-day journey to the Greek islands called Cyclades, which form part of the Aegean Archipelago.



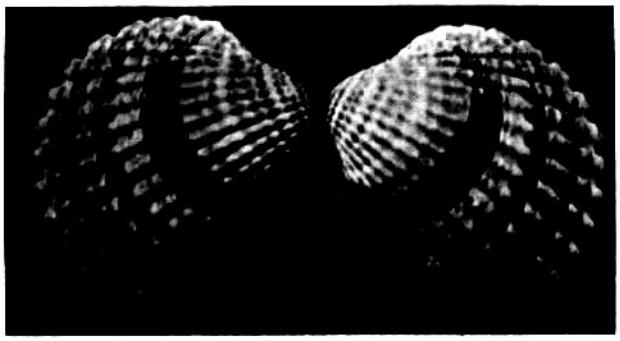
Cypraea pyrum Gmelin; Kalymnas Is., Greece



Spondylus gaederopus Linne



Pecten opercularis L.; Euvoic Gulf



Cardium tuberculatum L.; Anavyssos, Greece

We arrived at the port of Heraklion, Crete on Tuesday morning at 7 a.m. We were soon aboard our Knossos coach to visit the ancient Palace of King Minos, which had been excavated and restored.

Touring this magnificent edifice, we, again, encounter visitors from many lands and all agreed that Greece must indeed be one of the most popular "attractions" of the world. Also it was here that, just before boarding the bus, someone called my attention to some minute snails inside a huge, deep and ancient cistern on the palace grounds. I managed, at the expence of being "the last one on the bus", to reach in and grab several specimens of *Clausilia sp.*

Back aboard the Stella Solaris, we proceeded, at 11 a.m. to sail for the dreamlike volcanic island of Santorini in the south Aegean Sea. This island forms a crescent, which is the remains of a volcanic crater. Actually, it is only half a volcano, as the rest had split away and sank into the sea during an eruption or an earthquake thousands of years ago. Ships land visitors what was the crater and they climb the zig-zagging road up to the town, riding on donkeys. The town of Thira is perched on the remaining rim of the crater. It is believed, by some, to be the remains of the lost Atlantis. The population numbers 6400, and Santorini is one of the most interesting isles of the Cyclades.*

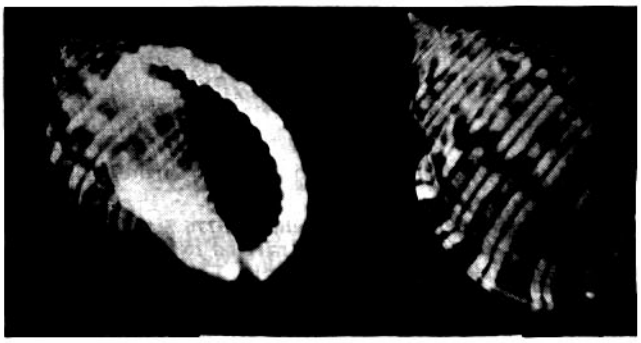
The next day, Wednesday, May 9th, we arrived at the island of Rhodes at 7 a.m. After breakfast the group departed by bus to visit the remains of the Temple of Athena at the Acropolis at Lindos. When one goes on a tour of this type and has other interests than what is "on the agenda", one has to take the time, to pursue this interest, which is what I did at this point.

I left the Stella Solaris on my own and proceeded to walk towards the city. I planned to try to savor all this old world beauty at my own pace. Before long a pleasant, English-speaking cabbie convinced me that I needed "wheels" and an interpreter, so I relented. Good thing too, as I was able to cover more territory in the little time I had. (We had to be back aboard ship at noon and I was petrified thinking I might "miss the boat".) I told the driver I was interested in sea-shells and asked him to inquire from the nearby fishermen lined up in the harbor if they might have any on board. After much translating, he found one gentleman who had one, a three-inch *Semicassis saburon* Bruguiere, which he caught in his net. He refused the money I offered him. I asked if he had any more and he replied, "Yes.". Later in the day he delivered several more to the ship (including a lovely *Charonia variegata* Lamarck) which I transported immediately to the ship's galley and into a bucket of bleach-water as the "fragrance" would not have been appreciated by my roomate.

*The 39 islands called the Cyclades, of which 24 are inhabited, form part of the Aegean Archipelago, and were so called by the ancient Greeks because they formed a circle around the sacred island of Delos. They are formed into 3 groups: Easter, Central and Western, with a total population of 90,000. The 3 that we visited were Santorini, Delos and Mykonos. The charm of the Cyclades lies in their extensive coasts and beaches, most of which are still unspoiled and are "ideal for fishing". "Submarine" activity, with diver's breathing apparatus, is forbidden in all Greek seas, lakes and rivers, in order to protect the country's cultural heritage. It is allowed, however, in certain areas. (See addendum at the end of article.)



Haliotis lamellosa Lmk.; Amarynthos, Greece



Semicassis saburon Brug.; Rhodes, Greece, trawled

Fortunately I found a helpful waiter aboard who was most "sympathetic" to my "shell problems" and assisted me with them for the remainder of the trip. My cabbie then drove to the "old city" of Rhodes, which was truly fascinating. He left me to "soghtsee" for about an hour as the "streets" were too tiny (about 10 feet wide) for autos and also quite steep, plus they were built of small pebbles. (I found this more difficult to walk upon than the regular cobblestones.) The ancient buildings on both sides of these narrow streets are still being occupied today and the many tiny and varied shops were irrestable - the handcrafted items having been made in the various far-off hamlets of Greece. Upon returning to the cabbie, he directed me to a neat, but tiny, SHELL SHOP! It was well-stocked and right in the center of the square. Oddly enough, about 90% of the shells, I noticed, were from the Philippines, rather than from the Grecian area. Also, the prices were exorbitant, and none had any data. When I thought of all those many islands with so many beautiful beaches in Greece, I felt that, "shell wise" .... this is "virgin territory" ... and shelling doesn't seem to be one of the favorite pastimes there, as it is in the United States.

Upon rejoining the group aboard ship, we all visited the outstanding Rhodes Museum and the Palace of the Grand Masters. Rhodes is one of the more favorite vacation spots for Europeans, we noted. There are miles of beautiful beaches and outstanding hotels and apartments, not to mention restaurants, shops, etc.

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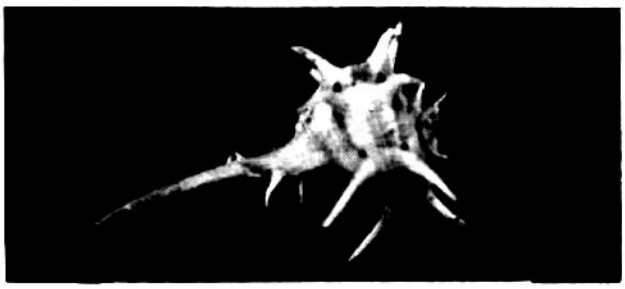
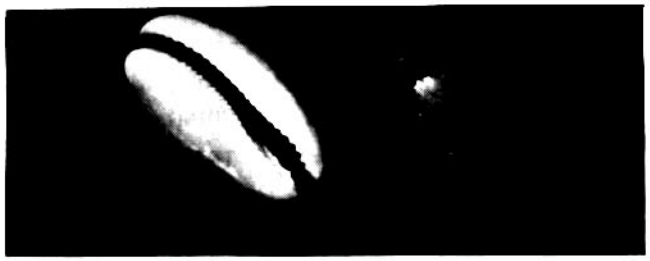
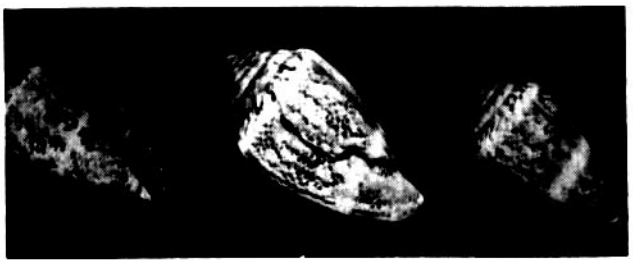


Murex brandaris longispina Coen
Oropos, Greece



Cypraea lurida L.; trawled, 30-35m Aegean Sea

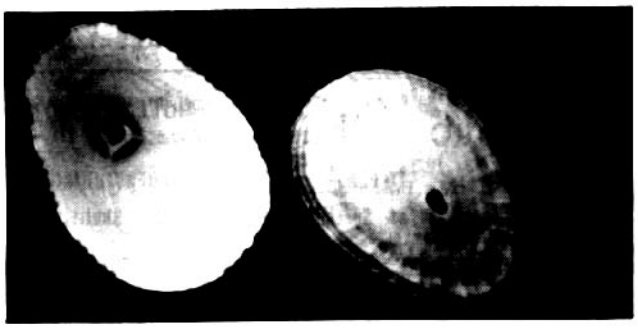


Conus mediterraneus franciscanus Lamarck
Corinthian Gulf - Limni Loutraki, Greece

We sailed at 9 p.m. that evening and arrived at the Turkish town of Kusadasi at 7 a.m. the next morning. The group was soon off by bus for Ephesus, to visit the ruins of this ancient Roman Capitol, including the Theater, the Stadium, and the Temple of Serapis. Unfortunately I had caught a severe cough in the mountains of Delphi and was unable to join the others on this trip. However, "shell bug" Jan Ringhaver brought back two specimens for me: *Clausilia* and *Hellica*, from the ruins, found clinging to the limestone.

We arrived at noon on Friday at Istanbul, Turkey, after having sailed through the Dardanelles, past Gallipoli. The weather was chilly and at times the skies were gray, but it was a thrill to be in this ancient city. We visited the Blue Mosque, the world famous Byzantine cathedral of St. Sophia and the Topkapi Palace. Security at the latter was really tight, they even checked our purses for cameras.

Later, shopping at the ancient and spreadout bazaar was a unique experience and it is the type of area where one should NOT get lost. We were warned by our guide NOT to enter the bazaar area alone. It consists of many tiny streets and hundreds



Diodora italica DeFrance; Legrena, Greece

of tiny shops. Most of the shop keepers were "communicating verbally and physically" with passerbys to entice them into buying their exotic wares: leather products (beautiful leather coats one of which I bought for my daughter), crocheted items and the sea of copper and brass items was endless. A suggestion to anyone contemplating a visit to this bazaar: go early in the morning as the shopkeepers tend to be more "rested and friendly" and are not as prone to be so vocal as they become later in the day. And one DOES want to arrive back at the ship unscathed!

That evening we attended a delightful floorshow of folk-dancing, representing various villages of Turkey, at the magnificent Istanbul Hilton ... to answer your question, yes we did enjoy the talents of several very excellent belly-dancers, and I can honestly say that I think this is one form of "exercise" that is more strenuous than "shelling".

We sailed at midnight for the island of Delos, Greece, arriving there at 9 a.m. Delos is the legendary birthplace of Apollo, the Greek Temple and the row of arcaic Lions. Again, due to my cold, I was, unfortunately, unable to make this tour. But Jan, again, brought back two specimens of *Gibbula* sp., crawling on rocks at the local beach.

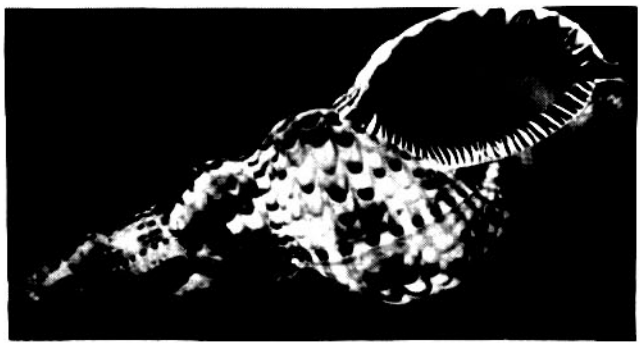
Sunday at noon, we sailed for our last stop, the beautiful and popular island of Mykonos. We arrived at 1 p.m. This lovely island is called the "Capri of the Aegean". It is noted for its white houses, windmills, churches and many gorgeous beaches. It is a sophisticated, international resort where you can enjoy swimming, Greek music and the excellent small restaurants that line the harbor. Of all the sun-drenched islands in the Aegean Sea, Mykonos is probably the most famous. We had the better part of the day to ourselves and each of us "went our own way", whether to visit the delightful shops, or to just "see the sights". And I did a lot of both, finally stopping at an eatery at the picturesque waterfront. As I sat, sipping some ouzo, I noticed a fisherman delivering about a half-dozen octopuses (one of the staples over here), which were immediately strung on the line to dry. Take it from me, they're delicious!

After this bit of histrionics, I decided to wade a bit in the cool, blue water, having removed my shoes, of course. Perusing the nearby rocks, I found some tiny turban shells, with pretty green and pearly interiors (*Gibbula*). But then I ventured in further, for I then noticed that the water was swarming with jellyfish, as it had been in Istanbul.

Wandering then, from shop to shop, I ventured into a delightful art and jewelry shop, just recently opened by a young Greek artist who had studied and received his degree in California. What a pleasant surprise it was when he presented me with a lovely, long-stemmed red rose, reminding me it was "Mother's Day".

Of all the places we visited, I yearn to see Mykonos again some day, and be able to swim in those incredibly beautiful waters and snorkle for shells (with "permission" of course). The natives are very friendly and helpful, and truly make one feel welcome. Yes, we saw mythical, magical, ancient and magnificent Greece in only two weeks, but we felt we had been gone not only for two years, but actually travelled backwards into history...

My special thanks to Jacksonville Shell Club member Dr. Harry G. Lee, for identifying all of the land snails I brought back from Greece. Also, my appreciation for all of the slides he has taken of the same and his cooperation in assisting me in a Club program on my trip. [NOTE: see ADDENDUM on page]



Charonia tritonis Linne
trawled by fishermen, Aegean Sea, Rhodes

ADDENDUM
to
Continued from page

Information on Greek Fishing and Diving

"Submarine" activity with diver's breathing-apparatus is forbidden in all Greek seas, lanes and rivers, in order to protect the country's submerged cultural heritage. It is allowed, however, in the following areas in the sea: (a list of some 15 areas is given).

Diving in the areas described as "free" for such activity, can be carried out under the following conditions:

1. Diving with breathing apparatus is permissible from sunrise to sunset.

2. Instruments for recording returning sound echoes or for locating sunken antiquities, and also metal-detecting instruments may not be used by divers, or carried aboard the pleasure craft, which they may be using.

3. Divers who may accidentally come upon submerged antiquities, should not attempt to salvage, move or photograph them, but should notify as soon as possible the Inspector of Antiquities, Police Station or Port Authority.

4. No form of work may be undertaken on the sea-bed, be it of professional or scientific nature without special permission from the Ministry of Culture and Sciences, in addition to whatever permits may be needed from other authorities.

5. Underwater fishing with breathing apparatus is forbidden. The definition "breathing apparatus" is taken to mean devices which permit the diver to remain underwater for periods exceeding that of his natural breathing capacity. (i.e. standard diving suit, Ferzer apparatus, snorkel float and tube, compressed air cylinder, oxygen cylinder).

6. Underwater speargun fishing without such breathing apparatus is free everywhere under the following conditions :
   a. That spearguns not be used by persons under the age of 18;
   b. That fish not be speared and sold when weighing less than 150 grams;
   c. That there should be no such fishing inside ports, organized bathing beaches and shores frequented by bathers.

Supervision of stretches of sea where submarine activity is permitted for recreation, is the responsibility of the General Directorate of Antiquities and Restoration and, in particular, the Inspectors of Coastal Antiquities, and it is within their jurisdiction to forbid diving in other areas also, should they have reason to believe that they hold sunken antiquities. Together, the Inspector of Coastal Antiquities, local archaeological authorities and the Coastguard and police authorities are responsible for seeing that regulations concerning antiquities are observed.

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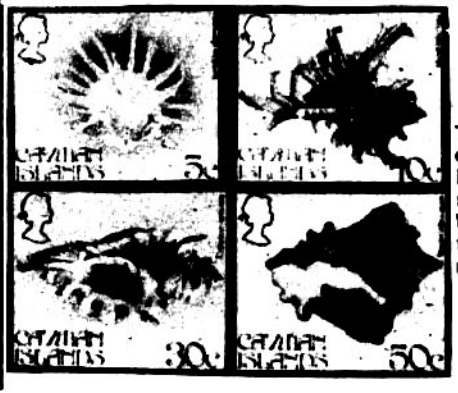


The Cayman Islands on Aug. 12, 1980 issued a four stamp set depicting shells. We'll have more information in our next issue.

Making Your Own Hand Dredge

PEGGY WILLIAMS



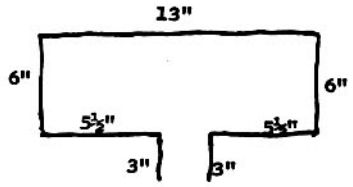
The author's hand dredge.

For use in sand and grassy areas, especially good for collecting miniature molluscs and crustaceans. Materials you will need:

- 6' piece of aluminum, 1/8" x 3/4" (called a "rectangular square corner bar")
- 2 bolts - 2", with nuts (aluminum is more expensive, but doesn't rust)
- 8 bolts - ¼", with nuts
- paint roller handle - you will cut off the roller part and use just the handle; handle must be threaded for a "screw-in" extension handle
- roller extension handle - the three piece kind; can be unscrewed and carried in a suitcase, yet is long enough to use without stooping
- nylon screening, 36" x 12"
- seam binding

Cut your aluminum into the following: 4 pieces 1¼", one 25", one 36".

Mark the long piece into sections of 3", 5½", 6", 13", 6", 5½", 3". Bend at the marks as illustrated below.



Mark the 25" piece at 6", 13" and 6" and bend it into a U. Grind the 13" edge of this piece to a sharp edge, if you wish. This is the biting edge of the dredge.

Now make the bag. Machine sew the ends of the screen together so you have a long loop 12" wide. Use seam binding for strength and lap one side over the other, using a zig-zag stitch. Leave the last 5" of the seam open.

Fold the loop with the seam at the center of one side.

Sew the bottom together with the seam binding folded over the raw edges of the screening. Now you have a bag.

Fold over the top 2" to make a casing and sew it on the unseamed side only, again using seam binding for strength and a zig-zag stitch.

Your bag should look like this:



Fit the bag onto the aluminum frame (the long piece only). Fold the remaining part of the casing over the frame and sew, by machine if possible, or by hand.

