

THE

FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 PM

President: Jules Hertz
 Vice President: Joe Bibbey
 Recording Secretary: Ann Schwarz
 Corresponding Secretary: Jeanne Pisor
 Treasurer: June Bellmer
 Editor: Blanche Brewer

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Vol. IV

January 1973

No. 1

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 Program for January 18, 1973
 Collecting in Tonga - Filmed and Narrated by Twila Bratcher

CHRISTMAS PARTY

The club's annual Christmas party was held again at Miramar Naval Air Station, on Friday, December 22nd. Forty-one members and their guests gathered in the Red Room of the C.P.O. Club to celebrate the holidays and to install the new club officers for the coming year. There was a relaxed and enjoyable Happy Hour before dinner was served. The tables had already been beautifully decorated by the Club, and Ivan and Agnes Thompson added our own special atmosphere with colorful sea fans and shells that sparkle such, only at this time of the year.

Seated at the head table were all incoming and outgoing officers. The ladies were presented with orchid corsages, and the gentlemen with carnation boutonnieres. Norm Currin, as Master of Ceremonies, thanked each retiring officer for the time and effort expended the past year in behalf of the club, and welcomed each of the new officers as he introduced them. Both Clifton Martin, retiring president, and Jules Hertz, incoming president, spoke a few words. Special appreciation was expressed to Blanche Brewer who, as editor, has devoted so much time and worked so hard to make our publication, The Festivus, the success it has been. Dr. George Radwin made a special presentation to Blanche of a set of beautiful drawings by Anthony D'Attilio, in appreciation.

After dinner, the gaily wrapped shells brought by members were selected by each member from under the Christmas tree. This is always fun; and this year we received a special bonus of some of the shells that had been arranged for WSM last summer, so each couple also drew an extra surprise shell package.

After a very pleasant evening, some called it a day, while the more hardy ones joined other couples dancing in the ballroom and made a really long evening of it. Our appreciation to Nola Michel and Carole Hertz, to Dave Mulliner as photographer, and to the Thompsons for helping to make it such a happy party and an enjoyable ending to another successful year for the club.

THUMBNAIL SKETCHES OF OUR NEW OFFICERS
by David Mulliner

Jules Hertz is our new President. He became interested in shell collecting when Carole and he found a large shell on Pt. Loma. On checking with the library they found it was an Astrea undosa. Shell collecting seemed like a good family hobby, and especially if beautiful shells like this could be found in the tide pools. They joined the San Diego Shell Club in 1966. Jules is an avid trader and has made many trading friends throughout the world. Their beautiful collection is of world-wide marine shells. Jules especially likes to search the grunge for minute shells. The hobby is enjoyed by Jules, Carole and their children, Ruth and Suzanne. They have collected locally, in Florida, the East coast, Hawaii, Mexico and along the Pacific coast into Canada.

Joe Bibbey is Vice-President. As a youngster in Missouri, Joe collected fossil shells in the limestone quarries. His interest in shells continued and when the Navy sent him to the Philippines in 1953, he started collecting marine shells. In Hawaii he joined the Hawaiian Shell Club in 1959. He has collected in Florida, Samoa, Australia, Japan, Fiji and the Gulf of Mexico. His main interest is in Cypraea, Cones and Volutes. Joe joined the San Diego Shell Club in the summer of 1970.

June Bellmer is Treasurer. June's interest in shells was visual--she was captivated by the beautiful shells--but she had never collected until several years ago when she was in the Florida Keys with her husband, Harold, and sister. They kept seeing conchs hung up in yards. She and her sister went out wading and found some conchs themselves--then Harold, snorkeling along nearby, found a big, perfect shell and held it up and said, "Is this what you are looking for?"

Later, in Texas, they joined the San Antonio Shell Club, where several members helped them get their collection started. They have collected in Florida, Puerto Rico, Texas, Japan--and Harold flies them to collecting places in Mexico in their own plane. The hobby is a family affair. They joined the San Diego Shell Club in 1971.

Ann Schwarz is our Recording Secretary. Ann's interest in shells came from her father who collected shells in the south Pacific during W.W. II. In 1970 Ann and her husband, Richard, started their own collection. She did quite a bit of typing for Art and Emma West who paid Ann in shells. They have collected locally and on the mainland of Mexico. Their collection is world wide, obtained by trading, collecting and buying. Shell collecting is a family hobby. Their favorite group is Cypraea. Ann and Richard joined the San Diego Shell Club in 1971.

(Jeanne Pisor, our corresponding secretary is continuing from last year and was interviewed in the Festivus, Jan. 1972.)

AN EVENT OF UTMOST IMPORTANCE

Did you know that Mary worth went "shelling" early in the morning this month and found, tossed up on the beach, a "candy stick tellin" a "Glory of the Atlantic" cone and a "Closter spindle"?

NEWS ITEM

The San Diego Union of December 10, 1972 tells of the finding by a lifeguard of a two foot long poisonous tropical sea snake Pelamis planturus off San Clemente, California.

This snake is usually not found north of the tip of Baja Calif. since it is said that it cannot survive in water cooler than seventy degrees. Hopefully, the explanation that it was probably brought here by accident in fishing nets and released unnoticed during the cleanup of tanks is true!

AN UNUSUAL FIND

by Carole M. Hertz

While snorkeling in the San Diego Mission Bay entrance channel in August 1972, I found what I believe to be rather unusual. I was gathering urchins for the Bursa californica in our tank when I picked up a Lytechinis pictus, the brownish-white spined urchin. The urchin looked somewhat deformed until I realized that its strange shape was caused by a barnacle, Balanus (Megabalanus) californicus, Pilsbry which was cemented to it. I'd noticed this barnacle many times on the sand dollar Dendraster excentricus but this was the first time I'd ever seen one on an urchin.

I placed this united twosome in a tank (one without Bursa) where for several weeks we were able to observe the restless "plume" (cirri) of the barnacle as it traversed the aquarium on its traveling companion.

The barnacle and urchin were donated to the San Diego Museum of Natural History where they were identified by Arnold Ross, Curator of Paleontology.

Balanus on Lytechinis
Enlarged approx. 4-5X



FROM THE MUSEUM

The November meeting, called to order by the President, William Michel introduced the speaker for the evening, Dr. Fred Zezen, who talked about shells he had collected while diving. Many of his shells were shown along with sea urchins and purple coral he had collected while diving at Farnsworth bank, off Santa Catalina Island, California.

Movies were shown that had been taken by Al Riddings off Twilight Reef, off the Yucatan Peninsula. Many different kinds of fish and sponges were shown. Some of the underwater scenes were filmed in a depth of two hundred feet and showed fantastic corals, sponges and many different kinds of tropical fish.

IN MEMORIAM

Sorrowfully, we report the passing of William E. Naylor on November 9, 1972 Mr. Naylor was a well known West coast collector and dealer for many years, and was a charter member of the San Diego Shell Club.

We deeply regret that news of his death did not reach us in time for notification in the November issue of the Festivus.

He wrote several articles on collecting in the Gulf of California and in the Mission Bay of pre-dredging years. Some of these were contributed to the News of the Western Association of Shell Clubs, of which this club was a member.

Below is a reprint from the issue of January, 1962.

FOOT AND TOE COLLECTING

W.E. Naylor

Quite a number of years ago when I was in La Paz, Mexico, collecting shells, I had an order for Murex recurvirostris (now called Murex recurvirostris lividus). However, I was unable to find a single live shell. At this time I met a big Mexican Indian by the name of Jesus. He said that he knew where there were plenty of these small Murex.

The following day the Indian and I went in his canoe about two miles into the estero. Jesus then hopped overboard into water which was about up to his shoulders. He tied the canoe rope around his waist and started walking. He dove several times but could not find any shells. However, he said that when he got to where there were some his feet would find them.

After he had been walking for about fifteen minutes, he brought up one big foot to the side of the canoe. And to my surprise there were three Murex stuck to the skin of his foot. He then started walking again and every few minutes his foot would come up with from two to six shells stuck to it. We continued with this procedure and I asked him if his feet were sore. He said, "No", and that God had given him good feet; and throughout the day I did not see any blood.

This was the most unique way of collecting shells that I ever had the chance to witness.

NEW MEMBERS

Dr. M. Frank King
859 East Vista Way
Vista, Calif. 92083
724-3790

Sammy Baugues
4133 Violet St.
La Mesa, Calif. 92041
465-9618

Francisco Fernandes
Av. Alm. Americo Tomaz 49
Bro. Sta. Barbara-Luanda
Angola, Africa Portuguesa

CHANGE OF ADDRESS

Gordon & Helen Robilliard
4955 Niagara St. Apt. 11
San Diego, Calif. 92107
222-0997

Dues are payable for the year 1973-1974. They can be sent to June Bellmer, 4680 W. Talmadge Dr., San Diego, Calif. 92116 or paid at the business meeting.

LOG OF THE AMERIPAGOS EXPEDITION - CONCLUSION

By Dave Mulliner

In this last installment of the log, we continue traveling on a fishing boat from island to island in the Archipelago, Galapagos. We collected molluscs by diving on hookah and tanks, snorkeling, and shore collecting. There are very few good shore collecting places in the islands, as most shorelines are solid rock or sand with very few turnable rocks. All of the collected specimens were preserved in alcohol or buffered formalin.

March 21 - We left Plaza before dawn for Baltra, stopping at North Seymour to take pictures of the swallowtail seagulls, frigate birds, and blue-footed boobies. worked part of the trip setting up the dredge. At Baltra, we collected by hookah and snorkeling,-- Carolyn and I on scuba. We saw many colorful fish and feather worms.

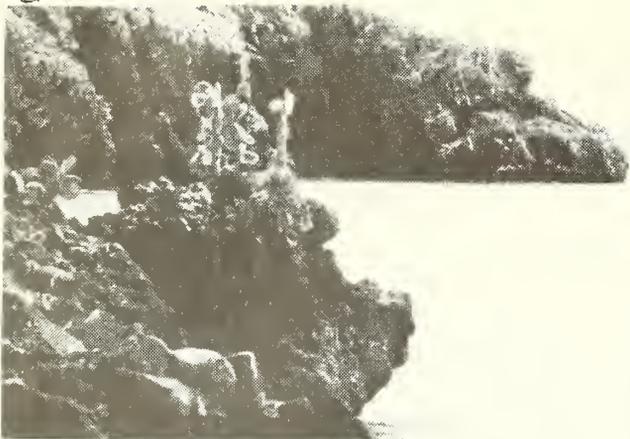
March 22 - Sombrero Chino - while the rest of our group took off collecting with hookah and snorkeling, Bill Old, Gale Sphon, and myself rigged the dredge and started making runs in the channel. The cable snapped on the third drag and we hooked a rock. After finding the dredge by diving, we all went collecting. Gale found Dolabrifera and the largest Purpura pansa any of us had ever seen. Storm clouds are forming; no sleeping on deck tonight.



Sombrero Chino

March 23 - James Bay on James Island - There are many flamingos in the lagoon back of the beach. We made another attempt to dredge and again broke the cable, and this time lost the dredge. We concluded that the cable was clothesline and could not be used, so we dismantled the dredging equipment; this is a bad disappointment after all the planning and work. Twila's hookah engine threw a rod. Mounted Carolyn's engine on Twila's hookah for the best combination; the rig works fine. Carolyn and Mike were on shore when it started to rain; they hid under the inflatable raft, with the bugs, mosquitos, flies, and sand. Many beautiful Cypraea and Conus were collected in the shallow bay.

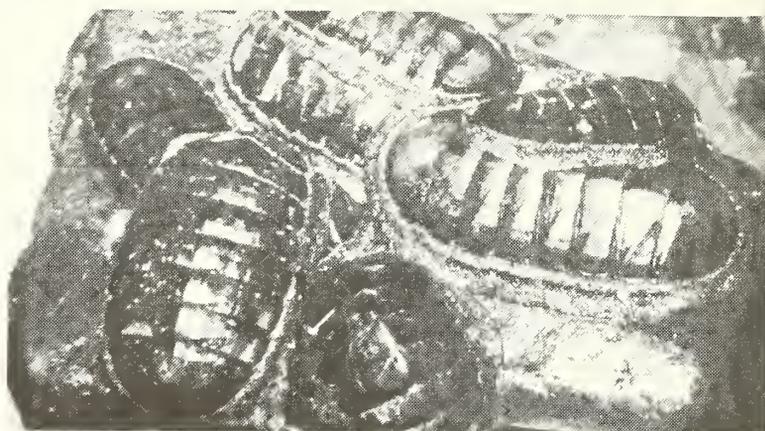
March 24 - Jervis - Diving was very good along the north side of the point and along the sand beach. There were many turnable rocks below ten feet. Carolyn and I made a deep dive off the point. We hit a 15°F. thermocline at about 60feet; found black coral from 60 feet down and Conus dalli around 50 feet under rocks. We visited with the people from the Golden Eschalot (a tourist boat) and took pictures along the picturesque point.



Jervis Island

Small boat with hookah on Jervis Island

March 25 - Isabella Island - Bill and Gale, shore collecting; Jackie, snorkeling in the shallow bay; Ellen and Twila on tanks; Carolyn and I on hookah. We found many Cones and some Thais and Cypraea. After lunch we headed for Duncan. Bill and Gale found Goodallii Chitons; Twila found Cypraea isabella mexicana; many Cones and some Nudibranchs were collected. Carolyn and I made a deep dive through a chilling thermocline. We saw a bat fish-he looks like a frog, and hops--related to the rays. We saw a sea snake and collected black coral and several Cones.



Chiton goodallii Broderip, 1832, Duncan Is.

March 26 - Duncan - We all enjoyed this island for its beauty, good collecting, clear water full of beautiful fish, and Oh Yes!, those pesky little sharks that kept swimming around the boat. Jackie found Typhis snorkeling; Carolyn found a live Lyropecten magnificus at 120 feet. A seal swam around us at 100 feet deep and looked us over; Gale found several Aeolid Nudibranchs. After lunch, we headed back for Academy Bay and the Darwin Research Station.

March 27 - Packing to head for home. Visited with the DeRoys and the Angermeyers. We thanked the Station director, Dr. Cramer, the Manager, Rolf Seiver, and our friend and guide, ornithologist, Dr. Harris for their advice and help in making this expedition a success.



Sullivan Bay on Bartholomé Is.



Fishing boat Cristo Rey with Ameripagos Expedition on Academy Bay, Santa Cruz Is.

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LIBRARY NOTES
Carole M. Hertz

Every member of the Club is entitled to a catalogue of our library holdings. Last year (1971) a complete list was printed and distributed to all our members. Since that time we have added many more books and periodicals for circulation to members. Following is a supplement which should be added to your list.

If you do not have a catalogue, please check with the librarian at the January meeting. Copies are available.

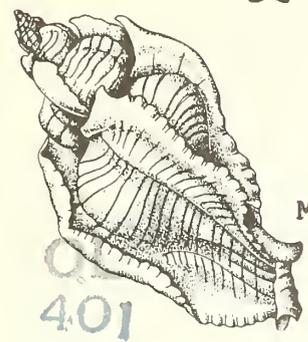
- A Catalog Of Dealers' Prices For Marine Shells (Third Edition), by Tom Rice
- A New Mitrid From the Western Atlantic by George E. Radwin and Loyal J. Bibbey, from Transactions of the San Diego Society of Natural History, Aug. 1972
- American Malacological Union Newsletter, Winter 1972
- An Upper Pleistocene Marine Fauna From Mission Bay, San Diego, Calif. by J. Philip Kern, Tom E. Stump and Robert J. Dowlen, Transactions of the San Diego Society of Natural History, 29 Dec. 1971
- Australian Seashells by Barry R. Wilson and Keith Gillett
- British Bivalve Seashells by Norman Tebble
- Cirrate Octopods With Associated Deep-Sea Organisms: New Biological Data Based on Deep Benthic Photographs (Cephalopoda) by Clyde F.E. Roper and Walter L. Brundage Jr., Smithsonian Contributions to Zoology, No. 121.
- Galveston Shell Club Newsletter 1972
- List 65-Shells of the Eastern Pacific by Tom Rice, issued Aug. 1970.
- Marine Shells of the Pacific Northwest by Tom Rice
- Marine Shells of the Pacific Northwest (Revised edition) by Tom Rice.
- Molluscan Digest (1971 and 1972) edited by Steven J. Long and Jack Brookshire.
- Muricacean Supraspecific Taxonomy Based on the Shell and the Radula by George E. Radwin and Anthony D'Attilio (reprinted from the Echo)
- New York Shell Club Notes No. 1-186.
- Philippine Shell News 1972
- Proceedings of the First International Conference on Meiofauna, edited by Neil C. Hulings. Smithsonian Institution Press, 1971.
- Rare & Endangered Mollusks (Naiads) of the U.S., edited by S.E. Jorgensen and R.W. Sharp, U.S. Dept. of the Interior
- Sea Shells of the Texas Coast by Jean Andrews
- Seashells of Tropical West America, 2nd Edition by Dr. A Myra Keen
- The Festivus
- The Systematics and Areal Distribution of Pelagic Cephalopods from the Seas, off Southern California By Richard Edward Young
Smithsonian Contributions to Zoology, No. 97
- The Systematic Position of *Urosalpinx carolinensis* Verrill, 1884 with Comments on the Genus *Mohnia* Friele, 1878 by George E. Radwin, Transactions of the San Diego Society of Natural History, Jan. 1972
- Tide-ings (Shelletter of the Crown Point Shell Collectors Study Group.

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Treasurer: June Bellmer
Editor: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas surface, \$3.50. Payable to San Diego Shell Club, c/o June Bellmer, 4680 W. Talmadge Dr., San Diego, Ca. 92116

Vol. IV

February 1973

No. 2

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* Speaker: Frank Rokop - - Dredging trip to the Peruvian Trench -
*

TONGA EXPEDITION

By Twila Bratcher

The Kingdom of Tonga's 150 islands and 1,000 reefs are tucked away in a far corner of the South Pacific. Paul Tzimoulis said when he went to the library and asked, "Do you have anything on Tonga?" the girl replied, "Is that more like Yega or Zen?" These islands, situated southwest of Samoa and south-east of Fiji, are in a remote part of the world, and our destination, the Ha'apai group of islands, is in a remote part of Tonga. Ours was the first party of tourists to stay in the Ha'apai group. There are no published molluscan records from there.

I was taking a picture of a police officer at the airport, where our plane had just landed on the grass runway. In a sneaky way I included an attractive Tongan girl, thinking she wouldn't notice. As I was putting my camera away, she asked, "Did you take a picture of me?" Feeling caught, I had to admit it. The girl said, "Thank you." One of our party started to take a picture of the new grave of a fisherman who died while we were in the Ha'apai group. As she focused on the grave, a woman ran from a nearby house waving her arms. My friend thought it might be Tabu to photograph the grave. Instead, the Tongan woman posed herself by the grave to be included in the picture. The only trouble with taking pictures of the natives was that the pictures got a little crowded. The Tongas have been known as the Friendly Islands since Captain Cook's time.

The members of our party were all from Hawaii, except Mary Pritchard from Samoa, and my sister Billie and I from California. We spent several days sightseeing and collecting in the area around Nuku'alofa, the capital, where we landed. While there, we stayed at the Beach House hotel, a wise choice for shellers. Inexpensive, the hotel was reminiscent of the play, "Rain". Meager accomodations but delicious food served family style. They were tolerant of our mounds of collecting gear and wet clothes hanging about and of our shell collecting activities. On the reef in front of the Beach

House we found the Cypraea calpurneus lacteus out in the open, their white shells gleaming in the sunlight. On the brownish soft coral we found a number of other shallow water species. We collected at three islands in the Nuku'alofa area with happy results in spite of the fact that natives collect mollusks for food.

We chartered the Just David, a boat with compressor for filling our scuba tanks, to take us to the Ha'apai group and remain with us to take us on day trips to other islands in the group. Mano, the Tongan skipper of the Just David, is a good diver. We showed him a picture of Strombus thersites Swainson, 1823, and he said he knew where we could find them. He took us to his home island, Ha'afeva and anchored in about 30 feet of water. Sandy bottom. Mano put on a mask and fins, no tank, and went overboard. Came up with two Strombus thersites. You can believe the deck was boiling with divers scrambling to get in the water. We collected enough to share with the snorkle divers and reef crawlers of our party.

