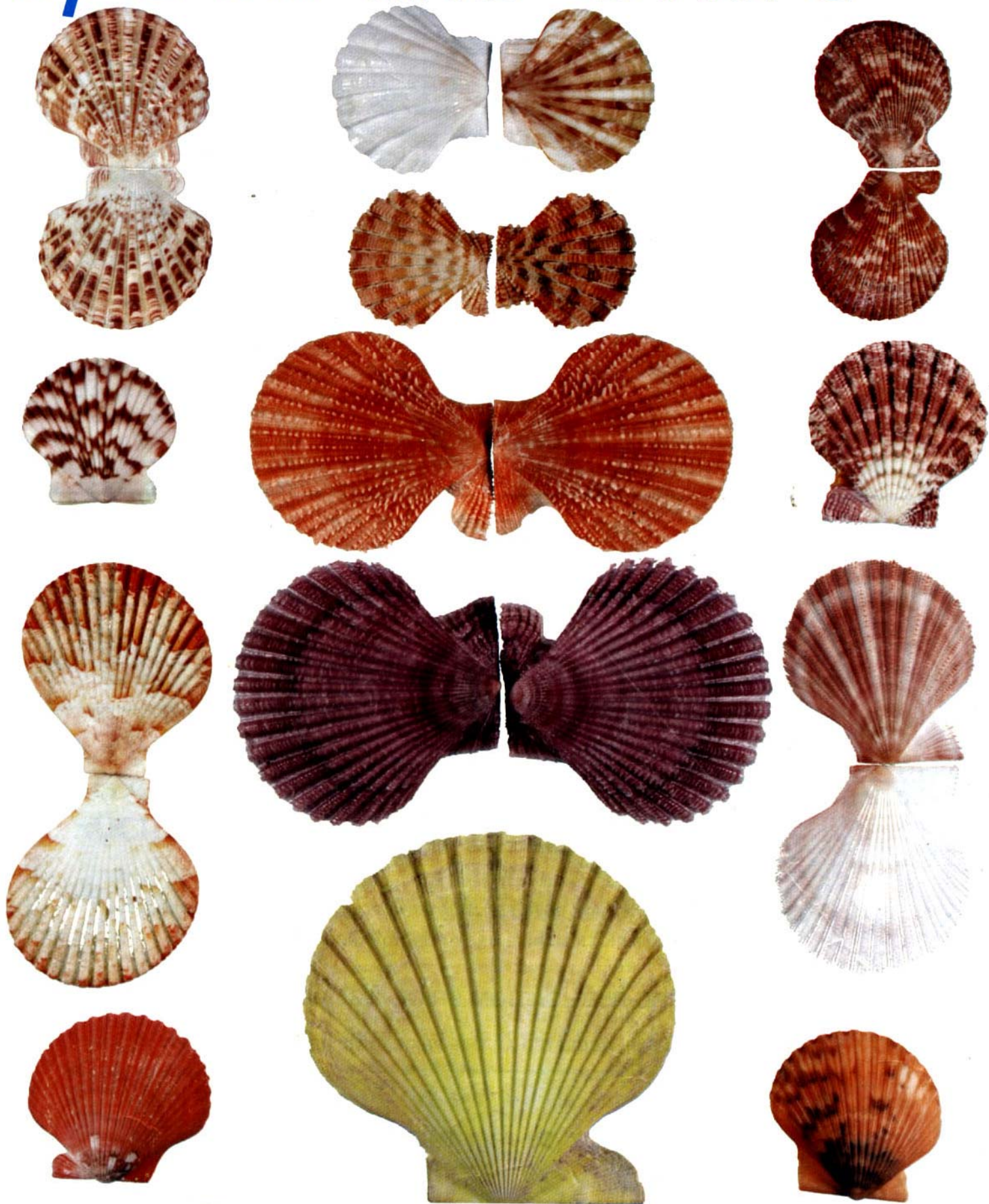


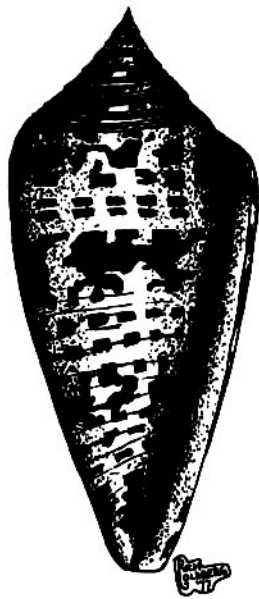
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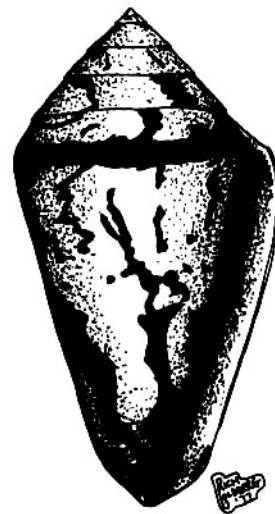
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### OUR COVER

Our cover features colorful members of the Pectinidae. A very popular mollusk to both the collector and the gourmet these provide a bright spot of color in your cabinet. Top row: left to right, *P. reevei* Adams (Philippines); *P. albicans* Schroter (Japan) above and *P. speciosa* Reeve (Okinawa) below; and *P. senatorius* Gmelin (P.I.). Second row: *P. gibbus* Linne (Florida); *P. australis* Sow. (Australia) and *P. pallium* L. (P.I.). Third row: *P. superbus* Sow. (Okinawa); *P. nobilis* Reeve (Japan) and *P. hercicus* Gould (Puget Sound). Bottom row: left to right, *P. flabella* Gmelin (Senegal); *P. australis* again, the yellow (and rare) color form; and *P. circularis* Sowerby (West Mexico). All from the collection of the Of Sea & Shore Museum.

Because of space limitations our regular features From The Editor's Desk and In Review and New on the Shelf have been omitted from this issue. They will return in our next issue, Winter 1977-78, out the last day of Dec.



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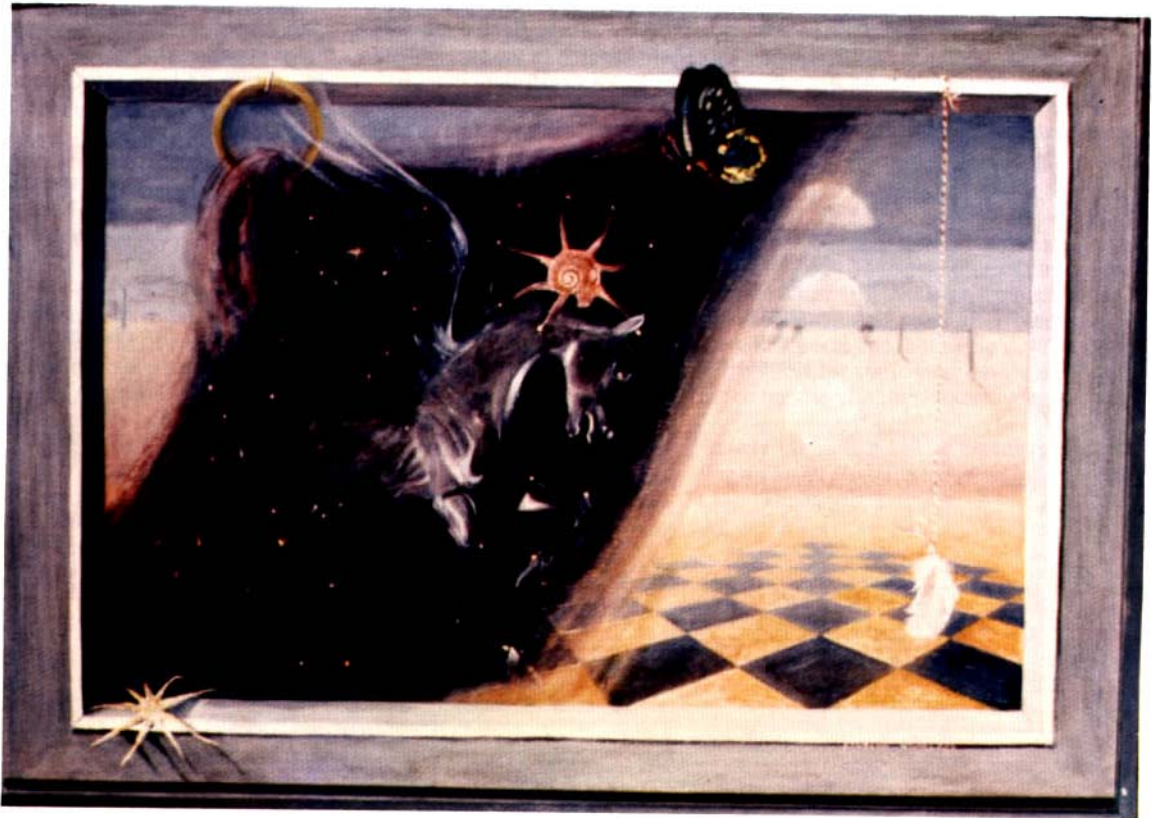
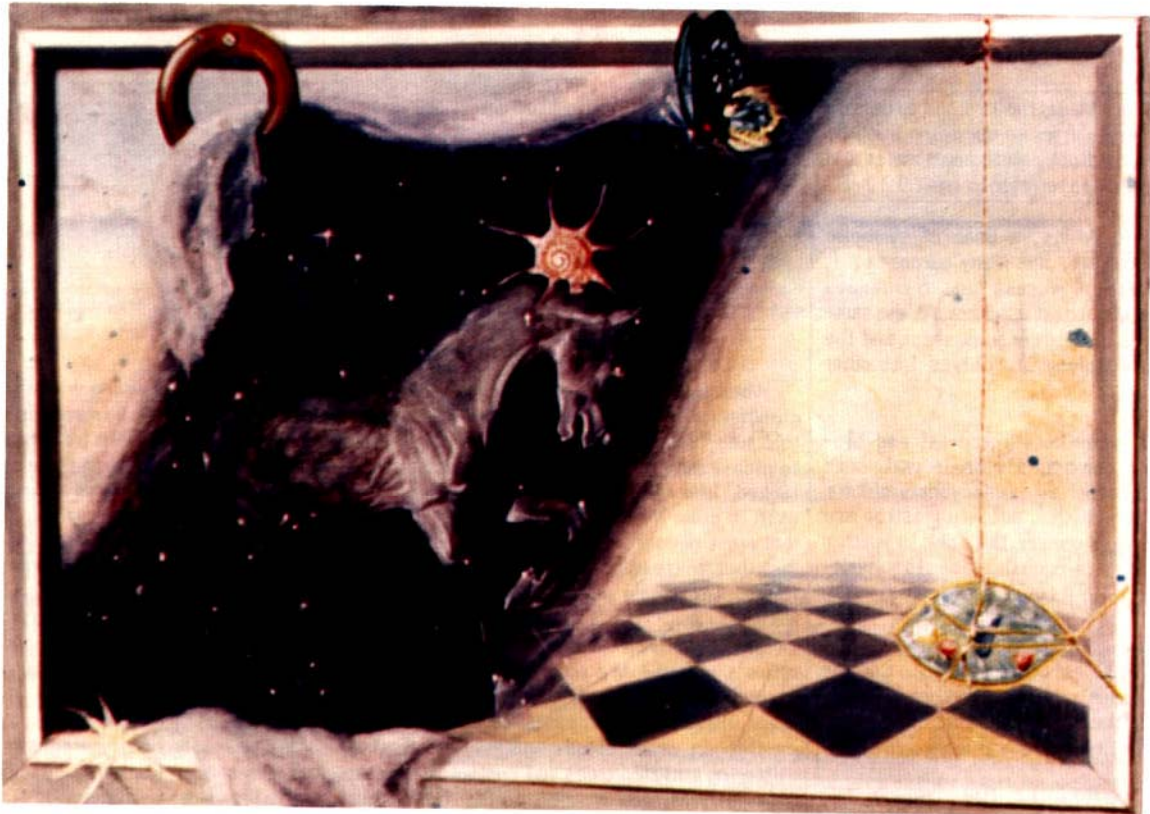


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The upper three rows feature a few of the fascinating terrestrial gastropods, we hope to have some news shortly concerning a new all color guide to at least some of these. The bottom row features two species, normally sinistral (left handed) snails and one in which left-handed specimens are occasionally found. Left to right: *Antiplanes perversa* (Gabb) from the Pacific Northwest; then two *Voluta vespertilio* Linne, one a normal right-hand specimen the other sinistral; then *Neptunea contraria* Linne, from 42 fms. off Oporto, Portugal.





## DREAMS HAVE WINGS

ETHELYN HURD WOODLOCK

(Of Sea and Shore Magazine is proud to be able to present excerpts from an upcoming book by Ethelyn Hurd Woodlock, wellknown artist and shell collector. Please refer to pgs. 132-6.)

*Dreams Have Wings*, a book of symbolic and inspirational art, has many purposes. It shows the creative process and techniques useful to students and art teachers. At the same time it explores cosmic consciousness and the field of parapsychology and delves into other dimensions.

The text is sometimes anecdotal and biographical, but consistently deals with such psychiatric concepts as bio-psychosynthesis (wholeness), bio-rhythm, auto-suggestion and self-realization. However, the book is written for the layman and through the pages is a spirit-lifting element with a trace of whimsy.

The preface is by Bertha Phillips Roger, M.D., former President of the American Society of Clinical Hypnosis, who, like other doctors, uses slides of the paintings done by Ethelyn Hurd Woodlock in her clinical work.

Comments William E. Old, Jr. of The American Museum of Natural History, New York City: "Mrs. Woodlock is one of the most talented people I have ever known. Over twenty-five years ago, she began acquiring shells 'because they were so beautiful', and frequently used them in her paintings. Later she became a full-fledged shell collector devoting considerable time to collecting, arranging, cataloging and studying her specimens. As a side-line, she carved a wooden Glory-of-the-Sea - a famous rare cone shell - which led to an appearance on the television program *To Tell The Truth*.

The Curtain of Night  
falls  
like soft wings  
and silently  
veils the day

Stars appear  
to light  
the soul's path  
in dream flight

When less than four years old, I asked my grandfather if he saw colors at night and he told me, "Yes," but I knew he was only trying to please me. Half a century later, a man who looked like grandfather asked if my dreams were in color? After my, "Of course," he said that most people dreamed in black and white, a fact that amazes me. After seeing color all day long why do people see a black and white dream?

Did my colorful childhood dreams predict an artist's career? My room of long ago had a sloping wall, where before and after sleep, many things floated past: crimson turreted castles on white clouds against a blue sky, glittering tinsel trees and costumed people, spun like painted wooden dolls. Everything was high in the air over my head and some of the clouds were like white horses galloping.

Years later, when my body was too burdened with pain to move a brush, an unfinished painting of an old plaster-cast horse, nicknamed Pegasus, sat on my easel. Behind him was a deep blue curtain hanging in the sky, and stars silhouetted him like a constellation.

THE CURTAIN OF NIGHT had a heavy mahogany ring holding up one end of night while the soul-butterfly hovered over the other corner. A nine-pointed starfish rested on the lower painted inner frame, a seven-pointed star shell, like an enormous crown was over the head of Pegasus and a large stained-glass fish hung from a suspended pendulum cord. There were three horizons with moon shell in various phases trying to explain other dimensions.

Something was wrong with the painting and my body was too sick to reason why. A black and white photo of me in front of it, looked like another-world creature, hollow cheeks, sunken eye sockets, a real mess. It was like those colorless dreams: uncreative, uninteresting, and unfeeling. My dream was lost. As recovery started, the will to paint returned and with it, the realization that the painting had shown my approaching illness. That heavy dark ring needed hope; it had to be light and golden, but something else was still wrong, something else was needed.

We need wings to fly. Pegasus needed wings and wings mean feathers, symbols of truth. It took a long time to change the fish into a light airy feather: the whole foreground and to be repainted, but those wings flew onto Pegasus in a few minutes.

A poem can never happen unless a painting is nearly finished and right. There was no poem: a word was needed for the complete idea, just as something had been needed for the painting. It took so long, too long, Pegasus had been earth-bound like a ghost. The poem and Pegasus needed wings.

I had forgotten that those childhood dream horses were in the air. They had wings. And while this body sleeps, my soul flies far away in dream.

DREAMS HAVE WINGS.



## GEMINI TO GABRIEL

As time flies  
 we change  
 day by day  
 fading away  
 into purple  
 shadows  
 of dark night  
 where we become  
 a BRIGHTNESS  
 stranger than  
 all light

The soul  
 never dies

## IN A FLASH

Nearly halfway through my self-portrait series a surreal painting, GEMINI TO GABRIEL became one of the better likenesses and the best idea.

Many ideas are born with a flash; the completed idea is in the mind's eye. Some ideas may be worked up fast, others take months or even years. This one took months. We were ten-weeks-with-no-bathtub, the plumber was having fits. We were spending so much money on the renovation but we had chosen the smallest mirror in the catalogue. (I wanted to see as little of me as possible.) That cheap mirror put all of the down lines and perhaps added a few besides.

Looking into the antique Ogee mirror in the parlor, my face reflected back and forth in the old mirror clock on the marble mantle opposite. This was the small flash. The real one came as I went past that cheap bathroom mirror that emphasized the wrinkles, and the thought flashes, "Girl, you are growing old." That did it. My mind could see this face growing older and older in mirrors that went back and back.

Everyone thinks he sees a real Ogee frame on the painting and cannot believe fingers that feel only paint. Hovering betwixt frame and time is a Blue Morpho butterfly, a symbol of the soul. A spotted shell, *Scaphella junonia* Shaw, becomes a fossil as does the blue bird's egg. A mist flows around the cord holding the key which does not reflect. Neither does the pendulum bob because both are symbols of time. Are those vapors around the cord moving into the distance or coming forward? Who knows which way time travels?

The clock hands extending out on the frame are in this world and not in the same plane as the painting. The hands are mystic purple, but when painting them, I did not know the esoteric meaning of color. I only knew that they had to be different from "in there". The mirror image is from another world for everything is reverse and backwards. If one were to walk into that world, he would be bumping into walls that are on the opposite side of the room from our world. He would become totally confused and lost. In that world, this face is growing older and older. It is becoming my own ghost!

In those days I did not understand the spirit or the ghost world but a friend solved the problem with four words, "Ghost walk, spirit fly". The ghost is confused as he is still on the earth plane, earth-bound. He does not realize that he had died and that he belongs in another dimension.

There are many kinds of spirits. When people used to ask, "Where do you find your ideas?" I always replied, "From the ghosts of the Old Masters." Growing tired of repeating this, I invented a wee green man who sat on my shoulder. Friends still smile about his telling me what to paint. And now, after reading about the ghost world and those who walk, I understand about the spirit force within each person which has its visible shining aura.

Now I know that behind my ideas is a being like an angel, helping me. And I must always say, "Thank you".





# PEARL OF THE PACIFIC

DR. M. FRANK KING

In some sort of fit of impetuosity I decided to go on the Of Sea and Shore Micronesia Tour of 1976. To try to get over the sinking feeling that came when it was cancelled, I dropped by the local travel agency to see if anyone ever went by himself. The price was so right that in a day or so, wife Dot, sons David (10) and Steven (8) and I were booked for three weeks of island hopping. We chose June to try and beat the rainy season. With all the luggage we could muster full of peanut butter, Tollhouse cookies and Hawaiian Punch, we headed for Honolulu to meet our "tour" which turned out to be us. After a short stop for refueling on Johnston Island, we were deep in the Trust Territories of the Pacific, where they boast, "more islands than tourists".

Air Micronesia, a subsidiary of Continental Airlines, has altered a couple of 727's to land on coral airstrips and it provides a great service to natives and visitors alike. For the first time since flying in to Tikal, Guatemala, we shared cabin space with cargo, though this time there were no pigs or turkeys. Through 19 takeoffs and landings we got to know the equipment and personnel pretty well. Indeed, the airline was the only thing that stayed the same throughout the trip. Each day and each place proved to be a unique adventure.

We can never forget the boat ride to Nan Madol on Ponape, when the guide got lost and the hotel forgot to send lunch. Finding bullets in every crevice on the reef gave us sobering reminder of the bloody battles on Saipan. Snorkeling among the rock islands of Palau offered unsurpassed beauty and the biggest bag of shells of the trip. We attended church where only Yapese was spoken and the ladies wore only grass skirts and chewed betel nut. Guam was devastated by Typhoon Pamela. Finally, before our return home, there was the fabled Truk Lagoon with its wrecks and collecting on Paradise Island.

I could never choose a favorite, but Robert Louis Stevenson's "Pearl of the Pacific", Majuro, has to be the most memorable. There is an indescribable feeling of excitement that goes with the first visit to an atoll. Even a "civilized" island paradise has an aura and charisma that only a totally unromantic person could escape.

Majuro is indeed a spoiled Eden. Located in the Marshall Islands, it is a hub of commerce for the area. The debris of everything that has worn out since WWII can be seen between the new airport and the capitol city of Rita, ten miles away. A radio station and movie theatre give the islanders a taste of mainland progress, while the ubiquitous coconut palms provide the link with the past. While the reef in front

of town is covered with people fishing at the afternoon low tide, canned tuna is the favorite food.

On arrival at the shiny new airport, we found it bustling with activity. The parking lot was full of cars. We soon learned a lesson that stood us well the rest of the trip. By the time we got through customs and retrieved our luggage, all of the taxis were gone and we were stranded ten miles from our hotel and there are no telephones. Fortunately, this happens often enough that the manager of the terminal makes the rounds in his truck and takes stragglers to town. An air conditioner in the window made up for the rustic accommodations. The hotel manager just happened to have a small station wagon for rent at \$16 per day and by bedtime we were prepared for whatever the wild Pacific might see fit to deliver up to us in the way of mollusks come the morning low tide.

Majuro boasts the longest road in Micronesia -- 30 miles. The Seabees used the abundant coral rock to link the narrow islands around one side of the 24 mile long lagoon, making the residents' old faithful outrigger something less than a necessity. Daylight found us with our eyes straining to see that perfect place to collect. Beyond the airport, at milepost 13, we saw it -- an exposed stretch of reef with rocks to turn and a place to park. With pounding pulses we swarmed over the slippery surface and suddenly we were busily gathering *Monula*, *Bursa*, *Mitra* and *Conus*. *Cypraea moneta*, *C. annulus*, *C. caputserpentis*, *C. isabella*, *C. arabica*, *C. maculifera* and *C. ventriculus* were found until the tide turned and we had to cross the road to the lagoon side where we found *Cypraea arabica* and *C. mauritiana*. Every rock had its eel; some grey and some green spotted. Beside slate pencil sea urchins, there were urchins with bits of coral attached to the ends of some of the spines. I almost picked up a stonefish. We gasped at the grotesque shapes of the sea cucumbers. Come mid-morning, we were ready for a meal and a rest. We were too tired for much more shelling that day.

Sunrise found us headed for Laura, at the other end of the road. The book described a village and a store which we failed to see. Instead we emerged on a white beach as unbelievably beautiful as the one in the brochure. Out came the snorkels and fins and in a flash we were out among the huge coral heads. Except for *Lambis lambis*, shells were elusive, but the brightly colored tropical fish dazzled us until we were exhausted. On the beach we found a great gathering of children. It was the last day of school and every first and second grader on the island was there for a picnic. Into the water they went, clothes and all. The King

children became the star attraction. Steven's soft white skin was so unbelievable to them that they could not resist touching him. He finally retreated in tears.

David befriended Mickey, a sixth grader who came along to help. He was fluent in English. After explaining why his uncle had so many skin scars and other bits of island lore, he learned that we were from California. He became excited and asked if we knew Jerry. Not being sure whether he meant Governor Jerry Brown or President Ford, we asked, "which Jerry?". He looked hurt and answered, "My dad. He has been working in California for the last 6 months." If he knew everyone in Majuro, it must have seemed reasonable to expect us to know everyone in California.

I felt confident as I snapped picture after picture with my new Nikkomat. Nothing is more photogenic than a bunch of dark-skinned kids at play and the backgrounds were spectacular. The low point of my career came when, after the trucks were loaded and gone, I found the film had not advanced and I had nothing but a memory.

Shelling was about over, but shopping was great. The boat carvings were the best we saw in all the territories. Missionaries and Peace Corps workers had taught the people to weave mats and dishes using pandanus leaves and coconut fiber along with cowries, and they were superb. The hard part was deciding what not to buy.

Restaurants had fairly good food at the most reasonable prices we found in Micronesia - \$1.95 for an Australian steak. Small grocery stores had bread and staples. The Eastern Gateway Hotel may have been nicer, but the Adijak, being downtown, had many advantages.

On our last day, check in time at the airport was 10:30 a.m. This gave us time for one more sunrise shelling trip and some last minute shopping. It was OK to leave our car in the parking lot; someone would get it eventually. We felt that two days had gone by in a few minutes as the 727 sped down the runway which shared the narrow island with the rain catchment surface for the island's water supply. Banking to head over the Pacific for Ponape and more excitement, we could see our white beach at the end of the road, empty and inviting.

HOW ABOUT AN ARTICLE  
ON YOUR SHELLING TRIP?

# The Saga of Rosey the Euglandina

KAY REISSING

The chill November rain clearly indicated that winter was fast approaching; but then the shelling should be considerably improved, or so I theorized as we trudged along looking for snails. Long weekend trips from Atlanta to Florida have become a pleasant way of life for my family. On this day, however, my seven year old daughter had retreated to the car, and my husband was scowling at the sand spurs, mixed with sand, mud and what-all that he had collected on his pants legs. Teddy, my twelve year old son, and I had yet to give up searching, and his cheery, "There's a lot of dead snails over here!", made me pick up my boots a little quicker. Then there it was, right on a grass blade 12 inches off the ground, the carnivorous *Euglandina rosea*, about 50mm in length, and sound asleep.

I was really congratulating myself on my persistence amid adversity about locating the snail when my not-to-be-outdone son came over with an even bigger (60mm) *E. rosea*, later named Rosey.

Upon introduction to the other *Euglandina*, Rosey made a prompt overture toward eating it by billowing out her stomach. Two cages were hastily devised until we returned home and put them into separate terrariums.

The winter passed uneventfully, local snails and slugs supplying the food when the peri-  
\*Atlanta, Georgia

winkles that we had collected ran out. In April, however, the smaller *Euglandina* stopped eating. Shortly thereafter Rosey stopped as well. Pooling our opinions, we decided that the two snails were love-sick! The smaller snail had gone without food so long that I feared for its health anyway, and I decided to put the two snails together even at the risk of losing the smaller one.

Carefully I put the smaller snail in Rosey's terrarium. Immediately both snails started coming out of their shells, and they promptly approached each other. Fearing the worst, I watched for the curling of the moustaches (really elongated lips) and the billowing of the stomach which we had observed as Rosey's behavior when on the attack. Neither behavior appeared; instead the two snails approached each other slowly and began rubbing the right side of their necks together and then gently twisted their necks around each other in a hugging embrace. The bluish sex organs appeared and interlocked.

The affair went on for eight hours even though I pulled the snails out of the fish bowl to take their picture, a local afternoon bridge group came over and watched, and numerous children from the neighborhood filed through the kitchen to get a free sex education course. With dinner time fast approaching, my housework sorely neglected, and a hungry husband on his way home, I decided to separate the lovers and

return them to their terrariums. (A friend who also tried this experiment did not separate her pet snails after they had mated, and one was eaten by the other.)

A week later the smaller snail laid about 20 pearly white eggs (4mm, oval) in her cage while Rosey didn't lay hers until about three weeks later. Perhaps Rosey was slower because of her next adventure. My son entered Rosey in the Chattahoochee Nature Center Pet Contest, as the most unusual pet. Rosey took the second place ribbon, while first place went to a very showy rooster. Rosey's day was to come, however, for six weeks later her batch of snails hatched out and adorable pea-sized transparent snails, complete even to the moustaches, crawled up the sides of the terrarium.

Rosey was removed from the cage, and during July went to visit a friend who had numerous live snails that needed to be cleaned while I was on vacation. When I returned only three babies had survived the cannibalism in the terrarium, and they have now been moved to a separate terrarium for baby snails.

Rosey's cage has been cleaned for the winter and a large stock of mountain snails (*Mesodon normalis* Pilsbry) have been collected to feed her and her friend through the cold months. It will be interesting to see how long Rosey lives and if her babies will grow to maturity and further add to the Saga of Rosey the *Euglandina*.



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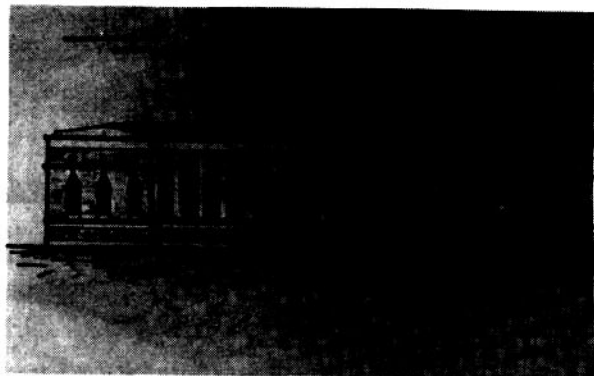
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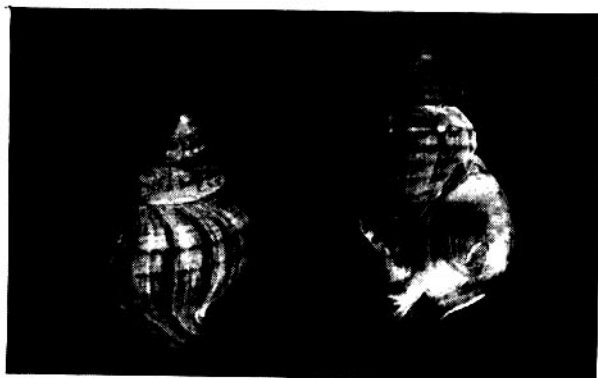
## Some Notes on the Zoological Institute Academy of Sciences, U.S.S.R.

ROBERT R. TALMADGE



Photograph of a sketch of the Zoological Institute, Leningrad

Sketches and photographs by the author.



*Neptunea beringiana* (Middendorff); Middendorff's type locality, Okhotsk Sea. Named for Vitus Bering, not the Sea of that name. These are from the Bering Sea. Homeotypes.

For most Malacologists working on the Molluscan Fauna of the eastern north Pacific basin, the names of Johan von Eschscholtz and Alexander Theodore von Middendorff have special meaning. To a lesser degree Georg Wilhelm Steller is known, but chiefly as a vertebrate zoologist, with one exception: his name being utilized for the largest of the chitons, *Cryptochiton stelleri* (Middendorff, 1846). It is common knowledge that these men worked with, described and named a great number of our north Pacific marine fauna, when this region was Russian-American, under the jurisdiction of Alexander Baranov, Factor of the Russian-American Company. It may come as a shock to some to learn that Alaska south to northern California (Fort Ross in Sonoma County) was considered to be Russian-American. Hinds, 1846, in the *Zoology of the Voyage of the Sulpher*, referred to "Russian Bodegas" for the locality of his *Tellina bodegensis*. However, the region of Russian-America had shrunk to only Alaska when the area was purchased in 1867. Humboldt Bay, on the extreme northern California coast, was visited between 1802 and 1811 by ships of the Russian-American Company and the present Humboldt Bay was called the Bay of Indians, with the Entrance of Rezanov, for the outer reaches. There is some strong indication that Eschscholtz was on at least one of these voyages. So, for a number of years as I sought our "Type" specimens from the north Pacific basin to examine and photograph, I had dreamed of working with the original material of Steller, Pallas, Eschscholtz, Middendorff, Rathke and Wroblewski. In 1977 this dream came true.

One morning, late in May 1977, I stood in front of a large double door on the east end of an imposing stone building on the north embankment of the Neva River at Leningrad, U. S.S.R. This was the Zoological Institute,

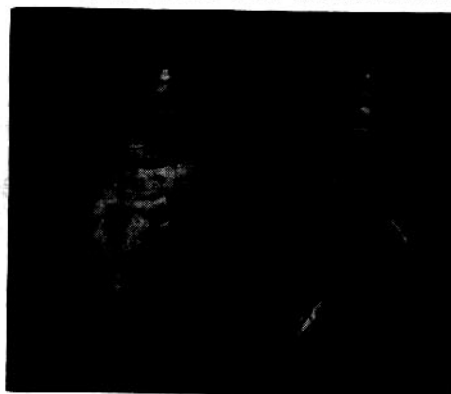
Academy of Sciences, and the Intourista Agency at the Astoria Hotel, my home away from home and a story in itself, has contacted the Institute with word that I would be there on this morning. I entered and identified myself to the lady at the entrance window, and within a few minutes a dark haired, relatively young man in a laboratory coat greeted me. This was my first meeting with Dr. Alexander N. Golikov, a specialist on the genus *Neptunea*, and whom I had heard of for several years.

The Academy of Sciences was established in 1725 by Tzar Peter Romonov I (Peter the Great). The original staff was, for the most part, German (this was prior to Bismark's unification of Germany under Prussia), with one notable exception, Michael Lomonosov. The separating ridge, dividing the Arctic basin into two parts is named for this man, the Lomonosov Ridge. I am not familiar with the early records, but Steller and Peter Simon Pallas

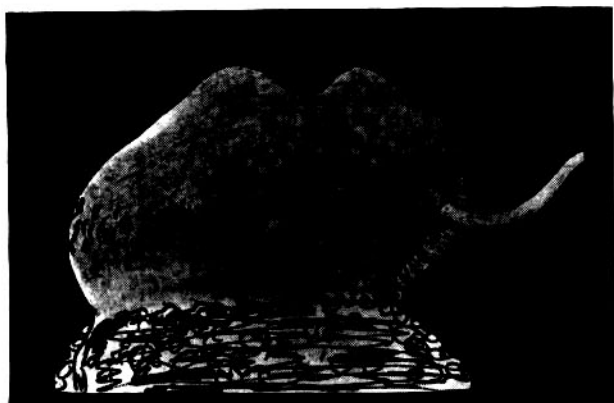
were on the staff of the Academy. The present edifice which houses the collections was begun in 1823, and by 1896 the present display and research building was completed.

There are several major halls or a continuation of a super hall with major displays of mounted birds, mammals and fishes. There was a special Hall of Insects under construction at the time of my visit and it appeared that the display of Cetaceans was also in the process of either reconstruction or construction. There was an entire section for invertebrates, divided into separate showings based upon Phyla. I was both interested and impressed by the Mollusca, Coelenterata, Echinodermata and Porifera, as locally I have studied all of these from the deep water fisheries. There was a habitat group of the species found in the Arctic Seas as well as one from a coral reef.

In the late 19th Century the frozen remains of a Hairy Mammoth, *Mammuthus primigenius*, was discovered in the permafrost of Siberia. The frozen body was dug up, thawed, skinned and the skin and skeleton brought to then Petrograd, where it was mounted and placed on display at the Zoological Institute. The specimen is still there, and mounted in the "sitting" position, in which it was found. Evidently, the elephant had either been hurled or fallen into a pit or crevice in the permafrost sometime between 42 and 45 thousands of years ago. Nearby there are some additional Pleistocene mammals or their parts. A "freeze dried" Wild Ass was noted in one case, and two heads, the hind leg and one forefoot of the Hairy Rhinoceros were on display in another case. Two Snow or Siberian Tigers are mounted for close-up inspection as are two Snow Leopards from north of the Pamirs. The collection features the fauna of the Euro-Asian land mass, but there is a small unit of African Mammals, plus



*Neptunea borealis* (Philippi) = *N. communis* (Middendorff, Golikov) = *Fusus* (Tritonium) antiquum communis Middendorff. Philippi's Type locality = Spitzbergen. Middendorff's Type locality: Barent's Sea. Homeotypes.



Sketch made from color slide of *Mammuthus primigenius*, from the permafrost of Siberia. Mounted in the Zoological Institute, Leningrad.

a nice Penguin series taken by Soviet scientists in the Antarctic during the Geophysical Year of research.

I was soon set up with my camera equipment and notebooks on a table in the office shared by Dr. A. N. Golikov and Dr. I. M. Likharev. Dr. Likharev is a specialist on land and fresh-water mollusca of Russia, but spoke only Russian and French. I had left my French behind me when I left that country in 1945, and had no Russian, so communications were a bit difficult. However, I did learn that evidently our land snail fauna, Pulmonates, never were much in contact between the extreme Pacific coasts. Only a very few genera and no species were common to the two sides of the Pacific.

