

# Development Decision Near On Florida's West Coast

By DONALD MOODY

**SANIBEL ISLAND** — Florida State Department of Environmental Regulation (DER) officials are still trying to decide the fate of an increasingly controversial beach improvement project for resort-development property on Redfish Pass between Captiva and Upper Captiva Islands. Both islands, along with better-known Sanibel, form part of a chain of barrier islands along Florida's West Coast.

Lee County (Florida) Commissioners gave the green light for the project after several stormy public meetings early this year. U.S. Army Corps of Engineers held hearings on the proposal to move several hundred thousand cubic feet of sand from offshore sandbars to the resort's shoreline.

State DER officials have indicated that they will probably deny permits for the project, which has been under increasing criticism from environmental groups and commercial fishing interests. They claim the removal of the sand would alter salinity in nearby backbay areas of Pine Island Sound, which the pass connects with the Gulf of Mexico, and cause undetermined environmental damage to the highly productive breeding nursery for shrimp, crabs, crustaceans, mollusks, and a variety of endangered marine animals.

State Department of Natural Resources (DNR) officials have also expressed private reservations about the impact of the "renourishment" on sensitive barrier islands to the north of Captiva. Some feel that the alteration of the offshore configurations of sand-

bars could accelerate beach erosion on Upper Captiva and Cayo Costa, being purchased by the State of Florida as part of the multimillion-dollar Environmentally Endangered Lands Program.

Public hearings were held in April on another increasingly important aspect of the beach project: the developer's application to move the "erosion-control line" seaward of its present location to coincide with the beachfront after "renourishment." A second public hearing on the erosion control line issue was held in nearby Fort Myers after the first hearing on Captiva was heavily attended by Captiva property owners and developers. Attorneys for the developer objected to the second hearing and complained bitterly to legislators and state officials in an attempt to overturn the DNR decision.

The second hearing was attended by citizens who questioned the legal authority of the trustees of the State Internal Improvement Fund to consider a change on the erosion control line on the privately funded project. State law only speaks to "publicly funded" renourishment projects, and environmentalists have charged that the developers are attempting to circumvent some State controls by not involving any public funding.

If granted, such a change would give the developers additional beachfront property at the expense of the public. Some estimates say that the "renourished" beach is worth several million dollars to the developers who are attempting to place the resort complex on the market.

DER officials say they are waiting for the decision from DNR on the erosion control line. DNR officials say they won't act until DER rules on the environmental permits. Attorneys for the developers are continuing to put intense pressure on State officials to make a quick ruling on the project. If the permit is denied, as expected, the developer may challenge the denial through the state's administrative appeals procedure.

The developer's attorneys include a former State administrative hearing officer well versed in the legal and evidentiary procedures of the Administrative Appeals Act. They appear confident of winning their case in that legal forum.

Meanwhile, to the north of Cayo Costa, a monumental legislative battle to protect the tiny barrier island of Gasparilla from the pressures of high-rise development was won in the final day of the 1980 session of the Florida Legislature. A bill sponsored by State Rep. Franklin B. Mann and State Senator Warren Henderson to limit density on the tiny barrier island, freeze all existing zoning, and place severe limitations on building heights was saved in

(Cont'd on Page 4)

# HAPPY BIRTHDAY, BESSIE ARNOLD

No matter how old you feel after a tough day on the reef, you probably don't match Bessie Arnold, one of the organizing members of the Hawaiian Malacological Society and its secretary immediately after World War II. Her 102nd birthday was October 21.



1979 photo

Bessie lives at a care home in Tucson, Arizona, near her daughter, Winnifred Arnold. Three other daughters — Helen Daniels, of Honolulu; Virginia Julich, of Enumclaw, Washington; and Marjorie Hungerford of Seattle — planned to be in Tucson for the birthday or soon afterward.

"Mother still has a sharp eye and a keen mind," remarked Mrs. Daniels. "Her marvelous shell collection is intact, although she has given a few specimens away. My husband and I have a golden cowry, which bears a label saying:

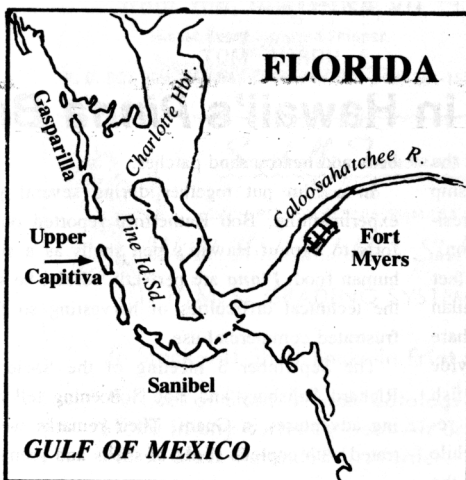
"This shell was given to Bessie H. Arnold in Honolulu in 1950 by Juliette Cooke Melanphy. It was in the collection of her father, Amos Frank Cooke, brother of Charles Montague Cooke (1874-1948) [famed Bishop Museum malacologist]. In 1976, Bessie, 97½, gives this rare shell to her favorite son-in-law, James Ganson Daniels."

"Mother came to Hawaii first in 1917, when my father was stationed at the U.S. Army Schofield Barracks, outside Honolulu. After many transfers she came to Hawaii as a resident in 1935, remaining until 1952. We were here on Pearl Harbor Day in 1941. Mother worked as a volunteer nurse in the military hospitals all through the war."

Mrs. Arnold early developed a keen interest in shells and had an excellent collection by the time she retired to Tucson 30 years ago. Her daughter, Winnie, was the author of *A Glossary of a Thousand and One Terms Used in Malacology*, which was published in *The Veliger* in 1965.



in 1940



# Hawaiian Shell News

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The Society meets the first Wednesday of each month at the Hawaii National Guard headquarters, Diamond Head Road & 2nd Avenue, Honolulu at 7:30 p.m.

### VISITORS WELCOME!

Hawaiian Shell News is issued free to members of the Society. Postage rates have been computed and added to membership dues. Single copies of any issue, \$1.00, postage included. Individual copies of any issue may be obtained, free of charge, by qualified individuals for bona fide research projects.

Members outside the United States are asked to pay with a bank cheque (not a draft) payable to HMS on a U.S. bank. (Be sure your name and address appear on the cheque.)

### HMS DUES FOR 1981

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Advertisements are accepted at the rate of US \$18.00 per column-inch/issue, payable in advance. Discounts are offered for six and twelve insertions. Write to the Corresponding Secretary for information.

## WELCOME TO HAWAII!!

HMS members visiting Hawaii are invited to contact the Society while in Honolulu. Please keep in mind, however, that the Society office is open irregularly, and that it does not have a telephone. Society officers are listed individually in the telephone book. If in doubt, ask the Waikiki Aquarium or the Bishop Museum for names. Better still, write to the Society in advance. The Museum's Karl Greene Shell Room has a good display of both Hawaiian and Indo-Pacific species.

# REEFCOMBING

## Objective? Subjective?

With a recent pack of shell identification cards, Sally Diana Kaicher offered some cogent thoughts on the differences between objective and subjective synonyms in shell taxonomy.

"Dr. Ernst Mayer, in his *Principles of Zoological Nomenclature*, makes this quite clear," she declares. "An objective synonym is a new name for a supposedly preoccupied name, or one based on the same specimen or illustration. No problem. Subjective synonyms, on the other hand, are names based on different type material.

"Big problems sometimes arise when species from widely separated localities and often visibly different are synonymized — sometimes without explanation or any proof whatsoever. One should always bear in mind that such synonymies reflect only one worker's opinion. They are certainly NOT Gospel, engraved on stone!"

\* \* \*

After several years of residence in Australia, HMS member and occasional HSN author R. M. Filmer is returning to England to live. His new address is Winterbourne House, Chobham near Woking, Surrey, England.

Filmer seems to have completed his long-term work on Australian cone shells. He reported that the manuscript was ready to go to the printer "via Bob da Motta in Bangkok." Copies should be available before the end of 1980, he added.

\* \* \*

## Welcome to Hawaii

Recent visitors to Honolulu have included some well-known names in shelldom.