The people of Filemea, on the island of Uiha, had built us three new Tongan fale (thatch houses about 20 feet long each, a cook house, two small rooms for sponge baths-water was kept heated in a large drum over a fire-and two toilets. I was prepared for "chic sale" type toilets, but they had made toilets of cement with American type toilet seats. They were flushed by pouring in water from a barrel. This type seemed in general use and was introduced by Peace Corps workers. Mats stuffed with palm fronds were our beds and tapa cloth our blankets. All inside walls not covered with tapa were wall papered with magazine pages-more printing than pictures. Ceilings and two walls were tapa covered. Gifts of fruit and drinking coconuts were brought to us daily by the villagers.



Native girls in front of fale built for us



Villagers of Filemea

On our first Saturday night, the village of Filemea gave us a feast. The villagers entertained. We ate. We later learned that all the feasts, either in private homes or community affairs, had the same menu: roast suckling pig, roast chicken, baked fish, baked taro root, white yams, laulau of chopped, spinach-like taro leaves, coconut cream and either fish or canned corned beef done up in individual leaf-wrapped packets. The dessert was leaf-wrapped packets of caramelized sugar, coconut cream and home grown tapioca. Some feasts added baked bananas, eggs or lobster. After the guests of honor have eaten with their fingers, a bowl of water is passed for washing hands, and the food on its table cloth of palm leaves is pulled from between the feasters and is consumed by the others. There is always much food left for the others because for six persons there may be two pigs, several chickens and whole medium-sized fish and several foot-long white yams.

The night we departed, both villages on the island gave a feast for us and tried to outdo each other in entertaining us. When the formal entertainment was over, they invited us to dance with them. A woman of our party would be as likely to be asked to dance by a Tongan woman as by a man. The dancing was somewhat like modern discotheque or hula with everybody doing his own thing. Then the villager would give his or her partner the crown of rafia, ferns and fresh flowers he was wearing or the sisi he was wearing around his waist. We ended up feeling festive, warm hearted and happy.

Directly in front of our fales were two types of pen shells, one a large black Atrina and another species. A large type of foraminifera was there too. I'm accustomed to looking at forams through a microscope or at least a strong hand lens because all I have seen are so small. There we found them nearly an inch across, which to my mind is large for a single-celled creature. We visited many islands on day trips and had sand, reef, and coral collecting, shallow and deep. It is difficult to say which we found the most rewarding. We found no golden cowries or Conus gloriamaris but there was always something exciting.

At the suggestion of Dr. Harald Rehder of the Smithsonian, Ruth Fair, with the help of the other members of our party, is making up a check list of the mollusks collected in the Ha'apai group. Dr. Rehder will also assist with the identification. Collecting and diving in a new area is always exciting, but our experience in knowing the people of this remote part of the world and, in a small way sharing the life of the people of the island of Uiha was the most memorable part of our trip.



Neat village path lined with shells



(My sister, Billee, diving off the Just David

(The above narrative accompanied the showing of movies taken by Twila. The pictures presented a beautiful, happy people in their lovely surroundings—lush vegetation in vivid colors, the air so pure that the light was dazzling. Nowhere any ugliness and everywhere beauty and cleanliness—no smog, no litter. The faces of the people mirrored their harmony with their environment in the Kingdom of Tonga.

A very interesting shot was of two huge vertical stones supporting a crosspiece, with a hole in the crosspiece, positioned to mark the summer solstice. Though these ancient monuments, as Stonehenge, are found throughout the world, their presence on Tonga was a thrilling surprise to this viewer...Ed.)

Shelling on the Maine Coast

by Norm Currin

Newagen, Maine, where I have a summer cottage, is located right in the center of a coastal stretch recognized as the most cut-up section of coastline in the world. From Portland north for a hundred miles, bays, inlets, estuaries, and islands abound. It is fabulous for boating, unbeatable for sailing, gorgeous for scenery, and unfortunately not outstanding for shelling. The severity of the New England winters is apparently responsible for the limited variety of shells found there.

My cottage is located close to the southern tip of a five-mile-long island marking the entrance to Boothbay Harbor. Many islands stud the bay. From my front porch I can see five lighthouses and, on days or nights that warrant it, hear three foghorns. Dense forests, predominately spruce and fir, grow right to the granite ledges which tumble off into the sea. Beaches are scarce in this area and we feel we are fortunate in having a rather pebbly one at one side of our property. Because there is no public access to the seacoast, we enjoy a degree of privacy not found in Southern California coastal sections.

Directly in front of the cottage stretches a long rocky reef-type ledge which is mostly under water at high tide. This reef creates splendid surf on a stormy day, and sometimes conditions are right for good body surfing there. The Maine waters are usually quite calm however --- often smooth and glassy as a lake --- a condition never seen on the Pacific Coast.

Let us suppose you should drop in some sunny day, anxious to do a bit of shelling, to see what can be found among our rocks and seaweeds. First I would take you to the granite ledges in front of the house. There, high up in the splash zone, you would find scattered groups of Littorina saxitalis Olivi. A quarter to a half inch in length, these shells are mostly found in shades of brown, yellow, or orange, although we may see an occasional brightly striped specimen.

Next we move down onto the slippery seaweed. Here Littorina obtusata Linne, are for the taking. They are the same size as the others but more rounded in shape and with a blunt apex. They are predominately bright yellow or brown, with an occasional striped specimen for variation. We turn a few rocks but find only green crabs, rock barnacles, and starfish.

On out toward the mid-tide reefs we find profusions of the very drab Littorina littorea Linne, just about everywhere we look or step. Under the overhang of ledges and in among the seaweeds are thousands of white Thais lapillis Linne. We look among them for the less frequent color variations and are happy to find a few in bright orange or varying shades of brown, some uniformly colored, others striped. They seem to be feeding on barnacles or mussels and it would appear that their diet

affects the shell coloration, for the juvenile orange ones are usually feeding on the orange meat of the mussels. We check a few tide pools and find numerous limpets crawling over the rocks. These are Acmaea testudinialis Muller.

Nearer the low tide line we turn more rocks and find a few slipper shells, Crepidula fornicata Linne. A rock resting on the sand produces a pair of three-quarter inch chitons, colorfully marked in red, yellow, and blue. They are Tonicella marmorea Fabricius. Nearby, half buried in the sand, is a three-inch univalve, Buccinum undatum Linne. It is encrusted rather heavily with calcium. A search turns up several more, some of which are free of deposits and quite attractive. This shell varies from purplish brown to white and many have gold apertures.

The tide is now very low and we turn more rocks. Eels and other small fish scurry out from under, spraying us with water in their eager flurry to escape. A lumpy looking little fish with raised silver nodes on his body swims up and attaches himself to your hand. Lumpy looking he has a right to be, for he is a baby lump fish. Equipped with a suction disc, he has a strong desire to attach himself to anything that looks solid. We find lots of red sea crabs. The young ones are very aggressive and can give a good nip. The big ones are good for eating, either boiled or steamed. Starfish and sea urchins are everywhere. The urchins are good to eat, raw, with a dash of lemon or lime juice. Big sea anemones hang from under the dripping ledges. Long strands of kelp wave back and forth in the tide. We pull in a large blade and remove a handful of small brown univalves, Lacuna vineta Turton.

Clusters of blue mussels are all over. The Mytilus edulis Linne, are the same species found on the West Coast. Good eating too. We pull up some kelp and find huge five-inch horse mussels, Modiolus modiolus Linne, clasped in the holdfasts. In the sand patches we can dig down a few inches and perhaps come up with a razor clam, Ensis directus Conrad. We will certainly find plenty of soft shell clams, Mya arenaria Linne. These are the clams that make the fabulous New England clam chowder, and are so good steamed or fried.

If we want to go scuba diving in the 62 - 65 degree water (colder down below) we can find Polinices pallida Brod. and Sow., at about twenty five feet, tracking through the sand patches. Sand dollars are thick there also. The large pecten, Placopecten magellanicus Gmelin, are quite profuse at fifty feet. Some of them are seven or eight inches across, and they are delicious. Remove the adductor muscles and fry them for a dish of the most delicious scallops imaginable. Many of these bivalve shells are rayed with red and are very attractive. On rock outcroppings we might find Colus pygmaeus Gould, a solid looking inch-long shell with a greenish periostracum. Lots of lobsters are crawling around and we'll see some inside the wooden traps which are tended daily by the lobstermen. We don't touch these crustaceans. It's illegal to take them by diving.

That just about covers what the sheller might find in the vicinity of my summer home. A visit to the docks at Boothbay Harbor might produce a few more shells brought up by the bottom-scraping nets of the dragners. They have given me pelican's foot shells, Aporrhais occidentalis Beck,

and three-inch specimens of Colus stimsoni Morch.

The rocky terrain, the crystal clear water, the profusion of undersea plant growth, --- it all points to what should be terrific shelling along the coast of Maine. But somehow it didn't work out that way. Either the evolutionary processes didn't develop properly, or Mother Nature felt Maine had enough going for it other ways. Anyhow, conchologically speaking, Maine was somewhat short-changed. Perhaps it's just because the winter water temperatures stay so low for such a long time. Now if we could only find a way to divert the Gulf Stream - - - ???

DUES ARE DUE AGAIN, CHECK THE FRONT PAGE FOR RATES AND ADDRESS

Minutes, January 18, 1973

President Jules Hertz called the meeting to order at 7:50 and announced the names of the new officers.

Visitors were introduced by Blanche Brewer. (John & Tess White, Estella Barnes, & Kim Fossan).

Vice President Joe Bibbey introduced Twila Bratcher, our speaker for the evening. First she spoke about her trip to Tonga. Tonga, in reality, is made up of 150 islands and 1000 reefs. She told us stories of the history, housing, food, customs, music, and life of Tonga. Especially enjoyable were some of her many adventures including attendance of a wedding feast. Then she showed a film she had taken and we all mentally packed our bags.

Business meeting

The first business meeting of the year was an important one.

1. No minutes of the previous meeting were read. They were already filed in the archive for posterity.

2. Treasurer's report - Current balance \$364.15, no bills outstanding. George Hanselman will do the yearly audit.

3. Committees were announced. (Telephone, hospitality, and Science Fair Judges) Blanche Brewer will continue to be editor of the Festivus. Carole Hertz continues as librarian.

4. Dues - After a discussion, it was moved (C.Hertz) and seconded that the raise in dues be rescinded to the 1972 rates and a student rate be added. It was passed by a more than 2-1 majority.

5. President Jules Hertz asked for shell auction donations to start at the next meeting.

6. President Hertz read a letter from Bert Draper. A meeting is being planned in Los Angeles having to do with collection permits in California. We will be kept informed of events. There was also a letter from the Department of the Interior asking for names and information of endangered mollusks; marine, fresh or estuary.

7. Librarian Carole Hertz asked that the library books be set on top of the case when returned and that proper cards be filled out when checking out the books.

- 8. A sign up sheet for yearly goodie providers was passed around. The telephone committee will remind the donor for the upcoming meeting.
- 9. The possibility of field trips was discussed. (Pros & Cons). One possibility, a trip to San Clemente Island, is being looked into.
- 10. A plea for Festivus articles.
- 11. Vice-President Joe Bibbey announced the next program, which will be on a trip to South America and the abyssal mollusk.
- 12. The Shell Drawing was won by our speaker, Twila Bratcher. The meeting was adjourned at 10:00.

Ann Schwarz, Recording Secretary

NOTICE -- SWAP COLUMN

Due to the request of some of our members, we are starting a new feature with this column. Many feel they have shells that they would like to exchange or acquire. If you desire to place a request in this column, send your information to Nola Michel, 4758 Mt. Cervin Dr. San Diego, Ca. 92117

- - - - -

Richard and Anne Schwarz are seeking the uncommon cowries. 7623 Blue Lake Dr. San Diego, Ca. 92119 Write or phone, (714) 469-0522

DUES ARE DUE AGAIN, CHECK FRONT PAGE FOR RATES AND ADDRESS

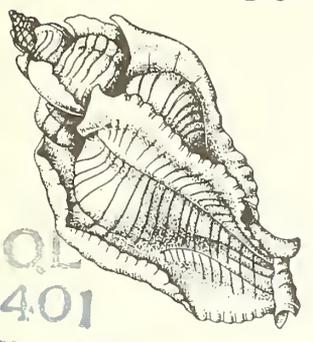
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Please bring your shells for the auction to the February meeting. There are only three more meetings left before the auction which will be held at the Radwin home on Saturday evening, May 12. Specimen quality shells with as complete data as possible are wanted. Please be generous. Our auction finances our Club and its activities and helps keep our dues low. Corresponding members are invited to attend and also to donate shells. Mail to Nola Michel, 4758 Mt. Cervin Dr., San Diego, Calif. 92117

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THE

FESTIVUS



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F418
Moll.

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 PM

President: Jules Hertz
Vice President: Joe Bibbey
Recording Secretary: Ann Schwarz
Corresponding Secretary: Jeanne Pisor
Treasurer: June Bellmer
Editor: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas surface, \$3.50 - Student membership \$2.00
Payable to San Diego Shell Club Inc., c/o June Bellmer, 4680 W. Talmadge Dr., San Diego, Calif. 92116.

Vol. IV

March 1973

No. 3

* Speaker: Bill Woods: Field Collecting in Mexico *

DUES NOTICE: This will be your last issue of the Festivus unless your dues are paid by the March meeting.

FROM THE MINUTES

Speaker for the February 15 meeting was Frank Rokop. He spoke on dredging in the Peruvian Trench and the abyssal mollusks found there. New information for many of us.

Dave Mulliner showed the slides he and his candid camera took at the Christmas party. We also were treated to his slides of life on an undersea rock off Point Loma.

George Hanselman reported on the meeting in Los Angeles having to do with collecting permits. (See report in this issue).

A reminder to donate shells for the auction in May was made. The auctioneers will be Norm Currin and George Radwin. Billee Dilworth suggested we have a silent auction on less expensive shells.

Jeanne Pisor reported on the possibility of a San Clemente Field Trip.

It was announced that the author of "Multiform Australian Volutes" is coming to the U.S.A. in 1974 on a slide showing trip. He asks for information on travel, schedules, hotels etc. We will definitely follow this up.

The shell drawing was won by Sammy Baugues. He drew his own number and was he surprised. "That's me!" Smile flashes!

* PLEASE BRING YOUR SHELLS FOR DONATION TO THE AUCTION. THERE ARE ONLY TWO *
* MORE MEETINGS BEFORE THE AUCTION. SPECIMEN QUALITY SHELLS WITH GOOD DATA *

16.

ON THE IMPORTANCE OF KEEPING ACCURATE DATA

by

Clifton L. Martin

It is well known to all who have attempted to make a serious study of any of the molluscan families that accurate data is of very great importance. Yet, occasionally we will encounter a collector who keeps no written record of the shells in his collection or, at best, such records are so vague or incomplete as to be of little value for a serious study. It is the purpose of this paper to encourage better "book-keeping" by such collectors since they, more than anyone else, will be the beneficiary. Keeping accurate records of the shells in your collection will not only enhance its value as a study collection but will also greatly increase the owner's knowledge of the shells it contains.

A few years after the end of World War II we visited a Southern California collector who had been collecting shells for more than thirty-five years. She had assembled a tremendous collection, especially of shells from the west coast of the United States and from Florida. She also specialized in world wide Cypraeidae, Muricidae and Conidae and had exceptionally large collections of these three families. From the standpoint of quality her collection was the finest I have ever seen. She was one of those individuals who insisted on perfection before a specimen was added to her collection. All of her shells were of superb quality and many of them were extremely rare. But with all of this her collection was somewhat of a disappointment for us and in some ways proved to be an object lesson in how not to collect shells. As an example, this collector had four outstanding specimens of Trophon cerrosensis catalinensis I. Oldroyd, 1917, all fully mature and perfect in every way. The only information given on her label was the name of the shell, without author's name, and the locality was given as, "Southern California". Since all of her labels were similar, giving only the name of the shell and vague locality data, such as, "Florida", "Philippines", "California Coast", etc., I thought she must surely keep more complete records in a catalog. However, when asked she stated that she did not keep a catalog since she knew where all of her shells came from. Further discussion disclosed that the four Trophons had come from four different localities over a period of many years. Three of them had been trawled and the other had been purchased for the sum of five dollars from a pressure-suit diver who had found it while inspecting dock pilings in San Pedro Harbor, in 1929. It was also disclosed that she could no longer say with certainty from which locality any individual specimen had come since she had them all mixed together in a single lot. Also, she did not know the depth from which any of them had been taken or the dates when they were found. She could very probably have gotten this information since all of the shells were personally purchased by her from the diver and the trawlers. The label with these shells was typical of all of her labels. None of her larger shells, such as the large helmet shells etc., had any labels at all. Her opinion, as expressed to us, was that serious workers would not mind her method of keeping records since they already know the ranges of all the shells. I doubt that any of them would agree.

Keeping accurate data can be a very rewarding endeavor for the serious collector. It does not need to be overly complicated or take an excessive amount of time. The easiest and most accepted method is to begin the entry of each new lot in your catalog with the lot number. These numbers usually begin with 100 or 1000 and run consecutively with a different number being assigned to each lot in your collection. Sometimes this number is printed in india ink on each specimen in the lot but some collectors prefer not to do this and simply print, or type, the number on the label which is made for each lot and placed in the box with it. After the number should come the name of the shell, with author's name and date

if possible; the locality at which the specimens were found; any remarks that may be of importance, such as, under rocks at low tide, trawled in ten fathoms on sandy bottom, on gorgonians in a depth of 25 feet, etc.; the collector's name; and the date the specimen was collected. If the shells were purchased from a dealer this fact should be added to your remarks, for example, ex Seashell Treasures, November 1971. Due to limited space it is sometimes not feasible or desirable to include all of this information on your labels. However, all labels should have the lot number; the name of the species and the locality. All of the information available should be included in your catalog however. This catalog can be a loose-leaf notebook, a book-keeping journal or record book etc., or it may be by index file cards, with a separate card being assigned to each lot number. I prefer the index card system for several reasons. First, this gives you a much better opportunity to re-assign a lot number, with new data, to another species if you should decide to eliminate something from your collection due to breakage, poor quality, or for some other reason. Second, when making a study of a particular group of shells it is more convenient to take all of the pertinent cards from your file than to keep a large number of book-marks in your notebook to find the data you want. The cards are returned to your file after the study has been completed. The index card system has other advantages as well, the importance of which will vary with each individual collector.

Do not, for any reason whatever, mix specimens from different localities together into one lot. Even shells from the same locality should be kept separated if they were collected on different occasions. One reason for this is that some mollusks go into deeper water for part of the year and are found intertidally only during a limited season. Keeping accurate records may help to establish the exact duration of that season.

Do not give data unless you know it to be factual. It would be quite easy to state that a mollusk had been found feeding on algae when it may have been there to prey on other mollusks that use the algae for food. Unless a microscopic comparison of the stomach contents was made with a sample of the algae it would be better to state that it was found on algae-covered rocks and, as stated before, any other observation, such as -1.4 tide, may be helpful.

One other thought must be expressed and that is this, no matter whether you write in script or letter your labels by hand be sure to make them as legible as possible. For this reason hand-lettering is often preferable to script. Nothing is more exasperating to a collector than to have information he cannot read. Keep in mind that others may eventually have to decipher what you have written.

Most of us have at least some shells with limited data or with no data at all. Record only that data which is known on your labels and in your catalog. It is rather easy to misplace or forget data we receive with a shell. For this reason it is always advisable to catalog your specimens as soon after their acquisition as possible.

At the Western Society of Malacologists annual meeting two years ago one of the speakers stated that the huge Maxwell Smith Collection had been bequeathed to the University of Alabama, where it was put in storage and is not available for study. As many species as were named by and for Maxwell Smith, his collection must contain several important type specimens. These, of course, may possibly be identified by photographs that have been published in the literature but the bulk of his collection may be much more difficult if the labels have been eaten by moths or otherwise destroyed. It is hoped that he was a collector who printed the lot number on each of his shells and that the University has taken good care of his catalog.