Dr. Orest A. Scarlato, Director of the Zoological Institute, is a malacologist and is perhaps the authority on the Pelecypoda of the Far Eastern Seas as well as the Arctic Seas of the Soviet Union. I learned that we have many genera in common and quite a few species may be found on either side of the Pacific Basin, with or without separate taxa applied. This is pretty good evidence of a common ancestry, the same as with the Gastropoda. Dr. Scarlato presented me with a copy of the *Flora and Fauna of Peter the Great Bay*, which is well illustrated and I had learned to pick out place names in the Cyrillic, which added with the Latin of the taxa, made this an interesting publication for my library.

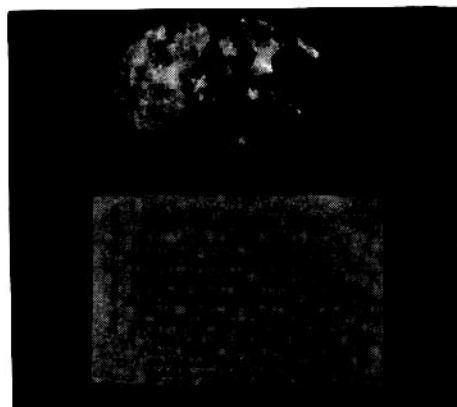
Dr. Alexander N. Golikov, Head of the Marine Research Laboratory, is well known for his publications. His monograph of the *Neptunea* of the U.S.S.R. (1963) is the latest such monographic work on that genus. This publication is well known in Alaska, Canada, Japan, Iceland, Denmark and England, as well as here in the southern 48 states. Unfortunately, this work has never been translated into either a German or English edition. He is also well known for his studies on the isothermic distribution and possible speciation of marine mollusca. We had several chats on this subject as I too had noted factors covering temperatures and distribution plus shell variations in several parts of the world. One feature that we dis-

cussed are the sills, elevations creating an underwater dike, which impounds extremely cold waters with a separable fauna from that of the open sea nearby. Usually these are found in channels or fjords, but Dr. Golikov had found two in the northern and western part of the Okhotsk Sea.

All these conversations took place as the staff continued to bring in and take out "Type" specimens as they were photographed. Lunch was at the cafeteria of the Zoological Institute and each time we visited this place, we utilized a different route to see and visit other departments and people.

The chitons were under the curatorship of Dr. Boris I. Sirenko and we also had several interesting chats. In 1971 he was with a party who visited the Monneron Islands off the southwest coast of Sakhalin. While there they discovered a small population of *Haliotis discus hannai* Ito. These islands, at the extreme head of the Sea of Japan, or at the southern end of the Tatar Straits, are considered to be in the cold Amur Current from the north. However, it is now thought that a current from the Okhotsk via the La Perouse Straits, forces the remnants of the warm Tsushima Current from the Sea of Japan away from the shore and it ends up in the Monneron Islands, warming the water sufficiently to allow a small breeding population of *Haliotis* to survive. To my delight, I was presented with one of the specimens taken in 1971. We also "isolated" one specimen of a lot of six, preserved in a jar with alcohol. These were the originals of Middendorff's *Amicula pallasii*, 1846, called *Chiton pallasii*. The "isolating" of a Lectotype was easy, as most of the specimens during the past 131 years had deteriorated, and we segregated the only whole specimen to photograph. Middendorff's *Chiton stelleri*, *Cryptochiton stelleri* (1846) is about 10 CM in length (4"), and is badly distorted. The specimen was taken on Kamchatka.

I met Dr. A. I. Kafanov, a specialist in Cardium, and felt that I had met him previously. During 1976 in København, while working with the Types in the Zoologische Museum, I



*Haliotis discus hannai* Ito  
range extension

had seen a set of two specimens of *Clinocardium ciliatum* (Fabricius), which Dr. Kafanov had worked on, designating the larger specimen as the Lectotype. A few days prior to my visit to København, I had been working with series of this *Clinocardium* at Reykjavik taken in Fossvögur Fjord. Hence my interest in that Type lot.

So hour by hour, line by line, species by species, I had whittled down my list of Types to examine and photograph. There were some that I failed to see, as such could not be located. One of these was the small *Tritonium luridum* Middendorff, *Ocenebra lurida* (Middendorff). Locally, I find it in association and feeding upon the flesh of the Great Chiton, *Cryptochiton stelleri* (Middendorff). The data states that the specimens came from Sitka, Sitka, Sitka (various spellings on original data). I looked in vain for the older, original, or official name Novaya Arkhangel'sk, but could find no specimens with this locality.

Finally, it was time to say a final "Thank You" and "Good Bye", and on a wet, chilly, late afternoon I found myself awaiting the In-tourist Car to take me to my hotel. A final handshake and I was away to Moscow, London and on home. The visit was well worth the energy and time, and I would like to repeat it some day.

Photographic note: both weather and rules made photography in the vicinity of the Zoological Institute rather difficult. So, the sketch was made from a rather dark print on a brochure on the Zoological Institute (in Russian).

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Curator of Natural History, College of the Redwoods, Eureka, California 95501.

Photographs are by the author.



## SOME SHELLS FROM SACHALIN ISLAND, THE OCHOTSK SEA

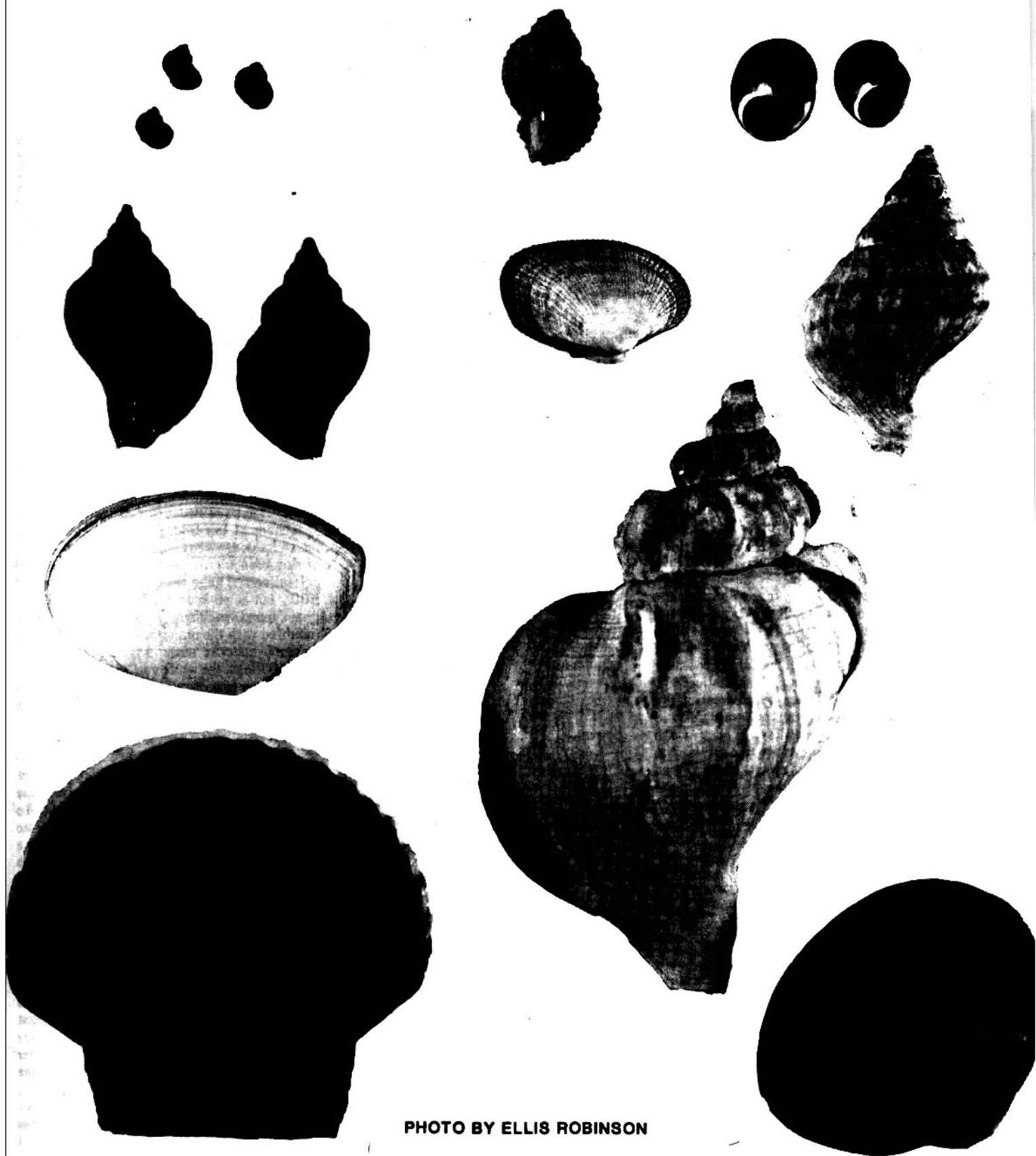


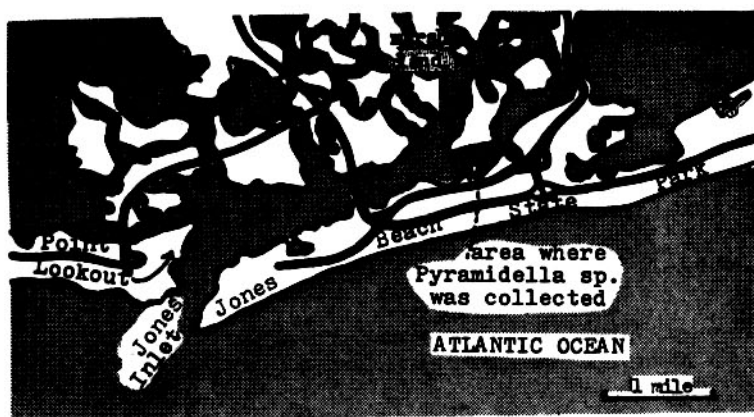
PHOTO BY ELLIS ROBINSON

1. *Littorina kurila*; 2. *Nucella heyseana* (Dunker); 3. *Tectonatica aleutica* Dall; 4. *Neptunea arthritica* Bernardi; 5. *Callithaca adamsi*; 6. *Neptunea beringiana* (Middendorff); 7. *Tellina lutea* Wood; 8. *Pecten yessoensis* Jay; 9. *Neptunea soluta costulata* Golikov; 10. *Spisula sachalinensis* (Schrenk). Numbers 5 & 6 are from Terpenija Bay; 8 & 9 labeled just Sachalin Island; the rest from Anivsky Bay.

SPECIMENS DONATED TO OF SEA & SHORE MUSEUM BY JAROMIR NEMEC OF CZECHOSLOVAKIA

# New & Unusual Species of Shells on Long Island

RICHARD GOLDBERG



Map of area of Long Island, New York dealt with in article.



Pyramidella species

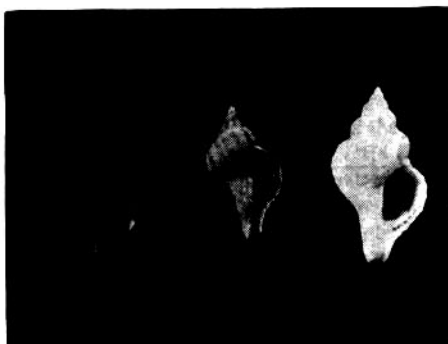
In a continuing survey of shells around Long Island, New York, one of my hopes was to find a new species never recorded from this area. My hopes came true on one of the Long Island Shell Club's field trips in June, 1977.

Active member and micro-shell fanatic Linda Springer turned up two dead *Pyramidella* species in the beach drift at the Jones Beach Fishing Station, on the south shore of Nassau County. The fishing station is a series of piers on the bay side of Jones Beach. On either side of the piers are narrow stretches of beach where much collecting is done by local collectors. The *Pyramidella* sp. were found west of the piers. Farther west of this collecting site is Jones Inlet, which connects the open ocean to the bay side. I believe these two shells must have washed in through the inlet and deposited themselves here. The specimens are identical to the illustration of *Pyramidella candida* Morch in Wamke and Abbott's *Caribbean Seashells*, Dover Edition, Plate 28 fig. D. The northern most range of this species or any related species is North Carolina. Until this species is found live on Long Island, if ever, I will hold to the theory that they had washed in through Jones Inlet.

After being shown to M. K. Jacobson, Associate in Malacology to The American Museum of Natural History, and co-author of a book on the shells of New York City, he stated that he had never found any species in the Genus *Pyramidella*, in his over 20 years of collecting in New York. A positive identification on these shells is important in determining its validity in reporting a range extension of the species. The specimens have been sent to Dr. Abbott at the Delaware Museum of Natural History for further verification on my identification.

Another find on Long Island, not new, but interesting, is a white (or albino?) form of

*Urosalpinx cinerea* Say. This variant has been called *Urosalpinx cinerea aitkiniae* by Silas Wheat of the old Brooklyn Conchological Club in 1913. In Vol. 2, no. 2 of The Brooklyn Institute of Arts and Science's *Bulletin*, Wheat wrote of a new variation of *Urosalpinx cinerea* collected by Miss Helen J. Aitkin in Hempstead Bay, Long Island, on June 27, 1913.



Three color forms of *Urosalpinx cinerea*

He went on to say, in the *Bulletin*, "Shell differing from typical *U. cinerea* in color which is pure white or rarely with a pale flesh tint within. Two of ten specimens are faintly tinted; the others are all glistening white within, and of a dead white on the rough exterior. Animal not observed." I was able to observe the animal of the specimen I found at North Haven (see Vol. 8, No. 2, *Of Sea and Shore* describing this locality) on July 5, 1977. The only color observed on the animal or its shell were the black eyes on the tentacles and the ocre-colored operculum. The rest of the animal was white. When cleaned for my collection, the liver was observed to be a grayish white, much lighter than a normal specimen.

Wheat concluded the article saying, "Other specimens taken in the same locality are dark purple within, the majority of them spirally

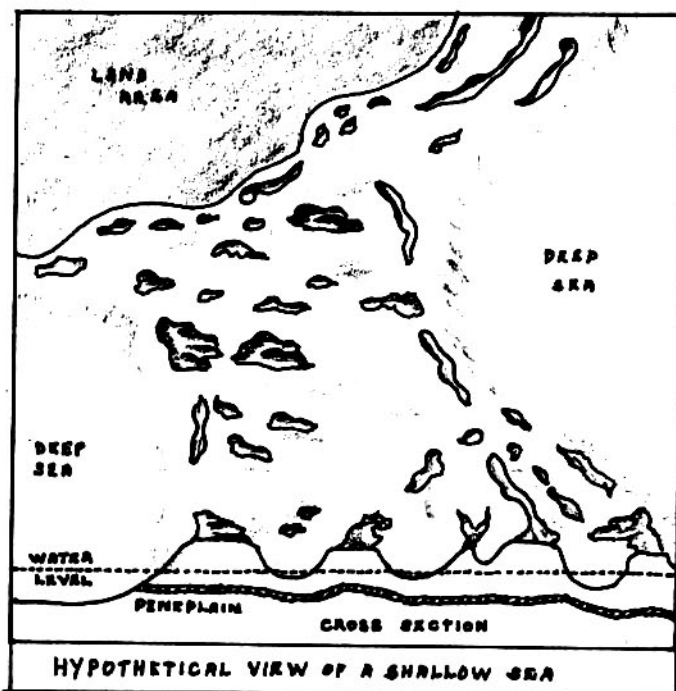
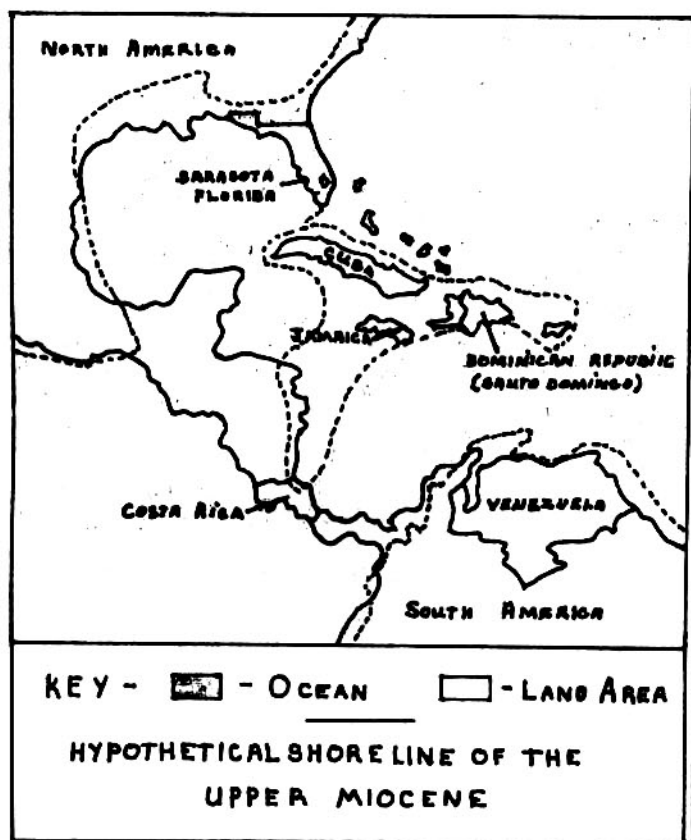
banded, having two yellowish zones separating by purple into three zones one of which is peripheral." Such was the case when I found my specimen. I had counted well over 500 specimens at low tide. The only variants were the white *U. cinerea* and a more common variant of pure orange color with the animal of normal coloration. These were two variations out of 500, but at other localities on Long Island, I have found specimens that look as if they had interbred with the orange and white variations, so a sub-specific name is probably not valid. None-the-less, the white variation of *Urosalpinx cinerea* Say is quite a striking shell, worthy of a position next to any exotic muricid of the world.

I had reported, in the Winter 1976-77 issue of *Of Sea and Shore*, about two separate incidents of finding live *Littorina irrorata* Say at Plumb Beach, in Brooklyn, New York. To recap the incident, on April 24, 1976, two specimens of *L. irrorata* were found during a Long Island Shell Club field trip to Plumb Beach, in a salt marsh behind the beach area. Two weeks later a club member and myself went back and found two more live specimens. These four, plus one other report of a live specimen in this area a few years earlier, were thought to be (by me) the only live collected specimens on Long Island. Wrong! In a letter from fellow club member Cherita Stark, she informed me of another live taken specimen, at the Town of Hempstead Marine Nature Study Area in Oceanside, Long Island. The letter said, "... To get the details, I made some phone calls and contacted Lawrence A. Kelly, who was leading a group of school children when one of the students found and showed him the *Littorina*. It was on a blade of *Spartina alterniflora*. He recognized it as out of its normal range and searched for others that day and after, but never found another, alive or

Continued on page 150, column one

## A Miocene Melongena in Florida?

JEANNE EICHLING



It has long been assumed that the geologic age of the Caloosahatchee and Tamiami formations in Florida were of the upper Tertiary period. The Caloosahatchee formation was considered to be Pliocene (1 - 10 million years ago) and the underlying Tamiami formation was considered to be Miocene (10 to 21 million years ago). Recent studies now seem to indicate that the Caloosahatchee and related formations are considerably younger, being no older than the Pleistocene period (10,000 to 1 million years ago). There is little authoritative written material concerning this new theory; therefore, this article is being written espousing the older Pliocene, Miocene belief. It is not meant to judge the true age of these formations as that final decision will be made, by knowledgeable scientists, after considerable research.

In southern Florida the geologic formations of the upper Tertiary period are composed of ocean sediments. They generally lie near the surface where they are thinly covered by sand and shell deposits of the Pleistocene and Recent periods. The two formations of the upper Tertiary period which are of specific interest to this article are the Caloosahatchee formation, here assigned to the Pliocene epoch and the Pinecrest facies of the Tamiami formation, assigned here to the Miocene epoch.

### 1. Caloosahatchee formation: (Pliocene)

The beds of the Caloosahatchee formation are composed of sand, shells, quartz sand and silt which combine to form a soft white marl. The Caloosahatchee marl lies near the surface throughout south Florida and is exposed in small sections west of Lake Okeechobee. These beds are variable in depth ranging from one to fifty feet. The character of this formation indicates that the Caloosahatchee marl was deposited in a delta region flowing south into a shallow sea. In most areas the fossil mollusks are exceedingly abundant. They are usually in excellent condition, are white in color and chalky in composition. They are closely related in evolutionary development to those found in the Pinecrest beds of the Tamiami formation.

### 2. The Pinecrest facies - Tamiami formation: (Miocene)

The Pinecrest beds are composed mainly of clay-like marls, silty sand, phosphatic sand, shell marls and sand which combine to form a soft, phosphatic, argillaceous, gray marl. The Pinecrest beds extend north and northwest of Lake Okeechobee and lie just below the Caloosahatchee marl. They are believed to be approximately ten feet in depth. These beds were deposited close to an estuary as is evi-

denced by littoral deposits. The location, shape and composition of these deposits show they were near large sand bars and sandy beach ridges in a shallow sea. Fossil mollusks are abundant in most areas. They are in fair condition, usually showing evidence of erosion and most are black, gray or mottled in color. Many species found in these beds are identical or closely related to known Miocene species found elsewhere. (Continued on next page.)

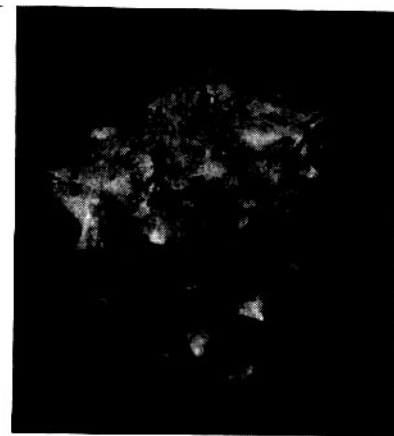


Photo #1 - *Melongena consors* Sow.  
Sarasota, Florida Miocene  
Photo by the author.



North of Sarasota, Florida the Pinecrest beds have been exposed in a pit being excavated by heavy machinery. In the northwest corner of this pit many hundreds of gray and mottled gray *Melongena* were found. *Melongena* were not found in other areas of the pit, giving rise to the possibility that these shells were a part of a larger population which composed a colony.

The Sarasota fossils appear to be *Melongena consors* Sowerby. This identification presents a problem, however, as many scientists believe it is highly unlikely that *Melongena consors* Sowerby existed in Florida. This *Melongena* is known to be found in the Miocene formations of the Dominican Republic, Jamaica, Cuba, Venezuela and Costa Rica; being abundant in Venezuela and uncommon in Costa Rica. It is the opinion of several experts that it also extends throughout most Miocene formations in the Caribbean, but its occurrence in the Pinecrest beds or the Caloosahatchee marl of Florida is doubtful.

The original description of *Melongena consors* was printed in the *Quarterly Journal*, Geologic Society, London, Vol. 6, p. 49, 1849. The fossil described by Sowerby in this journal was from Santo Domingo, Dominican Republic. This publication was unavailable. After several letters, trips to a local university and much reading and comparing, the Sarasota shell is definitely not *Melongena subcoronata* Heilprin. It appears identical in respect to descriptions of *Melongena consors* Sowerby, i.e. A.A. Olsson, *The Miocene of Northern Costa Rica*, page 284, plate 12(1), and therefore seems almost certain to be that species.

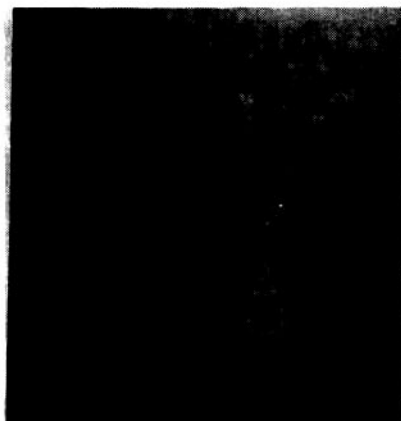


Photo #2, left: *M. consors*, Miocene  
right: *M. subcoronata*, Pliocene

If the Sarasota shells are *Melongena consors* Sowerby, and they seem certain to be, the question arises as to how they could have found their way to the Florida peninsula. Some understanding of the conditions of Florida and

(1) Olsson, A. A., "The Miocene of Northern Costa Rica", *Bulletins of American Paleontology*, Vol. 9, No. 39, Paleontological Research Institution, Ithaca, New York, page 284, plate 12.

the Caribbean Islands during the upper Miocene is necessary. During the ancient Paleozoic period an arc of volcanic mountains existed where southern Florida, the Caribbean Islands and portions of Central America now exist. After millions of years these mountains were worn down to a peneplain which sank beneath the sea. Sediments, mostly limestone formed from the accumulation of shells and skeletal material of marine animals, were deposited on the peneplain. These limestone layers then arched causing the area to rise above sea level. Erosion took place and after more millions of years a near level plain was again created. During the upper Miocene this plain became partially submerged forming marshes and lagoons in a very shallow sea over the Florida peninsula and Caribbean Islands. These conditions would make it plausible that, in some manner such as ocean currents, floating debris, storms, etc., *Melongena consors* could have made their way to a lagoon or marsh near the present-day Sarasota region.

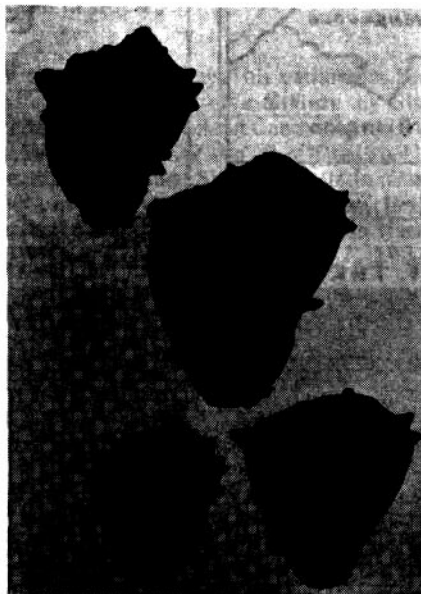


Photo #3, upper: *Melongena consors*; center: *M. subcoronata*; lower left: *M. melongena* & lower right: *Melongena patula*.

The *Melongena consors* of the Miocene can be traced into the Pliocene of Florida. Occasional specimens have been found in the Caloosahatchee marl in areas north and west of Lake Okeechobee and in the rubble of the Caloosahatchee formation located in the northwest section of the dike around Lake Okeechobee. After the lower Pliocene, this form of *Melongena* seemed to die out here leaving Florida to *Melongena subcoronata* Heilprin and eventually to the Florida *Melongena corona* complex. The Pliocene form of *Melongena consors* differs from the Miocene, having a more strongly angulated shoulder and a shorter spire. Although the consors did not survive past the early Pliocene in Florida it thrived in the Caribbean and is the evolutionary ancestor of the Recent *Melongena patula* of the Pacific and the *Melongena*

*melongena* of the Caribbean. It is believed that members of *Melongena consors* entered the Pacific through the Isthmus of Panama which was submerged during the late Miocene and early Pliocene. They then became isolated from their Caribbean members probably during the Pleistocene when the ice ages lowered the sea level exposing the continents and much of the continental shelves. This land barrier effectively isolated the two populations of *Melongena consors*, resulting in the eventual evolution of two distinct Recent species, *Melongena melongena* Linne and *Melongena patula* Broderip and Sowerby.



Photo #4: fossil *Melongena* egg capsules

A sample, consisting of 120 specimens of *Melongena corona*, and a strand of egg capsules were taken from the Sarasota site. The strand was originally composed of 9 capsules and was removed intact from loosely packed marl. Attempts to preserve the strand intact were unsuccessful as it separated immediately after being removed from the marl and three badly eroded capsules disintegrated. Those capsules which were in good condition exhibited considerable detail, even showing the escape pore. A careful examination and comparison leaves little doubt but what they are the egg capsules of a *Melongena*.

The fossil shells taken from the Sarasota site consisted of approximately 25 juvenile and 95 adults of varying sizes. All except 6 members of the sample were typical specimens which compared favorably to descriptions of *Melongena consors* Sowerby. Basal spines were reduced or absent on approximately one third of the adult specimens. The presence or absence of these basal spines seemed to be a normal variation and not related in any manner to the number or position of the double row of spines on the shoulder and upper body whorl.

There were six of the Sarasota *Melongena* which exhibited slight to notable variations - an occurrence which is common in *Melongena* today. The variant shells were:

1. one single spined specimen
2. one triple-spined specimen
3. four atypical slender-bodied, high-spined specimens

Continued on page 145, column one

## MIOCENE MELONGENA IN FLORIDA?

Continued from page 144

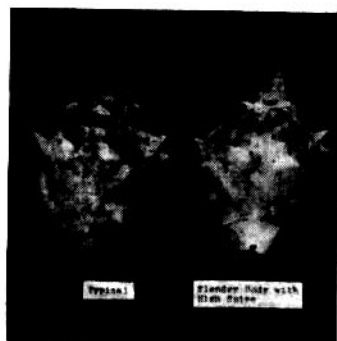


Photo #6, left: typical specimen; right: slender body with a high spire

A close examination of the atypical variant noted many similarities between it and the Melongena subcoronata Heilprin found in the Caloosahatchee marl. This leads to the speculation that Melongena consors Sowerby could be the evolutionary ancestor of the Recent Florida Melongena corona complex as well as Melongena melongena and Melongena patula.

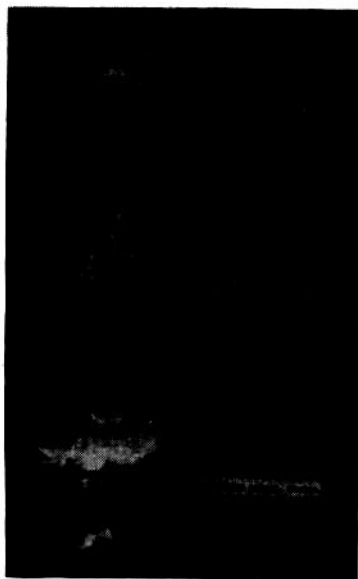


Photo #7, top: M. consors; center: M. subcoronata; bottom: M. corona

It can be safely concluded that a colony of Melongena consors Sowerby has probably been discovered in the Pinecrest beds near Sarasota, Florida. It is also probable that other colonies exist in this facies. Further exploration could disclose these colonies, the discovery of which would firmly establish the existence of Melongena consors in Florida.

I would like to obtain specimens of Melongena consors from other areas as well as any information on these shells. Please write me: 1455 NE 54th St., Ft. Lauderdale, Florida 33334.

## Mucronalia - A Miniature Adult Shell

CORINNE E. EDWARDS

I really don't go for miniatures unless they are live-taken adults, and I do "go for" Echinoderms, especially those that have a relationship with mollusks - either parasitic, symbiotic or for food.

She is gone now, but "Murph" Phelps, one of Palm Beach County Shell Club's earliest shellers, was interested in the animal as well as the shell. In the P.B.C.S.C. publication Seafari, April 1963, Murph told us of a tiny shell, discovered by Thomas L. McGinty of Boynton Beach while dredging off Palm Beach in 25 fathoms from the "Triton". It was later named Mucronalia nidorum by Pilsbry in 1956.\*

Dr. Donald Shasky, A.M.U. Convention 1967, said that it seemed closer to Rosenia and called this little mollusk Rosenia nidorum. He put Pilsbry in brackets, as he had changed the genus name. Abbott, American Seashells 1974, listed it by Pilsbry's original scientific name. Most Pacific look-alike shells have a different species name from ours, but this tiny mollusk's is the same from both California and Florida waters. The host for this parasite is the Club-spined Sea Urchin, Eucidaris tribuloides (Lamarck) in Florida and Eucidaris thourasii Valenciennes in the Pacific.

The 2-3 mm, operculate, gastropod shell animal inserts its radula into a small, living, porous\*\* Eucidaris spine, which grows around the annoyance. As the spine matures, a gall-like growth, about 6mm in diameter, is formed, leaving an opening at the top. The gall is usually at the tip of the spine, but occasionally I

\*The Nautilus, Vol. 69, No. 4, April 1956.

find one on the side, at least with a small point rising above it. When one finds an infected urchin there is usually several snails occupying the cup-like gall, with the apex of one tiny shell visible in the opening. Some authors call it a "colony", but I cracked open one gall. The "family" in that "nest" consisted of two adult Mucronalia, 3mm high, three juveniles and what appeared to be a little cluster of egg capsules. Mucro means sharp or pointed and nidorum means nest.

I believe it is a deep water shell, although once, when Mari Hughes, Marion Wheelock and I were shelling under the Palm Beach Inlet Bridge, I found an urchin with two bulbous, stunted spines, each gall displaying two Mucronalia in the tiny opening. Before I lost them, I called Virginia Lee, asking if she wanted them for her listing of Palm Beach County shells. Her screams of joy, saying she had never even seen one, gave me much pleasure. After an on-shore storm, Martha Nelson and I walked a mile of Boynton Beach which was littered with "runty" club-spined urchins. They were dead, dry and in perfect shape -- I like any sea life that comes in quantity as it is easier to make a study. I gathered 400 specimens - every single one I could find. Several tell-tale galls were noticed and later I found I had ten with this little open-top gall - some still contained a shell. The mollusk is not imprisoned in it, but it is almost impossible

Continued on the next page

\*\*Because the spines of Eucidaris are porous, it is called a Club-spined Sea Urchin whereas there are Pacific urchins called Slate-pencil Sea Urchins as their spines are very solid and clang or ring when struck.

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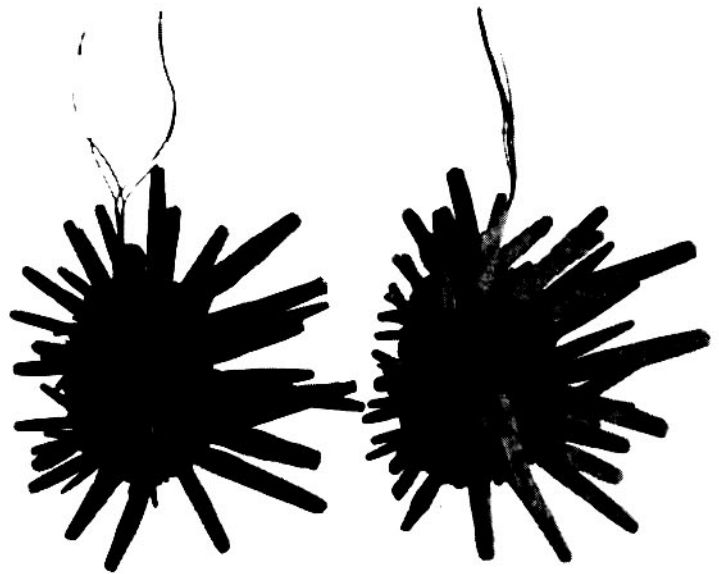
for one to remove that tiny, sharp-spined little shell. Another noted item is that, often when I have collected sea urchins with galls, it is not long before one or more of the mollusks climb out of their out-of-water abode as if they knew something was wrong.

Notice I said "runty" -- Wading out from shore on the grass flats one often encounters a large, solitary specimen of *Eucidaris*. (I don't mean the sea urchin was wading out from shore -- that is just a bad sentence structure habit I have.) This shallow water, club-spined sea urchin does not move rapidly as do other common sea urchins -- nor does it hold shells over itself with its tube feet as they do. This big, beautiful, in-shore club-spined urchin is 4 to 5 inches in diameter, counting the length of the stubby, porous, spines. Out on the off-shore reefs or in deep water it is much more smaller and is found UNDER rocks and in company of more of its kind -- never or hardly ever -- solitary. Sometimes they are wedged in crevices or brace their spines so that it is hard to remove them without damage. --- I toy with the premise that there are TWO DIFFERENT species of *Eucidaris* -- one large, inshore and solitary; one "runty", off-shore and communal. Being solitary, the larger, grass flats urchin does not get infected with these galls; whereas the much smaller, reef-dwelling urchins, living so close together, offer a habitat for those juvenile *Mucronalia*, and the hatchlings from the eggs, to find a nearby urchin to insert the radula into and cause a gall to form, so they too may raise a "family" in a "nest".

