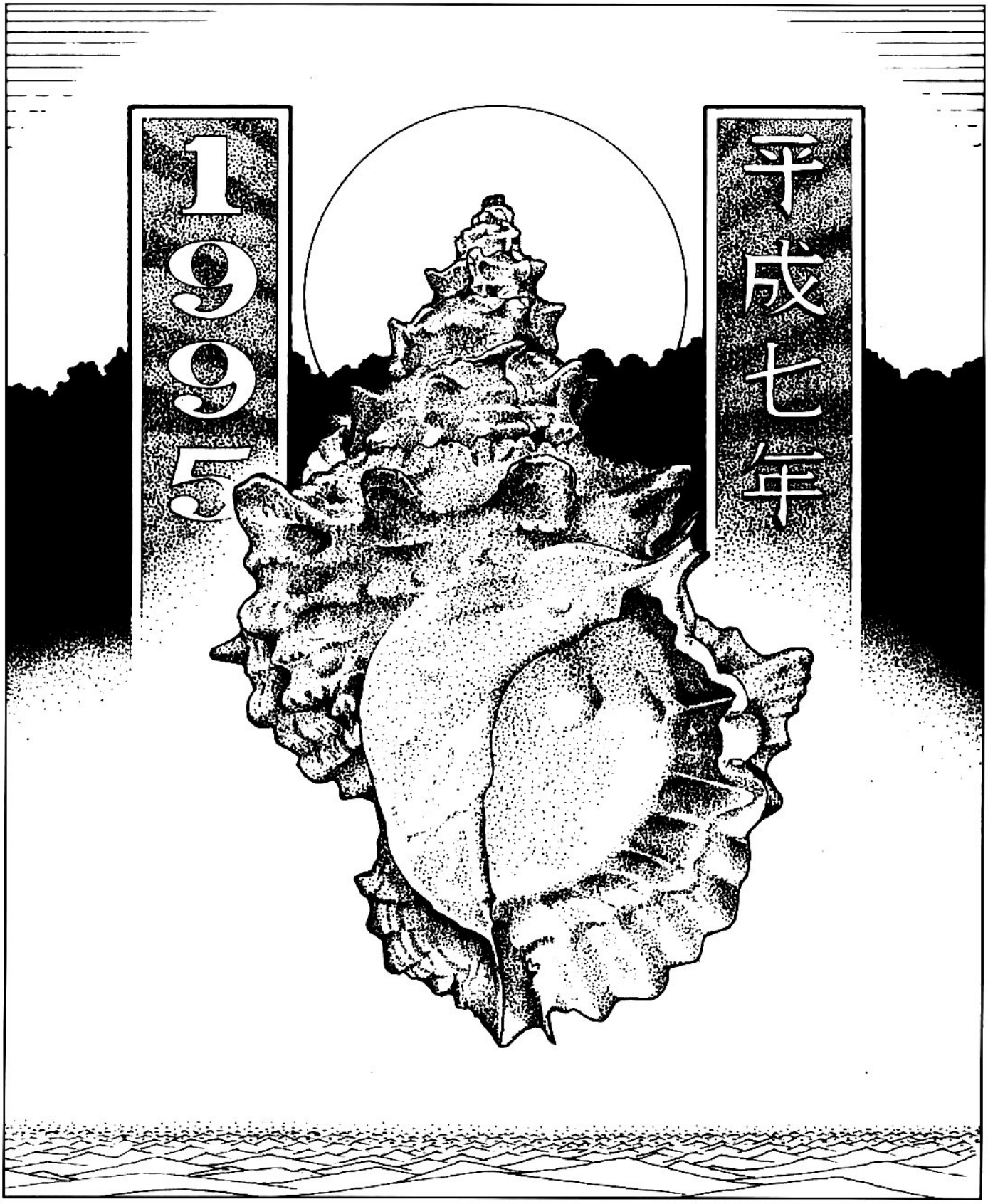
# of Sea and Shore



Volume 17, No. 4 $4.95 Winter 1995

In This Issue

Notice

Please note that the area code for our phone number has been changed - it is now 360. Our phone number is now (360) 297-2426. Same number for a fax.

Of Sea and Shore Magazine [US ISSN 0030 00551] is published four times each year by Of Sea and Shore Publications; Port Gamble, Washington 98364 U.S.A. Subscriptions are $15.00 per volume (4 issues) in the U.S., $20.00 elsewhere. Special rates for First Class & Air Mail Delivery available.) Send address chances to P.O. Box 219; Port Gamble, WA 98364-0219. Phone/Fax (360) 297-2426. This is issue #4 of Volume 17. Date of issue is January 9, 1995.

From the Editor's Desk

I hope you're having a great new year. Our front cover features a new year's card drawn by Paul Callomon of Osaka, Japan. The shell shown is ***Bursa lissostoma*** E.A. Smith, 1914, from Minabe, Wakayama, Japan. The Japanese characters refer to the current Emperor's seventh year of reign. I certainly join Paul in wishing all of you the very best for 1995!

Several changes will be coming in the magazine during the upcoming year. I plan to expand the "Recently Named Marine Mollusca" in this issue into a feature of from eight to sixteen pages to keep readers informed concerning recently described species. I also want to feature more "happenings" such as shell shows, club outings, etc., but to do this I need your help. Please write up your "happening" and send it in so it can be included in a future issue.

I hope you'll enjoy this issue and spread the word about the magazine. At a time when shell collecting seems "under the gun" (see the first article in this issue) all collectors need to work together and as individuals to make certain that those "in charge" realize the value of our hobby - that it's not just the collecting of shells for their value or beauty, but that it can help gauge environmental changes and challenges.

Tom Rice, Editor

The Criminalizing of Shell Collecting

Are Shell Collectors Targeted Next?

Carl Cook

EDITOR'S NOTE: The following article appeared in the December 1994 issue of **American Conchologist**, the publication of The Conchologists of America, and is reprinted here with the permission of the author.

Lynn Scheu, Editor of **American Conchologist**, introduced the article as follows: *If we've done much live-collecting, we've encountered some form of restriction on shell collecting. We've heard the horror story about the Florida tourists who unwittingly broke the law by collecting shells, and received heavy fines and criminal treatment. Even amateur collectors have encountered restrictive legislation in the form of the Australian collecting regulations and export bans. California is off limits to collecting, as are parts of Florida, and other areas of that state are under siege. And yet there are places in the world where entire reefs are dynamited for the sake of a daily fish catch! What is wrong with this picture? As population grows, regulations on the population grow with it; often these regulations fail to address the real problem, simply appeasing the vocal but ignorant majority. Will shell collecting fall victim to this trend toward regulation without understanding? It is a very real prospect if we continue to wait for someone else to do something. Things get dangerous when "the best lack all conviction while the worst are full of passionate intensity."*

As an amateur entomologist and archaeologist, I have observed with increasing alarm the current plethora of restrictive regulations, proposed and enacted, which are directed toward the privilege of collecting and acquiring natural history specimens both in this country and internationally.

Everyone who is interested in the conservation of natural resources - and no segment is **more** interested in conservation that natural history scientists - easily understands the extreme measures that have been required to stop the slaughter of elephants and rhinos in Africa. Also, every amateur archaeologist is well aware that the days of legal ancient burial excavations are past and gone. But there have been instances of well-meaning persons who attempted to salvage artifacts from construction sites - where they were about to be forever covered with fill dirt - **and these persons have been charged with grave desecration, heavily fined, and given jail sentences!** Such outrageous interpretation of the letter of the law have been completely devastating to these persons, criminalizing honest citizens for their well-intentioned service to science.

For a conchologist who should be fortunate enough to find a living ***Epioblasma obliquata perobliqua*** there would be absolutely no dilemma - he would immediately and lovingly return it to its stream bed home. The dilemma would come if the specimen he picked up happened to be a dead excavated shell. Should he add this once-in-a-lifetime treasure to his collection - clearly a violation of the U.S. Endangered Species Act, or should he drop it back on the stream side - to be eventually crushed under the boot of a fisherman or the wheel of an ATV? This is a good example of certain provisions (but by no means all provisions) of the Endangered Species Act and the Lacy Act which are pure political rhetoric designed to appease "animal rightist" groups and the scientifically uninformed public. These same provisions are ultimately sure to prove counter-productive to conservation efforts through strangulation of scientific research based upon the ready availability of study specimens and information largely furnished by the world's amateur scientists.

Are conchologists the next group targeted for attack by the "ban all collecting" forces? I think the answer is very clear. Witness the start of a movement in Florida to ban all live shelling along the southwest coast of Florida from Sanibel to the Keys. Isn't a total ban for all of Florida and the Caribbean a logical step from there?

What measures are open to conchologists to defend the continued privilege of collecting non-endangered live specimens, collecting, possessing and exchanging ALL naturally obtained shell specimens and naturally

excavated fossil specimens?

1. I hope every reader of this article will write to their two U.S. Senators and their congressmen in Washington, D.C., pointing out the very valuable service to science which is provided by natural history specimen collectors by providing specimens for distributional and taxonomic study, and expressing their concerns about the imposition of additional restrictions at this time. If you live in a coastal area, also write to your state legislative representative.

2. Please also express your concerns to your senators and representatives about the many reported instances of overzealous prosecutions by U.S. Fish and Wildlife Service agents against citizens because of ambiguous regulations or acts done with a well-meaning intent. An example is the U.S.F.& W.S. prosecution of a group of Illinois sportsmen who, during the 1993 midwestern flood, rescued a large quantity of duck eggs from the rising waters, incubated the eggs, and released the young ducklings, but were fined $5,000.00 because their effort was an "infraction of regulations relating to migratory birds"!!

3. Give your support to the International Scientific Collectors Association, the only international organization devoted entirely to addressing the problems discussed in this article.

What about ISCA? In July 1993, at Louisville, Kentucky, the new organization was founded to represent the interests of scientific collectors of natural history material, in particular, the amateurs; to facilitate best utilization of systematic material in scientific research; and to encourage the ultimate disposition of all such collections to public museums for permanent preservation.

It is becoming evermore apparent to anyone who collects natural history specimen for scientific purposes, or engages in exchanging material with international colleagues, that these pursuits are becoming subject to constantly increasing regularity acts, and require, in many instances, expensive or difficult-to-obtain import and export permits to be conducted legally.

The situation for amateur collectors in Germany continues to be extremely bad; all living invertebrates there are completely protected from collecting. We surmise this could possibly include excavated snail and bivalve shells as well. In this hemisphere, Mexico is one of the greatest offenders: a scientific collecting permit currently costs U.S. $700.00, and we frequently receive reports of instances where corrupt city officials have added further charges for "local permits." It is seemingly possible for U.S. Customs to require compliance with Mexico's permit requirements under terms of the North American Free Trade Act for imported specimens from Mexico.

Reports continue to be received at ISCA from both museums and private collectors about specimen shipments being seized and held by customs authorities because of some supposed, obscure permit infraction. This is happening with increasing frequency in the U.S. as well as in several other countries like Germany. We are left to wonder what is going to become of this material. Will it eventually be returned to the rightful owner, or destroyed?

I am working as a taxonomist in entomology, and I frequently need to borrow holotypes from many different museums in the process of describing new species. I am extremely concerned about the possibility that some museum's types could be seized or mishandled during customs examination.

Up to now no single source of information has been available to the avocational collector concerning these regulations and permit processes. ISCA proposes to act as a clearing-house to provide such information. They also propose to represent the viewpoint of scientists on all legislative proposals having impact upon scientific research. ISCA supports the necessity of scientific collecting and systematic collections for scientific research. ISCA would like to recognize the achievements made by amateur natural history scientists, because today it seems to have become fashionable to minimize the contributions made by the so-called "amateur" or "avocational" worker; it seems nearly forgotten that virtually all of the great pioneer natural scientists - Audubon, de Selys-Longchamps, Fabricius, Linnaeus, Rambur - were amateurs.

ISCA solicits your support and membership. Annual dues are $15.00 for regular membership ($25.00 or more for contributing membership). For information contact Carl Cook, Executive Director ISCA, 469 Crailhope Road, Center, KY 42214 (phone 502-565-3795).

Shells Wanted

Wanted: a right-handed ***Busycon contrarium***. Send particulars (size, condition, price, etc) first letter to: Neil Farr; 11 Dudley Grove; Edithvale, Victoria 3196, Australia.

NEW SOUTH AFRICAN SHELL MUSEUM

In a country where the majority of the population thinks that shells are explosive artillery, it is pleasing to report that a shell museum has been established. On December 1, 1994, the Sea Shell Museum celebrated its first birthday, having completed a successful year which has established the museum as a major tourist attraction for both local and international visitors to the Natal South Coast.

The museum, brainchild of the owners, Dawn and Michael Meyer, is based upon their shell collection which was built up over a combined 30 years of collecting, exchanging and purchasing.

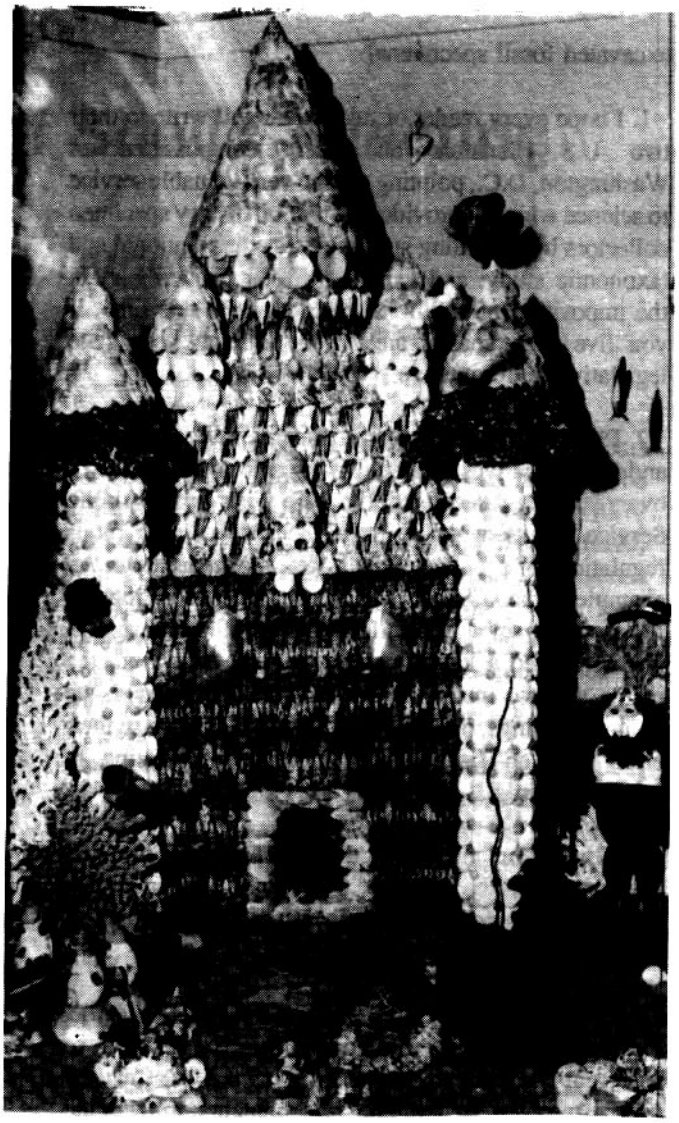
Michael and Dawn comment:

"Much is being said nowadays about dwindling shell populations and often the blame is laid at the shell collector's door for such declines. But in our experience what the scientific collector actually takes (with a few exceptions) is less than one percent of what is lost due to changing environments caused by advancement of civilization and what is taken daily by the general public, who collect for food purposes or who take live shells home as mementos from their holiday by the sea. Too, one cannot blame the general public for this as nothing has been done to educate them about our shell fauna.

"With this in mind the Sea Shell Museum was established with the mission to introduce the public to the fascinating world of shells. Until the general public appreciates that there is a living animal in the shell and that populations can be affected by overcollecting, we cannot hope for them to think twice before collecting those living shells on our shores.

"Some of our government museums have vast collections of shells for research, but these are not on display for the general public. It was out aim to display a large shell collection under glass so that the general public could fully appreciate the vastness and diversity in shape and in color of mollusks. The museum is comprised of a fully identified collection of about 20,000 different species of mollusks, including such rarities as ***Cypraea valentia***, ***C. langfordi***, ***C. broderipi***, ***C. aurantium***, etc. New species and better specimens are regularly added.

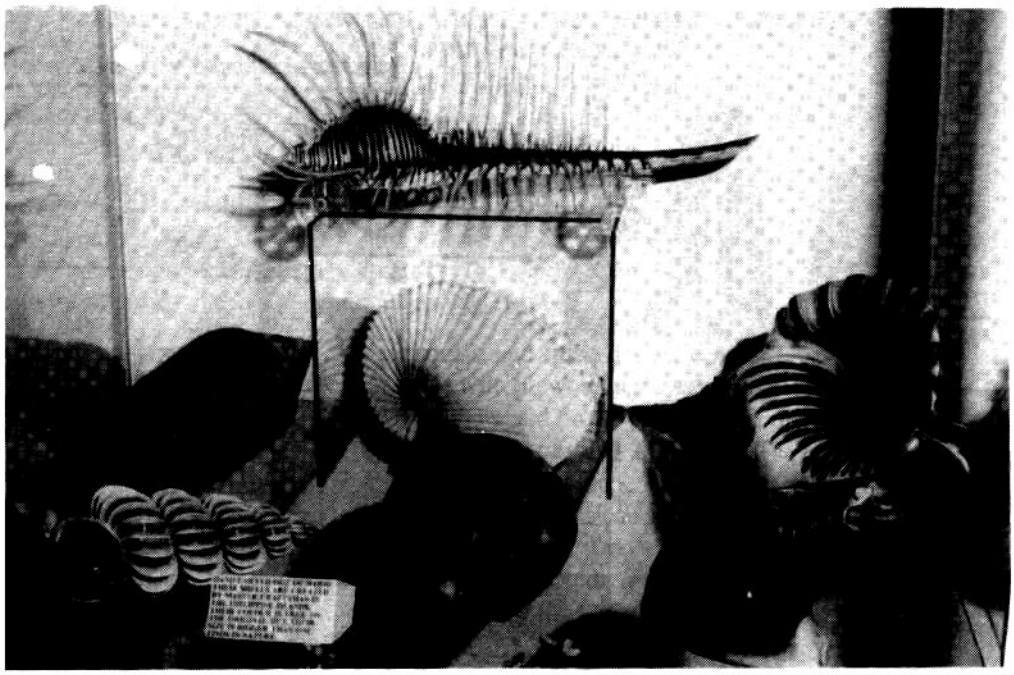
"In addition there are lots of educational displays on mollusks, fossils and a fun display of shell craft works, including a huge castle covered in shells. Most popular is the section on shells and man dating back to a 1684 edition of the first book written entirely on shells by Philippo Buonanni entitled (translated) 'Recreation for the eyes and mind through the study of shells'. This section includes fantastic wood carvings of shells, cameos, mother-of-pearl and other artifacts where man has used shells.



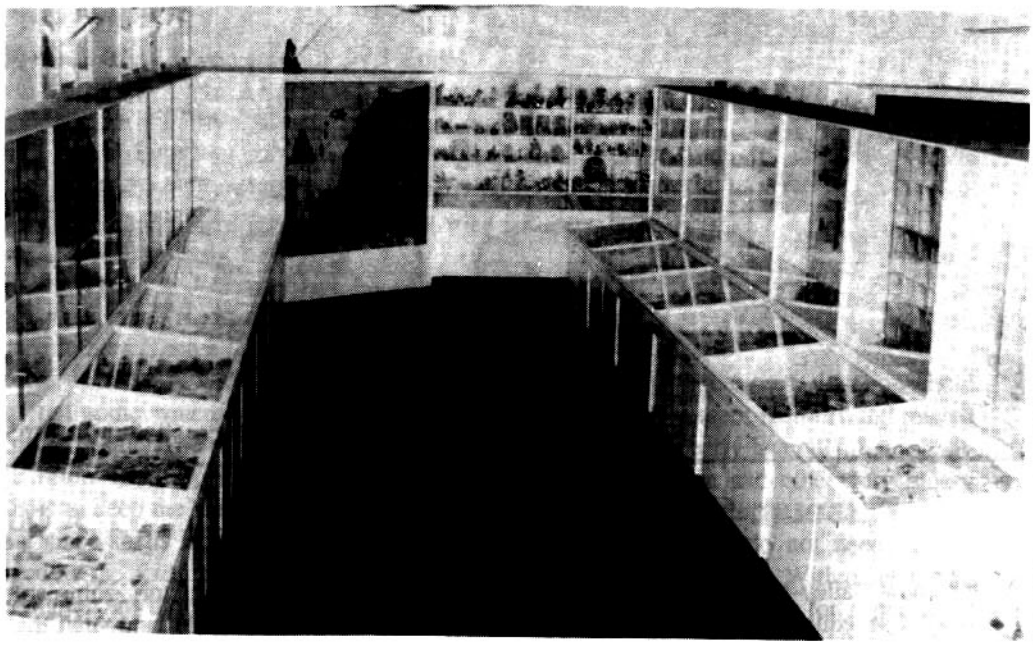
Fantasy land exhibit - 5 foot high shell castle.

"From the response from the many thousands of visitors who have passed through our doors, we are achieving our mission and out visitors leave with a greater respect for the shell world. Most didn't even realize that shells are inhabited and built by an animal.

"A small entrance fee and a gift shop helps to finance the running of the museum, which is more a labour of love than a financial proposition.



Wooden Philippine shells on display.



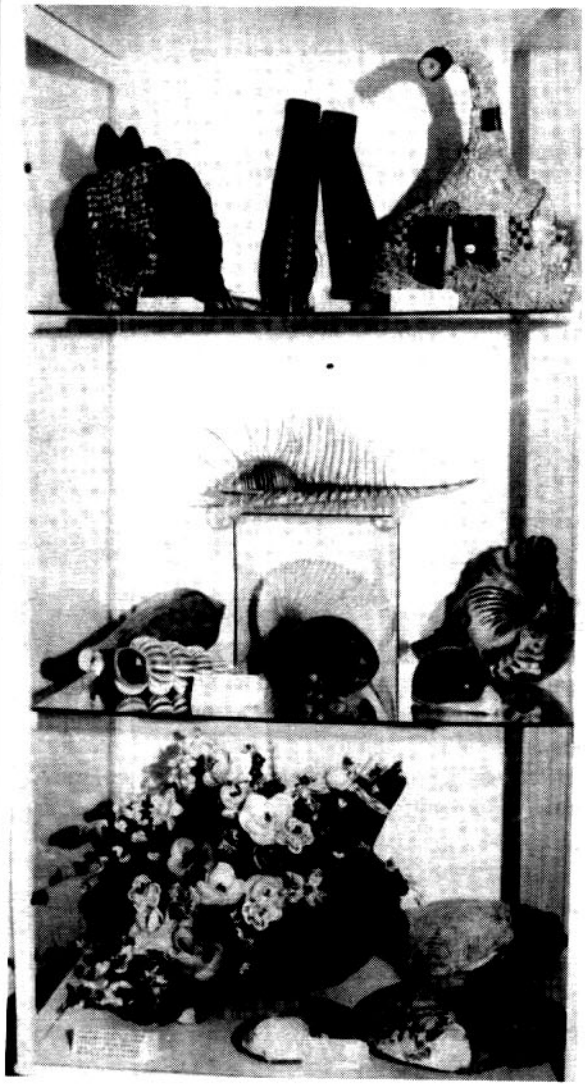
Museum interior

Below: Museum building.

"Future projects that are envisioned include expansion of the existing building to better house the ever-increasing collection. And, later, the publication of illustrated booklets on the subject.

"It will only be by a concerted effort by all that we can ensure that there is a future for the generations of shell collectors who will follow us."

The Museum is located at 995 Marine Drive, Shelly Beach, and the hours are, in season (school holidays) 9am to 5pm seven days a week, and out of season, 10am to 4pm Wednesday through Sunday.



Two of the exhibits at the new South Africa shell museum.

Museum to Open Soon

The new Bailey-Matthews Shell Museum on Sanibel Island is scheduled to open in March of 1995. Dr. R. Tucker Abbott is the founding director. I'm sure you've read one of the recent articles on Tucker and the new Museum on the front page of the Wall Street Journal or in U.S.A. Today and the February 1995 issue of Islands magazine. Membership in the Museum ($25 contributing; $35 family) are available - write The Shell Museum & Education Foundation, Inc.; P.O. Box 1580; Sanibel, FL 33957.

Continued from page 199

The character of a trade that does not work: The Trader send the Dealer a list of shells with trade values mostly equal to retail prices. Or, shells are received in poor condition, partially or totally uncleaned, vague data or no data at all. Or the Grader send shells from their collection that have been replaced by better specimens.

A Quick Bit

There is a story going around at shell society meetings of the little land snail that crossed the street (to get to the other side, of course!) without looking both ways and just then a California Banana Slug came around the corner and ran right into the little snail causing a lot of injury.

When the snail was rushed to the hospital emergency room the nurse asked him how he was injured and he replied, "I don't know, it all happened so fast!"

Submitted by J.M. Inchaustegui; Harahan, Louisiana

Short Bits

Do you have a short anecdote about shells? Or a joke? A cartoon? A poem? We certainly could use any of these or other material dealing with shells or other denizens of the seas and shores, send them today!

Cleaning Shells

Charles Cardin

INTERIOR: Cleaning out the animal is very important to keep long-lasting smells out of you shell cabinet. But getting the animal out is very difficult with many shells.

Boiling: Boiling is dangerous. I do not boil glossy shells, including ***Strombus***, ***Oliva***, ***Cypraea***, ***Cassis***, etc., because boiling will often do two very serious things. First, it can cause heat stress cracks in the which can sometimes be very obvious - especially in the ***Strombus***. Boiling can also destroy color. Since the color in shells is organic and subject to heat and light, boiling can, and often does, hurt colors in shell. I have had success in boiling some ***Conus*** shells and ***Terebra***. If you do boil, start with cold water. Don't drop shells into hot water! Boil for only a minute or two. Take the shells off the heat and let them cool slowly. Don't douse them in cold water to cool them off. It causes cracks.

Decay: I have had good results in the decay method. With ***Cypraea*** I put them in the freezer for a few days. You don't need to, but this seems to help loosen them allowing you to wash them out later. Then I prepare a container such as a 4-5" deep **Tupperware** with a tight-fitting lid. In the bottom I put some water, about an inch, to keep it good and moist inside. Then I put in a layer of plastic mesh (I often used upside down strawberry containers). This is to keep the shells out of the water. That is important since shells kept in water during decay will be damaged by the acids in the water. I leave the shells in the container, in the shade, away from dogs and kids, for four days. By then it is really ready. The shells are "ripe" and smell badly. I get my garden hose, rubber gloves, apron and face shield. Set the hose at high power stream and wash out the shell. It takes some squirting and shaking to get it all out. This works well on ***Cypraea*** and ***Oliva*** amongst other shells. The secret is to keep the shell out of the water. Keep the shell aperture down so liquids fall away. Don't leave the shell in the container for too long, nor try to clean them out too soon! You'll discover the best length of time for your particular kind of shells.