A properly cataloged collection can be a valuable tool for learning to its owner. Without adequate and accurate data no collection is worthy of any more consideration than would be given to the contents of a child's toy box, since the resemblance between the two is much greater than may at first appear. There is no worthwhile purpose in making a collection without accurate data. The world would be a better place if the shells in such a collection had never been taken from the water.

On 13 February 1973, a meeting was held at the Los Angeles County Museum of Natural History for the purpose of discussing the possibility of establishing a type of molluscan collecting permit of more general availability than the current Scientific Collecting Permit.

This meeting was in response to a request to the California Fish and Game Commission made by Mr Bert Draper, of the Conchological Clubs of Southern California. Attending were:

Marine Patrol Inspector Robert Kaneen of the State Fish & Game Dept.
 Dr. James McLean, Los Angeles County Natural History Museum, host.
 Mr. Bert Draper, Conchological Club of Southern California.
 Mr. William McManamon, Pacific Shell Club.
 Mr. Ralph Ferguson, Long Beach Shell Club.
 Mrs. Twila Bratcher, Western Society of Malacologists.
 Col. George Hanselman, San Diego Shell Club.

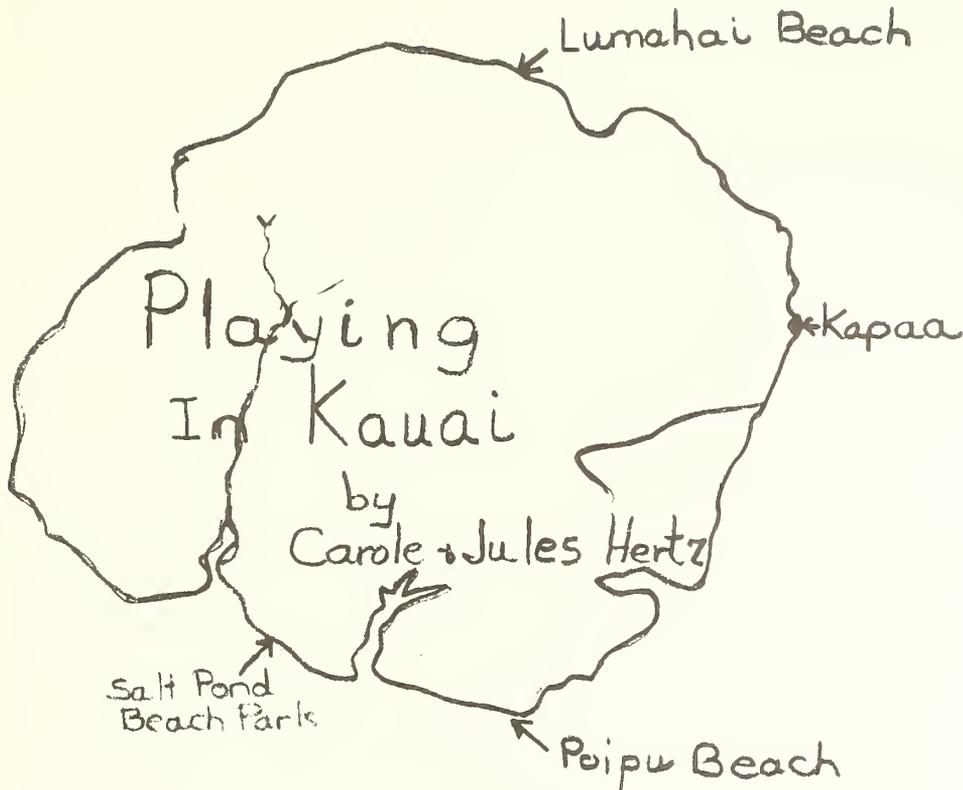
After preliminary discussion of the the adequacies of the current regulation pertaining to the intertidal area, Inspector Kaneen agreed to present to his superiors for consideration the following general outline of a less restrictive permit:

1. An "amateur collector's" permit authorizing the taking of all species of intertidal life, but with the restriction that not more than perhaps five of any single species may be "in bucket" on any one collecting trip to the beach.
2. The permit to be obtained only by application, and for a fee.
3. The application to be authenticated by some knowledgeable person, for instance a member of a museum staff, who in turn might perhaps rely upon the recommendation of someone known to him as informed regarding the applicant's bona fide interest in maintaining an effective collection.
4. An effective collection would be regarded as one fully catalogued and annotated with adequate data, so that real scientific benefit could be obtained from it.
5. An annual report would be required from each permit holder, to state species collected, number of each, place(s) taken, date(s) taken, and disposition.

Inspector Kaneen emphasized that he had no authority to approve such a permit, but would simply present his report to higher authority within the Department for further consideration. He stated that he felt it would probably be possible to present the results of this consideration to those attending the current meeting, if such were desired. The consensus was that such was indeed desired, and Mr. Draper indicated that he would attempt to establish a follow-up meeting at a later date.

George Hanselman
 GEORGE A. HANSELMAN

(The membership of the San Diego Shell Club has dedicated itself to pursue this problem and intends to be represented at any follow-up meeting.)



In January of this year we spent six idyllic days on Kauai. To us, it was like visiting a great botanical garden with lush valleys and exotic flora. Plants we worry over and carefully nurture here grow like weeds there—Epiphyllum hedges, all sorts of orchids, Plumeria—the poorest houses having vividly colored gardens with all sorts of shoots growing out of paint buckets, Wesson Oil cans and the like. The shoreline is the loveliest of the five Hawaiian Islands we've visited—storybook beaches in the north and northeast (though usually unsafe for swimming) and calmer though less spectacular beaches in the south.

We had decided on accommodations in Poipu Beach and we felt we'd made a happy choice. Since we are not the strongest swimmers, the south coast offered the best opportunities for us to enjoy the marine life in relative safety. Many brightly colored fish could be seen in shallow waters (5-15') and the rocky outcroppings hosted a wide variety of intertidal life.

Kauai's natural wonders abound and we spent many happy hours enjoying its beauty. We did try to arrange our days so that we could be near a possible collecting area at low tide but it sometimes worked out that we probed a beach at high tide and admired a wild passion fruit vine in the mountains at low tide. All the beach areas were interesting to the observer though we found none with an abundance of intertidal mollusks. We discovered some species we had never collected before and others which we noted but did not collect. Our collecting was limited to the four areas noted on the outline map of the island.

Just north of Lumahai Beach, the site of the Bali Hai of "South Pacific" fame, was a secluded (and unnamed) beach. We stopped at this ribbon of sand because the formations of eroded sandstone in the low tide zone was unusual to us. In the depressions of this exposed, wave battered reef we found Acanthochiton viridis. We also found some small bubbles here which we have not been able to identify. (Why don't authors show pictures of the bodies of animals instead of only the shells? How do you identify a 3/8" white bubble out of many other 3/8" white bubbles without seeing the animals?)

On the east coast we also enjoyed collecting and dodging rain clouds at a beach at the base of a bluff just north of Kapaa. This sandy beach had many lovely rock-enclosed tidepools. Here we found several interesting shells. Most exciting to us was Umbraculum sinicum, a bright orange four inch animal which we found in a sand-bottomed tidepool.

Poipu Beach in the south, is a very long sandy beach with rock outcroppings which seem to divide the beach. One area is a town beach and the rest is on hotel properties, easily accessible to anyone. This is on the dry side of the island and the area resembles parts of San Diego. Here we snorkeled several times and near the rocky areas saw many varieties of fish. Collecting on the rocks at low tide was interesting here too. The coarse sand between rocks revealed the more common cones such as Conus abbreviatus, C. sponsalis, and large C. lividus etc.

I guess our favorite beach spot was Salt Pond Beach Park. We, along with other families in the area, picnicked here and enjoyed the beauty of the area. Even little children snorkeled safely in the calm lagoon or quiet ocean. We were the only adults in the water and we had several little snorkelers follow us about, keenly interested in those funny grownups. Intertidal collecting was more productive here also and we found quite a few species that we had never collected before and some that we had never collected live. For us the most spectacular were the bubbles--Hydatina amplustre and Micromelo guaymensis live and a dead specimen of Bullina lineata. Fantastic diminutive fishes and shrimplike creatures were in the intertidal area and we were completely absorbed in watching their activity.

We found Kauai to be even lovelier than we had hoped.

Following is a list of shells we found, though did not necessarily collect, on Kauai. Those with an asterisk were only found dead.

<i>Drupa ricina</i>	<i>Trochus intextus</i>	<i>Balcis cumingi</i>
" <i>morum</i>	" <i>sp.</i>	<i>Littorina pintado</i>
<i>Conus miles</i>	<i>Umbraculum sinicum</i>	<i>Planaxis sp.</i>
" <i>lividus</i>	<i>Cypraea caputserpentsis</i>	<i>Peristernia chlorostoma</i>
" <i>omaria</i>	" <i>isabella*</i>	<i>Siphonaria normalis</i>
" <i>ebraeus</i>	" <i>helvola*</i>	<i>Natica macrochinensis*</i>
" <i>abbreviatus</i>	" <i>granulata*</i>	<i>Cerithium thaanumi*</i>
" <i>sponsalis (ceylanensis nanus?)</i>	" <i>fimbriata*</i>	" <i>columna*</i>
" <i>catus</i>	<i>Chiton perviridis</i>	<i>Nassarius reeveanus* (gaudiosa?)</i>
<i>Nassa sertum*</i>	<i>Acanthochiton viridis</i>	<i>Epitonium sp.*</i>
<i>Hydatina amplustre</i>	<i>Patella sandwichensis</i>	<i>Triphora incisus*</i>
<i>Micromelo guaymensis</i>	<i>Diodora granifera*</i>	<i>Columbella sp.</i>
<i>Bullina lineata*</i>	<i>Nerita picea</i>	3 species of nudibranchs (Dave hasn't identified yet)
<i>Haminoea sp.</i>	<i>Cymatium muricinum</i>	<i>Chama isotoma</i>
<i>Cerithoidea sp.*</i>	" <i>nicobaricum</i>	<i>Antigona reticulata</i>
<i>Vexilla taeniata*</i>	<i>Bursa granularis</i>	<i>Tapes japonicus*</i>
<i>Mitra brunnea*</i>	<i>Strombus maculatus</i>	Minute species as yet unidentified by us.
" <i>stricta*</i>	<i>Morum tuberculata</i>	
" <i>nodosa</i>	<i>Hipponix antiquatus</i>	
" <i>litterata</i>	" <i>pilosus</i>	
	<i>Amalthea conica</i>	

CHANGE OF ADDRESS ..

John K. Tucker
VF-92 F7C Shop
FPO San Francisco, Ca. 96601

Richard W. Baker
37760 Rudall Ave.
Palmdale, Ca. 93550

LIBRARY NOTES

Carole M. Hettz

Our library has received several new additions this month besides our regular periodicals. Review copies of the following two publications by Tom Rice are now available to members.

1. A Shellers Directory of Clubs, Books, Periodicals and Dealers, Third Edition, 1972, by Tom Rice and selling at \$1.00 is a worthwhile publication for shell collectors. For those interested in buying and selling shells, there are current listings of dealers with addresses and, in many cases, their specialties. The listing of shell clubs can be very helpful to libraries in arranging exchanges or for the traveler in acquainting him with a "friend" in a far off place. There is a rather complete section on shell books arranged in categories according to area and interest. This reviewer would wish that the books contained prices as in earlier editions rather than "inexpensive" "medium priced" etc. Even though prices do change rapidly, one has a better idea of the actual cost than with the present method. This will be a useful addition to our Club library.
2. What is a Shell? by Tom Rice, 1972, selling for \$2.00, boasts the same new photographic process used previously in Tom Rice's Marine Shells of the Pacific Northwest. This provides the reader with an opportunity to buy a book with good color illustrations inexpensively. However, this book seems to be designed primarily for a juvenile audience or for those at the very beginning of their interest in shells since technical names are almost hidden and the text is elementary in its information.
3. Molluscan Digest, Vol.3, No.1, Jan. 1973. This volume provides an index of authors for the bibliographic citations from Vols. 1 and 2 of Molluscan Digest. Thus, the library will file it with the volumes of the previous two years.
4. The American Malacological Union, Inc. Bulletin for 1971 contains listing of members and abstracts from the 37th annual meeting.
5. Two New Species and a New Subgenus of Lucinidae (Mollusca: Bivalvia), with Notes on Certain Aspects of Lucinid Phylogeny, Smithsonian Contributions to Zoology, No. 29 by Joseph C. Britton, Jr.

Our thanks to Nola Michel for having arranged for the binding, at no charge to the Club, of Vols. 1-14 of our second set of the Veliger and Vols. 1-3 (1970-72) of the Festivus. They are now in the Club library available to our members.

SWAP COLUMN

Mrs. M.G. Korevaar-Bierens, Kon. Julianalaan 31, Maartensdijk (Utr.), The Netherlands is a beginning collector who would like to exchange shells or buy local shells.

John K. Tucker whose change of address is listed in this issue is willing to arrange shell purchases for members if they write and tell him what they want.

Sam Raugues, 4133 Violet St., La Mesa, Calif. Ph.465-9618 is interested in exchanging shells. He would like to receive *Cypraea coxeni* and onyx and *Janthina globosa*.

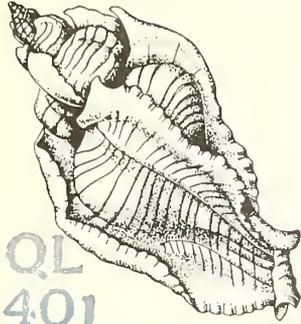
THE

FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 PM



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Vol IV

April 1973

No. 4

Program: Dr. George Radwin, Presentation on the last portion of their Murex book, (all new material and transparencies.)
 Joyce Gemmell; Paper, WSM 1972, Field Observations on Gastropod Breeding and Egg Laying, read by Dave Mulliner, slides.
 Dr. Gordon Robilliard, Slides, taken on his recent trip to Alaska.
 Presentation of Shell Club Science Fair Award.

BRING AUCTION DONATIONS TO THIS MEETING!!!! LAST CHANCE!!!!!!!

Minutes of March 15 Meeting

Our speaker, Bill Woods gave a most enjoyable talk on Mexico and his adventures encountered while traveling. Bill also covered dredging with factual and humorous details. His talk was accompanied by many beautiful slides.

Results of the Field Trip Survey were read and inquiries are being made concerning dredging costs and possibilities for dredging at different locales.

George Radwin announced the criteria for the San Diego Shell Club Science Fair Award. The award will be limited to senior division entries in the areas of marine biology and/or ecology of marine organisms.

The Exhibit Committee for planning of displays was announced. Arrangements for the auction were discussed. The shell drawing was won by Blanche Brewer. Five more drawings were held with winners receiving guest passes to the Museum. Cookies were supplied by Doris Brosius and John Souder. Guests at this meeting were Julienne Bayliss and Alex and Momiji Seligman.

Book Notes

A recent addition to the San Diego Shell Club library is Kingdom of the Seashell by Dr. R. Tucker Abbott. Published by Crown Publishers, Inc. and priced at \$14.95, this book is the finest general-information book on the subject available today. Its more than 250 pages cover all the aspects of shells of interest to the layman. Even the advanced amateur and professional conchologist or malacologist will find items of interest. Both the colored and black-and-white plates are exceptional, and give the book an artistic quality. Perhaps, the major criticism of the book is the extensive use of common names for the various molluscan species. This book is certain to be the best of its kind for many years, and at the inflated book prices prevailing today it is a remarkable value.

Jules Hertz

BRING AUCTION DONATIONS TO THIS MEETING!!!! LAST CHANCE!!!!!!!!!!

SWAP COLUMN

John K. Tucker, VF-92 F/C Shop; FPO San Francisco, Ca., 96601, is looking for common and rare cones with good locality data.

Carol Andresen, 214 Center St., Valparaiso, Ind. 46383, is interested in exchanging shells from Australia and the Philippines for shells of this area.

DANGER

A Seattle shell collector while visiting friends recently in California, collected some land snails. These shells were laying about in her friend's yard and as the friend considered them pests was happy her visitor wanted them. The Seattle lady started to clean the shells, in her friend's kitchen sink. Suddenly she became very ill, so ill she was rushed to a local hospital. Treatment for a suspected heart attack was given and she "recovered" and returned home to Seattle.

Upon reaching home she decided to clean the remaining shells she had gathered from her friend's yard. During the night she again became deathly ill and was, again, rushed to the hospital. This time extensive tests were undertaken as well as a history of her activities just prior to her attacks.

It was finally discovered that the shells she had collected had been killed with a snail bait whose ingredients included arsenic and that residue of this poison had been released during her shell-cleaning operation and her skin had absorbed this-she had been poisoned with arsenic, from dead snails!

BE CAREFUL!

This article is reprinted from Of Sea and Shore Winter 1972-73.

SOME HINTS ON THE IDENTIFICATION OF CHITONS

by

George Hanselman

The problems encountered in the identification of chitons differ considerably from those encountered with shells. Partly this stems from the fact that the structure of chitons is not only different but also far more complex. As a result, there are far more features to define, and necessarily a different terminology to define them. Couple this with the fact that the economics of book publishing often demand brevity of description and limited illustration and you may find that chitons begin to sound and look remarkably alike on the printed page. But a bit more clarity may appear if all the terms used are precisely understood.

Here, then, are a few sketches to (hopefully!) help you to form a clear mental image of what to look for on the chiton itself as you peek at a fuzzy photograph and read "The area adjacent to the jugum tends to be subgranulate." (Sub-anything, by the way, is what might be termed a precise generality meaning "Less than," or "Almost but not quite." What in plain American we might call "Kinda.")

To begin with, every chiton has certain major parts. Their details form the bulk of this account, but let's review them now as complete assemblies.

The shelly portion is composed of eight PLATES or VALVES. These plates are often referred to by number, the front plate being No. 1, and the back plate No. 8. Plate No. 1 is called the ANTERIOR PLATE, or the HEAD PLATE, or often the NOSE PLATE. Plates Nos. 2, 3, 4, 5, 6, and 7 are called simply the MEDIAN PLATES or the INTERMEDIATE PLATES or are referred to by individual number. Plate No. 8 is called the POSTERIOR PLATE, or more often the TAIL PLATE. These terms are important because the Nose Plate, the Median Plates, and the Tail Plate represent three different structural designs and the elements of these structures are key identification features. A layout of the plates is shown in Fig. 1 below.

The Plates or Valves have two differing aspects: the inside and the outside. The outside is called the TEGMENTUM; it is the surface of the plates you see when you view the chiton from above. Each plate is divided into one or more areas, denoted in Fig. 1 as A, B, and C. (Details of the areas are not discussed until later.)

The inside of the plates is called the ARTICULAMENTUM, and is visible only after the soft animal itself is removed or after the plates are lifted out of their socketing.

A second major part is the GIRDLE, which surrounds the plates. The top or DORSAL portion of the girdle usually bears ORNAMENTATION or ARMAMENT of scales, spines, bristles, etca. The bottom or VENTRAL side of the girdle also has armament, but this is so fine that it can be studied only with a high-power microscope.

The bottom of the chiton, inside the outline of the girdle, is the FOOT. In the long cleft along each side of the foot lie the paired (right and left) BRANCHIAE or gills, which usually start at the back end of the cleft and extend part or all of the way toward the head. The branchiae serve to identify certain Genera; locally, for instance, the Genus LEPTOCHITON has only very short gill-rows, while the preponderance of the local Genera have gill-rows which are nearly or completely ambient -- i.e., surrounding, or full-length. At the front of the foot lies the PROBOSCIS or mouth, inside of which is the RADULA, a zipper-like rasping "tongue" useful for identification only by microscopic study. These are noted in Figure 2.