Fred and Marjorie Kleckham, of Seaforth, North Queensland, stopped on their way back to Papua New Guinea from the U.K. They are presently serving as agricultural consultants at Popondetta, on the Solomon Sea east of Port Moresby. They expect to spend the coming year there before returning to Australia and their yacht *Cellana*.

Toshihiko Fujii, of Kitakyushu City, Japan, returned to his home late in August after spending nearly a year in Hawaii. Fujii is a marine biologist

employed by a cultured-pearl enterprise in Western Japan. He enrolled in English-language classes at the University of Hawaii, but found time between lessons to enjoy scuba diving on the Kona Coast of the island of Hawaii. He is a member of the Malacological Society of Japan, as well as of HMS.

\* \* \*

## WSM to Meet in June

The Western Society of Malacologists is a non-profit and educational society founded to promote the study of malacology and invertebrate zoology through the encouragement of research, lectures, publications and acquaintance and cooperation among persons, amateur and professional, interested in these topics.

The 14th annual meeting of the Western Society of Malacologists will be held at San Diego (Cal.) State University June 23 to 26, 1981. The meeting will feature symposia and contributed papers on molluscan topics, exhibits, shell and book auctions, and field trips. All interested persons are invited. For information contact Bruce Fowler, 5512 Blossom Terrace Ct., San Jose, California 95124.

\* \* \*

## Travails of Travel

As Elmer Leehman wrote a few months ago, the best way to save money on rare shells is not necessarily by traveling to the source. HMS member Tony Gabelish of Western Australia visited Mauritius early this year, seeking some of the treasures of that island. While at Port Louis he rented a car, which he prudently parked close to the police station while about his business in the city. On his return, he found a window smashed and his luggage, clothes, camera, passport and stock of shells gone!

The loss of the passport was particularly troublesome, Gabelish reports. Port Louis police were unable to locate any of his belongings.

\* \* \*

## The 1980 HSN Index

Publication of the annual HSN Index has been deferred in anticipation of a five-year 1976-1980 cumulative index, to be ready in a few months. Ray McKinsey continues as Index Editor.

# Under Cover Work in Hawaii's Pinna Beds

"What Goes On in the *Pinna* Bed?" was the theme of the program at the October 1 membership meeting of the Society. Speakers were vice president John Earle, Beatrice Burch and Wes Thorsson.

Pen shells are generally found in 60 to 200+ feet of water along the leeward shores of the Hawaiian islands. The beds not only constitute a large share of the biomass in that habitat, but they provide shelter, food and nursery area for a multitude of fish and molluscs, Earle pointed out. Mrs. Burch reported on the results of dredging research, while Thorsson told of the molluscan species found in the

beds and nearby sand patches.

In a film put together during several years of experimenting, Bob Rutherford reported on his efforts to exploit Hawaii's pen shells as a source of human food. *Pinna* are perfectly edible, he said, but the technical difficulties of harvesting so far have frustrated commercial use.

The September 3 meeting of the Society heard Richard Salisbury and Bob Schoening tell of shelling adventures in Guam. Their remarks were illustrated with copious slides of shells and scenery.

S.L.

# Living Together An Old Molluscan Custom

By OLIVE SCHOENBERG

Echinoderms (starfishes, sea urchins, sea cucumbers) are hosts to several small gastropods (some with attractive shells), crustaceans (shrimps) and even anemones. Some of the animals are parasitic and others symbiotic. The parasitic ones firmly attach themselves to the outside of their host echinoderms or even burrow deep into the tissues, thus making it their permanent home.

Take a close look at the underside of some of the stars, sea cucumbers or urchins. You may find some little creatures attaching themselves or burrowing into the body of the host.

Here in Hawaii, a large red starfish, averaging 12 inches across, sometimes is found in sandy areas from 75 feet to over 100 feet by scuba divers. This star is the habitat of a little porcelanous shell only a few millimeters long. It attaches itself by injecting its mouth parts and even part of the shell itself into the ventral side of these stars. So firmly do they hold on that it is possible to bring them up to the surface from deep water and transport them to an aquarium without their becoming detached. The tiny white shell is of the *Eulimidae* family, *Echineulima robusta* Pease, 1860.

Another little shiny white shell of the *Eulimidae* family is parasitic on black *Holothuria atra* (sea cucumbers), being common on them in certain areas of Waikiki. Clusters of 10 to 20 can be seen on one cucumber. Sometimes they are partially imbedded in the host's leathery skin where they suck out the juices. Because the shells are so slippery they are hard to capture.

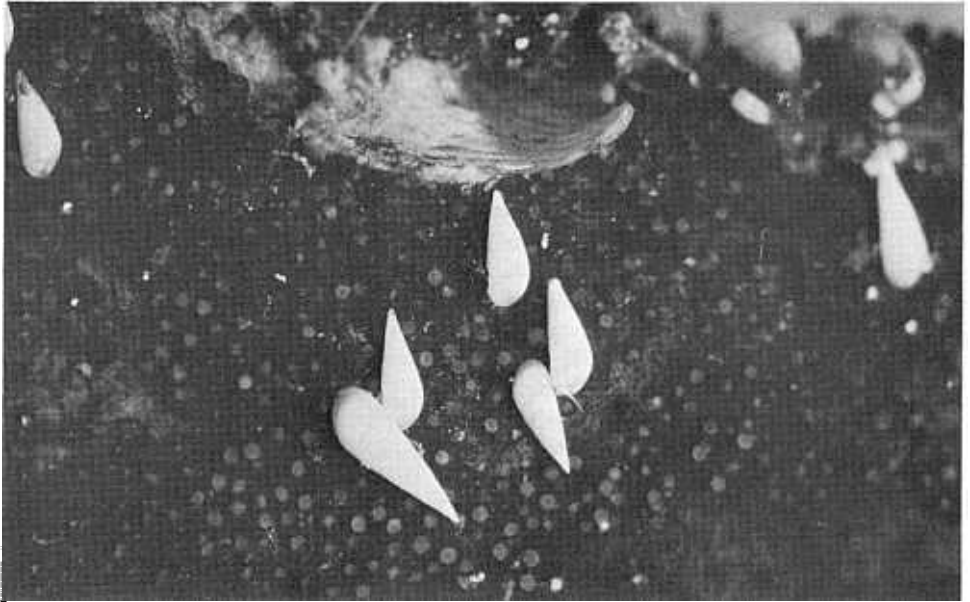
Cidaroidan urchins (the ones with thick, blunt spines) have little shells attached to their spines. A close look reveals *Hipponix* species. If the shell is removed a scar is left on the spine. The longer the parasite lives on the urchin, the deeper the scar becomes. The shell attaches itself permanently to its host, spending its entire life there. The older the cidaroid, the more parasites it has on its spines.

*Linckia*-type starfish have little parasitic shells attached to their "arms." One of these shells is *Stilifer linckiae*, a cone-shape shell of about 5mm average height. They, too, dig deep into the flesh of the starfish host. Female stylifers are several times the size of males. The male attaches himself to his female, making sure she never gets away.

In rare cases another pretty little shell parasitizes *Linckia* stars — *Thyca crystallina* Gould. If one carefully detaches the *T. crystallina* from its host and peers into the soft parts (with a magnifying piece) one might find a tiny male, barely a millimeter in size. What they don't go through for a little sex!

Two species of *Stilifer* live on the long-spined urchin, *Echinothrix diadema*. One is about 10mm long and a little more bulbous than those that live on sea cucumbers.

Some shells spend part of their time living with another host and part of their lives just plain roam-



Above — a group of parasitic *Eulimids* on the underside of a *Holothurian*. Leeward Oahu, Hawaii. Below — Two *Vexilla vexillum* (Gmelin) live comfortably among the spines of a sea urchin, on which they feed, Oahu. Right: a single *Thyca crystallina* (Gould) is firmly attached to the arm of a *Linckia* starfish. Madang, Papua New Guinea

Photos: Schoenberg



ing around under rocks, in sand, or on the reefs. A striped black and brownish-pink shell, *Vexilla vexillum* (Gmelin, 1791), a member of the *Thaididae* family, is sometimes found among the pink spines on the ventral side of the urchin, *Echinometra mathaei* Blainville, a shallow water species. They appear to use the urchin as a sanctuary and are probably not parasitic. Only at certain times of the year have I found them with urchins. Most of the time *V. vexillum* are found living under rocks farther out in deeper water. The shells are often inhabited by hermit crabs. Possibly *vexillum* move



into shallow water and hide under the urchins when spawning. There is sometimes more than one under an urchin — one large and one small shell. Kay in her *Hawaiian Marine Shells* reports that *V. vexillum* feed on the helmet urchin, *Colobocentrotus atratus*. A photo shows the mollusk inserting its proboscis into the urchin.