Ants and bugs. If you are lucky enough to have ravenous ants and bugs in your yard, this is about the best way to clean shells. You must also have a lot of patience. In Tonga I dug a hole a foot deep and four feet square and lined it with cement blocks. I covered the hole with plywood and placed cement blocks on top to hold the wood down - to keep out the pigs, dogs and kids; it also controlled the smell. The ants in Tonga were great shell cleaners. Two weeks and even the large ***Terebra*** were fully cleaned. Keep the shells in a place that will not flood. Don't stack shells on top of each other since the liquids from one shell will damage the one under it. It may take you longer than three weeks.

Smells. There are all kinds of tricks for covering up the smell if you don't get out all of the animal, but none of the ones I know are really good. Some include tightly fitting cotton in the aperture. Perhaps a drop or two of alcohol or formaldehyde? None work. In the dry air of Las Vegas I have actually mummified some animals. Once I ship them out to a damp climate ... well, you know what happens then.

I'm not sure which is harder: cleaning the inside or the outside. But the latter comes next.

EXTERNAL CLEANING. I have never had household laundry bleach hurt a shell (except ***Haliotis*** and related shells - bleach destroys the pearly layers!!). I shy sway from using bleach on ***Cypraea*** and other very glossy shells. I have used it many times with ***Oliva*** with no damage. Glossy shells normally do not need bleach, unless they are extremely dirty inside. With other shells, good old household bleach, undiluted, for a period of from 30 minutes to 4 hours, does a great job of getting rid of organic material on the surface of the shell. It will also quickly remove a periostracum, so be careful if you want the periostracum intact. It will also magically dissolve an operculum, especially a small, thin, delicate on. If the animal is dried inside the shell with operculum attached you first need to soak the shell in warm fresh water until the animal is soft enough to remove both operculum and body. Bleach will dissolve away some of the dried animal too, but not much. Not enough to eliminate smells! Once shells are removed from the bleach rinse them off in fresh water - completely - and let them dry. You will note that they are pretty sickly-looking when dried out, but that will change - read on.

Once you have dried the shell, there is the task of getting rid of any hard calciferous deposits. No easy task. No easy soak. No magic chemicals.

I use three methods to get rid of deposits:

(1) Dental tools. This is slow and tedious, but the best way. Get some used tools from your dentist - they throw away the worn-out ones. Removing the deposits take some practice and care not to chip away shell material or spines, etc. Once the deposits are removed, you may find more stains underneath. You then have to give the shell another quick bleach soak. Save the old bleach unless it is really grungy.

(2) A vibrating electric engraving tool. This is the tool, with a sharpened point, that I use most. This can be dangerous - you have to be careful not to poke a hole in the shell or break a delicate frond. Often only this tool can remove hard deposits. It works fine for me - I don't know what I'd do without it.

(3) Wire wheel. I use a stainless steel wire wheel on a variable speed motor. A regular steel wheel leaves metal marks on many shells. The wheel is ½-inch in diameter on a ¼-inch shaft and rated "medium" grade. You might have to special-order one unless you have a good supplier nearby. Stainless steel wheels are hard to find. I use the wheel a lot on ***Strombus***, miters and shells with a hard smooth exterior that will not be damaged by the hard steel wires. I have cleaned - very carefully - many ***Ceratostoma burnetti*** with this tool.

NOTE Be sure to use a face mask or at least eye protection and gloves when cleaning.

Acid. Acid is harmful to shells! I use regular household vinegar to clean off a chalky appearance or some black stains. A 30 second soak is a long time. I use a stiff brush, like a fingernail brush or stiff toothbrush. A ten second dip, then brush and then another dip and more brushing until you get the results you want. Rinse off the vinegar right away when you are done. Some collectors use diluted Muriatic acid (HCL). This is dangerous to you and to the shell. I do not recommend it. Try vinegar on shells of no value and get to know the properties of vinegar before you try it on good shells.

Oil. After the shell is cleaned you can restore a nice appearance by oiling the shell. I used to use mineral oil, which many swear by. If you like it, use it. I now use food grade silicone oil in a spray can. I like it because it is so easy to apply. It does not chemically react with the shell or periostracum or anything else for that matter. It is a bit more expensive. Fungus and other "things" will not grow on it as they sometimes do with mineral or baby oil. The silicone goes right into the shell leaving no oily feeling. Be sure to get food grade, otherwise it might have a petroleum component and it will smell. I use **Prestone** brand that you can get at your local auto supply store. It's really great if you have lots of shells to oil - just spray them! I've been using this for twenty years.

Glycerin. Plain glycerin softens and operculum and will do the same with a bivalve's ligament.

ADDENDA

Hydrogen peroxide. If you have a small bit of animal matter stuck up in the spire of a shell, causing odor, balance the shell with spire down (in sand or kitty litter) and pour in some hydrogen peroxide. Let it set for a few hours and then rinse. It should do the trick in removing that bit of dried flesh.

Shells Used As Musical Instruments

I don't know if anyone else is interested in this, but several recent CDs (compact disks) include shells as musical instruments. I am sending along the information for your reader' use, if interested:

-- **Drums, songs and chants of the Cook Islands,** Cook Islands National Arts Theatre (CINAT)
Ode Music Manu 1447 (1993) New Zealand

Comment: available in U.S. as an import; traditional triton shell blasts to introduce songs; good sample of Polynesian drumming and dancing. The only CD of music from the Cooks.

-- **Japanese traditional music: V. 10 percussion**
Seven Seas/King KICH 2010 (1990) Japan

Comments: I haven't found a copy, yet. Reviewed in Dirty Linen.

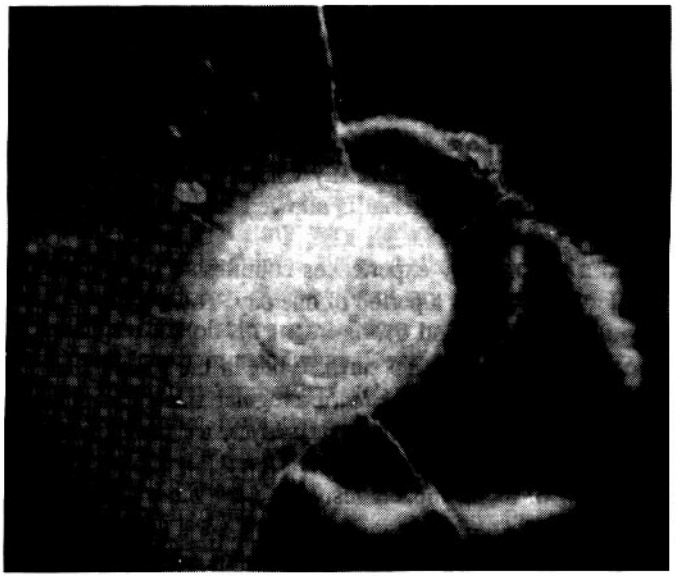
-- **60 Horses in my herd - old songs and tunes of the Tuva Huun-huur-tu**
Shanachie CD 64050 (1993)

Comments: contains a Mongolian lament, of unearthly beauty, featuring throat singing (ala the Gyuto monks), a 2-stringed fiddle, and "conch shell". The only instance I know of where a shell is used as a controlled, emotive instrument rather than an attention-grabber. A weird and stunning album.

Bill Hardy, Orangevale, California

How Cowries Lose Their Shine

Willem Krommenhoek



Erosion of the cowry shell as seen with a microscope.

Left: early stages in the erosion of a cowry shell. Clearly visible are the various irregular and superficial damage in the dorsum of a specimen of **C. arabica**. Each collision produces small damage in the smooth shell surface of irregular size and form, depending on the force of the impact. With increasing number of his the shell gradually loses its gloss and shine.

Right: full hit on the dorsum of a specimen of **C. carneola**. The shell has a crater-like puncture with concentric rings inside. From the center of the crater cracks run in eight directions, interconnected by fissures on the right side. The actual size of this damage is less than 1 mm.

Among shell collectors the cowries are extremely popular because of their beautiful gloss and shine. The shells of living animals are perfectly smooth and shiny as a result of the presence of the mantle. During life this mantle protects and polishes the shell continuously, resulting in a high gloss and usually multi-colored structures which is very attractive to many people.

However, beach collectors know that among the cowries which are washed up on beaches, less than one percent of the specimens have kept that shine. The majority is eroded and in different stages of dullness until at the end not only the shine has gone, but also the characteristic pattern of coloration. This last stage comprises about 10% of the washed up specimens. Consequently, some 90% of all washed up cowries is in some stage of being worn down.

Let us try to reconstruct what happens after the death of the animal. The remaining shell is subject to transportation as a result of water action, bringing it from its original habitat to the beach. The length of time for this process is determined by the position of the original habitat, e.g. grass beds, boulder blocks or the reef head, when we deal with cowries from the coral reefs.

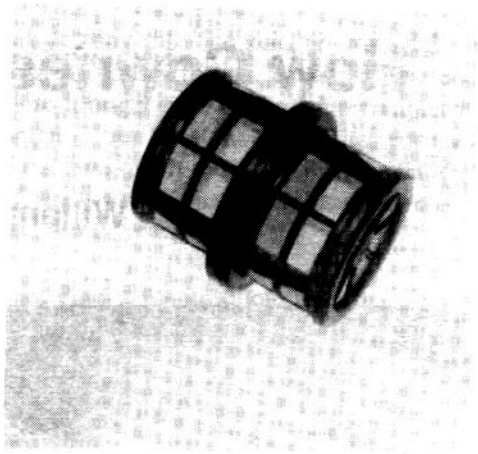
Sooner or later the majority of shells is transported to the beach, where most specimens arrive in a still good condition. Next, currents parallel to the beach are responsible for the fact that shells, together with other debris from the reef, assemble in clusters - the position of these accumulations depending on variations in the beach relief. Now a devastating and ravaging process will start, of which the intensity depends upon the slope of the beach and the height of the waves.

In deeper water, particles underneath waves tend to move in a circular motion. However, when a wave approaches the beach, the circular movement patten is flattened to a kind of ellipse as a result of friction with the bottom particles. The resulting forward movement causes the wave to break and to smash water and particles transported by the water on the beach. Immediately after this the returning rip current pulls most of the washed-up material back into the water where it is forcefully mixed and mingled. Often these rip currents are so strong that a person standing ankle deep has great difficulty in keeping upright while his ankles and feet are painfully bombarded with all sorts of debris and shells. This process of washing up and pulling back of material continues for several hours and several times per minute. Only when the tide is low or high, most of the material is allowed to come to rest.

So a fresh cowry experiences countless collisions of different impact in a period of one day. These collisions with other shells and debris fragments do not result in scratches on the shell's surface, but in the removal of part of the shell. Fragments of irregular size and shape are broken off the outer surface layer, as can be seen with microscopic examination (see figures). The majority of these impacts result in only minor damage, but gradually an increasing part of the shell's surface is deprived of its originally smooth surface and the whole structure is losing its gloss and shine. Occasionally a collision makes a direct hit, producing a puncture and even cracks and fissures in the outer shell surface. Although even these major damages can hardly be seen with the naked eye, the damaged area is far less than 1mm square, it speeds up further erosion of the shell. Eventually the complete surface layer of the shell is removed as a result of this process. Now a dull shell has still a long ways to go before new collisions have eaten away the colorations. It is in this stage that most washed up cowries are found.

It will be clear that this process always will erode the beautiful cowry shells, regardless of the type of beach. Only the slope of the beach and the wave action are of important, as they determine the velocity of the transport and hence the force of the impact. The wave action determines the force of washing-up material, whereas the slope of the beach is most important for the strength of the rip current.

Therefore, it usually takes only a few days to remove the gloss and shine of cowry shells after the death of the animal.



NEW SNAIL CAGE AVAILABLE

Darien, Connecticut ... Tops Mfg. Co. has announced the availability of a new cage for snails. Intended for the researcher, breeder and hobbyist, the new snail cage has been proven in use by the zoology departments of several research universities and natural history museums.

Constructed of rigid polypropylene frame with polyester mesh walls in the shape of a barrel, approximately 42mm in diameter and 60mm long, the cage snaps apart for easy access to specimens. The mesh of the cage has openings 250 microns diameter, allowing passage of light, air and water, and permitting easy visual identification of the specimens, while securely isolating individuals and breeding populations. All cage materials are F.D.A. approved and easy to clean, including autoclavable.

Additional information: Contact Patricia A. Himmel, Vice President; Tops Mfg. Co., Inc.; 83 Salisbury Rd.; Darien, CT 06820. Tel.: (203) 655-9367; Fax: (203) 655-1125.

Catalog of Dealers Prices

13th Edition

Ready Soon!

The thirteenth edition of this popular catalog should be ready for distribution at the end of February. Price is the same as the 12th edition ($19.50 plus postage - add $1.50 [book rate] or $3.00 Priority to the U.S.; elsewhere add $2 for surface book rate or for air mail add $3 for North, Central or South America, $7.00 to Europe or add $8.50 elsewhere. Order from **Of Sea and Shore Publications; P.O. Box 219; Port Gamble, WA 98364 U.S.A.**

Organizing Your Shell Collection:

Another Tale From The Trenches

Steve Rosenthal

Our purchase of a house in suburban Long Island (New York) in September of 1993 was accompanied by the usual excitement and anxiety. But, for me, there was more of those feelings than I might normally have expected. Having moved from our two-bedroom Manhattan apartment (finally) to a good-sized house (i.e. one with a basement), things were about to change. Actually a basement was a necessity on my list of essential criteria for a new house because I knew I would finally have to confront a problem I had had to avoid for years - what to do with my shell collection. Now I had to confront this bestial problem head on, at last.

For the past 25 years my collection had sat in the basement of my parent's home (also on Long Island), while first as a student and then a married wage-earner, I/we moved several times; never having a permanent enough and/or large enough place for a modest (but still expansive) collection of shells - until now. And my method of "curating" and storing those shells will curdle the blood of serious collectors. As my collection grew, mainly through self-collecting and lots of exchanging, I would simply receive shells, bag or box them as they were received and deliver them to my parent's home on my next visit. As I/we lived out-of-state for many of the last 20 years, this was a rather big ordeal.

And so, there my collection sat - in a huge random jumble of cardboard boxes and large zip-lock bags, all stuffed to the brim with shells in smaller boxes and bags. I could "revisit" all my additions to my collection simultaneously with my significant life events - boxes of New England shells placed me in Rhode Island during my college years in the early 1980's; boxes full of southeastern United States shells put me in graduate school / then married life (as a wage earner) in North Carolina through 1990, etc., etc. And, thrown in throughout were all the shells acquired from many persons and places by exchange (or purchase) at any given time.

Some of the associated problems will shock you. Most of the shells (except for those from about the last ten years) were never actually "curated". That is, I never actually critically evaluated any sender's (trader or dealer) identification of the shells, or the locality data. I did not re-write everything into my own standard label forms, as I do now. These situations were even worse for my older shells - sometimes I would put those shells in one bag and stick all their labels together in another! (Note: this was in my very early days!). I collected myself during that time - those shells got stuck in vials and bags together, often without my writing down the locality; now solely dependent on my ability to remember where and when I got them. I did know enough to start keeping a notebook of some data (but, again, separate from the shells - so, again, it meant more mixing and matching). The shells I collected locally were actually pretty easy to do, because our shell club's newsletter had the dates and finds from all our trips highlighted.

So now, after about twelve months of intensive (nights until 1:00 am on average and the occasional inclement weekend day) activity, I am about 75% or more through the curating. (Storage is a problem for later!) Here are some further observations on the whole bloody mess:

1. Actually, it's probably a good idea to have waited so long! Now there are good references out there for just about every region and taxon (at least for major families). For example, without **European Seashells** most of my European stuff would be hopelessly unidentifiable, or not given the most correct/recent scientific names. And new books just keep coming out ...

2. Trying to read other peoples' data labels is very frustrating at times. Besides having trouble with their handwriting (and many of the labels, especially the older ones, were handwritten - no computers then) the "place" names are often hard to determine with certainty (I have this problem at my job too). People from other areas (countries) assume you are as familiar with local (and global) geography as they are, so sometimes they just give you the name of an island, town, beach, etc. with no further data (i.e. what country or ocean is this ???). And forget it if the words are not in English! Of course, when the collection data is given, if it is

numeric, does it mean the U.S. or the European format? (i.e. the date 1/2/94 is January 2, 1994 in the U.S. and trouble the labels I send out when I trade shells (those I must add here that I will never know how much trouble the bales I send out when I trade shells (those too mostly handwritten) will cause their recipients.

3. There are a lot of misidentified shells out there! This should come as no surprise to serious collectors. I would guess that at least 10-15% (maybe even more) of what I had turned out to be wrong (and not just lacking the most recent scientific nomenclature - I mean just plain wrong.) I am sure the relative lack of good reference books at the time the shells were obtained by the senders is, in part, at fault. I'm also sure that some things I agreed with are, in fact, incorrectly identified - I'll probably never know for sure unless some more advanced collectors sees my specimens and alerts me. (And since my shells are not yet displayed, who knows when that will be.)

4. "Lumping and splitting": as a collector fond of adding to the number of species I have, I am happy when a shell misidentified as something I already had turns out to be, in fact, something different that I didn't have. And I am equally sad when the reverse happens. These two things seem to happen with about equal frequency, so the net trend is insignificant. (Better keep on trading.) A corollary of this is now that I will finally know what I do or do not have in my collection, I have to keep track of common things I need to obtain when the species I thought I had turned out to be something else. For example, when my "***Nucella canaliculata***" all turned out to be *N. lima*, I had to recontact some west coast people I had traded with to get true *N. canaliculata*. (I think they were happy to hear from me again.)

5. Geography on the go is a tough subject. As I previously noted, I didn't always do such a good job of noting locality data. However, when you are on a vacation in relatively unfamiliar places (not on a guided tour), and driving from place to place, and "stopping on a dime" when you see a likely looking collecting site, you can't always find signs or maps telling you exactly where you are. (I've had this problem, for example, in the Florida Keys. Now, at least, I know to check the mile markers.) But, face it, the world's coastlines are not all marked with signs. And names on a map often differ with the names local folks call a place, and vice versa!

6. You make interesting discoveries; you also lose things. As I now have only a few boxes/bags, etc. left, all with small shells, I must sadly conclude that I will probably never know what happened to my ***Charonia variegata*** (that measured almost 16 inches) that I bought at a souvenir shop for $7.50. How do I lose a shell that big, and why can't I remember any details about it's possible fate? (Anybody have one to trade?) There have been some interesting discoveries - things I never knew I had, or forgot I had: the albino ***Fasciolaria hunteri*** from the Cape Canaveral scallop piles, the white (and orange) ***Urosalpinx cinerea*** from Cape Cod, ***Ellobium pelluscens*** from the Everglades. Some were truly surprises: two "***Neritina fluviatilis***" from a collector in Spain, which look just like ***Nerita versicolor*** (definitely not ***Neritina***) - if his locality data is correct (and I assume it is) this is very odd, as Poppe & Goto state, in **European Seashells**, that there are no *Nerita* in Europe!

And so, on a "daily" basis (actually, more "nightly"), the work goes on. Fortunately the end is now in sight, but the worst (i.e., smallest / most obscure) stuff seems to be mostly what's left, so who knows how that will all turn out. As I said, I'm sure that in time I'll have to revisit and revise some of this, but it is good to finally feel like I am getting a handle on my collection. And storing/displaying should be more physical and less cerebral than the curating, which will be a welcome change for me. And then I'll actually have a real collection I can look at!

Continued from page 198

coastline, but because of over collection in the past, the best specimens are now only found in the cold stormy waters along the south coast of the South Island and off Stewart Island, and 360 miles east in the Chatham Islands.

There are nearly 100 different species of the Abalone family but none is as beautiful as the Paua. The Paua shell's outer side is usuaully covered with a thick marine growth which is hard to remove by hand. In the cottage industry workshops this rough colourless growth is ground off. Both sides of the shell are then polished with buffing tools, and the whole shell resembles a large piece of gleaming greeny-blue opal. The polished shell is cut into different shapes and sizes, and set into brooches, bracelets, pendants, rings and ear-rings, or is used to decorate all kinds of interesting tourist souvenirs.

In an age of mass production, plastics and synthetics, this lovely iridescent shell, and everything made from it, is a genuine and long lasting example of one of the wonders of nature. The Paua truly deserves to be called 'Opal of the Sea'.

By Austin Sprake
Shell Museum Publications
Guernsey, Channel Islands

C.O.A. to Meet in SAN DIEGO

Want to have a great time this coming June (the 23rd through the 29th)? The Conchologists of America, most likely the most fun-loving (yet still seriously involved) shelling group anywhere, will meet in San Diego, California during those days.

The Pan Pacific Hotel, one of the top hotels in mid-downtown San Diego, is the convention site. Events include a welcoming extravaganza, a dinner cruise on San Diego Bay, a visit to Scripps Aquarium, a fossil collecting trip and a trip to Mexico. And, of course, the famous shell auction (the 1994 ones raised nearly $20,000!) and the world renowned dealers' bourse.

To get on the mailing list for convention information contact: Don Pisor; 10373 El Honcho Place; San Diego, CA 92124 - tel. (619) 234-0249. Plan to attend - you'll be glad if you do!

1995 Shell Shows, Etc.

The following list is courtesy of Donald Dan, COA Award Chariman. To list your club's event contact him at 2620 Lou Ane Court; W. Friendship, MD 21794. Tel. (410) 442-1242 or 442-1942.

Feb. 3-5. Broward Shell Show; Pompano Beach, Florida John Chessler; 7401 S.W. 7th Street; Plantation, FL 33317. (305) 791-5909.

Feb. 4-5. VII émes Recontres Internaionales du Coquillage; Paris, France. Gilbert Jaux; 3 rue Saint-Honore; 78000 Versailles, France. (1) 39-53-80-46.

Feb. 10-12. Ft. Myers Festival of Shells; Ft. Myers, Florida. Anna Marie Nyquist; 18372 Cutlass Drive; Ft. Myers Beach, FL 33931. (813) 466-6391

Feb. 17-19. Sarasota Shell Show; Sarasota, Florida. Peggy Williams; P.O. Box 575; Tallevast, FL 34270. (813) 355-2291.

Feb. 24-26. Naples Shell Show; Naples, Florida. Gary Schmelz; 5575 12th Ave. S.W.; Naples, FL 33999. (813) 455-4984.

Mar. 2-5. Sanibel Shell Show; Sanibel Island, Florida. Georgette; 1119 Periwinkle Way #176; Sanibel, FL 33957. (813) 472-6290.

Mar. 9-11. Marco Island Shell Club Show XII; Marco Id., Florida. John Maerker; 365 Henderson Court; Marco Island, FL 33937. (813) 394-3438.

Mar. 17-19. St. Petersburg Shell Show; Treasure Island, Florida. Bob & Betty Lipe; 440 75th Avenue; St. Petersburg Beach, FL 33706. (813) 360-0586.

Mar. 17-19. Treasure Coast Shell Show; Stuart, Florida. Mrs. Cathy Fry; 1542 Jupiter Cove Dr. Apt. 502; Jupiter, FL 33469. (407) 744-2502.

Mar. 31- Apr. 2 [tentative]. Georgia Shell Show; Atlanta. John Cramer; 3537 Peppermint Court; Tucker, GA 30084. (404) 934-7143.

May 7. Pacific Shell Club Show; San Pedro, California. Frank Jewett; 1739 Vallecito Dr.; San Pedro, CA 90732. (310) 514-8012.

May 6-7. Fifth Belgium International Shell Show; Aarschot, Belgium. R. de Roover; Vorsterslaan 7; 2180 Ekeren-Donk, Belgium. (3) 644-3429.

June 8-12. American Malacological Union Annual Meeting; Hilo, Hawaii. Dr. Alison Kay; University of Hawaii; 2538 The Mall; Honolulu, HI 96822. (808) 956-8620.

Jun. 17-18. XIV éme Salon International du Coquillage; Lutry, Switzerland. Dr. Ted W. Baer; CH-1602 La Croix, Switzerland. (21) 393771 or 207371.

Jun. 23-29. Conchologists of America Annual Convention; San Diego, California. Don Pisor; 10383 El Honcho Place; San Diego, CA 92124. (619) 234-0249.

Also we have been made aware of:

May 13-14, 1995. New Zealand National Shell Show. Wellington. Peter Jamieson; 57 Bedford St.; Northland, Wellington, New Zealand 6005.

June 2-6. Western Society of Malacologists; 28th Annual Meeting; Fairbanks, Alaska. Nora R. Foster; University of Alaska Museum; 907 Yukon Drive; Fairbanks, AK 99775. (907) 474-9557. E-Mail: FYAQUA@aurora.alaska.edu.

July 8-9, 1995. Keppel Bay Shell Club Shell Show. Yeppoon, Queensland. Write the Club at P.O. Box 5166; Rockhampton Mail Centre, Queensland 4702.

September 3-8, 1995. XII International Malacological Congress. Vigo, Spain. M.T. Fernández, Secretaiet, Instituto de Investigaciones Marinas, Eduardo Cabello 6, E-36208 Vigo, Spain. Fax: +34+86+29.27.62.

New Istanbul Malacology Association

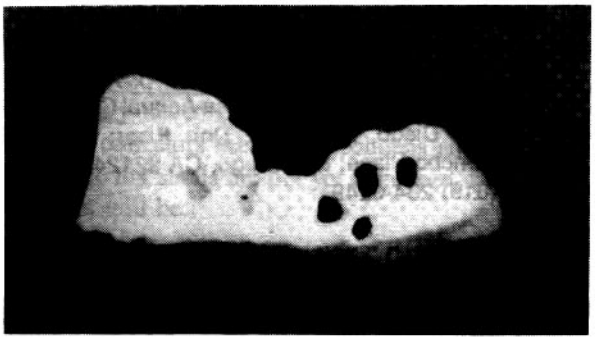
The Instanbul Malacology Association has been formed. We have no details, but hope to have information in our next issue. Contact: Geyram Kemal, Istanbul Malacology Association, Etemefendi Cad. Firin Sk. No. 15, Demirbag Apt. K.3D.6 - Erenköy, 81060 Istanbul, Turkey.

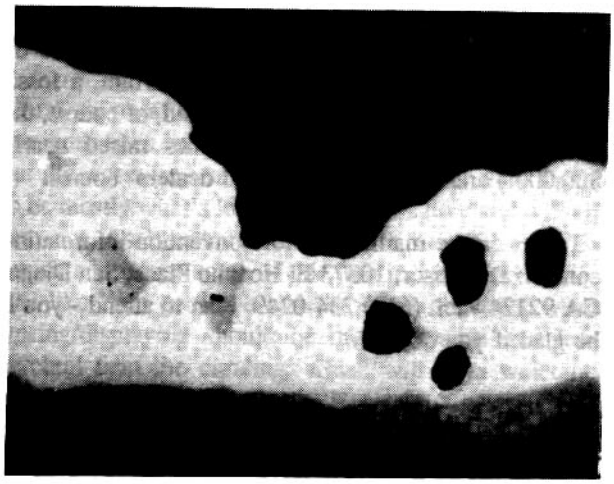
HELP!