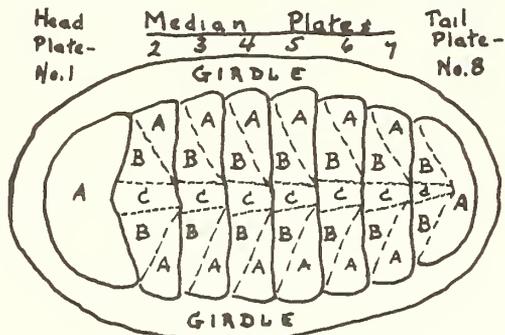


Fig. 1

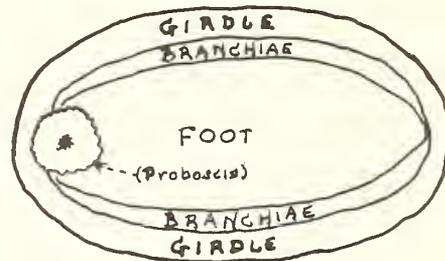


Fig. 2

And here are some of the principal variations and how they are usually termed. The accompanying sketches were prepared by Carole Hertz, and are mainly based on plate material in Pilsbry's "Manual of Conchology." The sketches are not to natural scale, so that the characteristic being discussed may be emphasized. The head of the chiton will always be located either to the left, or up.

1. OVERALL CHARACTERISTICS.

A. Shape. Chitons mostly are oval in shape, but some are long and slender, and a few are more round or fan-shaped.

1. Oval, this example being Cyanoplax hartwegii CARPENTER, 1855, a local chiton. (Fig. 3)

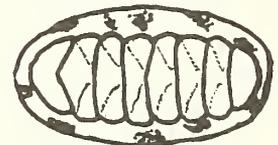


Fig. 3

2. Long and slender, an example from the Gulf of California being Stenoplax limaciformis SOWERBY, 1832. (Fig. 4)

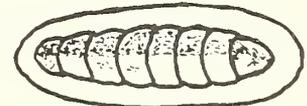


Fig. 4

3. Rounded. Local -- but rare -- is Placiphorella velata DALL, 1879, found from Alaska to the Gulf of California. (Fig. 5)

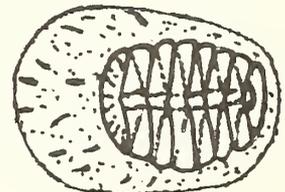


Fig. 5

B. Size of adult. Adult sizes are quite consistent and often serve to aid identification simply by eliminating unduly large species from consideration. But note that juveniles, in chitons as in shells, must be carefully watched for. Some local examples of varying species sizes are:

- 1. Small: Dendrochiton thamnopus BERRY, 1911, to 10 mm.
- 2. Medium: Lepidozona californiensis BERRY, 1931, to 35 mm.
- 3. Large: Stenoplax conspicua (CPR.) PILSBRY, 1892, to 112 mm.

2. GIRDLE.

A. Color. Some species are consistent in the color or pattern of the girdle. The possible variations are not great, but the factor can sometimes be of assistance in distinguishing between two otherwise similar species. Useful variations are:

- 1. Solid color, as in Placiphorella velata (Fig. 5).
- 2. Barred in a regular pattern, as with Callistochiton gabbi PILSBRY, 1893, in the Gulf of California and south. (Fig. 6)
- 3. Irregularly blotched, as Cyanoplax hartwegii (Fig. 3).



Fig. 6

B. General shape. Most chitons have an only moderately wide girdle which is consistent in width throughout its circumference. But some are noticeably different, and aid in identifying themselves thereby.

- 1. Wide, as in Mopalia muscosa GOULD, 1846, found locally. (Fig. 7)

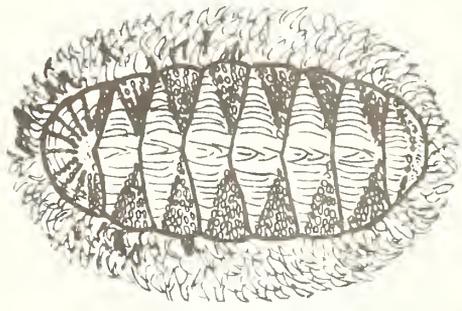


Fig. 7

- 2. Narrow, as Callistochiton palmulatus PILSBRY, found locally. (Fig. 8)



Fig. 8

- 3. Extended in front, as Placiphorella velata (Fig. 5).

4. Notched. The members of the Genus Mopalia GRAY, 1847, bear a notch centered in the rear edge of the girdle, as in this outline of Mopalia ciliata SOWERBY, 1840, found locally and north. (Fig. 9)

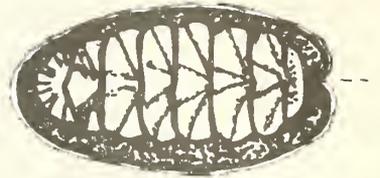


Fig. 9

- C. Texture. Here is where the Ornamentation or Armament -- or lack of it -- comes in. Check the top surface of the girdle for:

1. Nudity, or "Smooth". Here the ornamentation is so fine that it seems non-existent. Cyanoplax hartwegii (Fig. 3 above) is a good example. The northern Tonicella lineata WOOD, 1815, also has a "bare" girdle.
2. Scaled. The entire girdle is covered with platelets of a uniform shape, the shape varying from Genus to Genus. These scales may be described as fine or coarse, rounded or flattish; smooth or striated; oval or lengthened into a spiky appearance; imbricating (overlapping like shingles) or non-imbricating.

- a. Round or oval, as exemplified by Lepidozона californiensis BERRY, 1931, local. (Fig. 10)

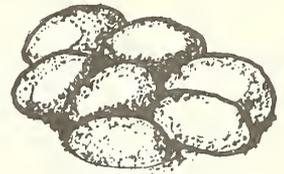


Fig. 10

- b. Elongate, as in Stenoplax conspicua, local. Note that these are scales, composed of chitinous material, and NOT bristles, which are composed of corneous material. (Fig. 11)

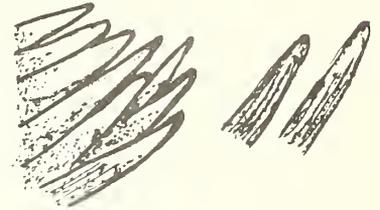


Fig. 11

- c. Striated, for which note the two separated scales in Fig. 11. Being elongated, they seem to be striated lengthwise.

- d. The imbricated scales of Lepidozона cooperi PILSBRY, 1892, are wider and appear to be striated crosswise. (Fig. 12)

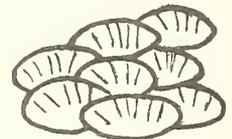


Fig. 12

3. Setae or Bristles of corneous material. According to the shape and structure of the bristle, it may be

described as:

- a. Simple, such as in Mopalia muscosa GOULD, 1846. (Fig. 13)



Fig. 13

- b. Branched, or Complex, a comment on its structure, as in this greatly enlarged hair of Dendrochiton thamnopus BERRY, 1911, found locally. (Fig. 14)

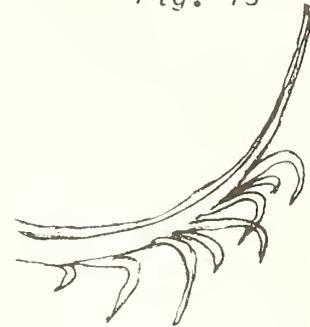


Fig. 14

4. Spicules, such as the fine glassy spines on the girdle of Acanthochitona avicula CARPENTER, 1864, found locally and in the Gulf of California. (Fig. 15)

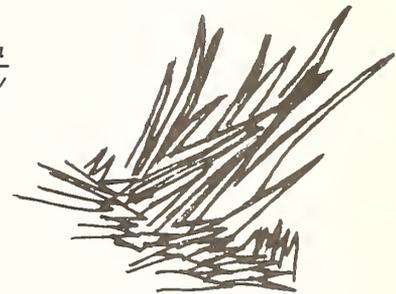


Fig. 15

5. Sutural Tufts, in which spines or bristles are grouped into clumps next to the junctions of the median plates. Acanthochitona exquisita PILSBRY, 1893, in the Gulf of California, is a marked example. (Fig. 16)

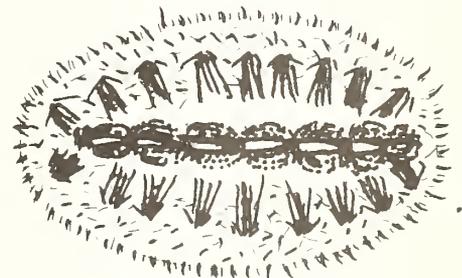


Fig. 16

D. The degree to which the girdle tends to cover the plates is also pertinent. This may be described as:

1. "Normal", meaning merely that in most species the girdle comes only to the extreme outer edges of the plates -- in which case it will probably not even be commented on. For illustration, any of the species listed above except the Acanthochitonas will serve.

2. Encroaching, meaning covering part of the plates, as in the Acanthochitonas. In actuality the encroachment is on the extremely large insertion plates, which are part of the Articulamentum, and not on the Tegmentum. This is Katharina tunicata WOOD, 1815, from central California and north. (Fig. 17)

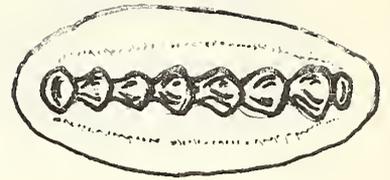


Fig. 17

3. Completely covering the plates, so that in fact there is none of the plate which can be seen and therefore no Tegmentum. The only species with this characteristic is Cryptochiton stelleri MIDDENDORFF, 1846. This huge chiton, found from central California north and west to Hokkaido Island in northern Japan, reputedly reaches a length of up to fifteen inches. (This page being only eleven inches long, no illustration will be attempted here.)

The next section of this discussion will consider the Valves or Plates. Meantime, several reference books available in the Club Library or available in local book stores are:

"Marine Shells of Southern California," by Dr. James H. McLean.

"Tidepool Animals from the Gulf of California," by Wesley M. Farmer.

"Seashells of Tropical West America (Second Edition)," by Dr. Myra Keen.

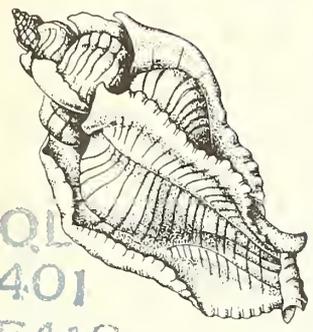
"Marine Shells of the Pacific Northwest," by Tom Rice.

"West Coast Chitons," by Glenn and Laura Burghardt.

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SAN DIEGO SHELL CLUB

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MUSEUM OF NATURAL HISTORY - Third Thursday - 7:30 PM

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Vol. IV	May 1973	No. 5

ANNUAL SHELL CLUB ACUTION: At the home of George and Rhoda Radwin		
At 6:00 PM	4341 Rodrigo Dr. San Diego, Ca	286-8938 Map on Back

From the Minutes, April 19, 1973

The meeting opened with the guests introducing themselves. Then we met several new members. WELCOME!

Dr. George Radwin introduced the winners of the San Diego Shell Club's Science Fair Award and presented them with the books they had chosen. Dr. Radwin also treated us to views of additional plates to the book being written by himself and Anthony D'Attilio on Muricidae. (Dave Mulliner is the photographer).

Joyce Gemmell's paper on Gastropod Breeding and Egg Laying in the San Felipe Area was presented to us by Carole Hertz. Slides were shown in conjunction with the presentation. The information was the result of many years of observation and greatly enjoyed, and appreciated by the club.

Gordon Robilliard showed slides of underwater life in Puget Sound and the Northwest. The nudibranch slides and information were particularly spectacular.

- Announcements:
1. The shell auction is next month and there are many choice items to be bid upon. A food sign-up sheet was passed around.
 2. Our future display in the downtown library was discussed.

31

Abstract of the research project conducted by the San Diego Shell Club Science Fair Award winners, April Gary and Amy Lindberg on the effect of lead on a type of diatom. (The importance of this project can be pointed out by the fact that this diatom is the basis for the production of $\frac{1}{2}$ to $\frac{3}{4}$ of the oxygen consumed by living organisms.-Ed.)

A program of research was suggested; to study the effect of lead chloride on the viability of marine phytoplankton. The organism chosen for experimentation was Phaeodactylum tricornutum, a marine diatom.

Many techniques had to be learned in order to conduct the experiments. The growth media (agar and liquid media) for the P. tricornutum had to be prepared under completely sterile conditions. The sea-water for the media had to be filtered and sterilized. It was necessary to conduct preliminary experiments to determine a sufficient growth period for the P. tricornutum cells, and also to determine the solubility of lead chloride ($PbCl_2$) in sea-water so there would be no precipitate. It was found that at least four weeks would be an adequate period of growth on the agar plates kept at $23^{\circ}C$. The solubility of $PbCl_2$ in sea-water was approximately 1.0 gr/L.

Prior to each experiment a Haemocytometer count was taken to find the average number of cells per milliliter. From this value the number of 1:10 dilutions to be made was calculated. All of the experiments were conducted under sterile conditions using sterilized equipment. Each of the first six experiments used several concentrations of lead chloride and a control without lead chloride. The lead concentrations used in experiments I-VI were 10^{-6} gr/L, 10^{-4} gr/L, 10^{-2} gr/L, and 5×10^{-2} gr/L. The length of exposure to lead chloride varied in each of the experiments. To expose the Phaeodactylum tricornutum to the various concentrations of $PbCl_2$, 10ml. of $PbCl_2$ solution was added to 10 ml. of P. tricornutum in liquid sea-water media. From this mixture, 1.0 ml. was withdrawn and placed in a centrifuge tube. The sample was centrifuged for three minutes, the supernatant liquid was poured off and 10 ml. of sterile sea-water was added to the cells. The P. tricornutum was mixed thoroughly in the sea-water on a vortex mixer to insure an even suspension of cells while dilutions were being made. From the last dilution tube, 0.2 ml. was removed, plated and incubated at $23^{\circ}C$ and 4300 lux for a period of at least four weeks. The inoculated plates were checked at one week intervals for growth. The number of colonies/plate was recorded each time. The equipment was cleaned and re-sterilized at the end of the growth period.

It was concluded that 10^{-6} gr/L and 10^{-4} gr/L of lead chloride do not affect the viability of P. tricornutum. A 10^{-2} gr/L solution of $PbCl_2$ has a slight effect on the viability after at least a week of exposure; and higher concentrations (10^{-1} gr/L and 1 gr/L) greatly reduce the survival rate. From the results of these experiments further tests were conducted with higher concentrations of $PbCl_2$ (10^{-2} gr/L, 10^{-1} gr/L and 10^0 gr/L) to determine the effect upon the viability of Phaeodactylum tricornutum. These experiments were conducted using a similar procedure; however, additional care was taken to insure the accuracy of the results. The results of this project will be helpful in conducting further research to determine how lead chloride (or possibly other lead compounds) may be affecting food chains in the ocean.

(The girls each chose a copy of Barnes' Invertebrate Zoology as their gift from the Club.)

FIELD OBSERVATIONS ON GASTROPOD BREEDING AND EGG LAYING

by
Joyce Gemmell

San Felipe, Baja California, Mexico, is a unique area for study of the intertidal molluscan fauna and the observation of the breeding and spawning of a large variety of gastropod mollusks. From January to May the maximum tidal range may be as large as twenty-three feet. At various times large numbers of one or another species migrate into the intertidal zone to breed and spawn, each species in its own particular portion of a ten mile curve of shoreline.

Increasing daylight seems to trigger the movement of some species into the low intertidal zone and a two week period of balmy air temperatures and gradually warming water, between spring tides, will generally be followed, on the next low tide by swarming activity. Species of Oliva, for example, are noticed in increasing numbers inshore from month to month and are suddenly found in pairs.

Commonly found spawning in San Felipe during this period are the muricid, Eupleura triquetra, (fig.1) the thaidid, Acanthina angelica, (fig.2) the columbellids, Mitrella granti (fig.3) and Anachis varia, (fig.4) the fusinid, Fusinus ambustus (fig.5) and the buccinids, Solenosteira capitanea (fig.6) and S. macrospira. (fig.7) Others are also known to reproduce at this time but only these have been observed personally in their spawning and breeding, or in close association with their respective egg cases.

In the general area, outside San Felipe Bay, spawning observations have been made on Cassis centriquadrata, Bulla gouldiana, Aplysia californica and Octopus fitchi.

The gastropods whose egg capsules will be discussed here are: Solenosteira capitanea Berry, 1957; Solenosteira macrospira Berry, 1957; Anachis (Costoanachis) varia (Sowerby, 1832) and Fusinus ambustus (Gould, 1853).

Solenosteira capitanea, type-locality San Felipe, is considerably less abundant intertidally than Solenosteira macrospira. S. capitanea is found living in the lowest intertidal zone, on fine, dense sand, while S. macrospira is found in the middle intertidal zone, on sand between rocks and moving closer and further from shore with seasonal changes in temperature.

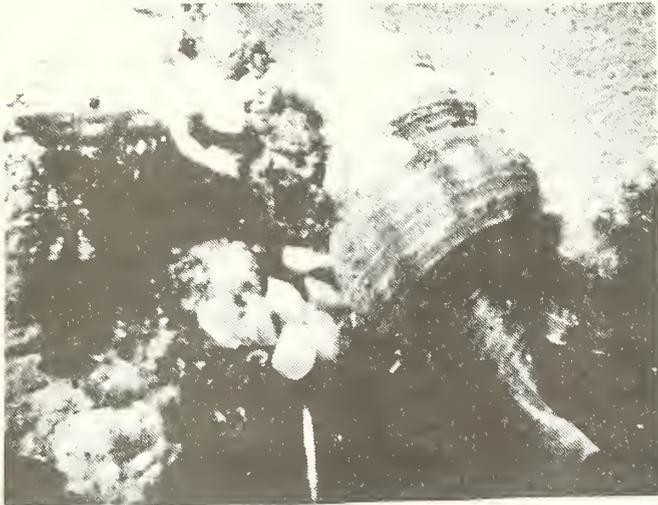


Anachis varia
with egg capsules

Solenosteira macrospira with egg capsules

Large numbers of S. capitanea congregate to deposit eggs and the egg capsules (fig.8) are attached to the dorsal surface of the shell of one of the other members of the breeding aggregation. When the animal is found burrowing in fine sand the attached egg capsules are effectively camouflaged by encrusting sand grains, and sand is packed between the individual capsules. In this condition, in the field, it is hard to tell if the cases are full of embryos or of sand. The actual egg deposition has not been observed personally and rarely have the live animals, with incubating egg capsules been seen intertidally. In April, 1971 during an unseasonable cold spring, S. capitanea was collected at the waters edge during "minus" tides with recently deposited egg cases attached. One specimen had emerging juvenile snails one millimeter in length, with microscopic sculpture, thus establishing as fact the non pelagic larval development of this species.

Anachis varia, the columbellid most abundant in the area, is found on and under stones throughout the year. Small patches of empty egg cases (fig.10) are persistent under stones for many months and have a texture similar to dry straw flower stamens. Individual capsules are one millimeter wide and three millimeters in height. In spite of this species commonness throughout the year and the presence of all stages of growth, personal observation of the female depositing eggs has been rare. Fresh egg capsules have been noticed in November and there may be more than one breeding season, as small juveniles have been collected from sea star (Astropecten) stomachs during late fall and winter.



Fusinus ambustus
depositing egg capsules



Egg Capsules of Fusinus ambustus

Of the four Fusinus species in the San Felipe area, F. ambustus is probably the most common. Juveniles of various sizes are present during low tides among rocks in the summer and fall. Large, fully-formed adults are found intertidally in late winter and early spring. (i.e. apparently only during the breeding season). Spawning of Fusinus ambustus has been observed in the North quarter of San Felipe Bay in February, 1970 and in March, 1971. At this time of year field observations are made at night by lantern light. Between February 24, 1971 and March 29, 1971 there were nine nights during New Moon tides of approximately five to six feet below mean low tide. Breeding

and communal egg deposition was taking place by hundreds of snails of from 40 to 65 millimeters in length, on stones, in a muddy channel. One month later, on April 25th, the breeding snails were gone and some of the egg capsules were empty. Capsules in one area completely covered the top and sides of clean granite stones. Viewed from a standing position the egg cases (fig. 11) looked like small, flat buttons. On closer examination with a microscope, the top was found to have five escape hatches raised above the general surface.