A purple, elongated shrimplike creature is occasionally found living among the spines of a deep-water urchin with long, lethal looking pink or purple-black spines. The skinny shrimp attaches itself head first to the body of the urchin and lets its body wave in the currents and sway with the fine spines, thus rendering itself almost invisible. In this habitat it certainly seems to be well protected from predators. It is possible to irritate the shrimp off its host, but it cannot tolerate life alone and soon dies.

#### References

1. Reef and Shore Fauna of Hawaii, Edmondson, 1946.
2. Hawaiian Marine Shells, Alison Kay, 1979.
3. Hawaiian Shell News: April 1963, July 1964, March 1964, Feb. 1968, May 1968, Dec. 1968, April 1969, Feb. 1979.
4. Pacific Sea Shells, Tinker, 1958.

## Dept. of Acute Embarrassment — Harpa Div.

By ELIZABETH KINLOCH

POOL-IN-WHARFEDALE, U.K. — My copy of *Hawaiian Shell News* for September 1980 has just reached me. "Harpa Happenings" (page 3), had two separate references by two very knowledgeable collectors to the locality given for one of my shells, a *Harpa costata*.

I immediately looked up HSN April 1980 to see what had been written about this shell. My interest turned to embarrassment when I found myself quoted as saying that this *H. costata* had been found "north of Mombasa," in Kenya.

(I must explain that my April HSN arrived while I was away in South Africa visiting our daughter. When I returned a large pile of mail had accumulated and HSN was at the bottom. Normally I read it from cover to cover at least twice but, with urgent matters to deal with, on this occasion I merely flipped through the pages and put it aside for perusal at my leisure. Alas, the issue remained buried until now.)

To set the record straight, the quotation was inaccurate. I must disclaim "Mombasa, Kenya" as a range extension of *Harpa costata*.

The truth is that I obtained the shell in South Africa during an earlier stay there. I had visited an elderly Afrikaans woman with scant knowledge of shells but who simply loved them for their beauty. She had a room with shelf after shelf full of shells from all over the world — no data, many beach-worn and quite a few broken, but she loved them all!

Among a dozen harp shells in one corner, I identified just one *H. costata*. Would she exchange it for anything else? She replied, "Yes, for something pretty!"

So I went home and filled a large chocolate box with the most colorful shells among my "swops," arranging them very carefully to enhance their color and beauty. Next day I returned with my offering. The old lady was delighted with my selection, and willingly parted with the only shell in her large collection which I coveted — my first *Harpa costata*.

This is the shell figured in HSN April 1980.

The mistake in locality apparently arose during my subsequent (September 1979) visit to Hawaii. I talked with many fellow members of HMS about many shells, including my treasured *H. costata*. It would have been all too easy for a misunderstanding to have occurred.

Blame it on the editor! He should have checked the quotation with Mrs. Kinloch who, by the time it appeared in HSN, had returned to England.

Our apologies, all around.

## One on the Right, and One of the Left

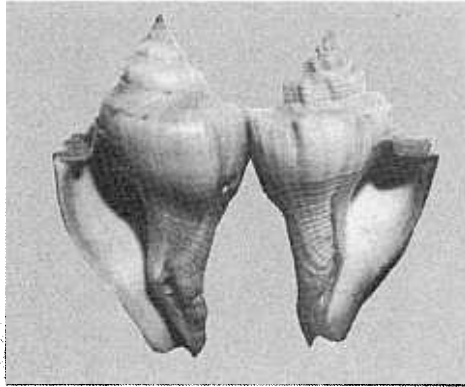


Photo: Derry

### FLORIDA — (Cont'd from Page 1)

an eleventh hour appeal and passed by the legislature.

A similar measure passed the previous year after a bitter battle on the floor of the State House between members of the local legislative delegation. That bill survived intense special-interest lobbying and repeated appeals to Governor Bob Graham to veto the measure, only to be ruled unconstitutional on a technicality.

Lawmakers are confident that the measure will survive constitutional challenges this year. Gasparilla straddles the entrance of Charlotte Harbor and borders on three major aquatic preserves.

State DNR officials have also approved the first regulations for the Biscayne Bay Aquatic Preserve in Dade County (Miami) and are presently conducting public hearings on rules and regulations for the State's other 35 preserves. The State of Florida created and designated sensitive marine areas throughout Florida as aquatic preserves in 1975. But actual rules to regulate development activity, commercial and recreational pressures on the resources, and use of the preserves, were never promulgated — rendering the aquatic preserve act ineffective to accomplish its main goal of protecting the State's valuable marine resources.

"The big environmental battles in Florida have been fought and won during the early seventies," noted one prominent environmentalist. "But the real battle — to develop the administrative rules and regulations necessary to protect what we have won — is just beginning."

The Board of Trustees of the Southwest Florida Conchologists Society endorsed legal petitions from the Sanibel-Captiva Conservation Foundation and others to force the State to undertake the rule-making effort. Resolutions of support for the legal petitions were forwarded to the State Department of Natural Resources, Governor Graham, and local lawmakers, many of whom have been extremely supportive of the effort.

*Volva (Pugilina) cochlidium* Linne, 1758 a member of the Melongenidae, is found across the Indian Ocean from Madagascar and Mauritius to Western Australia and the Darwin area. *Volegalea wardiana* Iredale is a synonym. This pair — one specimen dextral and the other sinistral — was procured recently on Mauritius. There were no data with the "straight" shell, but the left-handed one bore a note that it had been found off Madagascar in 20 to 30 feet of water on sandy grass bottom.

Both are now in the collection of HMS member Cid Derry, of Fullerton, California.

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## The Stormy Life of the Limpet

By GLADYS C. CORPUZ

Three Archeogastropod species of the family Patellidae endemic to Hawaii, comprise the Hawaiian delicacy 'opihi'. They are *Cellana exarata* Reeve, locally known as *opihi makaiaūli*, *C. sandwicensis* Pease ('ālinalina), and *C. talcosa* Gould (kō'ala). Subtle morphological differences such as the shell thickness and height, ridge sculpture, and color of the foot, as well as specificity in habitats, are characteristics used to identify these species.

All three species live on exposed wave-beaten rocky shores in Hawaii and may co-occur on the same shorelines, such as at Halawa Bay on the island of Molokai. *C. exarata* lives on the supratidal zone, feeding on microalgae and young thalli of macroalgae on the rocks. *C. sandwicensis* lives lower on shore, on the intertidal rocks where the strongest wave action constantly beats. *C. talcosa*, the largest of the opihi, live subtidally, but extend their ranges to the lower areas occupied by *C. sandwicensis*.

*Cellana exarata* seems to range the farthest, extending from the big island of Hawaii to Gardner Pinnacles, a span of about 900 miles. *C. sandwicensis* is not known to occur north of Necker Island, but is present down to the big island of Hawaii.

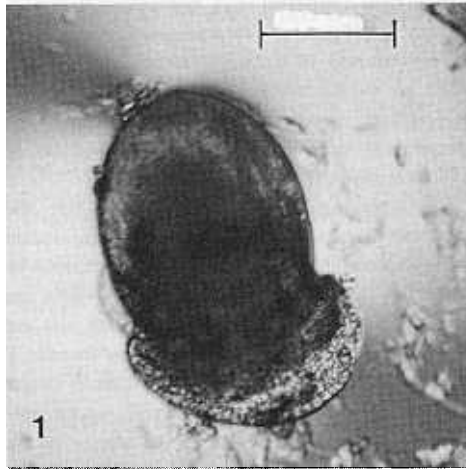
Like many Archeogastropods, *Cellana* spp. are broadcast spawners. They shed their eggs and sperm into the sea where fertilization and development take place. The fertilized egg develops rapidly into a swimming trochophore larva which becomes a pelagic veliger in a few hours by growth of a helmetlike protoconch.