On a 1970 expedition or seafari out on a deep-water reef, four of us examined enough specimens to find enough infected *Eucidaris* to send a batch to Tucker Abbott. Part of his reply delighted us: "WOW!! That was a beautiful sending of sea urchins with various sizes of *Mucronalia nidorum* --." On still another off-shore reef, I recently searched and found several gall-bearing urchins and was proud to be able to show Margaret Teskey a shell new to her. Later others purposely visited that same reef (Looe Key) and they too found *Mucronalia*. Most all reefs seem to have the "runty" urchin, but often that same reef will have no *Mucronalia* parasitic on them. Just this past April out on Sand Key off Key West, three of us searched most diligently. There were plenty of "runty" urchins, but not one infected, gall-bearing one was found among all the groups of urchins we examined under nearly every rock we turned over -- and turned back, of course.

Counting the number of urchins handled and the number of gall-bearing ones found, long long ago I estimated one nest site to every 40 urchins. Since then I've read of a serious study made over a period of several months, arriving at about the same estimate. Out of 1497 urchins examined, only 33 were infected -- or one in 44.

While working on this article, I awoke in the night and remembered that I had preserved two "runty" club-spined urchins from off Looe



Above urchins have galls and *Mucronalia*, can you spot them? Photo by E. Robinson.

Key. Each urchin had a gall on a spine, still with *Mucronalia*; at least one tiny apex was visible in the opening. What had I done with them after a "show & tell" at South Florida (Miami) Shell Club meeting? I was able to find them the next day for they were in plastic boxes and a red thread had been tied around each gall-spine to lead the viewer's eyes right to the little cup. It is not easy to describe and with someone not knowing what he was looking for, it is not always easy to spy. Over the years,

time after time, the spines would fall from a displayed urchin and I would throw it out and then -- too late -- remember, with dismay, that I had also thrown out a spine with a gall on it forgetting why a sea urchin was in a "shell" display in the first place.

This truly is a miniature, adult mollusk, one that shellers could search far out on the reefs and find alive. It surely would be a challenge to try to find the operculum.

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## Melanella - A Miniature Adult Shell

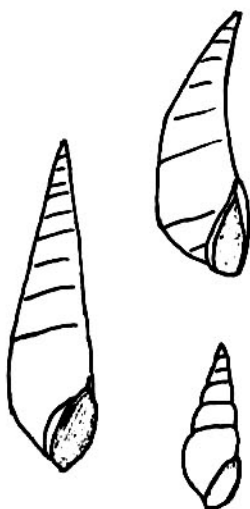
CORINNE E. EDWARDS

This genus, like *Mucronalia*, allows shell collectors to search out and find miniature mollusks. I only call a shell a miniature if it is an adult and still under a half inch. I am not partial to tiny shells unless I can collect them alive. As I've said, I am fond of Echinoderms (Sea Stars, Sand Dollars, Cake Urchins, Sea Urchins, Heart Urchins, Sea Cucumbers and Crinoids). I like shells related to them in one way or another.

*Melanella intermedia* (Cantraine), known as the Cucumber *Melanella*, is in my collection as it is parasitic on *Holothuria*, the Sea Cucumber. Although this soft-bodied Echinoderm does not lend itself to being preserved and displayed - it looks pretty awful - I can display the shells to which it is a host. I see several species of Sea Cucumbers while wading on sand, grass or rubble flats at low tide. Voss, *Seashore Life of Florida & the Caribbean* (1976) lists *Holothuria floridana* (Pourtalles), size under 10 inches in length, color reddish-brown. This may be the host for *Melanella*, although I think the ones I find are black. Abbott, *American Seashells* (1974), lists nine species of *Melanella* and figures five. As I study my specimens under magnification, I am lead to believe mine are in the subgenus *Balcis* and are *Melanella intermedia*; however, Abbott lists the size as 6-12mm and none of mine are over 9mm. Abbott also lists the host Cucumber as *Holothuria impatiens*.

There are other Sea Cucumbers, bigger, tougher and variously colored. A real big one in our Florida waters looks like a giant caterpillar with short feet along either side. Only on the smaller, softer ones (whatever their species) do I find or search for, the miniature, elongate, white, glossy, oily, 6-10mm *Melanella*. Sea Cucumbers usually have bits of debris and sand attached as they are sort of sticky. On the upper surface I carefully scrutinize each specimen as I pick it up and hold it in my hand. Sometimes I spy one, two or three of these small collector's items. They are not buried, but are well attached as they are parasites, sucking the blood of their host for nourishment.

Have a small vial handy when hunting for miniatures. These tiny bits of life are elusive mollusks. I quickly and carefully pluck the tall, pointed shell from the fast-drooping *Holothurian*. Then I pop it in my mouth while opening the container from out of my shelling apron pocket. Then I have to be mighty careful and sure that I get that little shell into the bottle and get the cap on securely. I have lost Cucumber *Melanella*, after I found them, often by waiting too long as I searched for more - and forgetting that I had one in my mouth.



Thinking I had a grain of sand there, which I often do get off of my finger, I have spit out my prize miniatures and realized too late what I had done.

These parasites evidently do not upset the un-Echinoderm-like animal. Once I found the unbelievable number of 38 specimens on one single Cucumber. It was going about its business, getting its nourishment from taking in sand and detritus and passing it through its body.

In the Bahamas, on Green Turtle Cay, while shelling at night, I was amazed at the great number of *Melanella* we saw. There seemed to be several on nearly every small, soft *Holothurian* we examined. Everyone in the group from Fort Myers was able to self-collect a few to carefully place in a tightly sealed plastic box to proudly display on a black background as true adult miniature shells.

In Costa Rica, I found three *Melanella* on one Cucumber. Into the only bottle I had, along with other small shells stolen from Hermit Crabs, I had to put my prizes. Later, as I carefully added alcohol to the pill bottle, I doubted if I would ever see those three wee things again. They WERE actually forgotten. Back home in Coconut Grove, I was opening smelly packages, trying to keep shells and opercula together and working over my Costa Rica shells. Luck was with me for, as I opened the little bottle to "dump" out the contents -- I happened to look first. Those three tiny shells were "floating" on the top. Keen's *Sea Shells of Tropical West America* (1971) and Olsson *Mollusks of the Tropical Eastern Pacific* (1963),

were used to help identify my Costa Rica shells. There were 32 species and 13 illustrations in Keen, with no real descriptions of these miniatures. They were put in the Family Eulimidae and Genus *Balcis* with that confusing line in the text reading (*Melanella* of authors). Due to shape, bent spire and nearest locality data (El Salvador) I called them the 5mm *Balcis bipartita* (Morch).

The Sea Cucumber won't hurt you. One may, of course, disgorge its sand-filled intestines should you handle it too roughly or too long. This is a defensive action - how would you like that great long, snakelike coil of intestines in your face? Let the Cucumber go free and it, like so many marvelous sea creatures, can regenerate those lost parts.

Maybe someone could find the operculum of a *Melanella intermedia*, it would be a little bit larger than the operculum of a *Mucronalia*.

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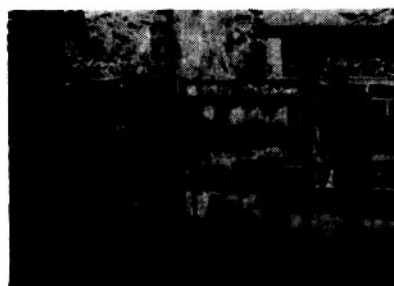
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# Shell Collecting in Ceylon

PHILLIP CLOVER (1964)



Rodney Jonklaas



Phil and Joyce Clover



Trincomalee, Ceylon

After intensive planning, letter writing, shots (ouch!), visas and passports, my wife, Joyce and I flew out of Clark Air Base in the Philippines. Our first stop, in Saigon, South Vietnam, was short and memorable; a few days after we passed through the restaurant where we had had lunch was blown up! From Saigon we flew on to Bangkok, Thailand and spent a few pleasant hours arranging for our stay on our return trip. Then on to New Delhi, India, which was the end of our free ride (provided by the U.S. Air Force's "space available system").

The whole trip was worth seeing New Delhi and the surrounding area. We spent a few days here and, of course, saw the marvelous Taj Mahal, built of white marble in the year 1645. From New Delhi we flew to Madras, in southern India, and received our final clearance to go on to Ceylon.

My telegrams to Ceylon did not arrive there in time, so no one met us at the Colombo Airport. We took a creaky old English-made taxi to find my host, Rodney Jonklaas, who besides being a shell collector, is a well-known ichthyologist, writer and the only scuba diver (in 1964) in Ceylon.

Rod was surprised to see us drive up, but after eight years of corresponding we quickly made ourselves at home. He lives outside of Colombo and has a regular zoo in his backyard. Monkeys and parrots are wild in the trees, but he does keep the snakes and crocodiles in cages. His pet python had to go because it ate too many other pets and scared his visitors, though it kept away any sneak thieves at night! Marine tropical fish were everywhere and Rod exports them by the hundreds to cities all over the world.

Our first outing was across the island to Trincomalee, about 150 miles away, on an all-day trip. Just out of Colombo we stopped at a chank factory. Here they sort the Chank shells (*Turbinella pyrum*) gathered in the Pearl  
\*now of Glen Ellen, California

Banks of northwest Ceylon, by size, and ship them to India where they are polished for religious use. I never saw so many chanks and asked Rodney why he hadn't sent me more. On closer inspection I saw that the shells had badly chipped channels and apex from the natives tossing them into the boats. Of the thousands I walked over I saw less than a dozen I would consider of specimen shell quality, and most of those were of a small size.

On the way across the island we stopped at Anuradhapura, a religious area where, 2000 years ago, Buddhism was first introduced to Ceylon. Here we visited the marvelous shrines of the past, including a temple of a thousand columns. Finally, late that evening, we arrived in Trincomalee and went to one of Ceylon's many famous rest houses built by the Dutch in the 1700s. These are not "The Ritz", but at \$4.00 a day for two people, including all meals, how can you complain?

Being anxious to get shelling and collecting fish for Rod's export, we started diving that night. I don't like night diving and so stayed in shallow water, 3 to 6 feet deep, turning rocks. Rodney likes the dark and often goes down 50 feet or more to catch fish. I found *Conus terebra*, *Marginella angustata*, *Harpa amouretta*, *Cypraea ocellata*, *C. caurica*, *C. carneola*, *C. hirundo*, just to name a few.

Next morning we worked a reef below a famous Ceylon temple, which the Dutch had destroyed by pushing it into the sea. It made a strange area to dive over with stone columns and figures all over the ocean floor. Rod said they even found a 300 pound stone sex symbol a couple years back, quite a rare religious artifact and the story made all the local newspapers. Below the reef, on the sand, I found such shells as *Conus monile*, *C. augur*, *C. betulinus*, *C. generalis* and a species I haven't identified yet. Oh yes, about my first experience at finding *Turbinella pyrum*, they stay buried in the sandy mud bottom and move little during the day, making only a slight hump in the sand.

During my four days in Trincomalee I also found *Murex haustellum* and *M. virgatus*, neither of which had I collected alive before. The best find of all, however, was a fine specimen of *Voluta arausiaca* in a small shop. One of the town's fishermen had brought it in, saying he had found it in his nets. According to Rod this is one of three known specimens now in Ceylon.

From Trincomalee we went back across the island of Ceylon by a different route, high into the mountains where we saw some of the famous Ceylon tea plantations. We stopped at the city of Kandy, where "Budda's Tooth" is kept in a special temple. Rod says it is brought out one day each year for everyone to pass by and see. Rod saw it once and said, "It looked more like a tusk". This city is also the summer capital of Ceylon and has one of the world's finest botanical gardens. My wife enjoyed this even more than shelling, I am sure, as she loves plants, flowers and trees and there were hundreds of types covering many acres.

After several days of sightseeing in Colombo, including the zoo with its dancing elephants, we were off to Tangalla in southern Ceylon to look for *Conus zonatus*, more tropical fish and a recently named *Voluta* which was of special interest to me. These trips around Ceylon are so pleasant, with the old Dutch rest houses every few miles along the palm-dotted beaches. Besides, each curve in the road brings a new colorful bird or wild animal to view.

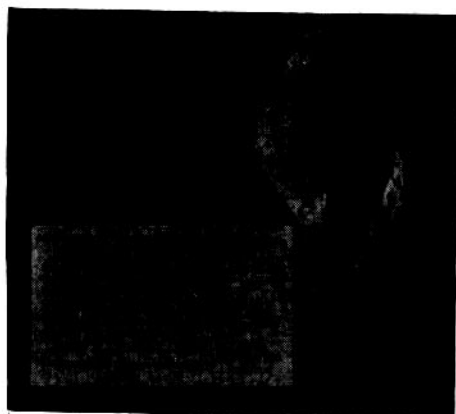
We stopped in the town of Galle to visit an old Dutch fort which had played a role in defending against the British in 1850. I was very pleased to find some beach specimens of the rare *Conus abbas* as well as, to my surprise, *Conus nimbosus* and *Murex pinnatus* which I had never received from Ceylon.

After arriving at Tangalla and seeing the water, I almost changed my mind about diving. But we got a forty-foot boat and headed out into the ten foot surf. Once past this it was

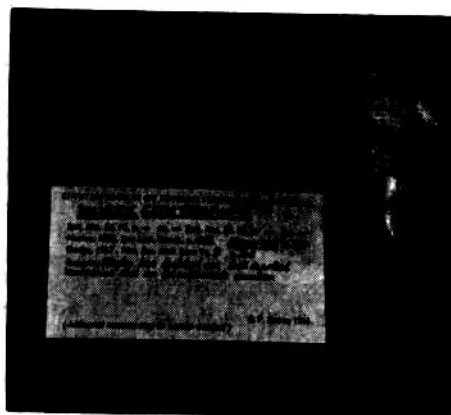
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# Notes on Portions of the Linnaean Collection

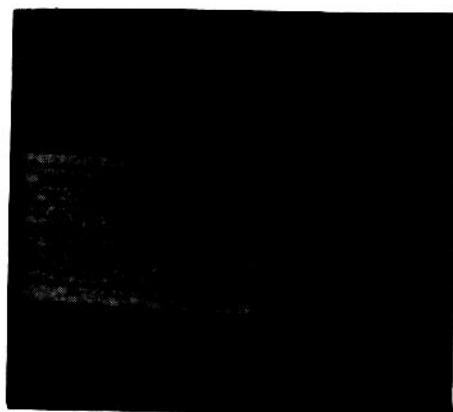
ROBERT R. TALMADGE



*Neptunea antiquus* (L.)



*Neptunea contrarius* (Linnaeus)



*Neptunea despectus* (L.)

On my return from a recent study project in some of the major research collections of Europe, I have been asked on many occasions, "What remains of the Linnaean Collection, how is it stored, and what did you see?" I can only answer in part, as my interest and studies are restricted to a few genera and families of marine mollusca, and these notes are restricted to only the genera *Neptunea*, *Buccinum*, *Boreotrophon* and *Haliotis*.

The Linnaean Society of London, founded in 1788, occupies the west wing of Burlington House, situated on the north side of Piccadilly, a few blocks west of Piccadilly Circus, London. The ground floor houses the main office as well as the office of Mr. T. O'Grady, Executive Secretary, who twice now has welcomed me and assisted in my project of examining and photographing the "Linnaean Types". There is a large library on the second floor which I visited in 1976, and the original collection is housed in a large "Walk-in" vault in the basement. The vault has shelves around the upper walls, and along the lower walls are cabinets with the usual specimen trays. Within each tray are a number of cardboard boxes, each numbered with the Linnaean Species number, based upon his Xth and XIIth editions of the *Systema Naturae*, plus some with the Numbers assigned from the *Mantissa*. I was very happy to note that most of the data had been checked by Dr. S. Peter Dance, and there was even references pertaining to Hanley's *Ipsa Linnae Conchylin*.

The original Linnaean Collection and Library had been purchased by Sir James Smith, one of the original founding members of the Society, and upon his death in 1828, the Society had purchased both the Library and Collections.

Karl von Linne, Carolus Linnaeus, had used the genus "*Murex*" for the three species

which we now place in *Neptunea*. There are three examples of "*Murex antiquus*" with the locality of "O. (ceanus Europaeo)". One is an adult shell, one an adult shell which has been split to illustrate the interior colling, and one is a juvenile. All apparently are the common coloration best known from the coast of Northern France to Holland and of course northeastern Britain.

There are also three specimens of "*Murex despectus*", O. Septentrionali, and which probably were taken off Norway. As Linnaeus had used Iceland with a specific geographical name, I doubt that if his specimens had been taken there he would have used any other locality. Both of these species were first named in his *Systema Naturae*, Ex. X, 1758.

The third species "*Murex contrarius*" consists of a single specimen of the Recent gastropod, known to inhabit the waters of the Bay of Biscay south to Cap Blanc off the west African coast. I had heard that this was one of the Red Crag fossils, Pleistocene, and was happy to learn that the original specimen was a Recent specimen. This species was described in 1771 in the appendix to the *Mantissa*. Location, O. Europaeo.

In Linnaean times the genus *Buccinum* was rather large, but the present "Type of the Genus", (Linnaeus of course did not designate such a type), *Buccinum undatum* was present. The one specimen is like the majority that I have seen from the North Sea area, and the locality if given as O. Europaeo.

Hanley, 1855, had isolated twelve specimens of *Boreotrophon* "*Murex*" *clathrata* in the Linnaean Collection. Although he, Hanley had not mentioned any numbering on the specimens, Dr. Dance had noted one with 563 and another with just 56, the rest being broken off. Hanley

did mention broken shells. I noted both broken shells and the numbering. Linnaeus gave "Islandiae Mari" as the location for his *M. clathrata*, and the specimens are the same as series that I have seen from that general area, and are all a dirty cream or tan at this time.

There are seven species of *Haliotis* listed in the *Systema Naturae* Ed. X and Ed. XII. One species, *Haliotis parva* is missing in the collection. As Linnaeus did not designate a "Type of the Genus" several of his original taxa have been proposed from time to time. One, the first species listed, *H. midae* is represented by three specimens, black in coloration, and which appear, at least to me, to have been picked up from some bay mud, where they may have been covered for some time to be stained this heavily. Linnaeus used only "?" for the locality, but the species is known from southern Africa from Natal on the Indian Ocean coast around the Cape and up to Saldanha Bay on the Atlantic Coast. In the Academy of Natural Sciences of Philadelphia, there is also a set of three specimens which were the basis of Pilsbry's *Haliotis eltiore* and which I consider to be midden specimens from Strand-looper Middens, as they have the same patina as *Haliotis* from California middens.

*Haliotis tuberculata*, O. Europaeo, is represented by a single specimen and could have been taken anywhere along the French or Channel Island coasts. This species has also been termed "Type of the Genus".

Hanley, 1855, had stated that the Linnaean *Haliotis varia* was the same as one figured by Martini (Neus. Syst. v. Conch. Cab.) and one of the set of three does closely resemble the color figure as indicated. The three specimens fit into series taken in the southern Philippine Islands, but Linnaeus gives only "\_\_\_\_\_" for his locality.



As mentioned above, both *Haliotis midae* and *H. tuberculata* have been used by some authors as the "Type of the Genus". However, there can be no question of which species is such when in 1810 Denys De Montfort stated in his *Conchyliologie Systematique* that *Haliotis asinina* "Espece servant de type au genre". There are two specimens, both old shells, in the box containing that species. The locality for this species was O. Indiae.

I was unable to locate the Linnaean *Haliotis parva*, but the species is apparently restricted to South African waters.

There was a single specimen of *Haliotis mamorata*, with the location O. Africano, and this species needs special comment. Some years ago, I received via Hong Kong a series of the same species taken on Hainan Island in the Gulf of Tonkin. The series had several color patterns and I have been able to match material from the Hugh Cuming collection at the British Museum (Natural History) which had been described and named by Reeve as *H. mamorata*, *H. virginea* and *H. rosacea*. Gray's species *H. mamorata* is the same. It is quite

possible that ships heading or returning from a trip to Canton picked up such material, and as it appears that often the localities were mixed in transit, such odd localities would creep into the literature. Personally, I am not certain as to the exact status of this species or subspecies, as I have yet to work with any of the soft parts.

When I opened the box with the label *Haliotis striata* in 1976, I was extremely surprised to find it filled with *Haliotis*, but a species which I had learned to call *H. lamellosa* Lamarck. There were a dozen shells in the box so I had a series to work with. The name *H. striata* had been used by a number of persons for the Mediterranean, or actually Dalmatian form of what had been termed *H. lamellosa*, which Reeve had called *H. reticulata*, and also the term had been used for Reeve's *H. coccinea* from the Canary and Azore Islands.

Now, it appears that we will have to place Lamarck's *H. lamellosa* and Reeve's *H. reticulata*, as well as his *H. japonica* and *H. aquatilis* into the synonymy of *H. striata* Linnaeus, 1758.

So, now that I have everyone mixed up, aren't you happy that I worked with only four genera?

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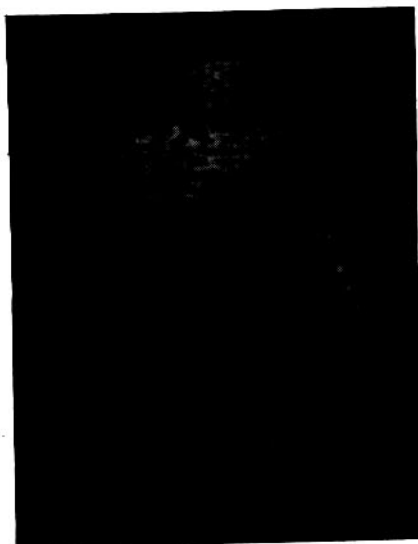
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Field Associate, California Academy of Sciences, San Francisco, California 94118.

## SHELLS ON LONG ISLAND, NEW YORK

Continued from page 142

dead. He still has the specimen with operc; date of collection was June 6, 1972 ... As far as I know, Larry Kelly's *L. irrorata* was the last live one collected in this area until the Plumb Beach specimens collected in April and May 1976."



*Littorina irrorata* Say

This winter I went back to Plumb Beach to see if I could find any during colder periods of weather. None were to be found. As before, I believe that since in its veliger state it is free-swimming, it gets carried up from warmer climates. When deposited in the particular locality it survives until the cold weather. None will be found until more veligers are deposited on the said location. This winter was an extremely harsh one, but it would be inter-

esting to see whether *L. irrorata* could survive a milder Long Island winter.

It should be mentioned that the second set of *Littorina irrorata* were kept alive in an aquarium from the date of collection on May 13, until the end of August. Observed were the laying of eggs in June, and a growth of over 3/8" on the body whorl with no apparent loss of coloration from being in captivity. By mid August the eggs hatched and I was able to observe the free-swimming veligers under a microscope. Unfortunately, they died off because of lack of facilities to feed them. No apparent reason was ascertained for the adults dying.

The Long Island Shell Club is now using U.S. Geological Survey Topographic Maps in order to make our survey of the molluscan fauna of Long Island more systematic and orderly. Once all 54 quadrangle maps have been surveyed, we hope to publish our findings. So now its off to study another quadrangle so I can plan my shellouting for next week!

Photographs and map by the author.

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# FOLLOWING COLUMBUS

BETTY JEAN PIECH

In 1492 Christopher Columbus made his first landfall in the New World when he set foot on San Salvador Island in the Bahamas and was greeted by the Arawak Indians. Today the Indians are gone, but the island looks much the same. Located 385 miles SE of Miami, it is approximately 12 miles long and 5 miles wide. The 41-mile circumference is made up of beautiful beaches alternating with sections of rocky coastline, and all protected by miles of reefs.

The natural harbour entrances are sometimes narrow and, before the lighthouse was built in 1856, the early settlers would often deliberately lure boats onto the dangerous reefs. This highly profitable occupation was known as wrecking or "wracking". From 1700 to 1926 San Salvador was called Watling's Island after a notorious pirate who roamed Bahamian waters in the 17th century. The ruins of a plantation in the southern part of the island known as Watling's Castle. There are tales of how this old buccaneer would wreck Spanish galleons on the reefs at French Bay, and of pirates' gold hidden in the caverns and caves or buried near the castle ruins.

Cockburn Town is the largest settlement on the island and the center of activity. In the old days it was called Riding Rock Settlement after the elusive rocks that floated or moved about on the ocean floor off shore between Cockburn Town and Riding Rock Point. One-half mile north of town is located the modern Riding Rock Inn and Marina.

It was to this small island and the Riding Rock Inn (only place to stay) that a group of ten from the Wilmington (Delaware) Shell Club went on February 20, 1977. There were 7 shellers (Joan, Bill, Al, Virginia, Vivienne, Iva and me) and three non-collecting, but congenial spouses (Doreen, Maurie and Ernie). What follows is the daily log I kept of our activities, accomplishments and minor catastrophes.

Sunday, February 20. At 1:00 p.m. we took off in two charter planes from Red Aircraft at the Ft. Lauderdale Airport. They were small, only held 8, but the ride was smooth and the trip took only one and three-quarters hours. We were met at the airport and driven to the Inn one-half mile away. I am pleased with our motel-type accommodations. They are right at the water's edge. The beach is mainly rocks interspersed with some sand. Most of us immediately changed and started exploring the beach. It was too late to give it more than a quick onceover. There was an excellent buffet dinner followed by an underwater film shown on the Inn's porch.

\*Wilmington, Delaware

Monday February 21. Everyone was up for breakfast at 7:30. I talked to Ron Lefebvre, hospitality host, about transportation and places we should go. Arrangements were made and we left at 10:30 for Fernandez Bay, several miles south, by van (they have a fleet of them complete with CB's). There were several miles of beachwash to investigate and it was very productive. My best specimens were several *Spirula spirula*, 2 *Cypraea cinerea*, 3 *C. spurca acicularis*, a young *Cassia tuberosa* (about 3") and a *Stigmaulax sulcatus*. There was a great variety of limpets. After lunch the group split up. Ernie and Vivienne took off on a Honda he rented. Iva, Joan and Bill hiked north to the southern end of Bonefish Bay, but didn't find too much. Virginia, Al and I hunted in front of the Inn, and I found some good live shells on the rocks - several species of *Thais*, *Astraea*, *Tegula*, *Mitra* and *Engina turbinella*. Went to Manager's Cocktail Party at 6:30 followed by dinner of dolphin fish that was delicious.

Tuesday Feb. 22nd. After breakfast we visited the small native straw market on the Inn grounds. Several bought hats. At 9:30 Ron took us on a tour of the area that Columbus Landings Corporation is developing at the southern end of the island. If their ideas get carried out as planned, it should be great. Some areas have a fantastic ocean view in two directions. We were assured that they are making every effort not to disrupt the ecology of the island and the surrounding reefs. Hope they continue to make this one of their prime concerns.

Explored Watling's Castle and then back to the Inn for lunch. Maurie followed Ernie's example and rented a Honda. At 2 we were vanned to the dock at Pigeon Creek (SE corner of the island). First I tried snorkeling west of the dock. It was difficult to get in due to undergrowth and mud. Once in, a few feet from shore the bottom was sandy with some eel grass, but there was a very strong current that was a problem. My total find, in about half an hour, was one beat-up *Codakia orbicularis*. Iva, in her enthusiasm, jumped in and got one foot in something, possibly a large sea anemone. Result was red welts and a stinging sensation that lasted for several hours - but it didn't slow her down one bit. Next I walked east of the dock where there were some exposed flats. Found dead pairs of *Tellina listeri*, *T. fausta*, *Linga pensylvanica*, *Chione cancellata* and a large live *Cassia tuberosa* that was three-quarters buried in sand and mud. I then joined several others across the road at the mouth of Pigeon Creek. Here I got live *Leucozonia nassa* and *Thais deltoidea* on the rocks, some dead pairs of *Asaphis deflorata* buried in sand

between the rocks, a particularly beautiful *Natica canrena*, and lots of live *Cittarium pica*. There were huge piles of *Strombus gigas* shells - all with a cut in the spire (to release the body so it can be removed easily). Owing to the pungent aroma, we did not shell too close to these. We found some live *S. gigas*, but passed them by as they are used for food here and live collecting is not permitted. Got back to the Inn at 5:30 and several shelled on our beach, but I was determined for once not to let my cleaning get ahead of me. Hung up my Helmet by its operculum, put the live stuff in alcohol (there are no cooking facilities), and sat on the porch and washed beach specimens in a plastic container I had picked up on the beach, feeling very virtuous. There was a slide show on the Inn porch after dinner.

Wed. Feb. 23. Got up to clouds and as breakfast ended it started to drizzle. We got ready to walk to Cockburn Town, but the rain kept coming so we congregated on Virginia and Maurie's porch and talked and showed and identified. Al let us look at the beautiful 9" *Fasciolaria tulipa* he had found the week before in the Florida Keys. And Vivienne showed the lovely little *Arene cruentata* she had found early this morning.

Had lunch and, as the rain had stopped, Ron drove us to the dock at French Bay on the south side of the island. Tom, another guest from the Inn, joined us. We walked the beach of rock and sand. Found typical rock dwellers and several of us found *Cassia tuberosa* in depressions among the rocks at the water's edge. Then into the water to snorkel over sand, eel grass, rock and coral - and I didn't see a thing. Tom snorkeled the offshore reef that was too far out for most of us. He returned with a live, 10" *Turbinella angulata* (West Indian Chank) with a brilliant orange columella. Now the three large shells that everyone really wanted to find were Helms, Chanks and Triton Trumpets (*Charonia variegata*) so everyone scrambled for their masks and snorkels and returned to the water with renewed vigor. Bill went part way out to the reef and found two. The rest of us hovered close to shore. Al, who had never snorkeled before, figured now was the time to begin. And on his first look in about 2½ feet of water he found one! Virginia's mask leaked and when she stood up to empty it, she stumbled over hers! The rest of us were doomed to disappointment. I am sure Doreen, reading a book up on the beach, had a good laugh over our antics. Cocktail hour was on the Inn porch as the sun was out and there was less wind - seems more like the Bahamas I am accustomed to. The unusual weather we have been having this winter back home must be having some effect even way down here.

Thurs. Feb. 24. The morning was spent in individual activities. I cleaned shells. Tried to pull my hanging Helmet, but it broke and much of the body remained inside. So I buried it and the one I found yesterday in about one inch of sand, aperture down, leaving the back exposed to the sun. Will see what the ants will do. Al soaked his Chank for a while in the extremely hot tap water and eventually succeeded in pulling it. But when it finally released, it came with such force that the resulting splatter necessitated a complete change of clothing. I am sure his wife Doreen was laughing again. Several walked to Cockburn Town sightseeing.

After lunch the van took us to Rocky Point - NW corner of the island. It was the poorest shelling so far - only a few *Nerita* and *Littorina* on the rocks at the water's edge and millions of tiny *Brachidontes exustus* in the cracks. Found two tiny bubble shells in the small amount of beach drift that looked most unusual. As I tried to put them in a small plastic container, a strong gust of wind carried them away - so I'll never know what they were (probably something very rare - or a new species that could have been named after me!).

Went snorkeling. The bottom was huge boulders and sand - but the rocks were clean, with nary a shell. The fish, however, were fantastic. I was so busy looking down that it was only just before I got out that I discovered the millions of tiny ones swimming just below the surface.

When we got back to the Inn, Tom offered me his Chank (shells are not that important to him). Normally I like to find my own shells, but this one I didn't refuse - especially since he had already cleaned it. Had a barbecue on the patio, followed by a dance.

Friday, February 25. Beautiful day with bright sunshine. Ron has left for a vacation, so Mr. Thompson, the Manager, took over helping us plan our excursions and was most helpful.

After breakfast the van took us to the north end of Bonefish Bay and we shelled the drift line all the way back, probably about 3 miles. It was good. I found some very large *Dentalium*. We were tired and thirsty - everyone had seconds and thirds of iced tea for lunch.

At 2:30 everyone but Maurie (who wanted to play on his Honda) eagerly rode the van half way around the island to a beach on the east shore. On the way we picked up an elderly woman on a deserted stretch of road (90% of the roads are that way) and gave her a lift. She was delightful and so appreciative. Said she liked to ride because it eased her feet. After five days all our feet are in need of easing. The beach proved disappointing, very little in the way of shells, heavy surf and lots of seaweed (although eagle-eyed Al found a good number of *Spirula spirula* in it). Tar was everywhere - it is sad to see such a beautiful beach spoiled this way. I found a small glass fishing net float and gave it to Tom's wife (felt I owed them something for the Chank).

Maurie did not arrive back at the Inn until long after we did - in fact we were getting worried. Seems he had a flat tire on the east side of the island. A passing motorist (the only one he saw in about two hours) drove him back to the Inn.

Saturday Feb. 26. This was the last full day for the whole group. After discussing all the places we had been, it was decided to return to Fernandez Bay. The van dropped us off at different locations (the road runs right along the beach) so we would not be trampling on each other. I went as far as the Columbus Monument - a large cross on the beach. Shelled the drift line and found lots of little things.

After lunch I checked my buried Helmets. Not one ant, but with persistent shaking I got the Innards completely out of both. Guess the sun did my cooking for me. Bill and Al tried dragging Bill's dredge in front of the Inn. They didn't get a great deal, but they had a great time and the rest of us took pictures of their struggles. I did some more cleaning. Am pleased with what I have, but still no Trumpet. No one else has found one either unless you count Al's two small ones. Continue to find the things I see so interesting. One tide pool today was full of *Nodilittorina tuberculata* and *Echininus nodulosus* and one only a foot away had nothing but *Puperita pupa* and *Littorina mespillum*. Why don't they intermingle? Why would the *Nerita* cohabit with the tiny *Littorina* and not the Prickly Winkles?

Sunday Feb. 27. Everyone but Vivienne, Ernie, Iva and I left today. How could a week have gone by so quickly! Iva, Bill (he had his wife, Joan, doing the packing) and I snorkeled in front of the Inn in the morning. No shells, but lots of fish. Vivienne and Ernie were off on their Honda, and everyone else was squeezing things into bulging suitcases. After lunch we sat in the yard under the palm trees and waited for the plane which finally left after 4. It was rather lonesome at dinner tonight and relatively quiet. Guess we had been the noisiest group in the dining room.

Mon. Feb. 28. Now that the rest of the gang has gone, Ernie wanted to go fishing, but it was too rough, so he and Vivienne went on the Honda and Iva and I decided to rent bikes. I took off on mine and narrowly missed a parked truck. Iva took off on hers and came even closer, leaving skin from a couple of knuckles on the fender. Not a very auspicious beginning, but we got our gear and pedaled to Bonefish Bay. It sure beats walking.

Iva found two excellent specimens of *Astraea phoebia*. And I found a huge *Sinum perspicillum*. We relaxed after lunch and in the late afternoon started off on the bikes for Fernandez Bay. Iva fell as we were leaving the Inn and sustained a cut elbow, a sprained thumb and a bruised behind; and completely destroyed her dignity. But we continued on. Nothing stops a dedicated sheller. As the tide was in we shelled the high water line. Had to hurry to get back while we could still see, it gets dark in a hurry

down here. Had some more of that excellent dolphin for dinner and then listened to the Rake and Scrape Band.

Tuesday March 1. Awoke to sunshine, but heavy wind and white-caps on the water. No fishing for Ernie today. So the van took the four of us to the mouth of Pigeon Creek and we had a fabulous morning. A place is never the same two times in a row. The tide was way out. On the rocks we found the largest *Thais deltoidea* and *Leucozonia nassa* I have ever seen. Between the rocks on the beach were lots more half-buried pairs of *Asaphis deflorata* in beautiful shades of yellow, orange, pink, lavender and purple. Ernie found a live *Cassia tuberosa* (we'll make a sheller out of him yet). Vivienne found a small glass float (this makes the second one we have found in less than a week - and they are supposed to be rare). Iva picked up a recently cut *Strombus gigas* that was really beautiful. Turned the right way you couldn't even see the slit, so she took it. In snorkeling over patches of eel grass, I found four live *Pinna carnea*. Between the grass patches were high mounds of brain coral and sponges, and brightly colored fish - all this in water two to four feet deep!

Worked on cleaning most of the afternoon and then took a short bike ride. No casualties this time.