Field observation, even in a unique, intertidal area, although it has many advantages, cannot approach the controlled and extended laboratory situation, necessary for many types of conclusions on breeding, spawning and incubation. After seven years of year-round-observation **in this area**, and making notes on molluscan associations I find delays of a month or two and even gaps of entire years during which certain species that could be expected to congregate for spawning do not appear.

I believe that the main factor in spawning timing, at least in the San Felipe area, is water temperature; in some instances a very critical temperature is necessary for spawning to take place. Of course, it is also necessary for the observer to be at the right place at the right time and, hopefully, to interpret correctly what is seen.

BOOK NEWS

Carole M. Hertz

Below is a list of new acquisitions by the San Diego Shell Club Library. These will all be available for circulation at the next meeting.

- 1-The Echo 5 Abstracts and Proceedings of the Fifth Annual Meeting of The Western Society of Malacologists, June 18-21, 1972. Donated to the library by Virginia and George Hanselman.
- 2-The Veliger, Supplement to Vol. 15, A Systematic Revision of the Recent Cypræid Family Ovulidae, by Crawford Neill Cate, a Club purchase to be reviewed in the **next** issue.
- 3-The Nautilus, Vol. 87, number 1, January 1973, founded 1889 by Henry A. Pilsbry, Editors R. Tucker Abbott and Charles B. Wurtz, a Club subscription.
- 4-Sea Frontiers, Magazine of the International Oceanographic Foundation, donated by Nola and John Michel, published bi-monthly. Vols. 11-18 were donated.
- 5-Sea Frontiers, six issues donated by MaeDean Richart.
- 6- We will again be exchanging publications with the Oregon Shell News.

NEW MEMBERS

Neeley, Claudia
 470 La Vetal St.
 Encinitas, Ca. 92024

Pallanck, Lee
 2318 Newport Ave.
 Cardiff, Calif. 92007

SOME HINTS ON THE IDENTIFICATION OF CHITONS (Part 2)

by

George Hanselman

The first part of this discussion covered the major parts of the chiton as complete assemblies -- the Plates, the Girdle, and the ventral portion of the Animal. Then the Girdle was discussed in some detail.

Now, before we start on the details of the Plates, let's take another look at them (Fig. 18). Remember that the outside of the plates is the Tegmentum, and the inside the Articulamentum. Remember too that the Nose Plate, the Median Plates, and the Tail Plate represent three distinct structural forms, each consistent with its functional purpose. Basically the nose plate serves as a cap to shield the animal during forward movement. The median plates protect the top of the animal, and also articulate with each other to afford the flexibility necessary to go around curves, over humps, and through depressions. The tail plate serves as a protective cap during rearward travel, but additionally is articulated to plate 7 in order to maintain flexibility; this dual role then results in a shape which somewhat combines the forms of the nose plate and a median plate.

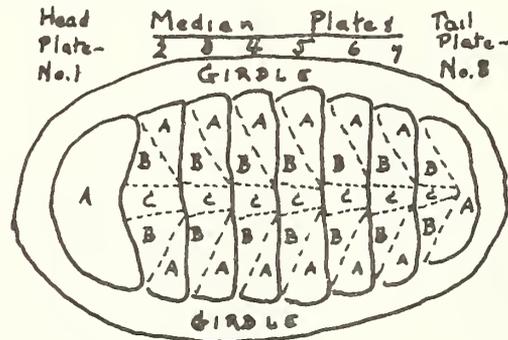


Fig. 18

3. PLATES or VALVES.

A. Tegmentum. As a result of their functional design, the various types of plates have differing shapes which in turn are divided into separately identifiable areas. For descriptive reference these areas are individually named.

1. Plate Areas.

- a. The Nose Plate has only one type of area, and consequently is simply referred to by its plate name.
- b. The Median Plates each have three areas of Tegmentum. (Ignore the portions marked "Sutural Lamina" -- they come later as part of the Articulamentum.) (Figs. 19 and 20)

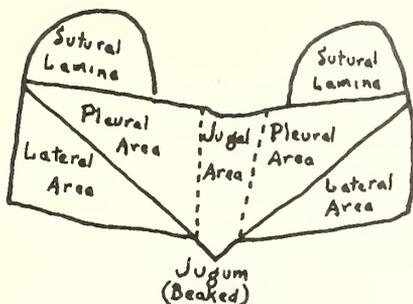


Fig. 19

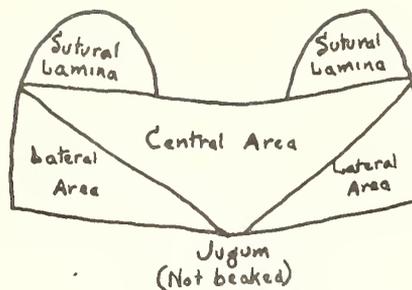


Fig. 20

- (1) Each median plate has two Lateral Areas. These areas are usually slightly raised above the general level of the plate surface, and therefore plainly defined.
 - (2) Each median plate has two Pleural Areas.
 - (3) Each median plate has one Jugal Area. This is a strip lying along the crest of the plate; its width is defined by the width and strength of its individualized sculpture -- if any.
 - (4) There is one Jugum on each median plate. It is simply the center point of the posterior edge of the plate. If it protrudes to the rear beyond the edge of the plate it is said to be beaked (Fig. 19). If it is even with the edge it is termed not beaked (Fig. 20). Often this portion of the plate is so eroded that the true shape cannot be clearly seen.
 - (5) If the sculpture of the Pleural Areas and the Jugal Area is the same, the two areas may be referred to jointly as the Central Area.
 - (6) If the Lateral Areas are not significantly raised and their sculpture is the same as that of the Pleural Areas, the two areas may be referred to jointly as the Latero-Pleural Areas.
- c. The Tail Plate is divided into two major areas plus one spot. (Fig. 21).

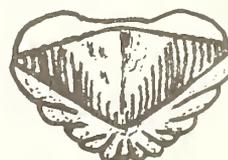


Fig. 21

- (1) The Anterior Area is the pie-shaped forward portion of the tail plate. Like the similar portion of the median plates, it is composed of two pleural areas and a jugal area.
- (2) The Posterior Area is the rest of the tail plate -- the back half, in other words. It compares to the nose plate, or to the lateral areas of the median plates.

(3) The Mucro is nothing more than a spot at the posterior edge of the tail plate's jugal area, right at the tip of the Anterior Area's pie-slice. It has no area dimension and no sculpture. It is used thus to describe its own location, to wit ---

- (a) Central, which would then indicate that the tail plate is fairly evenly divided between anterior and posterior areas.
- (b) Forward or Anterior, which inherently would signify a smaller anterior area.
- (c) Posterior, which would then denote a larger anterior area and a reduced expanse of posterior area. In Fig. 21 the mucro is definitely posterior.

2. Sculpture. This is where the A's, B's, and C's of Fig. 18 apply. The sculpture in all A areas will be the same. Area B will probably have a different sculpture, and all B areas will have that different sculpture. And if Area C has still a third form of sculpture, all C areas will have it.

a. The Nose Plate will have only one sculptural pattern, which can be:

(1) Smooth, as in Tonicella lineata WOOD, 1815; i.e., no sculpture at all.

(2) Ribbed, as in Mopalia muscosa GOULD, 1846. (Fig. 22)

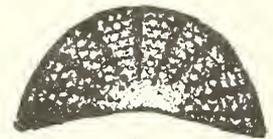


Fig. 22

(3) Granular, as in Nuttallina fluxa CARPENTER, 1864, a common local species. (Fig. 23)

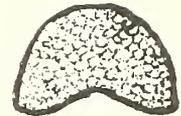


Fig. 23

(4) Beaded, as in Lepidozonia mertensii MIDDENDORFF, 1846. (Fig. 24)

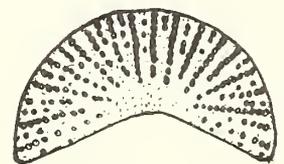


Fig. 24

(5) Pitted, as in Mopalia lignosa GOULD, 1846. (Fig. 25)

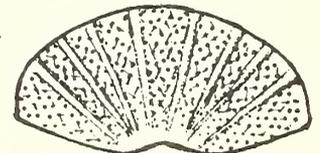


Fig. 25

(6) A combination of two of the above. For instance, note that in Fig. 22 the areas between the heavy ribs are somewhat

granulated. And in Fig. 25 there are rib-like strips which in fact are quite flat but which set off the areas of pitted sculpture.

- b. The Median Plates may show one, two, or three types of sculptural pattern. If only one, the entire plate will be covered with it and there will be little distinction between the lateral, pleural and jugal areas. Some of the possibilities:

(1) Tonicella lineata WOOD, 1815 essentially has a single overall sculpture -- that is, it is entirely smooth all over.

(2) The lateral areas of Stenoplax limaciformis SOWERBY, 1832 bear ribbing identical to the nose plate's encircling ribs, but their somewhat different orientation creates a slightly different appearance. Note that the sculpture of the central area is omitted. (Fig. 26)



Fig. 26

(3) This half-plate of Acanthochitona avicula CARPENTER, 1864 (GREATLY enlarged!) shows a two-sculpture species. The latero-pleural areas bear teardrop-shaped beads. The jugal area is a smooth band, lightly grooved longitudinally. (Fig. 27)

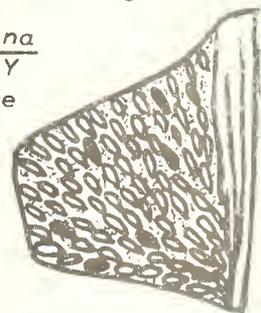


Fig. 27

(4) A median plate of Tonicia forbesii CARPENTER, 1856, a far southern species, shows three types of sculpture plus a beaked jugum. The bands of black dots in the lateral areas are Ocelli -- tiny glassy primitive eyes. (Fig. 28)



Fig. 28

- c. The Tail Plate will, in total, correspond to the sum of the sculptures of the nose plate and the median plates. This is demonstrated by the tail plate of the local Callistochiton decoratus PILSBRY, 1892, shown in Fig. 21.

(1) The anterior area is longitudinally ribbed, exactly like the lateral areas of the median plates, and the jugal area tends toward smoothness as do the jugal areas of the medians.

(2) The posterior area bears the same heavy ribbing as that of the nose plate and of the lateral areas of the median plates.

3. Silhouette. In some species a side view of the tail plate can aid identification. Callistochiton palmulatus (CPR.) PILSBRY, is unique in its swollen tail plate. Note that here the head of the chiton is to the right. (Fig. 29)



Fig. 29

4. The Color of the Tegmentum is seldom a satisfactory means of identification unless it can be coupled with a simple and absolutely consistent pattern.
5. Pattern of color is useful only in a very very few species. But then it can be absolutely definitive.

(1) The consistent black-gray-white pattern of Chiton albolineatus SOWERBY, 1829, never fails. (Fig. 30)



Fig. 30

(2) Likewise the limited and distinctive variations in brown-tan-cream-white of Tonicella lineata WOOD, 1815 serve almost equally well. (Fig. 31)



Fig. 31

Next time, a smashing finale --- the ARTICULAMENTUM!

Relaxing
fluid!

Good
food!

COME TO THE AUCTION

Radwin
4341
Rodrigo Dr.
296-8938

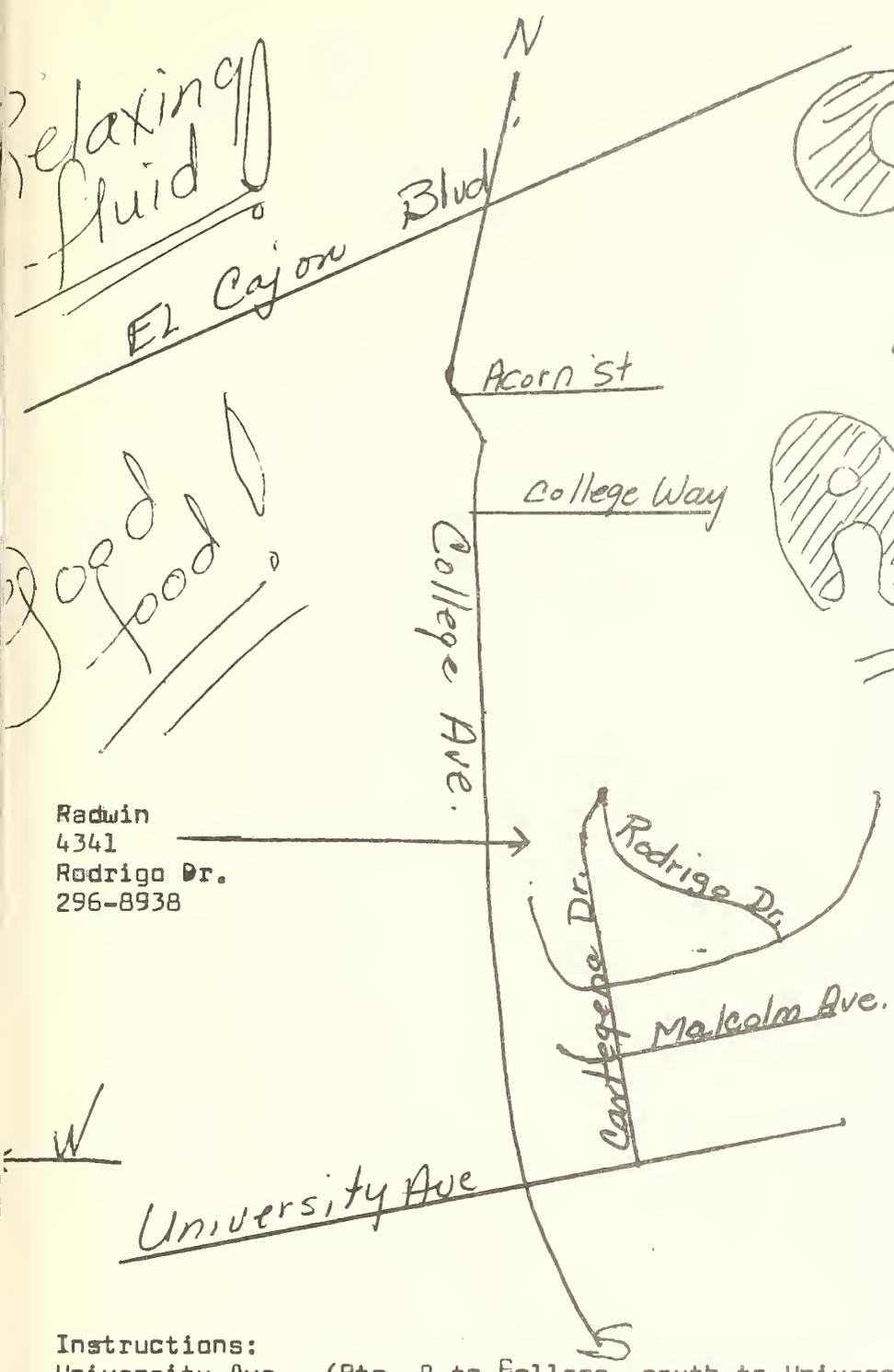
SATURDAY
May 12

Starts at
6 P.M.
beautiful
Shells!

Instructions:
University Ave. (Rts. 8 to College, south to University.
Rts. 94 to College, north to University)
East on University one block
Left on Cartegena, go three blocks to Rodrigo.

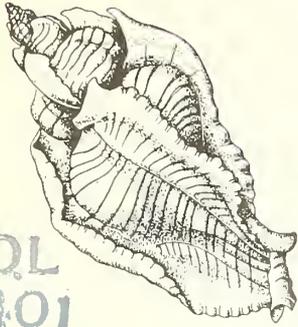
Remembers

- 1. Bring your pot luck contribution & serving utensils.
- 2. Bring eating utensils — paper plates provided.
- 3. Bring bridge chairs or zabutons
- 4. Be ready to Buy, Buy Buy!!



THE

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SAN DIEGO SHELL CLUB

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MUSEUM OF NATURAL HISTORY - Third Thursday - 7:30 PM

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Vol. IV

June 1973

No. 6

* Program: Dr. Raymond Gilmore, speaker. *
* "An Armchair Discussion on Whales" *
* June 14, 1973. 7:30 P.M. *

SHELL AUCTION

Once again our Club has had a successful and enjoyable shell auction. A potluck dinner, preceded by a social hour, was enjoyed in the patio room at the home of Dr. George Radwin and his wife, Rhoda.

Between thirty and forty members and guests were present. Several long-distance members were there to share in the fun. John Phillips from Santa Barbara was one of these-and a generous donor of many fine shells.

When the flowing bowl- a witches' cauldron with volatile vapors cloudily curling above the punch, had been generously sampled, the laden buffet was quickly lightened and we were ready for the auction. But not before guests and seldom-seen members were named and welcomed.

Norman Currin and George Radwin were our very able auctioneers, timing their turns to save their voices. Their knowledgeability added to our enjoyment-and their tongue twisters, too.

It takes the efforts of many people to make a success of a shell auction. First, there are the donors of shells, with data and, quite often already in boxes or bags. Then there are the willing workers who bag or box those that are not, and then number all of them; the maker of the punch, Dave Mulliner, the cooks, none better, who never disappoint us.

Our very great appreciation and thanks go to all of these people, more especially to George and Rhoda Radwin, (and most especially to Rhoda who is "infanticipating" (w.w.), not really an easy time to be hostess.

FREEZING RESISTANCE IN THE ANTARCTIC LIMPET PATINIGERA POLARIS

by

A.R. Hargens and S.V. Shabica

Observations by SCUBA (by S.V.S.) of Patinigera polaris during the antarctic winter of 1970 showed that these limpets were naturally frozen into either anchor ice or intertidal scale ice. Sea water temperatures ranged from -1.80°C to -1.95°C and mean daily air temperatures ranged from -4.5°C to -11.0°C . In all cases in-frozen limpets were surrounded by small ice-free pockets filled with a high viscosity mucus. These ice-free zones ranged in thickness from 1 mm to 11mm in eleven animals observed between June and August. After the anchor ice was lifted or the flood tide released the in-frozen limpets, the animals displayed normal behavior. These observations seemed to indicate that the mucus secreted by the in-frozen limpets was in some way preventing freeze damage.

Limpets for a freezing resistance study were collected at the end of the antarctic summer (mid-February) in tidepools and at a depth of 41 feet. Blood samples by heart puncture and mucus samples were collected using very fine drawn-out capillaries. The samples were centrifuged and the freezing experiments were performed in the same fine capillary tubes. Equilibrium freezing points (actually melting points) were determined using a method modified from Scholander et al., Journal of Cellular and Comparative Physiology 49:5-24 (1957) where the temperature was determined at which the last, small, upward-floating crystal began to blur. The temperatures at which ice began to propagate in the limpet blood and mucus, in conjunction with rates of ice propagation at lower temperatures, were also determined.

All equilibrium freezing points of intertidal and 41 foot limpet blood and mucus samples were very near the freezing point of the February sea water (-1.77°C). Six intertidal limpet blood samples, eight 41 foot limpet blood samples, and six limpet mucus samples were investigated. The initiation of ice propagation occurred near -2.0°C in all limpet blood samples without regard to habitat. The initiation of ice growth in limpet mucus, however, was retarded until approximately -2.4°C . Rates of ice propagation in blood at temperatures between -2.4°C to -4.0°C showed little difference between the intertidal and 41 foot limpets. On the other hand, the mucus showed much slower rates at the same temperatures. The striking ice retardant properties in the limpet mucus may afford these animals some protection in the below-zero antarctic environment, especially the intertidal limpets which could be exposed to temperature less than -2°C while frozen in the near-shore ice. By secreting such a mucus, they are, in effect, providing a protective milieu which ensures an extra 0.4°C supercooling below that of their blood. The mechanism by which ice propagation is retarded below the freezing point in ice-seeded samples is not known.

(Permission given to reprint by Scripps Institution of Oceanography.)