Please send information on your club's activities: shows, field trips, projects, etc. We'll be glad to print it here.

Strange Perforations in a Cowry Shell

Willem Krommenhoek





When collecting last July on the beaches of Grajagan Bay, in the Blambangan National Park in east Java, Indonesia, I found a large fragment of a ***Cypraea talpa*** shell with remarkable perforations in it (see Fig. 1).

Several irregular holes, with an average diameter of 5-6mm, together with some partial perforations do occur on the side of the shell, whereas it can be seen from the irregular fracture line that more such perforations were present before the shell fractured.

Close examination reveals that the process of perforation of the shell must have taken place from outside to inside, as can be seen from the remaining material. The partial perforations show a remaining smooth layer of shell material on the inner side as thin as paper and with several small perforations in it (see Fig. 2).

Since I have never noticed this phenomenon before, I would appreciate to hear if someone may have a clue to this puzzle. If you have an idea who or what is responsible for these holes, or if you have seen it before, please do not hesitate to let me know. Your reaction will be appreciated!

Dr. W. Krommenhoek
Dr. Letteplein 1
3731 De Bilt, Holland

Our Back Cover

The back cover of this issue shows some newly described gastropods from the subfamily Trophoninae (Gastropoda, Muricidae). Original descriptions appeared in **Ruthenica**, the Russian Malacological Journal Vol. 4(2), November 1994.

R.V. Egrov's article "New data on the taxonomy of molluscs of the subfamily Trophoninae (Gastropoda, Muricidae) from the Northwestern Pacific" is in Russian with English translations. All species are from depths greater than 100 meters - one taken at a depth of 4400!

The newly named species are: ***Abyssotrophon convexum*** Egrov, 1994 (figs. A & B); ***Abyssotrophon edzoevi*** Egros, 1994 (figs. C & D); ***Trophonopsis yurii*** Egrov, 1994 (figs. E & F); ***Trophonopsis nanus*** Egrov, 1994 (figs. G & H); ***Boreotrophon pygmaeus*** Egrov, 1994 (figs. I & J).

Subscriptions to **Ruthenica** is $21 (issued semi-annually) available from: Trophon Corporation; P.O. Box 7259; Silver Spring, MD 20907.

Corallium rubrum - Some Comments

Fritz Fleischmann

In an old issue of **Of Sea and Shore** (Volume 9, Number 2), I read a small article about corals in the Mediterranean Sea. This encouraged me to write the following article on this topic, more detailed and up to date.

Corallium rubrum has a long history - nearly 3,000 years ago they were used to make jewelry! Since that time the species has continued to be in high demand because its deep red color does not fade. However, its history is now nearly finished! In the past ten years the species has become nearly extinct! The main reason for this situation is not pollution and/or siltation, as might be expected, but net fishing by local fishermen. Most of the time these nets break off only the top portions of the corals - but the rest of the colony soon dies too. I observed one colony - measuring 10 meters by 1 meter -at a depth of 42 meters after this net fishing; the corals died slowly over the colony's entire length. I found other colonies that had died a few years before: nothing living anywhere, like the Sahara desert, but under water.

If you were to pick these corals by hand, you destroy only the one piece and all the rest continue to live. Recently all the Mediterranean area governments have made the collecting of ***C. rubrum*** illegal whether by net, hand or any other method. The ban has caused prices to become astronomical, with finger-thick pieces selling for more than their weight in gold!

The outlook is not good for this beautiful coral. Most of the remaining colonies, some of which I have had the pleasure of observing during dives, will probably be destroyed or severely damaged by illegal collecting during the next few years.

Corallium rubrum usually lives in relatively small colonies of up to fifty individuals, at a depth of around 40 meters, usually on the down-current side of small islands. In color it varies from orange to dark red, and, if undisturbed, can grow up to 50cm in height - quite impressive! Unlike the red Pacific Ocean coral species, with which it is often confused, the color goes all the way through the stem, and almost never fades.

I with to thank Ross Mayhew for helping me with the English of this article. He was selling some pieces of ***C. rubrum*** before he knew it was in danger of becoming extinct. However, he now feels it is not proper to help create or sustain a demand for an endangered species such as this.

Several other species of rare corals, in various areas of the world, are similarly nearly extinct because of overcollecting. This is a very serious problem, because, unlike molluscs, most corals grow very slowly and pollution and worldwide climatic changes are already threatening many species and, therefore, also the amazingly complex and biologically diverse ecosystems that depend upon them. While it is true that the highly destructive use of large amounts of common coral species for decorative and ornamental purposes is much more of a threat to ecosystems and biodiversity than the relatively small numbers of specimens taken to supply the desires of collectors, with rare, endangered species, every individual is important to the maintenance of gene pools and breeding populations. The collection of "just a few more specimens" could make a big difference in the survival of a local population, or even an entire species.

If you have any questions, or further information on this interesting coral species, please do not hesitate to write me at the address below.

Neubaugasse 16
A-3701 Gr. Weikersdorf, Austria

Opals From The Sea

A beautiful sea shell found only in the waters off New Zealand has, when cleaned and polished,such a striking resemblance to the rich greeny-blue variety of precious opal stone that the shell is often referred to as "Opal of the Sea".

Many centuries before Captain Cook's voyages of discovery, Polynesian islanders began to settle in New Zealand. Archaeological evidence indicates that the Maori settlers first landed at least 1000 years ago. As is the case on most islands where the sea is never very far away, the Maoris found an abundance of sea shells. They discovered that the mollusc of one of the shells was particularly good to eat. The shells was an Abalone (**Haliotis iris**, meaning in Latin 'rainbow ear') and known to the Maoris as Paua (pronounced rather like 'power'), The mollusc is easily removed after the shell has been boiled. Those molluscs which they did not eat at once were threaded onto strings of flax, dried, and put away as a reserve of food. Today they are canned and exported. When the mollusc is removed, the shell reveals its unmistakable green violet and blue iridescence. As with the finest opal stones, the colours flash and change when the shell is moved and viewed from different angles.

This iridescent rainbow effect was so striking that the Maoris used small pieces of the shell as an inlay for the eyes of their carved wooden heads, to give them a lifelike gleam. Many of their carved artifacts also incorporated a small figure with Paua shell eyes. Such items included spears, axes, staffs, hand clubs and flutes. They usually fixed a strip of Paua to fish lures to make them flash and glisten like a small fish. When Cook landed in New Zealand in the late 18th century, he noticed the decorative use to which the iridescent Paua had been put, and some of the artifacts brought home by members of his expedition had this typical shell inlay.

Owing to its extreme distance from Europe, New Zealand was not on the itinerary of the Grand Tour of the 19th and early 20th century travellers. It was not really until after Worl War I, with improved steamship communications, that the country began to attract many tourists. At first it was only a trickle of visitors, but it has since been growing into more of a flood. The superb scenery, the snow-capped peaks and glaciers, the lakes and hot springs, the geysers and volcanoes, and the rolling green pastures are proving a major attraction. Tourists and souvenirs go hand in hand. As the number of visitors increased, so that the development of the tourist souvenir business. It is supplied by an expanding cottage industry in New Zealand making Paua shell items.

The beautiful green violet and blue iridescence is so striking, and having had such extensive use by the Maoris in the past, it is not altogethers surprising that its popularity has grown. From about the middle of the last century, Paua shells in their natural unpolished state were exported to England. Pieces of polished Paua, usually in conjunction with mother of pearl, were used by English craftsmen both as an inlay and to decorate a huge range of articles in great demand and in daily use in those days. To mention just a few, there were hair brushes, hand mirrors, trinket boxes and small cases for visiting cards, thimbles and scent bottles. Even the covers of prayer books and Bibles were decorated in this way. Today, all such things are keenly collected and treasured as antiques and bygones.

As a result of world-wide demand for this beautiful shell for use in the tourist trade, the New Zealand Government has in recent years been forced to ban the export of natural unpolished Paua in order to protect the country's cottage industry. The Japanese in particular had wanted to import quantities of the shells for manufacture into Paua shell items in Japan. Only polished Paua shells and finished Paua shell articles can now be exported from New Zealand.

Many shells have a natural enemy which preys upon them. This is nature's way of maintaining a balance and preventing any one species becoming too numerous. The natural enemy of the Paua is the crayfish which lives amongst the same underwater rocks and outcrops as the Paua, which is usually found in 4 or 5 fathoms of water. Like other members of the Abalone family, it clings to the flat surface of rocks or to the side of small rocky hollows which provide some shelter from the incessant surge of the swell. Average specimens grow to about 6 to 8 inches. The power with which the Paua clings by suction action to the rocks is so strong that it would be almost impossible for a crayfish to force the shell away from the rocks in order to atack and devour the mollusc of the Paua. The crayfish generally catches the Paua while it has partly relaxed its suction grip on the rocks in order to move around and feed on seaweed. The Paua used to appear more widely around the

Please turn to page 194

Trading Shells With a Dealer One Dealer's Viewpoint

Charles Cardin

I have started this article two or three times. Each time I gave up on the project because it seemed like the subject was so simply that there was really no need to say very much. But if the subject is so simple, why is it so hard to trade shells with a dealer? Why are trades so often unsuccessful? I will give you my own answers if you keep in mind that they are MY OWN answers and may not apply to other dealers. I would be interested to see other dealers write their own thoughts for publication and perhaps we can establish some written "guidelines" that traders and dealers could use. Hopefully that would help eliminate many of the misunderstandings and missed expectations.

I have had misunderstandings with very good friends due to the fact that they thought a dealer, as a friend, should give retail for retail trade values. Dealers are in business to make a profit. If that is not acceptable to traders, then it is best not to try to trade with a dealer. Except in rare cases, a dealer will want a "margin" (sounds better than "profit").

Guideline A: Trade Value. Generally dealers will give an amount equal to 70% of their selling price as a credit against shells from their lists. Most often you will get a copy of the list on which your shells have been listed. Of course this is negotiable with very common or rare shells.

Guideline B: What dealers want. Dealers would rather trade only for shells they can not otherwise obtain through wholesale purchases. In my case, I would rather buy outright than trade. Trades are VERY time consuming for dealers.

Guideline C: Quality. Dealers want the best quality shells they can get - just like you. Don't be surprised if some or all of your shells are returned if they are not FULLY cleaned and in F+ or better condition. Often shells in F condition can be traded if that species is normally found in that condition. Dealers will give the trader same status as a cash customer and you will get the best shells available. You have the same return privileges as any cash customer.

Guideline D: Quantity. Don't expect to trade large quantities of common shells unless you are ready to give a little more room for margin. If you are blessed with being in an area where you can obtain large quantities of certain species, you can trade more if you ask less. Dealers don't want to stock large quantities of common shells that have little profit margin. If I have to pay a lot, leaving a very little margin, I need few. If the price and quality is good, I buy a lot. Simple economics. Don't expect to trade many common shells for rare shells. But, on the other hand, if you have plenty of good quality common shells that the dealer needs, your credit may add up to an amount to "buy" any shell. That happens quite often.

Guideline E: Prices. If you set the prices for your trades be ready to have two things happen. One is that the dealer ignores the shell because he doesn't want to haggle the price on a common shell. Be ready to get less than you could if you just let the dealer value it. If you can't trust the dealer then you are going to have a hard time trading. All the dealers I know will give you a fair value for your shells if they want them. Tom Rice's "Catalog of Dealers' Prices ..." is a good guide, but too often prices are changing. Size and condition make all the difference too. Let the dealer tell you how much to sell the shell for.

Guideline F: Postage costs. Generally with a trade postage is shared. You pay postage on what you send to the dealer and the dealer pays postage on what he sends to you.

Things Not to do!

Never send shells without writing to the dealer first; especially if it is the first time. Don't send dead collected or crabbed specimens unless that has been discussed with the dealer first. Don't send immature shells or shells with less than fully-formed varices.

Things to do!

Include opercula when possible. Include all the collection data you can.

The character of a trade that works: The Trader sends shells, prearranged, sometimes with prices already agreed upon. Shells are cleaned and ready to sell. Data accompanies the shells. Shells are choice condition. Dealer sends the Trader a credit.

To page 188

Continued from page 216

Safford, W. E., "Natural History of Paradise Key and the near by Everglades of Florida", 1917.

Say, Thomas, "*Achatina* solida", Journal of the Academy of Natural Science, Philadelphia, Vol. 5, p. 122 (1825).

Schwengle, Jeanne S., "*Liguus* Enlarges its Menu", Nautilus, Vol. 63 #2, p. 72 (1949).

Simpson, Charles T., - "Distribution of the Land and Freshwater Mollusks of the West Indian Region and their Evidence with Regard to Past Changes of Land and Sea", Proceedings of the United States National Museum, XVII: P. 432 - 450, 1894.

Simpson, Charles T., In Lower Florida Wilds, New York: G. P. Putnam's Sons, 1920.

Simpson, Charles T., "New Floridan Subspecies of the Genus *Liguus*", Proceedings of the Biological Society of Washington, Vol. 33, p. 121 - 126 (1920).

Simpson, Charles T., "Florida West Coast *Liguus*", Nautilus, Vol. 35, July, 1921, p. 20 - 22.

Simpson, Charles T., "A Search for *Liguus*", Nautilus, Vol. 35, January, 1922, p. 65 - 73.

Simpson, Charles T., "An Expedition that Failed", Nautilus, Vol. 36, 1923, p. 109 - 115.

Simpson, Charles T. "The Florida Tree Snails of the Genus *Liguus*", Proceedings of the United States National Museum, Vol. 73, p. 1 - 44 (1932).

Simpson, Charles T., Florida Wild Life, New York: G. P. Putnam's Sons, 1932.

Solem, Alan, "Gems of the Everglades, Bulleltin of the Chicago Natural History Museum. The reference given in Carol Brown's thesis is incorrect (Vol. 32, p. 8 - 9, 1961), and I have been unable to locate the article or the correct reference.

Thone, Frank, "Cuban Land Shells in Florida", Science NS, Vol. 86, #22332, Oct. 8, 1937, Supplement p. 8.

Torre, Ricardo de la, "On the Probable Cause of Certain Variations in Color of the Shell in the Genus *Liguus*", Nautilus Vol. 52 #2, p. 46 ff. October, 1938.

Tuskes, Paul M., "Population Structure and Biology of *Liguus* Tree Snails on Lignumvitae Key, Florida", Nautilus, Vol. 95 #4, p. 162 ff., October, 1981.

Visher, S. S. "Tropical Cyclones and the Dispersal of Life from Island to Island in the Pacific", American Naturalist, Vol. 59, Jan. - Feb., 1925.

Voss, R. S., "Observations on the Ecology of the Florida Tree Snail *Liguus fasciatus* (Muller)", Nautilus, Vol. 90, p. 65 - 69 (1976).

Weber, J. A., "Nests of the Florida Tree Snail", Everglades Natural History Magazine, Vol. 1, p. 63 - 65 (1953).

White, J. J., "Shells of Lake Worth, Florida", Nautilus, Vol. 12, April, 1899, p. 142 - 143.

Young, Frank N., "Extinct or Near Extinct Colonies of Tree Snails, *Liguus fasciatus* in Eastern Broward and Northern Dade Counties, Florida", Occasional Papers of the Museum of Zoology, University of Michigan, #595, p. 1 - 20 (July 22, 1958).

Young, Frank N., "Vanishing and Extinct Colonies of Tree Snails *Liguus fasciatus*, in the vicinity of Miami, Florida", Occasional Papers of the Museum of Zoology, University of Michigan, #531, (April 27, 1951).

Young, Frank N., "Color Pattern Variation Among Snails of the Genus *Liguus* on the Florida Keys", Bulletin of the Florida State Museum, Vol. 5, p. 259 ff. (1960).

Young, Frank N., "A Preliminary List of Colonies of Tree Snails, *Liguus fasciatus*, in the area of Dade County, Florida, South and West of Miami", Sterkiana, Zoology Department, Indiana University, Vol.1, p. 1 - 8 (1959).

Young, Frank N., "The Case of the Vanishing Tree Snail", The American Biology Teacher, Vol. 30 #5, May, 1968, p. 420 ff.

Young, Frank N., "*Liguus* pictus Reeve Not Extinct", Nautilus, Vol. 66 #2, p. 71 ff.

Young, Frances N., "A Word From the Wife of a Tree Snail Hunter", Everglades Natural History Magazine, Vol. 2 #3, Sept. 1954, p. 148 - 151.

Many of these references will be a waste of time to read. My recommendations, in order of importance for a general study of these shells, are: Brown (1978), Pilsbry (1912 & 1946), Simpson (1932), Abbott (1989), Hillis, et al (1957), Jones (1981) and Roth & Bogan (1984).

Some of the articles are highly entertaining: Clench (1951), Humes (undated), McGinty (1936), Simpson (1922 & 1923), Young (1954 & 1968).

Lure of the Liguus, Continued

APPENDIX D

IDENTIFICATION NUMBERS

In the March, 1965 issue of the National Geographic, the article on Tree Snails included photographs of the 52 color forms that had been named at that time. Accompanying these photographs were numbers to correlate the photos with the names that were listed in the text. Many collectors utilize this numbering system to identify their shells, writing the number inside the aperture. I have added seven more numbers in alphabetical order for the six forms that were named in 1979 and the form I am naming in this essay.

1. ***alternatus***
2. ***aurantius***
3. ***barbouri***
4. ***capensis***
5. ***castaneozonatus***
6. ***castaneus***
7. ***cingulatus***
8. ***clenchi***
9. ***crassus***
10. ***deckerti***
11. ***delicatus***
12. ***dohertyi***
13. ***dryas***
14. ***eburneus***
15. ***elegans***
16. ***elliottensis***
17. ***farnumi***
18. ***floridanus***
19. ***fuscoflammellus***
20. ***gloriasylvaticus***
21. ***graphicus***
22. ***innominatus***
23. ***lignumvitae***
24. ***lineolatus***
25. ***livingstoni***
26. ***lossmanicus***
27. ***lucidovarius***
28. ***luteus***
29. ***marmoratus***
30. ***matecumbensis***
31. ***miamiensis***
32. ***mosieri***
33. ***nebulosus***
34. ***ornatus***
35. ***osmenti***
36. ***pictus***
37. ***pseudopictus***
38. ***roseatus***
39. ***septentrionalis***
40. ***simpsoni***
41. **solidulus**
42. ***solisoccasus***
43. ***splendidus***
44. ***subcrenatus***
45. ***testudineus***
46. ***vacaensis***
47. ***versicolor***
48. ***violafumosus***
49. ***walkeri***
50. ***wintei***
51. ***solidus***
52. ***vonpaulseni***
53. ***beardi***
54. ***evergladesensis***
55. ***frampftoni***
56. **humesi**
57. ***kennethi***
58. ***margaretae***
59. ***nancyae***

APPENDIX E

SHELL SIZE

The size of a shell is a function of several things, foremost of which are genetic factors, growing season and food supply. The shells from the Long Pine Key area tend to be smaller than shells from other areas. The shells tend to multiply faster than the food supply, so there is always a shortage of food in an undisturbed location. Nature has two ways of coping with a limited food supply: limit the size of the specimens, or limit the birth rate. In some situations, large shells will have a better chance of survival against certain predators, etc., and nature would eventually produce a small number of large shells. In other situations, a larger number of smaller shells would have a better chance to insure the survival of the species. Perhaps these factors were influential in the difference in size of shells from the Long Pine Key area and other locations.

Jones pointed out that snails that graze on different trees will develop different shells. "For instance: if one took, say, 45 newly hatched ***graphicus*** from one small colony, divided them equally into three lots and put one lot in a hammock with a maximum amount of food on the Lysiloma and Jamaica dogwood trees; the second group in an identical hammock with a minimum of food; the third lot in a hammock forested principally with bustic and hackberry with optimum food, one would get three very different results. If one were to describe the size and solidity of each group at the end of the third year of activity, the descriptions would be approximately as follows:

> First group - large size (up to 70 mm.), solid;
> Second group - small size (up to 46 mm.), thin;
> Third group - large size (up to 65 mm.), thin."

(Nautilus, Vol. 94 (4), Oct. 30, 1979, p. 154)

However, Carol Brown, in her superb master's thesis, noted that there was no significant difference in the size of shells taken from different trees in the Long Pine Key Hammock she was studying.

The largest ***Liguus*** I have seen are a ***vacaensis*** in the Lysinger collection and a ***pseudopictus*** in the Winte collection that were 81 mm. Steve Sparks told me that he had grown shells that large under optimal conditions. The average ***Liguus*** is under 50 mm.; a 60 mm. shell is considered large; and anything larger than that is exceptional.

APPENDIX F

LOCALITY ABBREVIATIONS

Most collectors record collection data inside the lip of the shell. These data may include: (1), A number that identifies the color form (see Appendix D); (2), date and collector; and (3), location. Abbreviations are commonly used to identify locations. Here are the more commonly used abbreviations. Many of these abbreviations will be used on the maps in Appendix I. When you are writing locality abbreviations in your shells, please use some easily recognized abbreviation such as one of those presented here. Otherwise your shells will be useless for further scientific studies. Many of these hammock names are from Frank Young's STERKIANA article.

AH - Atoll Hammock
AC - Arch Creek
AdK - Adams Key
AddK - Addison Key
AfK - Angelfish Key
AngC - Anglers' Club (north KL)
AJB - Alligator Joe Bay

BC - Boca Chica Key
BH - Bloodhound Hammock, or Brickell Hamock, or Beach Hammock (say of LMK)
BlH or Bl - Bloodhound Hammock
BrH or Br - Brickell Hammock
BCP - Black Creek Point
BPA - Big Palo Alto Key
BPK or BP - Big Pine Key
Brad - Braddock Hammock

CB - Coot Bay
CrK - Crawl Key
Cox - Cox Hammock
Cax - Caxambas
Cho - Chokoloskee
CL - Cuthbert Lake
Camp - Campbell Hammock
Cast - Castellow Hammock
CC - Collier County
Chap - Chapman Hammock
CP - Central Plains
Clew - Clewiston
CJH - Charlie Jumper Hammock
Cut - Cutler Hammock

DB - Deerfield Beach
DCH - Dade County Home Hammock
Dew - Dewhurst Hammock
DK - Duck Key
DrT - Dr. Tiger
DeB - DeBoe Hammock
Dav or DC - Cavis Cove

EK - Elliott Key
EE - East Everglades
ECS - East Cape Sable

FtL or FL - Ft. Lauderdale
Fak - Fakahatchee
Flag - Flagami Hammock
Fla - Flamingo

GK - Grassy Key
GP - Goodland Point
GmP - Gomez Place
GH - Grossman Hammock

HK - Howe Key
HI - Horr's Island
HM - Horseshoe Mount
Hfly - Horsefly Hammock
HB - Hattie Bauer Hammock

Imm - Immokalee
IPH or IP - Iron Pot Hammock
InK - Indian Key

KL - Key Largo
V - Key Vaca
KW - Key West

LtP - Little Pine Key
LPK - Little Pine Key or Long Pine Key
LP - Long Pine Key
Los - Lossman's Key
LI - Long Island (Plantation Key)
LMB - Little Madeira Bay
LK or Lig - Lignumvitae Key
L&N - Lewis and Nixon Hammock
LPH - Lawrence Park Hammock

LRP or LRPSP - Little Royal Palm State Park
LMK - Lower Matecumbe Key
LH - Lysinger Hammock
LR - Loop Road

MH - Middle Hammock (as on LMK)
Mat or tH - Matheson Hammock
MC - Mud Creek
MCS - Middle Cape Sable
MTK - Middle Torch Key
MB - Madeira Bay
MI - Marco Island
Mah - Mahogany Hammock

NNK - No Name Key
NH - North Hammock (say of LMK)
NWC - Northwest Cape Sable
Nap - Naples

RK - Old Rhodes Key
OCH - Old Cutler Hammock
Opa - Opa Locka
Ost - Osteen Hammock (LPK #27)

Pot - Iron Pot Hammock (PC #168)
Pomp - Pompano Beach
Pav - Pavillion Key
PlK - Plantation Key
PorK - Porgee Key
Pum - Pumpkin Key
Pow - Powell Hammock
PC - Pinecrest
ParK - Paradise Key (RPSP)
Pop - Poppenhager's Camp

RS - Robert's Stand (PC #112)
RK - Rabbit Key (near KV)
Rab - Rabbit Key (near Marco)
Ram - Ramrod Key
Rus - Russell Key
Ros - Ross Hammock
RPSP - Royal Palm State Park

SBH - South Brickell Hammock
SCG - Snapper Creek Glade
SnC - Snapper Creek
SI - Stock Island
SPH - Silver Palm Hammock
StH - Stanley Hammocks
Sug - Sugarloaf Key
Sum - Summerland Key
SH - South Hammock (as on KL)
SC - South Central (as on KL)

TL - Type locality
TrK - Tryon Key
TK - Totten Key
Tony - Tony Hammocks (in CC)
TR - Turner River
TRM - Turner River mouth
TH or Tim - Timm's Hammock
TrH - Tryon's Hammock
TOH - Twin Oaks Hammock

UMK - Upper Matecumbe Key
UH - Upper Hammock (as on LMK)
USC - Upper Snapper Creek

VC - Vehlin's Camp (CP #17)

WH - Watson's Hammock (on BPK)
WK - Windley Key
WC - Waldek's Camp
Wal - Waldek's Camp

In the early ***Liguus*** articles, a few locations were known by names that are no longer used: Detroit (apparently between Florida City and Homestead; Long Island (now called Plantation Key); etc. In addition to the named localities given above, there are many names for the hammocks of Long Pine Key. Many collectors have used these names or their abbreviations instead of the hammock number for indicating locality.

APPENDIX G

CLASSIFICATION

Over the years, there have been several attempts to categorize the various ***Liguus*** color forms. These are attempts to bring some order to the vast complexity of the subject. None is completely satisfactory.

In 1928, Smpson classified the then-named 32 forms in three groups as follows:

SOLIDUS
solidus
solidulus
crassus
pictus
graphicus
lignumvitae
delicatus
(***simpsoni***)

FASCIATUS
alternatus
roseatus
lineolatus
elegans
livingstoni
miamiensis
ornatus
versicolor
castaneus
testudineus
castaneozonatus

CRENATUS
marmoratus
vacaensis
capensis
matecumbensis
subcrenatus
elliottensis
luteus
cingulatus
mosieri
eburneus
septentrionalis
lossmanicus

In 1939, Clench and Fairchild divided the 49 then-named forms into three groups, based on geography. They regarded 34 of these names to be authentic; those they regarded as synonyms are listed in parentheses.