Wed. Mar. 2. RED LETTER DAY! Awoke to gray skies and heavy winds. Looks like Ernie is going to remain fishless. The sun finally came out at 9:30 and Iva and I biked to Fernandez Bay. Best beachwash to date. And the tide was very low so we could also explore the rocks that we had not been able to get to before. I found live *Astraea phoebia* and *A. tecta americana*, a gigantic dead pair of *Tellina fausta* and a particularly nice *Cypraea cassis testiculus*. Then I saw the spire of what looked like a Triton Trumpet sticking out of the sand against a rock, completely out of water. I groaned - nothing like being teased with half a shell. But, as I pulled, a complete Trumpet came into view and when I turned it around the operculum was hastily retreating. I yelled at Iva up the beach and waved the shell in the air, and then said ("expletive deleted"). It was not that big (only about 9"), but in excellent condition. Nothing I found after that seemed very spectacular.

Puttered around on our own beach in the afternoon. Found a beautiful little *Chiton tuberculatus* under the rocks. Tried an experiment and it worked beautifully. I put him in a little aluminum tray of seawater and waited a few minutes until he flattened out. Then, holding my finger down on his back, I tilted off the water and poured on alcohol. In about 30 seconds I removed my finger and he never curled at all. I will let him soak in the alcohol until I am ready to go home.

Thursday March 3. Vivienne and Iva took off after breakfast in the van, headed for French Bay to look for Chanks, but they were un-

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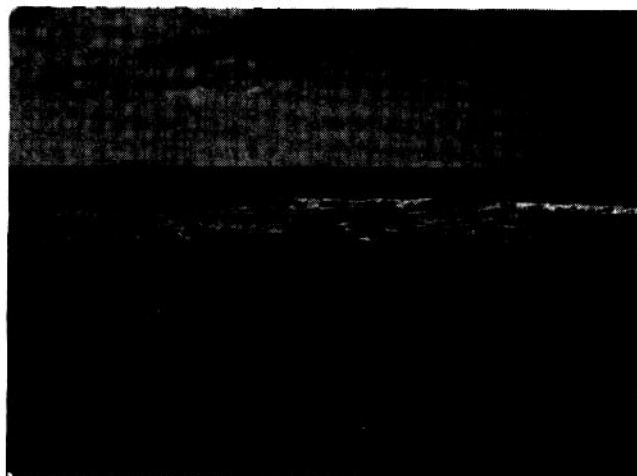


## Jeffreys Bay, South Africa

LOWELL & DOROTHY DE VASURE



Sandy stretch of beach, Jeffreys' Bay, South Africa.



The rocky section where shells were found, Jeffreys' Bay.

Dear Tom,

Since we travelled with you to Africa on your "Indian Ocean Odessey" in 1974 and had so many interesting and exciting experiences together, we knew that you would be interested in hearing about some of our travels there. We had seen just enough of mainland Africa in 1974 to make us want to return for another look. There is no way that we can spend the time to really see all of Africa, so we chose a few selected places and things to see and do.

Dotty and I left New York by Pan Am on a cold evening of February 1, 1977 for a 40 day journey beginning at Dakar, Senegal. We had a week at N'Gor Hotel, (which is a story by itself), and went on to Nairobi, Kenya for a nine day safari which was really something. With the border between Kenya and Tanzania just being closed and with the collapse of East African Airlines, we had some different experiences than those who had gone either before or after we did. (This becomes yet another story). We visited the magnificent Victoria Falls and then flew to a neutral territory to catch a South African flight to Johannesburg. Since Africa's politics make traveling there unpredictable, it is necessary to take things as they happen and be prepared to make changes as necessary.

We would like to tell you about our South African experiences which we could summarize with the word tremendous, but since one word descriptions can lead to different interpretations, we'll fill in a few of the details which might be of interest to you. When we made the decision to return to Africa and to include South Africa and Jeffreys' Bay in our itinerary, we wrote to Stanley and Helene Boswell asking if it would be all right to stop by to meet them and to see their shell collection. We also wrote

to the Savoy Hotel at Jeffreys' Bay requesting reservations for the time we planned to stay there. Both letters were answered in the affirmative, and as a result we had a most memorable twelve days.

We left Lusaka, Zambia on a Saturday morning, after inching our way through customs check. On the prop plane to Blantyre, Malawi, we were offered "finger" sandwiches, on a tray, unwrapped and fingered by all those who were ahead of us. We arrived, finally, in the rain and waited on the plane for a half hour before we could disembark. (Worse than the Madagascar to Comore Island flight, remember?) Now South African efficiency took over, our plane was prompt, cool, and clean, the service was courteous and clean, the food tasty and clean, the drink cold and clean! We arrived at Jan Smuts airport with no fuss, no hustling, just cleanliness and efficiency, with fast banking service and nice bus service to downtown Johannesburg. Our impression of South Africa is that it is cleaner and more efficient than we are here in the United States.

Within minutes after our arrival at a downtown hotel, Helene and Stanley Boswell telephoned us, welcoming us to South Africa and making arrangements to pick us up the next morning to visit with them. How great! We only had time for a short walk around a few blocks and it was evening. We were amazed at the streets filled with the black people at night, calling to one another and seeming to be having a good time. Like all large cities the downtown areas never grow quiet.

The next morning Stanley Boswell arrived at the appointed time, gave us a short tour of Johannesburg, and then headed for their home "Bandula" near Valhalla. Stanley and Helene have a beautiful home and gardens. These two are big people and their energy and enthusiasm

for what they are doing is even greater. How we wished that you could have been with us, Tom! You would have enjoyed the shell collection which Helene so casually shows, and the wall of bookcases which contains the shell library which Stanley has worked at collecting. We saw lots of species of shells which we had never seen before. I especially enjoyed seeing the Latiaxis and Cones which were new to me, and the Pleurotomaria collection! We saw as many shells as we could absorb and there were still drawers that hadn't been opened. A great collection! Helene is continuing to add to the collection.



Beach drift amongst the rocks, Jeffreys' Bay  
Photographs are by the author.

Shell collectors, Anne and Charlie Wilson, were there, and other friends of the Boswells and we had an enjoyable time talking about shells and many other subjects. After dinner Stanley took us to see the Vortrekker monument and Pretoria, before returning to Johannesburg, with one eye on the gas (petrol) guage since all service stations are closed from noon on Friday until Monday morning, and you can't keep a supply on hand for self filling. How was that for a welcome to South Africa? Are you ready to go?

We had a day to see some of Johannesburg and the area around the city, and caught an early flight the next morning to Port Elizabeth. While waiting for our luggage at the airport, we were approached by a Mr. George Moinet. He is the marketing manager of the Picardi Hotel chain which owns the Savoy Hotel at Jeffreys' Bay. They had been so intrigued that someone from the middle of the U.S. knew about their hotel and wanted to stay there, that they were there to meet us and to extend us their hospitality. Mr. Moinet showed us around Port Elizabeth, then drove us the 50 miles to Jeffreys' Bay and saw that we had a two room suite for our comfort during our stay. Can you imagine such consideration?

Jeffreys' Bay is a truly delightful place. Situated off the main highway, the town is built on the hillside overlooking the bay and is quiet and peaceful. From the second story balcony of the Savoy one looks down on the golden sand beach which curves for miles to the north around St. Francis Bay. Moonrise over the water was spectacular. A combination grocery-hardware-clothing-notions store was a block from the Savoy and the postoffice a short way up the hill. All the signs in South Africa are in two languages, English and Afrikaans, and the TV programs alternated languages every day. We ate all of our meals in the hotel dining room. There were lots of courses and choices of good food served by smiling competent waitresses. I needed your support at the Sunday noon buffet, Tom. Then everyone would have known that all American men eat ten kinds of dessert if it is available. As it was, people were laughing at my plate.

What was the beach like? Well, Tom, we were out there shortly after our arrival. We walked down from the Hotel and out onto the sand and there it was, golden sand stretching off into the distance, beautiful, clean, but not a shell. Well, there were some half shells of bivalves once in a while, but nothing worth picking up. You can imagine our thoughts, "This is the fabled beach that is supposed to be the best shelling beach in the world, better than Sanibel Island where in late January the beach was loaded with live shells just blown in?" Keep walking. Where are the people? Doesn't anybody come here, or have all the shells been picked up? Keep walking. About a quarter of a mile up the beach are some black rocks. There should be shells around rocks. About 50 feet from the rocks we begin to see some shell drift, and then more, in and around



Our "discards" returned to the beach.

the rocks, univalves, almost entirely univalves. There were no big drifts of shells, but enough to make it exciting. The waves sweeping up the slope of the beach make it seem that they are trying to retrieve those shells which they have just deposited on the sand; pink cones, purple cones, black cones, *Cypraea*, *Trivia*, volutes, miters, and on and on. Every species is new to our collecting. Most of them we have never seen before, so we gather a sampling and take them back to the hotel to begin our collection from Jeffreys' Bay.

We spent a lot of time on the beach each day, Tom. It was no problem to be the first out on the beach on the morning. We never talked with anyone on the beach who was doing other than casual collecting for their grandchildren, or looking for size and color for shellcraft; no serious collecting for a shell collection or with specific species in mind. Day by day we upgraded our collection of beach shells. We found live *Haliotis*, *Turbo* and limpet shells in the rocks. The hotel managers, Mr. and Mrs. Horne were interested in our collecting and allowed us the use of the kitchen to cook our live shells. There were many, many chitons and we wished again that you were here to add to your collection.

The beach drift had a pinkish look, probably from the ground-up pieces of the *Conus roseus* complex. We found our first pink *Latiaxis fritschii* von Martens by sifting through the drift, but after three days we could spot them from a standing position. What were the names of the shells we were collecting? There is a Shell Museum at Jeffreys' Bay which shares space with the Public Library. There are neat displays of shells collected from the area, but can you imagine this? They are all identified by family only!! Not a species is named! Inconceivable, unbelievable, and most frustrating. There was no shell shop as such and really no one seemed to know much about shells. Again the adjectives. We haven't identified all of the shells yet, but we do know that we have between 90 and 100 species. Among those identified are: *Conus tinianus* Hwass, *Conus lautus* Reeve, *Conus infrenatus*

Reeve, *Conus aurora* Lamarck, *Cypraea fusco-rubra* Shaw, *Cyp. edentula* Gray, *Cyp. fuscodentata* Gray, *Cassis achatina* Lamarck, and *Murex uncinarius* Lamarck. We are waiting for a book from South Africa which should help complete the identification.

We shelled at high tide, low tide, and at night with flashlights, and Tom, we have some questions. These shells have been known for a hundred years. Why hasn't someone dredged the area or done some scuba diving? Surely the *Conus*, *Cypraea*, and volutes can't be that deep. If these are deep water shells, then why is it necessary for them to be strained through the few rocks, when 50 feet away from the rocks the sand is bare of shells? We found the *Latiaxis* and *Murex* on only a 50-75 foot length of beach. Why not elsewhere? None of the specimens in the Museum were live taken, nor did they look in any better condition than the ones which we collected. Most of the shells are light weight or have enough volume that an air bubble would give them some flotation.

We had eight days at the Savoy Hotel at Jeffreys' Bay. We left with deep regret, Tom. It is a beautiful place with wonderful people and we would like to return some day. Mr. Moinet saw us off at the airport for our flight back to Johannesburg-Rio-Miami. So ended twelve days in South Africa, twelve of the most interesting, enjoyable days that we have ever spent. So Tom, try to add Jeffreys' Bay to your collection of shelling experiences. It is unique.

#### EXCHANGES WANTED

Correspondence invited from anyone interested in dwarf *Cypraea* - all species. Also desire to exchange or buy dwarf *Cypraea*. R. H. JONES; 1432 Dorsh Rd.; South Euclid, Ohio 44121.

I am interested in all families and can furnish worldwide species, but especially from Portugal and West Africa. ANTONIO JOSE ANTUNES MONTEIRO; Largo de Princesa, 24 - 1 - Esq.; Lisboa 3, Portugal.

I offer *Voluta perplicata*, *thatcheri*, *kerulerae* plus about 80% of other Australian volute species both common and rare; also Australian *Cypraea* (limited quantities), *Murex*, *Spondylus*, *Conus*, *Pecten* and hundreds of other varieties. Can offer excellent selection of South African material. Would be interested in hearing from anyone who has *Cypraea*, *Murex*, *Voluta*, *Conus* & *Strombus* to offer in gem or fine condition. All shells offered are gem or fine quality. Full data accompanies all Australian shells. CHRIS-TOPHER OATES; 56 W. Terrace; Kensington Gardens, 5068 S.A., Australia.

If you'd like to exchange with others just drop OF SEA AND SHORE a line with your interests and what you have to offer. We'll put your notice into an upcoming issue and then you'll start.

# A CHECKLIST OF CYPRAEA

JOHN CRAWFORD

Shell classification is a hotly debated subject and the genus *Cypraea*, in particular, has aroused controversy. This genus has suffered from both excessive "splitting" and "lumping". At the root of the problem is that vital taxon -- the species. The precise definition of a species is subject to varying criteria, but seems to hinge around the ability of the individual molluscs in question to reproduce with one another. In almost all marine mollusks, including cowries, very little reproduction has been observed or experimented with and usually only the dead shells are used for species determination. It is difficult to prove, for instance, that *Cypraea isabella* and *Cypraea isabellamexicana* are different species solely on the basis of the slight conchological differences. Even mantle characteristics might vary considerably within a species. In the field of botany, plants from different genera, let alone different species, have been cross-bred.

In my opinion, in recent literature about *Cypraea*, too little attention has been given to the so-called "synonyms". A case in point is *Cypraea propinqua*. Considered a "synonym" by Taylor (1975), it is now being referred to as a distinct species based on mantle characteristics (Burgess - *Hawaiian Shell News*,

1977). I have a strong feeling that if the hundreds of "synonyms" were more closely examined the number of valid *Cypraea* species could double. Future anatomical studies will eventually clarify this.

In the meantime my list of *Cypraea* only sets two levels of lower taxonomy - species and varieties. Varieties consisting of "subspecies", "varieties", and my own pet taxon - "significant synonyms". "Significant synonyms" are those "synonyms" which, in my opinion, have conchological differences significant enough to warrant closer examination as to the validity of their status. Many of these "synonyms" appear to merge with the maintype in question, but may prove to be distinct.

As a collector, my main purpose in compiling this list is to aid other collectors with a convenient checklist. I feel we collectors need a well-illustrated book with updated detailed discussions of all these variations. As of now, when we order a variation, we are almost solely dependent on the dealer's identification. While this is usually accurate, errors will sometimes occur even with the best dealer.

This list is based on Allan (1956), Burgess (1970), Taylor (1975), and other articles as well as the help of various collectors such as Harold Battles, Marty Beals, Virginia McClure and my wife. The arrangement follows Schilder (1971) as quoted in Taylor, with the exception that genera are reduced to subgenera and intermediate ranks are eliminated.

Melanistic and freak forms exist in many species and are collectable items, but have not been listed for the most part as few have been properly named and most probably do not deserve varietal status.

The most controversial aspect to this list is probably the ranking of such species as *acicularis*. It is my belief that this species, as well as others represent "species" that interbreed (*acicularis* with *spurca*) much in the manner of higher animals, such as the Red and Yellow Shafter Flickers in the bird family, as well as numerous other examples.

My list below shows 192 species and 358 varieties and is by no means the final word. Perhaps if we can persuade Tom, we could have an annual update of this list, based on reader contributions. (Editor's Note: Fine!)

## GENUS *CYPRAEA* Linnaeus, 1758

(subgenera)	(species)	(varieties)	(subgenera)	(species)	(varieties)
<u>Bernaya</u> Jousseaume					<u>gibba</u> Coen
	<u>teulerei</u> Cazenavette				<u>conspurcata</u> Gmelin
<u>Barycypraea</u>			<u>Macrocypraea</u> Schilder		
	<u>fultoni</u> Sowerby			<u>zebra</u> Linne	
<u>Zoila</u> Jousseaume				<u>cervinetta</u> Kiener	<u>dissimilis</u> Schilder
	<u>deciplens</u> Smith			<u>cervus</u> Linne	
	<u>perlae</u> Lopez and Chiang				<u>peilei</u> Schilder
	<u>venusta</u> Sowerby		<u>Mauritia</u> Troschel		
		<u>catei</u> Schilder		<u>mappa</u> Linne	
		<u>episema</u> Iredale			<u>alga</u> Perry
	<u>friendi</u> Gray	<u>sorrentensis</u> Schilder			<u>geographica</u> Schil. & Sch.
					<u>viridis</u> Kenyon
		<u>thersites</u> Gaskoin			<u>rosea</u> Gray
		<u>vercol</u> Schilder			<u>subsignata</u> Melvill
		<u>contraria</u> Iredale		<u>velentia</u> Perry	<u>rewa</u> Steadman & Cotton
	<u>jeaniana</u> Cate	<u>scotti</u> Broderip		<u>scurra</u> Gmelin	<u>panerthya</u> Melvill
	<u>rosselli</u> Cotton				<u>antelia</u> Iredale
	<u>marginata</u> Gaskoin				<u>argiolus</u> Roding
<u>Siphocypraea</u> Heilprin					<u>vono</u> Steadman & Cotton
	<u>mus</u> Linne			<u>eglantina</u> Duclos	
		<u>bicornis</u> Sowerby			<u>perconfusa</u> Iredale
<u>Trona</u> Jousseaume					<u>coutomieri</u> Vayssiere
	<u>stercoraria</u> Linne				<u>monokiti</u> Stead. & Cotton
		<u>rattus</u> Lamarck			<u>niger</u> Roberts



(subgenera)	(species)	(varieties)	(subgenera)	(species)	(varieties)
	<u>arabica</u> Linne	<u>immanis</u> Sch. & Sch. <u>intermedia</u> Gray <u>asiatica</u> Sch. & Sch. <u>dilacerata</u> Sch. & Sch. <u>brunnescens</u> Cate			<u>orcina</u> Iredale <u>polynesiae</u> Sch. & Sch. <u>dama</u> Gray
	<u>grayana</u> Schilder <u>histrio</u> Gmelin		<u>Chelycypraea</u> Schilder	<u>testudinaria</u> Linne	<u>testudinosa</u> Perry <u>ingens</u> Sch. & Sch.
	<u>maculifera</u> Schilder <u>depressa</u> Gray	<u>westralis</u> Iredale	<u>Luria</u> Jousseume	<u>Isabella</u> Linne	<u>controversa</u> Gray <u>rumphii</u> Schilder <u>atriceps</u> Sch. & Sch. <u>cavia</u> Stead. & Cotton <u>temuriana</u> Stead. & Cotton <u>lekalekana</u> Ladd
<u>Talparia</u> Troschel	<u>talpa</u> Linne	<u>dispersa</u> Schil. & Schil. <u>calcequina</u> Melv. & Stand. <u>regina</u> Gmelin		<u>Isabellamexicana</u> Stearns	
	<u>exusta</u> Sowerby	<u>imperialis</u> Sch. & Sch. <u>saturata</u> Dautzenberg		<u>pulchra</u> Gray <u>cinerea</u> Gmelin <u>turida</u> Linne	<u>oceanica</u> Schilder <u>minima</u> Dunker
<u>Cypraea</u> Linne	<u>tigris</u> Linne	<u>lyncichroa</u> Melvill <u>pardalis</u> Shaw <u>volai</u> Stead. & Cotton <u>amboolee</u> Stead. & Cotton <u>schilderiana</u> Cate	<u>Tessellata</u>	<u>tessellata</u> Swainson	
	<u>pantherina</u> Lightfoot	<u>vinosa</u> Gmelin <u>catulus</u> Schilder <u>syringa</u> Melvill <u>funerialis</u> Sullioti	<u>Schilderia</u> Tomlin	<u>achatidea</u> Sowerby	<u>oranica</u> Crosse <u>inopinata</u> Schilder <u>longinqua</u> Sch. & Sch.
<u>Lyncina</u> Troschel	<u>argus</u> Linne	<u>contrastriata</u> Perry <u>ventricosa</u> Gray	<u>Nesiocypraea</u> Azuma & Kurohara	<u>langfordi</u> Kuroda	<u>moretonensis</u> Schilder
	<u>nivosa</u> Broderip <u>broderipii</u> Sowerby <u>leucodon</u> Broderip <u>aurantium</u> Gmelin	<u>aurora</u> Lamarck <u>turanga</u> Stead. & Cotton		<u>hirasei</u> Roberts	<u>queenslandica</u> Schilder
	<u>porteri</u> Cate <u>joycae</u> Clover <u>lynx</u> Linne	<u>williamsi</u> Melvill <u>caledonica</u> Crosse <u>venelli</u> Linne <u>pacifica</u> Stead. & Cotton	<u>Zonaria</u> Jousseume	<u>sakurai</u> Habe <u>teramachii</u> Kuroda <u>midwayensis</u> Azuma & Kurohara <u>listetae</u>	
	<u>carneola</u> Linne	<u>titan</u> Schil. & Schil. <u>crassa</u> Gmelin <u>halmaja</u> Melvill <u>toebbeckeana</u> Weinkauff <u>sowerbyana</u> Anton <u>thepalea</u> Iredale		<u>gambiensis</u> Shaw <u>zonaria</u> Gmelin <u>picta</u> Gray <u>annettae</u> Dall	<u>aequinoctialis</u> Schilder
	<u>propinqua</u> Garrett <u>leviathan</u> Schilder & Schilder <u>schilderorum</u> Iredale	<u>kuroharai</u> Habe		<u>sanguinolenta</u> Gmelin <u>petitiana</u> Crosse	<u>angelicae</u> Clover
	<u>sulcidentata</u> Gray <u>reevei</u> Sowerby <u>ventriculus</u> Lamarck	<u>topee</u> Stead. & Cotton	<u>Cypraeovula</u> Gray	<u>pyrum</u> Gmelin	<u>senegalensis</u> Schilder <u>insularum</u> Schilder <u>angolensis</u> Odhner <u>maculosa</u> Gmelin
	<u>vitellus</u> Linne	<u>sarcodes</u> Melvill		<u>robertsi</u> Hidalgo <u>arabica</u> Lamarck <u>nigropunctata</u> Gray <u>spadicea</u> Swainson	<u>cohenae</u> Burgess <u>gondwanalandensis</u> Burgess <u>gloriosa</u> Shikama <u>cruckshanki</u> Kilburn

(subgenera)	(species)	(varieties)	(subgenera)	(species)	(varieties)
	<u>fuscodentata</u> Gray	<u>coronata</u> Schilder		<u>ovum</u> Gmelin	<u>chrysostoma</u> Schilder
	<u>algoensis</u> Gray				<u>palauensis</u> Sch. & Sch.
	<u>edentula</u> Gray	<u>alfredensis</u> Sch. & Sch.		<u>errones</u> Linne	<u>bimaculata</u> Gray
	<u>amphithales</u> Melvill				<u>mozambicana</u> Sch. & Sch.
	<u>capensis</u> Gray	<u>elizabethensis</u> Rous.			<u>oblonga</u> Gmelin
<u>Notocypraea</u> Schilder					<u>proba</u> Iredale
	<u>pulicaria</u> Reeve	<u>euclia</u> Steadman & Cotton			<u>nimiserrans</u> Iredale
	<u>piperita</u> Gray	<u>bicolor</u> Gaskoin			<u>coerulescens</u> Schilder
		<u>dissecta</u> Iredale			<u>coxi</u> Brazier
	<u>comptoni</u> Gray	<u>subcarnea</u> Beddome		<u>cylindrica</u> Born	<u>kalavo</u> Steadman & Cotton
		<u>mayi</u> Beddome			<u>vivili</u> Steadman & Cotton
		<u>albata</u> Beddome			<u>magerrones</u> Iredale
		<u>wilkinsi</u> Griffiths			<u>chrysophaea</u> Melvill
		<u>trenberthae</u> Trenberth			<u>bartletti</u> Stead. & Cotton
		<u>casta</u> Schil. & Summers			
		<u>hartsmithi</u> Schilder			<u>sista</u> Iredale
	<u>declivis</u> Sowerby	<u>occidentalis</u> Iredale		<u>caurica</u> Linne	<u>sowerbyana</u> Schilder
	<u>angustata</u> Gmelin	<u>emblema</u> Iredale			<u>tenella</u> Iredale
		<u>molleri</u> Iredale			<u>wangga</u> Stead. & Cotton
		<u>verconis</u> Cotton & Godfrey			<u>dracaena</u> Born
<u>Umbilia</u> Jousseaume					<u>elongata</u> Perry
	<u>ameniacia</u> Verco				<u>longior</u> Iredale
	<u>hesitata</u> Iredale	<u>beddomei</u> Schilder			<u>nigrocincta</u> Schilder
		<u>howelli</u> Iredale			<u>quinquefasciata</u> Born
<u>Erronea</u> Troschel				<u>felina</u> Gmelin	<u>corrosa</u> Gronov
	<u>walkerii</u> Sowerby				<u>thema</u> Iredale
		<u>surabajensis</u> Schilder			<u>blaesae</u> Iredale
	<u>bregeriana</u> Crosse	<u>continens</u> Iredale	<u>Notadusta</u> Schilder		<u>fabula</u> Kiener
	<u>pyriformis</u> Gray	<u>smithi</u> Sowerby		<u>punctata</u> Linne	<u>melvilli</u> Hidalgo
		<u>kaiseri</u> Kenyon			<u>listeri</u> Gray
	<u>pulchella</u> Swainson	<u>pericalles</u> Melv. & Stand.			<u>pauciguttata</u> Schilder
		<u>novaebritanniae</u> Sch. & Sch.			<u>velesia</u> Iredale
		<u>vayassieri</u> Schilder			<u>vatu</u> Steadman & Cotton
	<u>hungerfordi</u> Sowerby	<u>coucomi</u> Schilder			<u>atomaria</u> Gmelin
	<u>barclayi</u> Reeve				<u>trizonata</u> Sowerby
	<u>xanthodon</u> Sowerby	<u>fernandoi</u> Cate			<u>iredalei</u> Schilder
	<u>vredenburgii</u> Schilder	<u>stohleri</u> Cate & Schilder			<u>carula</u> Iredale
	<u>pallida</u> Gray	<u>insulicola</u> Schilder			<u>persticta</u> Iredale
		<u>dorsalis</u> Sch. & Sch.		<u>katsuae</u> Kuroda	
		<u>piscatorum</u> Schilder		<u>musumee</u> Kuroda & Habe	<u>superstes</u> Schilder
		<u>vaticina</u> Iredale		<u>rabaulensis</u> Schilder	
		<u>kesata</u> Stead. & Cotton		<u>martini</u> Schepman	
		<u>anceyi</u> Vayssiere			
	<u>onyx</u> Linne	<u>adusta</u> Lamarck	<u>Palmadusta</u> Iredale		
		<u>nymphae</u> Jay		<u>saulae</u> Gaskoin	<u>siasiensis</u> Cate
		<u>melanesiae</u> Sch. & Sch.			<u>nugata</u> Iredale
		<u>succincta</u> Linne			<u>jenostergaardi</u> Ingram
		<u>persica</u> Schilder		<u>contaminata</u> Sowerby	<u>distans</u> Sch. & Sch.
					<u>malaysia</u> Sch. & Sch.
				<u>lutea</u> Gmelin	
				<u>humphreysi</u> Gray	<u>bizonata</u> Iredale
				<u>lentiginosa</u> Gray	
				<u>ziczac</u> Linne	<u>misella</u> Perry
					<u>vittata</u> Deshayes
					<u>undata</u> Lamarck
					<u>signata</u> Iredale

(subgenera)	(species)	(varieties)	(subgenera)	(species)	(varieties)
	<u>diluculum</u> Reeve	<u>virginalis</u> Sch. & Sch.			<u>vitiensis</u> Stead. & Cotton
	<u>clandestina</u> Linne	<u>candida</u> Pease		<u>owenii</u> Sowerby	<u>marcia</u> Iredale
		<u>passerina</u> Melvill			<u>landeri</u>
		<u>moniliaris</u> Lamarck		<u>hirundo</u> Linne	<u>vasta</u> Schilder
		<u>whitleyi</u> Iredale			<u>francisca</u> Sch. & Sch.
		<u>extrema</u> Iredale			<u>neglecta</u> Sowerby
	<u>artuffelli</u> Jousseau				<u>rouxi</u> Ancey
	<u>asellus</u> Linne	<u>bitaeniata</u> Geret			<u>cameroni</u> Iredale
		<u>kawakawa</u> Stead. & Cotton		<u>ursellus</u> Gmelin	<u>peroprima</u> Iredale
		<u>latefasciata</u> Schilder			<u>korolevu</u> Stead. & Cotton
		<u>vespacea</u> Melvill			<u>coffea</u> Sowerby
	<u>gracilis</u> Gaskoin	<u>macula</u> Angas			<u>amoeba</u> Sch. & Sch.
		<u>notata</u> Gill		<u>stolida</u> Linne	<u>endela</u> Iredale
		<u>japonica</u> Schilder			<u>diauges</u> Melvill
		<u>hilda</u> Iredale			<u>brevidentata</u> Sowerby
		<u>cholmondeleyi</u> Melvill			<u>crossei</u> Marie
		<u>purpuratus</u>			<u>fluctuans</u> Iredale
	<u>hammondae</u> Iredale	<u>raysummersi</u> Schilder			<u>deceptor</u> Iredale
	<u>fimbriata</u> Gmelin	<u>durbanensis</u> Sch. & Sch.			<u>thakau</u> Steadman & Cotton
		<u>unifasciatus</u> Mighels			<u>irvineanae</u> Cox
		<u>marmorata</u> Schroter			<u>nandronga</u>
		<u>waikikiensis</u> Schilder		<u>erythraeensis</u> Sowerby	
	<u>minoridens</u> Melvill	<u>blandita</u> Iredale	<u>Ovatipsa</u> Iredale		
		<u>suvaensis</u> Stead. & Cotton		<u>chinensis</u> Gmelin	<u>sydneyensis</u> Schilder
	<u>serrulifera</u> Schilder	<u>chrysalis</u> Kiener			<u>tortirostris</u> Sowerby
	<u>microdon</u> Gray	<u>granum</u>			<u>coloba</u> Melvill
<u>Blasicrura</u> Iredale					<u>gregori</u> Ford
	<u>coxeni</u> Cox	<u>hesperina</u> Sch. & Sch.			<u>violacea</u> Rous.
	<u>steineri</u> Cate	<u>theilei</u> Sch. & Sch.	<u>Cribraria</u> Jousseau		<u>whitworthi</u> Cate
	<u>quadrimaculata</u> Gray	<u>garretti</u> Sch. & Sch.		<u>cribraria</u> Linne	<u>variolaria</u> Lamarck
	<u>pallidula</u> Gaskoin	<u>rhinoceros</u> Souverbie			<u>comma</u> Perry
		<u>vivia</u> Stead. & Cotton			<u>fallax</u> Smith
		<u>simulans</u> Sch. & Sch.			<u>melwardi</u> Iredale
	<u>dayritiana</u> Cate				<u>orientalis</u> Sch. & Sch.
	<u>luchuana</u> Kuroda	<u>subfasciata</u> Link		<u>cribellum</u> Gaskoin	<u>exmouthensis</u> Melvill
	<u>summersi</u> Schilder	<u>pellucens</u> Melvill		<u>esontropia</u> Duclos	<u>northi</u> Steadman & Cotton
	<u>interrupta</u> Gray	<u>alveolus</u> Taperone-Canefti		<u>catholicorum</u> Schilder & Schilder	<u>zadela</u> Iredale
	<u>teres</u> Gmelin	<u>pentella</u> Iredale		<u>gaskoini</u> Reeve	
		<u>hermani</u> Iredale		<u>fischeri</u> Vayssiere	<u>cleopatra</u> Schilder
	<u>subteres</u> Weinkauff			<u>cumingii</u> Sowerby	<u>astaryi</u>
	<u>rashleighana</u> Melvill	<u>eunota</u> Taylor			<u>kingae</u> Rehder & Wilson
		<u>laticornis</u> Melvill		<u>bernardi</u> Richard	
	<u>goodalli</u> Sowerby	<u>fuscomaculata</u> Pease		<u>haddnighiae</u> Trenberth	
<u>Bistolida</u> Cossmann	<u>kieneri</u> Hidalgo	<u>depriesteri</u> Schilder	<u>Pustularia</u> Swainson		
		<u>reductesignata</u> Schilder		<u>mariae</u> Schilder	<u>brevirostris</u> Sch. & Sch.
		<u>schneideri</u> Sch. & Sch.		<u>globulus</u> Linne	<u>tricornis</u> Jousseau
					<u>maricola</u>
				<u>clercula</u> Linne	<u>sphaeridium</u> Sch. & Sch.
					<u>liardi</u> Jousseau
					<u>vulavula</u> Stead. & Cotton
					<u>jennisoni</u> Stead. & Cotton



(subgenera)	(species)	(varieties)	(subgenera)	(species)	(varieties)
	<u>bistrinotata</u> Schilder	<u>margarita</u> Dillwyn & Schilder <u>keelingensis</u> Sch. & Sch. <u>medicinis</u> Sch. & Sch. <u>sublaevis</u> Sch. & Sch.		<u>poraria</u> Linne	<u>scarabaeus</u> Bory <u>wilhelmina</u> Kenyon <u>theoreta</u> Iredale
	<u>mauiensis</u> Burgess <u>childreni</u> Gray	<u>novaecaledoniae</u> Sch. & Sch. <u>lemurica</u> Sch. & Sch. <u>samurai</u> Sch. & Sch.		<u>engleri</u> Summers & Burgess <u>albuginosa</u> Gray	<u>nariaeformis</u> Schilder
<u>Propustularia</u> Schilder	<u>surinamensis</u> Perry			<u>spurca</u> Linne	<u>atlantica</u> Monterosato <u>sanctahelenae</u> Schilder
<u>Monetaria</u> Troschel	<u>moneta</u> Linne	<u>icterina</u> Lamarck <u>barthelemyi</u> Bernardi <u>mercatorum</u> Rochebrune <u>rhomboides</u> Schilder <u>monetoides</u> Iredale <u>isomeres</u> Iredale <u>endua</u> Stead. & Cotton <u>maxima</u> Dautzenberg <u>etoli</u> Steadman & Cotton <u>harrisi</u> Iredale		<u>acicularis</u> Gmelin <u>erosa</u> Linne	<u>chlorizans</u> Melvill <u>phagedaina</u> Melvill <u>straminea</u> Melvill <u>purissima</u> Vredenburg <u>lactescens</u> Dautz. & Bouge <u>kauilani</u> Kenyon
	<u>annulus</u> Linne	<u>dranga</u> Iredale <u>scutellum</u> Sch. & Sch. <u>hamandiana</u> Rochebrune <u>camellorum</u> Rochebrune <u>noumeensis</u> Marie		<u>nebrites</u> Melvill	<u>mozambicana</u> Sch. & Sch. <u>ceylonensis</u> Sch. & Sch.
	<u>obvelata</u> Lamarck	<u>perrieri</u> Rochebrune		<u>occellata</u> Linne <u>marginalis</u> Dillwyn	<u>pseudocellata</u> Sch. & Sch.
<u>Naria</u> Broderip	<u>irrorata</u> Gray			<u>miliaris</u> Gmelin	<u>magistra</u> Melvill <u>differens</u> Schilder <u>inocellata</u> Coen <u>metavona</u> Iredale <u>diversa</u> Kenyon <u>nivea</u> Preston <u>nitibashi</u>
<u>Erosaria</u> Troschel	<u>dillwyni</u> Schilder	<u>theeva</u> Steadman & Cotton		<u>eburnea</u> Barnes	<u>mara</u> Iredale
	<u>beckii</u> Gaskoin <u>thomasi</u> Crosse <u>macandrewi</u> Sowerby <u>cernica</u> Sowerby	<u>tomlini</u> Schilder <u>viridicolor</u> Cate <u>kemadecensis</u> Powell <u>mariae</u> Cate <u>ogasawarensis</u> Schilder <u>prodiga</u> Iredale		<u>lamarckii</u> Gray	<u>redimita</u> Melvill
	<u>labrolineata</u> Gaskoin	<u>nashi</u> Iredale <u>helenae</u> Roberts <u>maccullochi</u> Iredale <u>nasei</u> Steadman & Cotton		<u>turdus</u> Lamarck	<u>foedata</u> Sullioti <u>winckworthi</u> Schilder <u>pardalina</u> Dunker
	<u>gangranosa</u> Dillwyn	<u>reentsii</u> Dunker		<u>guttata</u> Gmelin	<u>azumai</u> Schilder
	<u>boivini</u> Kiener	<u>amoena</u> Schilder		<u>caputserpentis</u> Linne	<u>reticulatum</u> Gmelin <u>caputophidii</u> Schilder <u>mikado</u> Sch. & Sch. <u>argentata</u> Dautz. & Bouge <u>kenyonae</u> Sch. & Sch. <u>caputanguis</u> Philippi
	<u>ostergaardi</u> Dall <u>helvola</u> Linne	<u>argella</u> Melvill <u>hawaiiensis</u> Melvill <u>mascarena</u> Melvill <u>callista</u> Shaw <u>citrinicolor</u> Iredale <u>meridionalis</u> Sch. & Sch. <u>alleni</u> Ostergaard	<u>Staphylaea</u> Jousseume	<u>caputdraconis</u> Melvill	<u>interstincta</u> Wood <u>monstrans</u> Iredale <u>ruvaya</u> Steadman & Cotton
	<u>citrina</u> Gray				<u>annae</u> Roberts <u>polita</u> Roberts <u>spadix</u> Mighels
				<u>limacina</u> Lamarck	<u>descripta</u> Iredale <u>laevigata</u> Dautzenberg <u>consobrina</u> Garret <u>nukulau</u> Stead. & Cotton
				<u>semitota</u> Mighels	
				<u>staphylaea</u> Linne	
			<u>Nuclearia</u> Jousseume	<u>nucleus</u> Linne	<u>gemmosa</u> Perry

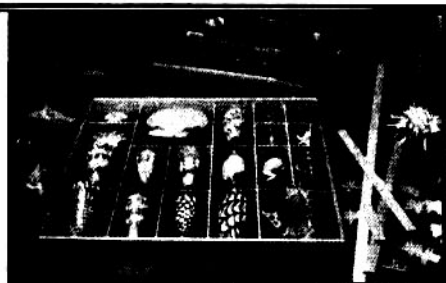
(subgenera)

(species)

(varieties)

cassiaui Burgess  
 madagascariensis Gmelin  
 sturangi Sch. & Sch.  
 granulosa

granulata Pease



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**MORE ON GREEN TREE SNAILS**

Dear Editor,

To lay the fears of conservationists and others who are concerned over the Manus Green Tree Snail, as noted by articles in your magazine, I would like to point out a few matters of interest on the subject.

a. *Papuina pulcherrima* is found in the hilly centre of Manus, not near the coast as has been stated.

b. This pulmonate is collected when the area is cleared for gardening, the pulmonates are found in the cut down brush. An average garden covers only approximately 50 square metres. The population in the centre of Manus is sparse, consequently shells have only been collected from an infinitesimal portion of the jungle where the pulmonate lives.

c. I estimate that approximately 95% of the shells taken and obtained by collectors come from the eastern third of the pulmonate area.