Handle: Detach the handle of the paint roller from the metal roller, pulling it out if possible. Insert the handle between the ends of the long bent piece and drill two bolt holes. Insert the 2" bolts and tighten down.

Smooth the 1¼" pieces of aluminum on the grinder. Make two bolt holes in each, about 3/8" from each end. Drill holes in the 25" piece, two on the long side and one on each of the smaller sides. Attach the smaller pieces on the outside of the U with the small bolts. Keep the bolt heads on the inside (the nuts will interfer with the dredged material if on the inside). Fit the smaller piece edge-to-edge with the larger piece. Drill through the larger piece for bolts at the connecting 1¼" pieces of aluminum. Bolt the two pieces together, keeping the bolt heads on the inside.

Your dredge is now ready to use with the extension handle set. The whole thing is very light and packs easily in a standard suitcase and can be used in areas without large rocks.

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Safeguarding Shells Against Fading

WILLIAM R. ROSE

Ever since I was propelled into the hobby of shell collecting, in 1972, by - so help me! - the gift of a truckload of seashells, I have been vexed by a problem common to all conchologists. How can one protect one's prize specimens from the ravages of time, which erodes their gloss and pales their colors and patterns? The answer is not a simple one.

The traditional school advises their annointment with baby oil. This treatment will add gloss temporarily and retard oxidation of the surface layers of the shell, with the inevitable loss of texture and color. Unhappily, baby oil attracts dust, and it is a little embarrassing to show off one's prizes when they are fuzzy and sprinkled with dust-bunnies. Dr. R. Tucker Abbott, the reigning monarch of malacology, admits that the baby oil treatment has its shortcomings, but defends it by noting, with considerable wistfulness, that it is better than nothing.

More recently, another method has come into use. It involves spraying the shell with a plastic-base glaze dispensed from an aerosal can. Admittedly the plastic coating will retard oxidation, but, in my opinion at least, it is not a good answer to the problem. Spray lightly and you achieve a speckled effect, with oxidation and fading proceeding as usual between the speckles. Spray heavily and you are left with something which changes the entire texture of the shell and gives it the appearance of a plastic model rather than the real thing. I think that people who coat their shells with heavy doses of glaze lack appreciation for the finer things of life and probably salt their food before they taste it.

I have a bachelor's degree in chemistry and have done rather more than the usual amount of biochemistry research. Sadly, I must report that this training and experience gave me no clues at all. On the other hand, I have long used paste wax to preserve the finish on wood products made in my workshop, and it eventually occurrred to me that if paste wax can protect a wood surface, ti could probably protect the surface of a mollusc.

At present, I apply two coats of paste wax to the surface of appropriate shells, polishing each time with a soft cloth. I prefer the brand called "Trewax", as it contains carnauba wax from Australia, the hardest wax known.

Waxes are closely related, chemically, to oils, and have much the same action. They will coat the shell, add luster and retard oxidation. The essential difference is that oils become sticky with time, so that the accumulation of the aforementioned dust bunnies is inevitable. Waxes, on the other hand, can be polished to a hard, dry, lasting, dust-repellant finish.

So far, this method has worked very well for me. My treated shells are clear, natural appearing, and have no dusty overcoat.

Our existence is, at best, difficult and beset with unexpected hazards. Anything which may reduce its complexities and burdens, no matter how non-critical the area of the endeavor may be, is worth trying.

Therefore I suggest that the next time you acquire a nice *Conus, Cypraea, Mitra* or other smooth-surfaced, colorful specimen, you apply a wax coating as described. If the result is not all you desire, a little turpentine will remove the wax without harming the shell.

The islands of Turks and Caicos have issued (on June 26) a set of six stamps depicting mollusks. We are showing these stamps to the right and will dicuss them further in our next issue of the magazine.

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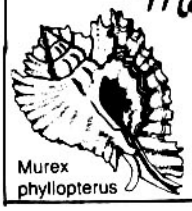
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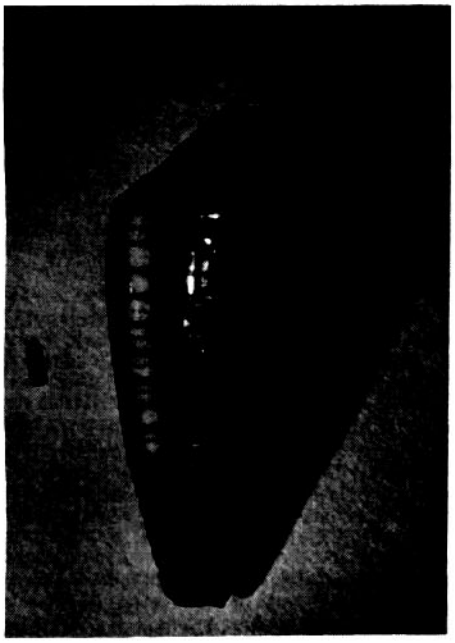
The "Overlooked" Operculum of Conus ximenes Gray

BARBARA D. CORNER



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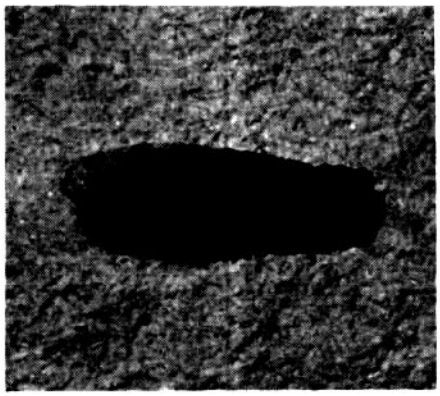

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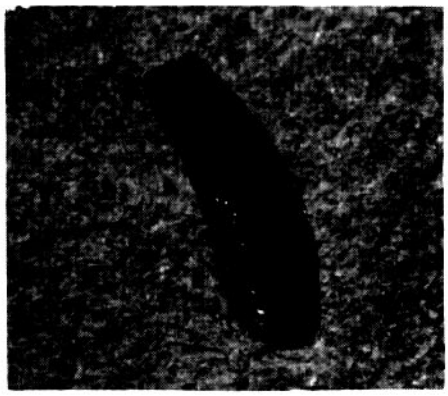


#3

#1 - A 3 cm *Conus ximenes* Gray, with a 3 mm operculum
Magnification: 0.5 x (half life size)

#2 - The operculum from Fig. #1, a 3 mm operculum that has a dull, rough texture. Magnification: 3.64 X

#3 - A 3 mm operculum from a 3.5 cm shell. This operculum is smooth and shiny. Magnification: 3.64 X

Photographs are by the author.

In the article "Some Observations Regarding *Conus ximenes* Gray" (Fall 1979, Of Sea and Shore, Vol. 10, No. 3), R. A. Whitney attempts to substantiate the viewpoint that *Conus ximenes* Gray is inoperculate. It is a tempting hypothesis, and I, myself, almost drew the same conclusion after collecting several *C. ximenes*.

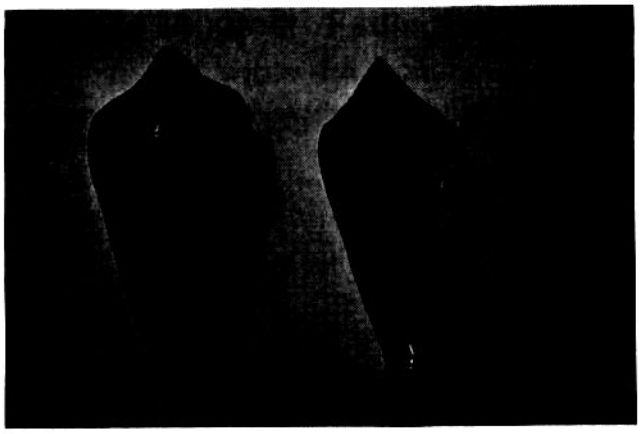
On my first shelling trip to Panama in 1978 my friend, Rosemary, tried to prepare me for my first outing my giving me a quick lesson on the habitats of Panamanian shells and showing me the various species I might find. As I drooled over the various cones she had collected, she mentioned that neither she nor her shelling buddies had been able to find an operculum in *C. ximenes*. I found this hard to believe, but when I tried to clean the *C. ximenes* I found, I too could not find an operculum. This disturbed me because all cones are supposed to have opercula. As I tried to get the animal out of my last *C. ximenes*, a juvenile, a tiny sliver, the operculum, washed out of the shell. My first thought was maybe only juveniles had opercula; maybe adults really were inoperculate; or maybe I had just not looked carefully and had overlooked the operculum.

When I made my next trip, a year later, I was anxious to see if I could find the illusive operculum of *C. ximenes*. Luck was with me this time. I use the word "luck" because all I did differently was to try a new method of taking care of the shells I found. I had decided that I just couldn't go through another smelly Customs check when I returned to the States. Therefore, at the end of each shell outing, I placed the day's collection in a net bag with all the collecting data and dropped the entire bag into alcohol. Then, a couple of days before leaving Panama, I removed the net bag from the alcohol and let the shells air dry before wrapping and bagging them for the flight home. I must say that Customa went much smoother without all the frowning and gagging of the gentleman behind the counter or the passengers standing around me.

I assumed that since alcohol removed the water from the meat of the shell, all I had to do was replace the water and I would be able to remove the animal with the operculum intact ... that is if there were any. My first attempt was with a juvenile *C. ximenes* since I had found an operculum in a juvenile the year before. To my surprise the animal slid out easily and there, right where it should have been, was the operculum. In the hopes of not breaking the spell, I tried an adult. The animal did not come out as easily, but I did manage to get it out in one piece. To my dismay, an operculum was not visible. I just couldn't believe it. As I held the animal under the florescent light above my kitchen sink, I noticed that there definitely was not a hard pad on the animal's foot where the operculum is normally attached. (Bob's observations appear to confirm this also.)

Just as I had decided that adults must be inoperculate, I noticed a slight shininess on the spot where operculums are normally found in cones. Picking up a needle I very carefully rubbed the spot where I had seen the glistening. Lo and behold, it moved; it was the operculum. It was so small (3 mm) in comparison to most opercula found in a 3 cm shell and it was completely transparent. Of the eight other shells I had, I was able to find opercula in more than half of them. Therefore, I concluded that *C. ximenes* was operculate; it was only when I had trouble removing the animal that I was unable to find the operculum. This is most likely due to the lack of the hardened surface of the foot which would better hold the operculum in place.

In February of this year I once again returned to Panama. This time I collected only a few pustulose and niger forms of *Conus ximenes*. I did one thing differently when preparing the shells. I thought my problem in easily removing the animals from cones and other species stemmed from the animals retracting drastically when being placed in the alcohol. So in the hope of avoiding this, I placed the live shells in fresh water for a couple of hours before placing them into alcohol. After returning home (with non-



#4 - Postulose, niger forms of *Conus ximenes* with operculum
Magnification: 0.5 X (half life size)

smelly shells), instead of just soaking the alcohol dried shells in plain tap water, I placed them in tepid water with a few drops of liquid detergent added. As I had hoped, this allowed the animals to easily slip out.

Of the five adults collected, all had operculums. Of the four juveniles and subadults collected to complete a growth series, all four had operculums. So I find myself in complete agreement with the quote taken from Myra Keen's Seashells of Tropical West America, "Some species are said to be inoperculate; perhaps because of the small size, the operculum in these have been overlooked". One might add that not only can the operculum be overlooked because of its small size, but it can be overlooked because it sometimes lacks contrasting pigmentation and is lost when removing the animal from the shell.

I should mention that the habitat of the Panamanian *Conus ximenes* Gray is more varied than mentioned by Bob Whitney. He stated that the *C. ximenes* he found in Guaymas, Mexico, were breaking in trails on a fine sand bar at the turn of the tide. In Panama, *C. ximenes* juveniles and subadults were almost always found on the exposed sand bars as the tide turned, day or night. At night they were especially abundant and one could easily pick up a large quantity of juveniles and subadults (if they so desired) before the tide chased the collector away from the shoreline. It was extremely rare to find an adult *C. ximenes* on these fine sand bars though. Their habitat appeared to be either muddy sand, muddy sand with rock rubble, or mud mixed with detritus and a little sand. For some reason most of the niger and pustulose forms were found in the latter habitat.

Whether or not the Guaymas, Mexico, specimens studied by Bob Whitney and John K. Tucker were really inoperculate or just overlooked because of the operculum size, lack of color, or lack of a hard pad to hold the operculum firmly upon removing the animal, needs to be looked into further. From my observations I have to draw the conclusion that *Conus ximenes* Gray, at least along Panama's coastline, IS OPERCULATE. It would seem logical to assume that all *Conus ximenes* Gray are operculate; but who has ever heard of anything being logical about this hobby of shell collecting. If we amateur collectors used logic very often we probably would not be shell collectors at all, now would we?

EXCHANGES WANTED

Have Spondylus americanus, will trade. I also have other Florida shells all collected live with excellant data. I am most interested in trading for Voluta, Harpa and Cypraea and in large shells to interest children. Do write. SUSAN KRISBERG 1530 Bella Casa Court; Merritt Island, Florida 32952.

Interested in exchanging shells worldwide - Cypraeidae, Conidae, Terebra, Mitridae, Turridae, Volutidae and Murex. Dealers price lists welcome. ALEX SCHELECHOFF; 43 Arras St.; Yeronga, Brisbane, Qld. 4104, Australia.

I am interested in hearing from worldwide collectors. All shells are of interest to me, but I do specialize in the more popular varieties such as Voluta, Murex, Conus, Cypraea, Oliva, Pecten and Strombus. I can offer a large variety of Australian shells and in particular I presently have available Cypraea thersites, marginata, piperita, venusta variations, Voluta thatcheri, perplicata, guntheri, pure gold Voluta mitraeformis Murex acanthopterus, secunda, umbilicatus, Conus segraevi, compressus, Vasum flindersi, Pecten australis (colours). CHRISTOPHER OATES; P.O. Box 44; Burnside, S.A. 5066, Australia.

Will exchange local shells, all gems. Conus, Murex, Volutes, Cypraea, etc. e.g. Cyp. langfordi, mortensis, hungerfordi, coucomi. Cyp. queenslandica, definitely not hirasi - more tumid, very dark. This is a private collection. What have you got? PAUL O'BRIAN; Kindarra St.; Amity Pt., Stradbroke Island, Queensland 4183, Australia.

I have both common and uncommon self-collected shells from the Florida/Caribbean area. I collect most marine mollusks, but am especially interested in the families Calliostoma, Voluta, Pecten, Cypraea and Murex. JIM CORDY; 385 Needle Blvd.; Merritt Island, Florida 32952.

South African collector wishes to exchange South African Cypraea and Patella for shells from Mauritius. Please write to JILL LINSDELL; 3, Montrose Ave.; Bunkers Hill, East London, South Africa 5241.

Interested in exchanging shells? Your notice can run free in our next issue. Send to: "Exchanges", Of Sea and Shore, Port Gamble, Washington 98364.

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Of Sea and Shore in East Africa

DR. LEW M. BEGLEY

I had never been overseas, much less to Africa, but the excitement of a new hobby like shell collecting, and the past exploits of of Sea and Shore tour leader Tom Rice, convinced me to jump in and try a new adventure. And sure enough, I jumped in; snorkeling and finding my own shells was the greatest adventure I'd come across in a long time.

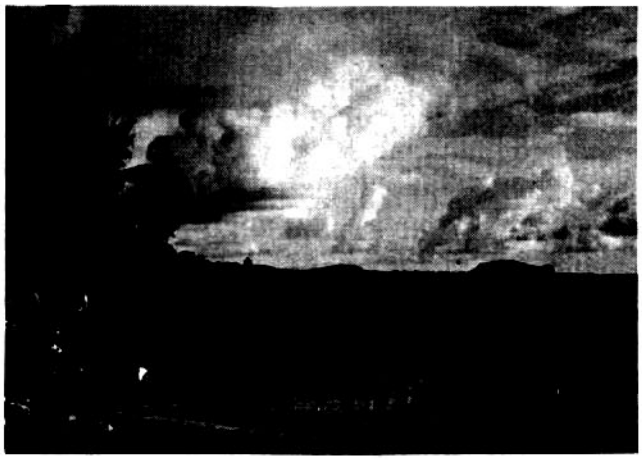
Eleven of us joined up in New York at Kennedy Airport the afternoon of April third. I was packed to the limit with ever conceivable need and plenty of food for the wilds. I thought preparations were complete for my first big trip, and mostly they were, except for a few missing items later needed, such as paper towels, more zip-loc bags and plenty of alcohol. I was eagerly looking for Sea and Shore Tour logos on luggage around the Air France counter since I had never set eyes on any of the other ten members of the group. At least I had their names on a sheet sent me by Barbara Webb of Gateway Travel Service. Soon I spied the luggage of Tom and Ruth Peck of Long Beach, California and after introductions we talked the Air France people into getting us on Flight 070 to Paris, without our passports - these still being in the possession of Tom Rice. Next we saw a whole group assembled in a corner, patiently waiting; Connie Boone and Barbara Hudson from Houston, Texas, Lew and Skip Powell from West Grove, Pennsylvania, Terry Maurer from Columbia, Pennsylvania and last, but far from least, the unredoubtable Bob and Ann Bianchi from Goodland, Florida. All but Pecks, Terry and I had been on shelling tours with Tom before, so they knew what to expect. Anxiously we awaited our leader, fearing the worst - that after all our dreams and planning we wouldn't make it off the ground. But, with plenty of time to spare, Tom Rice arrived from Florida, fresh and tanned from his motorhome tour of Florida shell shows, ready to lead us off to Africa. It was like Stanley meeting Livingston, we were all so relieved.

Now all were in line to board the Air France 747 for Paris and, eight hours later, we were there. April in Paris and, sure enough, it was cold and rainy. We were supposed to rest and catch up on jet lag at the Holiday Inn near Charles de Gaule Airport, but some of us had never seen Paris; so off by bus and metro subway to downtown Paris, where all eleven piled onto the bus for a tour of old Paris. All the old familiar sights from travelogs we viewed: Champs Elysses Avenue, Arch de Triumph, Eiffel Tower, Montmartre and Notre Dame.

Back to Charles de Gaule in time for the evening flight on Air France 489 to Grand Comore Island off the east coast of Africa. A long trip it was, but with stops at Athens, Greece; Kingali, Ruwanda; Dar es Salaam, Tanzania and a lot of good French and Greek food and the fine service of Air France, we arrived daring and ready to go at the Grand Comore Island capital of Moroni. After a hectic fight through Customs we were hustled off to the Itsandra Hotel, just north of Moroni. After checking into our air conditioned rooms and making sure the gecko lizards were doing their duty in catching flies in each room, we were off to the beautiful Hotel Itsandra Beach. Terry and Connie were busy picking up nerites and rock shells; the rest of us too tired to get in the water.