ADDITIONS TO MEMBERSHIP LIST

SELIGMAN, Alex
2658 Escondido Ave.
San Diego, Ca. 92123

WEST, Arthur & Emma Rose
P.O. Box 730
Oakhurst, Ca. 93644

DRAKE, Peter, Margaret
& son Brett
5021 Caywood St.
San Diego, Ca. 92117
274-1822

by Loyal J. Bibbey

The Veliger has recently published a 115 page supplement to Vol. 15 entitled "A Systematic Revision of the Recent Cypræid Family Ovulidae," by Crawford Neill Cate. It is available through the Veliger for \$15.00 plus handling charges.

Among newly proposed supraspecific taxa are to be found 19 genera and 7 subgenera. The new species number 94 with an additional 7 subspecies. The many new taxa make this work indispensable for further work by future specialists. The book is fully illustrated with 51 photographic plates, 4 of which are in color.

The title, "A Systematic Revision of the Recent Cypræid Family Ovulidae" seems to belittle this work as it appears Mr. Cate was referring to his work as a "Revision" of Dr. Schilder's monograph of the same family. Dr. Schilder's work is not nearly as detailed in text and is only illustrated with poorly done drawings. Mr. Cate includes the original description, and then selecting a hypotype gives a thoroughly enlarged description found lacking to a great degree in Schilder's work. The descriptions by Mr. Cate are followed by other necessary details such as size measurements and more precise locality data. The location of the holotype is also given when known.

The Cate monograph is the only serious work on the Ovulidae that has been done to properly illustrate and describe all known species and their generic placements. It is a magnificent work, and for the first time material has been made available to the amateur and professional for classification and study of this most interesting group of mollusks.

In 1969 this reviewer has what he believed to be 14 undescribed species of Ovulidae. Thanks to Mr. Cate's work only one, it appears, remains undescribed.

Mr. Cate, in the opinion of the reviewer, recognizes many morphological details of questionable importance in separating genera and species. However, until such a time that science decides upon a set of rules for clearly defining a species or its delimitations, we will have to go along with the facts as understood by authors who are specialists and not afraid to publish what they believe.

Well done, Mr. Cate.

From Sea Secrets

Question

Question: The Murex snails in my saltwater aquarium laid eggs a week ago. How long will it take for the eggs to hatch, and what precautions should I take to ensure survival of the hatchlings.
M.S. Long Beach, Ca.

Answer: The reproductive biology of only a few species of gastropods is completely known; thus we can only provide general information in answer to your questions.

In neogastropods, such as Murex, the sexes are separate and fertilization is internal. The eggs are usually deposited in horny capsules that may contain up to several hundred eggs; however, in some cases, not all the eggs in each capsule develop into embryos. The undeveloped eggs are called "nurse cells" and are used as food by the embryonic snails. Hatching may take place several weeks to several months after the eggs are laid. To ensure the survival to the embryos, it is advisable to keep the aquarium water clean and well aerated.

Murex snails feed on various bivalve molluscs, such as oysters, mussels, and clams.

SOME HINTS ON THE IDENTIFICATION OF CHITONS (Part 3)

by

George Hanselman

The first part of this discussion enumerated the major parts of the chiton --- the Plates, the Girdle, and the ventral portion of the Animal, and then reviewed the Girdle in detail. Part 2 covered the Tegmentum, the external surface of the plates, in its various parts and aspects.

That leaves the inside surface of the plates, the Articulamentum, for this final discussion. And as with any major assembly, there are various distinct and standard parts which can readily be described and referred to by name. However, certain of these do not appear in all genera, and their presence or lack may equally be significant.

But first, note that the color of the Articulamentum does not serve as a positive aid to identification. At most, in a very few species, the interior color may serve as a further boost toward an identification which is already reasonably certain.

3. PLATES or VALVES (continued).

B. Articulamentum. As the soft animal lives in direct contact with the inside of the plates, it comes as no surprise that their inner surface is so smooth as to be practically porcelainous. There are a few bumps and rough spots, but these are there to serve as a guide for ligaments.

1. The Sutural Laminae, also called Apophyses, are thin plates projecting forward from each valve except the Head Valve. As they project forward under the posterior edge of the next plate ahead, they are not visible unless the chiton is taken apart. They fit into gristle-like sockets in the top of the animal, and thereby serve to connect the several plates into an articulated whole to give the chiton solidity and yet enable it to be flexible as it crawls.

a. This is a median plate of Leptochiton rugatus PILSBRY, 1892, as seen from above. The two rounded lobes at the top of the plate are the Insertion Plates, and are part of the Articulamentum. The rest of the plate is Tegmentum. (Fig. 32)

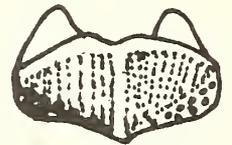


Fig. 32

b. This is a simplified sketch of a median plate (of no particular species) seen from the inside. Again the Sutural Laminae are the two rounded lobes at the top of the sketch. (Fig. 33)



Fig. 33

- c. This view of how the Sutural Laminae project from the tail valve of Callistochiton decoratus PILSBRY, 1892, also illustrates how the laminae can be of varying lengths and shapes in different genera. (Fig. 34)



Fig. 34

2. The Sutural Sinus is the gap between the two Sutural Laminae of each of the last seven plates. It always exists, although sometimes it may appear only as a slight wave in the anterior edge of the Articulamentum. It usually is described as Wide or Narrow, and then further described as ---

- a. Smooth, as in Fig. 32 above. That is, it is just a smooth edge extending across the anterior edge of the plate between the inner margins of the two Insertion Plates. Note again Fig. 34, where the Sinus also is smooth, but is much shallower.

- b. Denticulate, or Serrated, or Pectinated --- all with the same meaning: it has a saw-toothed edge. This is Chiton goodalli BRODERIP, 1832, from the Galapagos Islands. (Fig. 35)



Fig. 35

- c. Notched, that is, with a small notch on each side of the Sinus, so that it is separated from the adjacent Sutural Laminae. The example here is Ischnochiton tridentatus PILSBRY, 1893. (Fig. 36)



Fig. 36

3. The Insertion Plates are extensions of the edge of the Articulamentum. They fit into the girdle, and serve to bind the girdle to the valves. The Insertion Plate of the head valve extends around the complete anterior edge of the valve. That of the tail valve extends around the complete posterior edge of the valve. The median valves, however, have an Insertion Plate on each side of each valve --- that is, two per valve.

- a. Slits appear in the Insertion Plates of all genera except those of the Family LEPIDOPLEURIDAE. They are exactly what the name implies: narrow slits which extend vertically from the bottom edge of the Insertion Plate almost to the edge of the Tegmentum. If the Slits are only shallowly cut, this fact is usually mentioned in the description. Customarily a description will include the Slit Formula, giving the number of slits present in a typical head valve, median valve, and tail valve, in that order; e. g., the Slit Formula 5-1-4 indicates that in the species under discussion the head valve will usually have 5 slits, each side of each median valve will have 1 slit, and the

tail valve will have 4 slits. If much variation can be expected, the Formula might read something like "12-15, 1-2, 10-12".

- b. The segments of Insertion Plate lying between the Slits resemble teeth --- and Teeth is what they are called. Usually the head valve and the tail valve will each have several Slits, and thus several Teeth. The median valves, however, may have on each side of each valve ---

- (1) A single Slit, as does Lepidozona mertensii MIDDENDORFF, 1846. (Fig. 37)



Fig. 37

- (2) Two or more Slits. Median plates which normally have more than one Slit are sometimes referred to as Rad-sioid. This is a median valve from Stenoplax conspicua (CPR.) PILSBRY, 1892. (Fig. 38)

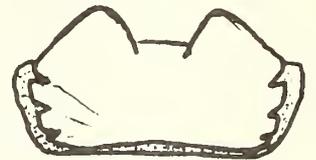


Fig. 38

- c. The Teeth themselves are described as to their smoothness or roughness. This applies to the outer vertical surface of the Teeth as well as to their edge.

- (1) The Teeth of Lepidozona mertensii, whose head valve is shown here, are Smooth. (Fig. 39) Note that this is a dorsal view.



Fig. 39

- (2) The roughened Teeth of Chiton virgulatus SOWERBY, 1840, are referred to as Pectinated, or Combed. This also is a dorsal view of the plate. (Fig. 40)

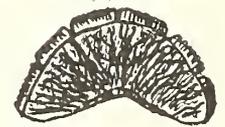


Fig. 40

- (3) Those of Acanthopleura spinosa BRUGUIERE, 1792 (an Indo-Pacific species), whose tail valve is shown here in side view, are understandably termed Propped. (Fig. 41)



Fig. 41

4. Slit Rays appear in some genera, and are lacking in others. They are simply finely indented lines which run diagonally from the center of the posterior edge of the plate directly to the upper edge of a Slit in the Insertion Plate. (But in the tail plate they start in the center of the valve, under the mucro, and run back to the Slits.) They generally correspond in number to the number of Slits in the plate. Sometimes instead of appearing to be smoothly incised they

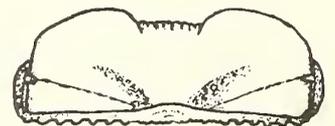


Fig. 42

show as lines of tiny elongated pits. This is the interior of a median plate of Lepidozonia mertensii. (Fig. 42)

5. Callouses are exactly that: swellings, usually a little bumpy on their surface. They usually are most apparent in the cavity of the tail plate, but can appear to some degree in all plates. The only local species with a notable callous formation is the deep-water Oldroydia percrassa DALL, 1894.
6. The Eaves are the overhang formed at the juncture of the Articulamentum with the Tegmentum, along the upper edge of the Insertion Plates. Fig. 43 is an end-on view of a median plate of Eudoxochiton nobilis GRAY, 1843, from New Zealand, chosen because of the tremendous projection of its Eaves. Assume you are standing at the base of the Insertion Plate, on its outside, and looking up under the Eaves. You will see that the surface there is either ---



Fig. 43

- a. Solid; that is, without any holes or pores.
 - b. Or Spongy or Porous; full of tiny holes like a very fine sponge.
7. The Angle of Divergence is often mentioned. It is usually measured at Valve 4 or Valve 5. Its value as an identification feature is limited. In Figure 43 the angle inside the Tegmentum, here 120 degrees, is the Angle of Divergence. The flatter the chiton the greater the Angle. By contrast, a razorback hog would have a quite small Angle of Divergence. Unfortunately, most chiton species vary widely within themselves. One specimen of Mopalia lignosa GOULD, 1846, for instance, can be quite sharply ridged, with an Angle of about 115 degrees, and a specimen on the next rock can often be flattened down to an Angle of 140 degrees.

So there we have it --- Animal; Girdle; Plates inside and out. The terms used cover all the basic ingredients, but not all the variations thereof; that would be enough for an entire new discussion. But here are a couple of the principal ones.

In the beginning of the present style of descriptions, the savants were familiar with Latin and used it as the international language of science. This eventually led to a somewhat fixed terminology, precise in its way but always subject to interpretation on the basis of how the individual had learned his Latin. For after all, the real experts in the language had been dead for several hundred years, and in the interim I have no doubt that Latin in London had departed a bit from Latin in Latvia. Then later still, these terms in turn had various national language words substituted, and VOILA! We're off and running!

As a case in point, jugum means "junction". The jugal area is the ridge where the sides of a median plate join. Fig. 19 (in Part 2) illustrates a Beaked Jugum. An umbo is the point in the center of a round shield. The umbo is also the point at which the jugal area is or

is not beaked. A mucro is a "point", and mucronate therefore means pointed. If the jugal area is extended in a point at its posterior edge, it may be called beaked, umbonate, or mucronate. Dealer's choice.

If the sculpture of the Tegmentum consists of both longitudinal and transverse ribbing, as in the pleural areas of Lepidozona mertensii in Fig. 44, it may be termed reticulate, or netted. Common knowledge, and no trouble. But often the tegmentum will be said to be "quincuncially punctate." Here is a different horse of a rarer color! A quincunx is a pattern of five points. Make a square with four dots. Put another dot in the center. Put two more dots to the right to make another square, and another dot in the center. Extend it as far as you like in any direction, and the pattern will always be quincuncial. If each dot were a tiny pit in the tegmentum? Right: quincuncially punctate. Many chitons which appear quite smooth to the naked eye will turn out to be Q.P. under the microscope. Note too, in Fig. 45, that the squares can be squeezed into flat or skinny rectangles, or even warped diagonally, and the quincunx remains.

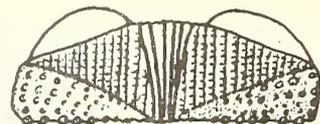


Fig. 44

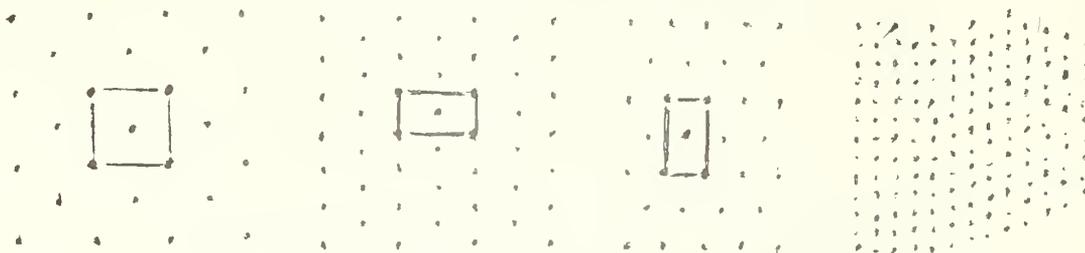


Fig. 45

Another point of variance has to do with ribbing. A "rib" on a chiton, to me is a ridge raised above the base surface. Between the ribs are channels. And that seems to be the general usage. A sulcus is a furrow. Sometimes the reference is to the furrow, a fine example being Chiton sulcatus WOOD, 1815 from the Galapagos. And of course between the furrows are ridges, which then may also be referred to as ribs. A ruga (plural rugae) is a wrinkle. And enough wrinkles side by side equate to ridges with channels between. Stenoplax limaciformis, for instance, could be said to be rugosely sculptured on the nose plate, sulcose in the pleural areas of the median plates, and heavily ribbed throughout! So in the long run, a 'escription may turn out to be the product of what the describer saw, what he thought he said about it, what you see, and what you think he thought he said.

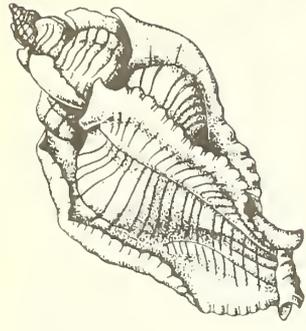
*Nuff said!

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MUSEUM OF NATURAL HISTORY - Third Thursday - 7:30 PM

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Vol. IV

July 1973

No. 7

* Program: A Talk on Typhis, Anthony D'Attilio *
* July 19, 1973. 7:30 P.M. *

Minutes from the meeting of June 21st, 1973

Our speaker for the evening was Dr. Raymond Gilmore. He spoke informally to the club about whales. It turned out to be a fascinating discussion and everyone had a chance to participate by asking questions that interested them.

Lerner Marine Lab. of Bimini, Bahamas, notified us of their facilities that are available for researchers.

Billee Dilworth read a letter from Tonga. Her friends (met during her trip there) told of a hurricane that wiped out the little island's housing, and the population's belongings. All the people were spared. The club moved and seconded the motion that the San Diego Shell Club send a \$25.00 donation to help these friends in need.

The exhibit at the library will be set up July 28th.

Phil Faulconer won the shell drawing.

Anne Schwarz
Recording secretary

UPCOMING SAN DIEGO SHELL CLUB EXHIBIT

The San Diego Shell Club will be presenting a large exhibit of marine mollusks in the main lobby of the Central Public Library during the month of August. The exhibit will open on July 28 and will feature over 17 displays. Subjects for exhibit include: Shells in History and Religion, Unusual Shell Forms, Mollusks and their Egg Cases, Nudibranchs, Fossil Shells, Molluscan Family Tree, Aquarium Display, and others.

Two slide shows will also be presented at the library during this time. On August 2 at 7:30 P.M., a program on Nudibranchs with slides and commentary by David K. Mulliner will be given. On August 28 at 7:30 P.M., the program will be Mollusks and Their Animals, featuring slides taken by Club members.

BOOK NEWS

Carole M. Hertz

A new purchase for the Club library is Alan Hinton's "Shells of New Guinea and the Central Indo-Pacific." The book, which sells for \$8.95, is profusely and beautifully illustrated with color photographs by the author.

Mr. Hinton treats only the gastropods in this book and of them, omits the less popular and/or less striking families. The nassariids, Patellas, Littorines, columbellids and pyramidellids, for example, are missing (which this writer finds disappointing). Of the families included, the species are very briefly described opposite clear, color photographs which would be extremely helpful for identification purposes. Where appropriate, dorsal and ventral views of the shells are given.

The text includes a short interesting commentary on the area covered with two accompanying maps. Also included is a section on collecting for beginners.

This writer believes the book will be a useful addition to our library, especially for those who have collected in this area or exchange with friends in the Indo-Pacific.

ADDENDUM-CORRIGENDUM-APOLOGIA

In Part 3 of "Some Hints on the Identification of Chitons," (FESTIVUS, June 1973) in paragraph 3. B. 7. appeared the statement "In Figure 43 the angle inside the Tegmentum, here 120 degrees, is the Angle of Divergence." This statement, although truly fascinating when you consider how you might go about taking such a measurement, is of course absolutely incorrect. The Angle of Divergence is measured on the OUTside of the Tegmentum. Fortunately. So please write out over in. (G.H.)

NEW MEMBERS

Hedges, Arlene
404 N. East St.
Crown Point, Indiana, 46307

LIVING ON THE HIGH TIDE

By Barbara W. Myers

In an environment that is constantly in motion, many marine invertebrates have the ability to attach, when young, to something stable such as rocks, pilings, ships' hulls, etc., living out their lives in one place, filter feeding on the plankton brought in by the high tide.

Barnacles, chamas, oysters, worm shells etc. secrete a special cement used in the attachment process, while mussels, jingle shells, scallops etc., use a byssus to anchor themselves to some support. Others, such as sponges, ascidians and hydroids have special cells or projections used in the anchoring mechanism.

When Ventura Bridge, built 34 years ago across Mission Bay, was replaced by a larger concrete structure, the old wooden structure was torn down. The wooden pilings supporting the bridge and serving as home for these sessile filter feeders were pulled from the water during January and February, 1973. Sponges, hydroids, ascidians, bryozoans, barnacles and mollusks, all unable to separate themselves from their threatened environment were doomed. In my survey of the pilings after they had been pulled from the water, I found that unattached mollusks, crabs, shrimp, starfish and even small fish associating safety and home with the piling would not leave and therefore met the same fate as those who could not leave.

I made 10 to 12 separate surveys of the numerous pilings during the course of the razing of this bridge, not as they came directly from the water as this would have interfered with the workers, but several hours later. I was able to keep track of where the pilings had been in the water and did not find any significant difference in the ones from the middle of the channel as compared with the ones from each side except that on the deeper, middle-of-the-channel pilings, I found a small red-orange aggregate anemone covering the lower 12 to 18 inches of the piling.

I did find some depth zonation, but not as defined as I expected. The upper portion exposed at low tide was covered by the small brown barnacle, Chthamalus fissus (Darwin), the somewhat larger Balanus glandula (Darwin) and Mytilis edulis (Linnaeus 1758). Below this exposed portion, I began to find M. californianus (Conrad 1837) mixed in with M. edulis and an occasional Modiolus capax (Conrad 1837). Singly and in large clumps on the piling and the mussels, the red and white barnacle Balanus tintinnabulum californicus (Linnaeus) with its strikingly colored red and blue cirri took over from Chthamalus fissus and Balanus glandula. Still feeding on the mussels and seemingly unaware of any danger was an occasional Pisaster ochraceus (Brandt). Living in the gill chambers of some of the specimens of Mytilis californianus, I found the small commensal crab, Fabia subquadrata (Dana)

Behind these thick clumps of mussels, I found several specimens of Acanthina spirata (Blainville 1832), Iselica fenestrata (Carpenter 1864) and Mitrella carinata (Hinds 1844). I also noticed the mussel or clam worm

Nereis vexillosa (Grube) with its lovely blue green iridescence. Rarely, I came across Megatebennus bimaculatus (Dall 1871), its large exposed body a red-orange matching the mantle color of Mytilis perhaps as camouflage.