The remaining two-thirds to the west is virtually untouched, as there are almost no villages or hamlets in the area.

d. The pulmonate is virtually invisible by virtue of its colouring and attempts to "harvest" this shell without cutting down brush has been met every time by frustration.

e. Only the minor "inland" population are suppliers of the shell as the more numerous coastal villages have no land rights inland.

f. The pulmonate is a hardy animal. By accident a live escapee lived in adverse conditions (on my living room ceiling) for 10 days without food or water before being found and placed into a laboratory pen where it revived and became quite normal.

g. A recent lack of these shells being collected was caused (as explained by natives) by a blight which has killed off a lot of taro on which the animal also feeds, and thus they

have sought other vegetation deeper in the jungle, hiding deeper (and breeding and feeding) in more inaccessible conditions favourable to the animal.

In my personal opinion, and lay-man observations, the animal is in no danger of extinction through over collecting or any other means. The animal abounds in almost inaccessible jungle untouched by suppliers and will continue to thrive for many years to come.

The conservation conscious attitude of the Papua New Guinea Government in allowing only one licenced shell dealer in Papua New Guinea to export these shells further protects the animal which has been in the past, subject to export by many unscrupulous persons.

Yours sincerely,

R. L. Knight  
 Lorengau, Manus Island  
 Papua New Guinea

**PROBLEMS AND POSSIBILITIES**

Continued from page 166

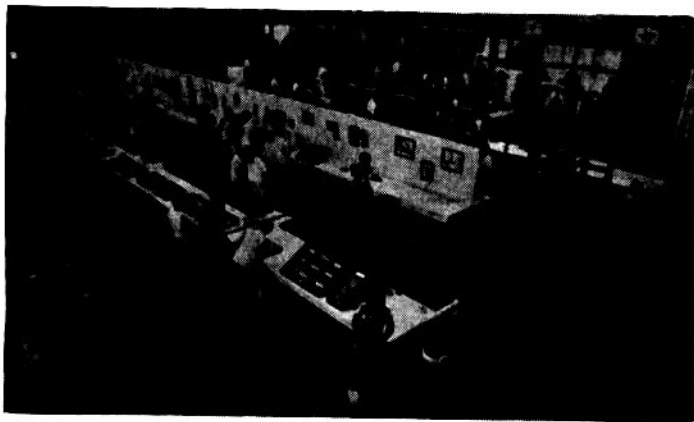
of the purple dye, *Murex trunculus* and *M. brandaris*, are regularly found in the mercado. Among mussels, *Cardium echinatum*, *Dosinia exoleta*, *Callista chione*, *Venus verrucosa* and *V. gallina*, are often available in quantities.

This article started with the Baltic Sea and ended up with the Mediterranean. Both are large water basins separated from the oceans by narrow straits. This is a dangerous situation in these days because of the increasing pollution from human activities around these waters. The Baltic is sensitive mainly owing to its generally low temperature and the resulting low

turn-over rate, but the Mediterranean is surrounded by land areas much more densely populated. Let us hope that modern man will not definitely spoil these classical waters, where the goddess of beauty was carried to the shore of Kythera on the great scallop shell, and the Tritons blew their shell trumpets in her honor.

# Jacksonville Shell Show - 1977

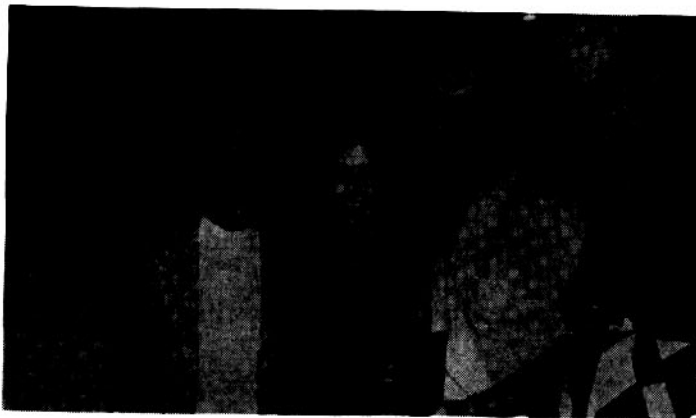
DR. HARRY G. LEE



Display area of the 1977 Jacksonville Shell Show.



A shell calliope, 50 years old, by Thomas A. White.



Left to right: Robert W. Morrison and Russel Jensen, judges; Susan and John Lott, DuPont Trophy winners; Selma Lawson, judge.



Leslie and Kay Easland, winners Exhibitor's Award

PHOTOS BY ALLAN B. WALKER

Cloudy skies and scattered showers failed to deter thousands of visitors to the Jacksonville Beach Flag Pavilion July 30 and 31. The Jacksonville Shell Club's thirteenth show offered over 750 lineal feet of 167 informative and inspiring exhibits to all and provided fulfillment to the scores of exhibitors from as far away as Hawaii and Virginia.

The 45 exhibit categories were about evenly divided between "scientific" and "arts and crafts" divisions. Russell H. Jensen of the Delaware Museum teamed with popular Floridians Selma (Sam) Lawson and Bob Morrison to judge the scientific exhibits. Jacksonville experts Irene Farrah, Jay Harder and Blanche Murray reviewed the artistic displays.

The coveted duPont Trophy went to John and Susan Lott of nearby Atlantic Beach for their exhibit of Strombidae, which featured a virtually complete representation of species, eye-catching notes on the life history of the conchs, original photographs and even a life-like model of a living *Strombus raninus*. The Lotts' recognition didn't stop there - they were also awarded a Blue Ribbon and the "Most Educational" rosette for this exhibit as well as

a Blue Ribbon and "Outstanding Exhibit" rosette for their self-collected Bahamian shells.

Leslie and Kay Easland of Orlando, Florida presented a beautiful and extensive collection of Florida shells which was honored not only with a Blue Ribbon, but with the "Exhibitors' Award" based on a poll of all competitors in the division. Led by Mr. and Mrs. Robert Worman of Merritt Island, Florida, several exhibitors received multiple awards for their art work with shells. These winners included local exhibitors Mrs. Charles Murchison, Ruth Abramson, Minnie Lee and Don Campbell and Billy Aley, as well as Thea A. Busch of nearby St. Augustine.

The undisputed "Self-collected-Shell-of-the Show" was Ed Schelling's magnificent live-taken *Cypraea kuroharai* from Okinawa, and the comparatively mundane *Festilyria ponsobyi* was picked from Harry Lee's Blue Ribbon winning exhibit of "Rare Shells" as "Shell-of-the-Show". Double winners in the scientific division included the Lotts, Dr. and Mrs. Rowland Zeigler of Florence, S.C. and Dora and Fred Chauvin of St. Augustine.

The judges gave special recognition to Major Jeff Dunning for his beautiful and informative "Hawaiian *Cypraea*", local aquarists of the Jacksonville Marine Aquarium Society for their striking display of living marine mollusks and the Wormans, who captured the coveted "Most Creative" award.

We were happy to have some special visitors from elsewhere in Florida join in the proceedings. Jerry Bijur and Lucia King of Naples, Al Calabrese and Gary Magnotte of Ft. Lauderdale and Germaine Wamke of Gainesville, seemed to agree that show and surrounding activities were stimulating and enjoyable.

The dozens of club members who collaborated in this year's production are especially thankful to their leaders for a gratifying effort. Show Chairperson Charlotte Lloyd, Entries Chairpersons Allan Walker and Ellie Macedonia and Bonnie Holman, who captained the shell shop, put forth an inspiring show of spirit and hard work and deserve our hardy thanks. Special mention is also due John Lott who edited (and published) the fine program distributed to all visitors. It will serve as a memento of time and effort well spent.



## INTERNAL STRUCTURE OF SEA SHELLS

The X-ray on page 163 is one of a collection originally presented in a series of three portfolios entitled "Internal Structures of Sea Shells" by Dr. W. W. Sutow and E. Libby. Although no longer available, a number of sets are still available through Dr. Sutow, made up of miscellaneous prints and broken sets, each contains 8 prints, including the

golden cowrie, nautilus, precious wentletrap and *Conus gloria-maris*. Sets are \$10.00 each from Dr. W. W. Sutow; 4371 North MacGregor Way; Houston, TX. 77004. Number of sets available is limited.

We thank Dr. Sutow for the opportunity to present the *Thatcheria mirabilis* herein.



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**SHELL COLLECTING IN CEYLON**  
Continued from page 148

like being in a barrel going over a falls. The swells were fifteen to twenty feet high even where we dropped anchor in sixty feet of water. Rodney said this was good weather! Joyce just hung onto the mast and watched us as we literally fell overboard getting our tanks on. Once down in the water it wasn't so bad, except the surge would toss you ten feet or more and you had to quickly grab for a shell when you spotted one. I can well see why *Conus zonatus* stays an uncommon shell and why *Voluta cloveriana* was never discovered before as this was no place to be shell collecting! A possibly new species of *Turbinella* lives here also and I was able to collect one - it differs in size, shape and pattern from *T. pyrum*. We did get some *Conus augur*, *C. araneosus*, two fair *Conus zonatus* and one *Cypraea coloba* for our efforts.

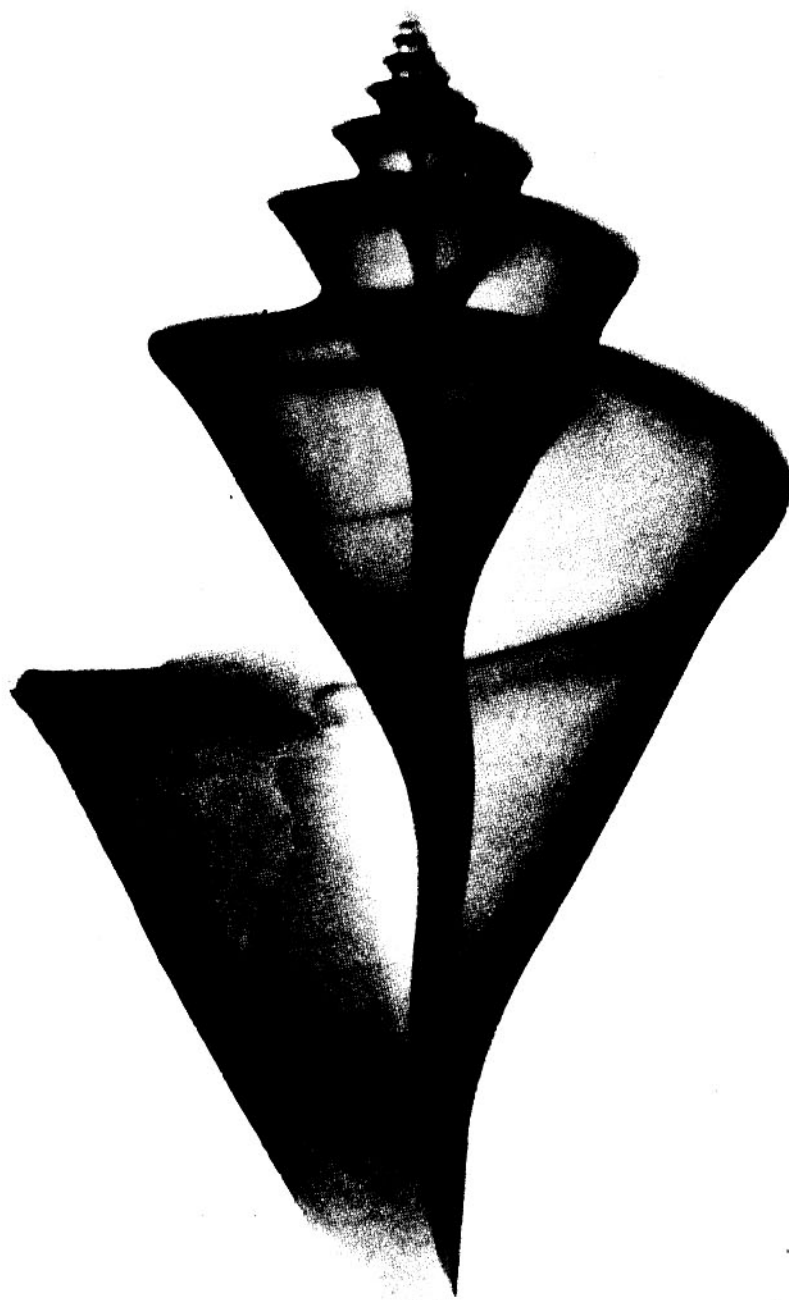
Rod collected some rare marine fish that live in this rough area too.

Near Tangalle is a very dangerous reef for shipping known as the Great Basses. There the waters are calm for only two or three weeks each year. Recently, during one of these calms, Rod and some friends discovered an old wreck which yielded several thousand silver Arabic coins. Some of the coins were 300 years old. The find has added interest in diving in this area.

I would liked to have stayed six months and covered more of the good diving areas of Ceylon. We even found shells in Colombo Harbor, including *Murex palmarosa* and *Cypraea interrupta*. But after a few more days around Colombo we checked in with the Customs people. They were not very happy to see us as they insist on checking all baggage - ours was mostly fresh

and very smelly shells! Sowe said goodbye to Ceylon and flew back to Madras, in southern India, for a couple days of sightseeing. The shops along the beach sell the famous Chank shells for religious use. To my surprise I found other shells too: *Voluta lapponica*, *Melo melo*, cones and Tiger Cowries, all polished with lacquer, but not one was a specimen shell.

In Bangkok we also found shells for sale in the temple areas. I noticed temple walls decorated with hundreds of *Cypraea mauritiana*. The temple that impressed me the most, however, had a recently discovered Buddha, ten feet tall and covered with plaster. When it was chipped, in moving, the Buddhists discovered it was made of 5½ tons of solid gold! That, my friends, would buy a lot of sea shells!



*Thatcheria mirabilis*

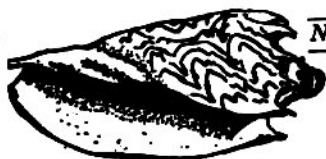


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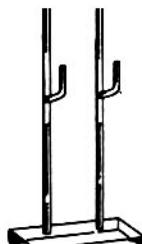
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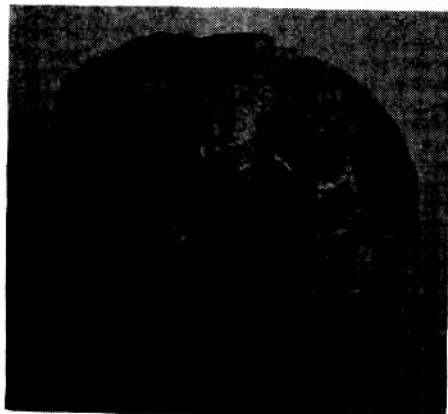
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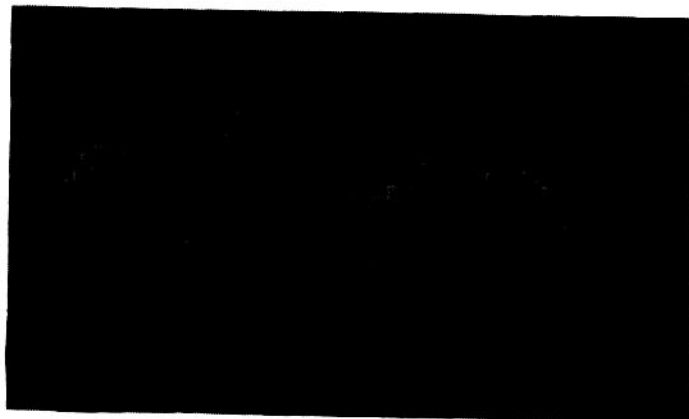


# Problems & Possibilities of a Swedish Conchologist

GOSTA FAHREUS



*Oriostoma* sp., fossil



Fossil Brachipods from Gotland, Sweden

I am living on a small island, surrounded by large areas of shallow water. This should be an almost ideal existence for a shell enthusiast, but, unfortunately, these waters house a very poor molluscan fauna, comprising less than ten different species, most of them small and dull. One may find dwarf specimens of *Mya arenaria*, *Macoma balthica*, *Cardium edule*, *Mytilus edulis*, *Lymnaea peregra*, *Theodoxus fluviatilis* and some still smaller gastropods - that is all.

Those familiar with the mollusks of Europe can easily guess the location of the island. It lies in the middle of the Baltic Sea, close to Gotland, "the pearl of the Baltic". This part of Sweden is a lovely place for tourists and particularly for botanists, owing to its rich vegetation - it is widely known for the abundance of wild orchids. It is also a mecca for ornithologists; it is, for instance, a resting place for northern migratory birds on their way north or south. But the water of the Baltic is not suitable for the development of a varied marine life.

This is a consequence of its low salinity. Salinity ranges from about 0.4 to 0.7 per cent; this is too low to permit the sea mollusks properly develop, but too high for freshwater species, except for a few (e.g. *Limnaea peregra* and *Theodoxus fluviatilis*) which are somewhat salt-tolerant. The low salinity is mainly due to the many rivers flowing into the Baltic from the Scandinavian mountains and the Russian plains. In addition, the Baltic is a very shallow basin and the straits connecting it with the North Sea are narrow, a high threshold preventing normally heavier salt water from entering. Fortunately, North Sea salt water is occasionally pushed into the Baltic by storms and oxygenates the otherwise rather stagnant deep water holes.

Photographs are by the author.

It is true that the west coast of Sweden, where the salinity of the water approached that of the oceans, has a richer mollusk fauna. Still, the northern climate is a barrier to the many colorful species of southern seas. Perhaps as a consequence of this, maybe also for other reasons (the heritage of Linnaeus making botany more popular in Sweden?), there are few people interested in shell collecting, especially when compared with the U.S. There is not, as far as I know, a single shell club in Sweden. There are few specialists, even at the museums, although the large Natural History Museum in Stockholm has a pretty good collection of shells.

My own interest in shells dates back to my 15th year and arose by a rather extraordinary event: by the will of an aunt, who died without children, I came into possession of a small, but beautiful collection of mostly tropical shells, stored in a handsome old cupboard. My aunt, in her turn, had inherited the collection from an old relative (born in 1820). I cannot trace

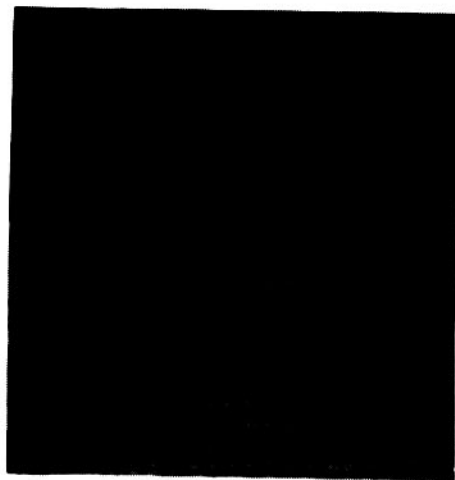
it farther back, but the collection might well be still older and perhaps even from the 18th Century, when natural cabinets were highly in vogue.

These shells made a deep impression on a boy already interested in biology. Practically all of them were unnamed, and I became an eager visitor to the Natural History Museum in Stockholm. This was not far from my home, and I walked there every free day in order to compare my own shells with the specimens exhibited at the Museum. To my satisfaction I was able to determine most of the shells, and in this way I became familiar with the taxonomy of mollusks. I should say that it was the right age for learning Latin names; now, 50 years later, I have hardly forgotten any name I learned in those days.

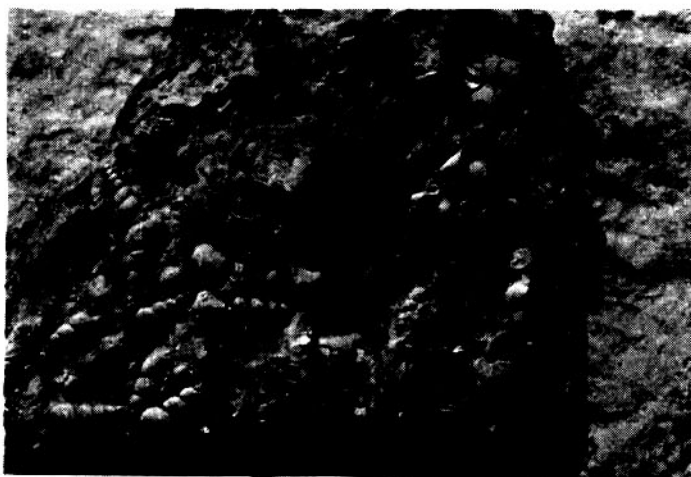
During several University years and later in life, while working at an Agricultural College, I had little time to cherish my fancy for shells. Although not entirely forgotten, the collection was put aside in boxes and drawers for about forty years. One day, however, the suppressed passion broke forth again; it happened when I visited Australia to take part in a congress. I remember very clearly a small incident that put the whole thing in motion: walking through a park in the centre of Adelaide I observed a nice big sea shell (later determined to be *Bulla botanica*) lying right on the soil between some ornamental shrubs. Apparently it had been brought there with seaweed used as manure. Next Sunday I went down to the shore to find out about this shell, I saw lots of them, as well as other species. After that Sunday on the beach I was definitely lost to the fascination of shell collecting.

Returning to Gotland again, How can a hobby for shells be cultivated in such a place?

Please turn to the next page.



*Loxonema* sp., fossils



Rock with Loxonema and various other species.



Trilobite and Brachiopods appear in broken rock.

I have found three answers to this question. First, one might study land and freshwater shells. The species occurring here are not very numerous or conspicuous, but there are in fact more species of land snails than marine species to be found. And, evidently, surprises are at hand for a keen observer. Close to my house I recently discovered a well-established colony of a typically Mediterranean species, *Helicella intersecta* Poiret (synonym: *H. caperata* Mortagu), which had previously not been observed north of Denmark and southwestern Sweden, about 300 km. away. It is an enigma how it arrived here.

Second, a fascinating line of shell collecting in this island is to look for fossils. Gotland has a long and interesting geological history, and large parts of it have been flooded by the sea, the last time some 7,000 years ago then the salt "Littorina sea" covered parts of the island. Deposits from this time have been found in the gravel of the "Littorina wall", about twenty-five meters above the present sea level. But, the most obvious impact of earlier periods dates back to the Silurian Era, around 400 million years ago. Owing to continental drift and perhaps to differences in the inclination of the earth's axis, Gotland, in that time, happened to lie near the equator and the tropical seas permitted huge coral reefs to build up. The calcareous bedrock of Gotland is, therefore, very rich in fossils from this period. Besides corals there are plenty of trilobites, crinoids, gastropods and brachiopods; with the latter group, especially, one frequently finds small, separate individuals with an almost intact surface structure in spite of their inconceivably old age. It is a breath-taking experience to come across nearly perfect specimens which have been dead for hundreds of millions of years and still have kept their original shape.

My third solution to the collecting problem is, of course, to travel abroad to places with a more generous climate. Scandinavian agencies offer a large variety of inexpensive charter flights, mainly to the Mediterranean and to North Africa. A "long-time vacation" for two months or more may be bought at a very reason-

able price. With increasing age, one appreciates this chance to escape the severe northern winters; if this can be combined with shell collecting, the fun is greatly increased.

Personally, I think that the western Mediterranean, for instance the south coast of Spain, is a good collecting area, but since I go in winter, the water is too cold to allow prolonged swimming. So, as a rule, I have to keep to the beach. It is easy to find pretty specimens of *Patella*, *Monodonta*, *Gibbula*, etc., on the rocks. But, a patient searching of rubble and sand, especially near rocks, often yields an astonishing number of small dead shells which, nevertheless, may be almost perfect. As a rule they lack operculum, but for determinative purposes this is seldom necessary, so to my mind it is only a small disadvantage. I am primarily fascinated by the endless variation in shapes and colors of shells within the limits set by genus or species characters, and I have no illusion about the scientific value of my collection.

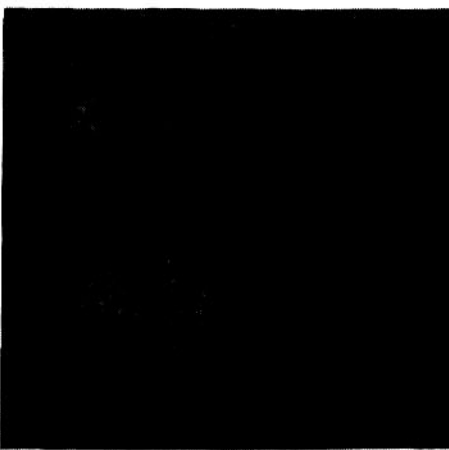
For determination work I use the rather complete, although a little impractical books of Nordsieck (there is, for instance, no alphabetical index of names): *Die europäischen Meeresgeschlechtschnecken* and *Die europäischen*

*Meeresmuscheln* (both in German). Still, difficulties are often encountered. Within the genus *Patella*, for instance, there is a long series of intermediate forms between the species *coerulea*, *depressa* and *aspera*. The variation of species within the large genus *Gibbula* has often defeated my efforts to a correct identification.

During two periods, for ten weeks altogether, (in December and January) at the little town of Marbella, not far from Gibraltar, I gathered about 140 different species, 60 bivalves and 80 gastropods, which I think is a fairly good result from collecting in a non-tropical region. It is impossible here to give a complete list, but just to give a hint, I found 7 *Cardium* (sens. lat.) and 5 *Venerupis* species, 16 trochids, among them 8 *Gibbula* species, 5 naticids, 9 nassariids and 6 muricids. Some species typical for the Atlantic coast apparently enter through the Strait of Gibraltar and can be found in the westernmost part of the Mediterranean Sea. Such species are, for instance, *Cymbium olla*, *Cancellaria cancellata*, *Littorina punctata*, *Siphonaria pectinata*. A rather peculiar find I made, at a pier in the town of Marbella, were the pretty shells of *Amygdalum politum* (Verrill & Smith). Both according to Nordsieck's book and Abbott's *American Seashells*, this is a deep water species (occurring on both sides of the Atlantic). However, I found a colony nesting right at the low water level. The shells are quite conspicuous with their green angular markings.

The big Atlantic Scallop, *Pecten maximus*, is caught by fishermen in this part of the Mediterranean and is sold on the fish market, where fine specimens of various sizes can easily be obtained - the meat is very delicious. I never saw the Mediterranean counterpart, *P. jacobaeus*, in this place. A large variety of other mussels and snails are also sold in the market; it seems that almost any larger species is used for food, and even some pretty small ones, such as the common *Donax trunculus*. The large *Charonia lampas*, as well as the two species used by the Phoenicians for production

Continued on page 160, column one

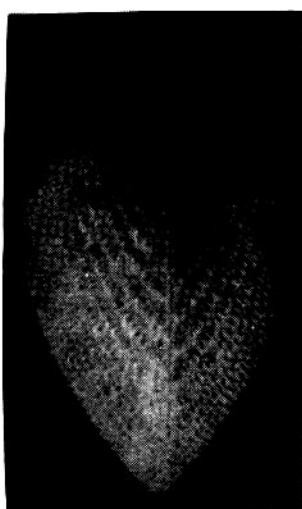
*Atrypa* sp. and other fossil brachiopods.

## COLLECTING IN ANTARCTICA

JULES HERTZ



Figure 1. Antarctic grunge.

Fig. 2. Outside of *Limatula hodgsoni*Fig. 3. Edge view of *L. hodgsoni*

(This article originally appeared in *The Festivus*, published by The San Diego Shell Club, and is reprinted here with permission of the author.)

For those of us in attendance at the October 19, 1972 meeting of the San Diego Shell Club, Dr. Gordon A. Robilliard's talk and slide show on "Marine Biology of Antarctica" was fascinating and exciting. There were many who would have loved to explore in seemingly virgin territory, although the rigorous weather and diving conditions sounded a little frightening. Gordon described (Robilliard 1972) the project that he and Dr. Paul Dayton, now a professor at Scripps Institution of Oceanography, conducted during 1967 and 1968 at McMurdo Station and Cape Amittage on Ross Island in McMurdo Sound, Antarctica. A detailed report on this work was published in *Ecological Monographs* (Dayton, et. al. 1974).

When we heard that Gordon was returning to McMurdo Sound for additional biological observations in the fall of 1974, we implored him to bring back a sample of grunge from their diving area. Another member of the 1974 group going to McMurdo Sound was James (Jimmy) R. Stewart, Diving Officer at Scripps Institution of Oceanography. Since Jimmy Stewart had also been a guest speaker several times at the San Diego Shell Club, it was hoped that he, too, might bring back interesting mollusks for photographing.

When Gordon returned, he dutifully delivered a gallon jar of "grunge", but it was not like any grunge that we had seen before. It was a bottom sample taken by him in 24.4 meters (80 ft.) of water on October 15, 1974 at Cape Amittage, Ross Island, McMurdo Sound, Antarctica. It consisted of a loose mat of

sponge spicules interspersed with valves of *Limatula hodgsoni* Smith, 1907 and occasional small members of other marine phyla. It had been immersed in formaldehyde, so besides looking strange it also smelled bad. Figure 1 shows a typical view of this "grunge". Many small shells were found in the grunge, and it let the author on a search for identifications. It was found that there exists a very extensive literature on Antarctic mollusca, with early references more than 100 years old. The seemingly virgin territory has been extensively explored by dredging and trawling.

Victoria Land near Cape Adare was first sighted by Sir James Clark Ross on 11 January 1841 (Bullivant and Dearborn, 1967) and with his ships *Erebus* and *Terror*, he charted the coast of Victoria Land and the edge of the Ross Ice Shelf. In the summer of 1842-43, Ross made the first oceanographic observations and collections in the Ross Sea. During the late 1800's and early 1900's, many famous explorers led expeditions to this area and took many samplings. Among the most famous were W.J. Bull, C.E. Borchgrevink, R.F. Scott, E. Shackleton, C.A. Larsen, and R.E. Byrd.

Those of us who are intertidal collectors would find Antarctica completely frustrating. In McMurdo Sound, the shallowest zone (0 to 15m) is essentially devoid of sessile organisms because of the annual certainty of the ice disturbance from both anchor ice and scouring action of drift ice. In winter, ice accumulated along the shore may grind against the bottom to depths of 5 m or more, and this scouring action along the shoreline effectively eliminates an intertidal fauna. An intermediate zone (15-33 m) is below the limit of ice scour but is still influenced by anchor ice formation capable of removing heavy objects (Dayton, et. al. 1969).

The larger invertebrates are sometimes found in the shallow waters adjacent to ice foot formations but this mostly occurs in summer after some melting has occurred. Benthic invertebrates have been found embedded in sea ice in very shallow water. However, it is believed that the animals become entrapped in ice on the sea bottom and the ice subsequently rises.

Most of the shells pictured in this article were obtained by scuba diving. The water temperature is about  $-1.8^{\circ}\text{C}$  ( $28^{\circ}\text{F}$ ) the year round. During the first visits of Robilliard and Dayton to McMurdo Sound, (October to December, 1967 and 1968) the Sound was covered with 1.8 to 2.4 m (6-8 ft) of ice. The water could only be entered by open-air dives through cracks in the ice or by first blasting a hole in the ice. Horizontal visibility ranged from 183 m (600 ft) in October to 61 m (200 ft) in early December to 0.6 m (2 ft) in mid-December. Most of the species were collected in depths greater than 25 m.

Below 33 m, anchor ice does not form and scouring rarely occurs. Dayton et. al. (1970) reports that most of the conspicuous species in the benthic community at depths between 33 and 60 m are sponges and their asteroid and molluscan predators. In 30 to 60 m at Cape Amittage, McMurdo Sound, sponges are the most conspicuous sessile species and cover almost 55% of the surface area. The extensive mats of sponges found on the bottom in much of McMurdo Sound, usually below 50 m, are formed largely of siliceous species. The substratum below 33 m is a mat of siliceous sponge spicules which varies from a few cm to more than 2 m (cf. Koltun 1968).

*Limatula hodgsoni* Smith, 1907 is the most abundant bivalve in McMurdo Sound and has



been reported embedded in splurge of the softer, horny types, and in certain areas it occurs burrowing in the upper centimeter or two of a sediment of sand and grit matted with sponge spicules.

In the "grunge" brought back by Gordon Robilliard, there were many single valves of assorted sizes. Figures 2 and 3 show a typical specimen of this common bivalve. The height of this specimen is 25 mm and the width 19 mm.

Looking for microscopic specimens in the "grunge" is a very time consuming and sometimes painful task. One must hazard the millions of potential silica fiber splinters and the floating silica dust. To date, about half of the grunge has been carefully examined and a variety of small shells found. Some species are plentiful, while others are so far represented by only one or two specimens. Figures 4 through 21 show these microscopic shells. The excellent photography is a result of the patience and skill of Festivus staff photographer, David K. Mulliner. The author is equally indebted to Barbara Myers for most of the beautiful photographs of the larger species.



Fig. 4. Dorsal view of *Margarella refulgens*



Fig. 5. Apertural view of *M. refulgens*  
Height 3mm, width 5 mm

Many of the microscopic species were first brought back by the National Antarctic Expedition, 1901-1904, ("Discovery" Expedition - R.F. Scott) and were described by Edgar A.

Smith (Smith, 1907). The most common minute species found in the grunge was *Margarella refulgens* (Smith, 1907). Approximately 50 specimens were found, varying in both greatest diameter and height from about 1 to 5 mm. Dorsal and apertural views are shown in Figures 4 and 5. The shells are turbinate, narrowly umbilicated, pearly iridescent and beautifully bluish, pearly within. Smith originally called this species *Valvatella refulgens*.