In *C. exarata*, settling requires a hard surface covered with a film of algae and in water well aerated. The occurrence of opihi only on wave- and surf-beaten rocky shores attests to the specific physical and biological requirements for settlement and habitat selection in these species.

Settlement is soon followed by metamorphosis from a swimming veliger to a crawling juvenile. The most outstanding feature observed is the appearance of a "brim" on the protoconch lip marking the development and growth of the adult limpet shell.

*Cellana exarata* reared in the laboratory from egg to maturity reached a growth rate of 3.5mm per month during the third to sixth months of age. Sexual maturity occurred six months after fertilization at 18mm shell length. In nature, adult growth rates, observed by Dr. E. Alison Kay, decreased after sexual maturity by about 2mm per month. It is safe to assume that the same trend will occur when animals are reared in the lab.

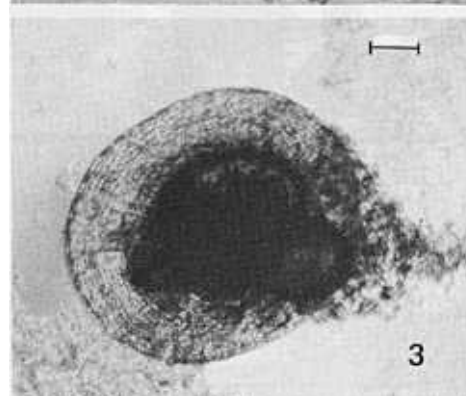
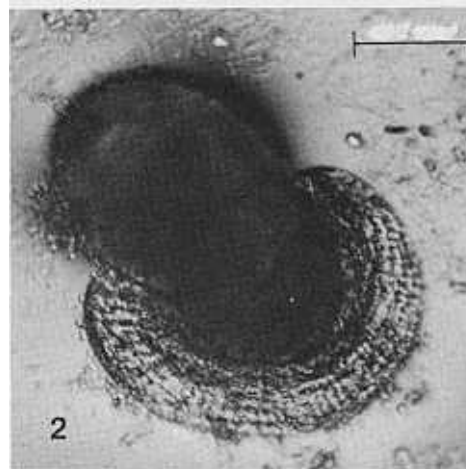
If commercial culture of opihi becomes a reality, production to marketable size (about 40mm shell length) can be estimated conservatively to take one year and three months.



Juveniles of *Cellana exarata* (Reeve) grazing on microalgae growing on glass settling plates. Two to three whorls of patelloid shell growth form a brim on the helmetlike protoconch lip. On the six-day-old (1) the patelloid limpet shell does not encircle the protoconch aperture completely. Figures 2 and 3 show progressive growth of the patelloid shell at eight and ten days respectively. The 10-day-old has complete whorls. The protoconch will be shed at about the 19th day.

The bar in each figure represents 0.1mm.

Ms Corpuz last year received a grant from the HMS Scholarship Fund to assist in her study of the edible limpet in Hawaii. Photos: Corpuz



## HMS Shell Auction Is Called 'Tops' in Quality and Variety

The HMS Shell Auction scheduled for October 25 (while this issue of HSN was coming off the presses) is likely to be without precedent in the variety and value of shells offered.

After deductions for hall rental and minor expenses, the returns from the sale are to go to the HMS Scholarship Fund, which in the past three years has distributed nearly \$10,000 among students of malacology.

Three weeks before the auction date, Sale chairman Wes Thorsson reported that donations of shells had been received from 30 individual HMS members in all parts of the world, and from a dozen important dealers. The latter are identified by the phrase "Auction Donor" in their ad in HSN.

"Donations were received from virtually every corner of the world," declared Thorsson. "England, Germany, Ascension Island, Italy, Spain, South Africa, Australia, New Zealand, India, Thailand, the Philippines, Canada, the Persian Gulf, half a dozen U.S. states and, of course, Hawaii were represented.

"Most areas without donors were covered by well-wishers in other parts, so that we have an excellent worldwide collection of shells for sale.

"In several instances, we got complete sets of cones and cowries. A member in Spain sent us a whole collection of shells of several families. In this instance, as in others, it appeared that the donor had made a selection from his entire collection.

"And I must say that our advertisers outdid themselves in selecting shells for us.

"As auction chairman I received queries from a number of members regarding the quality of the shells to be offered. HMS donors definitely gave high-quality shells. I expect that they will be very much in demand.

"It is extremely gratifying to be in charge of an event receiving such splendid support and cooperation."

Society members who donated shells as individuals included:

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## More on *Agaronia lutaria* Roding

By ROWLAND F. ZEIGLER M.D.

MURRELLS INLET, SC — An attractive member of the olive family was sent me by HSN Associate Editor Elmer Leehman in 1977 for identification. I recognized it as *Olivancillaria subulata* Lamarck (HSN Feb. 1977).

HSN Science Consultant Walter O. Cernohorsky advises that the correct name is *lutaria* Roding and that the appropriate generic group is *Agaronia* Gray (HSN July 1980).

I thank Cernohorsky for his information, which my own recent research indicates is absolutely correct. The name *lutaria* Roding has priority and the generic group is *Agaronia*.

The proper name for the illustrated Indonesian species thus is *Agaronia lutaria* Roding, 1798. Probable synonyms are *subulata* and *luteola* Lamarck, 1811; *modesta* Reeve, 1850; *barthelmyi* Ducros, 1857, and *lutaria*, *carita* and *cauta* Marrat, 1871.

Many authors (Thiele, etc.) considered *Agaronia* to be a subgenus of *Olivancillaria*. John Burch, however, writing on the genus *Agaronia* J. E. Gray, 1839 (*The Nautilus*, Vol 77 (4), April 1964) pointed out that the genus *Agaronia* (1839) had priority over *Olivancillaria* Orbigny, 1840.

If either is to be made a subgenus of the other, he declared, the genus should be *Agaronia*.

I agree with Cernohorsky that species of *Olivan-*

*cillaria* have a different shell morphology than does *Agaronia*, and that both deserve generic status.

The opinions of both Thiele and Burch were based on radular similarities. In classifications, if only animal characteristics are considered and shell morphology ignored, imagine the problems of paleontologists a few million years hence!

The genus *Agaronia* includes species from the American West Coast, West Africa and the Indian Ocean, according to Cernohorsky. To this should be added the east coast of South America where the well-known *A. travassosi* Morretes, 1938 and the little-known *A. orbigny* Marrat, 1868 are found.

There is at least one exception to Cernohorsky's comment that the species of *Olivancillaria* are confined to South America. West Africa has one dainty little species, namely, *O. nana* Lamarck, 1811. It once was placed in the genus *Micara* Gray.

### WHAT'S IN A NAME?

In a note to the editor with the above material, Dr. Zeigler raised a minor point that seems to have worried other HMS members: what are the preferred spellings of the names of Linneaus (Linne) and Roeding (Roding)? The answer is, either.

The great Swedish naturalist wrote in Latin and consequently signed his works with the Latin form of his name — Linnaeus. The modern tendency, however, is to use the Swedish form — Linné, with a diacritic over the e. Either is acceptable in current writing.

The German scientist spelled his name Röding,

## The Color Plate

The color page with this issue of *Hawaiian Shell News* is the Society's annual present to members all over the world. It is a reproduction from Reeve's *Conchologia Iconica*, published in November 1850 in London. As noted in the lower left corner, the drawing and engraving were done by G. B. Sowerby II.

*Oliva*, Pl. 1 figures *Oliva angulata* Lamarck, 1811, today put in synonymy with *O. incrassata* Lightfoot, 1786. Color of this species is variable, ranging from dove gray to brown. Other forms of *O. incrassata* vary from gold to pure white to glossy black.

This color plate is copied from a volume of *Conchologia Iconica* in the Rare Book Collection of the University of Hawaii.

with an umlaut. Since non-German printers seldom have ö in their type fonts, it has become the custom to substitute oe. The ICZN long ago accepted this as a legitimate alternate in species names.

Now comes *Hawaiian Shell News*. For purely mechanical reasons we prefer "Linné" and "Röding." We carry this a step further by dropping the diacritics, which our printer would have to add by hand — if he remembered! We feel that the reference is still perfectly clear without them.

We are not adamant, however. If a submitted article refers to Roeding, we usually leave it that way.

S.L.