SOLIDUS
solidus
graphicus
pictus
innominatus
solidulus
dryas
crassus

LIGNUMVITAE
lignumvitae
splendidus
pseudopictus
dohertyi
delicatus
simpsoni
subcrenatus

ROSEATUS
elliottensis
(***capensis***)
(***eburneus***)
(***vacaensis***)
(***mosieri***)
septentrionalis
lossmanicus
luteus
matecumbensis
aurantius
ornatus
cingulatus
roseatus
(***livingstoni***)
lineolatus
(***elegans***)
castaneozonatus
(***miamiensis***)
(***walkeri***)
alternatus
fuscoflammellus
testudineus
(***clenchii***)
(***solioccasus***)
castaneus
versicolor
farnumi
marmoratus
(***barbouri***)
(***gloriasylvaticus***)
floridanus
(***violafumosus***)
(***nebulosus***)
(***lucidovarius***)
deckerti

In 1946, Pilsbry, following the work of Thomas and Paul McGinty, created a rather elaborate classification. He recognized three major groups (***solidus***, ***castaneozonatus/testudineus*** and ***septentrionalis***), two major patterns (Zoned and Diffuse) and three grades (Subspecies, Forms and Varieties). "The subspecies ... do not intergrade ... [and] the color may vary from fully developed to albinistic, by progressive loss of dark and pink color. The chief stages in this scale of color pattern are distinguished as Forms. In most cases the "form" is characterized by peculiarities of pattern, often by the loss of some color factor. Subordinate to the "forms" are placed numerous minor strains here called Varieties, many of them intergrading freely, being selected stages of clines, and most of them are of a taxonomic grade which would not be considered worth naming in other genera." (p. 41) In the following list, the subspecies are in bold capitals, forms are in bold type and varieties are in normal type. The two varieties in parentheses are mentioned in his text, but not in his chart.

(***SOLIDUS*** Group)

Zoned Pattern

GRAPHICUS

Form ***graphicus*** + ***crassus***.
Var. ***osmenti***. Var. ***dryas***.

Form ***lignumvitae*** Var. ***delicatus*** and ***innominatus***.
Var. ***simpsni***. Var. ***dohertyi***

Continued from page 89

Pinecrest #55. It does not look like other **castaneozonatus** I have seen from this locality (which resemble the one in XVII-2); the wide dark band on the body whorl suggests it might have come from Central Key Largo, but Key Largo shell do not have mottling on the early whorls; so locality for this specimen is in doubt. 10. A most unusual repair; I have tried (unsuccessfully) to produce this effect artificially, to create a shell with the whorls totally separated in order to see the effect on the latter; if you ever have occasion to try this, please let me know the results. 11. Miami anthropologist Robert Carr found this specimen in an archaeological dig at the Cheetham site, where NW 25 St. and 125 Ave. would intersect if extended; the shell is now in the Miami Historical Museum and is estimated to be between 500 and 3000 years old. 12. The dorsal view of #11. 13. Notice the roughness of the area created by the partially separated whorls. 14. I found this interesting specimen in Pinecrest #5. 15. This specimen was found 3 feet deep in an Indian mound on Plantation Key; it is now in the Museum of Natural History at the University of Florida.

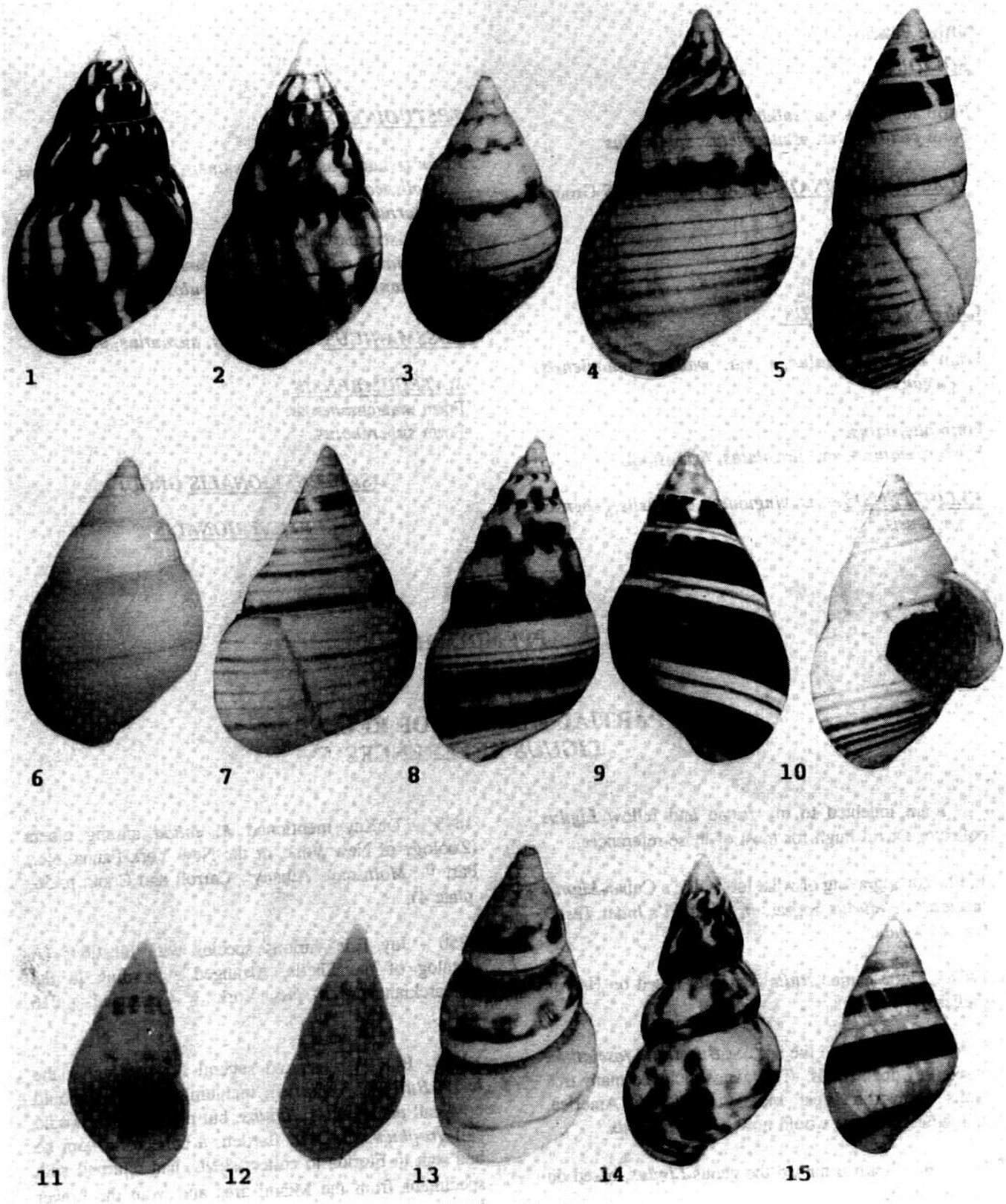


Plate XXVI

1. Many years ago Grimshawe accidentally introduced **castaneozonatus**, **marmoratus** and perhaps other forms to Little Pine Key where they interbred with native forms (**graphicus** and **dryas**), producing hybrids like these. 2. Hybrids from Little Pine Key. See above. 3. This pretty little hybrid is found occasionally in Timm's Hammock, and is highly prized by collectors. Many foreign forms have been introduced to Timm's Hammock, producing a variety of pretty shells. 4. I got this specimen from Winte who told me its ancestors came from Brickell Hammock. 5. Pinecrest #36; I found another specimen just like this on the same tree. 6. Winte told me the ancestors of this shell came from Key Largo. 7. No information. 8. Probably a **versicolor**, perhaps from the East Everglades. 9. I got this specimen from Winte, who told me it came from

Continued on page 88

Diffuse Pattern

SOLIDUS

Form ***solidus*** + var. ***solidulus***.
Form ***pictus*** + var. ***pseudopictus, splendidus***

(***CASTANEOZONATUS*** - ***TESTUDINEUS*** Groups)

CASTANEOZONATUS

Form ***castaneozonatus*** + var. ***walkeri, miamiensis, elegans***

Form ***alternatus***.
Form ***roseatus*** + var. ***lineolatus, livingstoni***.

ELLIOTTENSIS + var. ***cingulatus, eburneus, capensis, vacaensis***.

TESTUDINEUS

Form testudineus + var. ***castaneus, versicolor, clenchi, (solisoccasus)***.
Form ***ornatus***.
Form ***fuscoflammellus***.
Form ***marmoratus*** + var. ***barbouri, gloriasylvaticus, floridanus, violafumosus, nebulosus, (lucidovarius)***.

LOSSMANICUS + var. ***luteus, aurantius, mosieri***.

MATECUMBENSIS
Form ***matecumbensis***.
Form ***subcrenatus***.

(***SEPTENTRIONALIS GROUP***)

SEPTENTRIONALIS

APPENDIX H

A PARTIAL HISTORY OF RELEVANT *LIGUUS* REFERENCES

I am indebted to my friend and fellow ***Liguus*** collector David Pugh for most of these references.

1742 - An engraving of what looks like a Cuban ***Liguus fasciatus achatinus*** appears in Gaultieri's *Index Testar Conchyliorum.*

1767 - Linne named ***Bulla virginea***, based on Haitian shells.

1774 - Muller named the species ***Buccinum fasciatum***, based on Cuban shells. This genus included many tree snails from the West Indies and South America, including shells we would now call ***Orthalicus***.

1810 - de Montfort named the genus ***Liguus***, based on Haitian shells.

1825 - Say named ***Achatina solida***, based on one shell that was probably from Key West.

1842 - Reeve named ***Achatina picta***, thinking the shell was from Cuba, although it was almost certainly from Key West.

1843 - DeKay mentioned ***A. solida*** among others (Zoology of New York, or the New York Fauna, etc., Part V., *Mollusca.* Albany: Carroll and Cook, p. 56, plate 4).

1850 - Jay lists various species with locations (A Catalog of the Shells, Arranged According to the Lamarckian System), New York: R. Craighead, p. 216 - 223.

1851 - Binney illustrated several ***Liguus*** (under the name ***Bulimus fasciatus***), including shells we would now call ***pictus*** and ***solidulus***, but none that we would call ***graphicus***. A Mr. Bartlett, a collector whom he had sent to Florida to collect shells, had returned with specimens from the Miami area and from the Lower Keys -- apparently from Key West.

1858 - Adams and Adams listed 12 species that are referrable to ***Liguus***, although he gives the genus as *Pseudotrochus* (The Genera of Recent Mollusks), London: John van Voorst, Vo. II, p. 135.

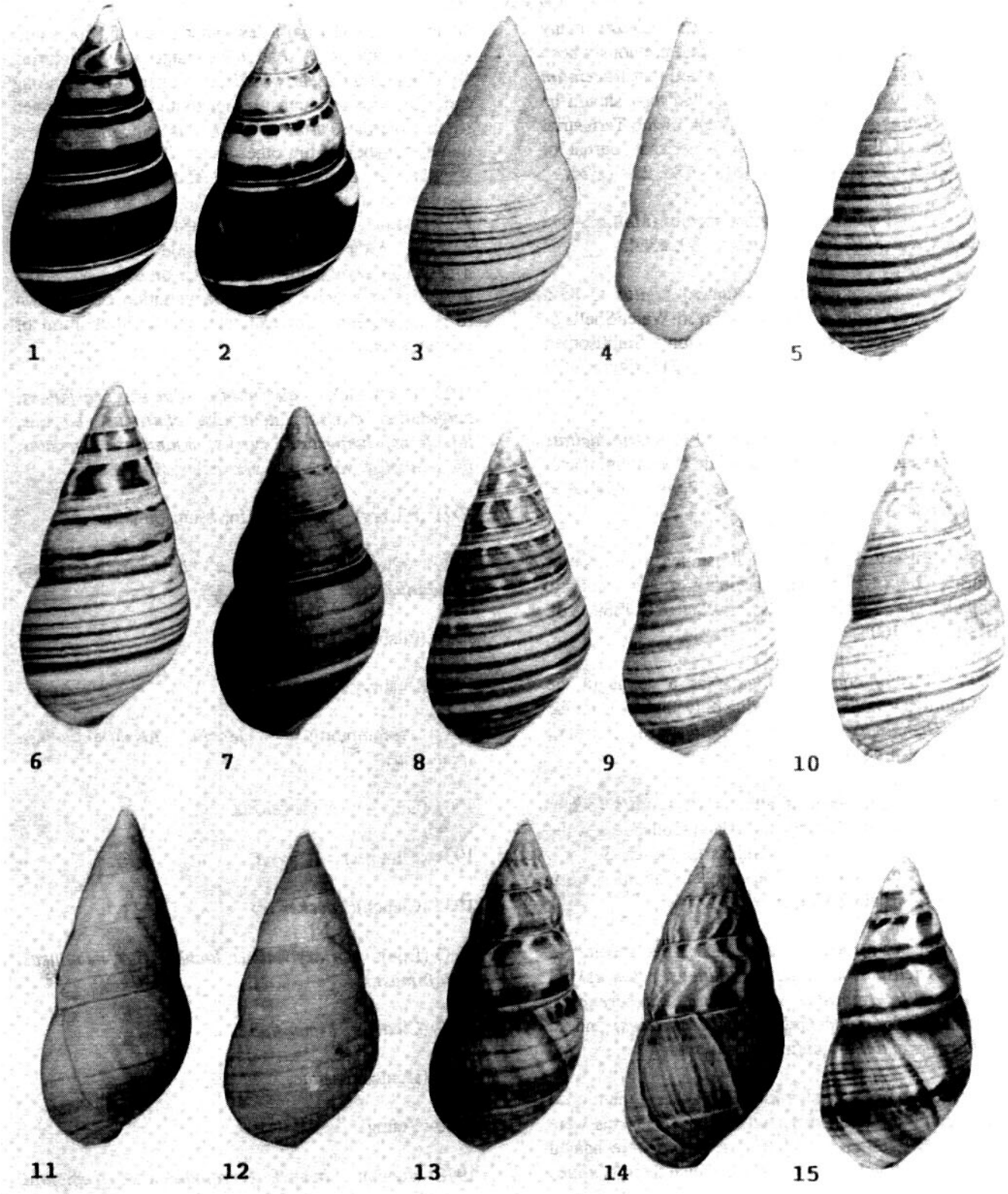


Plate XXVII

Cuban **Liguus**, some in the collection at the University of Florida's Museum of Natural History. 1 & 2. Names unknown, these were collected by McGinty at Puerto Esporanza on the northwest coast of Cuba. 3. **L. crenatus** Swainson, 1821. 4. Label with shell says "**L. flammeilus murreus,**" a name created by Reeve in 1849, but this can not be the same shell as that shown in XVI-9. 5. **L. f. judasense** Jaume, 1952. 6. **L.f. achatina** Clench, 1934. 7. **L.f. caribaeus** Clench, 1935. 8. **L.f. archeri** Clench, 1935. 9. **L.f. angelae** Clench, 1934. 10. Label says "**occidentalis**", but I cannot find any reference to this name. 11 & 12. **L. flammeilus cubensis** Clench, 1934. 13 & 14. **L. f. flammeilus** Clench, 1934. 15. I do not know the name of this form.

1867 - Tryon included in the genus ***Liguus*** many Florida and West Indies shells that had previously been called ***Buccinum*** or ***Achatina***. He said that ***Buccinum fasciatum*** included Florida shells, and they should be called ***Liguus fasciatus***. Monograph of the Terrestrial Mollusca of the United States, American Journal of Conchology, #33, pp 34 - 80, 115 - 185, 298 - 324.

1869 - Paetel listed four ***Liguus*** species (*Molluscorum Systema et Catalogus*), Dresden, p. 80, #364.

1869 - Binney and Bland considered ***Liguus*** to be a subgenus of ***Achatina***. (Land and Fresh-Water Shells of North America, Part I, Washington: Smithsonian Miscellaneous Collection #4, pp. 212 - 214, figures 365, 366.

1887 - Fischer discussed ***Liguus*** and lists ***Orthalicinus fasciatus*** and ***O. virginea*** (Manuel de Conchyliologie et de Paleontologie Conchyliologique, Paris: Librairie F. Savy, pp. 473 - 474.)

1889 - Pilsbry discusses and illustrates a number of Florida ***Liguus*** in the Manual of Conchology, Philadelphia: Academy of Natural Science, 1889, Vol. II, #12, pp. 160 - 175.

1894 - Pilsbry considers ***Liguus*** as a genus in the sub-family *Orthalicinae*, differing only slightly from the genus ***Orthalicus*** ("On the ***Orthalicus*** of Florida", Nautilus, Vol. 8, pp. 37 - 39.

1901 - Gratacap listed a number of ***Liguus*** species ("Catalogue of the Binney and Bland Collection of the Terrestrial Air-Breathing Mollusks of the U. S. . . ", Bulletin of the American Museum of Natural History, Vol. XIV, Article XXIII, p. 399.

1912 - Pilsbry named 12 forms under three species: ***L. fasciatus (castaneozonatus, testudineus, roseatus); L. crenatus (marmoratus, elliottensis, subcrenatus, septentrionalis, matecumbensis, lossmanicus)*** and ***L. solidus (graphicus, solidulus, lignumvitae)***.

After Pilsbry's 1912 article, ***Liguus*** were mentioned more and more frequently, and many more forms were named. The order in which these shells were named corresponds roughly to the order in which their localities became accessible to collectors. The first Florida ***Liguus*** were named in the early 1800's. These came from the lower Keys. They were almost certainly exported from Key West, which was an active shipping port, and were probably collected there. The railroad to Key West was built during 1905 - 1912, and provided access to shells from all over the Keys. The forms Pilsbry named in 1912 came from the Keys, from the Miami area, and from a few other south and southwest coastal locations. A road to Flamingo was built during the 'teens and the early 1920's. It opened up the Long Pine Key area and areas further south. Simpson named shells from these areas in 1920, plus some more precise names for shells from other areas. The Loop Road (S. R. 94) was opened in 1924 (four years before the completion of the Tamiami Trail), thus opening up the Pinecrest area. Clench named four forms from this area in 1929. After that, collectors would occasionally find a new hammock with new shells, or someone would give a more precise name to a variation of a known form ***(splendidus***, for example, for the dark form of ***pseudopictus)***.

1920 (Simpson): ***alternatus, capensis, castaneus, cingulatus, crassus, delicatus, eburneus, elegans, lineolatus, livingstoni, luteus, miamiensis, ornatus, pseucopictus, vacaensis, versicolor, (lineatus).***

1921 (Pilsbry): ***simpsoni*** (for Simpson's ***lineatus***)

1929 (Clench): ***aurantius, barbouri, farnumi, floridanus***.

1930 (Pilsbry): ***innominatus***

1932 (Pilsbry): ***dryas***

1932 (Frampton): ***clenchi, fuscoflammellus, splendidus***.

1933 (DeBoe): ***solisoccasus.***

1934 (Pflueger): ***dohertyi.***

1935 (Clench): ***deckerti.***

1937 (Doe): ***gloriasylvaticus, lucidovarius, nebulosus, violafumosus.***

1942 (Clench): ***osmenti.***

1954 (Humes): ***wintei.***

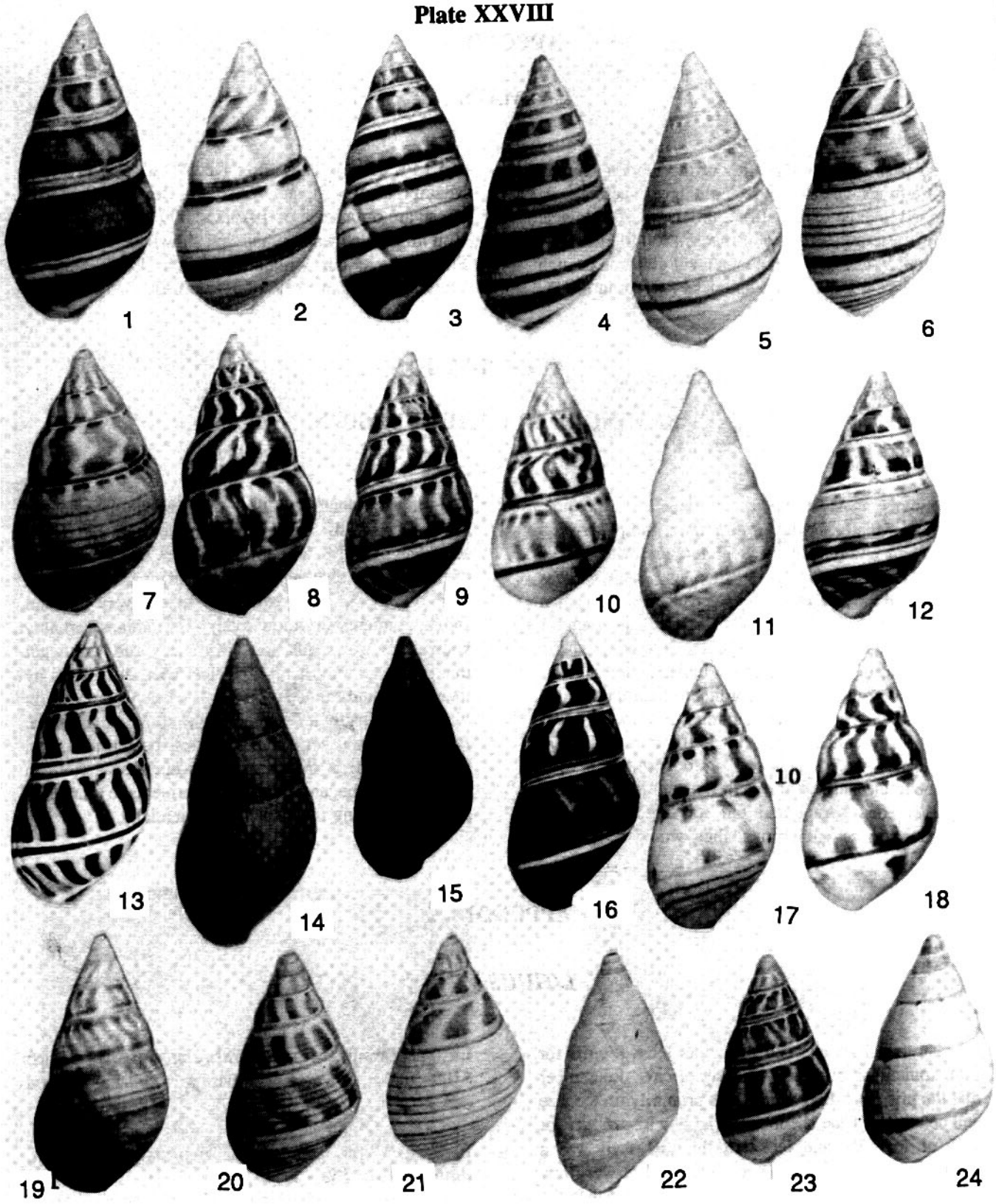
1960 (Young): ***vonpaulseni.***

1978 (Jones): ***beardi, evergladesensis, framptoni, humesi, kennethi, margaretae.***

1994 (Close): ***nancyae.***

Continued from page 95. parasitic organism. The leaves are crisp, sough, dark green, pointed at the ends, and opposite each other on a stem. This tree is common on the hammocks of the lower and middle Keys, but less common elsewhere. **Liguus** definitely prefer this tree to others in the middle and lower Keys.

Plate XXVIII



1 & 2. **L. f. goodrichi** Clench, 1934. 3. **L.f. laureani**; a name mentioned by Platt in a 1949 National Geographic article, but I can find no formal description. 4. **L. blainianus** Poey, 1851. 5. **L.f. falconi** Juame, 1952. 6. **L.f. fasciatus** Müller, 1774. 7. **L.f. josefae** Guitart, 1945. 8. **L.f. flammeilus** Clench, 1934. 9. The label said **"murraeus"**, but this and shell on XV-4 cannot be the same. 10 & 11. **L.f. torrei** Clench, 1934; label indicates it is rare. 12. **L.f. viridis** Clench, 1934. 13. **L. blainianus** Poey, 1849; note streaks that fork at top. 14 & 15. **L.f. carbonarius** Clench, 1934. 16. Label said **"whaltoni obscura"**, but I can find no references. 17 & 18. **L.f. macgintyi** Clench, 1934. 19. Label said **"L. whaltoni whaltoni"**, but I can find no references to form. 20 & 21. **L.f. aguayoi** Clench, 1934; Dr. **aguayoi** pictured in Abbott's Compendium of Land Shells. 22. Dr. Alcalde says this is transitional between **mcgintyi**, **turneri** and **blainianus**. 23. **L.f. nobilis** Clench and Aguayo, 1932. 24. Dr. Alcalde told me this was transitional between **blainianus** and **turneri**.

APPENDIX I

MAPS

If you wish to make a display of the Florida ***Liguus***, there are four maps that you should have. These can be purchased inexpensively from the U. S. Geological Survey, Eastern Distribution Branch, 1200 S. Eades St., Arlington, VA 22202. Three maps will give you enough detail to locate individual hammocks (except in the PC and LPK areas). These are: Key West (NG 17 - 11); Miami (NG 17 - 8); and West Palm Beach (NG 17 - 5). These are on a scale of 1979:250,000 and are in color. You might also want a map that shows the entire south Florida area, but without as much detail: State of Florida Base Map, scale of 1:1,000,000.

APPENDIX J

SEMINOLE CLOTHING DESIGN

An interesting sidelight has to do with the possible influence of the beautiful ***Liguus*** colors and patterns on the colorful clothing of the Seminole and Miccosukee Indians. Dr. Clench told me that years ago he was collecting in the Everglades when an elderly Indian man who spoke no English pointed to the shells in Clench's hand and then to his own brightly colored garment. Clench took this to mean that the Indian's clothing was patterned after the snails. According to Miami naturalist Laymond Hardy, the Indian clothing prior to 1910 was a very plain calico. Then in 1910, a merchant in Chokoloskee, Ted Smallwood, introduced the sewing machine to the Indians. It was the custom of the Indians to gather each spring and fall for large ceremonial dances. At these gathertings, they would congregate according to clans, based on a matriarchal orientation. Some time shortly after 1910, the mother of Billie Josey sewed a colored band onto the sleeves of the garments of those in her clan, as a means of identification. From then on, the practice expanded to the very colorful Indian garments we know today. The Indians certainly knew of the tree snails, and Billie Josey said he thought that most certainly his mother had been influenced by their colors and banded patterns. The heavy emphasis on blue was probably influenced by the common ***barbouri***. After the Indians began creating these beautiful clothes, Deacon Bedell, a missionary who operated a store in Chokoloskee, began selling these garments to tourists as a way of helping the Indians commercially.

APPENDIX K

LIGUUS PRICES

Many shell dealers and collectors have ***Liguus*** for sale, sometimes at widely varying prices. Remember that the price of a ***Liguus*** depends primarily on the size and condition of the shell. You can buy a ***barbouri*** for $.25 or for $10, and feel that the $10 shell was a bargain by comparison. There will be some very few exceptional specimens that will cost much more than the prices suggested here. For instance, I offered $100 for an 80 mm. ***Pseudopictus***, and was refused! A sinistral specimen may cost $500 or more-- if you can find someone who would part with one. One dealer listed them at $2200, but I don't know if he ever sold one at that price. Here is a very rough guide for evaluating shells that are offered for sale.