Another member of the same family figured in Figures 6 and 7, is believed to be *Margarites dulcis* (Smith, 1907). Only one specimen has been found to date and although it resembles the figure in Smith, 1907, there is some doubt in this identification. Smith originally called this species *Valvatella dulcis*.



Fig. 6. Dorsal view of *Margarites dulcis*

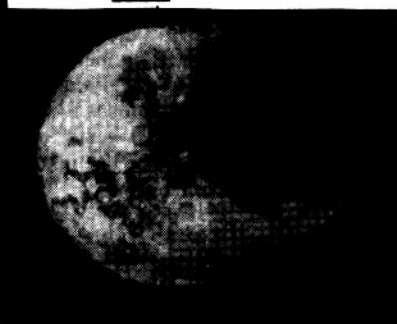


Fig. 7. Apertural view of *M. dulcis*, diam. 1 mm

The second most common gastropod found in the grunge was *Rissoia glacialis* Smith, 1907. Twenty specimens have been found so far. Specimens were about 3 mm long, and a typical specimen is shown in Figure 8. The shell is white, smooth, and glossy and contains 5 to 6 very convex whorls separated by deep sutures. A second *Rissoia*, *Rissoia gelida* Smith, 1907 was also found in the grunge. This was represented by 5 specimens varying in size from 1 to 3 mm. The largest specimen is pictured in Figure 9. It is a dirty white shell with fine spiral lines.

One of the largest, and perhaps the most beautiful, species found in the grunge was *Epitonium antarcticum* (Smith, 1907). Four specimens varied in size from 7 to 10 mm. The species was originally named as *Scala antarctica*. The shell is dirty white, globose, with somewhat oblique sutures, and is minutely



Fig. 8. *Rissoia glacialis* Smith, 1907  
Diameter: 3.5 mm



Fig. 9. *Rissoia gelida* Smith, 1907  
Diameter: 3 mm

cancellate in appearance. It has a yellowish, horny operculum. Dorsal and ventral views are shown in Figures 10 and 11. (Next page.)

Another beautiful small shell is pictured in Figure 12. Two specimens, 3.5 and 6 mm in length have been found of this species, identified as *Sulima convexa* Smith, 1907. This is very similar but somewhat smaller than another species later described by Smith (1915) as *Eulima exulata*.

Another small, dirty white gastropod found in the grunge was *Pareuthria innocens* (Smith, 1907). This member of the Cominellidae was originally called *Thesbia innocens* by Smith. Only two specimens have been found in the grunge, both about 7 mm in length. The larger

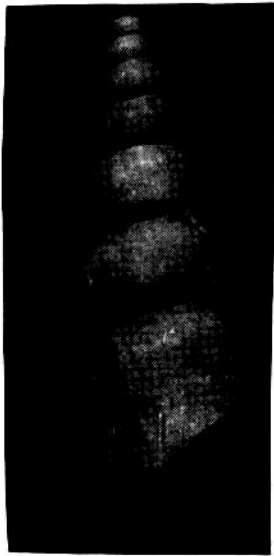


Fig. 10 and 11. Dorsal and ventral views of *Epitonium antarcticum* (Smith, 1907). Height: 10 mm. Width: 3.5 mm



Fig. 12. *Eulima convexa* Smith, 1907. Height 6 mm; width 1.9 mm

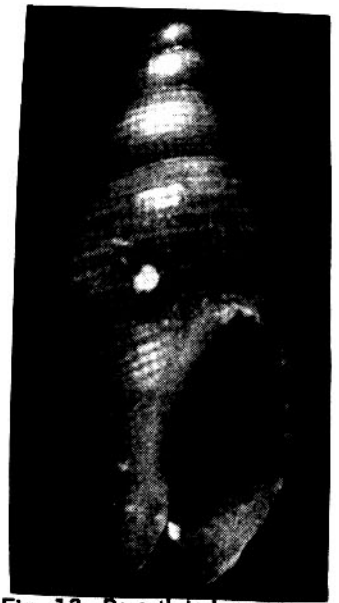


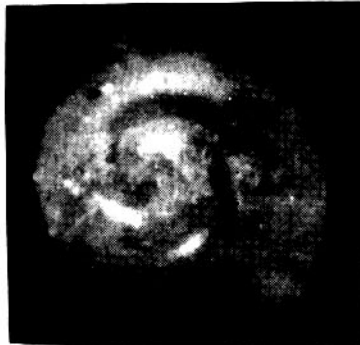
Fig. 13. *Pareuthria innocens* (Smith, 1907). Ht. 7 mm, width 2.8 mm

shell is shown in Figure 13.

Figure 14 shows one of the specimens which has been most difficult to identify. The specimen is approximately 5.5 mm and resembles a specimen described (Tomlin, 1939) from Macquarie Island. That species, *Eumetula macquariensis* Tomlin, 1939 was described from a single, dead, immature (?), 3 mm long specimen. This species belongs to the family Cerithiopsidae. A number of species are found over a wide range in the Antarctic, in fact some are circumpolar. Therefore, it is quite possible that the shell in Figure 14 is a mature specimen of *Eumetula macquariensis*. Macquarie Island (54°30'S, 158°45'E) and Cape Armitage, McMurdo Sound (77°46'S, 166°26'E) are not that far away. The effective boundary to marine life is not the coastline of

Antarctica but the Antarctic Convergence. This is a zone in the southern oceans between about 48° and 60° south latitudes, where the colder waters flowing northward from Antarctica mix with the southward moving warmer waters from the north. This places Macquarie Island right in the Antarctic Convergence zone.

of this Family have also been observed but in extremely friable condition, which seems to disintegrate when touched. It is hoped that the remaining grunge will reveal additional specimens of both types. Figure 17 shows a minute tube worm shell believed to be a member of the Verrucidae. No identity has been established for this shell.



Figs. 15 and 16. Dorsal and apertural views of a probable *Vitrinella*. Size: less than 1 mm

Some of the minute gastropods have yet to be identified. Figures 15 and 16 show ventral and dorsal views of what appears to be a member of the *Vitrinella*. Several specimens have been obtained but generally in a broken or very chalky condition. Sinistral specimens

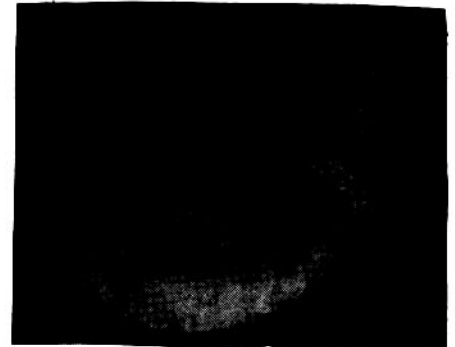


Fig. 17. probable member of Family Verrucidae. Size: 1 mm.

The most common minute bivalve found in the grunge is pictured in Figure 18. It is believed that this is the shell from the Ross Sea pictured by Smith, 1907, as *Philobrya limoides*, although I couldn't find adductor scars on the dead valves. The specimen pictured in Figure 18 is complete and is likely to have been live collected. The Family *Philobryidae* badly needs revision (Soot-Ryen, 1948) since there are some 20 generic or subgeneric groups proposed and more than 80 species described, (mostly Subantarctic and some true Antarctic). Hedley (1916) referred the Antarctic species to the genus *Philippiella* Pfeiffer, 1886. Therefore the specimen in Figure 18 is tentatively identified as *Philippiella limoides* (Smith, 1907). (Fig. 18 is on next page.)

A single valve of another small bivalve is



Fig. 14. *Eumetula macquariensis* Tomlin, 1939. Ht.: 5.5 mm; width: 1.5 mm.

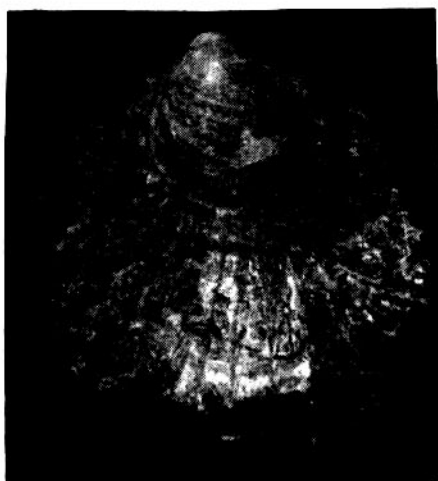


Fig. 18. *Philippiella limoides* (Smith, 1907)  
Size: Height: 8mm; Width: 6mm

shown in Figure 19. This has been tentatively identified as *Adacnarca nitens* Pelseneer, 1903, which is another member of the Family Philobryidae. A very minute (less than 1 mm) shell is pictured in Figures 20 and 21. No identification has been found for this shell, although it may be a member of the Mytilidae.

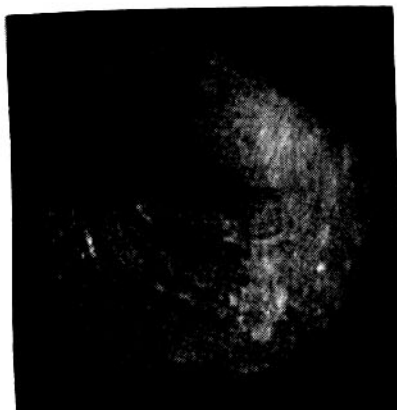
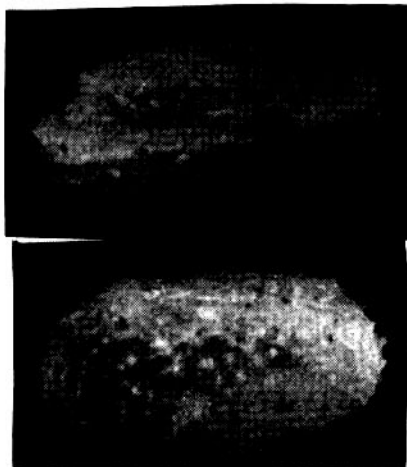
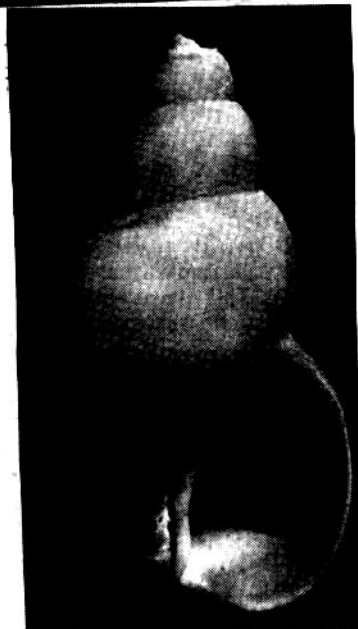
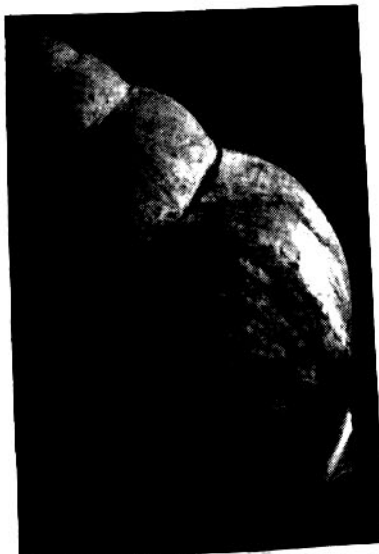


Fig. 19. *Adacnarca nitens* Pelseneer, 1903  
Size: 1 mm



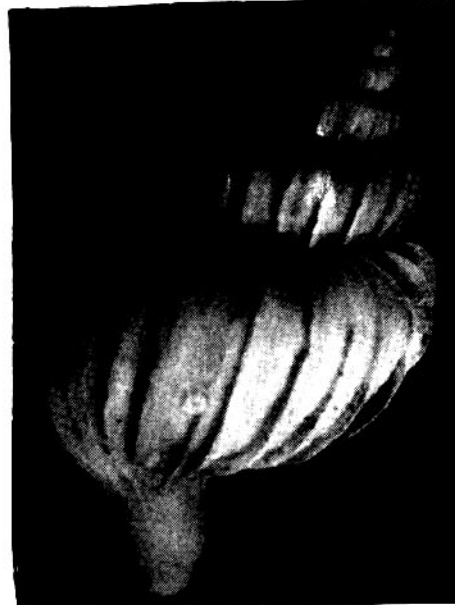
Figs. 20 & 21. Side and ventral views of ?*Mytilus*. Size: less than 1 mm



Figs. 22 and 23. Dorsal and apertural views of *Neobuccinum eatoni* (Smith, 1875)

One of the largest mollusks found in Antarctic waters is *Neobuccinum eatoni* (Smith, 1875). The specimen pictured in Figures 22 and 23 was collected by Jimmy Stewart using scuba in 40 m (130 ft) of water at Cape Evans, Ross Island, McMurdo Sound, Antarctica in October 1974. Similar specimens were collected by Gordon Robilliard in 24.4 m (80 ft) off Cape Ammitage. The specimens are generally dull white with occasional traces of a light brown periostracum. The specimen pictured has a height of 63 mm and a diameter of 33 mm. The original description (Smith, 1875) called the species *Buccinopsis eatoni*.

A second gastropod found by Jimmy Stewart in 40 m off Cape Evans was *Trophon longstaffi* Smith, 1907. The specimen pictured in Figures 24 and 25 was 40 mm in height and 25 mm in diameter. Again similar specimens were found



Figures 24 and 25. Dorsal and apertural views of *Trophon longstaffi* Smith, 1907.

by Gordon Robilliard in 24.4 m off Cape Ammitage. The shells are dirty white and beautifully ornamented, which is unlike most cold water species. Original specimens were brought back by the National Antarctic Expedition of 1901-1904 and named by Smith in 1907.

Two species belonging to the Naticidae were brought back from off Cape Evans by Jimmy Stewart, both taken in 40 m by scuba. The first, *Pelliltorina rossiana* (Smith, 1907) is shown in Figures 26 and 27. The shell measured a height of 24 mm by a width of 21 mm. A slightly smaller specimen of the same species was live collected by Gordon Robilliard





Figs. 26 and 27. Dorsal and apertural views of *Pellilitorina rossiana* (Smith, 1907)

In 24.4 m off Cape Amity, the shells are medium brown and complete with animal and horny operculum. The species was originally called *Amauopsis rossiana*, but was later assigned (Hedley, 1916) to *Pellilitorina*. *Amauopsis* occurs in the Arctic region, and it is unlikely that it would have bipolar distribution.

The second member of the Naticidae which was collected by Jimmy Stewart was *Natica* (*Kerguelenatica*) *grisea* (Martens, 1878). The specimen shown in Figures 28 and 29 measures 11 mm in height and 10 mm in width. The species was originally placed in the genus *Amauopsis* by Martens and has since been placed, at various times, in *Natica*, *Friginatica*, and *Polinices*. The species is easily recognized by the composite nature of the operculum. Powell (1951, p. 117) felt that the unusual operculum warranted a new subgenus and described the Subgenus *Kerguelenatica*. The unusual operculum is formed of both horny and calcareous materials. There is a thin calcareous layer over a strong, horny interior, and this horny interior projects uncovered around the entire edge of the operculum.



Figures 28 and 29. Dorsal and apertural views of *Natica* (*Kerguelenatica*) *grisea* (Martens, 1878)

In November 1970, Jimmy Stewart, using scuba, collected several bivalves off Turtle Rock, Ross Island, McMurdo Sound, Antarctica. The first, *Adamussium colbecki* (Smith, 1902), is shown in Figure 30. It first was brought back by the "Southern Cross" and called *Pecten colbecki*. It has at various times also been called *Chlamys colbecki* Smith and *Pecten racovitzai* Pelsener. The specimen pictured is 33 by 32 mm which is relatively small since specimens up to 85 by 90 mm have been found. The species has almost a circumpolar range. It is deep purple on both valves and purple within.



Fig. 30. *Adamussium colbecki* (Smith, 1902)

The other species brought back from off *charcoti* (Lamy, 1910) and others of *Harporvoluta vanhoeffeni* Thiele, 1912. The shell

libraries. The shell measures 30 by 20 mm which would be rather small for *L. elliptica*. Specimens are reported in the literature (Soot-Ryen, 1948) up to 97 mm, and the species is apparently circumpolar.

The bivalve pictured in Figure 33 was trawled in January 1967 off Macquarie Island (54°30'S., 158°59'E.) in 29 to 37 m by Ronald McPeak who is presently Senior Research Biologist at Kelco in San Diego, Ca. The specimen is *Chlamys subantarctica* Hedley, 1916. The original description by Hedley was from a single valve dredged in 1913 from the same general area. The original valve was worn with a large gap in its margin and was 80 mm high by 75 mm wide. This compares with the 57 by 56 mm dimensions of the pictured specimen. The top valve of this specimen is a peach color and the bottom valve is white. (Figure on next page)

Perhaps the rarest of all the large specimens figured in this paper is shown in Figures 34 to 36. The specimen shown is one of two dredged by Ronald McPeak in 567 m (1860 ft) in the Ross Sea in January 1967. The volute which is 35 by 17 mm belongs to the Genus *Harporvoluta* Thiele, 1912. The two shells have been examined very carefully, and they show some characteristics of the species *Harporvoluta*

Fig. 31. *Laturnula elliptica* King and Broderip, 1831

Fig. 32. Internal view of hinge area of *L. elliptica*.

This has caused an extensive literature search. It is tentatively called *Laturnula elliptica* King and Broderip, 1831, although pertinent literature and plates were not available in local libraries. The specimen pictured has a pointed spire as noted (Weaver and duPont, 1970) in the description of *H. vanhoeffeni*, whereas the second shell has a low, blunt spire as noted in the description of



Fig. 33. *Chlamys subantarctica* Hanley, 1916

*H. charcoti*. The presence of a gray-yellowish periostracum and fine revolving striae over all the whorls of the teleoconch agree with the description of *H. charcoti*. In contrast, there is no mention of a periostracum for *H. vanhoeffeni* and the latter species is supposed to have revolving striae on the whorls of the teleoconch except for the adult whorl. There is mention of a glaze for *H. vanhoeffeni* which is present on the pictured specimen. *H. charcoti* is supposed to have a thin callus that covers the entire parietal area, and in the pictured specimen this is absent except perhaps on the parietal lip. The animal as seen in Figure 36 has a prominent eye which is mentioned in the description of the animal for *H. charcoti*. Hedley



Fig. 36. Live animal and commensal actinian of *Harpovoluta* ?.

(1916, p. 53) in his description of *H. vanhoeffeni* noted that when the animal is present, a large commensal actinian is usually seated on the back of the shell. This agrees with the picture of the live animal as taken by Ronald McPeak in 1967. To further confuse the identification, Weaver and duPont (1970) note that a somewhat atypical specimen was given the varietal name *striatula* by Thiele in his original description of *vanhoeffeni*. According to Thiele, this form was smaller, had a higher spire, and had microscopic striae covering the entire teleoconch. Moreover, the columella had a higher, more twisted edge than the typical *vanhoeffeni*. The form *striatula* was rele-

gated to the synonymy of *vanhoeffeni* by Weaver and duPont (1970). There have been few specimens found of the *charcoti*, *vanhoeffeni*, and *vanhoeffeni striatula*, and it is possible that they are all forms of the same species. Therefore, this author has referred to the pictured shell as *Harpovoluta* ?.

The last mollusk figured is a species of *Lamellaria*, collected by Gordon Robilliard off Cape Armitage in 24.4 m on October 15, 1974. The specimen may be the same species reported by Dayton, et. al. (1974) as a chrome yellow lamellarian which was observed to feed on ascidians, frequently drilling holes in the ascidians and depositing eggs therein. The color is right and the location and depth are approximately the same. The shell is extremely fragile and misshapen due to handling as can be seen in Figures 37 and 38. The species is most likely *Marseniopsis conica* (Smith, 1902) since quite a few specimens have been taken over the years in McMurdo Sound in similar depths. The original description and figure of this shell were not available in local libraries. Eales (1923) has a complete description of the animal, but it would require dissection of the available specimen to confirm the suspected identification. Such investigation is beyond the scope of this article. There have been other lamellarians reported from McMurdo Sound (Eales, 1923) but they are generally found at greater depths. These include *Marseniopsis mollis* (Smith, 1902) collected in 379 m; *Marseniopsis* sp. collected in 549 m; and *Marseniopsis* sp. (second unnamed species) collected in 406 to 441 m. There are many other lamellarians found in other areas of the Antarctic, and there is need for work on the Family Lamellariidae to determine the proper taxonomy and to establish the ranges for the individual species.

As noted earlier, the literature on Antarctic



Figs. 34 and 35. Dorsal and apertural views of *Harpovoluta* species



Figs. 37 and 38. Dorsal and apertural views of *Lamellaria* ? . Height 17mm; width 17mm.

mollusca is extensive. However, the author has been hindered by the unavailability in San Diego libraries of much of the pertinent literature. The author would be indebted to anyone who can assist in the identification of the un-

named species in this article or in correcting the names of any specimens which have been misnamed. Such identifications or corrections will be printed in future issues of the *Festivus*. Any additional Antarctic material would also be appreciated for use in future articles.

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The author expresses his gratitude and appreciation to the original collectors of the Antarctic mollusca featured in this article, Gordon Robilliard, James Stewart, and Ronald McPeak; the excellent photography by David Mulliner (figures 1 and 4 to 21), Barbara Myers (figures 2, 3, 22 to 35, 37 and 38) and Ronald McPeak (figure 36); and to Barbara Myers and Carole Hertz for their long hours of library research and help in shell identification.

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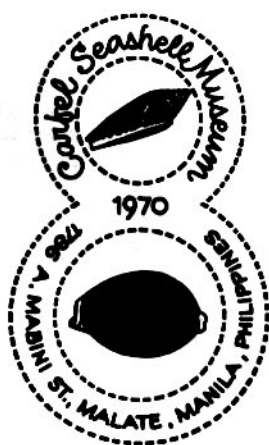
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## More on *Octopus giganteus*

GARY S. MANGIACOPRA

In the Spring 1975 issue of *Of Sea and Shore*, I had recounted at length the discovery and history of the only known beached specimen of *Octopus giganteus* near St. Augustine, Florida. (1)

Since that publication two years ago, several minor local newspaper accounts relating to this discovery have been uncovered and a line of inquiry that I had failed to undertake in my attempt to locate living relatives of the photographers of the carcass came to light. I hoped that they might possibly have, in their family possessions, records connected to this discovery.

Seven names were recorded in regards to photographers of the carcass: Ernest Howatt, Edgar Van Horn, a Mr. Lockwood and Messers. Cary, Osborne, Burns and Kettle. (2X3)

An Inquiry to the St. Augustine Historical Society, in regards to these names, produced the following information:

"We have checked the 1889 City Directory (the next earlier one is 1885) and there was no listing for Burns, Cary, Osborne or Van Horn as residents of St. Augustine, so we may assume that these amateur photographers were visitors. Probably the visitors flocked to the beach to see the newest tourist attraction and take pictures of it." (4)

Of the three remaining names I was able to locate living relatives of Ernest Howatt and Mr. Kettle. These relatives were able to explain, to a limited degree, about their ancestors' involvement with this beached octopus.

Ernest Howatt, who had taken photographs when the carcass first came ashore on December 7, 1896, returned with Mr. Kettle in January of 1897 to take additional photos. Willard Howatt, son of Ernest, wrote me: "It was quite startling to receive your letter .... inquiring as to an amateur photographer in St. Augustine in 1897. You are correct, he was my father. Unfortunately I do not have anything at all relating to his involvement in photographing the carcass of the octopus." (5) "... unfortunately this occurred prior to my birth, so I have neither knowledge of same nor any records." (6)

Regretably the same lack of information occurred when I contacted Mr. Kettle, not a direct descendant who wrote: "There were three Kettles in St. Augustine in 1897. One (not my father), Frederick W. Kettle worked for the St. Augustine Record." (7)

So, although no additional information was forthcoming, I had, to my satisfaction, exhausted these possible leads.

Mrs. Jacqueline Bearden, of the St. Augustine Historical Society, was able to locate several minor local newspaper notices that were published in *The Tatler*. This weekly was published during the winter season and concerned the activities of visitors at the local hotels. Though *The Tatler* did contain three brief accounts of the octopus, these do not contain any new information. But these are the only known dated local newspaper accounts and serve to clear up some minor questions as to when Dr. Webb resumed his examination of the carcass, as well as several sequences of events on which only general speculation has been made previously.

The first notice, published January 16, 1897: "The wide-spread interest in the very remarkable specimen of the giant squid, now lying on the beach a few miles below the city, is mainly due to its enormous size. It is believed to be the largest specimen ever found. Its great size and immense weight have thus far prevented its being moved for a more careful examination. A dozen men with blocks and tackle not being able even to turn it over. Another effort will be made with more extensive apparatus by which it is hoped to drag it from the pit in which it now lies and placing it higher up the bank so that a careful and thorough examination in the interest of science can be made and its exact species determined. Prof. Verrill of Yale and Profs. True and Dale of the Smithsonian, are in constant correspondence with Dr. DeWitt Webb, President of the St. Augustine Scientific, Literary and Historical Society, in regard to it. Several photographs have been taken of it, but owing to its position these have not been satisfactory. Mrs. John L. Wilson believes it to belong to an extinct species. Its hide is three and a half inches thick and its head is covered by a hood that prevents examination. Apparently it is a mass of cartilage and may have been dead in the water many days before it was washed ashore on Anastasia Island." (8)

This notice gave clues as to the date of the first aborted attempt to manually life the carcass and an undated letter, written by Dr. Webb, to Dr. Dall of the Smithsonian details the attempt. Dr. Webb mentions that he had spent the greater part of that day, with 12 men and strong tackle, trying to move the carcass over and failing.

The next notice published the following week of 23 January 1897: "Doctor DeWitt Webb, President of the Scientific Society, has succeeded in drawing the huge invertebrate out of the sand and securing it farther up the beach, that it may be examined by scientists. So far as can be determined at present, it belongs to no family not extinct, and is principally interesting on account of its great size,

being about twenty-one feet long, without a head. Professor W. H. Dall of the Smithsonian Institute, and Professor A. E. Verrill of Yale, are naturally much interested, and may be prevailed upon to visit it." (9)

Dr. Webb had written a letter, dated 17 January, in which he told of using four horses and six men, on the 16th, to move the carcass and succeeded in rolling it out of the pit and placing it higher on the beach. Yet this news was not published until the following Saturday January 23rd, which means that the news deadline was from the previous Saturday to Friday.

By using this information, and by comparing the information in the undated Webb letter and January 16th notice, it can be computed that Dr. Webb could have re-examined the beached carcass no earlier than 9 January, but no later than January 15. Dr. Webb's letter states that he had spent two days at the carcass and that by this mail he was sending new photographs to Dr. Dall. This means that the letter was written as early as January 11, as it fell on a Monday, which meant that the post office would be open for him to mail the photographs, and no later than Friday 15 January, as the following day, the 16th, Dr. Webb would be re-examining the carcass and would have been unable to mail anything at that date.

The third, and last, notice appeared on March 13: "Professor Verrill of Yale University, who recently decided that the curious something, supposed to be an octopus was one, basing his decision on descriptions sent, has now concluded, after examining a piece of it, that it could not possibly be an octopus, and that he cannot decide what it is. One theory advanced is that it may be a portion of some inhabitant of the sea, long since extinct, that has been fast in an iceberg for centuries, and released washed ashore here. Another theory is that it is a portion of a deep-sea monster that on coming too near the surface was attacked and killed by a shark, who found it too tough for a breakfast. One thing is now determined, and that is, if we do not know what it is we know what it is not." (10)

To readers who wonder why I had concerned myself with these revisions on these minor, trivial points, it is unlikely that any additional information will be uncovered concerning this beached carcass of a giant octopus. It is my intention to present as accurate a record as I can.

### Acknowledgment

I wish to thank, foremost, Mrs. Jacqueline Bearden, of the St. Augustine Historical Society. continued on page 178

# The Great Unknowns of the 19th Century.

## PART 4 - COMMENTS & CONCLUSIONS

GARY S. MANGIACOPRA

(Copyright 1977 by Gary S. Mangiacopra)

In the previous three parts of this series I have treated the accounts of sea serpent sightings as they were published in the New England newspapers during a thirty year period: 1869 to 1899. In this final part, I would like to comment on this information taken as a whole.

Let me begin by saying a word about the sources which were used for this study. In the previous articles I presented the sightings as the newspaper accounts themselves presented them, without trying to inject my own opinion. We must now, however, confront directly some of the difficulties that the use of newspaper accounts pose. How can we be certain that the "facts" in these accounts were accurate and not distorted or partly invented by reporters and/or editors? What about information which was available from witnesses, but was not used in the articles, information which might help us identify cases of fraud, mistaken identity or the nature of a genuine unknown?

In several cases involving ships, I have found the ship's name and the name of the Captain in the "arriving ships" columns; in these cases there is evidence, at least, that the ship and observers were real. In other cases the incidents had occurred at a different locale from the source of the article and had been reported via (for example) telegraph. In these cases I wrote to the original source of the report and obtained the local account of the sighting, preferably using these in the analysis. Even these checks, however, do not resolve the basic dilemmas of possible unreliability.

### IDENTIFYING THE UNKNOWNNS

As closely as it is possible to examine the data, I have come to the following conclusions as to the nature of the 64 cases mentioned in the previous articles.

Hoaxes	1
Misidentifications	8
Insufficient data	7
Unknowns*	48
Total	64

\*possible sea serpents

Thus out of 64 sightings, 48 seem to relate to an unknown marine animal. How are we to go about identifying these animals?

Two classifications of "sea serpents" have been proposed, one by Heuvelmans (7 categories) and one by LeBlond and Sibert (3 categories). Heuvelmans' categories are based on worldwide published reports, while those of LeBlond and Sibert are based upon personal eyewitness reports originating from British Columbia, Canada. (1X2)

There seems to be some reasons to use the LeBlond and Sibert categories, in as much as British Columbia and New England are similar in latitude, climate and are part of the same continent. But we must consider the possibility that one or more species may be common to both the Atlantic and Pacific, or that they may occur in only one ocean and not the other. The categories of Heuvelmans are more extensive, and yet would I be bias in my conclusions if they fit the facts to these proposed models? Perhaps it is best simply to see what our data suggests and to compare my conclusions with both systems.

Now I must be somewhat critical of my work and of the problems which confronted me in providing a workable cataloging system to separate these marine animals. In the tables accompanying my previous articles I had listed reported features sighted by observers. There is little conformity amongst the features reported. Certain basic features such as enormous eyes, manner of swimming, presence of hair, etc. are the few common features. One must work with secondary features to catalog these animals.

### CHARACTERISTICS OF THE DIFFERENT TYPES OF SEA SERPENTS

Originally I had planned not to include the models of the different types proposed by either Heuvelmans or LeBlond and Sibert. This was to avoid any undue influence on my own proposed models. However, after critical examination of the reported details based upon my original newspaper sources, I could only give, at best, general features, in contrast to their more detailed examination of published accounts or by contacting eyewitnesses directly.

I shall give a description of the Heuvelmans models first; the LeBlond and Sibert models second; and my own proposed models last.

#### MANY-HUMPED (Heuvelmans)

An elongated marine animal in range, ranging

in size from 60 to 115 feet, with an ovoid head - flat on top and blunt - extending into a broad snout. The neck is slender, medium in length, with the shoulder sometimes bearing a small triangular fin which may be a feature of the male or appear only with age. It has a single pair of flippers and a bilobate (whale-like) tail. Its skin is generally described as smooth, but sometimes rough (parasites?). Scales are mentioned (they could be bony dermic plaques - only on the body). Its characteristic feature is a row of many humps regularly placed along its spine. The color of the head and back is dark brown to black, with the throat and belly pure white; one or two white stripes on the sides of the neck. Its swimming motion is vertical undulations and can reach speeds of from 22 to 35 knots. Its possible identification is that it is a mammal - probably of the cetacean family or possibly a form of sirenian. (3)

#### TYPE ONE (DORSAL FINNER)

Sighting references: 4, 17, 26, 27, 34

An animal 70 to 100 ft. in length, 9-15 in diameter, with a head described as frog-like or alligator-shaped, with a snout reported of 15 feet in length. A jaw 5 feet long, with teeth 6 inches in length - though the last three reported features have not been confirmed by additional reports. In one report its eyes are described as 6 inches in diameter, colored between green and red (probably due to the way in which light strikes it) and once reported to have wrinkled, like an umbrella opening and closing. The neck is large and round, has one pair of frontal flippers and a huge fin/fan kept straight on its back - reported twice. The tail has not been described in any of the accounts. The skin of the body is very smooth, with bright grayish scales - parasites probably - with the head described, in one instance, being covered with large green warts and with a characteristic series of ridges, 10 to 15, starting about 15 feet forward of the body. The color is dull green to dark brown, with yellow, shading lighter, on the underside. The swimming motion is vertical undulation with its speed described as being rapid, like a steamer at full speed. Its behavior is to splash and lash the water. Once it was attracted to a steamer, which rammed into it.

#### Comments

From its described swimming motion it can be deduced that this animal is a mammal, how-

ever, from the lack of specific details only the facts of its extreme length and coloration can be positively stated.

#### MERHORSE (Heuvelmans)

Ane longated sea-animal that rarely exceeds 60 feet, with a head, wide, diamond-shaped when viewed from the front, and described as a horse, camel or snake, with a wide mouth. The eyes are enormous, point forward, are black in color. The neck is medium length to long, with a long flowing mane and it may have whiskery hair-bristles on its face, forming a moustache.

There is one pair of frontal flippers and, possibly one hind pair which may form a false tail. The skin looks smooth and shiny (probably covered with close short fur). The color is uniformly dark brown or steel-gray to black. Its speed is usually not mentioned; the swimming motion is a very marked vertical undulation.

Identification: mammal, probably a pinniped. (4)

#### LARGE EYES (LeBlond & Sibert)

A creature with large eyes set laterally on a horse or camel-shaped head, mounted at the end of a long neck. Has short dark brown fur and no mane. Only one instance mentioned body humps. (5)

#### TYPE TWO (Maner)

Sighting references: 7, 29, 31, 35, 44, 61, 63

The size is from 15 to 50 feet, proportionally thick with a very large, flat head. Usually the head is described as being about 1½ feet broad and 3 feet long, tapering down to the nose, with a shape described as horse, snake or hog-like. The eyes are continuously described as enormous, usually termed saucer-shaped, and once were reported to stick out like a frog's. The neck is usually long, slender and with a length of 10 feet +. There have been three reports of a mane, one describing it as erected like porcupine quills and green in color. Once a beard was reported. It probably has four flippers, with a tail described as fan-like; once the tail was described as long, round and tapering to a point.

Its color is dark, with eel-like or serpentine characteristics. Its speed is rapid, like a steam yacht, with a serpentine or "squirming" motion. Other details reported were gleaming scales, continuous hissing and visible breath. The animal's behavior is curious and cautious, on occasion playful. It has been reported to circle a boat, jump completely out of the water and land back on its stomach.

COMMENTS: Though the swimming motions are described as serpentine (side-ways), because of the description of a mane and beard and these being characteristic only to the mam-

mals, this sea-serpent type is of the mammal family. However, as this hair is reported in only four cases, it may be sex related, perhaps only occurring on the male of the species.

#### LONG NECK (Heuvelmans)

Animal reaches 65 feet in length, with a relatively small head. The head is round in shape with a somewhat tapered muzzle. Two little "horns" are sometimes seen, which may be erectile tubes surrounding the nostrils. The eyes are small, the neck long and cylindrical, extremely flexible. There are four webbed feet. The tail is a mere stump. The skin, when wet, is smooth and shining, colored a dark brown on top, with black and gray or whitish mottling; the belly reported as dirty yellow and much lighter. Its characteristics is a massive body, thick and showing one to three dorsal humps, the middle being the largest and with the spine forming a ridge all along the body length - this may be a hairy crest. Its swimming motion is on a vertical plane and with a speed of from 15 to 35 knots. The identification is mammal, probably a pinniped. (6)

#### SMALL EYES (LeBlond & Sibert)

A similar animal to the large eyes, but with much smaller eyes, sometimes described with horns or a mane. A fast and smooth swimmer, submerging vertically, as if pulled under. (7)

#### TYPE THREE (HORN HEAD)

Sighting references: 1, 23, 25, 43, 64

The length is reported to be from 25 to 60 feet, proportionally thick. The head is large, flat, round - about 2 feet across - once described as horned. The neck is elongate. The eyes once described as "wicked". There are two pairs of flippers, and the tail is usually described as forked, or tapering to a sharp point. Coloration is a dark, drab back with the underside of a lighter color. Characteristically reported as being long, with a round body and with saw-like projections on a semi-circular back. Other details include 3 inch scales, like a corcodile and that, rather interestingly, it once growled. Young were seen with adults.