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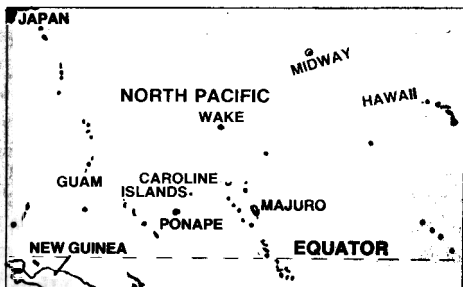
# TO PONAPE FOR GUESS WHAT?

Seeking cheap thrills or something, three veteran HMS members — Wes Thorsson and Ray McKinsey of Honolulu, and Bob Purty-mun of West Point, Cal. — two years ago visited Majuro and Ponape atolls in the Central Pacific. They spent their first week on Majuro, on which they reported in HSN May 1979. Then they made the flight to Ponape. Let Wes and Ray take it from here:

By WES THORSSON and RAY MCKINSEY

From Majuro we flew westward to Ponape with the idea of comparing shell populations. Air Micronesia made the trip quickly and comfortably, with a brief stop at Kwajalein en route.

Ponape is more isolated than Majuro in many respects. Our first indication of this fact was the tiny customs inspection area where — contrary to



the practice elsewhere — each arriving passenger is joined by welcoming relatives, making for very joyous confusion.

This confusion was somewhat heightened in our case by the failure of our scuba air tanks and Bob Purty-mun's dive bag to come off the plane. By the time it has been established that our gear was on its way to Truk (at no extra cost), all ground transportation had left the airport. Anyhow, in the meantime we had learned that the hotel where we had reservations had closed its doors!

But Ponape is full of friendly people. We were given a ride into town with our considerable baggage, while the airline people called around on CB radio (there is no phone system on the island) to find accommodations. By happy chance the Village Hotel had a cancellation. We stayed there.

Equally luckily, the Village Hotel operated the only nongovernment dive shop on the island. Since it also had dive boats for rent, the location was obviously desirable.

As we all know, shellers tend to be viewed with scepticism, if not actual distaste, by nonshellers. Ponape's hotel people followed that tradition. Of course, we did have with us the results of a week's collecting at Majuro, which might have prejudiced them. Read Patti's note.

Everything was in a rather large box. We had cleaned large shells, such as *Lambis*, as well as possible, then stuffed toilet tissue into the apertures. Other specimens were treated by simply stuffing paper into the apertures and wrapping closely. Shells were then sealed into double ziplock bags. Several of these double bags were then placed in a larger envelope and sealed. This procedure minimizes on-site cleaning problems and normally gets everything home safely, but it by no means eliminated the smell.

Ponape is a so-called high island (as opposed to the low atolls) with hills approaching 1600 feet. Rainfall is plentiful most of the year, more or less eliminating any worry about arriving during the wet season. The island itself is roughly circular and about 10 miles in diameter. A barrier reef lies from one to five miles offshore.

The lagoons have room for a vast fleet of large ships, but they contain many reefs that are barely submerged — an enchanting sight from the approaching airplane or from a hilltop.

The lagoon shoreline is mostly mangrove swamps, but access to the water is possible at a number of points by car. About one third of the island is served by roads. Most roads are paved with material dredged from the lagoon. We were able to collect quite a few shells in the roadways.

In the mangrove we found a number of *Cerithium* species. The shallow water near shore (reasonably clear except after heavy rains) had *Cypraea tigris*, *C. lynx*, *C. erroneus*, *C. moneta*, *C. annulus*, *C. vitellus*, *C. eglantina* and *C. caurica*. At the time of our visit (May) *Conus magus* were busy laying egg masses for the future.

Our week-long stay at Ponape involved daily boat trips to the outer reefs, where we stayed on the lagoon side. We found the vicinity of Mant Passage (see map) particularly attractive. The outer reef there is about a half mile wide and usually covered by one to five feet of water, in which small sharks were occasionally seen.

The bottom on the lagoon side drops quickly to 10 to 20 feet with prolific coral, including some very colorful types we had not seen on other islands. The coral was not particularly rich with shells, however, but we did find several species of zigzag oysters (still unidentified) growing on the whip coral and coral heads. *Haliotis varia* also were found in this range.

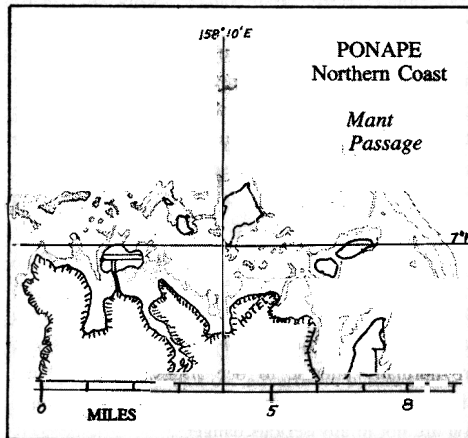
In the sand at the base of the coral, and down the slope toward the pure sand area 50 to 90 feet deep,

*your shells had begun to rot & odor was attracting flies, so we have removed box from your room. It is under your house.*  
Patti

was a profusion of small *Nassa sarta*, *Strombus gibberulus*, *S. mutabilis* and *S. luchuanus*. *Cerithium asperum* were in the sand at all depths in a great variety of shell patterns from pure white to banded to dotted. Miter and *Vexillum* hunting was good in the sand, also.

At least once each dive, sharks of substantial size went past us, adding interest to the area.

We sampled the tops and slopes of patch reefs in the middle of the lagoon. Results were about the same as on the outer reef. Near an abandoned sea-plane ramp on one offshore island we found numbers of *Conus marmoreus*, *Cypraea tigris* and an as-yet-unidentified *Cerithium* species.




The inner shore of the island immediately west of the seaplane ramp seemed an unlikely place, but we made a dive there, anyhow, until the murky water and the prospect of visits by our gray-suited friends finally got on our nerves. With our aqualungs, we continued the search in about three feet of water, which at least let us stand and yell when we found something!

Again there were plenty of *Conus marmoreus*. Wes insists that it was the best area in Ponape for cowries. (He found four *C. staphylaea*, a single *C. hirundo* and a *C. kieneri*, as well as the usual *annulus*, *moneta*, *erosa*, *errones* and *tigris*.) Ray and Bob contend that the area was the worst.

In the sand of Mant Passage we encountered what must be the largest garden eel "farm" in the world. Eel holes were situated about one foot apart for several hundred feet, in water ranging from 20 to at least 100 feet. It was fascinating to watch the eels disappear into the sand as we approached, then reappear about 10 feet behind us as we swam along.

Packing another fairly large box with Ponape shells, we closed out our venture with a spirited discussion at the airport over whether we had seats on the plane, which has been overbooked out of Truk. We made it, however, and soon were headed for Honolulu.

In the end, we discovered that Ponape had given us more shell species than we had realized — 28 *Conus*, 20 *Cypraea*, 17 bivalves, 10 *Terebra*, 3 *Cymatium*, 4 *Strombus*, 8 *Cerithium* and a mixed bag of 27 *Mitra/Vexillum*, for a total of 150 species.



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THE AUSTRALIAN GAUGE

# OUCH!

By TOM RICHERT, M.D.

Just about anyone at the beach or on the ocean is subject to sunburn and jellyfish-type stings. Usually, however, only shellers suffer from a special kind of sting — that inflicted by cone shells. Let us spend a moment considering prevention and treatment.

First, cone stings are not limited to the inexperienced. A moment's carelessness is all it takes for anyone to get "zapped." So, never take a cone for granted. Treat it with respect!

While diving or reefcombing, wear a rubber or plastic-coated glove. Never place a cone inside your wet suit or swim suit, no matter what species. They all can sting — although, fortunately, few do. And don't plunge your bare hand into your "goody bag" if it contains a cone.

Cone stings can be very toxic. It isn't only the infamous *geographus*, *striatus* and *tulipa*. Even Hawaii's minute *C. obscurus* packs a real wallop. A good rule of thumb is: Don't trust any cone with tent markings.

If you or someone in your party is stung, scrape the sting site with a knife blade or something similar to remove the "dart." You won't be able to see the stinger without a lens. You can also suck at the wound — or get someone else to do it.