But by dinner we were ready to attack the world and the food. We all tried the fresh broiled lobster and broiled it was, the cook didn't want anything that wasn't black around the edges. We indulged in a little red wine, and at fifteen dollars a bottle it was an indulgence and we watched the gecko catching moths and flies off the ceiling. Ruth Peck kept her plate shielded.

The next day was Sunday and, after a continental breakfast at the hotel - fresh papaya, toast and jelly - we were off in our bush taxi to the north end of the island at Maludja Beach. Here I learned the joys of snorkeling, with Tom Rice as my able teacher, and soon found a *Harpa amouretta*, what a thrill! A lot of *Strombus urceus*, nerites, ceriths, rock shells, historic cowries and *Conus tessulatus* soon filled our bags. We snacked on the beach and all could hardly wait to show the others their finds.



The beach at the Hotel Itsandra, Comoro Islands



"Everyone into the taxi, let's head for that shelling beach!"

Back into the bush taxi for the trip to our "home" at the Itsandra. Besides the indignities of a small hard bench to sit on, we ran out of gas, and when you see the price of gas is four dollars a gallon, you know why the taxi driver is so sparing. While awaiting their return with petrol, all explored the side of the road, the lava, plants and many land snails. Lobster thermidor at the Itsandra, then all joined in a Yahtze game, and off tiredly to bed. I had found a couple of chitons on the rocks at Maludja so got my first lesson from Tom in tieing them down and into alcohol for preservation.

Monday, after our usual breakfast, we set off by the bush taxi to Lac du Sal, an old volcano cone where salt water had seeped from the sea into the lake and that's the reason for the name - Salt Lake. After Skip proved to the natives that he could throw a rock further over the lake, we walked down to the beach just south of the old volcano. The rocks were productive for nerites



Lac Sal, Grand Comore Island

and rock shells, chitons, ,some cones and cowries from the water, but not as productive as Maludja. Who can complain though of a beautiful sand beach, the ocean and fancy colored fish. Back to the Itsandra for broiled fish, fried bananas and to learn a new card game from the Pecks called ninety-nine; soon to become our favorite nightime relaxation. Even though we were all "picked clean" by the Pecks, we kept asking for more.

Tuesday we were off for a big day in moroni,. After treating minor eye infections in Terry and Barbara at the pharmacy, we were off to the bank to get some Comoro CFA francs to fuel our sightseeing. Next we visited Mr. S. A. Edroos, an old acquaintance of Tom's through Sea and Shore Magazine. He showed us his warehouse and huge stock of beautiful commercial shells. He generously gave each of us a *Cassis rufa* and *Charonia tritonis* and to Tom, and especially large triton which he had lovingly polished to perfection.

Then it was off to the south end of the island, around the active volcanos, to Hantsinzi Beach and a real treasure trove of shells: histrio cowries, many varieties of cones and strombs, and a few *Lambis*. Happily we return to the hotel and an evening meal of rabbit. All learned to play the card game UNO from the Powells, then off to bed.

The ninth of April, Wednesday. We had learned our lesson and our sore derriers demanded relief from bush taxi-itis. We borrowed the cushions from the hotel chairs and were off to the villages of Male and Uruvani, and to their beaches. After some great snorkeling and a few shells of the usual varieties, we were back to Moroni for lunch at Le Coelocanth restaurant, where the herb omelette was a gourmet's delight, and the pistacio ice cream not bad either. Our "chocolate freak", Tom Rice, after reveling in chocolate jelly every night at the Itsandra, even declared the chocolate ice cream delectable. Back to the Itsandra for evening meal of fish and a new card game "Oh Hell!". Oh, hell, and it's off to bed, I lost!

On Thursday we're off by Air Tanzania, with the big giraffe on the tail, to Mauritius. What a delightful island: a tropical paradise. There we were on Blue Bay at La Chaland Hotel. Such a beach: sand, coral, blue water, fish and shells, mountains in the background - a sheller's paradise, heaven come true. The management knew what we wanted, and perhaps from the past experience (Tom led a group here in 1974) remembered the shell smells and put us in the north end of the bungalows, right on the water. It was getting late, but Connie and Barbara went



Now where did I put that collecting bag?

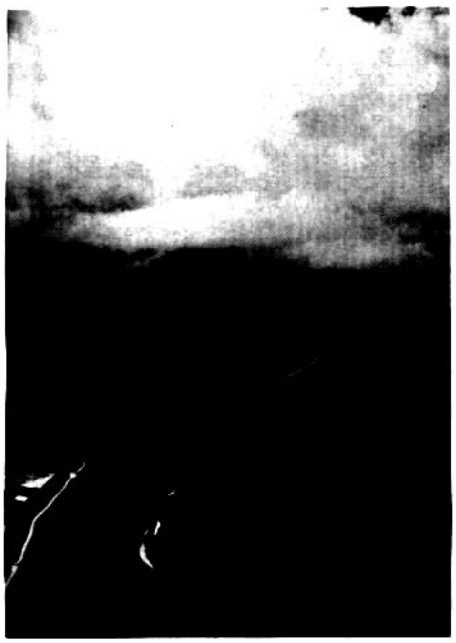


Tour leader Tom Rice talks with S.A. Edroos

straight to the rocks to start turning and peering through their magnifying lenses, the Bianchis right into the water, and all of us on the prowl. *Cypraea histrio* and *C. mauritiana* soon were in our "paws". After a delightful meal of squid salad and prawns in La Chaland's dining room, we saw the employees of the hotel perform the "Sega" - native folklore told in song and dance; what a talented group they were!

Friday dawned bright and clear and I couldn't resist an early walk along the beach of Blue Bay before breakfast - promptly at 7:30 we joined the ever-present diningroom birds for breakfast buffet. The sparrows had grown quite tame and with no screens on the windows and lots of open doors, our feathered friends made a good living off toast crumbs.

Today was spent in bureaucratic frustration. The chief of reception at Le Cheland, Sydney Carre, had been kind enough to arrange for, and drive, the hotel bus with us to Port Louis, the capital of Mauritius. There we eagerly applied at the Madagascar Embassy for our visas to that country, which we had been assured by their Washington Embassy, would be waiting. However, the rolls of red tape from Washington to Port Louis were entangled and by no means were they to be unwoven. After many telexes, pleas to the U.S. Embassy and visits by Tom to both ambassadors, we found Madagascar was not to be. Nossi Be and the tropical paradise red island faded away in changed visa requirements and poor communications. We made the best of our situation and enjoyed more time in Mauritius, a paradise of its own. Still, we all wondered what we had missed in the low tides of Nossi Be, what treasure shell lay still buried in the sands



Our flight approaches Isle Maurice



Some of the "finds" on Mauritius:
Cypraeacassis rufa, *Cypraea mauritiana*
and *Cypraea arabica*.

and coral of Isle Rouge.

Many of us visited the Mikado Shell Shop and made some stuning purchases. *Harpa costata*, *Lambis violacea*, etc.

After returning to the hotel, we crossed the strait south of the grounds to the rocky side of an island and there found a good variety of shells, including *Cypraea mauritiana*, *C. arabica* and *C. caputserpentis*. Lew Powell found some good size *Cypraecassis rufa*. An afternoon shower failed to dampen any of our spirits. On the way back to the hotel we were waylaid by the shady shell element of the island - Dayed and his crew of shell



Sunrise, Blue Bay, Mauritius



It's "all aboard" for a shelling trip in Maheborg Bay
on the island of Mauritius.



The beautiful animal of *Harpa major* shows itself.



Live juvenile *Lambis truncata* in Mauritius.



" Sunrise - Sunset "

merchants, selling shells both from area waters and from all over the world. He insisted all were very rare and local, but we were not taken in; Connie Boone, especially, laughed at the "local" *Strombus gigas*. After a good dinner of broiled fish, we played ninetyninety-nine and then on to tired dreams of the shell that got away.

April 12th, a Saturday, dawned bright and clear and our snorkeling eleven were on their way to the far south beach where the old Le Cheland Hotel once stood, now in ruins from fire. We found many cowries, chitons, nerites, drupes and rock shells. That evening a real treat for any sheller awaited us. Maurice Maurel is one of the most respected conchologists on Mauritius and through his contacts with Tom Rice and Of Sea and Shore, he graciously invited the eleven of us to his home at Rivere Des Anguille, where he manages a sugar plantation. After a gregarious French welcome by his wife, Nancy, and his father, we joined in cocktails on a warm evening. Then back to his shell room where all were aghast at the beauty and variety of his shell collection. The largest collection of *Harpa costata* in the world! A growth series, from tiny juvenile to the world record specimen - and the same in a series of *Lambis violacea*. His vast collection and knowledge amazed us. Such a treat, when he presented us with a bag of live spiny nerites, found only on Mauritius in fresh river water. The place, too secret for us to know, even though Tom Rice used all his persuasive charms, the secret Shangri La remained locked in Maurel's brain. As we stood transfixed, staring at all those beautiful shells, we were served the first course of the evening meal, chicken soup hot and creamy in Chinese-style bowls, to sip and enjoy. We repaired to the dining room and were served cold fish salad in a mold with bernaise sauce. Next arrived a steaming tray of chicken and vegetables grown on the plantation, served with French red wine. To top off the evening, a delicious French custard with layers of cake and cream. We could have talked and talked all night, but finally had to take our leave for the drive back to Le Cheland in our waiting bus.

Sunday, April the thirteenth, was rest day for Tom and I. We needed to do a little catching up. The other nine, however, were off in the hotel boat with Frances, head boatman, to Isle Marian, where some very productive snorkeling and shelling took place. That evening all relaxed at a card game and a few of us dared the disco.

Monday was a day filled with shelling. To the south beach for snorkeling, reveling in the coral and many colored fish, many small cowries - *Cypraea annulus* and *C. moneta* too plentiful to bother with. At eleven a.m., Frances took the load of eleven to the reef where all gathered shells and watched the surf break over the reef. After a delicious dinner of steak with bernaise sauce, we retired to our private card room for ninety-nine, where - miracle of miracles - I won forty rupees!

On Tuesday Frances obliged us by taking our crew to the farthest island past the old lighthouse in Maheborg Bay. We never grew tired of snorkeling in the pure clean water, finding the usual shells and a few unusual ones as well; live *Oliva* and a beautiful juvenile *Lambis truncata* - found by Ruth Peck. How the animal did squirm as she held him in a towel to protect the delicate lip; every once in a while they both jumped. We turned a ton of rocks, but all in joyful labor.

April 16th, Wednesday, up an at 'em again. This morning an early start at five-thirty a.m.; how we missed our buffet of fresh fruit, yogurt, eggs and cheese, hot tea, etc., yet we wanted to spend the early hours at low tide on Marian Island, and fruitful it was, so many *Conus tessulatus* and *Strombus urceus*, all varieties of cowries, even a *Mitra mitra* and a *Harpa major*. In the afternoon the Le Cheland Hotel staff was playing soccer with a team from a rival hotel and Tom, Lew and Skip Powell and I went along as part of the cheering section, all wearing our red head bands. Le Cheland won one to nothing and Tom Rice took the first half betting pot with a zero to zero guess.

Up and off again the next morning, at five-thirty. This early morning owl business was getting too regular. Off by taxi to Mahebourg, where we met Maurice Villard of La Reunion at the Sea Fever Pension owned by Mr. Mongelard, both subscribers to Of Sea and Shore magazine and whom Tom had contacted prior to our arrival. They were good hosts; after a continental breakfast at the Sea Fever we were guests of Msr. Villard on yet another snorkeling trip to Isle Marian and the old fort island for more excellent shelling. Maurice Villard is in the shell business and also has a very fine collection. I purchased a beautiful *Conus barthelemyi* from him - large in size, only two millimeters off the world record, which, incidentally, is owned by Villard. Near the Sea Fever we visited a local fisherman's shop and purchased a few local shells. Connie Boone made a delicious find of a world record sized shell.

That evening we taxied to Curepipe for a delicious dinner at Nobby's Steak House and then on to the Mauritius Casino for a little action. Ruth Peck and I have the blackjack table a working over.

On Friday we bade our farewells to Mauritius and caught the Air Mauritius flight to Nairobi at six p.m.; to the regret of an inexperienced traveler with everything but the kitchen sink, and plenty of shells, I paid a seventy dollar charge for overweight. A few others were caught in the same squeeze. Oh well, on to the Hilton in beautiful downtown Nairobi. Although Nairobi is on the equator, the high altitude makes it quite pleasant.

Saturday, while the rest shopped and toured the city, Lew, Skip, Terry and I were off to famous Treetops for the night. This world-renowned hotel holds only seventy, overlooking a



Kenya native carving a gourd near Nairobi .



Dancers at the Outspan Hotel, Kenya.

waterhole and salt-lick in the Abedare Mountains. We viewed, in awe, Cape buffalo, rhinoceros, elephant, water buck, hyena, warthogs, Reed buck and baboons. The baboons were all but obnoxious; they eagerly climbed the poles of the hotel and reached into every room with an open window. To the chagrin of a zoo director from Paris, one grabbed his passport and all of his francs, taking off down the side of the building. Fortunately, this was old hat to the manager and all were soon recovered. On the seventy mile trip back to Nairobi we stopped at the Outspan Hotel for a meal and to view the native dancers' performance. Next we stopped at the wood carvers compound and filled a duffel bag with ebony and other wood carvings.

On our return to the city, this Sunday afternoon, we rejoined the others for a tour to the Nairobi National Game Reserve. The animals in the wild made us dream of safari films, but all within sight of the city of Nairobi. Our last night together we tried the Gourmet's Delight restaurant and surely the gods of Africa were looking the other way, because after delicious chateaubriand for all and fresh green salad with tomatoes, the demons bore down upon us. Diarrhea and cramps racked us all, but medication stemmed the flow. Skip suffered the most, surely he should not have cheated the old ebony woodcarver at Outspan, having halved the price of Lew's large rhinoceros, for vomiting and dehydration followed in close order. Only an injection, a lot of Gatorade and an Egyptian remedy of antibiotics for "everything" brought him through the night. Much the weaker for wear, he rejoined the living the next day for a tour of Luxor.

But we are getting ahead of our narrative. The four of us had parted from our friends that night. Skip, Lew, Terry and I were off to Egypt for an extension of the tour. The other seven were to wing their way to Paris, New York and home the next day. We can only hope they didn't suffer the indignities of the gods as we had done.

Up at three a.m. for an Air Egypt flight to Cairo and here experience didn't help - I paid $132.00 in overweight fees! We arrived in Cairo, Monday April twenty-first, and went to the Sheraton Heliopolis Hotel, where Skip retired to his room alone, all he wanted was last rights and a sign for the door "Do Not Disturb". The other three "living dead" were off to the pyramids of Cheops, Chephren and Mykerinos, a delightful camel ride and to see papyrus made as in the days of the pharoahs. After a dinner of salty fluids, soup, juice, etc. we retired to bed to rehydrate.



The author aboard his trusty steed near Cairo.

The next day we're off on Air Egypt again, down the Nile four hundred miles to Luxor and Thebes, the old capital of Upper Egypt and the gateway to the Valley of the Kings. We marveled at Karnak and Amon Ray Luxor temples, then across the Nile by ferry to the west bank and the Valley of the Kings. Going down into King Tut's tomb, viewing the rooms unearthed by Howard Carter and Lord Carnovan in 1922, where all Tut's treasures lay undisturbed, was one of the thrilling moments of my lifetime. Next we entered Ramses II tomb and were intrigued by some of the best hieroglyphics in any of the pharoah's tombs, along with the mural painting of the tomb of Makht. We viewed the temple of the only Queen of Egypt, Hatshepsut, and then the Mennon Colossi of Amenophis III. Such a day of wonderment at the glory of Egypt past, nearly five thousand years old.

April 23rd was a Wednesday and we were up and off on Air Egypt back to Cairo and the Sheraton Heliopolis. We were back in time for a tour of Old Cairo, the St. Mary and Jesus and St. George Coptic Churches, the old fort and the Citadell. We crowned the day with dinner at the base of the pyramids at the Pavillion as we awaited the magnificent Sound and Light Show. The pyramids and sphinx were brought to new understanding as they were bathed in colored lights and stereo sound.

Thursday our guide, Mr. Fayed, toured us through the Egyptian Museum of Cairo. King Tut's treasure laid out three thousand strong. It was a dream come true, a dream held since I had first seen part of Tut's treasure in Seattle in 1978. All the treasures

of the Early, Middle and Late Kingdoms marched before our eyes as we walked the many corridors and floors. We were exhausted with all the history and grandeur. Still we could eat, and eat we did at the historic old Mena House Hotel near the pyramids. Our guide drove us south to the first capital of Egypt at Memphis. The Sakara necropolis and the Step Pyramid of King Zoser, the oldest pyramid in the world were most impressive. The mastabas contain the most interesting mural reliefs of the ancient empire. We descended one hundred eighty steps straight down a spiral metal staircase to the bottom of the Physicians Tomb. I felt right at home and lay in the sarcophagus to have my photograph taken. Next we visited the Alabaster Sphinx and the Collosus of Ramses. What a day!

Friday saw us off for Paris and Orly Airport via Air Egypt. Transferred by bus to Charles de Gaule we began two days of trying to get home. We were early since Madagascar had fallen through, but alas all the Frenchmen were coming to the United States where their francs would buy more than our dollars and all the flights were full. We gave up after three long waits on the standy-by list and retired to the Holiday Inn to await our regular confirmed flight on Air France to New York on the 27th. We winged our way home, back to the good old United States, the most fortunate country in the world.

What memories were stored away; a lifetime it will take to recall them all. The fine group of friends and shellers made fast by our interest in shells. The experience of my first snorkeling and the beauty of the sea. My first live collected shells! Oh, when can I get away again to join Tom Rice and the Sea and Shore shelling group? Can my schedule be rearranged? Is Micronesia too soon? Ah! I hope not!