COMMENTS: This is the only instance in which young have been observed with adults. Description of the young was similar to the adult. Due to a lack of description of the swimming manner, the identification must be left open as no other clues help in determining its identity.

#### SUPER EEL (Heuvelmans)

An animal, serpentine in shape, about 50 feet long, with a rather blunt head. The eyes of considerable size and a neck apparently long, actually the cylindrical body, along which runs a continuous dorsal fin. There is one pair of pectoral fins and a long tail, tapering to a point. Some report the coloration to be blackish-brown, blue on top, with a white underside

and others speckled reddish. Its swimming motion on the surface is a coiling, undulating rapid motion, presumably on their side. (8)

#### SERPENTINE ANIMAL (LeBlond & Sibert)

A long serpentine animal, showing loops of its body above the surface. Swimming fast, but with much thrashing. Its head described as sheep-like. A dorsal fin runs along its back. (9)

#### TYPE FOUR (MANY COILED)

Sighting references: 10, 39, 55, 57, 59, 60.

A long, serpentine animal, from 20 to over 100 feet in length. A marked feature is the body diameter, usually small for its length. The head is described as square-shaped, seal-like, with a diameter of 2 feet on a line with the eyes. The eyes themselves are large and bright. The neck seems to be a continuation of the serpentine body. Two types of dorsal fins have been described: one a long, continuous fin starting about 8 feet back of the head, the other a fleshy fin on each loop of the body, some 3 to 4 feet apart. The speed is rapid, color described as whitish and dark. A startling characteristic is that large curves of the body appear frequently above the water's surface when the creature is swimming. Other details, which are questionable, include a one foot horn on the head and a noise like steam escaping.

COMMENTS: The two most noticeable and common features of this type of sea serpent are the manner in which it swims - arching its body out of the water - like a snake and its unusually thin body diameter, supporting the notion of the serpent of the seas. But, if the manner of its swimming motion is correctly reported, that of an up-and-down undulation, this would indicate the animal is a mammal.

#### CONCLUSIONS

Thus, out of 48 sea-serpent sightings, I have divided them into four - possibly five - different groups of sea serpent types. The two most commonly reported types are the Maner (type two) and the Many Coiled (type four). The Dorsal Finner (type one) and Horn Head (type three), due to the lack of sightings and the amount of details reported in the few observations, at least show that they are not misinterpretations of the Maner or Many-coiled types. There is a fine line of distinction between these latter two types, but I currently favor separating them into two types of long neck sea-serpents.

Of the fifth possible type of serpent, there is only one sighting, #19. Occurring at Rondout, New York, 29 August 1886, and similar to Heuvelmans' Super Eel category because of its long dorsal fin originating eight feet from its head, observers described it as seal-like - a description given to the Many Coiled type.



## IDENTIFICATION OF SEA SERPENTS

Code

MH = many humped; LN = long neck; ME = merhorse; SL = super eel; SE = small eyes; LE = large eyes; ST = serpentine; DF = dorsal finner; M = maner; HH = horned head; MC = many coiled.

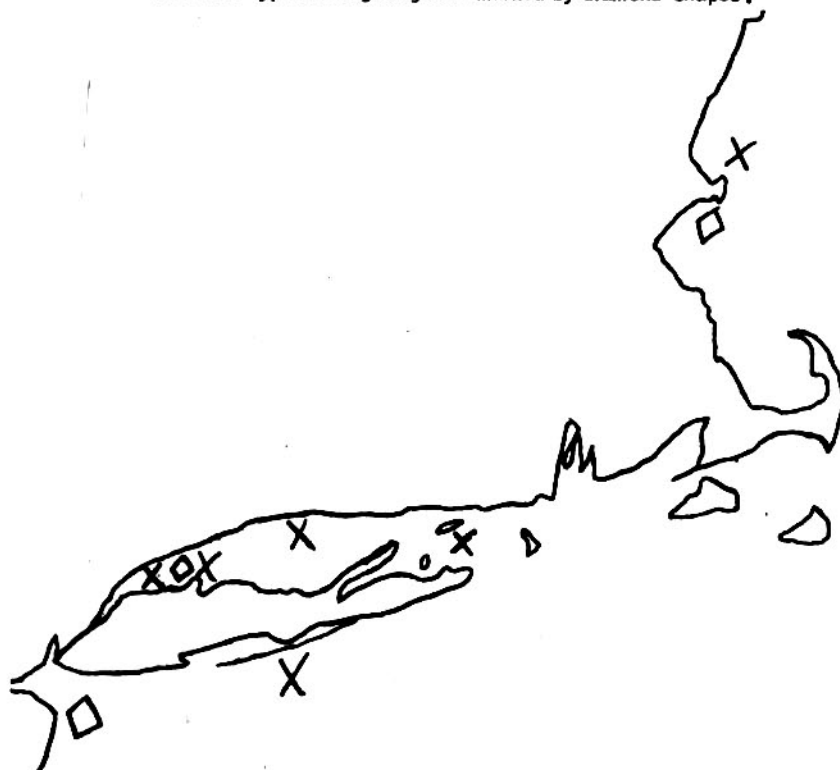
Sighting Number	Heuvelmans Type	LeBlond & Sibert Type	Mangiacoipa Type
1	LN	SE	HH
3	MH?		DF?
4	MH		DF
5	?	?	?
6		?	?
7	ME	LE	M
8	MH/SL	ST	DF/MC
9	ME/LN	LE/SE	M/HH
10	SL	ST	MC
11	MH?		DF?
12	ME/SL	LE/ST	M/MC
13	?	?	?
17	MH		DF
18	MH/SL	ST	DF/MC
19	SL	ST	MC/SL
20	?	?	?
21	?	?	?
22	?	?	?
23	LN	SE	HH
24	?	?	?
25	LN	SE	HH
26	MH		DF
27	MH		DF
28	MH?		DF?
29	ME	LE	M
30	ME/LN	SE/LE	M/HH
31	ME	LE	M
32	MH/SL	ST	DF/MC
33	?	?	?
34	MH		DF
35	ME	LE	M
37	?	?	?
38	LN/SL	SE/ST	HH/MC
39	SL	ST	MC
43	LN	SE	HH
44	ME	LE	M
45	?	?	?
46	?	?	?
51	?	?	?
55	SL	ST	MC
57	SL	ST	MC
58	LN?	SE?	HH?
59	SL	ST	MC
60	SL	ST	MC
61	ME	LE	M
62	?	?	?
63	ME	LE	M
64	LN	SE	HH

EPILOG

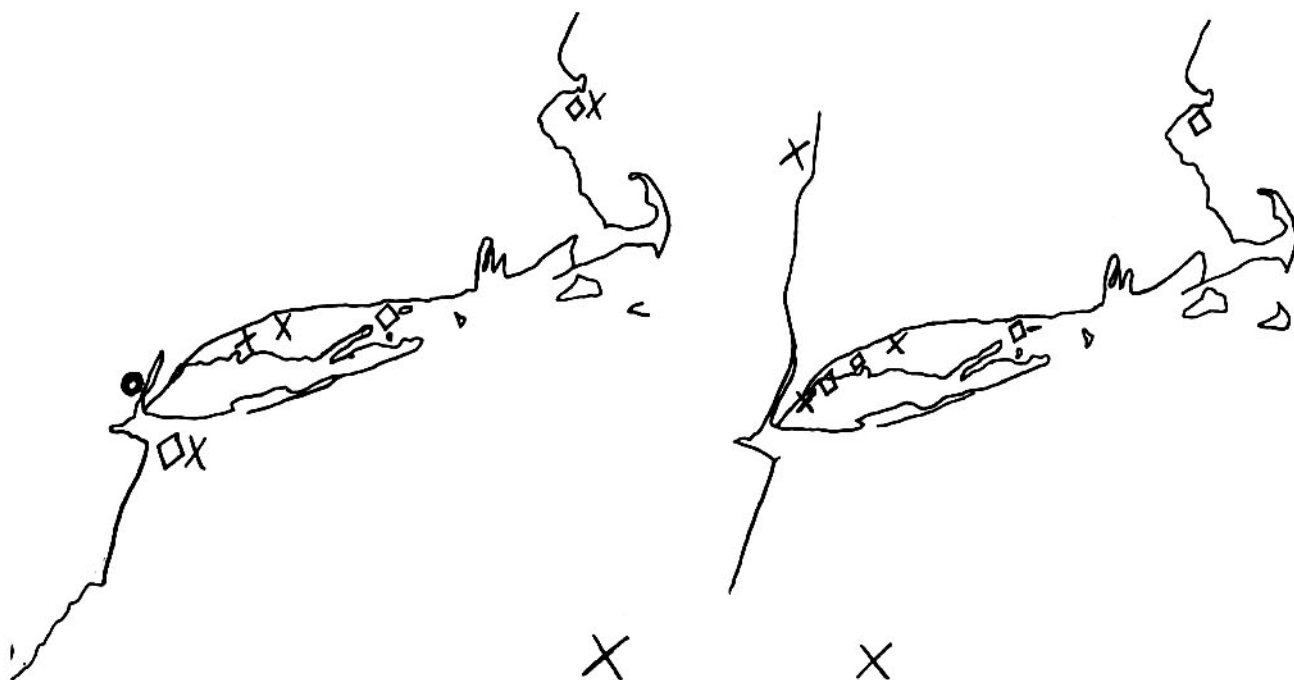
To the incredulous reader, who has had the fortune to read the previous articles in the series, it seems that, beyond question, there exist several different types of unknown marine animals, collectively called sea serpents, which were sighted along the New England



Over all distribution of sightings of Type One (Dorsal Fin). Sightings marked by X. Possible type one sightings are marked by diamond-shapes.



Over all distribution of sightings of Type Two (Maners) sea serpents. Sightings marked by X. Possibly type two sightings marked by diamond shape.



Over all distribution of Type three (Horn Head) sightings, marked by X. Possible type three sightings are marked by diamond shape.

Over all distribution of Type Four (Many Coiled) sea serpent sightings, marked by an X. Possible type four sightings marked by a diamond shape. All maps by the author.

coast during the last third of the 19th Century. Readers may disagree with my interpretations of the possible models of these uncaught marine creatures. It should be again noted that these models are based upon data gathered from the available newspaper accounts of the period. It is my intention that additional information must be gathered in order that a revised and better model of these marine animals can be put forth. After scanning over 160 years of newspaper microfilm, and after five years of work, all I can say concerning this series is, it was really quite simple.

#### ACKNOWLEDGEMENTS

I wish to thank Assistant Professor Ron Westrum, of Eastern Michigan University, who proofread parts two through four and who gave much needed and valuable criticism. I, alone, am responsible for any errors and conclusions.

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- (3) In *The Wake of the Sea Serpents*, pages 548 to 560.
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- (5) *Observations* ...., pp. 52, 53
- (6) In *The Wake* ...., pp. 557-562.
- (7) *Observations* ...., p. 53.
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- (9) *Observations* ...., p. 53

#### OCTOPUS GIGANTEUS

Continued from page 174

clety, for her considerable efforts and help in regard to locating previously undiscovered newspaper accounts; to Mr. Willard Howatt and Charles Edward Kettle of Florida for their knowledge concerning their family history.

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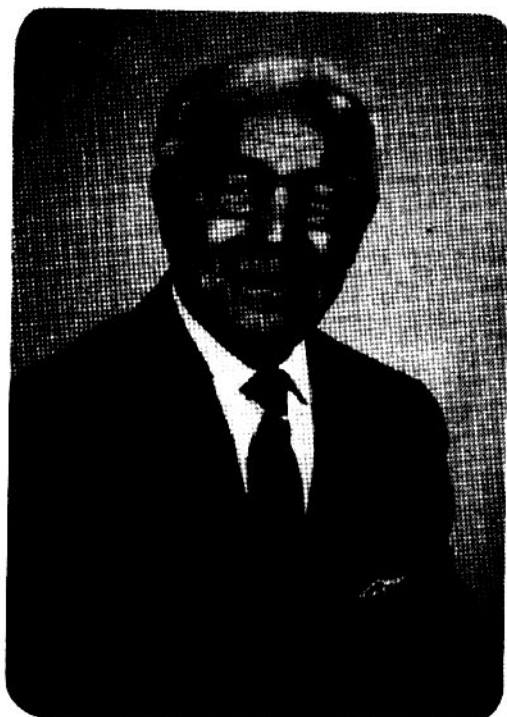
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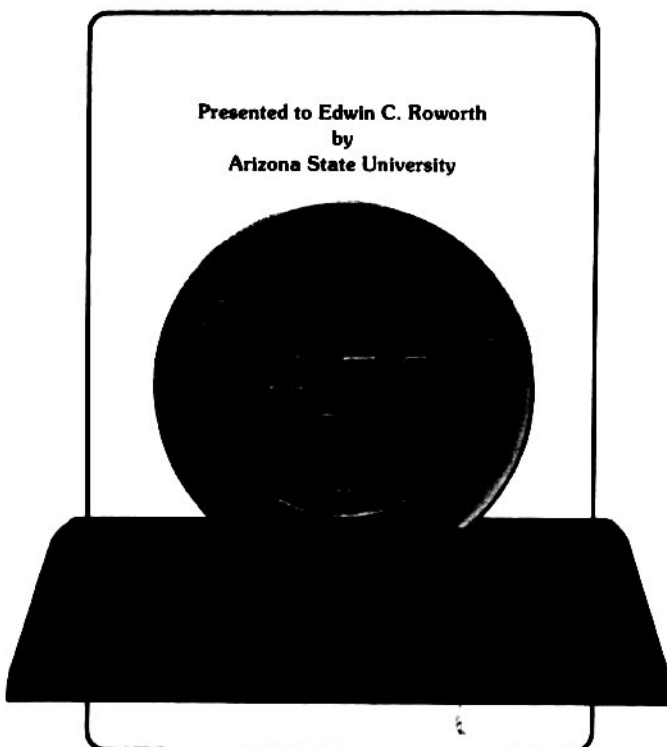


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gathering of specimens. In his long career Mr. Roworth built a collection of about 130,000 specimens - shells, meteorites, minerals, fossils, rocks, biological and archaeological materials. All were carefully catalogued, filed and referenced. Specially designed looseleaf notebooks contain the facts about the items for ready referral. Eventually the question arose as to where the collection might find a permanent institutional home, and Mr. Roworth decided to donate it to Arizona State University. The faculty of the Department of Geology knew it was one of the finest private collections of marine specimens in the world and were thrilled to acquire it. Public relations and teaching programs will be enhanced, and valuable trade materials will be made available for building

existing collections. The acquisition of the collection is particularly timely as the Geology Department moves into new museum facilities in the Bateman Physical Sciences Center. Mr. Roworth has become a true friend of Arizona State. He has spoken about the University in his circle of friends, with the result that additional gifts of considerable value have been willed to us. Generous support from enlightened private individuals is vital to the growth of educational programs. For his contribution to the advancement of science and for his service to the State of Arizona the College of Liberal Arts at Arizona State University is proud and honored to bestow its Distinguished Achievement Award upon Edwin C. Roworth.

(taken from the Award's Ceremony program)

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MORE CLASSIFIEDS PAGE 179

# Artistic Photography of Oceanic Specimens

PROF. A. H. MARSTON & PROF. M. M. TAYLOR

UNIVERSITY OF GUELPH, ONTARIO

The assistance provided by artistic photography of marine specimens can enhance the identification process which we believe is exemplified by the prints accompanying this article.

For sometime my co-author and myself have discussed the problems of black and white vs. colour, magnification factor vs. scale, drawings vs. photographs, in connection with gastropod evaluation. Earlier on, one of the big problems, for example, was identifying juvenile *Charonia variegata* versus *Colubraria obscura*.

Then, later on, headaches increased with expanded knowledge:

- a) is it really Coues's spindle in photo #1?
- b) is the *Murex olssonii* or *cabritti* in #21?
- c) is the *Argonauta hians* or *nodosa* in #31?
- d) what really are the shells in #13 and #35?
- e) is the harp shell depicted in #10 conoidales, costata or articularis?

And then when you reach the corals it can be even more difficult.

We feel this type of photography can fulfill both the aesthetic and practical approaches to identification and in subsequent articles intend

to explore and analyse further comparisons in an endeavour to illustrate where and how the salient points and differences can be more easily remarked due to the changes in lighting, film, background, etc.

In this initial study we offer you a few examples of our approach and would solicit your reaction to our presentation and would be truly grateful for your comments and criticisms in order to clarify our task. Furthermore, we will be photographing growth rate studies of *Murex florifer*, *Oliva reticulata*, *Charonia tritonis* and *variegata*, *Pleuroploca gigantea* and *Busycon contrarium* to begin with, in the hopes that we can clearly show how the creature's characteristics develop with time.

Then, at some future date, we propose to show how this type of photography can be related to design in industry with particular reference to textiles.

In the meantime have fun with your reference books and good shelling!

## Equipment

- 1. Spotmatic II camera body (Pentax)
- 2. 50mm FA Macro Lens, Takumar

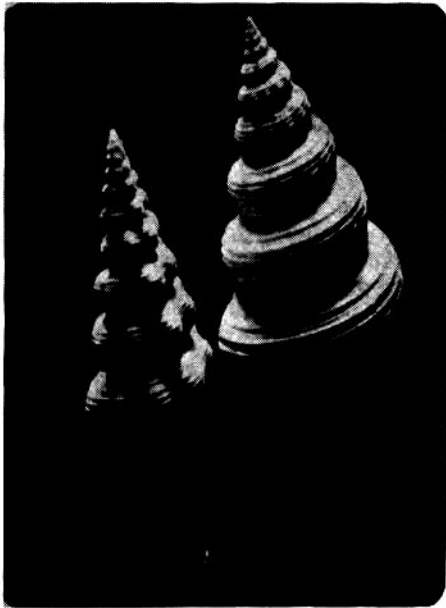
- 3. 2#2 photoflood bulbs in 10" deep aluminum reflector
- 4. Tripod
- 5. Working surface entailed one sheet of  $\frac{1}{4}$ " thick glass, 20 x 20 inches
- 6. 30 x 30 inch sheet of black velvet
- 7. Plastercene
- 8. Sable Brush

## Procedure

The velvet was placed over a raised bar 12" high at the back of a table, the rest of the fabric was then draped over the table surface. Over this surface the  $\frac{1}{4}$ " thick sheet of glass was placed 4" above the velvet and standing at the corners on 4 blocks of wood. All the shells were placed on the glass for photography and small quantities of plastercene were used, out of sight of the lens to hold the shells in the desired positions. It was also vital to keep the glass clear of dust particles with the sable brush prior to taking the photographs as these particles stood out prominently against the velvet background. An assistant was used to direct the lights while I viewed the results through the camera. The lights were used at different distances and angles on each shell to bring out the most attractive features of the individual shell.

## ABOUT THE PHOTOS

Slide #	Description	Size	Related Slides	Slide #	Description	Size	Related Slides
1.	<i>Fusinus halistreptus</i> , <i>F. aepynotus</i>	19cm		20.	<i>Thatcheria mirabilis</i>	20 cm	
2.	<i>Acropora cervicornis</i> ; Staghorn Coral	15cm		21.	<i>Murex troscheli</i> , <i>M. olssonii</i>	11.5 & 4.5 cm	
3.	<i>Spondylus americanus</i>	14cm		23.	Sea Fans on coral	30cm wide	#15
5.	<i>Fusinus aepynotus</i> ; Spindle	15cm		25.	<i>Tridacna gigas</i>	21 cm	#27
7.	<i>Diplora clivosa</i> ; type of Brain Coral			26.	<i>Nautilus pompilius</i>	16 cm	
9.	<i>Lyropecten nodosus</i> ; Lion's Paw	10.5 cm		27.	See #25		
10.	<i>Harpa conoidalis</i>	10.2 cm	#12	29.	<i>Cypraea argus</i>	8 cm	
11.	<i>Epitonium scalare</i> ; Wentletrap	4 cm		31.	<i>Argonauta nodosa</i> ; Paper Nautilus	13.5 cm	
12.	See #10			32.	<i>Pitar dione</i> ; Venus Comb Clam	4 cm	
13.	Miscellaneous Augers, etc.			35.	Miscellaneous Cowries		
14.	<i>Mussa angulosa</i> ; Rose Coral			38.	<i>Cypraea histrio</i> ; Ovula ovum	5.5cm; 8 cm	
15.	<i>Gorgonia ventalina</i> , Purple Sea Fan growing on <i>Meandrina meandrites</i> , Brain Coral type			40.	<i>Colpophyllia natans</i> ; Lettuce Coral		
16.	<i>Eusmilia fastigata</i> ; Carnation Coral			43.	<i>Spondylus americanus</i>		
17.	<i>Strombus gallus</i> ; Rooster Tail Conch	9.5 cm		45.	<i>Spondylus americanus</i>		
				46.	<i>Diplora clivosa</i> ; a type of Brain Coral		
				48.	<i>Spondylus americanus</i>		



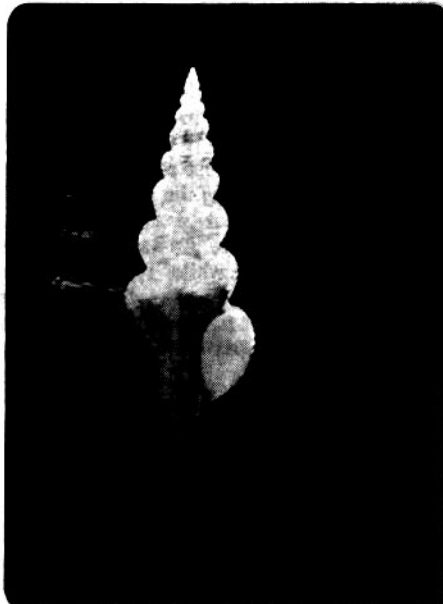
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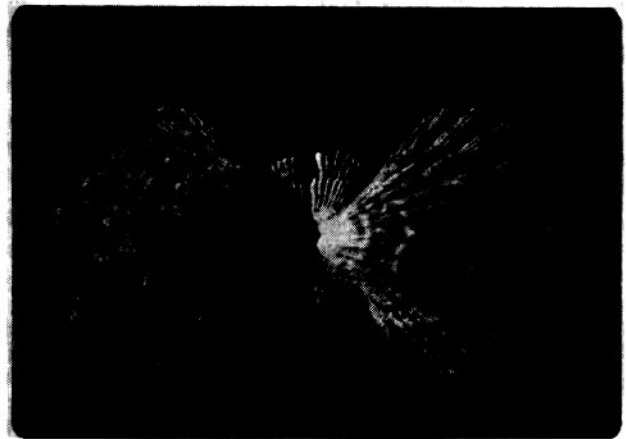
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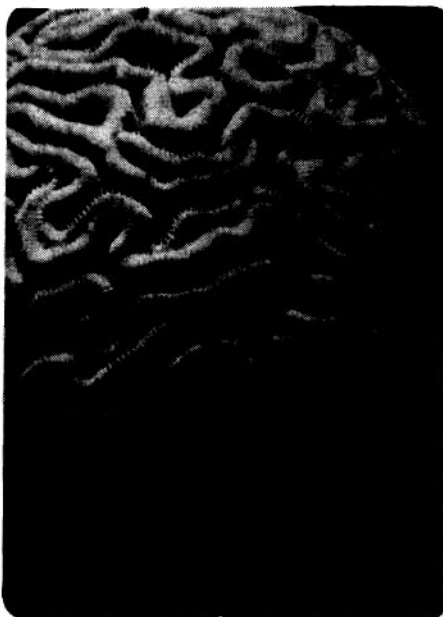
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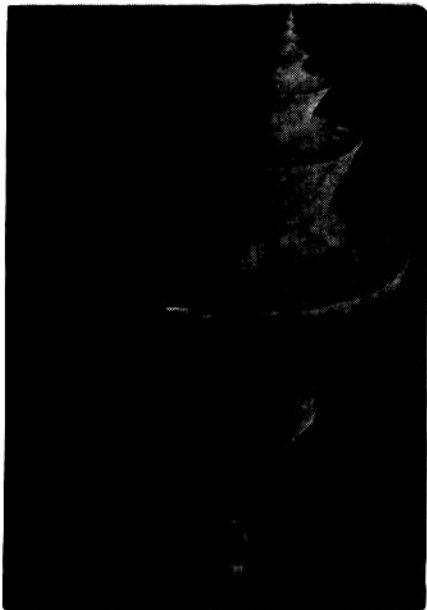
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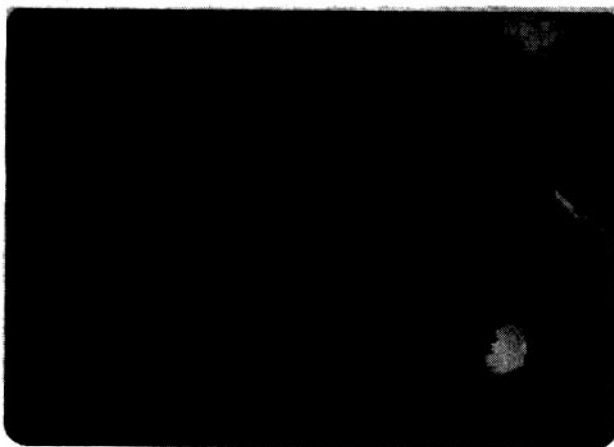
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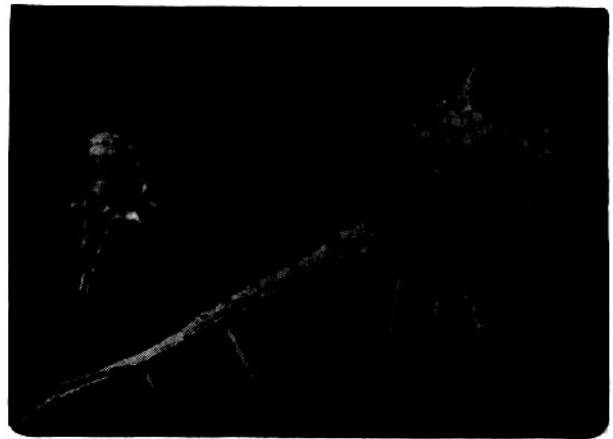
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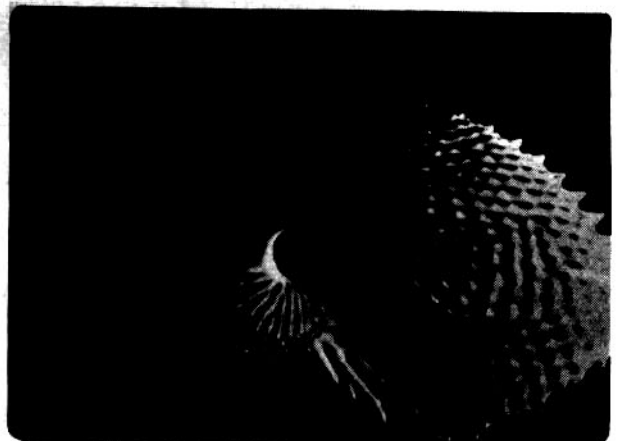
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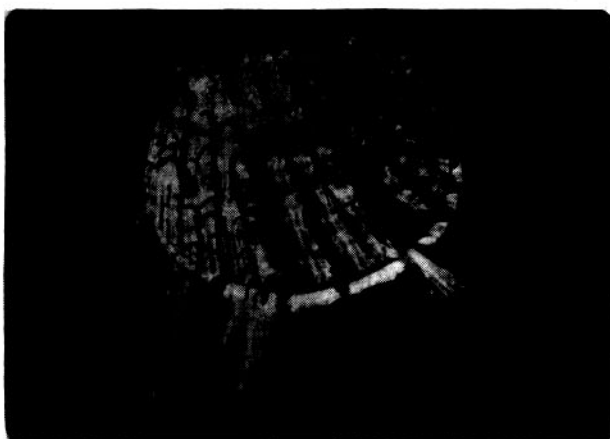
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## St. Petersburg Shell Show



Show Winners: (left to right) Jack Reynolds, Jo Kotora and Kitt Westfall with their awards. See story below for details.

The 30th Annual Shell Show of the St. Petersburg (Florida) Shell Club was held from February 24 thru 27, 1977. (The 1978 show will be from Feb. 23-26.) The well-attended show was held at the Treasure Island Auditorium with Judges Vincent Conde, Ed Petuch and Jerome Bijur. Awards were made in 16 categories. The Smithsonian Award was presented to Jack Reynolds for "A Study of the Marine Gastropods" and an Award of Merit went to Kitt Westfall's "Seldom Seen Shells". The Shell of the Show award for her *Voluta demarcae* Olsson, 1965 went to Jo Kotora. Under Most Beautiful Exhibit, winners were: Jack Reynolds (1st) for the display mentioned above; Ed Haviland (2nd) "Scallops Are Lovely!"; Mrs. Helene Avellanet (3rd) "Shell Palette".

Best Display of Any One Family: Don Moody (1st) Family Conidae; Bernadette and Robert Pearson (2nd) The Olive Tree; Dorothy Hansler (3rd) Cowries of the World; Edith Dodd (Honorable Mention) The Muricidae World Tour.

Best Display One Genus: Helene Avellanet (1st) *Harpa*. Best Display of and One species: Mrs. Helene Avellanet (1st) *Phasianella aus-*

*tralis*; John Van Buren (2nd) *Lyropecten nodosus*; Mina Slinn (2nd) The Cross-Barred Venus; Judith Van Buren (3rd) *Argopecten gibbus*; Yvonne Bequet (H.M.) *Trachycardium egmontianum*.

Best Display, One Locality: Florence Kuczybski (1st) Shells From Uruguay; Elaine Phillips (2nd) A Tale of Wading on Isla Mujeres; Kenneth Mull (H.M.) The Shells of Ft. DeSoto Campground.

Best Florida Collection: Daryle Ann Trick (1st) Pliocene Mollusca from Southern Florida's Ancient Seas; Katie Reynolds (2nd) Florida Pliocene Fossils; Irma Sehner (2nd) Self-Collected Florida Shells.

Best General Collection: Kitt Westfall (1st) Seldom Seen Shells; Jo Kotora (2nd) A Guide to Shell Terminology; Carl Withrow (3rd) Odds 'N Ends From Here 'N There; Jane Colburn (H.M.) Come With Me to the Living Sea.

Best Special Exhibit: Alice Lipe (1st) The Living Mollusks. Best Display by Beginner: Eleanor Rothoff (1st) Shelling From the Cruise

Ship Southward.

Best Display, Self-Collected: Jane Colburn (1st) Come With Me to the Living Sea; Carolyn & Earl Petrikin (2nd) Where Did You Find Them?; Katie Reynolds (3rd) Florida Pliocene Fossils; Irma Sehner (H.M.) Self-collected Florida Shells.

Best Educational Exhibit: Jack Reynolds (1st) A Study of Marine Gastropods; Don Moody (2nd) Family Conidae; Alice Lipe (3rd) The Living Mollusk; Edith Dodd (H.M.) The Muricidae World Tour.

Best Junior Exhibit: David Petrikin (1st) My Univalves and Bivalves; Kenneth Mull (2nd) The Shells of Ft. DeSoto Campground.

Best Shellcraft: Johanna & Al Schwerdt (1st) Wild Life; Mr. & Mrs. Wesley Brian (2nd) Main Street, Frogville; William Pichardo (3rd) Shellcraft; Alice Lipe (H.M.) Shell Mirror.

Commercial: Ed Haviland (1st) Scallops Are Lovely!; Robert Lipe (2nd) Small Jewels - Marginellidae.

### IN MEMORIAM

#### ISABELLE WELCH

Falls Church, Virginia

August 1977

Co-owner "The Shell Cabinet"

#### ARTHUR LAWSON

St. Petersburg Beach, Florida

June 6, 1977

Lawson Shell Collection now housed at Sarasota Jungle Gardens. Survived by his wife, Selma R. Lawson

#### KITTI FELIX WESTFALL

Pinellas, Park, Florida

July 17, 1977, while shelling in the Dominican Republic

past contributor to *Of Sea and Shore*  
see photo in above story

Our sympathies and prayers go to relatives and friends.

## FOLLOWING COLUMBUS

Continued from page 152

successful. While they were gone, I shelled in front of the Inn. It was a good low tide and there was excellent beachwash. Found two nice *Coralliophila caribaea* that were new to me, and more live *Tegula excavata*. Stretched out on my back for a while to try to get rid of my pale face (you can tell a sheller by his brown back and white face).

After lunch I packed shells - a job I dislike second only to removing bodies. I know they will never all fit into my suitcase. There was an excellent buffet followed by a dance and Ernie did a magnificent job of escorting three women.

Friday, March 4. D-Day for Iva and I - D stands for dismal downhearted departure and didn't find all the shells I wanted so I just can't go yet. Vivienne and Ernie will leave tomorrow.

The tide was even lower than yesterday, so early in the morning we checked our beach for drift and there was practically nothing. Where had all the stuff of yesterday gone?

Had one final bowl of conch chowder for lunch, spend considerable time arranging and rearranging the things that were supposed to fit in my luggage, and then Iva and I were airborne at 4:30, changed planes in Ft. Lauderdale, and were back in Wilmington by 11 p.m. I am tired, but satisfied. It was a good trip.

After Comments: Everyone got home without any problems. Ernie never did get a fish. Several had found a tiny cherry-red univalve (about  $\frac{1}{2}$ " in the beachwash. It took the Club's Caribbean expert, C. John Finlay, to identify them as juvenile *Charonia variegata*, so we had found several Triton Trumpets after all. By comparing notes it was determined that the group probably found about 250 species (although some specimens left a little to be desired). The consensus was that the non-shellers had had as much fun as the shellers (they got to laugh at the shellers) and that following Columbus had provided a most enjoyable experience for everyone.

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Many new programs are being planned.