Take an antihistamine. Any kind will do — even the "cold cures" such as " Contac " or " Coricidin . "

The sting site — and possibly your whole arm — will be sore for several days, and you may have a numbness in your fingers for weeks. But unless you are normally allergic to bee stings, or have been "hit" by one of the known lethal species of cone, you are not in any serious danger.

## Pass the Pills

Dear HSN: Philadelphia

I agree with Dr. Tom Richert on the need for taking precautionary measures against sunburn (HSN Sept. 1980). There is an excellent product called "Sylvasun," made in England, which we and many others have used with great success in the Caribbean. Two tablets a day, starting a day or two before exposure begins, effectively prevents severe — and even mild — burn.

The active ingredients are vitamin A and calcium carbonate. You could probably get the same amounts of these by eating half a dozen carrots and some stone-ground tortillas daily.

Unfortunately, this product has not yet been approved by the U.S. Government, and thus is sold only in non-U.S. territories. So, until "Sylvasun" is available here, shellers would do best to follow Dr. Richert's advice.

Jerry Donohue  
Professor of Chemistry  
University of Pennsylvania

The editor was happy to receive Donohue's letter, if only as a reminder of earlier days in East Africa where "Sylvasun" was available and commonly used. Whether it really prevented bad sunburns, we were never sure, but we believed.

There was also a widely accepted rumor that — in case you couldn't get to the beach — taking "Sylvasun" regularly at the office would give you a healthy tan, anyhow! S.L.

## Hot and Cold *Marginella rosea*

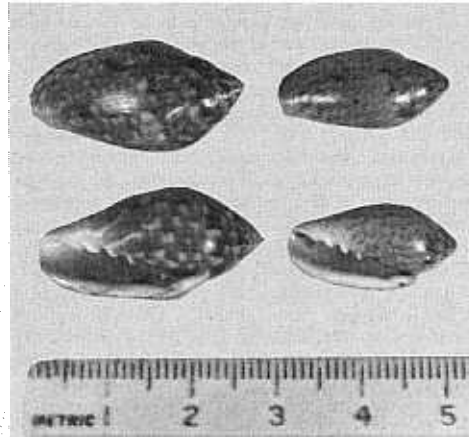


Photo: Chapman

*Marginella rosea* Lamarck is found in two forms along the shores of southern Africa — one type twice the size of the other.

HMS member Helene Boswell of Pretoria tells me the warm-water variety is much the larger. It is found on the eastern (Indian Ocean) side of South Africa. The smaller form comes from the colder Atlantic waters on the west coast. They are the same species.

The smaller cold-water form figured on the right is from Table Bay, Cape Town, on the Atlantic. The larger warm-water type was collected near Simonstown, on False Bay — only about 30 miles from Cape Town but facing eastward on the Indian Ocean.

Is water temperature alone responsible for such a size difference?

Elmer G. Leehman

## Speaking of Books

CONCHS, TIBIAS, AND HARPS. By Jerry G. Walls. 191 pp. West Neptune, N.J.: T.F.H. Publications.

Reviewed by Olive Schoenberg

Jerry Walls' third shell book, following *Cowries* (with Dr. John Taylor) and *Cone Shells; a Synopsis of the Living Conidae*, is a survey of the Strombidae and Harpidae. It fills a need for anyone who collects strombs and harps, and should be in the library of all shell collectors.

*Conchs, Tibias, and Harps* is the first comprehensive treatment of the two families since some of the early sections of *Indo-Pacific Mollusca* — now out of print.

Walls is a master of organizing his material so that one does not have to search all over the book, or turn to the index, to find the description of a particular shell. Descriptions are back-to-back with figures. All photos are in color — well reproduced in almost every instance. Identification of a new shell is easy.

Illustrations include a number of live animals, including a front-cover figure of a *Strombus vomer hawaiiensis* Pilsbry, taken by HMS member Scott Johnson. Rather than showing outstanding specimens, Walls has figured "average" shells. And he has not attempted to show every variant of a species, while noting that the strombs and harps are

extremely variable.

In his introductory section, Walls briefly discusses the two families, the development from egg to adult, anatomy and physiology. Maps showing the distribution of each species are helpful, even though they are rather generalized.

The volume is handy size (5½ by 9 inches), with a clear vinyl cover on the binding that will resist both dirt and salt water. It will be an easy book to carry on the reef.

*Conchs, Tibias, and Harps* appears to include most of the established members of those families, but I am told that it does not include some of the most recently described species. My only actual complaint is at Walls' use of the word "conch" for members of the Strombidae. Actually, conch means a shell of any sort; "Stromb" might have been a better popular name.

But why quibble? *Conchs, Tibias, and Harps* is a much-needed volume — a "must" for both beginners and advanced collectors.

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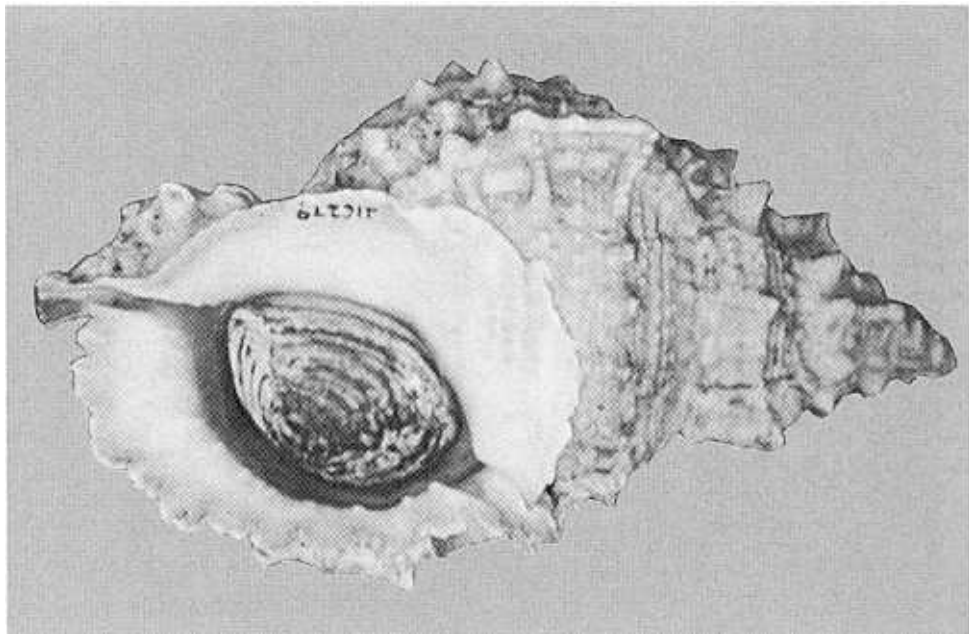
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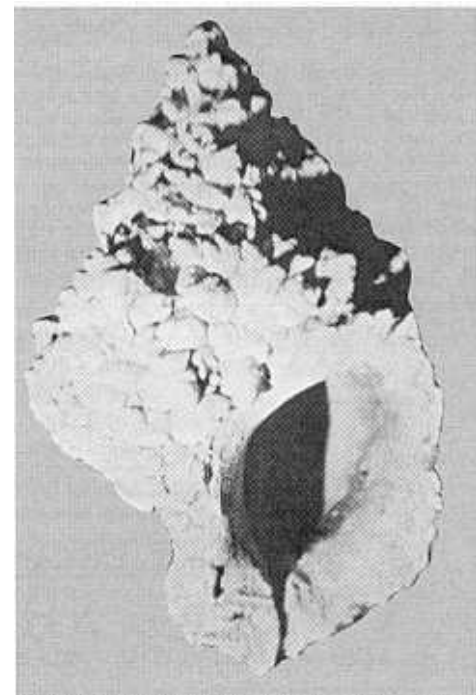
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In her *Hawaiian Marine Shells*, Dr. E. Alison Kay notes that *Tutufa bufo* (Roding) — well known throughout the Indo-West Pacific — is a rare deep-water species in the Hawaiian Islands, known from a unique shell from a depth of 200m. That lone Hawaiian specimen was dredged alive about 1960 by the research vessel *Pele* from a munitions-dump area south of Honolulu. (The military could do such things in those days!) It now is in the personal collection of C. S. Weaver.

In July, 1980, while trapping molluscs for the B.P. Bishop Museum of Honolulu, the crew of the modern research vessel *Easy Rider Too* brought up a crabbed specimen of *T. bufo* from approximately 35 fathoms near Maro Reef, in the Leeward Hawaiian Islands.