IN REVIEW

PULMONATES, Vol. 2A: Systematics, Evolution and Ecology
edited by Vera Fretter and J. Peake $50.75
Academic Press; London, New York, San Francisco 1979

PULMONATES, Vol. 2B: Economic Malacology
A. R. Mead, edited by Vera Fretter and J. Peake $25.20
Academic Press; London, New York, San Francisco 1979

These are two heavy volumes, both in weight and in content. Fifteen authors contribute ten chapters to the first volume, covering the subjects of systematics, evolution and ecology in detail. The 540 pages in the first volume deal mainly with the "field" problems, whereas the first volume in the series dealt with laboratory work. Recommended for the serious student of the molluscs and every field worker.

Volume 2B runs only 150 pages and seems priced too highly for its size, especially in light that less expensive works are available covering much the same information. The current volume concentrates on the economic importance of a particular species, *Achatina fulica*, the Giant African Snail.

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CARFEL Philippine Shell News

On June 27, 1980 the African nation of Kenya issued a set of 4 stamps depicting local marine life. A sea slug, *Chromodoris quadricolor*, is shown on the 3 shilling stamp.



RIGHT PLACE, RIGHT TIME
Continued from page 97

discovered a juvenile specimen of *Nassarius vibex* on these same rocks. Why was this individual not on the muddy bottom? Beside this specimen, we had found some dead juveniles and adults in the drift, telling us this species, too, was in its breeding season. Eventually, the rising tides and setting sun indicate to us that any further explorations will have to wait until another day.

All in all, Harbor Beach offers the shell collector or seaside naturalist an opportunity to observe a large variety of mollusks, both alive and dead. It is not often (if ever) that I have seen some 35 or so species of mollusks at one time and at one place at such a northern location. The large diversity and abundance of shells that can be found at Harbor Beach on a spring day, besides making for some fine collecting, vividly shows how the right environment, with the right conditions, can harbor a surprisingly large and varied molluscan fauna. Additionally, the large number of dead juvenile shells reminds us that, for all species, the overproduction of young becomes a necessity for the survival of the species, since high "infantile" mortality is a fact of nature. Given these, and other numerous discoveries to be made, and lessons to be learned, Harbor Beach should always be worth a return trip.

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How It Really Was

CORINNE E. EDWARDS



A group of us were on a shelling tour in Costa Rica, over on the Nicoya Peninsula. The tide was very low at six a.m. and again about six p.m. So, after late night and early morning shelling, we were on a nature hike along a not-so-dry creek bed. We were seeking out a group of monkies and heard them before we saw them, high in the trees. We watched a herd of cows and calves struggling along a muddy ditch and helped rescue a calf - though the desparate mother tried to drive us off. We came upon a few pigs (behind a house) grubbing in the family garbage.

We spied Ark Shells - a shell collector can see shells everywhere. The big white valves stood out among the refuse. The area may have been a pig pen, but it was not a nasty pig pen - pigs don't have to be in muck, you know.

I like to collect a few shells, good, bad or stolem from crabs, of as many species as I can when I am on shelling trips. I wanted some of those big white valves. So, I climbed into the pig pen, sat on a log and laid out left and right valves of the best of those big thick shells, many of them with black periostracum still on them. Then I played solitaire, trying to match up pairs by size. Back at the hotel I found, out of 20 unbroken shells — that I had five matched pairs of *Anadara tuberculosa* (Sowerby, 1833). The average size was 55 mm long and 38 or 39 mm high. This is one of the many important food sources for the people of Costa Rica who live near the coast.

Several friends could not resist taking photographs of a lady in a pig pen, but only Gerrie Walklet sent me a copy showing a Lieutenant Colonel in a pig pen.

At the Palm Beach County Shell Club's 17th Annual Show, the Publicity Chairman, Mari Hughes, told the above story to a reporter to emphasize to what ends we shellers will go to obtain shells.

This is how it came out in the newspaper article: --- "According to Mari Hughes, one sheller went so far as to tussle with a wild pig in Costa Rica to wrest a shell from its jaws."

Dear Tom ...

How the time flies! I can't believe O.S.&S. is in its 11th year ... or that I've been a subscriber all this time! I well remember my first issues ... and how very professional O.S.&S. has become since then. I'm sure you have worked like a "dog" to keep improving the issues. I look forward to my subscription all year ... so here's my payment to keep it coming.

In my personal opinion, shell collecting has changed a lot over the past 10 years ... slowly becoming a "rich man's hobby". It may be that the new hobbyists can still build their collections from scratch, rather reasonably ... but inflationary postage rates, packing material and all the rest are taking their toll on trading ... as we knew it.

The prices for color illustrated reference books have gone sky-high ... and much as many of us would love to add these to our reference libraries, at an average price of $30.00 per ... we must think twice ... and perhaps desist. Many books in the past year or two, I simply cannot comfortably afford. When it comes to a new shell reference book or a week's groceries ... guess where the money goes.

Continued good luck and success...

Helen Martz; Evanston, Illinois

The Great Unknowns Into the 20th Century

Part Two: 1919 - 1939

Between the Wars

GARY S. MANGIACOPRA

With the ending of the War to End All Wars, the newspaper columns began to gourge themselves with accounts of the post-war conditions in Europe. In America, the anticipated boom and prosperity - and dreaded prohibition - were news published nearly daily.

But an anachronism such as the sea serpent didn't fit into the new period of fast living, where technological advances and records of new achievements were taken for granted. And the sea serpent, an intellectual and esoteric subject, studied seriously by few people at best and given by the general public a reputation of ill-repute and ridicule.

The New York Times printed, in a humerous fashion, the first account of the sea serpent being sighted after the war. Sometime prior to 24 August the White Star's liner Baltic reported seeing a strange sea monster off the Goodwin Sands around the Kent coast of England, as the ship left that country bound for New York City. (1)

The Baltic did exist, but what, if anything was seen, was treated as an obvious hoax. Due to lack of confirmation this case should be considered as a hoax.

The next reported sighting was handled in a similar fashion. The ship was the Munamar, of the Munson Line, under the command of Captain Andrew Osborn. On 24 April 1921, some of its passengers reported a 30-foot creature with a head as big as a barrel. Coming alongside the Munamar hauled aboard a stout 30 foot hawser with an empty keg attached. The emptiness of the keg caused a dismail wail from the passengers due to Prohibition, which was then in progress. At least one can not explain their sighting as due to intoxication. (2, 3)

Following the two previous false alarms came a sighting of an immense marine monster which kept pace with the liner Vauban of the Lanport and Holt Line, on October 1, 1922. As the passengers watched, from 1:40 to 2:20 p.m., they described it as something between a speckled, hump-backed manatee and a whistling grampus; in size about 20 feet long, 10 feet wide. It had the ability to stand on end and treading water with its immense tail, which swished the water into foam. At its speed of 16 knots, the Vauban was throwing a wave about the break of the bridge. The animal, when not treading water, traveled along at a great speed inside the hollow wave about four points on the Vauban port bow, whistling shrilly. A British naval attache at Washington, D.C., Captain Sidney Bailey, fired several shots, with an express rifle, at the animal which then disappeared off the port bow. (4)

The location of the Vauban during this occasion was a day's sailing from Buenos Aires, Argentina. It had left there September 30th for its next scheduled stop at Rio de Janeiro, Brazil.(5)

As to what this animal might have been, presuming the size and speed given was correctly observed and reported, can be ascertained through elimination and speculation. Compared to the whistling grampus (also called Risso's Dolphin, *Grampus grampus*) which attains a length of 11 feet and inhabits temperate to tropical waters; and the speckled hump-back manatee found in the lower reaches of the Amazon and its main tributaries - these two species were native to the region through which the ship was passing - but neither seems likely to have been the species seen from the Vauban. Risso's Dolphin is eliminated by its small size, although it can reach speeds of 16 knots. Also the small size and lack of speed for the Amazon manatee eliminates it as well. So just what was seen? A possible identification was that it was a small whale, possibly *Balaenoptera acutorostrata* (Little Piked) or *B. borealis* (sei Whale), either of which would fit the description given and both of which are able to attain or exceed the reported 16 knot speed.

Arriving in New York City, 16 January 1923, the White Star Liner, the Baltic, which four years previously was the unwilling recipient of ridicule for sighting a sea monster, again became involved in this controversy. The master, Captain John Roberts (RNR, PSG, KBE), reported having sighted, in mid-ocean, a strange marine monster with ears and nose of a pig - fully nine feet in girth at the thickest discernable section and showed 12 feet above the water, with an unknown length of body submerged.

Second Officer H. Greenrod and Fourth Officer G.D.R. Sales had been on the bridge on January 11, at 9:30 a.m., when they sighted a strange object on the water's surface about a mile away on the starboard bow. As the ship drew near, the animal was seen to have ears and a length of about 20 feet, with no discernible tail. Captain Roberts and Chief Officer R.J. Williams, who had been notified to come to the bridge, used binoculars and palinly saw its ears and nose - resembling those of a pig. The back above the water was black and dark brown. The animal bore a resemblance to a sea elephant, which is rarely seen away from the Antarctic. As the Baltic drew near the animal appeared to rise from the sea and then turned northeast, displaying every evidence of fear. Swimming alternately at the surface and below, it made undulating motions three or four times and soon disappeared from view.

Various passengers on the Baltic saw the beast. The ship's officers later searched through countless books on deep sea life, but were unable to identify it. A joint letter, written by these officers, regarding what they had seen was sent to the American Museum of Natural History in New York City. John Treadwell Nichols, head of the Department of Fisheries at the museum, was acquainted with the Baltic's officers, having recently sailed aboard the vessel. (6, 7)

Inquiries to the American Museum reveal that, though Nichols had written several hundred articles, to their knowledge, he had not written of this incident. The letter, if there was one, had been destroyed with all correspondence when the Ichthyology Department was moved to its present location. (8, 9, 10)

From the officers' description, this "monster" can be identified as the Southern Elephant Seal (*Mirounga leonia*), whose habitat is the Antarctic ice and associated islands. Occsionally isolated

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(1) Spotted Skipflip Returns With Peace, 25 August 1919. New York Times, New York, page 4 - 4
(2) Shipping News, 27 April 1921, New York Herald, New York, page 18 - 1
(3) Munson Liner Captures 30 Foot Sea Serpent, 28 April 1921, *ibid.*, page 7 - 4
(4) Sight Sibilant Sea Wonder, 16 October 1922, New York Times, New York, page 31 - 6
(5) Shipping News, *ibid.*, page 21
(6) Marine Monster Sighted by Baltic, 17 January 1923, New York Times, New York, pahe 7 - 1
(7) See Sea Serpent Wearing Pig Ears and Tell of It, 17 January 1923, Washington Post, Washington, D.C., page 1 - 6, 7
(8) private communication, 21 March 1980, Sylvia Diaz
(9) John T. Readwell Nichols, 5 March 1947, Herpetologica, V. 3 part 5
(10) J. T. Nichols, 1959, Copeia, page 83

animals are found farther north along the South American and African coasts. In this instance a lone individual, for whatever reason, strayed even farther north passing the equator and entering the northern hemisphere, possibly headed for the cooler waters of the Arctic regions.

Two years passed before a genuine appearance of a truly unknown of the seas made its appearance. Returning from two week fishing trip to the South Channel Banks, Captain James Doyle of the Boston fishing trawler Foam, related that on Sunday 24 May 1925, he sighted a sea serpent 88 miles south/south-east of the Boston lightship. It had the general appearance, configuration and color of a gigantic eel; about as thick as a barrel and was longer than the 136-foot Foam.

A lively creature performing with speed and grace, it appeared rather close to the trawler and remained in the vicinity for about twenty minutes. The back was black and the underside white, shading to green toward the end of the tail, near which appeared several small fins; otherwise the body was free of protrusions. The head was described as similar to that of an eel, but proportioned to the length and bulk of the body. It swam around the Foam several times. The crew members were not displeased when it finally disappeared. (11, 12, 13)

Three sea captains reported that a huge sea serpent apparently was killed by a steamship or some other vessel. Sighted off Fenwick Island Shoal prior to 14 July 1925, it was 80 feet long and 15 feet in circumference. This too meager description makes one wonder about a correct identification, but based on size alone it probably was a dead Fin (*Balaenoptera physalus*) or Blue (*B. musculus*) Whale. (14)

The final account for the last year of the 1920's was published eleven years later, in 1940. In a United Press interview, Lt. E. E. Hahn, Commander of the U.S. maritime training ship Northland, had as a hobby the collecting of testimony on sea serpents. Two friends had personally seen such creatures and both were maritime officials.

One friend reported seeing a creature on Pamequid Bay, Maine; the other friend, a Commander of a Coast Guard patrol ship, sighted a sea serpent off Montauk Point, New York in 1929. The latter stated, "We were running from Bermuda and on reaching a point about 20 miles south of Montauk Point, on the east coast, we stopped the engines and lay to.

"I was on the bridge when I sighted something in the water about a half mile off starboard bow.

"As it came nearer, I saw that it was a strange creature with a long neck and a serpent-like head. It was moving through the water at about 10 to 12 knots.

"I called the helmsman and he summoned four or five men all of whom started for a boat with the intention of launching it and capturing the creature.

"I immediately countermanded that intention because from what I could see of the creature's head and neck, it was quite apparent that it was big enough to swamp the boat.

"It eventually passed within about 200 yards of us and I could establish that the head was about 2 feet in diameter and was 8 to 10 feet out of the water.

"The front of its neck was very black and shiny like satin, glistening as if it had recently been under water.

"I could plainly see the wrinkles on the skin where the eye that was turned toward the ship must have been two or three inches across.

"Iam glad I had this opportunity to conscientiously take the part of the sea serpent for it had always pained me to deny the existence of so picturesque a monster. (15)

1934 opened a new international period of sightings of the great unknowns. The first, and most famous, concerned the Cunard Line's Mauretania. While steaming at 24 knots off the island of St. Eustatius in the Caribbean, it passed a 65 foot sea monster - two feet across the head and six feet wide across the body.

Writing in the log book for the 30th of January, Senior First Officer S.W. Moughtin wrote: "Sighted sea monster headed s.w. at 1:20 p.m." He sketched the animal on the side of the chart. Senior Third Officer J.W. Caunce also saw the animal.

T. Walter Williams, a New York Times reporter, interviewed Moughtin: "It was a fine, clear afternoon and the ship was about a mile off the island of St. Eustatius when I sighted this strange monster on the starboard bow coming from the direction of the Saba Bank, which is composed of white sand and coral.

"At first I thought it might be a whale or a whistling grampus thrusting its head up into the air to catch flying fish on the wing, but soon saw it was too large. The head of the monster was about six feet out of the water and was fully two feet across. Almost forty five feet of the body, which had a six foot beam could be seen in curves on the surface of the sea, and judging by the commotion caused by the tail moving to and fro there was another twenty feet below. its color was shiny jet black.

"I could not distinguish the eyes, as the monster kept its head on a slant from the Mauretania as if it were braced sharply against the breeze. Before I could get Caunce, who was on the middle watch with me, out of the chart room, the head and shoulder, so to speak, had disappeared, but he saw quite 30 feet of the monster." (16, 17)

Arriving in New York from another cruise through the West Indies on the 23rd of February, the New York Times reporter Williams interviewed Moughtin in Staff Captain S.T. Mott's cabin on the Mauretania :

"Of course it's true. If there are such monsters in the depths of the ocean as sea serpents, then I saw one, You must remember that the Mauretania was steaming twenty four knots and over a mile away at the time, so there was no chance to notice what color eyes the sea monster had too small ears ...

"... the sea serpent I saw had a shiny jet black skin and left a long undulating wake as if it must have been at least 65 or more feet long, I saw the head and the shoulders and about 45 feet of the body and senior third officer J.W. Caunce, who was on the middle watch with me, jumped out of the chart room in time to see about thirty feet of the strange denizen of the deep zigzagging down below the surface of the water."

Denying he sketched the illustration printed along with the 11 February article in the New York Times, Moughtin said: "That was the artist's conception of it, I have never sighted a sea monster looking like that one, and I trust I never shall."

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(11) Sea Serpent Longer than Ship Reported by Trawler Crew, 27 May 1925, Evening Transcript, Boston, Massachusetts.
(12) Sea Serpent Season Opens, 28 May 1925, New York Times, New York, page 6 - 2
(13) Sea Serpent of 1925 is like Gigantic Eel, 28 May 1925, Washington Post, Washington D.C., page 1 - 3
(14) Big Dead Sea Serpent Seen by Three Captains, 15 July 1925, Washington Post, Washington, D.C., page 1 - 3
(15) If You See Sea Serpent, Chances Are It's There, 14 January 1940, News and Observer, Raleigh, North Carolina.
(16) Mauretania Sights Sea Serpent, 11 February 1934, New York Times, New York, page 3 - 3
(17) Sailor Sights 65-foot Monster, 11 February 1934, Washington Post, Washington, D.C., page 1 - 6, 7

Out of frustration over the ridicule received over what he had observed, Moughtin said: "I saw this sea serpent, but if I should ever sight another one in any part of the seven seas I will never tell, not even my own brother."(18)

But Moughtin did tell again of what he saw, as the Times reporter Williams wrote the last of a trilogy on the Mauretania when another sea monster was seen by the same officers in the same waters.

The Mauretania, steaming at 26½ knots, was about a mile and a half from another sea monster, sighted off its port bow, sixty miles east of Nassau, at one o'clock on the afternoon of March 6th. The liner, traveling around the island to the anchorage at Nassau, met the creature traveling in the opposite direction.

Staff Captain A. T. Mott's attention was called to it by a passenger, Mrs. Robbins Ibeson, as he came out on the deck on the port side under the bridge, as Mrs. Ideson was looking through his binoculars. Mott related: "I looked in the direction indicated and sure enough there it was heading straight for the Mauretania at a good clip. It was sixty feet long with undulating humps and a large head lying flat on the surface of the water. Other passengers saw it too, but the marine monster disappeared while they went below to fetch their cameras."