Moving on down the piling much of the living space was taken over by Chama pellucida (Broderip 1835) and Pseudochama exogyra (Conrad 1837), the former sometimes a deep orange or ruby red. There began to appear ascidians Styela sp. and thick clumps of the ostrich plume hydroid Aglaophenia sp. In looking carefully on the Aglaophenia I did find some small sea spiders. Ostrea lurida (Carpenter 1864) appeared here and there attached to the piling, the Chamas etc. Crepidula onyx (Sowerby 1824) stacked four and five deep were very numerous as was Crepidatella lingulata (Gould 1846).

Hiding in the nooks and crannies, I came across many varieties of crabs. Some examples: Cancer antennaris (Stimpson), Paraxanthias taylori (Stimpson) having the carapace and claws pebbled with lumpy granulations, Pachecheles rudis (Stimpson) the large clawed crab, and the hairy crab, Pilumnus spinohirsutis (Lockington). These were the only ones that I could positively identify.

Hinnites multirugosa (Gale 1928) was present earlier in great numbers. This edible rock oyster had been depleted by divers during the past six plus months after the fate of the bridge had been determined. I found small specimens and many juvenile unattached ones however.

Sponges were abundant in many varieties and I will not attempt to identify any. Pododesmus pernoides (Gray 1853) and P. cepio (Gray 1850) were not common, the latter being more numerous. Nestled in empty chama and barnacle chells was the small fragile translucent Kellia laperousi (Deshayes 1839) and nestled almost anywhere inside sponges, between fronds of the Chama pellucida, at the base of the hydroids etc. was the chalky white usually distorted Hiatella artica (Linnaeus 1767). Here, hidden as were the crabs, I found several species of small fish and shrimp. Ceratastoma nuttalli (Conrad 1837) were plentiful, but Lamellaria sharonae (Willett 1939) with its red body completely inclosing the white shell was rare. Terebellid worms within their parchment-like tubes wound in and out, around and about as did Serpulorbis squamigerus (Carpenter 1857) in its calcareous casing.

Moving on down to the lowest portion of the piling which had been deepest in the water, I came across egg clusters of the family Muricidae and in this area I again found Ceratastoma nuttalli as well as Pterynotus festivus (Hinds 1844).

Now, on the pilings of the new bridge there is limited space available for those who like "living on the high tide".

WHAT IS A SPECIES?

by

George E. Radwin

All of us are familiar with the term species but judging from the contexts in which it is often used, it seems that few define it in generally accepted terms. It happens that species was used in common language for a considerable time before its scientific usage became almost universally accepted.

Species (from the Latin species- ei) literally means "a look, appearance, form, kind" and archaic (i.e. pre-scientific) usage might allow such phrases as "the various species of men" or "species of weather." Scientific usage has narrowed the definition to indicate simultaneously a distinction (between species) and a certain level of relationship. It is, for example, generally accepted that all living men belong to the same species and their differences are pertinent only below the species level. If, however, no distinct line was drawn between Homo sapiens and Homo erectus, the geological age of our species would be extended much further back in time. This, in turn, would undoubtedly alter the ideas of anthropologists as to man's rate of evolution, the length of time that was necessary for us, as a species, to develop our present characteristics and abilities; and it would also alter, by extrapolation, projections of our future physical and social evolution.

Traditionally, if two closely related forms of life are consistently different in appearance (i.e. separable), they have been considered different species and each has been accorded a distinct name. This criterion was followed for many years, in spite of its obvious shortcomings. What, after all, is consistency and who shall be the judge of separability? In addition, how is one to deal with close relationships of groups of individuals within a species?

The introduction of a multiplicity of terms for these subspecific or interspecific groupings has not provided a solution unless the level (i.e. the degree of distinction) at which a species may be distinguished is clearly defined.

Whereas one person may consider a small group of individuals, differing from other similar kinds of individuals in only a few features, a distinct species, another equally earnest person may believe these distinctions to rate no more than subspecific recognition and a third person may consider the degree of difference insignificant.

About a half-century ago, in an attempt to establish an objective basis for species, the criterion for a "biological basis of the species" was asserted to be the ability to interbreed. According to this concept, two individual organisms of opposite sex are conspecific (i.e. belong to the same species) if they can reproduce fertile offspring. This presumably eliminates both the subjectivity of the earlier morphological approach and the influence of ecological factors on the appearance of the organism.

The strength of this concept has supported it to the present day, although it is by no means universally accepted. Its acceptance for so long a time was no doubt influenced by the fact that it is a very difficult hypothesis to test.

In nature, most organisms are difficult to study, let alone to breed on demand. Breeding is more feasible in a controlled environment but it has been found that such an environment almost never duplicates the natural situation. Thus, there is always a grave doubt as to the relevance of the results. Hybrids produced in zoo matings have rarely been found to be fertile. In the few instances in which the hybrids have been fertile they were never identical to naturally occurring forms. As a result, their appearance is generally accepted to have resulted from the artificial conditions that encourage animals which normally do not mate successfully (e.g. several zoos have, or have had "tigons" from the breeding of tigers with lions).

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In nature, species are often reproductively isolated only by geographic or topographic conditions. Two marine species derived from a common ancestor may now live on opposite sides of the isthmus of Panama due to geologic alteration of the area or two populations of land snails may be separated from each other by a hill that is impassable to their respective members. Such isolation can lead to speciation, which may be expressed in many ways.

In addition to the obvious morphological differences between species, such as those between a robin and a bluebird, there are immediate causes of isolation that may be anatomical, ecological or behavioral. In some closely related species the shape or position of the genital organs precludes breeding. Or some forms that are morphologically similar may have differing physiological or ecological requirements that prevent their meeting (e.g. a brackish-water mollusk would not be likely to encounter a relative from a full-salinity habitat, even though they may be otherwise reproductively compatible). In some higher animals, such as birds, reproductive compatibility may be determined by a complex array of behavioral patterns. The male must, in many cases, attract a female's attention with his plumage and with his behavior, which may include a courting display. Even if other females of closely related species are in the vicinity, only females of the male's own species will respond to his display and approach the male for mating.

Thus, bringing two isolated forms together by artificial means presents the possibility of a successful reproduction that would be impossible in nature. Are these, then, conspecific forms if, indeed, reproduction takes place? In attempting to answer this question we are facing one of the most difficult situations in taxonomy. At what point can it be said that the differences between forms indicate a species distinction? Unfortunately, there is no conclusive answer to this question.

Perhaps most damning to the biological-species concept is the incidence of naturally occurring hybrids, particularly among the flowering plants. Although plants are fixed in place, their reproductive "mobility" is apparently quite great. Pollen from many plants may be carried by the wind or insects over an area of many square miles from its point of origin. The high incidence of naturally occurring fertile hybrids in many groups of flowering plants leads us to one of two alternative assumptions. Either the species accepted by botanists are separated at too high a level and are really, at best, closely related subspecies, or the genetic material of plants is much more plastic than has been generally assumed and that, in such groups, the biological-species concept does not "work."

Where, then, are we? Should we throw up our hands and admit that, since unequivocal definition of a species is probably impossible to formulate, we are wasting our time trying to develop one? I, for one, cannot accept this attitude. In spite of the abuse that has been heaped upon nomenclature and taxonomy in recent years, the simple fact remains that there is too great a need for names and for a rational circumscription of the entities that they purport to represent to abandon the search.

It should be axiomatic that all scientists need names in their work. An anthropological axiom holds that an object lacks the quality of reality to man unless and until he has given it a name. A physiologist would obviously benefit from having a name for the species upon which he performs his physiological experiments. The importance of taxonomy may be seen in the physiologist's need to accurately identify a species and to be certain that it is a single species. Experimental data derived from the study of two or three distinct species haphazardly mixed together have little scientific value.

Rather than apologize for not answering the question phrased in the title, it should be pointed out that the human search for knowledge is perpetual and quintessential to our character. Even though we may admit that true objective reality will probably always remain just beyond our grasp, we are driven to attempt to attain or at least approach that goal. To do otherwise would be to betray our inherent character.

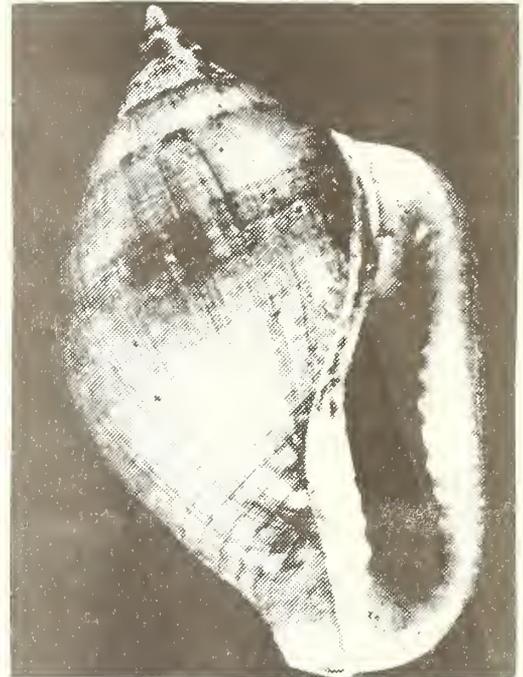
Four species of Columbella, a small gastropod abundant in tropical seas reflect speciation resulting from isolation. Believed derived from a common ancestor, the Gulf of Mexico form, a, is isolated from b, c and d by the Central American land mass. The Socorro Is. form, d, is isolated from b and c by miles of sea and the barrier effects of ocean currents. Baja coastal varieties c and d are the most northerly occurring forms and are ecologically isolated presumably by tolerance to temperature extremes.



Form A



Form B



Form C

Some organisms which appear similar are not closely related. The appearance of the hard-shelled snail Mitrella carinata (left) is mimicked by the soft-bodied, unrelated amphipod Pleustes platypa (a small crustacean). Presumably mimicry has provided the amphipod with evolutionary advantage in defense against its enemies. It is an example of convergent evolution rather than speciation.



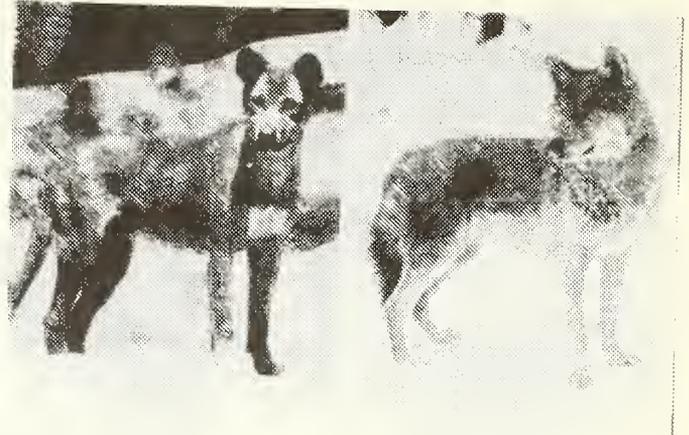
1 cm



Form D

50

The differences between individuals in the same species may appear greater than those between members of different species. The Pekinese for example little resembles the Doberman pinscher although both belong to the species Canis familiaris. On the other hand, the wild Australian dog, Canis dingo (below left), closely resembles the circumpolar Wolf, Canis lupus (below right), but has been assigned to a separate species.



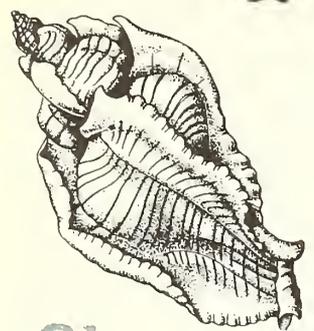
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Vol. IV August 1973 No. 8

.....
Program: Columbellids of the Eastern Pacific, Dr. Geo. Radwin
Aug 16, 1973. 7:30 PM
September Party - FESTA - Mediterranean stlye - FRI Sept 14
.Save this date !!!
.....

SHELL CLUB MEETING OF JULY 19, 1973

The speaker for the evening was our own Tony D'Attilio. His subject was Morphology of the Typhinæ and he said that the highly complex group was a real challenge.

Slides of his beautiful drawings of several species represented three months of intensive work. Using magnification of his subjects, he presented them in exquisite detail with the fine-line drawing of which he is a master.

Of the forty-two *Recent known species of Typhis, thirty-six of them are available for study in our Museum of Natural History.

George Radwin had a question for us....Would the San Diego Shell Club host a joint meeting of the Western Society of Malacologists and the American Malacological Union in 1975? After a brief discussion, it was decided unanimously that the Club would be host. George Radwin will be President of WSM that year.

* Tony says the Recent should have a capital letter.

by Clifton L. Martin

Among several ex-pisces shells received from South Africa recently were three species of Cypraea, one of which, to my knowledge, has not been reported from that area previously. This specimen, Cypraea beckii Gaskoin, 1836, was taken, together with the other two species, from fish trawled off the coast of Natal, Republic of South Africa, earlier this year. A map published in The Living Cowries, by C. M. Burgess, shows the range of this species to extend from Hawaii westward across the central Pacific, north of the equator, to the Philippines, thence northward to southern Japan. Therefore, a possible range extension for Cypraea beckii is indicated.

BOOK NOTES

Carole M. Hertz

The Club is grateful to Gordon A. Robilliard for his generous donation of many pamphlets and reprints to our Library. They will be listed in this column as they are ready for circulation. The following are the first group.

1. Life Between Tide-Marks in North America, IVa. Vancouver Island, I, by T. A. and Anne Stephenson, Zoology Dept., University College, Aberystwyth, The Journal of Ecology, Vol. 49, No.1, Feb. 1961 (xerox-type copy)
2. Life Between Tide-Marks in North America, LV b. Vancouver Island, II, by T. A. and Anne Stephenson, The Journal of Ecology, Vol.49, No. 2, June 1961
3. Microhabitats, Abundance and Food of Conus on Atoll Reefs in the Maldive and Chagos Islands, By Alan J. Kohn, Reprint from Ecology, Vol. 49, No. 6 Autumn, 1968.
4. Pleistocene Molluscs from Lake Iroquois Deposits in Ontario, by Karrow, Clarke and Herrington, Canadian Journal of Earth Sciences (reprint) Vol.9 May 1972.
5. The Relationship of *Atractodon stonei* (Pilsbry) (Mollusca, Buccinidae) to the Pleistocene Stratigraphy and Paleoecology of Southwestern Nova Scotia, by Clarke, Grant and MacPherson, Canadian Journal of Earth Sciences, (reprint) Vol. 9, August 1972.
6. Lower Pleistocene Mollusca from Devil's Elbow, Hawke's Bay, By A.G. Beu, Transactions of the Royal Society of New Zealand, Vol.3, August 1965.
7. Three Late Cenozoic Molluscan Faunules From Baja California, with A Note On Diatomite From West of San Felipe, By Leo G. Hertlein, Proceedings of The California Academy of Sciences, Vol. XXX, No. 19, September 1968.
8. Cenozoic Muricidae of the western Atlantic Region Part II, *Chicoreus* sensu stricto and *Chicoreus* (*Siratus*), Emily H. Vokes, Tulane Studies in Geology, Vol. 3, No. 4, June 1965.
9. A New Species of *Boetica* From the Pliocene of California, by George P. Kanakoff, Contributions in Science, L.S. County Museum, No. 103, May 1966.
10. A New Fossil Shell From the Palos Verdes Sand, By George P. Kanakoff, Bulletin, So. Calif. Academy of Sciences, Vol. 52, Part 2, 1953.
11. The Prosobranch *Veliger*, by Vera Fretter, Proceedings of the Malac. Soc. of London (1967) 37, 357.
12. Animal Succession on Denuded Rocks, By R.P. Pierron and Y.C. Huang, Publication Puget Sound Biological Station, Vol. 5, 1926.
13. Experiments with Animals in Tide Pools, W. M. Gersbacher and Maggie Denison, Contribution from the Zoological Laboratory of the University of Illinois, No. 351, 1930.
14. A Medium-Sized Sea-Water System for the Laboratory, By McInerney and Hoar, U. S. Department of the Interior, Research Report 63.
15. Aeration in Aquaria, By Downing and Truesdale, Reprinted from Zoologica, Scientific Contributions of the New York Zoological Society, Vol. 41, Part 4, December 31, 1956.

by Joyce Gemmell

The Nassariidae is a large and morphologically varied gastropod family. Commonly known as an intertidal species, much of the environmental behavior and reproductive reports have shown a consistent pattern for all functions.

The Nassarius is a carnivorous and active scavenger intertidally. Locomotion is rather fast for a snail and is extremely agile in manipulating the foot for turning, lifting, and reaching. The anterior end of the foot can be manipulated into lobes for holding food as the radula is extended from the proboscis for feeding.

The animals actually taste the chemical decomposition of dead animal matter. As water is drawn through the siphon it passes over a gill-like taste organ in the mantle cavity called the osphradium. In a few seconds the animal is directed to the food source.

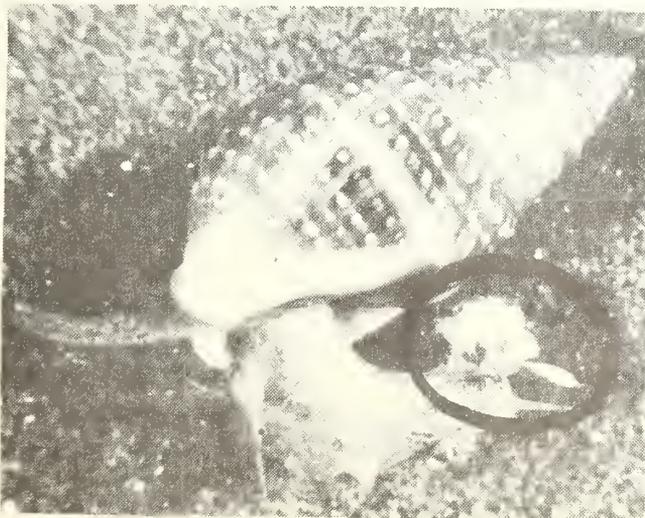
This scavenger pattern and taste organ for intertidal species does not preclude other food preferences or another type of food sensing organ activated by chemical composition of a small bivalve or egg cases in the sand. The Nassarius' adaptability to deep water, shallow water, brackish water, high salinity, and high and low water temperatures would certainly suggest a more varied food pattern than that of the intertidal scavengers.

Many snails, including Nassarius, lay eggs in membranous capsules. Several west coast nassariids attach their egg capsules to blades of the sea grass Zostera. Other species have attachment preferences such as shells, stones, or the undersides of moon-snail collars. Another unique attachment for egg capsules is made by Nassarius moestus (Hinds, 1844), from the Gulf of California, which attaches about 30 capsules to the dorsal surface of its operculum.

Most gastropods that lay eggs in a tough membranous capsule have a gland on the underside of the foot known as a pedal gland. Its function is the forming of the capsule. Eggs and fluid flow from the genital pore into the pedal gland. Each mass of eggs is encased in a capsule and the capsule is extruded through the lips of the pedal gland onto a clean surface. During the attachment of each capsule, sea water is manipulated around the capsule membrane which toughens in a few minutes.

In the case of Nassarius moestus, only field and aquarium observations have been made by the author. Dissection would be needed to determine the location of the capsule forming gland for this odd placement.

Viewed microscopically, the egg capsules of N. moestus are of simple form; shaped as inverted ovals, transparent, stalked, flat envelopes entirely lacking sculpture. The membrane is rather delicate, and the edges are thin. There is no apical escape-aperture.



Nassarius moestus with egg capsules attached to foot.

(enclosed in circle)

The capsules are attached on the operculum in a counter clockwise spiral over a period of hours as is consistent with other species. The eggs in the center capsules are the first to mature and hatch. Specimens carrying egg capsules were collected in the field and nine days later hatching of these capsules was observed in the aquarium. Water temperature in the aquarium was between 78 and 86 degrees during hatching. Veligers were active for about 12 hours. The egg capsules around the periphery of the operculum which were slower in maturing were still attached and in good condition after the center capsules had emptied and disintegrated.