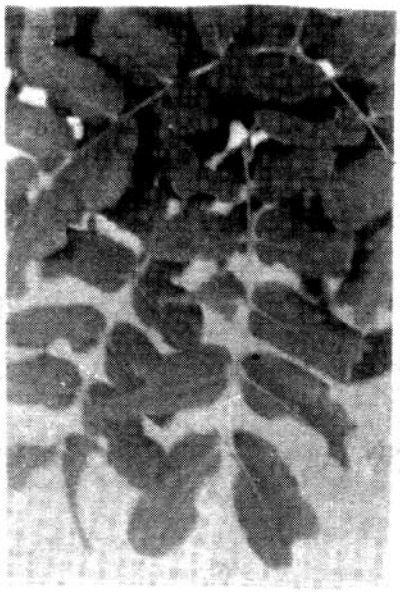
I. Extinct forms, very rare: ***farnumi, solidus, crassus***: $100 - $200. Beware of the false ***farnumi*** I mentioned earlier.

II. Extinct forms, uncommon: ***violafumosus, dohertyi, innominatus***: $30 - $100.

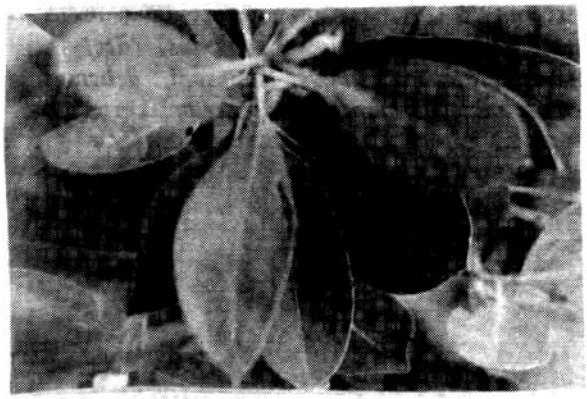
III. Uncommon forms, exceptional specimens, large (over 60 mm.): ***pictus, pseudopictus, splendidus***: Up to $60.

IV. Somewhat uncommon forms, exceptional specimens: ***graphicus, osmenti, vonpaulseni, kennethi, beardi, lignumvitae***: Up to $40.

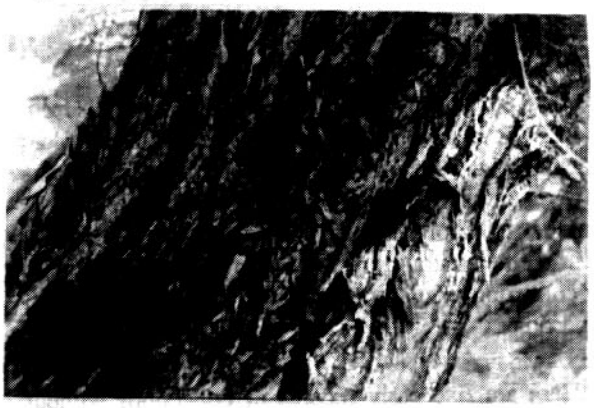
Plate XXIX



1

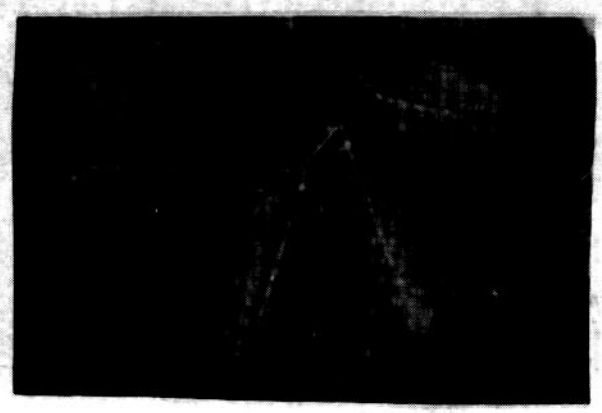


3



4

2



5 6

1 & 2. Lysiloma or Wild Tamarind (**Lysiloma bahamaensis** or **L. latisiliqua**). The bark is rather smooth on young and middle aged trees, sometimes separating into strips. On older trees, the bark is more rough. The bark is gray, sometimes with whitish blotches. The leaves are small, light green, in double rows of leaflets. This tree is common on the upper Keys and the central Everglades. It is what is called an "invader" tree – its seedlings do not thrive in the dark shadows of the interior or a hammock, but grow well on the edges, thus serving to enlarge the hammock by invading the open prairie. 3 &4. Buttonwood (**Conocarpus erecta**). The bark is coarse, the leaves are medium green, slick and pointed. This tree grows in slightly salty soil near the coast. In the Keys, it grows on the outside rim of the island, separated from the mangroves by several yards of fairly open space. Shells are found on the leaves and bark of this tree. 5 & 6. Jamaican Dogwood (**Piscidia piscipula**). On young and middle aged trees, the bark is fairly smooth; on older trees the bark near the bottom is fairly coarse. The bark is gray-green, with whitish blotches of some kind of Continued on page 92

V. Exceptional specimens of not uncommon forms: ***septentrionalis, subcrenatus, solidulus, deckerti, fuscoflammellus, testudineus, simpsoni, delicatus, alternatus, humesi, framptoni, margaretae:*** Up to $30.

VI Exceptional specimens of relatively common forms: ***versicolor, vacaensis, mosieri, matecumbensis, barbouri*** (blue) ***lucidovarius, evergladesensis:*** Up to $20.

VII. Exceptional specimens of other more common forms: Under $20.

VIII. Common shells, small to medium: less than $1.00.

APPENDIX L

RELATIVE DISTRIBUTION

Most collectors have taken mostly pretty shells from the hammocks, and only a very small number of plain shells. We therefore have few accurate records of the relative numbers of different color forms in the various hammocks. Also, the selective collecting over the years has upset the natural proportions of forms, so that today, any collecting would not accurately reflect the original proportions.

Here are five early records of collections without regard to color form or attractiveness of the specimens:

Brickell Hammock (1932), 361 shells (from Pilsbry, 1946, p. 45)

castaneozonatus	66
deckerti	2
roseatus	53
elliottensis	61
testudineus	50
ornatus	36
lossmanicus	65
matecumbensis	1
marmoratus	25

Middle Cape Sable (1935), 85 shells (from Pilsbry, 1946, p. 45).

castaneozonatus	53
roseatus	2
elliottensis (***cingulatus***?)	15
testudineus (***clenchi***?)	6
marmoratus	6
lossmanicus	3

This hammock was destroyed by Hurricane Donna in 1960.

Collier County #13, 88 shells (from Pilsbry, 1946, p. 45).

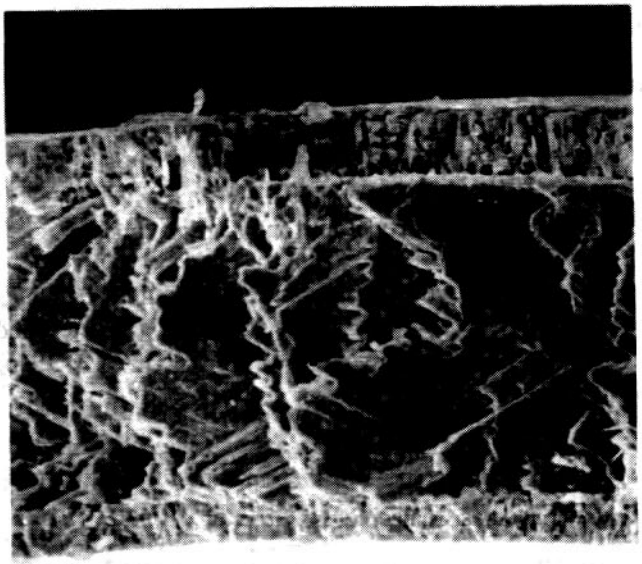
castaneozonatus	10
roseatus	6
marmoratus	40
solisoccasus	7
ornatus	8
lossmanicus	17

Key Vaca (1904), 12 shells (from Pilsbry, 1946, p. 46).

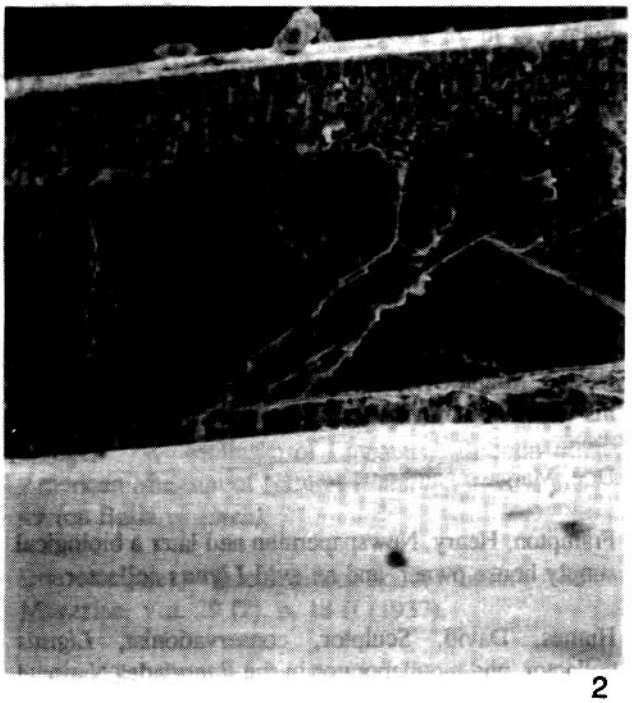
marmoratus	3
lossmanicus (***luteus***?)	2
vacaensis	6
ornatus	1

Key Vaca (McGinty), 151 shells (from Pilsbry, 1946, p. 46).

marmoratus	51
lossmanicus (***luteus***?)	45
vacaensis	20
castaneozonatus	6
roseatus	7
cingulatus	20
marmoratus (light)	3

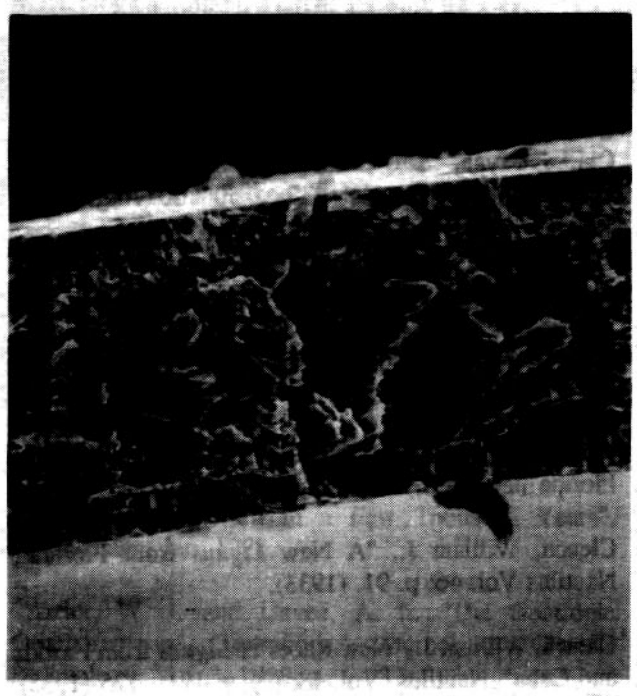


1



2

These photomicrographs were taken by a scanning electron microscope at the University o Florida's Museum of Natural History, and provided through the kind generosity of the Curator of Mollusks, Kurt Auffenburg. To take these photographs, a small piece of shell is broken off and the edge is photographed. Notice that there are three layers of dense crystals: a thin layer on the surface, a thicker layer in the middle with a different orientation, and a very thin layer on the bottom. Unfortunately, I was unable to get photos of the



3

4

Plate XXX

very thin new growth near the lip of a shell in the early summer, not a photo of **septentrionalis**. 1. **L.f. castaneozonatus**, Ross Hammock, museum specimen #UF-136083. This photograph is of a section of the lower body whorl. Magnification: 200 times. 2. **L.f. versicolor**, museum specimen #UF-136086. This photograph is of a section of the blue zone near the lip. Magnification: 200 times. 3. **L.f. subcrenatus**, museum specimen #UF-6315. This photograph is of a section near the lip. The slightly dark zone on top is a green line. 4. **L.f. dryas**, museum specimen #UF-136084. Magnification: 150 times. Notice that the crystalline structure seems to be different on this shell compared to the other three. The chip that was broken off for this photograph was probably broken at a different angle than the others. It would be interesting, however, to verify this.

APPENDIX M

AUTHORS

Clench, William, Curator of Mollusks at Harvard's Museum of Comparative Zoology, and an avid ***Liguus*** collector.

Close, Henry, Presbyterian minister, family therapist and avid ***Liguus*** collector.

DeBoe, Mizpa Otto, An eye doctor in Miami who with his wife was an avid ***Liguus*** collector.

Doe, Margaret, author.

Frampton, Henry, Newspaperman and later a biological supply house owner, and an avid ***Liguus*** collector.

Humes, David, Sculptor, conservationist, ***Liguus*** collector, and a collaborator in the Everglades National Park ***Liguus*** project.

Jones, Archie, A sales representative and executive with a drug company, and an avid ***Liguus*** collector since the 1930's. Archie is considered the primary ***Liguus*** authority today.

Pflueger, Al, A taxidermist and ***Liguus*** collector.

Pilsbry, Henry A., Curator of Mollusks at Philadelphia's Academy of Natural Sciences, and a collector and authority on ***Liguus***. His two articles (1912 & 1946) are classics.

Reeve, Lowell, Publisher and malacologist.

Say, Thomas, Malacologist.

Simpson, Charles Torrey, Author, naturalist and avid ***Liguus*** collector. Someone told me that Simpson was a carpenter by trade.

Young, Frank, Professor of Biology at Indiana University, with an avid interest in ***Liguus*** localities and patterns. It was he who humorously coined the term "***Liguus dementia***" for the obsession that afflicts ***Liguus*** collectors.

BIBLIOGRAPHY

Abbott, R. Tucker, COMPENDIUM OF LANDSHELLS, Melbourne, FL & Burlington, MA: American Malacologists, Inc., 1989, p. 1 - 31, 108 - 120.

Ball, Ian R., "Nature and Formulation of Biogeographical Hypotheses", Systematic Zoology, Vol. 24 #4, 1976, p. 407 - 430.

Bayer, Fredrick M., "Charles T. Simpson's Types in the Molluscan Genus *Liguus*", Smithsonian Miscellaneous Collection, Vol. 107, #16, April 5, 1948, p. 1 - 8.

Binney, Amos, THE TERRESTRIAL AIR-BREATHING MOLLUSKS OF THE UNITED STATES, ETC. Boston: Charles C. Little and James Brown, 1851, pp. 266 - 270, plates LV - LVII.

Blackwell, H. G., " Our Most Beautiful Land Snail", Natural History, Vol. 45, April, 1940, p. 215 - 219.

Brown, C. A., "Demography, Dispersal and Microdistribution of a Population of the Florida Tree Snail *Liguus fasciatus*", Master's Thesis, University of Florida, Gainesville, Florida, 1978.

Clarke, Bryan, "The Causes of Biological Diversity", Scientific American, Vol. 233: p. 50 - 60 (Aug. 1975).

Clarke, Rosemary, "On raising *Liguus*", American Malacological Union, Annual Report, 1957, p. 7.

Clench, William J., "Some New *Liguus* from the Florida Everglades", Nautilus Vol. 43: p. 18 - 21 (1929).

Clench, William J., "'Ligging' in the Everglades of Florida", Nautilus, Vol. 45: p. 10 - 15 (1931).

Clench, William J., "A New *Liguus* from Florida", Nautilus Vol. 46: p. 91, (1933).

Clench, William J., "New Races of *Liguus* from Florida and Cuba", Nautilus Vol. 48: (4), p. 121 - 125 (1935).

Clench, William J. and Fairchild, G. B. "The Classification of the Florida *Liguus*", Proceedings of the New England Zoological Club, Vol. 17: p. 77 - 86 (1939).

Clench, William J., "A New Race of Liguus from the Lower Keys of Florida", Proceedings of the New

England Zoological Club, Vol. 19, p. 69 - 71 (1942).

Clench, William J., "A Catalogue of the genus *Liguus* with a description of a new subgenus", Occasional Papers on Mollusks, Dept. of Mollusks, Museum of Comparative Zoology, Vol. 1 #10, p. 117 - 128, 1946.

Clench, William J., "Supplement to the Catalogue of the Genus *Liguus*", Occasional Papers on Mollusks, Dept. of Mollusks, Museum of Comparative Zoology, Vol. I #18, p. 442 - 444, 1954.

Clench, William J., "Supplement to the Catalogue of the Genus *Liguus*", Occasional Papers on Mollusks, Dept. of Mollusks, Museum of Comparative Zoology, Vol. 2 #34, Nov. 8, 1965, p. 425.

Clench, William J., "Henry G. Frampton", Nautilus, Vol. 81 (1), July, 1967, p. 31 - 32.

Clench, William. J., and Boss, Kenneth J., "The Henry G. Frampton Collection of Florida *Liguus*", Occasional Papers on Mollusks, #3, p. 36, 1967.

Clench, Wm. J., "Tree Snails (*Liguus*) of Cuba, Hispaniola and Florida", Annual Report, American Malacological Union, March, 1968, p. 48 - 49.

Clench, William J., "Eastern Land Snails", Malacologia, 1970, Vol. 10 #1, 1970, p. 35 - 37.

Close, Henry T., "Lure of the *Liguus* -- A Beginner's Guide", Of Sea and Shore, Spring, 1978, p. 3 ff.

Cox, Marilyn H., "My Escape to Matecumbe Key," American Conchologist, June, 1990, p. 23f.

Craig, Alan K., "A New Record for *Liguus*: The Boynton Beach Colony", Nautilus, Vol. 87 #3, July, 1973.

Craig, Nigal, "Head South With All Deliberate Speed: Ice Age May Return in a Few Thousand Years", Smithsonian, Jan. 1978.

Crozier, W. J. and Uavez, A. E. "The Geotropic Orientation of Gastropods," Journal of General Psychology, Vol. 3, 1929, p. 3 - 37.

Culverhouse, Ben, "Gems of the Everglades", Florida Wildlife, July-August, 1982.

Davidson, Treat, "Tree Snails, Gems of the Everglades", The National Geographic, Vol. 127, March, 1965, p. 372 - 387.

DeBoe, Mizpah Otto, "A New Color Form of *Liguus* from a new Area of the Florida Everglades", Nautilus, Vol. 47: p. 68 - 69, (1933).

DeBoe, Mizpah Otto, "*Liguus* from a new Locality in Central Florida Everglades", Nautilus Vol. 48 (4): p. 69 (1934).

Delcourt, P. A. and Delcourt, H. R., "Vegetation Maps for Eastern North America, 40,000 yr. B. P. to the Present, in Romans, R. C., ed., GEOBOTANY, New York: Plenum Publishing Corp, 1981, p. 123 - 165.

Dodge, , "Mollusks of Linnaeus," Bulletin of the American Museum of Natural History, Vo. 107, p. 47 - 49 (on Bulla *virginea).*

Doe, Margaret, "Tree Snails of South Florida", Nature Magazine, Vol. 29 (2), p. 18 ff (1937).

Eisner, T., and Wilson, E. O., "Defensive Liquid Discharge in Florida Tree Snails (*Liguus fasciatus*)", Nautilus Vol. 84, p. 14 - 15 (1970).

Emery, D. L. "Sinistral *Liguus fasciatus* roseatus", Nautilus, Vol. 52, April 19, p. 140.

Fairbridge, Rhodes W., "The Holocene Sea-Level Record in South Florida" in Gleason, Patrick, Environments of South Florida, Present and Past, Miami: Miami Geological Society, 1974.

Frampton, H. G. "Three New Subspecies of Florida *Liguus*", Proceedings of the Biological Society of Washington, Vol. 45: p. 55 - 58, April 2, 1932.

Hillis, David M; Rosenfeld, David S.; and Sanchez, Jr., Modesto, "Allozymic Variability and Heterozygote Defiency Within and Among Morphologically Polymorphic Populations of *Liguus fasciatus* (Mollusca: Pulmonata: Bulimulidae), American Malacological Union, Vol 5 #2, p. 153 - 157 June, 1957.

Hoffmeister, John Edward, Land From the Sea, Miami: University of Miami Press, 1974.

Humes, Ralph H., "A New Color Form of *Liguus*", Gastropodia Vol. 1 #2, p. 10 (1954).

Humes, Ralph, "A Short History of *Liguus* Collecting", Tequesta, Vol. 25, p. 67 - 82.

Hutchins, Fran, "Life Story of Tree Snails", Muse News: Bulletin of the Museum of Science, Miami, Florida, Vol. 1 #2, June, 1969, p. 32 - 33.

Jacobson, Morris K. and Old, William E., Jr., On a Sinistral Specimen of *Liguus* virginea (With Additional Remarks on the Genus *Liguus*)" Nautilus, Vol. 88 (1), p. 28 (Jan. 29, 1974).

Jones, Archie L., "How the Florida Tree Snails Live", Everglades Natural History Magazine, Vol. 2, 1954, p. 59 - 62.

Jones, Archie L., "The Florida Tree Snail -- An Endangered Species", Mollûsk Chaser (Newsletter of the South Florida Shell Club) Vol. 9 #5, May, 1971.

Jones, Archie L., "Descriptions of Six New Forms of the Florida Tree Snail *Liguus fasciatus*", Nautilus Vol. 94 (4): Oct. 30, 1979.

Jones, Archie L.; Winte, Erwin C.; and Bass, Oron L., Jr., "The Status of Florida Tree Snails (*Liguus fasciatus*), Introduced to Everglades National Park", National Park Service Report T-622, April, 1981.

Krieger, Peter J., and Austin, Daniel F., "*Liguus* The Boynton Beach Colony After Forty Years", Nautilus, Vol. 89, #4, p. 97 - 98 (1975).

Linnaeus, Caroli, Systema Naturae, ed. XII, Bulla virginea (1767).

McGinty, Thomas L. "A Canoe Trip in the Ten Thousand Islands to Collect *Liguus*", Nautilus Vol. 50 :p. 1 - 8 (1936).

McGinty, Thomas L. "*Liguus* at Northwest Cape Sable, Monroe County, Florida", Nautilus Vol. 50 (2): p. 71 (1936).

McGinty, Paul and Thomas L., "*Liguus* pictus Reeve", Nautilus Vol. 60 (2) (1946).

Miller, M. G. (Untitled note), Nautilus Vol. 34: p. 140.

Montfort, Denys de, Conchyliologie Systematique et Classification Methodique des Coquilles, 2, Paris, 1810 (The Genus *Liguus*).

Moore, C. B., "On the Northernmost Habitat of *Liguus fasciatus* on the Florida East Coast", Nautilus, Vol. 18, Dec. 1904, p. 88 - 89.

Moore, Clarence B., "*Liguus* at Marco, Florida", Nautilus, Vol. 34, p. 139.

Muller, Otto Fredric, Vermium Terrestrium et Fauviatilium Succinta Historia, Vol. 2, p. 145 (1774) (Buccinum fasciatum).

Parkinson, B., Jens Hemmen and K. Groh, TROPICAL LANDSHELLS OF THE WORLD, Weisbaden, 1987.

Pflueger, Al, "A New Variety of *Liguus*", Nautilus, Vol. 47, p. 121 - 122 (1934).

Pilsbry, Henry A., "Nomenclature and Check List of North American Land Snails", Proceedings of the Academy of Science, Philadelphia, 1889 (20 pp.).

Pilsbry, Henry A., "American Bulimulidae: North American and Antillean Drymaeus, Orthalicinae, etc.", Manual of Conchology, Vol 2, #12, p. 160 - 175, plates 1 - 63, Academy of Natural Science, Philadelphia, 1899.

Pilsbry, Henry A., "A Study of the Variation and Zoogeography of the *Liguus* in Florida", Journal of the Academy of Natural Science, Philadelphia, Vol. 2, #15, p. 427 - 471 (1912).

Pilsbry, Henry A., "Note on a Variety of *Liguus*", Nautilus, Vol. 34, p. 140 (1921).

Pilsbry, Henry A., "A New Form of *Liguus* from Florida, Nautilus, Vol. 44, p. 82 (1930).

Pilsbry, Henry A., "*Liguus* solidus dryas", Nautilus, Vol. 45, p. 106 (1932).

Pilsbry, Henry A., "Sinistral *Liguus fasciatus* from Florida", Nautilus, Vol. 60 #2, p. 72 (1946).

Pilsbry, Henry A., "Land Mollusks of North America North of Mexico", Academy of Science, Philadelphis, Monograph #3 (2), p. 37 - 102 (1946).

Platt, Rutherford, "Shells Take You Over World Horizons", The National Geographic Magazine, SCVI (1), 1949.

Reeve, Lowell, "*Achatina* picta", Proceedings of the Zoological Society of London, Vol. 10 (1843).

Rex, Michael A., "Relationships of Island Area and Isolation to Color Polymorphism in *Liguus fasciatus*", Breviora, Vol. 391, Aug. 11, 1972, p. 1 - 15.

Rhodes, S. N. "Annotated List of Land and Fresh-water Shells Recently Collected in the Vicinity of Miami, Florida", Nautilus, Vol. 13, Aug. 1899, p. 43 - 48.

Roth, Barry and Bogan, Arthur, "Shell Color and Banding Parameters of the *Liguus fasciatus* Phenotype (Mollusca: Pulmonata), American Malacological Bulletin, Vol. 3 (1), p. 1 - 10, 1984.

Continued on page 200

Books, Publications, etc.

IN REVIEW

Field Guide to the Slug
David George Gordon. 1994. 48 pp.
Sasquatch Books, Seattle, WA $5.95

This new paperback book is an identification guide to the land slugs of the Pacific Northwest. Writing out of his Port Townsend home, prolific author David George Gordon has come up with another informative book on the identification and life histories of Pacific Northwest slugs. He writes in an amusing, tongue-in-cheek style while more than adequately describing these pesky mollusks.

The book first tells of the author's interest in slugs and gives some interesting facts about the "slug-abilia" available in tourist shops and why we should be interested in slugs. Due to its damp climate, the Pacific Northwest is well-known for its slugs, and to certain extent, celebrated; in these gift shops, tourists can buy such curios as carved wooden slugs, chocolate slugs, or cans of Manhattan-style "slug chowder".

The book is divided into chapters on the slug family tree, anatomy of a slug, descriptions of Northwest species, controlling slugs ("skip the salt!"), a representative bibliography of slug literature, and the "seven wonders of slugdom." Accompanied by good drawings of the individual species, the book works well for telling who's nibbling on the cabbage and lettuce in your garden or munching your marigolds.

The seven wonders of slugdom includes the sole of the foot, slime, stomach, speed, senses, sex, and speciation. The sole of the foot is interesting because of how slugs crawl on it with a rippling motion, soothed with mucus. They can indeed crawl over the edge of a razor blade.

Gordon goes on to describe slug slime, how it's produced, and what purposes it serves. In the section on "stomach," he tells us what slugs eat. As far as slug speed goes, it's more a matter of lack of speed, but we learn that some slugs can slime along at 40 meters an hour.