Moughtin, after looking through his binoculars for a moment, sent word to Captain Reginald V. Peel to come on the bridge quickly as another sea serpent was seen. Peel arrived and viewed it for three minutes. Due to the ridicule suffered when relating their previous sighting, the deck officers agreed that nothing should be said to the newspapers on their arrival. But before the Mauretania left for its next cruise, Captain Peel disclosed the sighting. (19)

At the time of the second Mauretania sighting another monster was seen 250 miles from the mouth of the Mississippi River, just a few hours from New Orleans, in the Gulf of Mexico. Three seamen comprised the watch aboard the ship Steel Inventor and they sighted the creature. (20, 21)

An extreme incident was involved in the next sighting, occurring on April 4th. Thomas G. Ratcliffe had the unique opportunity of seizing an oar and hitting a sea serpent on the head. While in a small motorboat on Vineyard Sound, with Eric Warbasse of Brooklyn, Ratcliffe saw something - he is quoted in a UP dispatch: "I couldn't have seen it, but I did and haven't had a drink all week. It had an enormous head and no fins or scales, it was about thirty feet long and two and a half feet in diameter. It was the color of an eel and had a sort of mouth and two large eyes. Its tail was tapering and it really didn't have a neck, because it was about the same diameter from the head until the tail began to taper." Hitting the monster's head with an oar, caused it to dive immediately. Two fishermen saw Ratcliffe as he stood in the bow of his boat striking at something in the water, but were too far away to distinguish the object of his attack. (22)

Sometime before 18 July, the Captain and crew of the Latvian steamer Elsa Croy saw a strange animal off Three Island, western Scotland. The skipper described it as having a snake-like head, with a stout neck and elephant-like body ending in a long tapering tail. The crew harpooned it, but the chain broke in hauling it alongside. The Captain said it was nothing like a shark or whale. (23)

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(18) Ship's Officer Stick to Sea Serpent Yarn, 24 February 1934, New York Times, New York, page 15 - 2
(19) New Sea Serpent Reported by Ship, 10 March 1934, *ibid.*, page 15 - 2
(20) Gulf Has Its Own "Monster", 7 March 1934, New York Herald Tribune, New York, page 13 - 4
(21) New Orleans, 7 March 1934, New York Times, New York, page 21 - 7
(22) Harvard Junior Smacks "Sea Serpent" With Oar, 5 April 1934, New York Herald Tribune, New York, page I-7
(23) "Snaky Elephant" Seen and Even Harpooned, 19 July 1934, New York Herald Tribune, New York, page 10 - 4

Newspapers, in the late 1930's, carried brief accounts of alledged sea monsters. A twenty foot creature was netted, by Captain Stephen Puddester of the Boston-based trawler Quincy, prior to 18 February 1935, while fishing off the Western Banks in 100 fathoms of water. A description of the capture was given to Frederick F. Dimick, secretary of the Boston fish bureau. The animal, described as like a sea cow and weighing a ton, was ordered to be tossed back into the sea for fear of unbalancing the boat. It had a head and neck resembling those of a cow, gray in color; had the tail of a fish and was equipped with fins on its belly, but none on its sides. From these observations one can conjecture that it was some form of shark in an advanced state of decomposition, with various portions of the body falling off and mutilated. (24)

Ireland was the next site of a reported sighting of a sea monster. On 5 May John Crowley, lighthouse keeper on Mutton Island, shot and killed a creature 48 feet long and 28 feet around the middle. It had a huge head and a long scaly body, ending in two knife-edge tails and weighing four tons. Local fishermen reported the creature had torn their nets to shreds in recent weeks. Crowley saw one of the creature's fins protruding from the water while tending his lights, fetched his gun and shot the monster just as a boatload of fishermen from Galway approached the island, arriving to see the beast in its death agonies. (25)

The beast in question could have been some species of whale, based on the reported size and assuming the four tons incorrectly estimated.

Canada became the next country of sighting. In August 1936 fishermen of Port-aux-Port asked the Newfoundland Department of Natural Resources to send a boat to kill a sea monster that was destroying their gear. A telegram to that department by the fishermen informed that the monster had scared them from their harbor, located on the southwest coast of Newfoundland. A collective description made the animal 200 feet long and 18 feet in diameter and its neck stuck 60 feet out of the water. The eyes were as big as an enamel sauce pan and were spaced apart; it snorted blue vapor from its nostrils; had a mane larger than that of a horse and its undulating body rose in a loop above the water. (26, 27)

This beast set up such waves that for days no boat ventured out to sea; this could mean that the animal traveled very fast. By disregarding the estimation of its length (200 feet) and the 60 feet of neck (?) and concentrating on the other reported features, I identify this sea serpent as a "maner" species. Undoubtedly, during this month one or more - more probably several - "maners" were in this region of Newfoundland and were aggressively protecting their territory; so protective were they that they were destroying fishing gear and driving away the fishing boats.

Next, on the other side of the Atlantic, a strange, thirty foot creature raced an interisland steamer, the Earl of Zetland, and won. According to the passengers and crew, after landing at Lerwick, Zetland (a small group of islands at the northern tip of Scotland), in an account which reached London on 20 February 1937, they were able to observe it at fairly close range. Three large - dark in color - pointed fins, six feet in height, were observed, but the head and tail were always below the surface. The animal emitted a loud puff, or blow (a portion of the head must have barely broken the surface to allow the animal to breathe), but was stated not to be a whale. Moving at a fast speed, it passed the steamer easily and was still visible when 2 to 3 miles away. (28)

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(24) 20 Foot Sea Cow Netted, 19 February 1935, New York Herald Tribune, New York, page 21 - 6
(25) Lighthouse Keeper Slays A 48 Foot Sea Monster, 6 May 1935, *ibid.*, page I - 4
(26) Want Sea Serpent Killed, 19 August 1936, New York Times, New York, page 12 - 4
(27) Newfoundland Monster Puff Blue Vapor At Sea, 22 August 1936, *ibid.*, page 28 - 7
(28) A 30 Foot Sea Creature Is Reported In Shetlands, 21 February 1937, *ibid.*, page 19 - 4

The reported sound of a loud puff or blow indicates an air breathing mammal and eliminates the possibility of the creature being a basking, or other species, of sharks swimming in a line. The three fins may have been the fin and portion of the body of dolphins swimming in a line. *Delphinus delphinus* - the Common Dolphin - which inhabits the Atlantic may have been what was seen. Yet the 6 foot height for the fins is not quite satisfactorily exolained - a possibility is that these were not fins, but humps and the creature was one of the "many coiled" sea serpents. But there is insufficient information to support this and the dolphin explanation should be considered the probable one.

Newfoundland was again in the news for this same year. In August, after a 48-hour battle, fishermen used guns and harpoons to kill a 34 foot sea monster. Described as finless, but with several pairs of four-foot long flippers, a tail nine feet in extreme width with a mouth of three feet eight inches across. It was still lashed to the side of Captain Earl Noble's motor vessel, the Golda, after a day awaiting a buyer. (29)

The animal in question had a 9 inch layer of fat, and due to the size given, was most likely a whale not generally found in the region. Its probable fate was a conversion into oil, a fitting and useful end for such a prehistoric creature!

In the final year of the decade, Lewis Pedersen, a 65 year old commercial fishermen, caught a sea serpent on 27 August. While fishing several miles off the Jersey coast, he pulled up a thirty foot monster which had fins about two inches apart along the length of the body. The body was about two feet thick and covered with a tough skin. The head was snapped off the body by the flounder line in which it had become entangled, but not until it was close enough to the surface to give Pedersen, and a companion, a glimpse of brush-like needles sticking out all over the head. (30)

From the description given, what was caught was an oarfish, which was in a state of decomposition and falling apart. Even when alive an oarfish is fragile and can be easily damaged.

This same month, August 1939, marked the end of published accounts of the sea serpent for the duration of World War Two, which had just begun. Once again the news of war, terror, death, destruction, etc. became the mainstay for the columns of the newspapers and the flirtatious sea serpent was soon forgotten.

(29) Sea Monster For Sale. 14 August 1937, *ibid.*, page 2 - 3
(30) Fisherman Tells Wild Tale About N.J. Sea Serpent, 29 August 1939, Newport Daily Press.

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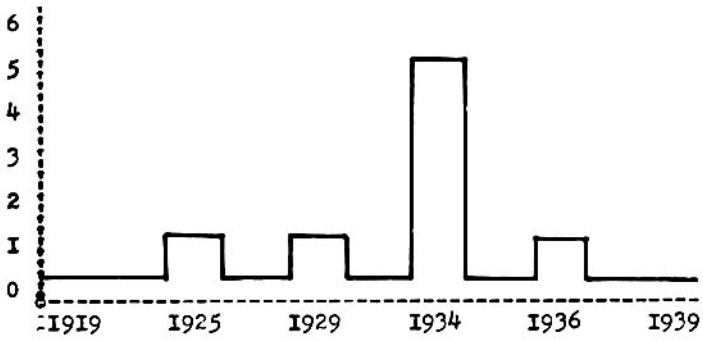
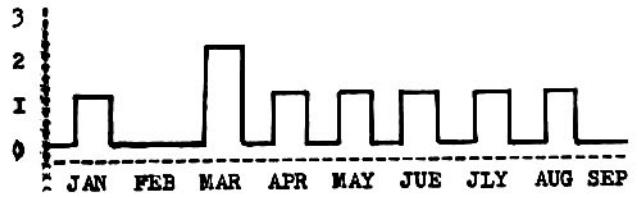
Yearly Distribution of Sightings from 1919-1939



Of the 36 reported sightings, only 8 cases: numbers 23, 25-30, and 33, can be classified as either genuine or probable sea serpent sightings. As shown by the graf there is no apparent cyclic peaks occurring, as they did during the 19th and early 20th centuries.

Though 1934 had the highest number of sightings, five, this may be explained by the advent of international news services who provided stories of the incidents to any newspaper desiring these services. In contrast the pre-war era newspapers had to rely on their own sources and so more cases were printed that might otherwise have gone unnoticed.

Monthly Distribution of Sightings



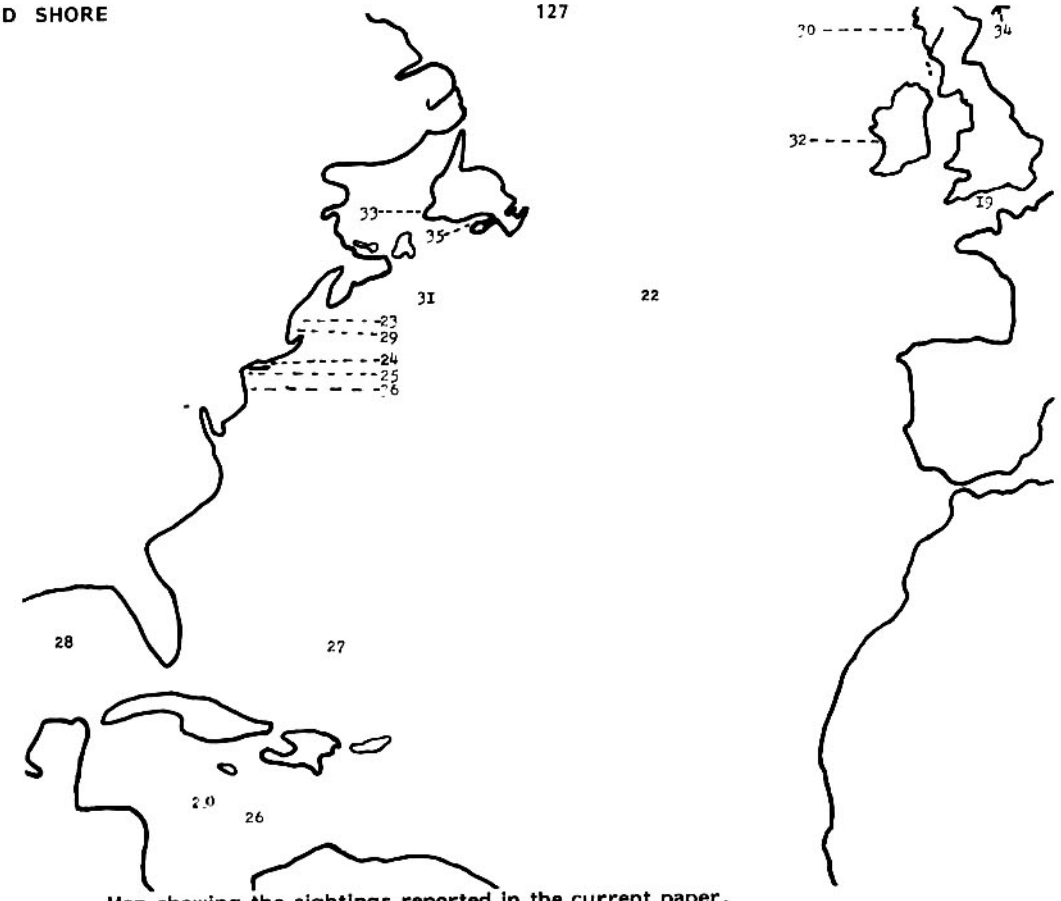
As shown in the graph there is no definite cyclic peaks apparent.

Identification of the Types of Sea Serpents

Many Coiled: A long serpentine animal, reaching over 100 feet in length, with a marked feature being a small body diameter, (about five feet radius). The neck seems to be a continuation of the body to the head, which has been described as seal-like or alligator-shape. A startling characteristic is that the animal is capable of producing large curves of its body above the water's surface when swimming - described as being like coils. This animal is a mammal, probably a form of the early cetacean (Zeuglodon) named Basilosaurus, thought to have become extinct during the Miocene, 25 million years ago.

Maner : in length about 50 feet, somewhat in proportion to its body diameter; with a neck usually long and slender with a length of 10 feet (plus or minus). The head is about 1¼ feet across and 3 feet long, described as being like a horse or snake. The eyes are enormous and may tend to extend outward. On the back of the neck, a mane like a horse's is sometimes seen. It is a mammal perhaps related to the pinnipeds (seals).

Horn Head : about 60 feet in length, proportionally thick. The head is described as about 2 feet across, somewhat rounded and has an unusual feature described as small "horns" on its head; the neck is elongated. There are two pairs of flippers and the coloration is a dark drab black, with a lighter underside.



Map showing the sightings reported in the current paper.

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Help Wanted

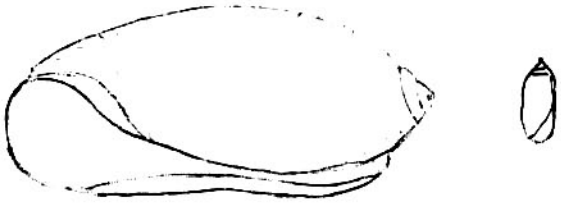
DR. EVELINE MARCUS

Of many old shells the so-called soft parts are not known, and so it is necessary to obtain "living" animals or ones preserved with their flesh. I have been trying to obtain an 11 mm high and 5 mm in diameter snail called *Tornatina bullata* described by Kiener in 1834. It is recorded as *Acteocina bullata* (Kiener, 1834) and as being from the Florida Keys, Bermuda and the West Indies, but it is unfigured in Abbott's American Seashells, (1974) = #3920.

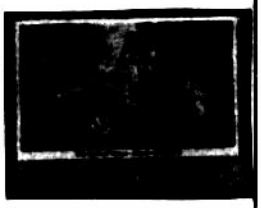
I have, some time ago, obtained one empty shell, but all my writings to zoological friends in Miami, Curacao, Washington D.C., etc. have not met with success. The *Tornatinas* live in shelly and a bit of muddy sand, from the lower tidal zones to deeper water. I have collected other species of *Tornatina* by scooping mud into a sieve and washing it clean, so that the tiny snails, and of course, the shell fragments out of the sand, remained in the sieve. There are also other *Tornatina* and relatives and, of course, also other snails, probably Prosobranchs, in the muddy sand, but the convex shape of *bullata* as well as its size - up to 11 mm high and 5 mm in diameter - are characteristic.

I should very much like to obtain a dozen specimens with the body of the animal preserved in the shell - in 80% alcohol, changed after a few hours. The lucky finder of my dear *Tornatina bullata* Kiener, 1834, should send the specimens to Corinne E. Edwards (P.O. Box 691; Coconut Grove, FL. 33131) who will take care of them for me.

When my husband and I came to Brasil in 1936, we found a 1915 paper on the Brazilian Opisthobranchs collected by the Challenger, listing 24 species. In 1952 we began to collect and study the group and out list now contains over 150 species. The classification of most groups is hard work, but necessary for zoolgeographical studies and for ecological statements. For many physiological experiments the exact knowledge of the material is idispensable, e.g., the studies of the nervous system and its functions. For classification it is not enough just to look at the pretty shell or the pretty colors of your specimen. The next step is comparing your animal with what others before you have described and named. It will often be exasperating to find very primitive and incomplete descriptions and figures. The internal characters of an animal are helpful for dertermination: the buccal apparatus with or without jaws is important. Still more weight has the radula, composed of cuticular teeth, whose number, shape and distribution are of systematic value. In some families the radulae are rather similar, and then one has to go farther into the anatomy. Especially the wanting of a radula in several shelled animals is characteristic. Hence the classification of empty shells is often impossible. Fossil shells described by their shell structure can, in many cases, not be assigned to the correct family.



Masterpieces of world art are depicted on a series of stamps from Antigua. The 30¢ value is Botticelli's "Birth of Venus" and a scallop shell is a prominent part of the painting.



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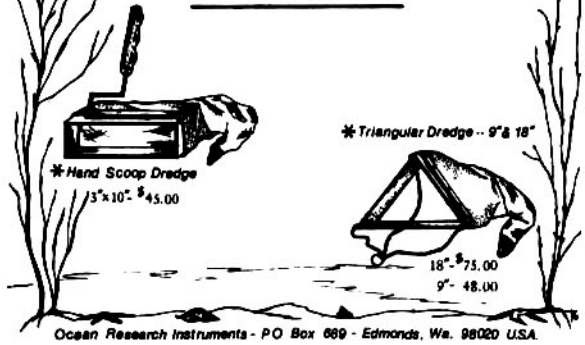

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Of Coral Reefs, Intertidal Shores and Sand Flats in the Florida Keys

FRANCES MCC RING



"NATURE IS CEASELESSLY EXAMINING AND PROCESSING EACH SPECIES, WINNOWING OUT THE LESS FIT INDIVIDUALS." J. COUSTEAU

Loggerhead Sponge Smooth Trunk Fish Queen Conch
Rock Crab Diadema Linkia Sea Star

It is not enough to go down to the sea to collect seashells and sunburns; one must also collect understanding and a sense of wonder - by opening the mind and the spirit to the unity of the sea's life forces that bind plants plants to animals, animals to man, man to the sea.

In February while the snow accumulated and the winter winds howled in Arctic fury, we began planning our spring vacation. We would go to the Florida Keys to seek the sun and the sea.

Toward the end of March the long awaited time arrived. Barely thawed, we flew to Florida; then we drove directly to our first stop in the Keys: Key West. Taking a week, we would work our way back up the Keys, spending some time in Marathon and ending the trip in Key Largo.