So, it appears that the species can tentatively be regarded as a resident of Hawaii. S.L.



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# Why So Much Confusion?

By ANNE WILSON

PRETORIA — After reading the article, "Conus Descriptions Aren't Improving," by Dr. Alan J. Kohn (HSN May 1980), I must ask why — if people are supposed to use names currently accepted under ICZN rules — is there so much confusion on shell names? So many synonyms, name changes, and all that. Is the ICZN an international body? Where is it to be found? And what do the initials stand for?

One cannot keep changing the names of his shells, especially if it is a large general collection, as mine is.

I have Jerry Walls' Cone Shells. Our rare *Conus gradatulus* Weinkauff was named *C. altispiratus* Sowerby iii. It would be so much easier if the countries of the world could work together on this.

### An Editorial of Sorts in Response to Anne Wilson

ICZN stands for the International Commission on Zoological Nomenclature, a nongovernmental group with headquarters in London. Scientists of many nations are members of the commission, which is supported financially by scientific bodies around the world.

That Ms. Wilson is not alone in her perplexity at the frequent changes of shell names (carried out "in accordance with ICZN rules") is evidenced by the stream of articles, comments and letters received by HSN in response to Associate Editor Elmer Leehman's criticisms of the way the ICZN rules work in the real world.

As HMS members must be aware, Leehman proposes the creation of some new system to regulate the publication of new species names. Whether and how this can be done within the ICZN system is uncertain.

Malacology is only one branch of zoology, and it has been alleged that other branches are not suffering from the seeming chaos that plagues shell names. To a considerable extent this reflects the truly astounding general interest in shells and the vigor of scientists and laymen alike in exploring the world of malacology. But if our problem is unique, it suggests that it may be something we have created for ourselves.

No one is forced to accept a shell name, old or new. Nor is the mere publication of a new book a compelling reason for changing name tags in your collection. In the case of South Africa's *Conus gradatulus* Weinkauff, it was Jerry Walls' opinion that the shell is merely "the slender non-nodulose form" of *C. altispiratus* Sowerby. Ms. Wilson is at liberty to disagree with Walls. The data slip need not be changed (although it probably would be helpful to add in pencil, "form of *C. altispiratus*,

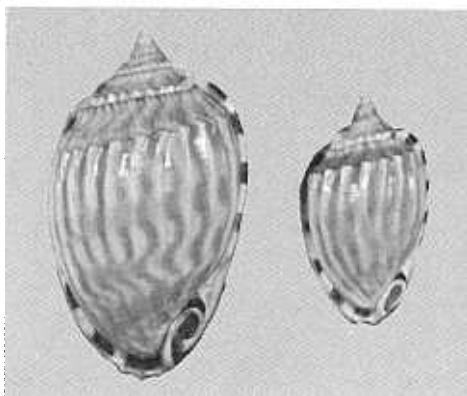


Photo: Chapman

*Cassis (Phalium) fimbria* Gmelin, 1791 is probably the rarest member of the family. The precise habitat is unknown, although live specimens occasionally are washed up on the beaches of Mauritius. The two figured above measure 3-3/4 and 2-1/2 inches respectively. The smaller has its operculum, but they are without data.

E.G.L.

according to Walls").

In the same way, a cowny collector may agree with Dr. C. M. Burgess (a "lumper") that there is only one *Cypraea guttata*, or he can follow Luigi Raybaudi Massilia (a "splitter") in establishing subspecies (HSN June 1979). Neither author necessarily has the last word. The collector is free to choose.

(An important factor, of course, is uncertainty as to exactly what defines or separates species.)

There are dark hints that the present system is being perpetuated by those who offer "rare new species" for profit. Perhaps the only sensible response is to ask: How many collectors do I know who actually have let a dealer sell them a "rare new species" they didn't want?

The difficulty with shell names is real, but the responsibility does not lie exclusively with the ICZN system, any more than automobile fatalities are the consequence of traffic laws.

Stuart Lillico

### Boards of Review?

BRISBANE — The International Commission on Zoological Nomenclature should have some sort of infrastructure of authority in each zoological field (entomology, malacology, etc.) to review proposed new species and subspecies. Ours would be the "Malacological Board of Review," I suppose. It should include at least six top malacologists.

Proposed new species would have to be submitted to the board for consideration at least one year prior to proposed publication. No species which had not been passed would be acceptable. This would sort out proposals that violate the spirit of the ineffective ICZN rules.

Thora Whitehead

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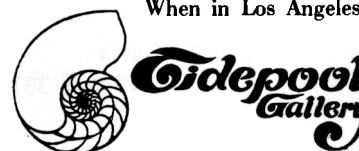
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**THE OTHER SHELL CLUBS:**

**Florida Societies Get Set for 1981 Shows**

The Southwest Florida Comchologist Society at Fort Myers is sponsoring the first U.S. shell show of the 1981 season. The club will open its fourteenth annual show at the Fort Myers Exhibition Hall on Friday, January 9, to run through Sunday, January 11.

Show Chairman William Shaw has sent out letters to other clubs, inviting members to participate in the show, as exhibitors or as visitors.

Dr. R. Tucker Abbott and Mr. and Mrs. Robert Wagner will judge the scientific displays. Mrs. Cecelia Abbott, Mrs. Lucia King and Mrs. Sue Robertson are to judge the artistic exhibits. The judges' dinner will be Thursday evening, on the eve of the opening.

Other Florida shell shows scheduled for early in 1981 include:

Jan. 16, 17, 18. Astronaut Trail Shell Club.

Jan. 29, 30, 31, Feb. 1. Greater Miami Shell Club.

Jan. 30, 31, Feb. 1. Sarasota Shell Club.

Feb. 6, 7, 8. Broward Shell Club (Pompano Beach).

Feb. 7, 8 or 14, 15. Ft. Myers Shell Club.

Feb. 13, 14, 15. Palm Beach County Shell Club.

Feb. 20, 21, 22. Naples Shell Club.

Feb. 26, 27, 28. St. Petersburg Shell Club.

March 5, 6, 7, 8. Sanibel-Captiva Shell Club.

End of July or beginning of August. Jacksonville Shell Club.

Potential visitors to Honolulu next year might mark their calendars to show that the Hawaiian Malacological Society has scheduled its 1981 Shell Show for the weekend of November 13, 14 and 15 in the Pacific Ballroom of the Ilikai Hotel, Waikiki. Anderson Butler is the show committee chairman.

**Getting Away to Herm Island**

By GRAHAM SAUNDERS

To the average British shell collector Herm Island is the native counterpart of America's Sanibel. This island really offers the chance to get away from it all. Although in season there is a daily surge of tourists, these usually stray no farther than the gift shop and cafe. There are just two vehicles on the island, and both are agricultural.

Herm, one of the smaller of the Channel Islands, can be reached only by boat from Guernsey which does have air and sea links with England and France. There is a single hotel and several self-contained cottages which are rentable on a weekly basis. I would recommend two or three days at the hotel and a week in a cottage. One does tend to put on weight quite seriously at the hotel, where the food has to be experienced to be believed!

Herm is shaped like a wedge of cheese, sloping from sheer cliffs at the southern end to a flat shelf of sandy soil to the north. The central belt contains various buildings and a farm with scattered eucalyptus forests. The tidal rise and fall is impressive, exposing sheer cliffs and areas of rock, mud, zoster, gravel and sand.

On the northeastern quarter of the island, sand is building and now forms probably 20 per cent of the island's land mass. At high tide, it absorbs sea water like a sponge, releasing it as the tide falls. At low tide, the lower shore is covered with sweeping shallow streams only one to two inches deep, which twist their way through sand flats carrying with them a selection of living bivalves and an occasional *Natica*. Most of these will be larger species such as *Lutaria angustior*, *Venerufus rhomboides auria*, *V. pullastra* and *V. decussata*, *Tellina crassa*, *Venus serrucosa*, *V. casina* and *V. fasciata*, *Ensis arcuatus* and *Spisula solida*.

While one may stand at a strategic spot and select



specimens as they flow past, a better range of colour forms may be obtained by working slowly over the whole length of the beach. All these species are quite palatable. *Venus casina* has the best flavour. *Spisula solida* is rather indifferent.