Slugs have a surprising amount of senses, including eyes which can't form images, but do well at distinguishing light and dark. In "speciation," we learn what role the glaciers had in slug evolution. At present 23 species of slugs are found in the Olympic Peninsula rain forest, many of which were introduced on plant bulbs and produce.

I have to marvel at some of the slug sex described in the book. Slug sex is more elaborate than most other mollusks. Far from the lowly oyster which casts its gametes haphazardly into the watery wind of ocean currents, slug sex includes courtship, sexual displays (some slugs rival the barnacle for possession of the largest male organ - one slug species is ***dolichophallus***), and "apophallation," which should bring a cringe to any male reading this. It's hard to describe apophalltion as done by the slug in a gentile way, so I'll let the reader look up the term in a dictionary or buy the book to get the description. Needless to say, the practice benefits the slug genetic pool.

Proceeds from this book benefit a good cause, the educational programs and grants of the Western Society of Malacologists.

Review by **Roland C. Anderson** (Seattle Aquarium)
See ordering information on page 220

Monsters of the Sea
Richard Ellis. 1994. 429 pp.
Alfred A. Knopf, New York, NY. $30.00

Richard Ellis is one of America's most celebrated marine artists. He has authored and illustrated such books as The Book of Whales, Dolphins and Porpoises and The Book of Sharks. In Monsters of the Sea Ellis turns to real and perceived sea monsters. This is a good review of sea monsters from prehistoric times up to the present. He has obviously done a lot of research in developing this book and presents both the legendary and the factual, in most cases puncturing the myth of the monsters, albeit reluctantly.

He includes chapters on the Loch Ness monster, sea serpents, mermaids and manatees, the kraken (giant squid), leviathans (whales), octopuses, sharks, and "blobs and globsters." In each chapter he thoroughly discusses myth versus reality and includes valuable references for the latter. The book is amply sprinkled with historical drawings, photographs, and Ellis' own wonderful illustrations.

There are also three appendices. The first is the questionnaire circulated by the Linnaean Society concerning sightings of sea serpents and other sea monsters. the second is a compilation of all historic sightings and stranding of the giant squid, and the third is the complete text of Professor A.E. Verrill's description of the enormous "blob" that washed ashore in St. Augustine in 1896, taken by many to be the remains of a gigantic octopus.

Ellis tells us where the mythology comes from and spends considerable time and effort debunking some of the most egregious monster sightings. For example, he describes (and superbly illustrates) how the tentacles of a giant squid could be misconstrued as the loops of the body of a sea serpent, and how the manatee could be seen as a mermaid (an ugly one, but those old-time sailors were at sea for a long time!).

Ellis really hits his pace in the chapter on giant squid. It's obvious to the reader that the giant squid is a subject near and dear to his heart. He points out that this sea monster is very real: giant squid up to 57 feet long have washed up on the shore. We know virtually nothing about these monsters other than that they exist. The only specimens we have of it are sick and dying animals found on the surface waters, washed up on shore, or found in sperm whale stomachs. Precious little is known of its biology. Its eggs have never been found and we don't know what it eats (dead one's stomachs have all been empty). We know more about the worms found at deep sea hot vents, a whole new phylum of animals discovered just 20 years ago, than we do about giant squid.

Although squid, octopus, sharks, and other "real" monsters truly exist, their size and ferocity have all been exaggerated by legend, myth, fiction, and movies. For example, Benchley's shark in the movie Jaws, appears about 30 feet long, yet the biggest accurately measured great white shark was only 21 feet long. Ellis points out that "monster sharks" twice as long may have existed in the past, based on the size of fossil shark teeth.

Ellis obviously watched his share of "monster movies" in researching this book, as it is liberally strewn with references to movies such as Jaws, Monster from the Ocean Floor, Mysterious Island and others. Of course, no book on sea monsters would be complete without a description of the giant squid in 20,000 Leagues Under the Sea. Ellis gives us a complete description of the elaborate mechanism that manipulated the movie monster. (For a complete listing of squids and octopuses in movies see my article "20,000 Tentacles Beneath the Sea" in Of Sea and Shore, 1992).

Although Ellis unmasks the fable of many of these monsters (the famous photo of the Loch Ness monster has been proven a fraud; the perpetrator recently confessed on his death bed) one gets the feeling from this book that Ellis wants to believe in unknown sea monsters. His chapter on "Blobs and Globsters" described masses of rotting flesh washed ashore that have been variously described as the remains of giant octopuses, whales, or basking sharks (see also Mangiacopra's numerous articles in past issues of Of Sea and Shore). Based on the treatment of these blobs, Ellis obviously wants them to be remains of giant octopuses. His treatment may be tempered by his charter membership in the International Society of Cryptozoology (the so-called science of "hidden" animals). Reluctantly, and almost as an aside, he states that the most recent analysis of tissues from the blob confirm it to be the remains of a whale.

Despite the most decidedly romantic bent of the book this will be a valuable addition to the libraries of those interested in sea legends.

Review by **Roland C. Anderson** (Seattle Aquarium)

New Florida Fossil Book

The prolific Dr. Edward J. Petuch has spent the past 20 years researching Florida's fossil shells and now we can all see the results of his efforts. Atlas of Florida Fossil Shells is a compendium of fossil gastropods of the Pliocene and Pleistocene. 8½ x 11", hardcover, 394 pp, 100 plates, covering 56 families, 237 genera, 1100 species of macrogastropods. Cost is $60.00 plus $3.50 shipping & handling (Florida residents add $3.60 tax); checks, Visa or Mastercard accepted. Order from the Graves Museum of Archaeology and Natural History, 481 S. Federal Highway, Dania, FL 33004.

Some Recent Publications

Cairns, Stephen D. 1994. Scleractina of the Temperate North Pacific. Smithsonian Contributions to Zoology, Number 557. 150pp. 42 black and white plates. Covers 119 species of these corals from the temperate North Pacific, defined as extending from Bahia Magdalena on the Pacific coast of Baja California to Formosa Strait, China, and spanning six zoogeographic provinces. Seven new species or subspecies are described.

Child, C. Allan. 1994. Deep-Sea Pycnogonida from the Temperate West Coast of the United States. Smithsonian Contributions to Zoology, Number 556. 23pp. 5 figures. Describing four new species of sea spiders and reviewing others from the coasts of Washington, Oregon and California.

Cole, Linda. 1994. Catalog of Type Specimens in the International Protozoan Type Collection. Smithsonian Contributions to Zoology, Number 561. 28pp.

Egorov, Roman and Sergey Barsukov. 1994. Recent Ancistrolepidinae (Buccinidae). Moscow. 48pp, 30 figs., including 6 in color. Text in English.

Gordon, David George. 1994. Field Guide to the Slug. Sasquatch Books, Seattle. 48pp, drawings. See review elsewhere in this issue.

Hershler, Robert. 1994. A Review of the North American Freshwater Snail Genus **Pyrgulopsis** (Hydrobiidae). Smithsonian Contributions to Zoology, Number 554. 115pp. 53 figures. 65 Recent species are reviewed.

Pérez, Antonio Mijail. 1992. Variabilidad en moluscos gastrópodos. Managua, Nicaragua. 65pp, 7 figs., text in Spanish. Aspects related with variability in gastropods are discussed.

Vermeij, Geerat J. 1993. A Natural History of Shells. Princeton University Press. 207pp, numerous figures. Fascinating and educational - well worth having.

IN REVIEW

WASHINGTON STATE SHIPWRECKS!

(a computer program)
Argonaut Resources, Inc.; Mukilteo, Washington

The Pacific Northwest has a long history of maritime activities dating back at least two hundred years. In 1792 the expeditions of Captain George Vancouver and Robert Gray charted most of Washington's waters and named many of the geographic features they saw, including the Columbia River, Mount Baker, Puget Sound, Gray's Harbor, and others. Settlement of Puget Sound began soon after these explorations. With settlement came trade that depended on shipping. Supplies were brought into Washington, and furs, lumber and coal were exported. In 1849 shipping increased to meet the needs of the gold rush boom in California. With increased shipping, it is not unexpected that the first shipwrecks occurred.

One of the first shipwrecks in Washington was the Russian brig St. Nicholas, driven onto the rocks near the Quillayute River in 1808. The Washington coast was ripe for shipwrecks in those early years. The coast is often blanketed with fog for weeks on end, and aids to navigation were minimal. Offshore, uncharted sand reefs shift with the mood of the weather and currents. The northern coast is rocky, with fog-shrouded pinnacles and jagged crags lurking underwater. This coast is known as the "Graveyard of the Pacific" because of the many ships wrecked there.

In addition to the daunting coastline, other factors also contributed to shipwrecks in Washington. Some parts of the coast get 200 inches of rain a year, driven by fierce storms from the mid-Pacific. Even in the summer-time the weather can be miserable on the coast; in August the weather station at Tatoosh island has recorded winds of over 80 miles per hour. Although usually protected from the weather, the passages and bays of Puget Sound proved deceptively safe, as tidal currents drove some ships to the doom on rocks or beaches.

Even under the best of conditions, the "human factor" has also contributed to a large number of Washington shipwrecks. Many were caused by fires, collisions, explosions from an over-heated boiler, or just plain pilot error. Some were caused by abandonment or dismantling; one beach on Puget Sound where wooden ships were burned for their scrap metal is now known as "Shipwreck Beach," because of the hulls left there. Other ships were sunk deliberately to provide fish enhancement, or in the case of the Edmonds wrecks, an underwater dam to protect a ferry dock from currents.

There are over a thousand known shipwrecks in Washington waters, and many more went un-recorded. Heretofore, a diver looking for shipwrecks or looking for information on a known shipwreck had to laboriously seek out information about it, involving research at libraries and maritime museums, perusal of old newspapers, or extensive phone work and personal interviews. Now there is an easier way to get information on nearly all shipwrecks in Washington. You can buy a computer program called "Washington State Shipwrecks!" marketed by Kent Barnard of Argonaut Resourses, Inc.

This is an extensive computer program that lists 1,006 shipwrecks. You can buy a disk covering 300 Puget Sound wrecks, a disk on Northern Puget Sound wrecks, a disk on coastal wrecks, or a set of all three called the "Explorer Bundle." Each disk sells for $39.95 or $99.95 for all three. The programs are on standard 3½ inch floppies and come with a coupon for exchanging them for 5¼ inch floppies if necessary.

Installation is quick and easy on the hard drive of your IBM-compatible computer using MS-DOS. I installed mine on a very old Compaq portable. I had to upgrade my DOS before the installation would work, but the computer is admittedly a dinosaur with ancient software running it (and I wouldn't trade it for anything!). Installation took about five minutes. In my computer, the Explorer Bundle uses about 1.6 mb of memory, not very much for modern computers. It comes complete with password protection.

Once installed, the program has a comprehensive introduction. In it there are sections on how to use the program, helpful hints, shipwreck laws, shipwreck safety, researching shipwrecks, undiscovered shipwrecks, and his top 15 divable wrecks. In the extensive database itself, the user can scroll through the wrecks by

name or set up a search pattern. It is possible to call up all wrecks that occurred in Pierce County, or that occurred in 1910, or that carried lumber as cargo. Once a specific wreck is called up, the screen shows its name, type, date sunk, cause of sinking, location, cargo, and where and when it was built. Further "fields" on each wreck give interesting notes on the wreck ("The Reaper ... was one of the more notorious 'hell ships' ... had the nickname of The Grim Reaper") and specific references about it. There is also a separate section listing all the sources of his information.

A dive log is also included in the program that can be used to hold up to 500 dives. You can also sort or select particular features about your diving activities and tally your cumulative bottom time.

In any ambitious project of this size there are bound to be a few glitches. I've had no technical problems with the program so far, but found a few minor errors in content. I recently dove on the wreck of the Comet at Port Hadlock, which the database says is sitting dry on the beach; it is really 10-40 feet deep. I am also surprised that he doesn't mention the peculiar stance of one of the sunken Shilshole Bay barges (O & H 95); this large rectangular metal barge is lying upright on its starboard side. It is certainly excusable to have a few errors or omissions in a project this large.

This database will be invaluable to any Washington diver interested in shipwrecks. Over a hundred of the described wrecks have reasonably good location data, good enough to find them with a little persistence, and the interesting information on each wreck will give the diver a useful insight into what he/she is seeing.

For those of us planning to diver further afield, or for those divers in other areas, Barnard is planning to market several more databases in the near future, including one on shipwrecks of British Columbia.

"Washington State Shipwrecks!" can be purchased at dive shops, marine supply stores, and maritime historical museums. It can also be ordered directly from Argonaut Resouces, Inc.; P.O. Box 743; Mukilteo, WA 98275-3044.

Review by **Roland C. Anderson** (Seattle Aquarium)

Attention Authors

Writing a book about mollusks or some other subject you think would interest our readers. Arrange for a review copy to be sent to the Editor and these readers can learn about your new tome here.

INNER DIMENSIONS
The Radiographic World of William Conklin
William A. Conklin. 1994. xi + 100pp.
WRS Publishing, Waco, Texas. $29.95

Our readers may recall the article about William A. Conklin and his radiographic shell work from a back issue. (Of Sea and Shore 13:3, 119-121.) Now you can own a beautiful collection of these images, plus more. This large (11¼ x 11¼ inch) book includes 50 full page radiographic images of shells, and on the opposite page a full color ¼-page photographic of the shell used in the x-ray. Also included on each page is a poem, many of which make use of shells, others use nature as a subject; the poetry is from noted poets such as Amy Lowell, John Keats, Alfred Lord Tennyson, William Cowper and Oliver Wendell Holmes - of course the latter's work accompanies the photograph and x-rays of the Chambered Nautilus, ***Nautilus pompilius***. Each shell photograph is accompanied by a paragraph of information concerning the shell shown.

This is a beautiful book that combines art and science and provides the shell collector with another volume to show friends to help explain one's fascination with these creatures of the natural realm.

MARINE LIFE OF THE NORTH ATLANTIC
Canada to New England
Andrew J. Martinez. 1994. 272pp.
Co-author: Richard A. Harlow
published by the author, Wenham, Massachusetts.

This handy-sized (6 x 9") spiral bound, guidebook contains 364 color photographs of more than 200 species of fish and invertebrates. Each species from the algaes, sponges, worms, molluscs, echinoderms, arthropods and fish has a paragraph of information on the page opposite the color photograph and listing the common and scientific name, identification features, habitat, range and the author's comments. The author has been a diver and photographer for 25 years and has had his work appear in magazines and books; he has had photographic assignments for the National Geographic Society. Co-author Harlow has taught biology and oceanography for 30 years. Their expertise and experiences are evident in this book.

One interesting feature of this guidebook is a place for the reader to enter the date and location where the species shown was observed. 57 species of molluscs are included. I think this might be a handy book for the beginning naturalist of the area covered. Copies can be ordered from the author at P.O. Box 335; Wenham, MA 01984. Tel (508) 468-2326; Fax 468-2365. Cost is $29.95 plus $4.00 postage and handling.

Last two reviews by **Tom Rice**

History Repeating Itself: Part II

Ignored - Rediscovered - Ignored Again! -

And Final Vindication for Octopus giganteus: 1909-1994

Gary S. Mangiacopa*, Michel M. Raynal**
Dr. Dwight G. Smith & Dr. David F. Avery***

The Controversy Continued into the 20th Century

In the human memory, events are quickly forgotten unless they are constantly reinforced by additional stimuli. Such a lackluster fate would normally have awaited the mystery and controversy surrounding Dr. Webb's claimed gigantic octopus. Much notoriety occurred at the time of the initial discovery, reached a peak and was soon followed by neglect. A pattern common worldwide to such discoveries of beach 'sea monsters" is that upon examination they are identified as mutilated remains of known marine creatures. In Dr. Webb's case this pattern was uniquely broken.

During the first decade of the 20th century, brief references to the discovery of this gigantic octopus appeared randomly in both articles and books. As early as 1909, the magazine Chamber Journal published an article that was surprisingly articulate and unsensational as it recounted previous articles that had given brief mention to a Florida giant octopus washing up on the shore near St. Augustine eleven years previously. This incident was placed along with other reports of man's encounters with the giant devilfishes (=cephalopoda) (Washington Post, 1909).

Frederic A. Lucas (1928), who had examined the preserved tissue samples when they had arrived in Washington, D.C., reiterated the position he had held 30 years earlier: that the samples were blubber and came from "the wave-worn carcass of a sperm whale, from which the spermaceti had been taken before it was cast ashore." [This blubber theory can be ruled out, as blubber is nothing more than a layer of fat tissue, which could not have given the shape of the Florida monster.] Lucas lamented, "And now, there can never be an ***Octopus giganteus***, for by the rule, 'once a synonym always a synonym' the name has been attached to the sperm whale and can never properly be applied to a cepalopod."

However, during the first half of the 20th century, the Florida incident was continually referred to by none other than Prof. Verrill's son, Alpheus Hyatt. Like his father, a man of many varied and exceptional talents whose decades of extensive exploration in far-flung regions of the world. Bermuda, the West Indies, Guiana, Central America and Panama provided the raw data for numerous articles and 105 books produced during his lifetime (23 July 1871 - 14 November 1954).

Hyatt had done two sketches based upon under-exposed photographs sent to his father. These were included in the American Naturalist - a retraction that this Florida carcass was the probable mutilated remains of a sperm whale (Verrill, 1897). Oddly, neither these sketches or other photographs were ever reprinted in any of Hyatt's other books. In The Ocean and its Mysteries (Verrill, 1925) he wrote only briefly of the incident in which he had been personally involved:

"Only a few years ago a strange object was washed upon Florida's coast and, as in the case of the wonderful giant squids, photographs of this new 'sea monster' and pieces of its substance were sent to Prof. Verrill. At first is seemed as if this would prove another unknown and gigantic cuttlefish, but upon examination it turned out to be a portion of some very different creature. Although some twenty feet in length and forty feet i circumference and weighing many tons, yet this great mass of tough, fibrous flesh was a mere fragment of some titanic marine monster and in its structure and shape so different from any known form of animal that no scientist could even guess at its origin and it has gone down to posterity as one of the mysteries of the sea."

* Milford, Connecticut
** Paris, France
*** Southern Connecticut State University, New Haven

It is a mystery as to why Verrill's son would make such a statement when Verrill senior was still alive and would certainly have criticized his son for the above statement when he, himself, ultimately had, some twenty years earlier, identified this great mass of flesh simply as the remains of a sperm whale head. Or was it?

Some 36 years later, and two years before his death, Hyatt wrote still another passage referring to this incident which involved his father. Expanding and giving a slightly different version of what had transpired between his father and this Florida monster, Verrill wrote:

"Photographs and a description were sent to my father, Professor A.E. Verrill, at Yale, who assumed it to be the remains of a giant octopus. He at once sent tanks of alcohol to Florida with instructions to preserve as much of the object as possible. But there was no air mail or motor freight in those days, and under the Florida sun the enormous mass, some twenty feet in length, seven feet in width and six feet in height, had begun to decompose. By the time the tanks reached Florida, most of the material had rotted away to a slimy malodorous mass. However, there was still enough remaining so that several large pieces were preserved. Enough for a zoologist to identify it. But when my father studied the specimens he was completely at a loss. The flesh was totally unlike that of an known creature, for it contained neither the fiber of muscles, nerves, blood vessels, sinews or bones. Probably nine out of ten scientists would have propounded some explanations but my father frankly and freshly admitted that he was at a complete loss, that he couldn't even guess what it was, but that it unquestionably was the remains of a part of some totally unknown marine creature."

This statement contradicts those attributed to his father's original 1897 identification of the beach carcass as the mutilated remains of some sperm whale is still puzzling. Did Verrill senior, after no less than three official retractions, still have lingering doubts about this Florida carcass? And why did Prof. Verrill not take the opportunity, at a later date, to retract his sperm whale identification? A possible explanation may lie in Verrill's personality as a scientist - very seldom did he review his past accomplishments, always stressing that there were new fields to be opened and to lay the foundation for others to follow after him. Or perhaps, though a prolific writer like his son, Verrill may not have had the opportunity - or even the interest - to publish his second thoughts and allowed his son to do so instead.

Prof. Verrill's archives were given to the American Museum of Natural History after his death in 1926 and have, regretfully, been lost. Nor does Brigham Young University, which possesses Hyatt's second wife's archives, have her husband's papers. Whatever notes that may have existed by either father or son that could have clarified these contradictions are considered permanently lost.

As to the correct zoological identification of this five ton carcass it has, like all other claimed "sea monsters" remained in question. Written descriptions were published, perhaps a photograph or two taken and published somewhere, perhaps some tissue samples were taken and examined and preserved for future reference and all stored in some musty basement at some institute of higher learning.

It is the latter factor that has caused a 40 year controversy that is still raging. Webb forwarded to Verrill preserved tissue samples from the Florida monster. Tissue samples were received at Yale University (these were lost in the 1920s) and to the Smithsonian Institution (lost too, some time prior to 1984 [Voss, 1984]). The Smithsonian's tissue samples would have been the basis for reconsideration of Verrill's original identification.

Although referred to by various writers over the years it was not until the Spring of 1957 that the Florida carcass would be "rediscovered". Dr. Forrest Gerald Wood, Jr., then Director of Exhibits and Curator of the Research Laboratories of Marineland, Florida, while going through their laboratory files, came upon an old newspaper clipping telling of the discovery of the giant octopus. Wood, as a personal interest, spent several years researching these forgotten events before presenting his findings in 1971.

Shortly after his initial rediscovery, Wood forwarded information to the writer Arthur C. Clarke. Clarke (1960) included a brief mention of this discovery in his book, The Challenge of the Sea, but commented, "So the mystery remains unsolved to this day."

Ironically, Clarke would, some twenty years later, be the host of a British TV series, "Mysterious World", which would feature Wood in a segment about a U.S. Naval vessel being attacked by a giant squid near San Diego. The show also features Gennaro, at St. Augustine, Florida, showing the jar containing the last pieces of ***Octopus giganteus***, and a small octopus on the beach - explaining the dimensions the carcass would have had in life. This segment also showed several 1897 photographs on the carcass - including two that have not been published elsewhere.

Amusingly, ***Octopus giganteus*** appears in a more recent novel of Clarke. In The Ghost from the Great Banks (1990), the year is 2012 and an expedition tries to explore the **Titanic**, 100 years after its sinking. Among other incidents the expedition encounters a giant octopus.

But now the mystery is starting to be unraveled. In the forthcoming three decades, researchers, using scientific analysis techniques that were undreamed of in Professor Verrill's time, would support his original position - that there may be in existence 100-foot-long species of octopods, as he proposed almost a century ago.

A Second Look at the Tissue Samples

During Wood's efforts to obtain background information, he learned, from Dr. Gilbert L. Voss of the University of Miami, of the existence of the container holding Dr. Webb's tissue samples and labeled ***Octopus giganteus*** Verrill. Voss had discovered these remains in the early 1950s. They were in a very poor condition. This lead was subsequently confirmed by Dr. Harald A. Rehder, Curator of Mollusks at the Smithsonian, who later allowed Dr. Joseph F. Gennaro, Jr., of the University of Florida and a friend of Wood, to examine and remove a small portion of the tissue.

A lengthy and detailed account of Gennaro's histological findings were formally presented in Natural History magazine (March 1971) in an article by Wood and Gennaro. In summary, results came from samples examined under polarized light - the tissue samples were more similar to those of the octopus rather than those of the squids. At that time their conclusion was that the tissue samples had, indeed, come from an octopus; this seemed to vindicate Webb's and Verrill's original identification of the unknown species as a gigantic octopus. However, vindication did not come after publication of this research. Both the public and scientific response was one of ridicule and hostility.

Final Vindication After A Century: Further Analysis of Webb's Tissue Samples

Even amidst these criticisms, Gennaro continued further examination of the last remaining tissue samples in his possession. In a general article (Argosy, 376:3 [March 1973]) he noted:

"Microscopic examination by experts revealed that this dense connective tissue is reinforced by collagen, an extremely tough, white, fibrous protein of a type that all living tissues make. As the investigations continued, however, it was found that the chemical constituents of the monster's collagen were the type found in octopus collagen, and that none of this type of tissue exists in the squid at all."

In August of 1975, one of the authors (G.S.M.) met Dr. Roy P. Mackal of the University of Chicago at a convention in that city where Dr. Mackal was giving a talk on his work at Loch Ness. A mutual interest in cryptozoology led to an effort by Dr. Mackal to contact Dr. Gennaro, as he was very interested in comparing Gennaro's collagen analysis in regards to the amino acids. By early 1979 ***Octopus giganteus*** tissue samples were sent, along with samples of Beluga whale (***Dephinapterus leucas***) and giant squid (***Architeuthis dux***) that Gennaro had recently obtained from a carcass washed ashore in Newfoundland. Further comparisons with U.S. west coast octopus species as well as bovine and human collagen were also made.

Three shipments of tissue samples were sent by Gennaro to Mackal and identified only by letters and numbers. Amino acid analysis of these samples (see Tables 1-3) showed that the amino acid composition of the ***Octopus giganteus*** sample was unlike any of the other specimens, particularly with respect to the high percentage of glycine and proline and lower quantities of glutamic acid. Additional amino acid analysis of contemporary squid and octopus tissue stored in formaldehyde for periods of from 2 to 11 years, along with fresh tissue samples, were compared. This was done because of the fact that the ***O. giganteus*** tissue was preserved in formaldehyde and, possibly, ethanol. Since formaldehyde might have produced some cross-linking between the amino acids and could distort the analysis, Mackal advised including similar tissue that had also been exposed to such preserving substances.

Further comparison of ***O. giganteus*** tissue with bovine and human collagen produced results that they were almost identical to decalcified bone material and collagen. They concluded:

"We interpret these results as consistent with and support Verrill's original identification of the carcass as that of a gigantic octopus not referable to any known species. It seems to us reasonable to suppose that an octopus weighing 2,000 to 4,000 kilogram (2 to 4 ton), without external or internal supportive skeletal elements, would have to consist of a great lack of connective tissue (collagen), enclosing the internal organs and forming the structural base for the attachment of comparably large tentacles."

This report was formally presented at a symposium of the III International Congress of Systematic and Evolutionary Biology on July 7, 1985 at the University of Sussex, Brighton, England (ISC Newsletter, 1985). This paper was expanded and republished in the journal Cryptozoology under the title "Biochemical Analysis of Preserved Octopus Giganteus Tissue" (Mackal, 1986).

However, some scientists, including teuthologist Gilbert L. Voss, doubted - and are still doubting - that a "positive identification" could be made after 75 years. The histological structure, and even the amino acid content, might have been altered due to the long storage in formaldehyde (Wood, 1982). One of the authors of this article (M.R.) thus proposed to analyze the iron/copper concentration of the ***O. giganteus*** sample (the iron coming from hemoglobin, the blood protein

found in vertebrates, including cetaceans); and the copper coming from hemocyanin, the blood protein found in cephalopods).

The results of these copper and iron determinations were included in Mackal's report under M.R's auspices (see Table 4): they are consistent with the octopus hypothesis.