Our plan flowed as smoothly as the out-going tide. Ultimately, we would cover hundreds of miles - most of it in the water (or so it seemed!). We also criss-crossed the Seven Mile Bridge six times to the children's refrain: "Oh no, not again!" Be that as it was, we sought out as many different places and ecological niches as time would allow: an off-shore coral reef, bridge channels, sand flats and turtle grass, the intertidal shores, the sheltered mangrove bays and finally we would meet a real "old man of the sea".

Our activities would surge with the tides. Only while we were sleeping and eating, were we not in bathing suits and snorkeling gear. We did, however, have many a meal dripping water, sand and turtlegrass on one or two restaurant floors.

THE KEYS

Anyone who travels the length of the Keys has to be impressed by the expanse and colors of the sky and water; the allure of scattered mangrove-covered islands and the wealth and diversity of tropical life.

This area is unique to the continental U.S., not only for its geographical features, but for its history as well. The picturesque islands still exude an atmosphere of mystery, past adventures and tropical charm. Their historical lore includes rum-runners, bucaneers and pirates of the high seas - like "Blackbeard", Lafitte and Morgan; wrecks and sunken treasure; civil war intrigue; artists, writers and presidents and its on-going fishing, shrimping and sponging activities.

Regardless of the comings and goings, the follies and pursuits of man, however, the Keys - which march southwestward nearly 200 miles - represent the everchanging equilibrium between land and water masses. They themselves are the remains of an ancient reef system, formed nearly 100,000 years ago, when the sea level was 20 to 30 feet higher than today.

Continued on the next page



"The unmistakable rock beauties were everywhere"

Adult and two juveniles

Finger Coral and Gray Angelfish

Yet, offshore, more recent and thriving coral reefs perch on the edge of the deep blue sea and fringe the Island chain. And even though, Key Largo's Pennekamp Park and Underwater Preserve is the most well-known, there are hundreds of spectacular reefs to explore along the chain.

THE CORAL REEF

"The reef community in general constitutes one of the oldest, most complex and most tightly integrated of all ecosystems on this planet." *Jacques Yves Cousteau*

We visited one such reef, called San Key Light - 7 miles off Key West and about 50 minutes by boat. Sand Key, in 12 to 30 feet of water, represents typical fore-reef ecology which is diverse in form and fauna. This type of reef precedes the deep fore-reef which is characterized by its spectacular wall environment, beyond which lies the deep expanse of ocean. It is always a wondrous and revitalizing experience to submerge into the underwater world of a living coral reef community.

The physical structure of the fore-reef is typified by stands of massive Elkhorn Coral (*Acropora palmata*); low-spread Staghorn Coral (*Acropora cervicornis*); delicate Finger Coral (*Porites porites* var. *furcata*); knobby mounds of Star Coral (*Monastrea species*) and isolated heads of Brain Coral (*Diploria labyrinthiformis*). Fire Coral (*Millepora species*) - not a true coral - exists in many forms and shapes, growing over and covering existing structures like a blanket. It is well known for delivering a painful sting to careless hands.

The seascapes here in general is a jumble of multi-colored hard and soft corals, punctuated by ramdom purple and yellow seafans and swaying seawhips. In total it is an area of intense biological processes. Not only are the many species of corals competing with each other for space and nutrients, but they must also contend with other varieties and species of invertebrates: tube, basket and vase sponges, zoanthidians, hydroids, gorgonians, anemones and tunicates. The many labyrinth coral crevices provide anchorage and protection for these and a host of other organisms and creatures: plummed-gill tube worms, eels, urchins, crabs, lobsters, mollusks and the many fishes with their rainbow display of activity.

As in most tropical reef communities, it is the ever-changing parade of fish that surely captures the diver's attention and sense of wonder. Haughty Angelfish mill about in a bold array while nibbling on sponges: the Queen (appropriately named for its bright blue "clown"), the Blue (similarly colored, but lacking the "crown" of the Queen), the French and the Gray. Angelfish are most curious and approach people without fear. It is amazing, but their exotic colors do blend in surprisingly well with the colorful reef backgrounds.

Also there are the gaudy Parrot Fish which poke around unhurringly, creating a melange of vivid pastels. We saw the Stoplight Parrot Fish and the male Redband Parrot Fish. These fish are efficient re-cycling inhabitants of the reef, as they turn coral and rock into fine sand while grazing. Females and males often share the same color pattern.

My favorite fish are always the rainbow-hued and irridescent wrasses and gobies and the pugnacious little damselfish which flash gaily about and hover around the coral heads. Among the many we saw were Yellowtail Damsels, Cocoa Damsels, Sergeant Majors, Blueheads and the incredible purple Creole Wrasse (which has pale blue bones and teeth!); the charming Fairy Basslets, Blue Chromis and Beaugregories. The unmistakable Rock Beauties were everywhere (their black spot on the yellow-orange bodies increase in size with the fish's growth).

Butterfly Fish - Spotfin, Foureye and Reef - flitted nervously about while the common Spotted and Smooth Trunk Fish skulled awkwardly through the water. In the lee of coral heads, vast schools of French and Small-mouth Grunts and Porkfish swayed languidly in the current.



"The reef community ... constitutes one of the oldest, most complex and most tightly integrated of all ecosystems on this planet." *J. Cousteau*

In a nearby sprawling grove of multi-colored seafans - always facing broadside to the current - we noted numerous grazing Flamingo Tongues (*Cyphoma gibbosum*) and assumed that their population was strong, at least in this area.

Beside the visual potpourri of a reef community, it is always fascinating to me to stop and listen underwater and hear the constant background profusion of snapping, crackling, crunching and pinging of the feeding, communicating sea-life unseen.

And while floating serenly around in these waters, always present in the back of my mind was the image that from seaward would come the large predators - Grouper, Baracuda and an occasional Shark to gorage on the edge of the coral reef. We saw only four or five medium-sized baracuda, suspended motionless in mid-water as we made our surface swim back to the boat.

Even so, on a coral reef, one can quickly become mesmerized, tranquilized and feel a part of the sea's own life pulses. Finally and reluctantly, we left Sand Key reef and headed back to shore, as the setting-sun signaled the inevitable emergence of the night creatures to participate in the underwater drama on the coral reefs.

THE BRIDGE CHANNEL

"Each recurrent high tide is a dramatic inactment
of the advance of the sea against the continents ....
while the ebbs expose to view a strange and
unfamiliar world." *Rachel Carson*

Soon, we too ventured out at night as the tide receded to investigate the bridge channel between Key West and Boca Chica Key. We observed some fairly common activities that only serve to remind us of the sea's on-going pattern of life and death.

We watched there, for example, a large True Tulip (*Fasciolaria tulipa*) scavaging a dead mullet and crabs devouring sea hare egg-strands that were intertwined in much profusion in the bottom weeds and grasses.

There were the large patroling needlefish, fishes of feeding mullet and Gray Snapper; plowing sea cucumbers and a multitude of grazing Spotted Sea Hares, orange star-fish and common sea urchins.

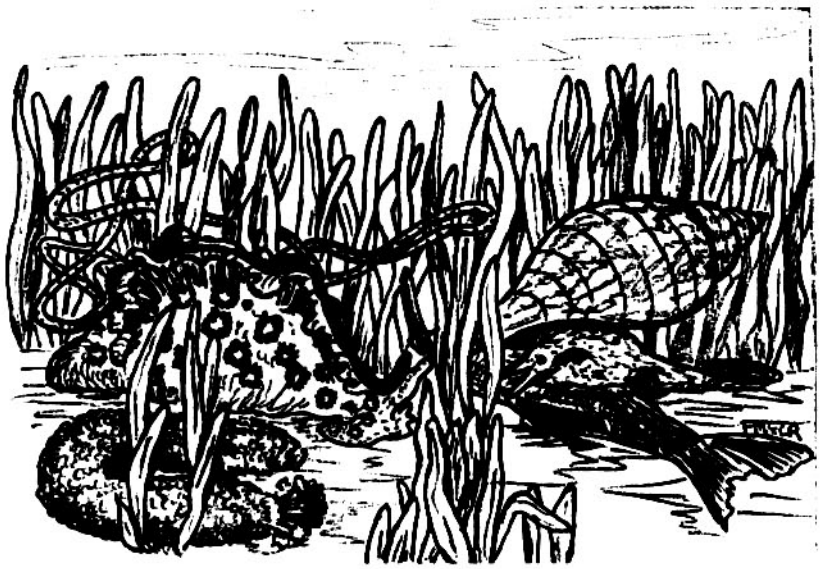
Mysterious movements, lapping waters and dim shadows and shapes fill the darkness beyond the flashlight's small, illuminated circles. Always is the background accompaniment of the spitting and crackling noises of mussels, barnacles, periwinkles and scurrying crabs in the tide's retreat. At night, on the water's edge, a simple flashlight parts the curtain of darkness - allowing one a glimpse of the small scenarios which make up the timeless world of survival. Predators and grazers alike move about according to the tidal rhythms that determine their activity or quiescence.

The next morning, the sun's brightness cast aside all mysterious shadows and noises of the previous night. At high tide now, all creatures were submerged and hiding to await darkness and the next tidal ebb. In the light of day, we entered the water under this bridge with more confidence and less expectations.

Before too long, however, my husband discovered a 4.75 inch Atlantic Deer Cowry (*Cypraea cervus*), wedged way up inside a cement piling in six feet of water under the bridge. It was a beauty, sporting its heavy, pitch-black mantle, studded with its numerous black papillae. Was this very mollusk out prowling about the preceding night as we were?

Among the regular channel residents, was also a delicate little Rough Lime (*Lima scabra*) nestled under a rock near the shallows. We watched its "jet propelled" snapping gyrations in the water; this lively action reveals the *Lima*'s brilliant-red mantle. Since it is nocturnal, we returned it to the day-time refuge of its rock.

We also discovered that snorkeling in some of the channels is a bit hazardous - not becayse of any sea creatures, but because of the motor boats! Therefore, we often had to take turns directing boat traffic away from our diving activities or risk the dangerous tight passings between the pilings.



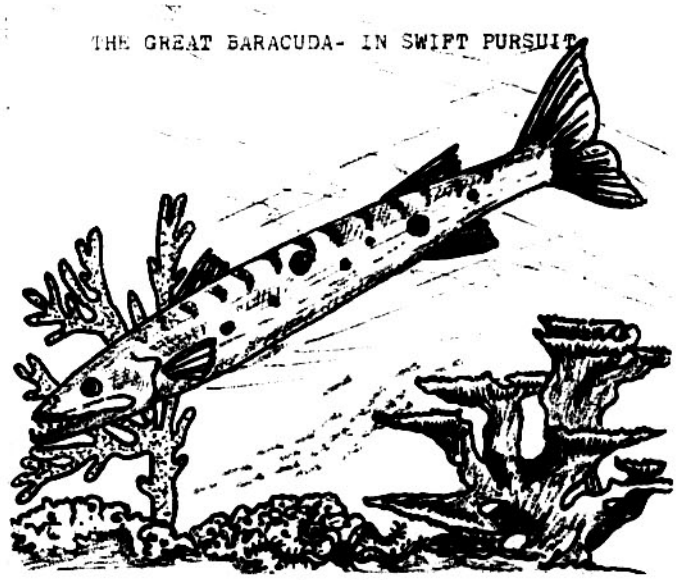
"All are important in the economy of the marine world."

Spotted Sea Hare with egg strands

West Indian Sea Cucumber

True Tulip feeding on Mullet

Turtle Grass



The sea lies all about us.
Rachel Carson

Nature is ceaselessly examining and processing each species, winnowing out the less fit individuals.
Jacques Yves Cousteau

THE SAND FLATS

As the living reefs are building up off shore, sediments are accumulating in shallow waters. Winds, currents, temperature and tides are constantly shifting and rearranging water and land boundaries. Next we would explore some of the shallow, intertidal waters and see different sea life, as well as some of the same coral reef or channel species which move about from one habitat to another, according to tidal or day/night cycles. In general, the sand flats offer a less stable and more stressful environment than do the coral reefs.

Along the Keys on the seaward side, where the bottom slopes gently and where the shore is washed by the tidal seas, is the back-reef. It may vary in width from a few yards to several miles and in depths from a few inches to 20 feet.

In these more shallow waters, the relative calm causes thick sediments to accumulate.* And where the sediment base is thick, the area is characterized by dense beds and patches of turtle grass (*Thalassia testudinum*) and sand bars, which lie fully exposed at extreme low tide. Around the Keys, there is only a foot or two variation in the tidal rise and fall, with "spring" tides having a range of 3 to 4 feet.

Most of the inhabitants of this area remain buried and hidden in the thick sediments and turtle grass and emerge under cover of darkness and with the rising, incoming tides to feed and seek mates. These creatures include many mollusk species, crustaceans, the sea horses and pipefish; bristle worms, sea cucumbers and stingrays. Lone trunk fish or small schools of Grunt and Snapper occasionally visit to forage over the sand flats and turtle grass at night, having spent the daylight hours in the coral reefs.

Off Bahia Honda Key, Marathon and Key Largo, we must have snorkeled over acres and acres of the seaward sand flats. In some places at low tide, we'd be yards from the shore in a foot of water, literally crawling over the 6-inch high turtle grass. Trying to float like a skim on the surface, we'd make our way over a sand flat and coming to the edge, peer over it into a sudden 12 foot deep channel and feel quite a bit more comfortable with our noses in deeper water.

While finning slowly over these flats, we would see a few immature Queen Conchs (*Strombus gigas*). The broad-lipped, cameo-pink Conch used to be a familiar and abundant sight all up and down the shallows of the Keys; today, however, overfishing and over-collecting has drastically reduced such inshore colonies and many have even fallen prey to the now scarce, carnivorous Horse Conch (*Pleuroploca gigantea*) around the tidal flats. Fishermen must seek the Queen Conch in deeper waters to satisfy the increasing demand for the fresh conch delicacy. And for satisfying the tourist souvenir demands, most of the handsome shells are imported from the Bahamas which are struggling with their own diminishing Queen Conch populations.

We spotted a few Hawk-Wing Conchs (*Strombus raninus*), a couple of Vase Shells (*Vasum muricatum*) - the interior of one was blushed with a soft violet tint; and Star Shell species (*Astraea phoenia* and *A. americana*) were found on the occasional coral rubble of the flats. The larger mollusk species, like the Helmets, the Horse Conch and the Atlantic Triton normally inhabit the sand flats, turtle grass and rubble patches around the coral reefs in deeper water; they will be found in the intertidal shallows in late spring as they come in to breed and spawn. Because of this accessibility at breeding time, their numbers are greatly decreasing around the inshore flats and bays.

The islands of turtle grass provide food and shelter for creatures other than the bolder mollusks. Everywhere were the unappealing Sea Cucumbers, which nonetheless play an important role in recycling the bottom sediments. I wondered how many of the ones we saw might have its attendant Pearl Fish - a small fish that habitually takes up residence in the rear-gut cavity of some Sea Cucumber species.

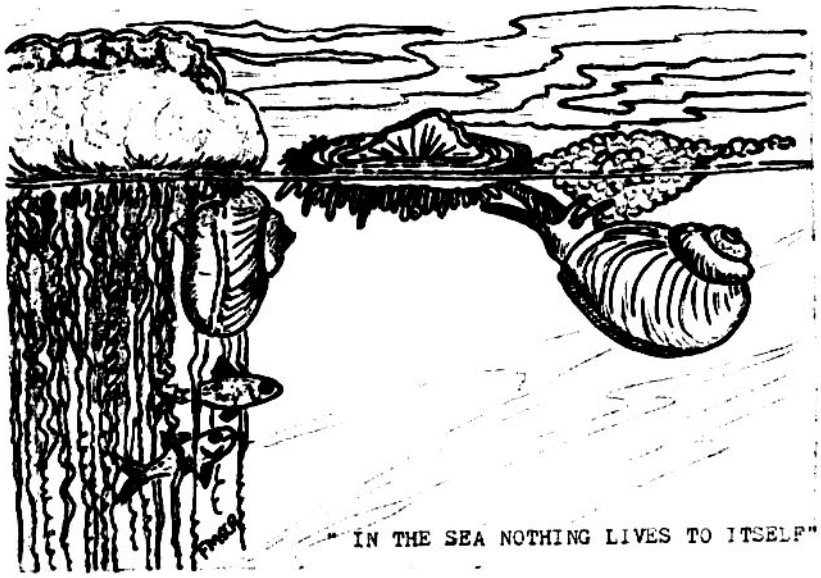
There were also many large, olive-green Spotted Sea Hares (*Aplysia dactylomela*) which, as noted earlier, move into shallow water to spawn their eggs in long, transparent spaghetti-like tangles. All species are hermaphroditic and they lay an extraordinary number of eggs, most of which succumb to the dynamics of the food chain. Mature sea hares do not return to offshore feeding grounds, rather they are thought to die after a single spawning. The animals give off harmless, deep-purple fluid if disturbed and because of this behavior, they have had a place in Old World folklore and superstitions.

A part of the sand flats and turtle grass drowned-landscape, were massive Loggerhead Sponges squatting lumpishly here and there. The flour-like whiteness of reef sediments is deposited all over the sponges' normally black surface; only the large exit canals on top remain free of the silt. Often inside this sponge can be found the unusual Snapping Shrimp. Adults are imprisoned forever in the meandering, internal canals and only the young can escape. However, they themselves are programmed to eventually take up residence in some other Loggerhead Sponge to repeat the cycle. Other creatures, such as worms and isopods, may also lodge in the sponge; and sheltered at the base of the sponge are sea urchins or young spiny lobster.

In the turtle grass patches all of the smaller, more vulnerable inhabitants exhibit the protective coloration of their surroundings. It takes concentration and a keen eye to tell the mottled grass blade from a tiny sea horse, pipe fish, some small crustacean or a little baby cow fish. Only the ubiquitous sea urchins flaunt their presence on the flats, openly secure in their defense.

Seaward to the sand flats off Bahia Honda Key, my husband drifted over by a baracuda as big as he: six feet and growing. So as not to further disturb the fish's musings and patient sentinel over the deepwater's edge, we decided to snorkle instead the bridge channel near-by. The out-going tide there was running one to two knots and after a hard swim against it, we en-

*Occasionally, after a southeastern "blow" or even if the daily winds come up and shift suddenly, the calcareous sediment, washed out of the reefs and stirred up from the bottom ooze, produce a condition called "white water" whereby the suspended particles and surface chop drastically reduce underwater visibility and all organisms are coated with white powdery sediments.