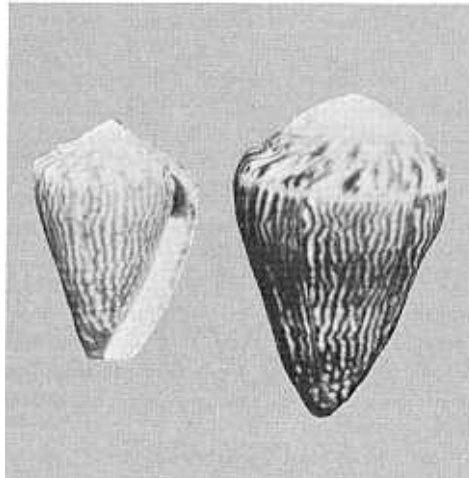
A spring low tide will expose beds of shell gravel full of smaller gastropods and bivalves. In algae-covered gravel, one may find colourful *Gibulla magus*. Nearby, but on rocks, you can find *Calliostoma zizyphinum*, but these are not such attractive specimens as those from Havoilet Bay over the water in Guernsey. *Haliotis sp.* are usually found under boulders at more than four feet below the best minus tides, and are heavily depleted by the locals for culinary purposes. Closed seasons are imposed when the population drops below a certain level.

At high tide, the high-water mark should be examined for the smaller bivalves such as the rare *Tellina donacina* and *Gari tellinella*, *Turrids*, *Velutina*, *Natica*, etc. If you are interested in land snails, these may be found in quantity in the sand dunes.

From National Capital Shell Club Newsletter

## NEWS OF NEW SPECIES:

## Hawaii's Ancient Cone Finally Has A Name



Photos: Carlson

By WM. BRUCE WELLS

A mysterious, long-neglected and now extinct member of the Conidae finally has been given a valid name and status appropriate to its position as an endemic Hawaiian species. The step completes a process that has been going on for at least 50 years (HSN July 1978).

Dr. Alan Kohn, professor of zoology at the University of Washington (Seattle), a long-time HMS member and certainly one of the world's leading experts in the Conidae, formally named and described *Conus kahiko* in the *Journal of Paleontology*, Vol. 54, No. 3, May 1980.

Kahiko, in the Hawaiian language, means ancient, the remote past, or a very old person. In addition, it carries the connotation of ornamented or dressed in fine cloths.

"The word thus appropriately describes the only extinct, endemic Hawaiian species, of *Conus*, a shell with a richly ornamented color pattern," wrote Dr. Kohn.

Although known for half a century or longer, this shell has never enjoyed the privileges and convenience of an internationally accepted valid name. Dr. Kohn has performed remarkable (and laborious) detective work in delving into the confused ramifications of its taxonomic history.

But why the lengthy hiatus since 1975, when it was rediscovered, before validation as a distinct species? For the answer, the reader is referred to Dr. Kohn's classic article, "Conus Descriptions Aren't Improving" in HSN May, 1980. This should be required reading for all malacologists, amateur and professional alike.

Dr. Kohn explained that a good description must distinguish a proposed new species from ALL previously described species in the genus. For *C. kahiko*, he has done his best to do just that, and very successfully, in my judgement. The whole article occupies 7½ pages, including 30 references, with the systematic paleontology and description of the species comprising the major part of the content. I can only attempt to summarize the high points of the article here.

The description alone, which includes detailed morphometric data, occupies three columns. Under the subheading, "Differentiation from similar spe-

cies," some 2½ columns explain why *C. kahiko* is truly different and distinct. Kohn states that although Jens Ostergaard (1928, 1939) reported on 62 species of fossil gastropods from Oahu (Honolulu) and an additional 25 species from Maui and Molokai, he did not refer to the subject cone. No specimens are present among fossil material he deposited in the Bishop Museum in Honolulu.

H.C. Alexander collected specimens in the 1930s, however, including the only previously catalogued museum specimen to Dr. Kohn's knowledge. It is in the Bishop as "*Conus alexanderi* Bart. Coll. by H.C. Alexander, gift from H.C. Alexander, Oahu, Mokapu, Paratype 1."

"This suggests that Paul Bartsch, who undertook a study of Hawaiian marine mollusks at the U.S. National Museum in 1936 (Rehder, 1973) intended to publish a description," Kohn writes. However, he never did (Ruhoff, 1973), the name attributed to him is a nomen nudum, and no specimens studied by Bartsch are in the USNM."

Kosuge illustrated the species in 1969 in the *Bulletin of the Natural Science Museum in Tokyo*, but identified it as *C. chaldaeus* (Roding).

Most known specimens of the new species were collected from the so-called Waimanalo Formation on the windward (eastern) side of Mokapu Peninsula, Kaneohe, Honolulu. Measurements by several investigators using radiogenic methods on corals, coral limestone and shell material (species unspecified) from the Waimanalo Formation establish the age of the eight-meter Waimanalo ancient shoreline at  $122,000 \pm 7,000$  years before the present — contemporaneous with the last (Sangamon) interglacial transgression. Kohn describes several lines of evidence to support the hypothesis that *C. kahiko* lived chiefly on intertidal benches.

Kohn has concluded from his study that all previously described Hawaiian fossil gastropods belong to extant species. Of the 162 species listed by Kosuge in the most recent review of Hawaiian fossil molluscs (1969), eight no longer are found living in Hawaii, but they occur commonly in more central parts of the Indo-West Pacific. Kosuge also listed six species that now occur rarely in Hawaii, but rather commonly in the Indo-West Pacific. As Kosuge pointed out the fact that these 14 species characteristically occur where sea temperature is higher than in Hawaii suggests that Hawaiian sea temperatures were higher when they occurred there.

Several independent investigations signify that maximum temperatures during the Sangamon Inter-glaciation were  $0.5-1^\circ\text{C}$  higher than at present, and  $5-6^\circ\text{C}$  lower than at present during the subsequent

maximum (Wisconsin) glaciation. More recent studies, however, have suggested that during the last (Wisconsin) glacial maximum (about 18,000 years ago) August sea surface temperatures in the vicinity of Hawaii were only about  $2^\circ\text{C}$  lower than at present. Intertidal animals, subject to lower air temperatures during winter low tides, might have succumbed to such temperature changes during a time of maximum glaciation and become extinct, but the gastropods that Kosuge (1969) listed as now extinct in Hawaii are primarily subtropical species.

Kosuge also listed five gastropod species endemic to Hawaii that occur here both living and as Pleistocene fossils. *Conus kahiko* does not fit this category either. Dr. Kohn concludes that it probably speciated in Hawaii, perhaps differentiating from an early propagule of *C. chaldaeus*, thrived during the last interglaciation, and subsequently became extinct. *Conus kahiko* is thus the only marine gastropod species thus far identified that is both endemic to Hawaii and extinct there.

As always, some questions remain unanswered, of course. What actually caused *C. kahiko* to become extinct? And why the remarkable state of preservation when all the other fossil shells from the same formation are bleached, chalky, and eroded? The answer to this one could be very useful to present shell collectors.

My own observations at Mokapu Point strongly suggest that *C. kahiko* was present and thriving at the time of the eruption and formation of Ulupau Crater, on the northeastern tip of Mokapu Peninsula. Whether any members of the species survived this event is open to question. In any case, live animals apparently did not persist to any appreciable degree later than about 120,000 years ago.

No shallow-water mollusc, of course, could be expected to survive a drop in the sea level of more than 300 feet, which is what occurred during the earth's last period of glaciation. Could the population have migrated seaward as the sea gradually fell? The answer, if there is one, must lie in the offshore sediments.

And why did *Conus kahiko* occupy such a restricted habitat in the first place? Ah, there's a good question.

## HSN ADVERTISING RATES

The HMS Board of Directors at its October meeting voted an increase in advertising rates for *Hawaiian Shell News*, equal to approximately 20 per cent across the board.

Display space will cost \$18 per column-inch per issue, effective with the January 1981 issue. It has been \$15 since the mid-1970s. Discount rates for six or 12 insertions per year will go up proportionately.

A revised schedule to replace the present ad card will be available early in November from the Corresponding Secretary.

The Directors agreed that the present rates will remain in effect for all 1981 advertising for which payment is received by 31 December 1980.

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