The amino acid analysis demonstrates that the samples of ***O. giganteus*** are almost pure collagen. The peculiar properties of this protein account (Raynal, 1987) well for the hardness of the cadaver which was difficult to be cut even with a knife and for the fact that it remained unchanged for several months on the beach, despite rotting. Though the spermaceti of a sperm whale could explain the properties, as well as the shape of the Florida Monster, the results of the iron/copper measurements and the photographs showing stumps of arm (amongst other clues) are rather consistent with Webb's original diagnosis: ***Octopus giganteus*** seems to actually be what its Latin name implies: a gigantic octopus!

Present Status of *Octopus giganteus* - 1994

Eight years have passed since Mackal's report. Unfortunately, further analysis of tissue samples which might give definitive identification by analyzing and comparing the amino acid sequences of purified collagen samples and/or radio-immunoassay has not been carried out. This leaves open the next question: does this species still exist and, if so, just where may they presently reside? These are questions that will be put forth in the next chapter of this series: "Lusca and Scuttles of the Caribbean."

Acknowledgement

Our thanks to Dr. Roy P. Mackal, University of Chicago (retired), for permission to reproduce his amino analysis tables for ***Octopus giganteus***, from the journal **Cryptozoology**.

References

Chamber's Journal. 1897. Science and Arts, August 28, Part 164: 556-557.

Clarke, Arthur C. 1960. The Challenge of the Sea. Holt, Rinehart and Winston, New York.

Clarke, Arthur C. 1980. Mysterious World. Vol. 2: Monsters of the Deep / Monsters of the Lakes (Video): Trident Television, Ltd., United Kingdom.

Clarke, Arthur C. 1990. The Ghost from the Great Banks. Victor Gollancz, Ltd., London.

Gennaro, Joseph F. 1973. Octopus Giganteus: largest creature in the world? Argosy, Vol. 376, #3 (March) : 30-32.

ISC Newsletter. 1985. Brighton Symposium Program. Vol. 4, #1 (Spring): 9.

Lucas, Frederic A. 1928. Some Mistakes of Scientists. Natural History, Vol. XXVIII, #2 (March/April): 169-174.

Mackal, Roy P. 1986. Biochemical Analysis of Preserved Octopus Tissue. Cryptozoology. Volume 5: 55-62.

New York Times. 1954. A. Hyatt Verrill, an Explorer, Dies at 83. November 16.

Raynal, Michel. 1987. Properties of Collagen and the Nature of the Florida Monster. Cryptozoology, Vol. 6: 129-130.

Verrill, Addison Emery. 1897. The Florida Sea Monster. The American Naturalist, Vol. XXXI: 304-307.

Verrill, George E. 1958. Life and Work of Addison E. Verrill of Yale University. Pacific Coast Publishing Co., Santa Barbara, California.

Verrill, Alpheus Hyatt. 1916. The Ocean and its Mysteries. Duffield & Co., New York.

Verrill, Alpheus Hyatt. 1962. The Strange Story of Our Earth. Premier Books, New York.

Voss, Gilbert L. 1984. private communication to Michel Raynal, August 8.

Washington Post. 1909. Fish That Are Dangerous. Feb. 14: miscellaneous section.

Wood, Forrest G. and Joseph F. Gennaro. 1971. An Octopus Trilogy. Natural History, Vol. LXXX, #3 (March): 14-16, 18, 20-24, 84, 86, 87.

Wood, Gerald L. 1982. Guinness Book of Animal Facts and Feats, 3rd edition: 196-197. Enfield, Guiness Superlatives, Ltd.

Table 1.-Comparison of Amino Acid Composition of Octopus Giganteus Against Cetacean And Cephalopod Tissues.

Sample specimen	Amount weighed (mg)	Mole % Asp	Thr	Ser	Glu	Pro	Gly
Octopus giganteus	12.4	5.9	2.5	3.9	8.8	16.8	34.6
Architeuthis dux (left tentacle III)	18.4	10.5	4.9	6.0	14.2	6.3	19.2
(mantle)	49.0	11.7	5.4	5.8	16.6	4.7	11.5
(fin)	17.0	10.3	4.8	5.5	12.6	6.5	20.0
Stenella plagiodon (spotted dolphin)	5.2	10.5	4.6	7.1	17.7	4.7	10.6
Delphinapterus leucas (skin) (beluga whale)	18.0	10.5	4.6	8.0	16.7	4.3	14.2

(Mackal, 1986)

Table 2.-Comparison Of Amino Acid Composition Of Octopus Giganteus Against Cetacean And Cephalopod Tissues.

Sample specimen	Mole % Ala	Val	Met	Ile	Leu	Tyr	Phe
Octopus giganteus	13.4	2.4	0.4	1.2	2.9	0.0	1.5
Architeuthis dux							
(left tentacle III)	8.6	4.8	1.9	4.9	7.8	0.7	2.6
(mantle)	9.5	5.5	2.2	5.9	10.0	0.6	3.0
(fin)	8.6	5.3	1.9	5.4	8.1	0.5	3.2
Stenella plagiodon (spotted dolphin)	7.5	6.6	2.2	5.1	10.7	1.2	3.1
Delphinapterus leucas (skin) (beluga whale)	7.6	6.4	2.1	4.6	10.4	1.4	3.5

(Mackal, 1986)

Table 3.-Comparison Of Amino Acid Composition Of Octopus Giganteus Against Cetacean And Cephalopod Tissues.

Sample specimen	Mole % His	Lys	Arg	Hydroxy-lys
Octopus giganteus	0.0	0.0	5.8	0.0
Architeuthis dux				
(left tentacle III)	+	1.0	6.6	0.0
(mantle)	+	0.9	6.7	0.0
(fin)	0.2	0.8	6.5	0.0
Stenella plagiodon (spotted dolphin)	0.3	1.6	6.4	0.0
Delphinapterus leucas (skin) (beluga whale)	+	0.5	5.2	0.0

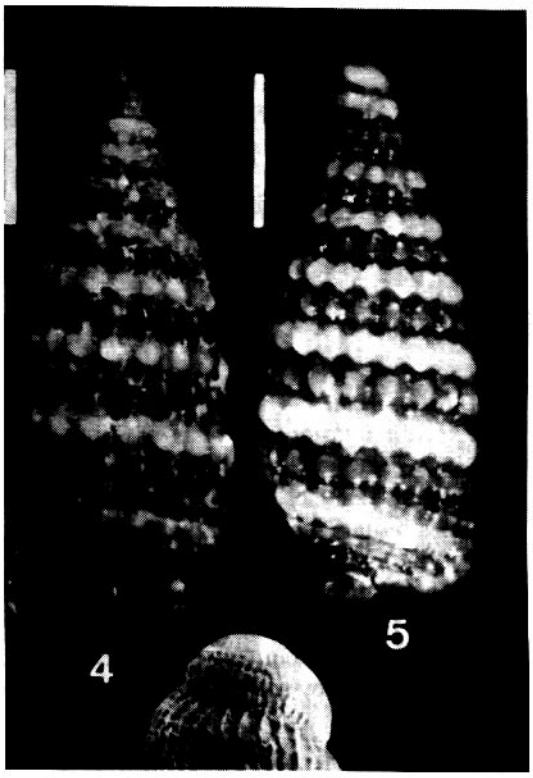
+ Trace detected but not integrated - less than 0.1%

(Mackal, 1986)

Table 4.-Comparison Of Copper And Iron Composition Of Octopus Giganteus Against Cetacean And Cephalopod Tissues

Sample specimen	Amount weighed (mg)	Cu (ppm)	Fe (ppm)	Cu/Fe
Octopus giganteus	29.1	60	200	0.30
Architeuthis dux (mantle)	5.6	240	560	0.43
Stenella plagiodon (spotted dolphin) (muscle)	12.8	300	1,600	0.19
Delphinapterus leucas (white whale) (skin)	10.5	330	470	0.70

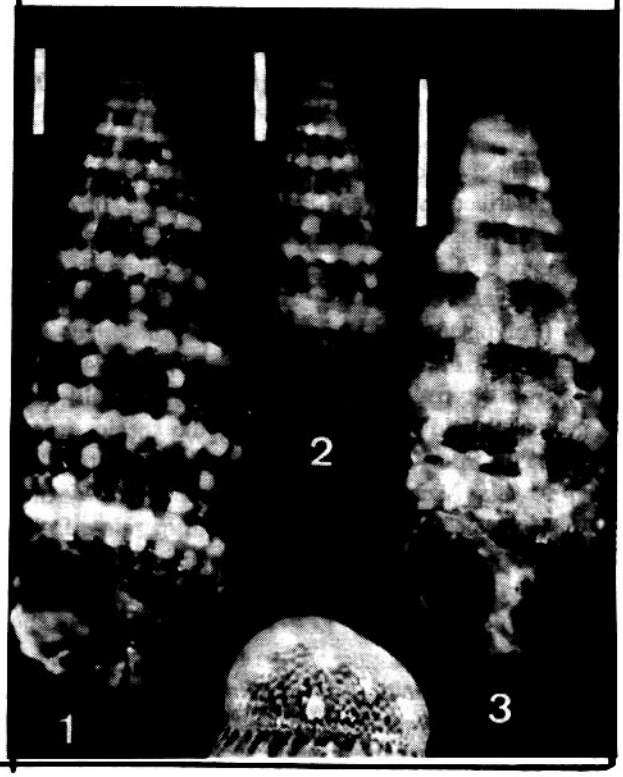
(Mackal, 1986)



Above: **Monophorus steralbus** Rolán & Fernández-Garcés, 1994 (holotype is #4, paratype #5; plus protoconch). See page 226. scale bar: 1 mm.

Below: **Monophorus olivaceus** (Dall, 1889) for comparison. Protoconch also shown. scale bar = 1 mm.

See next page.



Last issue's Back Cover

The back cover of our last issue (Vol. 17, No. 3 - Fall, 1994) featured a number of recently described species and more details were promised in this issue. So here they are.

Sinezona confusa Rolán and Luque, 1994 occurs in various localities of the Caribbean Sea - Cuba, Puerto Rico, Santo Domingo, the Yucatan and possibly the Bahamas as well. Described in Iberus, 12(1) 1994, 1-5, this is a very tiny species, measuring less than 1mm in diameter.

Caecum lightfootae Pizzini, Nofroni and Oliverio, 1994 was described from the Canary Islands and was named in honor of the late Joanne Lightfoot (see her articles on this molluscan family in past issues of this magazine). The description appears in Apex 9(2/3): 79-82. The slightly over 1mm species was taken is depths of 1-30 meters. The authors state that the species is easily separated from the seven others that occur in the Canary Islands by sculptural or septum differences.

Boschitestella donaldi Moolenbeek, 1994 and ***Boschitestella eloiseae*** Moolenbeek, 1994 are newly described in Apex 9(1): 5-7. The new species and new genus are described from the Sultanate of Oman are named in honor of honor of Dr. Donald Bosch and his wife Mrs. Eloise Bosch and belong to the molluscan family Orbitestellidae. Because of their tiny size (under 1mm) these shells are easily overlooked. ***Borschitestella*** differ from the genus ***Orbitestella*** Iredale, 1917 by its single sharp carina on the periphery, being larger and a different structure of its protoconch. It differs from the Panamic genus ***Vitrinorbis*** Pilsbry & Olsson, 1952 in being twice as large and having a different sculpture of fine spiral threads, cut into fine beads by close, retractively radial grooves.

The two chitons pictured on that back cover were described by Roger Clark whose articles on chitons and collecting in southeastern Alaska have previously appeared in this magazine. Clark reviews the Genus ***Placiphorella*** Dall, 1879, ex Carpenter MS (Polyplacophora: Mopaliidae) and describes two new species. ***Placiphorella mirabilis*** Clark, 1994 is described from a type locality off Catalina island, California in 69 meters and the distribution of the species is noted as being from Gaviota, Santa Barbara County, California to Isla Asuncion, Baja California Sur, Mexico. The species can be distinguished from ***P. velata*** Dall, 1897, ex Carpenter MS and other species of the gnus (***P. atlantica*** [Verrill & Smith, 1882], ***P. blainvillii*** [Broderip, 1832] and ***P. rufa*** Berry, 1917) by studying the setae.

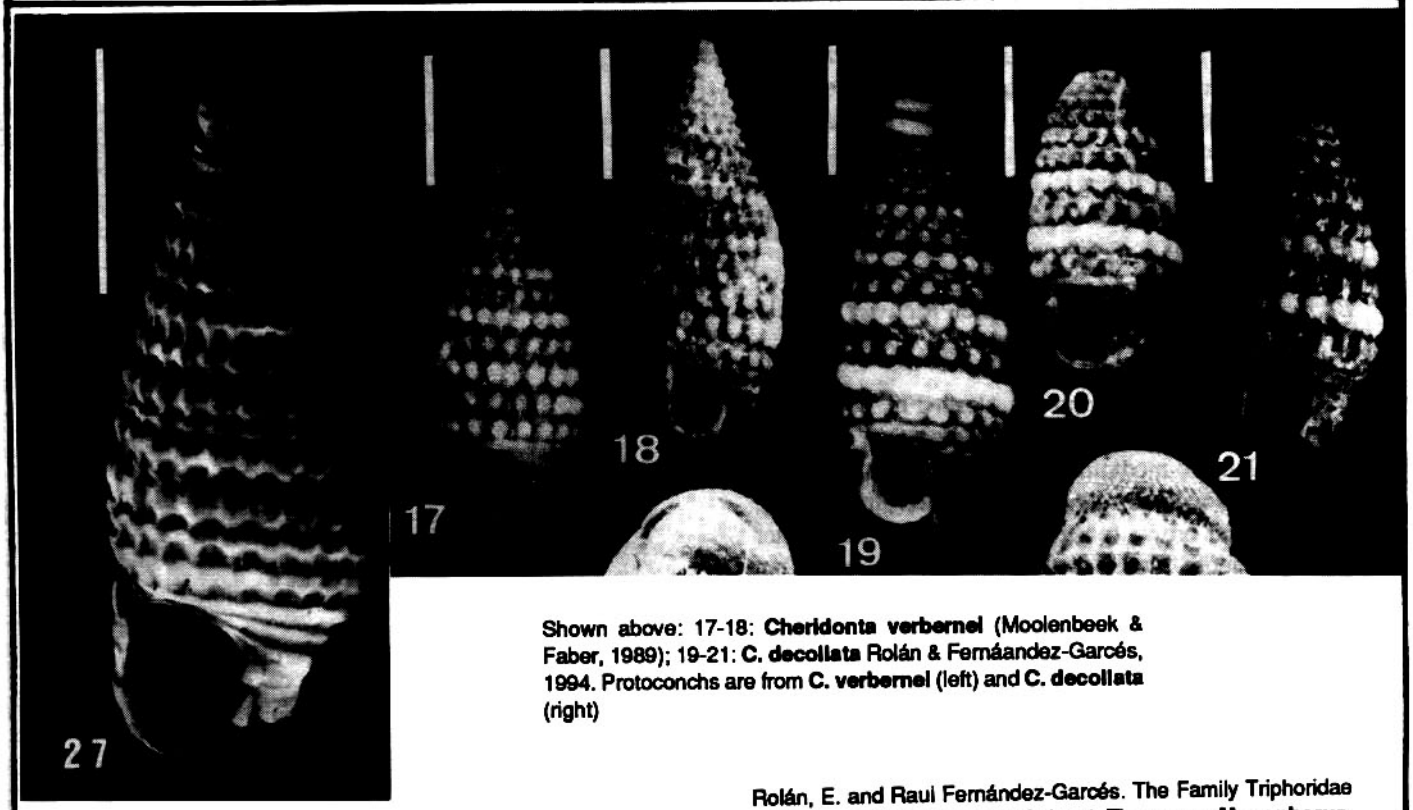
In the same article, which appeared in The Veliger, Vol. 37, No. 3, pp. 290-311, Clark also describes ***Placiphorella hanselmani*** Clark, 1994 (honoring George A. Hanselman of San Diego [see his article on preparing chiton specimens in the very first issue of this magazine]). Type locality is Bahia de Los Angeles, Baja California Norte, Mexico (Gulf of California) at depths of 0-5 meters and is restricted in distribution to the upper Gulf of California north of 28° N latitude. The species can be distinguished from ***P. velata*** and ***P. blainvillii*** by: (1) scales of setae, which are about 2.5 times as long as wide, distally truncated, and bear a long, sharply pointed spicule at the distal end; (2) the heart-shaped rachidian tooth of the radula, which is very broad at the working end (3) the consistent color pattern which is buff, speckled with dark brown in the center one-fourth to one-third of the valves, with the remaining portion of the valves dark brown.

Recently Named Marine Mollusca

Monophorus ateralbus Rolán & Fernández-Garcés, 1994 [Family Triphoridae]

Described from Cuba and the Bahamas, the shell measures between 3 and 6mm and has brown and white spiral cords. The authors compare it with several other species from the area. ***M. olivaceus*** (Dall, 1889) has the spiral cords with the same colors, but in each cord the nodules may be brown or white; also different are the animal coloration and radula. ***"Triphora" intermedia*** (C.B. Adams, 1850) has smaller and more numerous nodules and three spiral cords from the third whorl of the teleoconch. ***"Triphora" ellyae*** De Jong & Coomans, 1988 has the position of the spiral cords inverted, the upper one being white (in the new species it is brown) and the same occurs with ***"Triphora" elvirae*** Jong & Coomans, 1988. ***Iniforis turristhomae*** (Holten, 1802) has smaller nodules and a tubular anal hole far from the aperture (in the new species the anal sinus is open). The differences of the shell with those of ***Cheirodonta verbernei*** (Noolenbeek & Faber, 1989) and ***C. decollata*** Rolán & Fernáandez-Garcés, 1994 are based on the different position of the brown and white color in the spiral cords in most parts of the teleoconch.
Apex 9(1): 17-27.

Note: This column starts a continuing series that will alert collectors to newly named marine molluscs. The Editor hopes this will be both interesting and useful.



Shown above: 17-18: **Cheridonta verbernel** (Moolenbeek & Faber, 1989); 19-21: **C. decollata** Rolán & Fernáandez-Garcés, 1994. Protoconchs are from **C. verbernel** (left) and **C. decollata** (right)

Above: **Cheirodonta apexcrassum** Rolán & Fernández-Garcés, 1994

Rolán, E. and Raul Fernández-Garcés. The Family Triphoridae (Mollusca, Gastropoda) in Cuba. 4. The genera **Monophorus, Nototriphora, Cosmotriphora** and **Cheirodonta**, with the description of three new species. Apex 9(1): 11-16, April 1994.

Cheirodonta decollata Rolán & Fernández-Garcés, 1994 [Family Triphoridae]

Another Cuban species, measuring nearly 4mm, this is also reported from the Bahamas. Most specimens loose their apex upon maturity. It differs from the above new species, ***M. ateralbus***, which it superficially resembles, in that the lower spiral cord is brown, not white. There are also differences in the microsculpture of the protoconch and the radula. It can be distinguished from ***C. verbernei*** (Moolenbeek & Faber, 1989) by the coloration of the first whorls of the teleoconch which are cream with a brown cord - in ***C. verbernei*** these are a uniform brown color. Apex 9(1): 17-27.

Cheirodonta apexcrassum Rolán & Fernández-Garcés, 1994. [Family Triphoridae]

The third new triphorid from Cuba and the Bahamas described by Emilio Rolán and Raul Fernández-Garcés in Apex 9(1): 17-27. Apex is published by the Société Belge de Malacologie.

This species measures between 2 and 3mm. Its position in the genus ***Cheirodonta*** Marshall, 1983 is only tentative, based on its great similarity to ***C. labiata*** (A. Adams, 1851) from Australia. This new species can be distinguished from ***"Triphora" calva*** Faber & Moolenbeek, 1991 by its larger protoconch and nucleus, it also possesses two constant cords in the protoconch, a feature missing in ***"T." calva***. It differs from the other new species in having a paucispiral protoconch.

Bathymodiolus brevior von Cosel, Métivier & Hashimoto, 1994 [Family Mytilidae]

One of three new species of mussels from hydrothermal vents in the western Pacific and mid-Atlantic areas. The Genus ***Bathymodiolus*** Kenk & Wilson, 1985 was based upon a new species collected in 1977 at hydrothermal vents on the Galapagos rift (***B. thermophilus*** Kenk & Wilson, 1985). Similar species from Atlantic sites: the Florida Escarpment, the continental slope off Louisiana, the Barbados Accretionary Prism and the mid-Atlantic Ridge are under study. The above species, and the two following are newly described in The Veliger 37(4):374-392 (October 3, 1994).

Specimens of ***B. brevior*** live byssally attached to hard bottom around the hydrothermal vents and occur several layers deep. This species is known from the North Fiji Basin and the Lau Basin, Fiji back arc. The shell measures up to 140mm long, rather thin but solid, somewhat variable in outline, inflated and equivalve. The exterior is smooth, with well-developed, irregular growth lines; some specimens with very faint, broad radial undulations visible on the postero-dorsal slope, bifurcating and thus somewhat reminiscent if the sculpture of ***Brachidontes***. Umbo somewhat flattened.

The periostracum is strong and dark brown (lighter in the umbonal region), smooth, somewhat dull, with no periostracal hairs (but there are byssal endplates of other specimens scattered over the valves). The shell is somewhat stouter and more tumid than that of ***B. thermophilus*** and it has a broader anterior part and longer dorsal margin and ligament while the umbo is placed slightly more posteriorly

Bathymodiolus elongatus von Cosel, Métivier & Hashimoto, 1994 [Family Mytilidae]

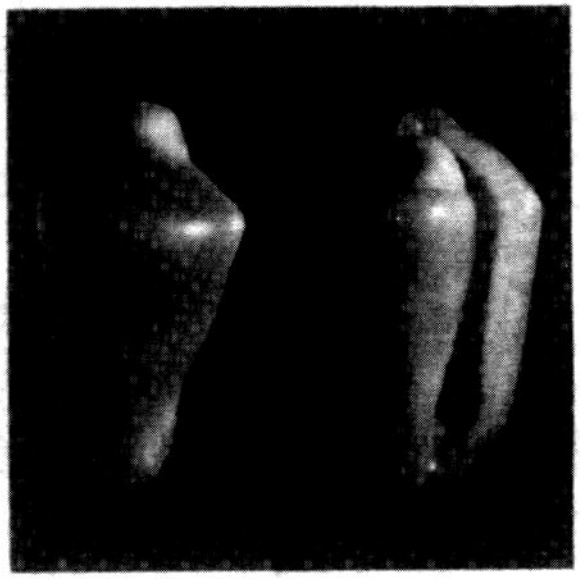
This new species is from the North Fiji Basin. The shell measures up to 155mm and is very thin and quite fragile, elongate-modioliform and in outline generally very inflated and equivalve. The periostracum is strong, light chestnut brown (posterior umbonal region lighter brown), smooth, glossy, with no periostracal hairs (but with byssal endplates of other specimens scattered over the valve). The shell is easily distinguished from ***B. brevior*** by its markedly more slender, more elongate, and more tumid shape; the anterior end is narrower, and the beaks are situated still more backward.

The specimens were found byssally attached to lava around diffuse vents. The habitat is characterized by the absence of massive hydrothermal deposits and by low temperature vent fluids, not exceeding 8.5°C. Slender vestimentiferans, limpets (***Leptodrilus elevatus***), bythograeid crabs (***Austinograea*** cf. ***williamsi***), and galatheids were found in the diffuse vent areas.

Bathymodiolus puteoserpentis von Cosel, Métivier & Hashimoto, 1994 [Family Mytilidae]

This new species was found byssally attached to sulphur blocks immediately around diffuse venting of water in the Snake Pit area of the Mid-Atlantic Ridge. The shell measures up to 119mm long and is quite thin but solid, oval-modioliform, variable in outline and tumidity and is equivalve. The periostracum is strong, dark brown, and rather glossy. The shell outline is roughly similar to that of ***B. brevior***, but even more variable. It is shorter and somewhat broader and a bit more inflated with a longer ligament in relation to shell length than that of ***B. thermophilus***.

von Cosel, Rudo and Bernard Métivier. Three New Species of **Bathymodulus** (Bivalvia: Mytilidae) from Hydrothermal Vents in the Lau Basin and the North Fiji Basin, Western Pacific, and the Snake Pit Area, Mid-Atlantic Ridge. **The Veliger** 37(4): 374-392 (October 3, 1994).



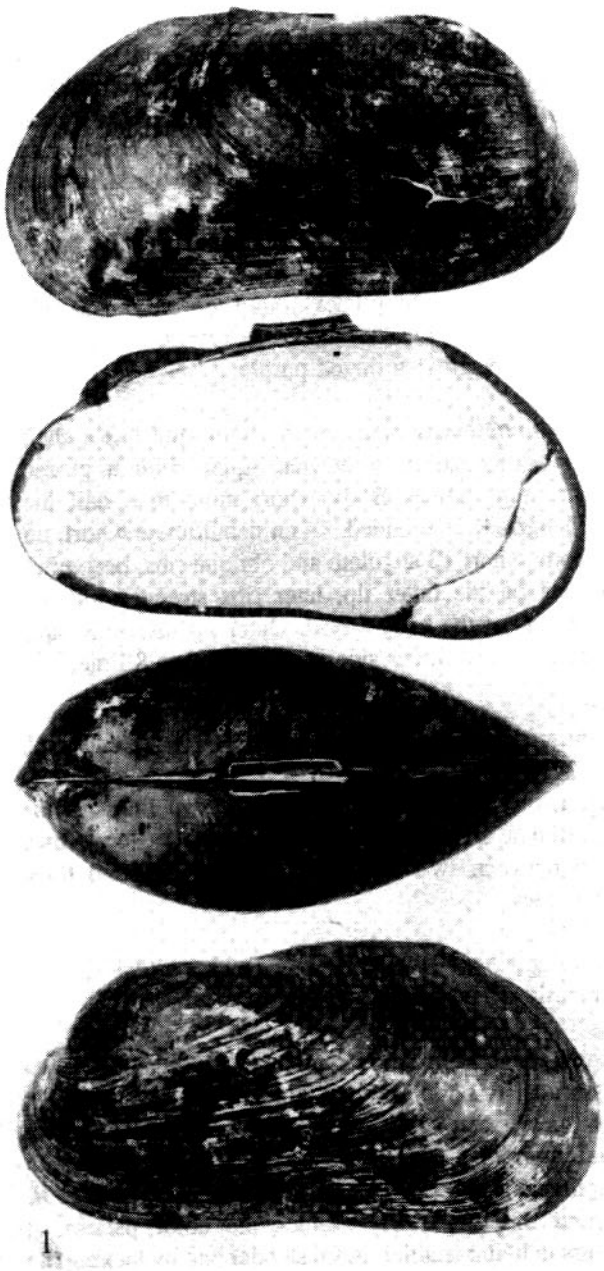
Primovula (Adamantia) horai Cardin, 1994 [Family Ovulidae]

Another new southern Philippine species that has previously been mis-identified as ***P. (A.) rutherfordiana*** Cate, 1974 or as ***Dentiovula masaoi*** Cate, 1973. While the shape of ***P. horai*** closely resembles that of ***P. rutherfordiana*** the most obvious difference is the coloration. The general overall rose pink color of ***P. horai*** contrasts with the milk white of ***P. rutherfordiana***. The yellow encircling line is missing in ***P. horai***, even in a recently discovered albinistic specimen. The new species is named in honor of Mr. Quirino Hora (see photo in Of Sea and Shore 17:2 Summer 1994) of Panglao, Bohol Island, Philippines who had obtained the specimens from deep set tangle nets off Bohol Island. **La Conchiglia** N° 272 (July/September 1994).