Portuguese-Man-O-War Velella Janthina
Janthina
Nomeus

joyed a "drift dive" on the return swim. As we glided swiftly along, we saw a convention of black sea urchins, whose long spines spanned a foot or more across.

The creeping star-fish, holothurians and mollusks; the visiting fishes, floating larval forms and the buried sting-ray, which would suddenly rise up in a cloud of white silt - all are important in the economy of the marine world. Patterns of survival are intertwined and mutually dependent; the individuals represent the species which are the vital links in the living chain by which organic and inorganic materials are taken from the sea, passed from one to another, returned to the sea and re-cycled again.

THE INTERTIDAL SHORE

"The river is within us; the sea is all about us;
The sea is the land's edge also ...
The beaches, where it tosses
It hints of earlier and other creations"
T. S. Eliot

One day the "white water" had greatly reduced underwater visibility and we had to cancel a prospective reef visit by boat off Key Largo. Thus, we had to amuse ourselves with beachcombing and playing hide-and-seek with a colony of Fiddler Crabs.

Even on the sandy edge of the beach, there is abundant life to be found "pioneering life that has reached the high-tide line and seems poised in space and time for invasion of the land."** Most of these, however - the sand fleas, ghost crabs, various worms and burrowing mollusks - remain buried during the day and the surface of the sand appears barren of any life. It is difficult to believe that with the return of the life-giving tide, the living and dying activities of the sandy beach fauna will be stimulated by this ceaseless, rhythmic inundation. This life, concealed from human eyes, waits patiently in suspended animation.

Meanwhile, in the high-tide flotsam of dead seaweeds, grasses, and the bits and pieces of debris can be found clues to the offshore habitats and the stranded remains of some other interesting sea life. Even here is the constant reminder, drying in the sun, that most sea creatures at one time or another, have to yield to the whims of the tides and the winds and the sheer power of the water.

** Rachel Carson, The Edge of the Sea, p. 164.

Sifting through this ocean graveyard of beach driftage, we found Lightning Whelk (*Busycon contrarium*) egg cases, the sand collars of the Moon Snail (*Polinices lacteus*), skates' egg cases, various sponges and the inevitable bric-a-brac and droppings of Homo sapiens, from near and afar!

Even so, many previously unknown sea creatures have been discovered in the debris of the tide lines. This is particularly true after storm surf has deposited on the shore species from deep ocean bottoms or far away islands. For many years the familiar Ramshorn Shell, commonly found in beach flotsam, mystified scientists as to the nature of its creation and origin. Finally, in 1912, live *Spirula spirula* were brought up in plankton tows miles across the Atlantic and the mystery of the little squid-like animal, an abundant inhabitant of the deep was solved.

Too, the life-cycle of the deep-sea Cephalopod, the Argonaut, was pieced together with the discovery that the fragile, paper-like "shell" often found in tidal debris, is in fact the egg-case secreted by the female animal.

Among such drift then, we found numerous Vella or "By-the-Wind-Sailor" jellyfish. This seldom-noticed, colonial coelenterate has a beautiful purple and blue "sail" attached to an oval "float". After the protoplasmic material dries and sluffs off, the thin transparent float remains; the delicate design on this disc resembles a fingerprint.

The lovely, purple pelagic mollusk, *Janthina janthina* or Violet Bubble Shell, feeds upon *Velella*, as well as upon the better-known Portuguese-Man-O-War, *Physalia physalia*. I found a fresh-dead *Janthina* with its frothy bubble float, resembling dried cellophane, still attached. In life the mollusk hangs suspended from its bubble raft, formed by mucus and trapped air, as it drifts across the ocean's surface. In breeding season, some species attach the egg capsules to the underside of the raft as well. The *Janthina* may discard its bubble float, if it interfers with feeding and crawling on a *Velella*. A new float is formed later by the anterior, bubble-producing end of the foot while in contact with the surface film of the sea.

We saw, in addition, quite a few small Portuguese-Man-O-War stranded in the beach drift. It is hoped that most people are aware that although this colonial jellyfish might look for all the world quite "dead" and harmless, the nematocysts packed within its tentacles can still be activated by touch and are atill capable of inflicting its characteristic painful sting.



"The mangrove habitat is ... a transitional environment."

White Crane Mussels and Barnacles

The small fish, *Nomeus*, which often lives in association with the Portuguese-Man-O-War is as immuned to the stinging cells as is the Clown Fish to its anemone's. Only when these fish lose their immunity through age or disease is it then devoured by its host. There is no sentiment in the sea. The individual fish will be replaced by another and life will go on as before on the water's edge and beyond.

THE SHELTERED BAYS

of the

MANGROVE FOREST

"There is, one knows not what sweet mystery
about the sea, whose gently awful stirrings
seem to speak of some hidden soul beneath."
Herman Melville

As the coral reefs and the turtle grass flats dominate the seaward edge of the Keys, the mangroves take over the bayside shores. The mangroves are responsible for creating land from only a sandbar and where once there was sea, there forms the beginnings of land.

They are seedplants and the first "American" ones probably arrived on currents from Africa. In adapting to a water environment, mangroves are anchored to the bottom by layers of arching roots which soon become a supporting tangle.

Their roots then, also provide attachment surfaces for marine organisms and reduce tidal action, promoting silt and mud accumulation. Besides providing sheltered nursery habitats for fish, mollusks and crustaceans, mangroves contribute directly to the food web by means of their own decomposing substances. The build-up of sediments in mangrove areas helps as well to maintain coastlines against erosion. So as debris of all kinds pile up within the mangrove root systems, islands are created from these simple processes.

The sheltered, green world of the mangrove presents a look at a different ecological community, which plays an important role in the over-all land-sea environment around the Keys.

Looking at the mangrove habitat from the historical perspective, the still, swamp world at the very edge of land and water suggests the primordial stirrings of all life; it is truly a transition environment. Some creatures crawled out of it to walk the land; others returned from the land to the water-world; still others are even now bearing the adaptation-burden of the transitional phase. All, however, depend upon the rhythm of the tides - the effects of which still remain mysterious, as the essence of the mangrove swamp is to the casual observer and the scientist alike.

Upon approaching the still waters, the shadowy coves with its pungent smells, one notices immediately the stately Blue Herons, white Cranes and Egrets that regally stalk its low-tide perimeters. And groups of the great Brown Pelican roost and preen in the nearby mangrove trees.

But it's around the very mangrove roots themselves where a wide variety of life congregates. Coon oysters (*Ostrea frons*) are often seen adorning the roots within tidal reach while Marsh Periwinkles (*Littorina irrorata*) and the Angulate Periwinkle (*L. angulifera*) hug the roots at water level. Brittle stars, burrowing crabs, shrimp and other mollusks make their home in the mud at the base of the roots.

In one bay area, we snorkeled over a veritable carpet of strange, star-shaped, yellow-white jellyfish. They appeared, at first, to be anemones anchored as usual to the substrate, but the slight movement of water caused by our kicking fins sent them floating like inverted parachutes to the surface. They seemed to be harmless, but it was not a pleasant experience to have one or more stuck to your facemask or body. Only in this particular cove did we see them and they were there in great numbers .... were they a breeding colony of jellyfish species?

In another cove on the bay side, we came upon an old lobster pot. Turning it over to see what might be underneath, we surprised a Scorpion Fish (probably *Scorpaena plumieri*). He was so secure in his camouflage and defense abilities that he did not move a fin towards fleeing. He remained in place and very still as we acknowledged his good reasons for his confidence; we then returned his lobster pot hideout to its original position.

The outer bays of the mangrove forests extend way "inland" into the dark island-swamps of its own making. The swamps most important ecological role is one that is largely invisible. For it is the nursery grounds for innumerable species of sea-life. The rise and fall of the tides, which penetrate deep into the swamplands, provides water transportation for migrating larvae to and from the open sea. The incoming tides from the sea renew oxygen and nutrients, add to the sediment accumulation and usher in new species which may become established and flourished in the mangrove niche. The outgoing tides flush the bays of debris, spawn and larvae sending them out to thrive or perish in the open sea.

Each succession is a phenomenon of the whole life pattern. Here also, the present echoes the past and hints of the future. The tides and currents, the winds, temperatures and seasons and the very thrusts of the sea all link the coral reefs, the channels, the intertidal shores, the turtle grass flats and the mangrove bays and swamps with the pulse and surge, with the continuing chain of life itself - born before Man - of the enduring sea.

"In (the sea's) mysterious past, it encompasses
all the dim origins of life and receives in the end ...
many transmutations ... For all at last return to the sea,
to Oceanus, the ocean river, like the ever-flowing
stream of time, the beginning and the end."
Rachel Carson

EPILOGUE

Sea Shells, Aboard the Good Captain's Boat

Boat people are a special breed, having adapted a life-style more of the sea than of the land; they embrace the simplicities as they

have forsaken the amenities. Their mind and bodies are disciplined by the sea, but their spirits remain free to cast with the winds.

We had the delightful opportunity to make the acquaintance of such a person, a modern day "old man of the sea".

One afternoon we were poking around a marina, looking for a boat to take us out to some offshore reefs south of Key Largo. Unfortunately, and again, - "white water" and its consequent reduced visibility cancelled all dive-boat operations for the area. Boats were moored for the remainder of the day and divers sat idly, sipping beer. Eventually, however, we were referred to a fellow who lived aboard a boat there at the marina. We were told that he would occasionally take a small group of individuals out to the reefs.

We found out that the good Captain did take-on private charters, but the water and wind conditions were such that it would have been futile to attempt an outing that day.

However, as the subject of seashells came up, the good Captain's eyes sparkled and he proceeded to pull out some buckets of shells that were in various stages of cleaning. "Most people think I'm 'wacko'", he shyly explained, "because I spend a lot of time fixing up these critters and smelling up the dock." "But," he went on, "here's what I get for all my hours of work." With that he proudly displayed a cookiebox, full of cleaned and polished Tulips, Apple Murex, small *Cymatium* and other assorted shells. These, he said, were to be gifts for his grandchildren at Christmas and birthdays. As he fondly picked over some of the shells, he said, "Kids these days don't really appreciate store-bought toys and things - they just go and break 'em. But the shells I send 'em - one at a time - they really like.

As the chit-chat progressed, he brought out a few more shells from their hiding places in the nooks and crannies of his small boats. "It's not too often," he said, "that I run into folks who want to talk about seashells ... Now, you see, this little fellow protects himself from enemies by closing himself inside, behind his little trapdoor ... kinds' clever, isn't it? Picking up an Atlantic Hairy Triton, he went on: "Now, this one - it still has on its jacket - I'll have to scrub that off, then you'll see how nice it is. Some have this on 'em and some don't ... don't exactly know why, tho' - Do you?"

The good Captain told us that he knew exactly where to go to find his seashell "gifts"; he knew all the reefs around the area, the light keys, the channels and the bays and would often go out at night to "where the critters are". Sometimes divers from his boat would bring them up and end up leaving them for the Captain.

It was delightful and evident to us that he did know all about these mollusks' habits, what they ate, their seasonal comings and goings and how to go about "fixing them up". What he didn't know too much about - nor really seemed to care - were the species names. But, to appreciate their beauty and forms, he didn't have to. To him they were just one of Nature's wonders and gifts of the sea. And he didn't really care either of the other locals thought him "whacko".

Later that evening, I returned to the good Captain's boat and presented him with a small book to identify Florida and Caribbean sea shells, I felt a bit foolish, howeverm knowing that the Latin names and pertinent information would do little to embellish his own treasury of experience and first-hand knowledge. With that, however, he wished that I take with me some of his shell gifts. He expressed mild astonishment and confusion when I said I preferred just a few of the uncleaned shells; I did not want to take the lovely polished ones, destined for his grandchildren!

At 75 years of age, the good Captain is a content man of the sea, even though he is minus his two wives and two fingers on his hand. With a smile and a knowing twinkle in his eyes, he said that he loved his shells and life aboard his boat was good to him. "What more could I ask? There are still a lot more years ahead." Indeed!

CONCLUSION

Finally, the press of time brought us homeward from the timeless sea. But, "The common thread that links these scenes and memories is the spectacle of life in all of its varied manifestations ..."* All are a part of the living sea; the past and the present can but foreshadow the promise of the future - may all of us continue to learn from it and confidently look to the future. Look to the sea.

*Rachel Carson, The Edge of the Sea.

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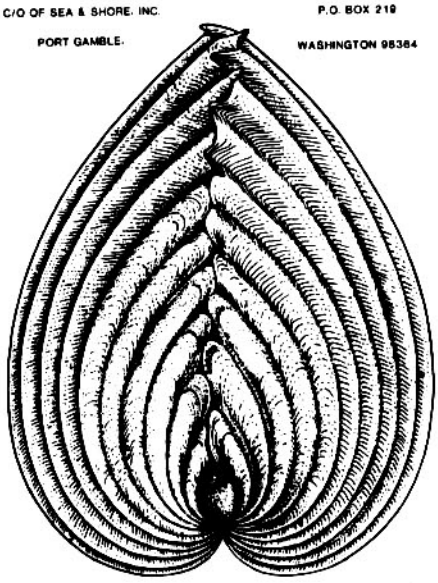

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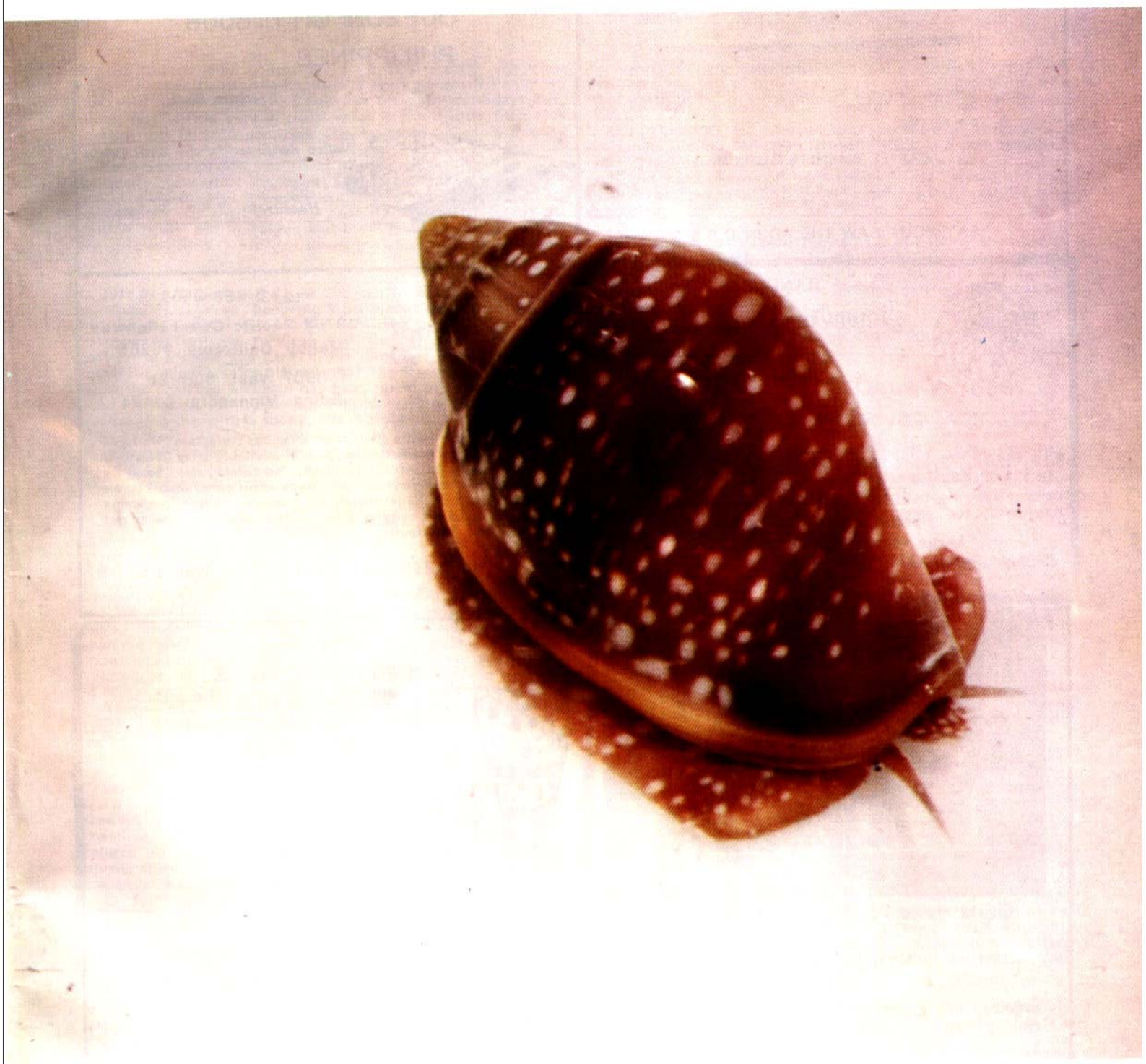
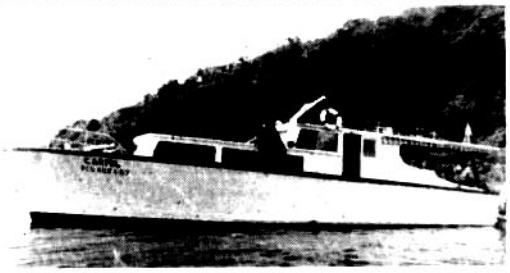


Marginella glabella Linne (24 mm); Dakar, Senegal
First photograph of the living animal of this species. Phillip W. Clover.



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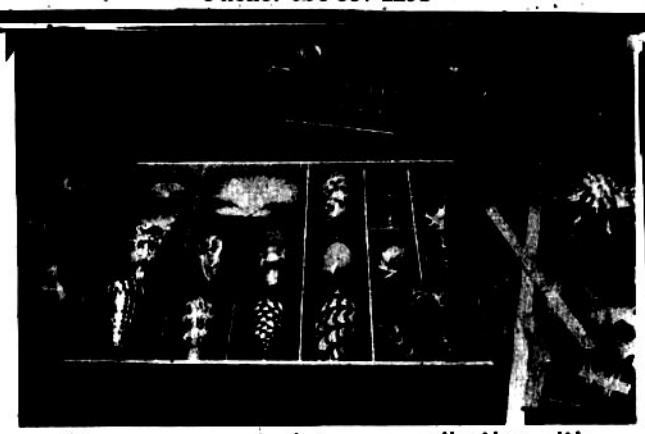

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Two Rarities from Three Countries

PHILLIP W. CLOVER

When I started shell collecting, some 25 years ago, *Cypraea hirasei* Robberts was little known and everyone wanted a Golden Cowry, *Cypraea aurantium* Gmelin, as they still do today! But, while these shells were of equal value in the decade from 1950 to 1960, this is no longer true. The Japanese collector, in particular, will pay a very high price for *C. hirasei*, not only because it was originally described from Japan and named for the founder of several Conchological Societies there, but because it is a striking beauty. One can imagine many figures in the dorsal markings of this shell. *Cypraea hirasei* has been collected, not only in Japan, but in Taiwan and the Philippines and some feel the species called *Cypraea queenslandica* is a form of *hirasei* as well.