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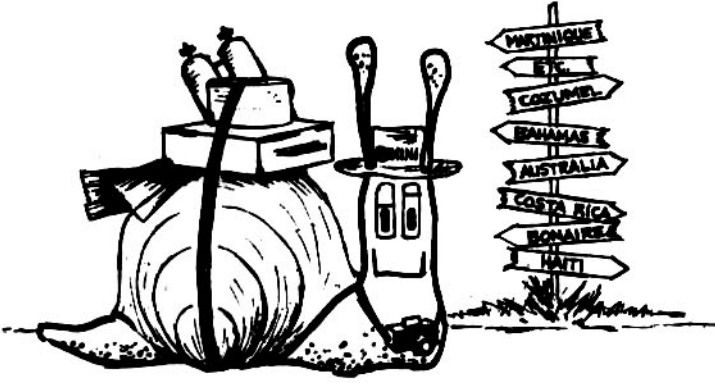
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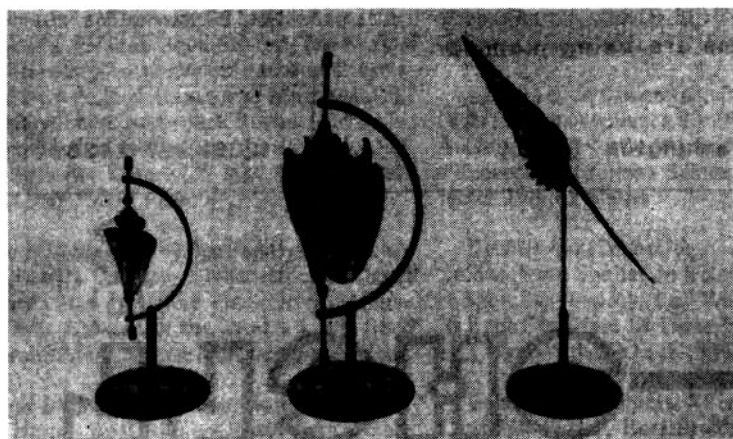
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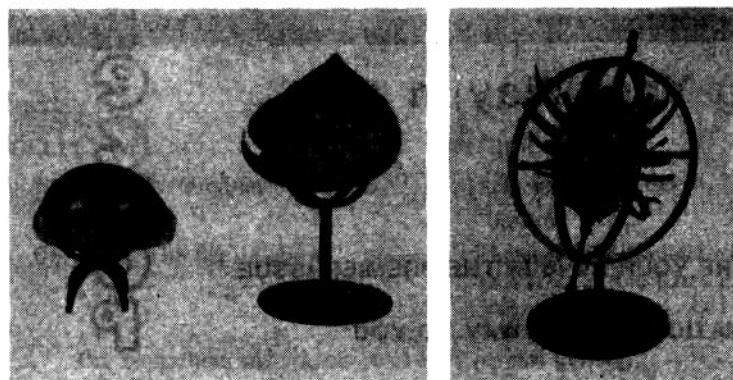
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## Art in Shell of the Ancient Americans

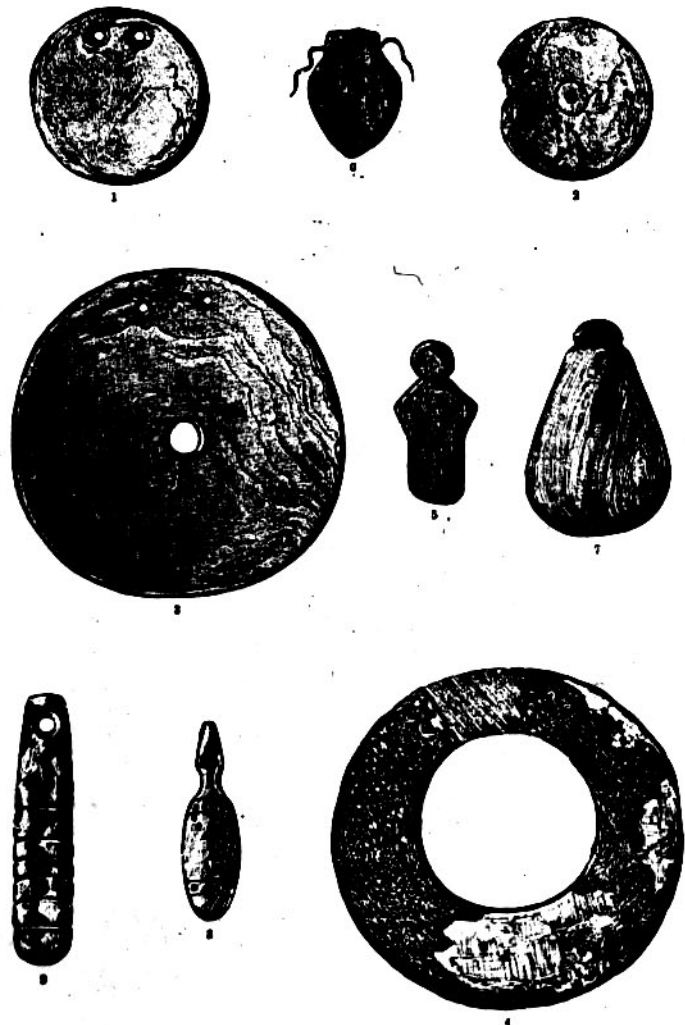
By WILLIAM HENRY HOLMES

(U.S. Bureau of Ethnology, Annual Report for 1881)

Eastern forms. — The great number of elaborately carved and engraved gorgets of shell found among the antiquities of the Atlantic slope, all of which need careful descriptions, so overshadow the simple forms illustrated in Plate XLVI, that only a brief description of the latter need be given. Rudeness of workmanship and simplicity of form do not in any sense imply greater antiquity or a less advanced state of art. The simpler forms of plain pendants constituted the every-day jewelry of the average people and, like beads, were probably used freely by all who desired to do so. Many forms are found — circular, oval, rectangular, triangular, pear-shaped, and annular. The more ordinary forms are found in mounds and graves in all parts of the country; other forms are more restricted geographically, and probably exhibit features peculiar to the works of a particular clan, tribe, or group of tribes. Even these simple forms may have possessed some totemic or mystic significance; it is not impossible that the plainer disks may have had significant figures painted upon them. Such of the forms are found to have definite geographic limits become of considerable interest to the archaeologist. In method of manufacture they do not differ from the most ordinary implements or beads, the margins being trimmed, the surfaces polished and the perforations made in a precisely similar manner.

In Plate XLVI I present a number of plain circular disks. The larger specimens are often as much as four or even five inches in diameter and the smaller fraternize with beads, as I have shown in Plate XLV. Figs. 1 and 2 are from a mound at Paint Rock Ferry, Tenn. They are neat, moderately thin, concavo-convex disks, with smooth surfaces and rounded edges. The first has two perforations at the upper edge, while the other has similarly placed but much smaller ones, besides a small central perforation surrounded by an incised circle. The national collection contains similar specimens from most of the Atlantic States; they differ from the larger discoidal beads only in the method of perforation. A typical specimen of this class, four and a half inches in diameter, is shown in Fig. 3. It was associated with the remains of a number of children in a mound in Hardin County, Ohio. Disks of this class were usually suspended upon the breast with the concave side out. That many of the specimens described were suspended in this way is indicated by the character of the abrasion produced by the cords. On the concave side the cord of suspension has worn deep grooves between the perforations, and on the opposite or convex side similar grooves extend obliquely upward from the holes toward the margin of the disk, indicating the passage of the cord upward and outward around the neck of the wearer.

(contributed by Esther Hendrickson; Warsaw, Illinois)



A large white disk, similar to the one just described, was obtained from a grave at Accotink, Va. It is five inches in diameter and has one central and three marginal perforations. It is made from a *Busycon perversum*, and is neatly shaped and well polished.

A fine specimen two inches in diameter was obtained from a mound on the French Broad River, Tenn., and, with many other similar specimens, is now in the national collection.

The central perforation is often very much enlarged. A number of specimens, recently sent to the National Museum, from a mound in Auglaize County, Ohio, show several stages of this enlargement. One specimen five inches across has a perforation nearly one inch in diameter, while in another the perforation is enlarged until the disk has become a ring. These gorgets show evidences of long use, the surfaces and edges being worn and the perforations much extended in the manner described above.

They have been derived from the *Busycon perversum*.

In Fig. 4 I illustrate an annular gorget from a mound in Alexander County, Ill. It was found associated with ornaments of copper by the side of a human skull, and is hence supposed to have been an ear ornament. It is fragmentary and has suffered greatly from decay, the surface being mostly covered with a dark film of decomposed shell substance, which when broken away, exposes the chalky surface of the shell. These shell rings, so far as I can learn, have been found in the States of Ohio and Illinois only.

Rectangular pendants are much more rare. The national collection contains one rude specimen from Texas. It is about two inches wide by two and a half long, and is made from the base of some large dextral-whorled shell. A similar but much more finished specimen comes from Georgia, and is preserved in the New York Natural History Museum.



A large keystone-shaped gorget with rounded corners was obtained from an ancient burial place at Beverly, Canada. It is illustrated in Plate L, Fig. 1.

The small pendant shown in Fig. 5 is given by Schoolcraft in "Notes on the Iroquois". It represents rudely the human figure, and is ornamented with eight perpendicular and four or five transverse dots. It was found on the site of an old fort near Jamesville, N.Y. In the same work Mr. Schoolcraft illustrates another small pendant, which is reproduced in Fig. 6. The body is heart-shaped, the perforation being made through a rectangular projection at the upper end. It was found at Onondaga, N.Y.

The small pendant presented in Fig. 7 is from West Bloomfield, N.Y. It has been suspended by means of a shallow groove near the upper end. It is made from the basal point of a dextral-whorled shell.

The handsome little pendant shown in Fig. 8 was found with similar specimens in Monroe County, New York — probably on some ancient village site. It is well preserved and has been made from the columella of a dextral-whorled shell. An ornamental design, consisting of lines and dots, is engraved upon the face. A small, deeply countersunk perforation has been made near the upper end. These objects have apparently been strung with beads, as the per-

forations show evidence of such abrasion as beads would produce. Many of the New York specimens have a new look, and their form suggests the possibility of civilized influence. They are certainly more recent than the western and southern specimens.

A small cylindrical pendant is illustrated in Fig. 9. A large, neat perforation has been made at the upper end, and the middle portion of the body is ornamented by a series of encircling grooves. This specimen has been made from a large *Unio* and was obtained from a mound in Union County, Ky.

to be continued in our next issue

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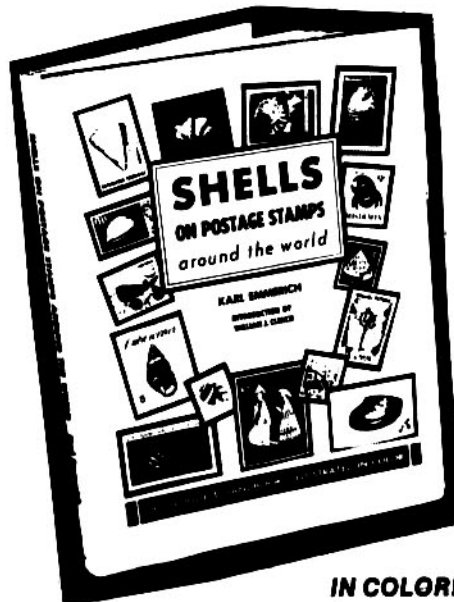
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## SHELLS ON STAMPS

A couple of new issues to report. Brazil has issued a set of three stamps featuring shells (see opposite page for illustration). Each stamp is a 1.30 and show *Strombus goliath*, *Murex tenuivaricosus* and *Vasum cassiforme*, the illustrations used on the latter two stamps have been reversed in the printing process, thus producing sinistral or left-handed specimens.

In a continuing series of marine life subjects (the shell stamps were mentioned in our last issue) French Polynesia has issued three stamps featuring species of corals, on one issue, the 25fr, a small *Tridacna* clam is included in the design.

The former French colony of Afars and Issas has been granted its independence and is now known as the Republic of Djibouti (also the capital and largest city). Previous issues of Afars and Issas have been overprinted with the words "Republique de Djibouti" and this includes the 30fr *Conus betulinus*, 45fr *Lambis radiatus* (?), 70fr *Conus striatus*, 20fr *Cypraea exusta*, 40fr *Ranella spinosa*, 45fr *Murex scolopax* and 60fr *Conus taeniatus*.

Singapore has added high values to its set of shell stamps, and while two of the four new

issues feature fish, two of them also feature mollusks. The \$1.00 issue shows the Spotted Hermit Crab, *Pagurus punctulatus*, inhabiting a *Trochus* shell. The \$5.00 stamp illustrates the Cuttlefish (a mollusk), *Sepia pharaonis*.

St. Vincent has overprinted the Squid and Sperm Whale issue of April 10, 1975. The red overprint reads, in two lines, "Carnival 1977 / June 25th - July 5th".

I understand that several issues of Angola's shell stamps have also been overprinted since the recent upheaval there. Hope to have more details in our next issue.

I recently obtained a seal from Denmark, similar to our T.B. seals, but for the hard-of-hearing. The design shows a little girl holding a stylized seashell to her ear. Japan, over the years, has issued seals for Nature Conservation, at least one features a mollusk: *Pecten (Patinopecten) yessoensis*. Another series of seals issued by "Sabata" (Sabah?) in an anti-tuberculosis campaign; issued in 1966 the seals show a nautilus, cones, cowries and clam on four separate stamps. While these seals were not intended for postage purposes, they do make an interesting addition to your

collection of shells-on-stamps. I also have a block of four seals inscribed "Cape Cod", and one has various shells.

Those of you who have purchased our "A Checklist of Mollusks on Postage Stamps", but who do not have a list of additions issued July 5, 1977 and bound into most copies, just send us a note and we'll send you a copy. These additions were bound into the center of the booklet and are on three un-numbered pages. 100+ additions are included.

Our color plate opposite illustrates the new Brazilian issue, plus two souvenir sheets which feature mollusks in both the stamp and border designs. Some souvenir sheets of marine life show shells in the border design while the stamp issue does not.

## STAMPS

Shells, ships, fish, animals, birds, sealife and other topicals are featured in current browse lists. Send \$1.00 (refundable) for lists plus ten Sea Shell Stamps. Certain shell stamps wanted, what do you have? PENNISTON; Box 7253; Arlington, Virginia 22205.

## More on Caribbean Chitons

SHIRLEY PIPLANI

As a chiton enthusiast, I was happy to see the article, "A Layman Looks at Caribbean Chitons", by Lt. Col. Corinne E. Edwards, in the Spring 1977 issue of *Of Sea and Shore*. Although chitons have been overlooked by most collectors, there is now a growing number of chiton lovers in this country. This is at least partly due to two publications which have appeared in the last few years: *West Coast Chitons* by Glenn and Laura Burghardt and "Preparation of Chitons for the Collector's Cabinet" by Col. George A. Hanselman in *Of Sea and Shore*, Spring 1970 or Summer 1976. The two collecting methods described in these works bring excellent results. I disagree with those who contend that it is difficult to collect chitons, as both of these methods are simplicity itself in comparison with the difficulty of removing the animals from shells such as *Vasum* and *Cassis*, and the added problem of removing acres of lime and algae from gastropods and pelecypods. Furthermore, both methods are odor-free!

I believe the problem is simply that most collectors have never seen well-prepared chiton specimens, and have missed the great beauty and variability of most species. There are somewhere between 600 and 750 known species of living chitons, and their great variability in girdle structure, color and sculpture rivals the great popular families of gastropods such as Conidae and Cypraeidae. Therefore, I send along a few color photos of a few of the species discussed in Lt. Col. Edwards' article.

The Caribbean is not known as a chiton collector's heaven, as are the Pacific Northwest and South Australia, but the species of the Caribbean are still of considerable interest. I'd like to make a few comments about the color photos.

*Chiton tuberculatus* Linne, 1758, is a Caribbean species. There are few, if any, authenticated records from Florida, except for its rare occurrence in Miami Bay. It usually lives on the undersides of large rocks from midtide to lowtide level, though in Bermuda, at least, it is found in an exposed position in crannies and caves on large boulders. It is a beautiful species. Each island in the Caribbean has its own particular color form, though the sculpture remains relatively stable. The mark on the third valve described by Lt. Col. Edwards is not consistent and should not be used as an identification mark. See the color photo of the dark Bermuda form.

*Acanthopleura granulata* Gmelin, 1791, is abundant in Florida, especially the Keys, and throughout the Caribbean. It lives in an exposed position on the tops and sides of rocks, from midtide to high tide level, and even above, and is, therefore, usually badly eroded. These eroded specimens are best left to nature, as there is no way to turn them into good specimens. Rather, the collector should search for the rare uneroded specimen, usually young. Many collectors in Florida call this *Chiton tuberculatus*, and I hope the color photo will

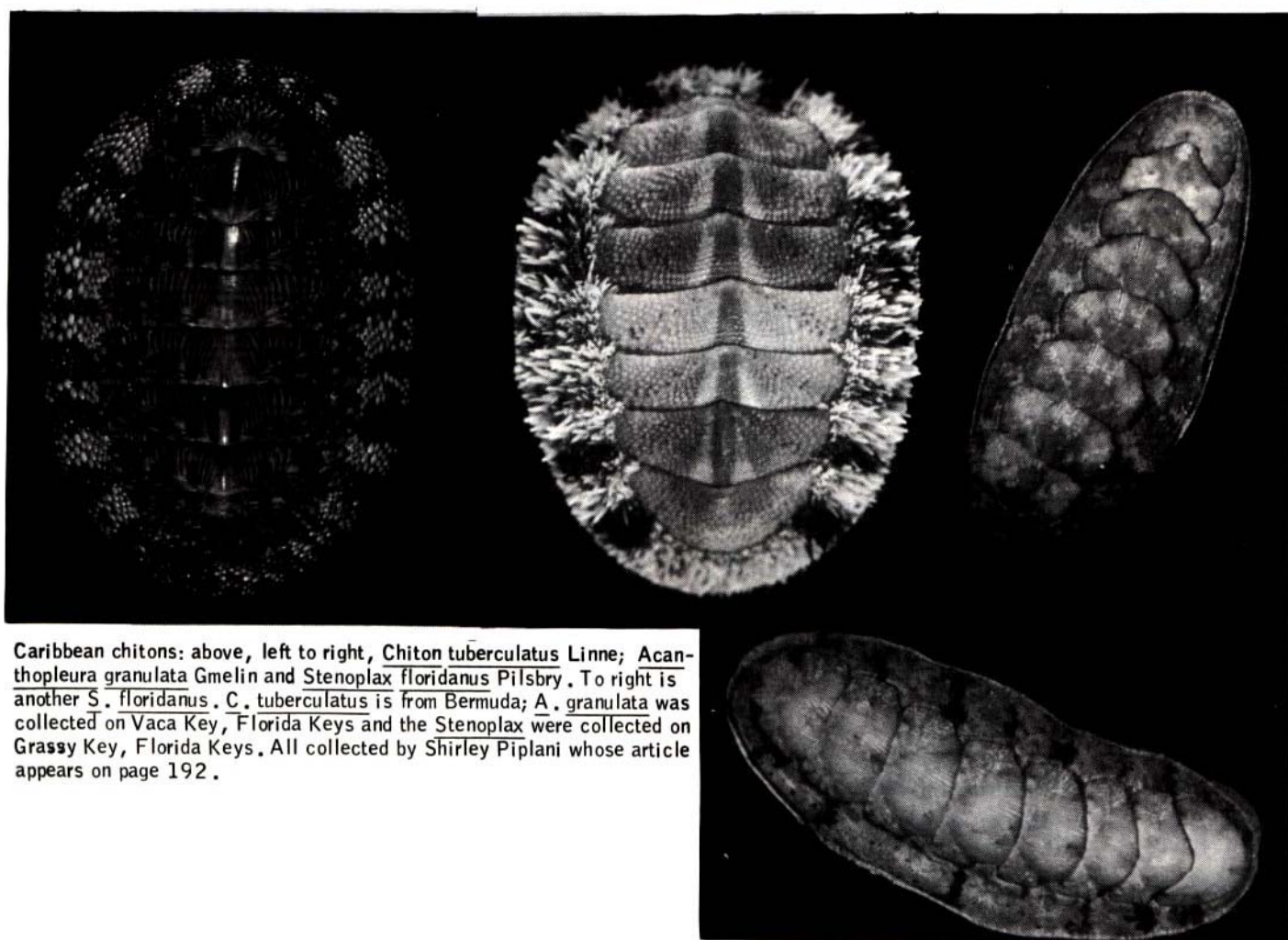
correct this impression, as there are few similarities. Interestingly, this species, when young, has eyes scattered over the top of the valves. The radiating black spots in the photo are the eyes. These eyes are complete with iris and retina, and are seen in several families of advanced chitons. In this species the eyes erode off as the shell erodes, so we can assume the big boys we see on the tops of the rocks are blind.

*Stenoplax floridanus* Pilsbry, 1893, has a limited range, occurring for the most part only in the Florida Keys. It is closely related to the Caribbean and Panamic species *Stenoplax limaciformis*. This species should never be dried, except by the Hanselman method, as the lovely velvety girdle scales drop off when dried. It has a number of color forms, including the two in the photos, though I have also collected brown, black and green specimens, as well as color mixtures.

In short, really seeing chitons means loving them, though many are difficult to identify due to the paucity of modern works on chitons and the poor and sketchy treatment given them in most shell books. Let us hope that this situation is soon remedied, and with the newer collecting methods, more can enjoy the beauty of the chitons.

Color photographs by E.R. Spunagle  
Prints by Alec Piplani  
Specimens from S. Piplani Collection





Caribbean chitons: above, left to right, *Chiton tuberculatus* Linne; *Acanthopleura granulata* Gmelin and *Stenoplax floridanus* Pilsbry. To right is another *S. floridanus*. *C. tuberculatus* is from Bermuda; *A. granulata* was collected on Vaca Key, Florida Keys and the *Stenoplax* were collected on Grassy Key, Florida Keys. All collected by Shirley Piplani whose article appears on page 192.



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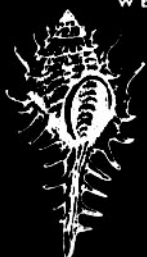
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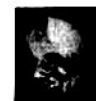
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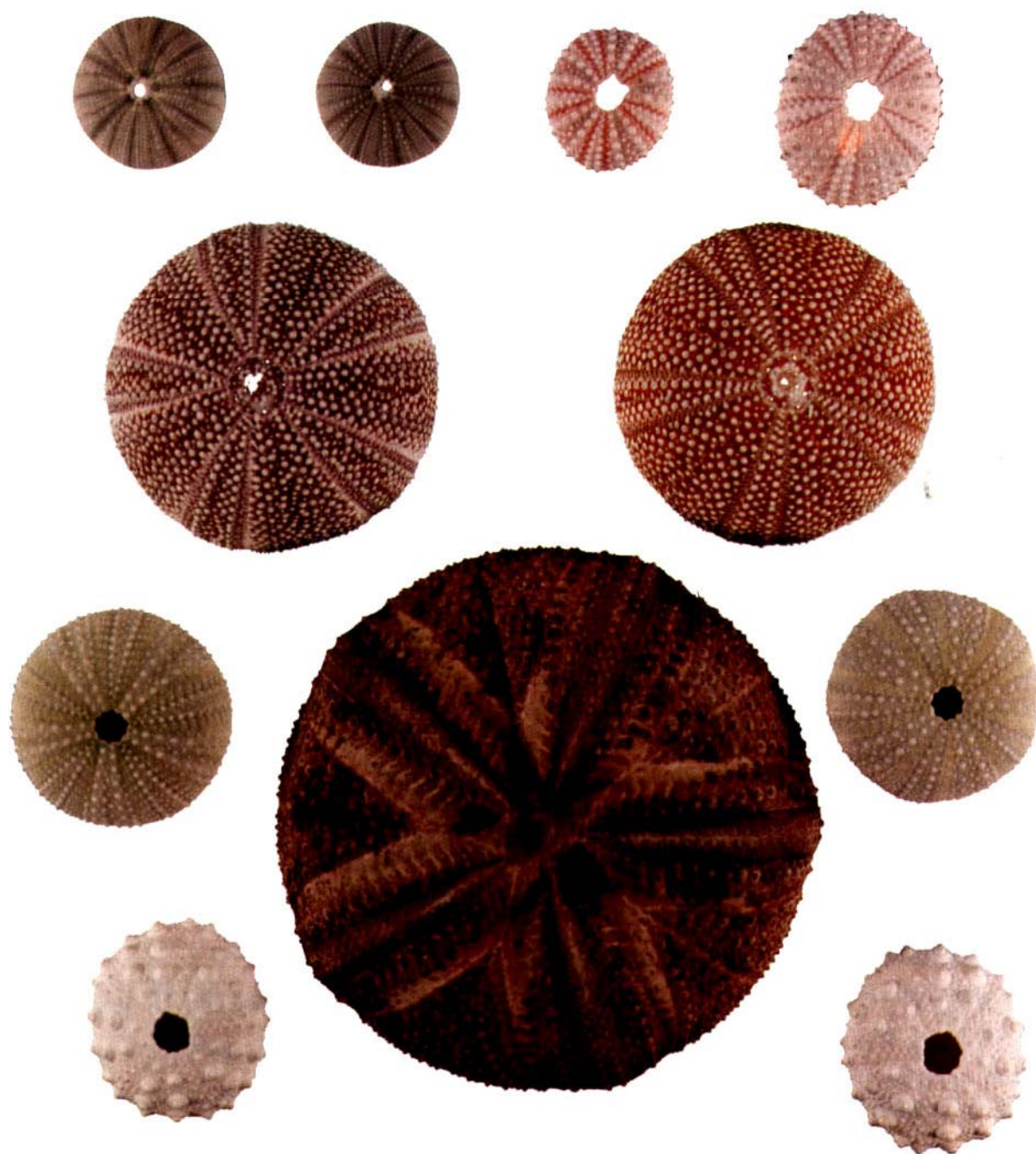
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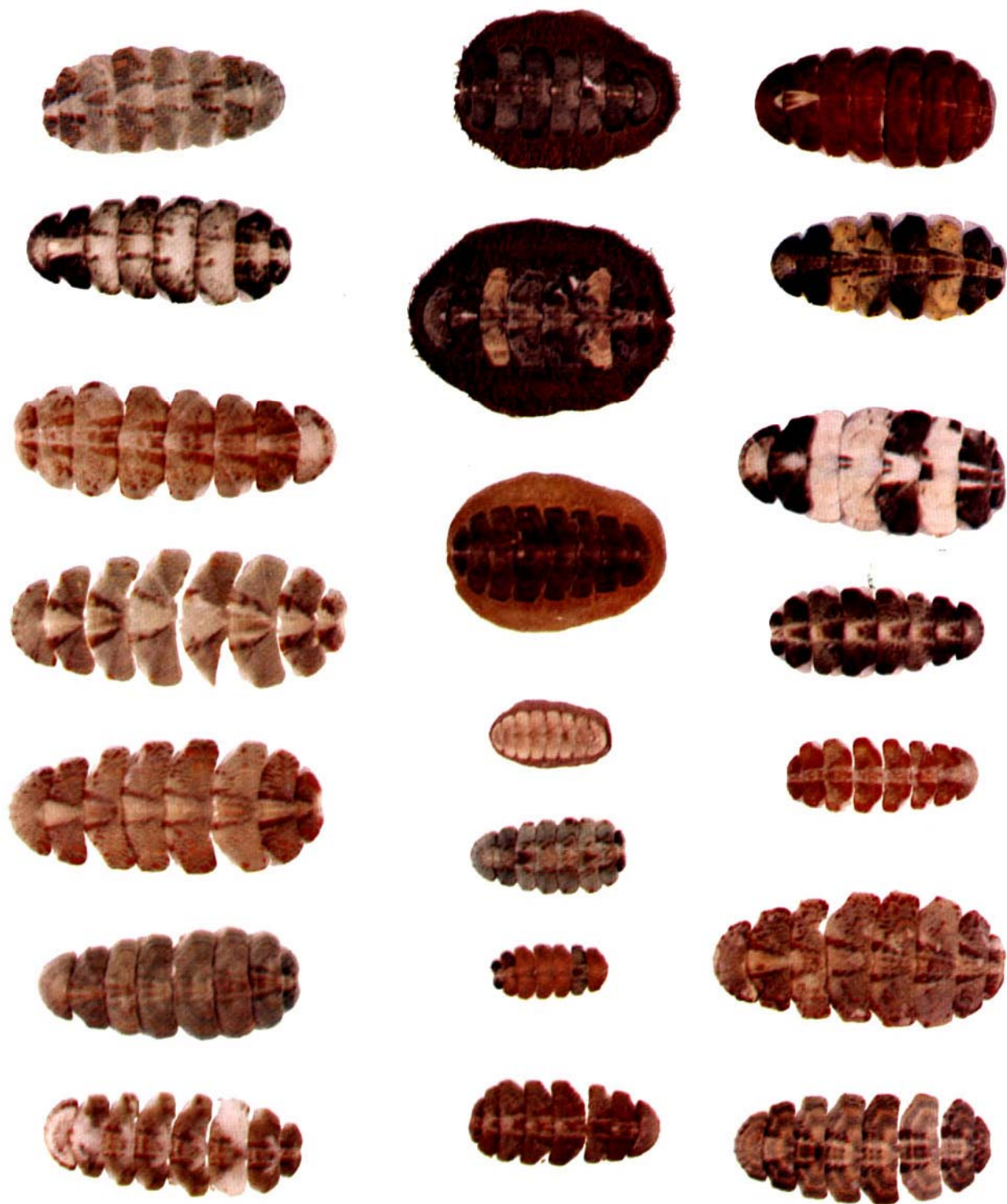
C. SAMSON-BOURET

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The test, or shell, of the echinoderms known as sea urchins display an intriguing pattern in both sculpturing and structure, and a wide variety of color. The tiny holes in the test are for the thin tube-feet to protrude. The pimples, or bumps, on the test are the point of attachment for the spines. These specimens from Japan, mainland China, Puget Sound, Philippines and the English Channel.

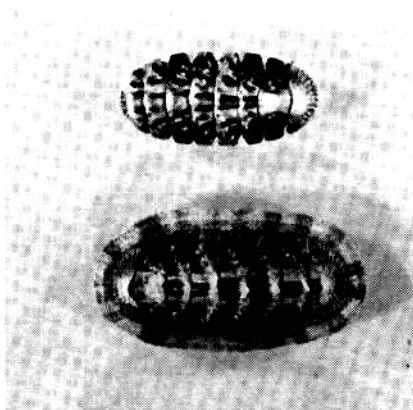




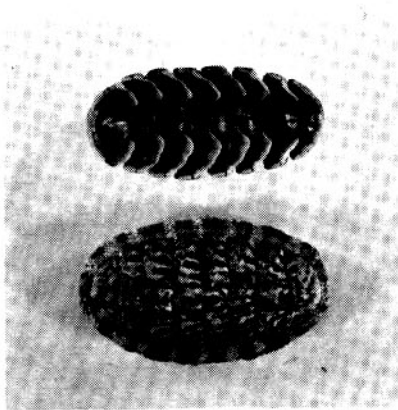
Some of the more variable species of chitons in Pacific Northwest waters are of the species *Mopalia ciliata* Sowerby, 1840 and *Mopalia swanii* Carpenter, 1864. Without girdles the species are nearly impossible to separate. Specimens from Of Sea & Shore Museum.



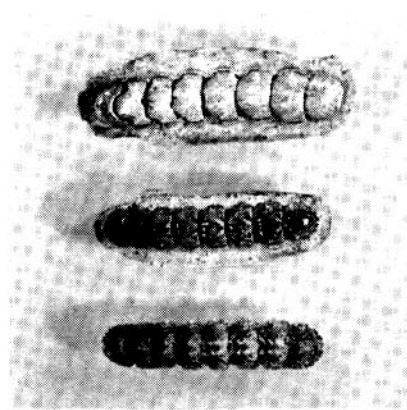
MAYBE THIRD TIME IS THE CHARM!



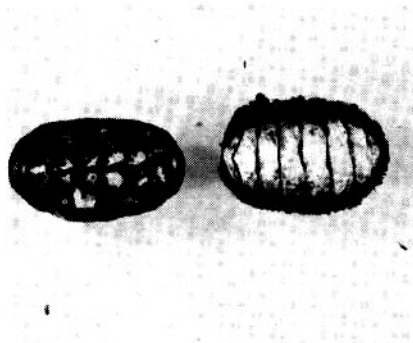
Chiton viridis Spengler



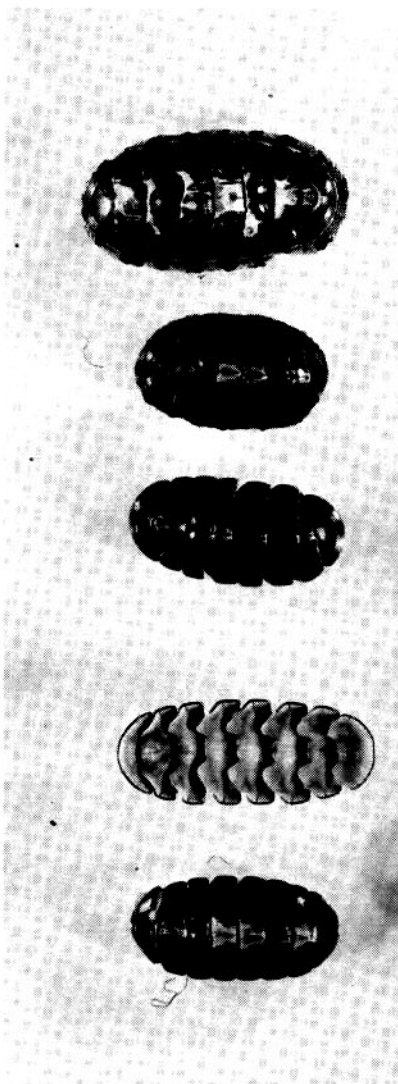
Chiton squamosus Linne,



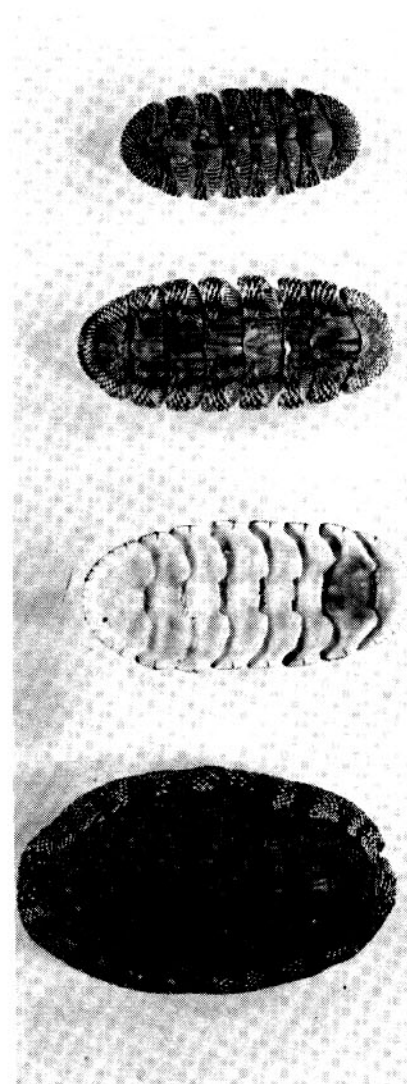
Stenoplax floridanus Pilsbry



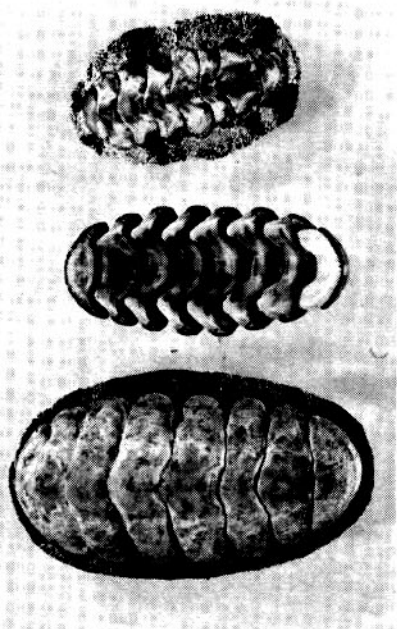
Ceratozona squalida C.B. Adams



Chiton marmoratus Gmelin



Chiton tuberculatus Linne



Acanthopleura granulata Gmelin

Photograph by Ellis Robinson

This is the third run for this page; hopefully the gremlins will let us do it right this time. First goof was my fault, then the printer failed to put corrected captions onto plate. Now, hopefully, it's corrected.

Tom Rice

Specimens collected by Corinne E. Edwards

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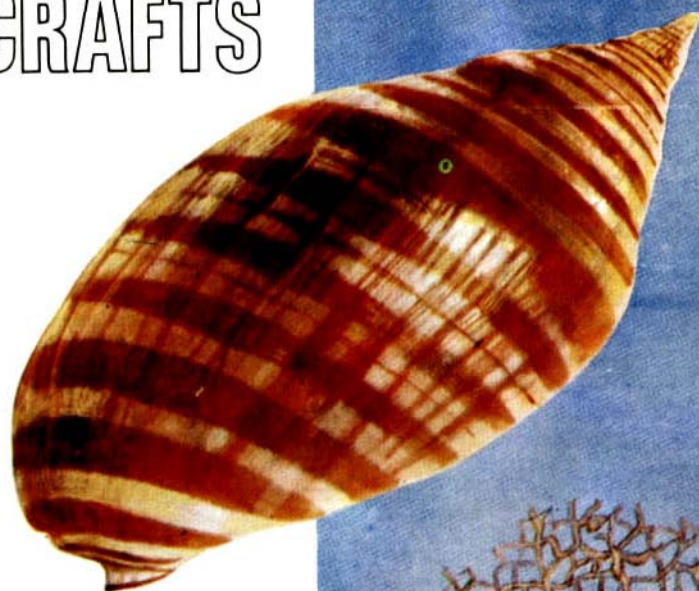


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