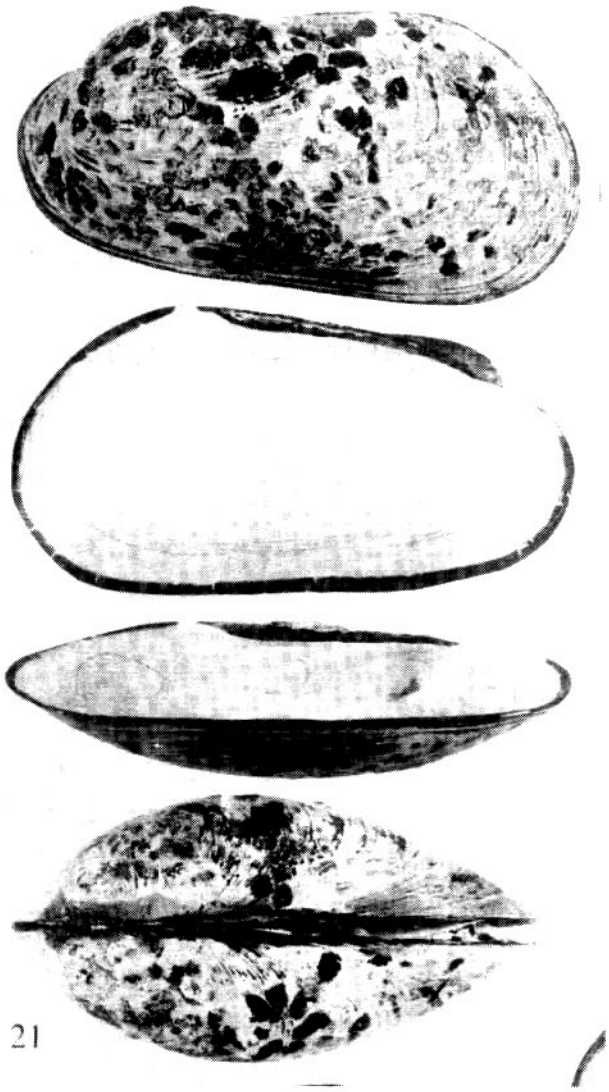
Cardin, Charles. From the Philippines A New "False Cowry". **La Conchiglia**, no. 272 pp. 40-41, July/September 1994.

Opalia garciai Kilburn, 1994 [Family Epitoniidae]

Another new species uncovered by commercial fishermen in the southern Philippines - type locality is off Balicasag Island, Bohol Sea. The holotype measures 45+mm it has a ground color of brownish-white, with random dots of orange-brown and a small blotch of orange-brown behind each varix; varices uniform pale yellowish-buff. Varices are developed from the 2nd teleoconch whorl onward, more or less randomly arranged, usually one per whorl, on some of the early whorls two, but none on the penultimate whorl.

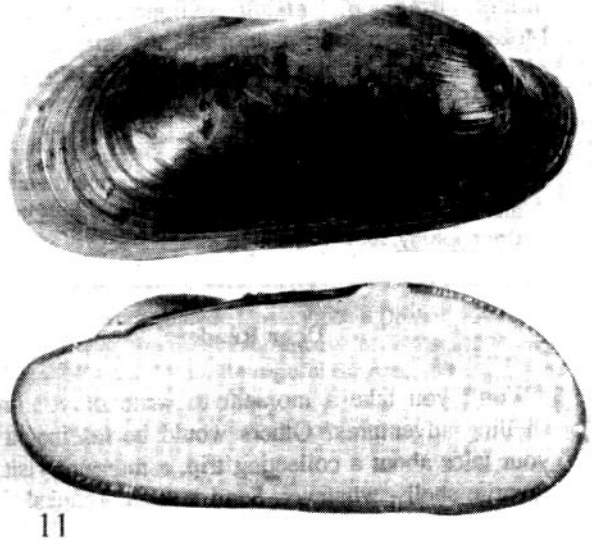


1



21

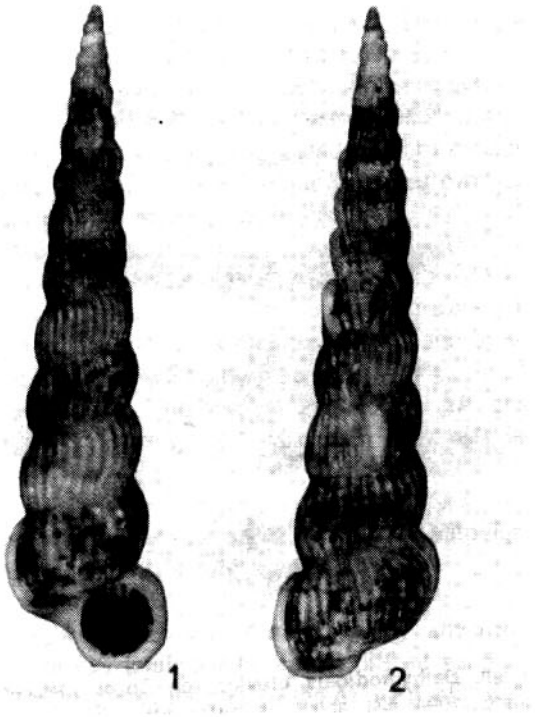
#1 to left: Bathymodiolus brevior von Cosel, Métivier & Hashimoto, 1994; **#21, above, B. puteoserpentis** von Cosel, Métivier & Hashimoto, 1994; **#11 & 12, below: B. elongatus** von Cosel, Métivier & Hashimoto, 1994.



11

12

Sculptured by narrow, arcuate, slightly prosocline axial ribs, not aligned from whorl to whorl, on each whorl terminating above at suture and below at basal cord; 29 ribs on penultimate whorl, 17 (including varices) on 3rd whorl. Ribs and their intervals crossed by microscopic spiral striae and equally fine, wrinkled, more or less axial striae, but where unworn, the surface is seen to bear chalky areas of intritacalx which bear microscopic, spirally arranged pits. Basal disc without axial ribs, although strong growth interruptions are caused by previous varices; microscopically rugulose, caused by spiral striae and wavy axial threads. **Basteria**, 58: 1-2, pp. 49-51.



Kilburn, R.N. Description of a remarkable new species of **Opalia** (Gastropoda: Epitoniidae) from the Philippines. **Basteria**, 58: 49-51, 1994.

Nassarius emilyae Moolenbeek & Dekker, 1994
Nassarius emilyae somaliensis Moolenbeek & Dekker, 1994 [Family Nassariidae]

The area of Oman and Somalia continues to produce new species of mollusca. In **Journal of Conchology**, 35:1, pp. 9-15, a new species and subspecies differentiated from one another in sculpture and color pattern are described. ***N. emilyae*** is from Oman and the subspecies from Somalia. ***N. emilyae*** has a shell measuring from 9-15mm, the first post-nuclear whorl has about 10 strong axial ribs, while the body whorl has 6 rather strong axial ribs on the ventral side, but the dorsal side to aperture is smooth with only vague axial ribbing just below the suture. Under high magnification many minute spiral lines are visible. Columella smooth and shiny. Inner side of outer lip has 5-6 denticles; outer lip has a strong varix and a reflected edge. In color it has a creamy white band below the suture; on the lower part of this band are irregular, black, triangular markings. At mid-body are 5 irregular bands of reddish brown dots. On the ventral side these spiral bands are on a creamy background, on the dorsal side they are on a grayish brown background. Inside of aperture dark grayish tinged purple.

N. e. somaliensis measures 8-16mm and has a shell that is shiny, solid, somewhat squat, with a glazed ceramic appearance. Body whorl more than half the total length. Ribs rounded, 14 on penultimate whorl; on the body whorl 12 angulate and oblique ribs, becoming obsolete on the outer lip, later ribs strongest on the upper part of the body whorl. Outer lip thickened and broadly variced. Inner side of outer lip has 8 lirae.

Microscopic, slanting growth lines all over the shell. Radial sculpture limited to 3 basal cords. Color is cream, one yellow-brown band and two lines on the penultimate whorl; on the body whorl one yellow-brown band between two lines, strongest on ribs and three other lines.

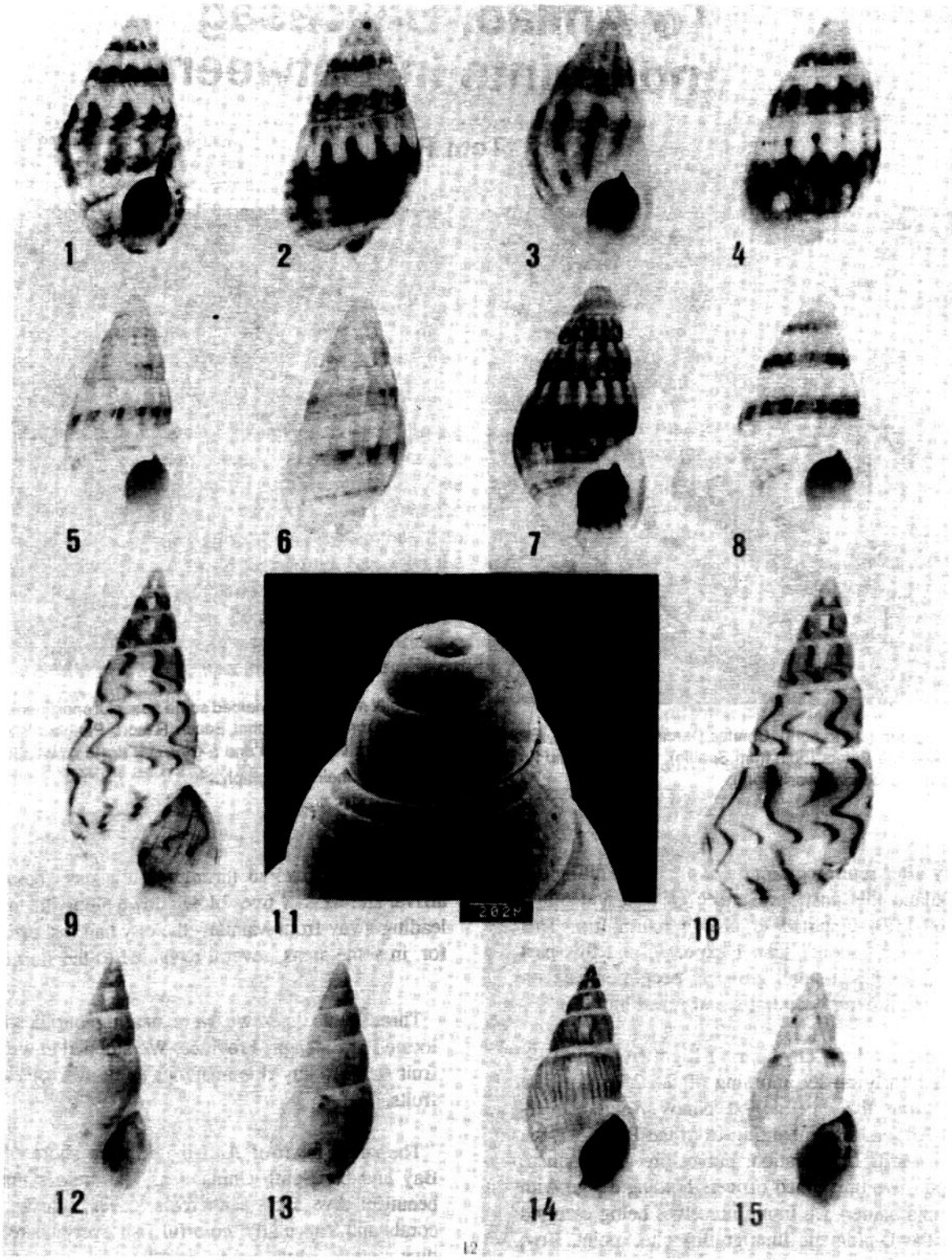
Bullia smytheae Moolenbeek & Dekker, 1994 [Family Nassariidae]

Newly described in the same article as the above two nassariids, this too is from Oman. At first glance the new species can be distinguished by the reddish-brown axial markings. The shell measures about 15mm in length and is glossy. While it lives sympatricaly with ***B. rogersi*** Smythe, 1981, besides the color pattern, it differs in being smaller, more slender and by lacking the spiral grooves on the first post-nuclear whorls. It also differs from ***B. aikeni*** Kilburn, 1978, from Mozambique, in color pattern and the operculum of ***B. aikeni*** is smooth whereas that of ***B. smytheae*** has a denticulate margin.

Moolenbeek, R.G. and H. Dekker. New Nassariids from Oman and Somali (Neogastropoda:Prosobranchia). **Journal of Conchology** 35: 9-15 (1994)

Dear Readers

Won't you take a moment to write of your recent shelling adventures? Others would be fascinated with your tales about a collecting trip, a museum visit, you favorite shell - whatever. Send it soon. Thanks!



Figs. 1-4: **Nassarius emilyae** Moolenbeek & Dekker, 1994. Figs. 5-8: **Nassarius emilyae somaliensis** Moolenbeek & Dekker, 1994. Figs. 9-11: **Bullia smytheae** Moolenbeek & Dekker, 1994. Figs. 12-13: **Bullia aikeni** Kilburn, 1978. Fig. 14: **Bullia tranquebarica** (Röding, 1798). Fig. 15: **Bullia rogersi** Smythe, 1981.

To Anilao, Balicasag and Points In Between

Tom Rice

Our little group (left to right): Charles Cardin (Las Vegas), Ellen Lewis, Blanche Peters (both from Seattle), the author and Fran Arriens (Long Beach, Mississippi).

An early morning tide yielded some beautiful specimens from the reef in front of the Bohol Beach Resort, Panglao Island. Two **Cymbiola vespertilio** and a **Cypraea tigris** crawl about a pan, posing for their photograph.

Shortly after returning from a trip to the Philippines and Thailand this past spring (see Of Sea and Shore 17:2, 109-117), I started to plan a return trip. This happened much sooner than I expected and this past October 23rd saw a small group of people embark on what was to prove a wonderful and rewarding trip.

Following the long (15 hours+) flight from the U.S. we landed early on the morning of the 25th (lost the 24th crossing the dateline) at Ninoy Aquino International Airport. Disembarking from the PAL 747, we headed towards Immigration, but before getting there came upon two uniformed officers holding a sign with our group's name - we found ourselves being escorted through the Diplomatic immigration checkpoint. Boy, didn't we feel important! Of course them we joined the commoners and waited for our luggage like everyone else (didn't get to keep our noses in the air too long). Then a quick trip through Philippines Customs and we were warmly greeted by Fely and Carlos Leobrera (who had arranged for the officers' escort at Immigration).

Luggage and people into an air-conditioned van and we were off to the south of Manila, heading for the Leobrera's resort, Vistamar. A typhoon, the last of the season, had blustered through a few days before our arrival and we saw trees blown down along the toll road leading away from Manila - the city had lost electricity for, in some areas, several days due to the storm.

Three hours later we were nearing our destination, located in Batangas Province. We stopped at a roadside fruit stand to buy ripe mangoes and a few other exotic fruits.

The small town of Anilao is on the shore of Janao Bay and the South China Sea. The area is noted for beautiful dive spots with reefs, caves, wrecks, walls, corals and, especially, colorful fish everywhere. Many dive resorts dot the rocky shoreline. We were to spend the next five days in the area.

It was high tide when we arrived at Vistamar, but that didn't deter several of us from "hitting" the beach, collecting some common upper intertidal shells and checking out a meager driftline. The sun soon set and it was time for the first of many delicious meals - featuring fresh fish and local vegetables - at Vistamar.

Photos this page: to right, some thirty shell shellers sit under two large trees in the beach at Balicasag Island. Below, shells are displayed in baskets and plastic containers. Some nice tangle net specimens can be purchased here at nominal prices, but one needs to know what the shells are that are offered.

Early next morning we boarded a dive boat for the short trip along the shore of the Calumpan Peninsula, then across the small strait to Sombrero Island - the beach here is strewn with large boulders and the remnants of the recent typhoon causing higher than usual surf - we moved on to a protected cove on the shore or larger Maricaban Island. Colorful fish, blue sea starts, long-spined urchins, corals of a multitude of species and, of course, many species of mollusks we observed and a few nice specimens of the latter were taken for our collections.

Following a very rough, gut-wrenching trip back across the strait and along the shore - the afternoon winds and remnants of the typhoon produced waves of 3-6 feet, we returned to Vistamar, showers, a delicious dinner and a cribbage tournament that lasted throughout the entire trip. (I won't mention who started it, or who ended up "champ" - but neither was me.)

Our destination the for the next day's low tide was across Janao Bay to Ligpo Point. Here were boulders and small rocks to turn, a large amount of beach drift to prowl and crystal-clear water to float upon. The day was beautifully sunny with a light breeze to cool us - working that driftline can be hot work!

After the tide turned we headed back across the bay

and as the wind was rising and I am not a boating enthusiast, I had the boatman drop me off at a beach near Vistamar to explore, while the rest headed around Bagalangit Point to a dive spot near the settlement of Mainit. Upon their return I heard glowing reports about the gorgeous coral heads and marine live that lived in the waters off the settlement. Also noted were upwellings of hot water, something the area is renowned for and which occur both on land and underwater - caused by volcanic activity in the area.

Another result of volcanic activity, and a place we visited on a "day of rest" in Lake Taal. A huge freshwater late that occupies the caldera of an ancient volcano, Taal Lake still shows the peak of that ancient volcano in its center. We travel along Tagaytay Ridge, marveling at the spectacular view of the lake hundreds of meters below and have a sumptuous lunch at a hotel perched high atop the ridge. Here we see an excellent troup of dancers performing Philippine national dances, including the one using bamboo poles that are beaten against the ground in rhythm as the dances quickly jump from one side to the other, pulling their ankles away just as the poles are slapped together.

On another day we traveled by truck to a beach between Mabini and Mainit. As we rode along we were constantly greeted with smiles, waves and shouts of "Hi, Joe!" We presumed that since most of the Americans that the Philippine people knew were in the armed forces, everyone who was American was G.I. Joe. This beach was cobbles and difficult to walk along, but teemed with life. Shallow water dives brought up ***Lambis*** and cones of several species, as well as some ***Terebra*** and olives. Several local ladies were working the shoreline, picking up the ***Littorina*** and ***Nerita*** and, upon inquiry, advised us that these mollusks were delicious when steamed with rice. Speaking of that grain - my name always goes over big with people in both the Philippines and Thailand; they usually have me for dinner every day! In the Thai language rice is "kow", so there I'm Mr. Kow!

Our five days at Vistamar seemed to fly by as we worked on gathering a representative collection of shells, took photographs of local flora and fauna and enjoyed the beautiful scenery everywhere we looked. But is was time to head back to Manila and the next phase of the tour.

Our accommodations in Manila were at the year-old boutique hotel - the Palm Plaza. Centrally located just two blocks from the harbor, it was a perfect place from which to visit several shell shops, including the Leobrera's Carfel and those of Mario Macapagal, M. Montilla and Maxilinda Aguilar. Carlos and Fely Leobrera continued their fantastic hospitality and treated our group to dinner at the Manila Yacht Club. We'll all long remember the delicious gambas, the fried calamari, and the pancit we gorged upon.

I'm not certain that we all "shopped until we dropped", but we all had gifts to buy for people back home and the only problem was to decide amongst the many fascinating things we saw just what to buy. We all became more adept at bargaining - seldom paying more than 75% of the original asking prices at the stalls in the "flea market" that was near the hotel.

After two days in Manila, we again boarded a PAL plane for the hour trip south to Cebu. Actually, we land on Mactan Island, then cross a towering bridge to Cebu City and Island. Prudy Ponce, of Far Exports, provides transportation from airport to the Cebu dock where we board an interisland ferry for the four-hour trip to Tagbilaran, on Bohol Island. As on the previous trip we rent cots, blanket and pillow on the upper deck and, those who want to, nap during the crossing. The crossing is smooth and uneventful and we soon reach the dock on Bohol.

We are met at the dock by a van from the Bohol Beach Club on Panglao island, where we'll be staying for five days. Henry, who works at reception, greets us and off we go - we're soon serenading him with our rendition of the Herman and the Hermit's "I'm Henry the Eighth, I am" (I'm certain he was sure that this group of people were certainly concho-loco!) - we seemed, during car rides, to often starting singing snippets of whatever songs came to mind, unfortunately not remembering much in the way of lyrics, but we did have fun! For some reason Philippine van drivers, with the exception of Prudy Ponce, seem to think they're some relation of Mario Andretti and speed across the islands at breakneck speeds, continually honking the horn to warn children, animals, bicycles, motorcycles and other autos of our rapid approach. They seem to be great drivers, though, for in all the travelling I've done in these cars and vans, I've yet to see an accident.

The Bohol Beach Club is an idyllic setting for relaxation and shelling - both done at one's own pace. We were soon in our bungalows fronting the sandy shoreline, talking of the plans for the next few days. We arranged for a panga (a boat with an outrigger) to pick us up in the morning and transport us to a small island off Panglao Town. There were lots of dead shells here to pick over - some very freshly dead with part of the animals still evident - but little in the way of live molluscs, except for some huge ***Littorina*** and a small ***Trochus*** that lived on blades of seaweed in the sheltered cove of the island. Again our return trip turned out to be very rough - Fran and Ellen thought that since I had now survived several rough boat trips that they'd present me with a Bohol Beach Club t-shirt, with the added legend "I survived four boat trips"!

to be continued

CLASSIFIED ADS

(Rates: $0.50 per word single insert; $0.35 per word if prepaid for two or more inserts. Minimum ad 15 words.)

Shells for Sale

Florida Liguus: an old collection, average quality, decent prices, many different localities. HENRY CLOSE; 104 Ansley Villa Drive; Atlanta, GA 30324. (404) 892-6744.

JEANNE DANILKO, retail specimen shells - new free lists. 154 Crowell Rd., Apt. B; Chatham, Cape Cod, MA 02633. Phone (508) 945-1492.

Shells Wanted

Urgently need Cassis madagascarensis. Send details. CASCO, S.R.L.; P.O. Box 85; 80059 Torre del Greco, Italy.

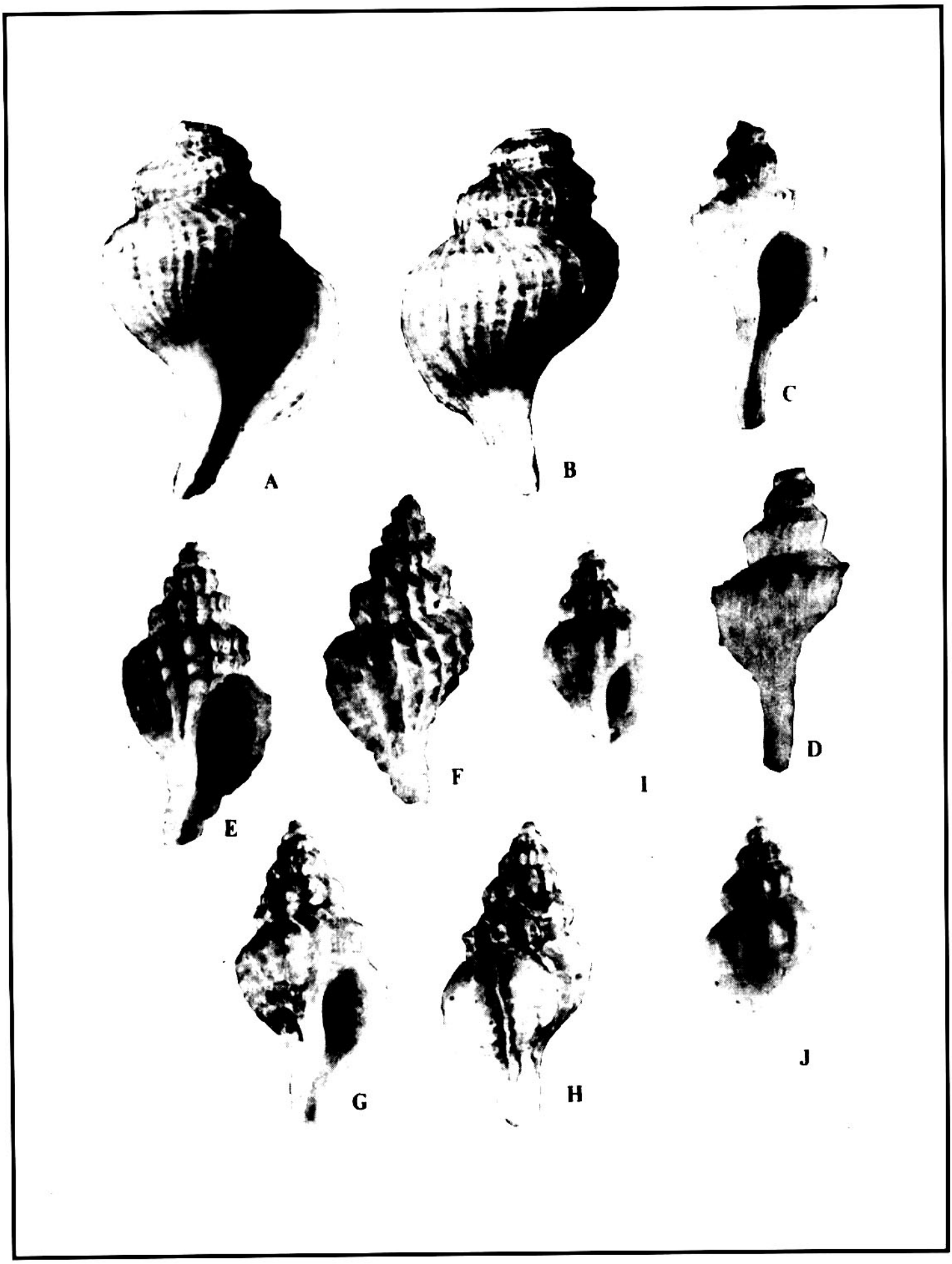
Wanted: Beringius crebricostatus, Neptunea smirnia, Neptunea stilesi, Neptunea ithia and other rare Buccinidae. Will buy or trade. DIRK STRATMANN, Buchenweg 28. 41352 Korschenbroich, Germany. Fax: 49-2161-672727.

Miscellaneous

Shell notecards - five different black and white with envelopes $3.50 plus $1 shipping per set. SHELLART BY KAREN; Karen Couch, 2029 Joann; Newton, Kansas 67114

Books

"A Guide to the Seashells of Sanibel Island" now available for $20.00 (plus shipping) from SUSAN RODGERS; 4270 S. Biscay Circle; Aurora, CO 80013.


A
B
C
D
E
F
G
H
I
J