In 1970 Dr. Habe named a new *Cypraea* from Taiwan, giving it the name *C. sakuraii*, honoring a prominent collector in Japan. This shell is similar to, but far more rare than *C. hirasei*. It has coarser teeth, is more rounded, developes a different lace pattern and lacks the dark brown blotch at the posterior extremity (called a spire blotch) that is present on *C. hirasei*. Recently *Cypraea sakuraii* has been found in the tangle nets used off Mactan Island, Cebu, Philippines. The photograph accompanying this article shows, left to right: *C. sakuraii* (47 mm, from Taiwan), *C. hirasei* (50 mm, from Tosa Bay, Japan) and *C. sakuraii* (54 mm from Cebu, Philippines) [See page 140, fig. 3 and 4.]

A Rare Volute

PHILLIP W. CLOVER

I recently had the opportunity to photograph a pair of a rare species of the Volutidae. As the species has only recently been named, illustrations appear in few books and only a few of the shell periodicals have illustrated them. The original description appeared in the Journal of the Malacological Society of Australia, Vol. 2-3, p. 354, Pl. 33, figs. 1-4. A later illustration appeared in of Sea and Shore, Vol. 9, No. 2, page 67. Illustrations have also appeared in the Australian Shell News and in the West Australian Collector.

Notopeplum annulatum Wilson, 1972

Trawled from 70 fathoms, west of Rottnest Island, Western Australia - type locality. The two specimens illustrated here were trawled by Taiwanese fishing boats working the West Australian coastline. The shells are 53 and 56 mm in length and are flesh colored, with brown spots or circles around the body whorl and up the spire. The apex is rounded and the aperture has four columellar whorls. [See page 140, figure 5.]

Upper left illustration on page 140 is of a very new species of volute - *Falsilyria morrisoni* Petuch, 1980. The description of this new species appears in the July 30, 1980 issue of The Nautilus, Vol. 94 (3). The specimen illustrated here is the paratype from the collection of Dr. Emilio F. Garcia of Lafayette, Louisiana, who kindly sent us this photograph. Dr. Edward J. Petuch named his new species in honor of Robert Morrison of Sarasota, Florida, who first recognized the species as new and who provided the Holotype, which is now deposited in the U.S. National Museum of Natural History in Washington, D.C. The species is known, at present, only from off Roatan Island, Honduras where the holotype and paratype were taken in 60 m depths. This represents another new species found recently in this same area, which more closely resemble the fauna of the Pliocene Caloosahatchee Formation of Florida than Recent Caribbean species. Amongst these shells are *Falsilyria demarcoi* (Olsson, 1965), *Pleioptygma helenae* (Radwin and Bibbey, 1977) and a new species of cone described in this same Nautilus article: *Conus kulkulcan* Petuch, 1980.

The Mexican Carrier Shell

LAURA SHY

Xenophora robusta Verrill, 1870, usually decorates its self with dead bivalves, bits of broken shell, rocks and, occasionally, with dead gastropods. In other words, anything that is handy!

In the fall of 1966, we dredged some specimens in 23 fathoms at Manzanillo, Colima, Mexico, that really lived in a slum neighborhood. They used a mixture of bivalves, broken bits of gastropods and small clumps of "worm shells" (not Vermetidae) and, finally, resorted to living *Turritella mariana* Dall, 1980 for their camouflage.

I have one or two *X. robusta* that have had living shells, such as *Serpulorbis oryzata* (Morch, 1862) and *Ostrea megadon* Hanley, 1846, attach themselves for a free ride, but this was the first, and only, time that we have found carrier shells that had picked up other living shells.

[See page 140, fig. 2] PHOTO by ROY POORMAN.

Rarities from the Cape Verdes

PHILLIP W. CLOVER

Since most of the Portuguese collectors left Angola, they have concentrated their collecting in the Cape Verde Islands. One of the most popular, and rare, species from there is *Conus venulatus* Hwass, 1792. This cone comes in many color patterns and has many names, some of which may be valid, but all appear to be very closely related.

In our photograph we show, from left to right, *Conus ateralbus* Kiener, 1849; *C. nivosus* Lamarck, 1810; *C. crotchii* Reeve, 1849 and, on the right, a typical *C. venulatus*. Specimens range in size from 34 to 40 mm. All of these cones were collected by divers from just below low tide to depths of 20 meters, in the many island bays in the Cape Verdes. [See fig. 6, page 140.]

Some of the forms of *C. venulatus* are quite expensive. I see in A Catalog of Dealers' Prices for Marine Shells, 6th edition (1980) prices ranging from $25.00 to $120.00. If one is a serious cone collector, this is an interesting group from a very popular shelling area.

Rare Red Patterned Shells

PHILLIP W. CLOVER

With the recent use of tangle nets and dredging in Taiwan and the Philippines, a very interesting color pattern has been noticed in four newly named species, occurring in separate families. All have been taken in sand and mud, 200-300 meters depth along the same submarine bank. Dr. Okutani noted this when he described *Lyria habei* in April of 1979 (Venus, V. 38-1, p. 7). These shells have a smooth surface with a crossing red pattern of lines. Some areas are filled in to make the color pattern seem like a stack of bricks.

In 1980 Dr. S. Kosuge named a Columbellidae, *Mitrella celinae* from Mactan Island, Cebu, the Philippines. I believe this is identical to a Turridae, named *Anarithma dorcas* Kuroda and Oyama, 1971 (center of our illustration). This shell is also being called *Mitra cloverii*, in error. I am illustrating specimens of these species together here. Note *A. dorcas* is smaller in size, lacks sculpture on whorls and lacks the columellar (4) folds of *M. cloveri*, having only a hint of teeth within the aperture.

Our illustration shows, left to right: *Mitra cloveri* Cernohorsky, 1971 (26 mm, s.w. Taiwan); *Anarithma dorcas* Kuroda and Oyama, 1971 (18mm, Philippines) and *Conus kimioi* Habe, 1965 (21 mm, Mactan Island, Cebu, Philippines). [Pg. 140, figs. 7 & 8]


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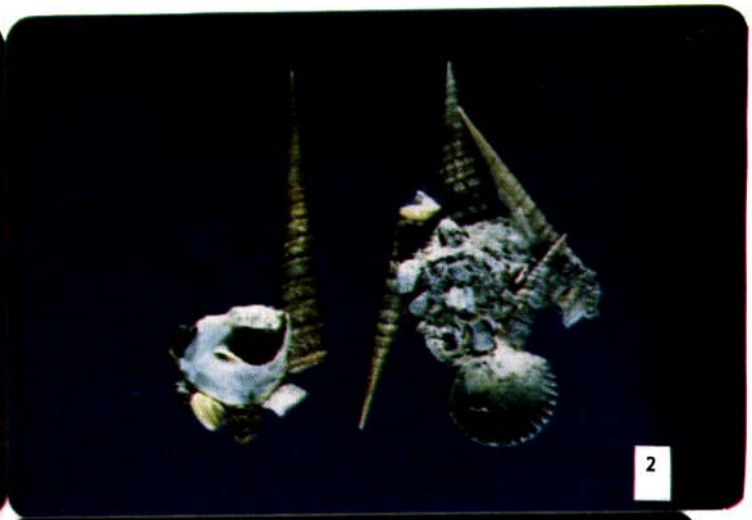
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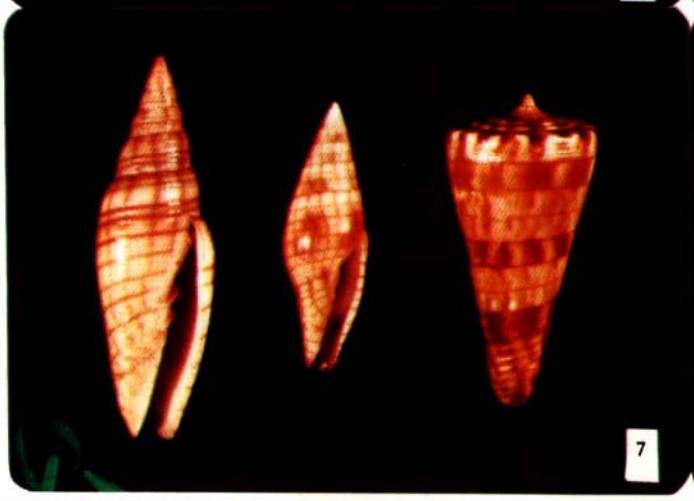
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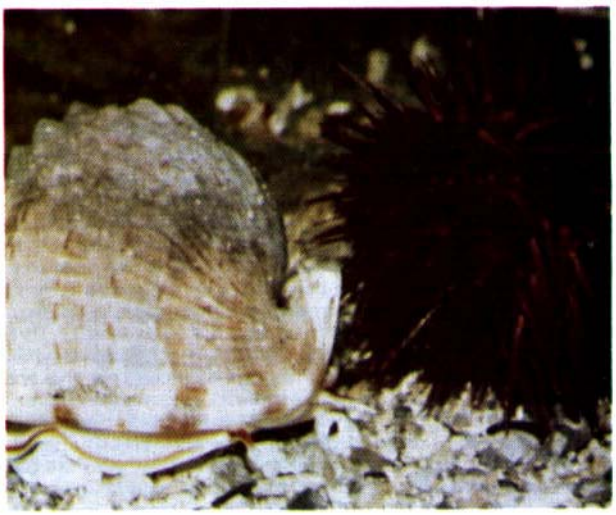

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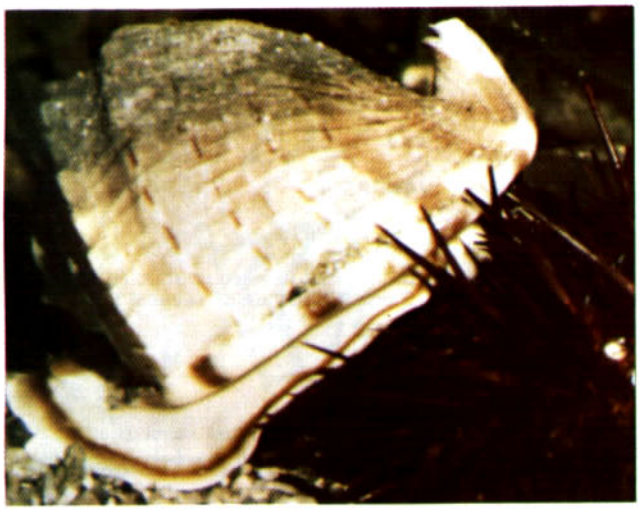

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6

South Australian Helmet Feeding

C. R. ILLERT SEE COLOR PAGE 141

Very little has been written about the life habits of South Australian invertebrates. Taxonomical studies are well advanced, but most scuba divers in South Australia, myself included, are aware of the fact that there are still many creatures which are unknown to academics and consequently totally unclassified or studied scientifically. Fortunately, the South Australian helmet shell, *Hypocassis bicarinata* (Jonas, 1838), is one creature which is at least mentioned in the literature. Jonas found it burrowing in the sand and romping through the sea grass (*Poisidonia australis* and *Amphibolis antarctica*) which - even twenty-five years ago when I first moved to this beach area - came almost up to the shoreline. Over the past quarter of a century the activities of man have released sewage effluent, stormwater runoff, and industrial waste into the sea with the result that the inshore seagrasses have receded dramatically and massive sand drifts now occur along this Adelaide shoreline. The habitat has been destroyed, at least so far as the helmet shells are concerned and live helmets have not been seen by locals for at least 15 years.

Fortunately the inshore Adelaide coastline, where Jonas found the first *bicarinata*, ia not the only habitat for this interesting gastropod. There are still remote areas in South Australia where they survive. Responsible conservation attitudes are being adopted by some private groups and government authorities and it is possible that damage to our local marine environment may be slowed to some extent. I am not certain in my own mind that conservation awareness has arrived in time, but I suppose it is better late than never. This article will deal with the South Australian helmet shell as a tribute to a beautiful creature which has suffered much as a result of human urban development.

The name *Hypocassis bicarinata* means "double-lipped false helmet". The aperture of the shell has a thick varix on either side - hence the name *bicarinata*. Photographs of the shell and taxonomical references occur in the book South Australian Shells written by B. C. Cotton. Non South Australian conchologists often refer to this shell as *Cassis fimbriata* (Quoy & Gaimard).

Whilst I am happy to leave taxonomy to taxonomists I am vitally interested in natural history, and decided to capture a live specimen and keep it for several years in an aquarium so as to study its life habits. I decided to study growth rates and feeding habits. It had been reported in Australian Shell News (April 1978), number 22, page 3, that a Kangaroo Island resident, Mrs. Helen Blackburn, had observed a helmet "sitting on top of a round yellow sea-urchin and making a good meal of it". "Streamers of urchin meat" were reportedly observed when the mollusc was lifted off the prey. I found that helmets do indeed eat urchins in captivity, but there were no streams of urchin flesh. The helmet eats the urchin roe sacks and secretes a thick salivary substance which is thought to contain sulphuric acid.

Photograph 1 shows the helmet after emerging from the sand which covered him during his fortnight-long hibernation. Under favourable conditions this gastropod eats an urchin once every three weeks. His two tentacles probe the substrate for clues as to the urchin's location.

Photograph 2, by now the helmet is close enough for his small black eye (on his left tentacle) to actually see the urchin. He swivels about and chases the urchin which has now realised its dangerous situation and is fleeing.

Photograph 3. The helmet reaches out with its pancake-like foot and grabs the urchin. Next the gastropod extends a long nose-like structure (called a proboscis) through the long primary spines of the urchin. The proboscis punctures the urchin's spherical shell (test) and inserts its proboscis into the body cavity.

Photograph 4 - although they are far too small to be seen here, there are many small stinging cells (glandular or "glociferous" pedicellaria, according to D Nichols) on long stalks radiating out from the exterior of the sea urchin's body. They bite and inject venom into the gastropod's fleshy eye stalks. This causes discomfort so the helmet has curved back both of his eye stalks in this photograph, thus enabling him to dine in comfort - free from the unpleasantness of the urchin's defence mechanism.

Photograph 5 shows the urchin still mobile, however and it is subdued only by the sheer weight of its opponent when he eventually climbs on top. The aperture of the helmet's shell is put to good use, bulldozing the urchin's spines out of the way. The forces involved in this grim and static equilibrium are considerably greater than might be initially imagined. If the helmet did not have the aperture of its shell reinforced with a thickened varix the shell material could easily fracture. Such an event would be a disaster for the gastropod. This matter has been treated mathematically by me in the January 1980 Maria Journal Vol. 1(3), pages 4, 5, 14 and 15.

Photograph 6 - the helmet's soft body is spirally coiled about the shell columella so that mechanical torques of relatively considerable magnitude may be generated by muscular contraction. Usually such contraction results in the urchin's spines being forced away by the aperture of the helmet shell. But if the helmet loses his footing on the writhing urchin spines then the urchin can manouvre spines under the lip of the helmet's shell. This photograph shows several such spines embedded in the gastropod's soft siphonal canal. In response to this injury the helmet secretes drops of thick salivary mucous which may be toxins or paralysing agents (so far as the urchin is concerned).

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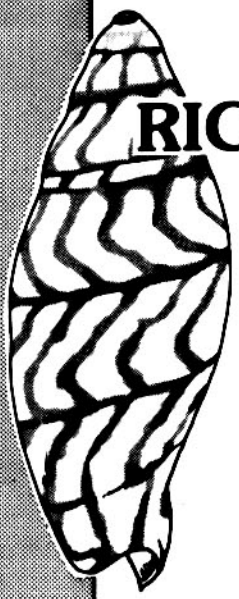

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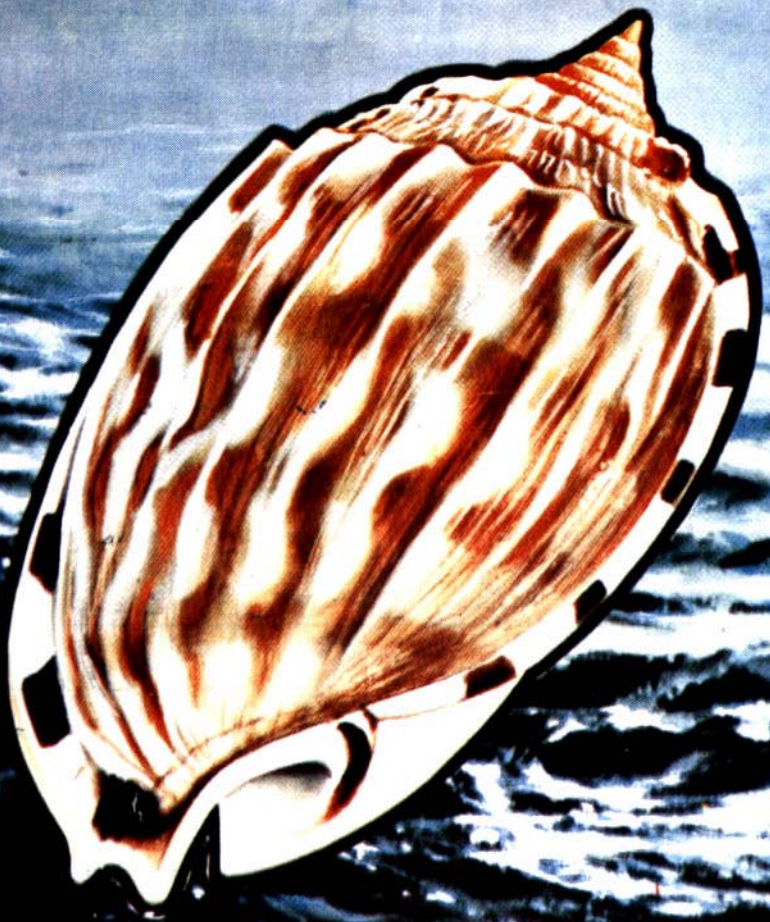

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