W.S.M. Report
July 11-14, 1973

by Nola Michel

The meeting opened with the President, Twila Bratcher's "Get Acquainted Party". Following the party there was a barbecue on the grounds. The meeting was held on the beautiful Asilomar Conference Grounds in Pacific Grove, California. Following dinner the opening session was held, which lasted until about 10:30 PM. Then weary travelers went off to rest.

Attending from San Diego were seven persons. A good showing since attendance was down this year due to the lateness in the year. The meeting is usually held close to the last week in June.

The next day, Thursday, both morning and afternoon sessions were held with an identification workshop following. In the evening the Shell Auction was the center of attention. Phil Clover arrived and spent an hour or two on the grounds. It was good to see him after so long. He's now out of the Navy and plans on settling in California--unfortunately not in San Diego.

On Friday there were both morning and afternoon sessions followed by a banquet at The Outrigger on Cannery Row, in Monterey. The speaker, Morris K. (Karl) Jacobson of New York was very entertaining. He spoke wittily about his collection of literary extracts of mollusks.

On Saturday only a morning session was held, the last meeting of the year. Next year the meeting will be held in Pomona and the following year we will have the meeting here in San Diego. That one will be a joint meeting of the WSM and the AMU. We will be the host Club for that meeting.

Papers presented by San Diego people were--

- Billee Dilworth with her sister Twila spoke on thier Tonga Expedition.
- Dr. George Radwin on Columbelloid Genera of the Eastern Pacific.
- Anthony D'Attilio on Morphology of the Typhinae.
- Dr. Gordon A. Robilliard on Collection and Presentation of Ecological Data on Opisthobranchs.
- Fay Wolfson on Conus as a Host to Decapod Crustaceans.

Of course there were many other varied and interesting papers presented. Our Library will have a copy of the abstracts of the meeting when published.

HELP WANTED for FESTA! We need records of Mediterranean music, volunteers to plan and decorate, Mediterranean style entertainment--(talented people, come forward) Call Carole Hertz--277-6259.

ON THE CARE, FEEDING AND PRESERVATION OF NUDIBRANCHS

by

Gale G. Sphon

Los Angeles County Museum of Natural History

The best advice that I can give is DON'T! The best way to do it is to go to the beach and observe the animals in their natural habitat. Photograph them if you can. The easiest way to do that is to take a real camera buff along with you and let him do all the work while you enjoy the scenery at the beach. If you must take nudibranchs home for your tank be sure that you notice what you think they are feeding on. Many of them are very specific about what they will eat. After you have collected what you believe to be the 'Branch's' food, as well as the 'Branch' itself, and have put them in some type of plastic container to transport them, be sure that they are not crowded. Crowding is a very quick way to get off to a bad start. You'll find that when overcrowded they use up the oxygen rapidly and everything dies--very fast; and smells--badly! If you must keep them alive in a bucket for several days, try and keep them cool. Put some ice in a plastic bag and float it in the bucket. Leave the bucket uncovered when possible to allow more oxygen to be absorbed. Once you've got them home and in your tank you'll find out several things rather rapidly: you brought the wrong kind of food for them; the food you did bring was the right kind, but you didn't bring enough of it; the food died and the 'Branch' won't eat it; the 'Branch' is nocturnal and doesn't like the light; it spends all its time under the rock in the aquarium and you never do get to see it. With all this information you can do several things; take the animal back to where you found it and put it back and forget about it; go back and get more food if what you did get was the right kind; see if you can find the right kind of food if you didn't get it the first time; or pickle the 'Branch!' If you do decide to pickle the 'Branch', you've got more work ahead of you. If you didn't get photographs of the animal, at least make a color sketch of it ~~BEFORE~~ you preserve it. There's a little more to preserving a nudibranch than just dropping it into a bottle of alcohol. If you are lucky, you may be able to get the animal to relax by slowly adding epsom salts to the sea water. If this taxes your patience and you decide to go ahead and pickle the damn thing, use 85% ethyl alcohol and replace it with 80% ethyl alcohol. The reason for this is that the animal is mostly water and the alcohol removes it--thus diluting the alcohol. Do the same thing about a week later, replacing the alcohol with 80% ethyl. About that time you will probably notice another set of things that has happened: 1) the 'Branch' has shrunk considerably 2) it has lost all its color; 3) it has turned into a nasty grey-brown mess. Want some more advice? Throw it down the garbage disposal and forget it! Pour what you have left of unused ethyl alcohol in some orange juice and relax!

Now let's go back and look on the brighter side of things. Just suppose you got the critter home all right and you just happened to get the right food for it, and you got enough of it. You haven't crowded anything, and all is going well and you are pleased. The animals have laid a rosette of eggs on the front of the tank. The eggs hatch and it turns out that you have found one of those rare species that have no veliger stage, but have direct development. You can rear the young and do a life history on the species. What's happened? You've become "hooked" on 'Branches', that's what's happened. Good Luck! You'll need it!

(Reprinted, courtesy of New York Shell Notes)

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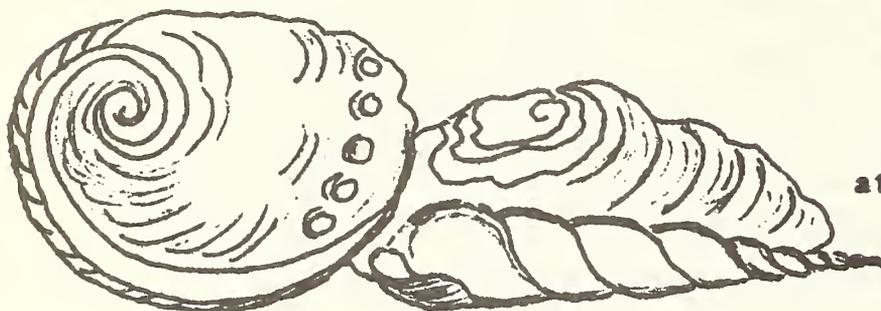
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LOBBY EXHIBIT for AUGUST 1973

Shells of the San Diego Coast; sea shells in history, economics, and religion; unusual shell forms; beautiful shells; nudibranchs; endangered species; etc.

(Exhibit prepared by the San Diego Shell Club)

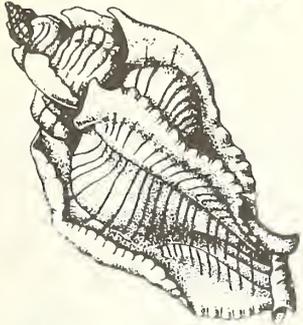
Gifts from the Sea



SPECIAL COLOR SLIDE PROGRAMS
at 7:30 in the Lecture Room.....

Thurs. Aug. 2 "Nudibranchs"
Tues. " 28 "Mollusks and Their
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September 1973

No.9

* September 14--Come to the Mediterranean FESTA All members invited *
* to come and enjoy the friends, fun, food and entertainment. Event *
* starts at 6P.M. See map and instructions on last page. *

OUR LIBRARY EXHIBIT
Gifts From the Sea
by
Blanche Brewer

They came into the Library at eight-thirty in the morning and they brought with them boxes and boxes of materials, mostly shells, to set up an exhibit in the main lobby of San Diego's Central Library. Five hours later they had completed their task. They had arranged seventeen display cases, hanging the smaller ones. They had also placed several groups of pictures--a few black and white prints and many marvelous color enlargements--as well as legends in upper case type to accompany some of the individual exhibits. On a table bubbling away was a salt-water aquarium with some local marine invertebrates in residence.

The exhibit was placed in response to an invitation from Mrs. Lois MacKenzie to the San Diego Shell Club through our President, Jules Hertz. Mrs. MacKenzie is Public Relations Officer for the Library and its branches and is responsible for films, programs and exhibits. These always require planning and sometimes she has spent months in research and preparation.

Ours is the first group to put up its own exhibit. It is certain that Club members have done months of preparation. Each of the several persons participating had a particular assignment and his or her own plan. The resultant display was cohesive, both informative and educational, beautifully executed and a pleasure to view.

Part of the exhibit was in view on entrance to the main lobby. Appropriately, these first cases concerned habitat and reproduction.

Habitat was represented by a diorama of an idealized beach and waters off the coast of San Diego. Here the shells are seen in an approximation of their natural environment of rocky or sandy intertidal zones and mud flats to the deeper water regions.

Over one hundred species were shown but the shells used were smaller than average to be in proportion in the exhibit. Who wouldn't like to collect in such a rich area as this? But now there are restrictions and viewers were advised that except

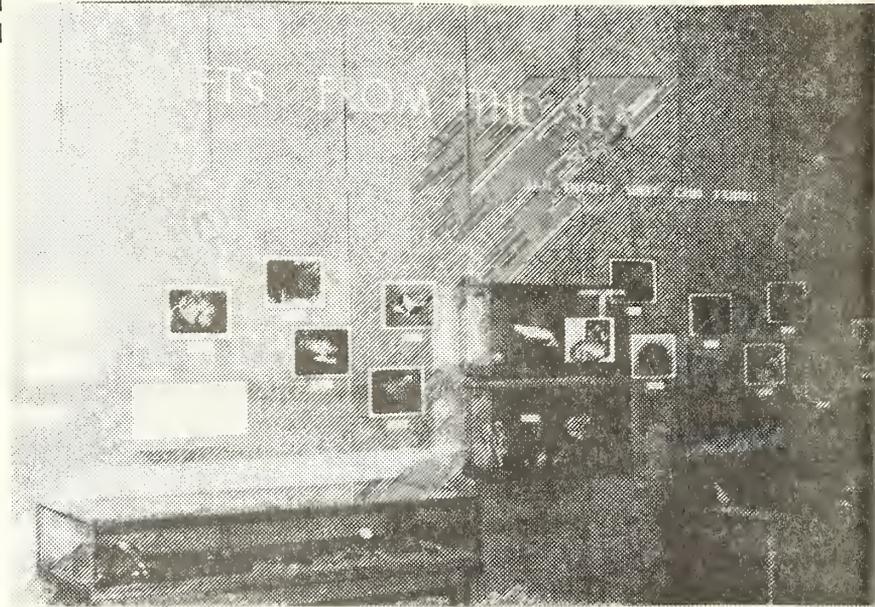
for the collection of a few food species, allowed by a fishing license, no specimens may be collected without a written permit issued according to the 1973 California Sport Fishing Regulations. On the wall just above, all the numbered specimens were identified. Jules and Carole Hertz had the pleasure of arranging this exhibit.

The second case, also by the Hertzes, presented some illustrations of the variety and placement of egg cases. The most dramatic contrast was quite likely between Busycon carica from Cape Cod, Mass. and Murex cabriti from Florida. The Busycon expels its eggs in large golden discs strung on a long 'umbilical' cord perhaps eighteen inches in length, while the Murex places its eggs in a large colonial mass (about ten by twenty inches) that resembles a rather yeasty but giant serving of cereal. This particular egg mass was taken by fishermen and rescued-too late- by Don Pisor who doesn't believe in collecting viable egg masses.

Some species, as Murex nigritus and Solenosteira macrospira carry the eggs of their species on their backs--others deposit them on rocks or in crevices. Polinices reclusiana weaves her eggs within a sand casting resembling a stiff broad collar. The Scotch Bonnet, Phalium granulatum finds a good foundation and builds a cylindrical tower that looks very much like the Tower of Pisa, but this tower doesn't lean. There is a photo in the case and there she sits atop her tower having already accomplished about ten stories.

With the beautiful, crinkly egg case of Argonauta nodosa there was a photograph of the still-occupied case, revealing the eye of the mother octopod still brooding her eggs.

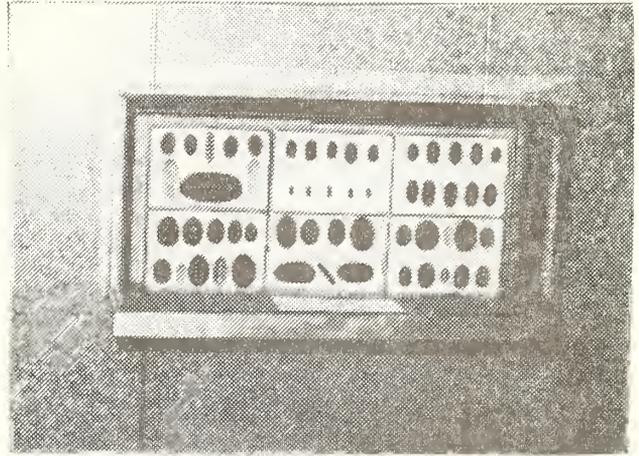
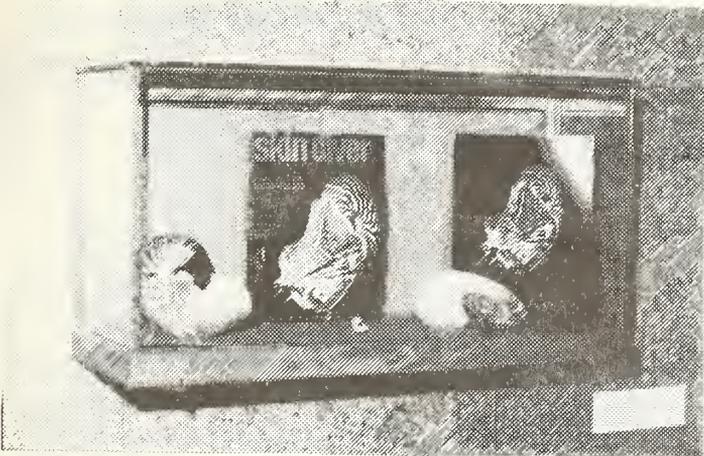
In two species pictured, Triopha grandis and Aegires albopuntatus, the egg masses are expelled looking very much like a very neat turnip peeling. In the looser coil of A. albopuntatus one can see that the emergence of the young will be soon.



On the wall above these cases were color enlargements by Dave Mulliner, Don Pisor and Gordon Robilliard of several animals, some with egg masses. There was also explanatory material concerning the reproductive processes of several species. Also on the wall were two smaller cabinets prepared by Carole and Jules. One of these contained three large volutes, Mesericusa sowerbyi, Livonia mammilla and Melo amphora with an opened volume of "Living Volutes". The other small case held a growth series of Pleuroplaca gigantea, commonly known as the 'horse conch'.

On the opposite wall were two groups of pictures. The color enlargements here were by Dave Mulliner and Don Pisor. Just to name a couple, Cypraea spurca acicularis with a lacy mantle and Ovula ovum which has a frilly black mantle with random gold spots. The black and white prints were x-ray shell pictures from a folio by Ernest L. Libby and Wataru W. Sutow.

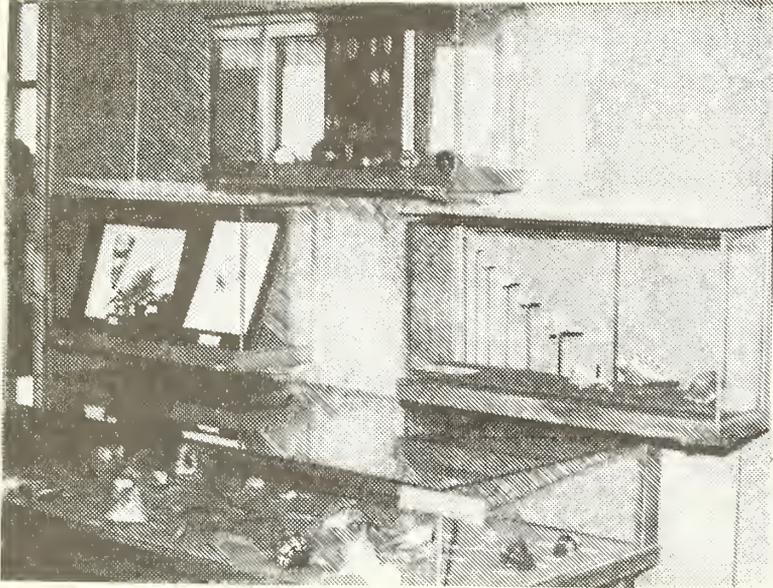
The main part of the exhibit was located near the science section. The remainder of the hanging cases was here. The first held some beautiful Harpas with their pictured likenesses as background and one, having the animal recreated in a ceramic by Helmut Meier. In the next was Nautilus pompilius. With it--the animal pictured in its shell. These cases were set up by Nola Michel.



The third case contained trays of chitons. The Acanthochitonidae from Baja California have tufts of fine silky-looking hairs on their plates. We know that Acanthus leaves carry prickly hairs. From the shape and the hairs on these chitons, one is reminded of certain beetles and bumblebees. The Chitonidae from western Mexico are in two aspects--a rich brown and a soft charcoal with patterned plates and smooth girdles. Lepidochitonidae, from the Pacific Northwest, have wide girdles and striking Indian-looking designs--or do, or did the Indians have striking chiton-looking designs? The Ischnochitonidae have pinks and blues and bright browns in their colorings, their plates have fluted edges and their girdles are thick and furry. But the Mopaliidae from the Pacific Northwest are real charmers. They are dark sometimes and beautifully patterned but others are quite bright--yellows, greens and coral with patterned plates. Some have thick girdles and some have 'eyelashy' ones. They are only samples of the many, many beautiful chitons whose acquaintance many collectors have yet to make. This case, George Hanselman.

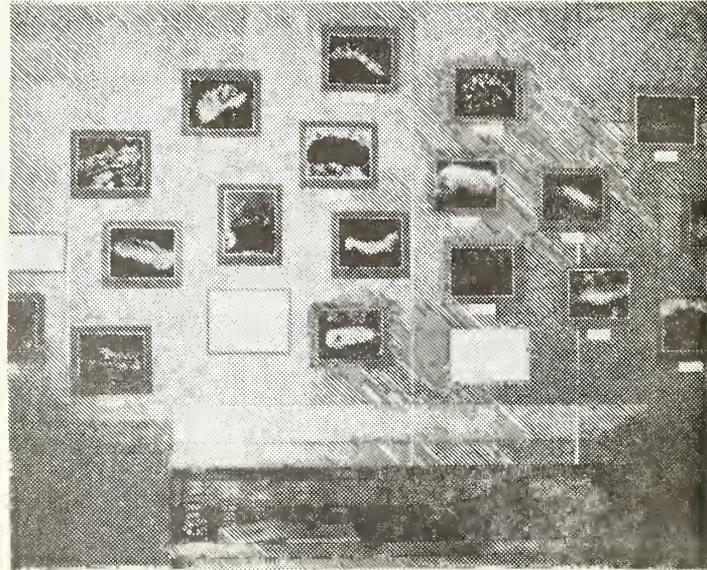
With two beautiful drawings by Anthony D'Attilio to frame them, three lovely shells become even more important. Conus imperialis and Lambis

scorpio are repeated in color-soft gold and rich pinky-brown. Murex festivus



in lacy brown furls is a much smaller shell found in San Diego waters and is the shell for which our magazine is named. This arrangement by Anne Schwarz. Six tremendous cowries were in the next case with a copy of Living Cowries by C.M. Burgess. These were arranged by Clifton and Clifford Martin. Lastly, a growth series of Cymatium femorale. Some of the specimens from the Bahamas and a couple from the Florida Keys. These were arranged by Don Pisor. The first large case here depicted the Family Tree of Marine Snails. Of the hundreds of gastropods, thirty-four took their place on the tree. The trunk was, suitably, driftwood as were the four main branches.-Archaeogastropoda, Neogastropoda, Mesogastropoda and Tectibranchia. It was carefully and beautiful done by Anne Schwarz.

The next case was an amazing one. It contained true-to-life models of Nudibranchs with many accompanying photos on double page spreads from two magazines, Oceans (photos, Jim Lance) and Terra (photos, David Mulliner). These models are made by Wesley Farmer, beginning with a mould. Into the mould goes Wes' talent making a lifelike animal with all the details-the cerata, ruffled edges, vivid colors. The finished creature is then sealed in a block of clear resin. They are fantastically beautiful. Only a couple of steps away a live Dendrodores fulva is in the aquarium and the one sealed in resin looks as real as the one in the water. Above this case are color enlargements of photographs taken by David Mulliner of live specimens. Dave Mulliner arranged this display. (Wes Farmer sells these models. His address is on your membership list.)



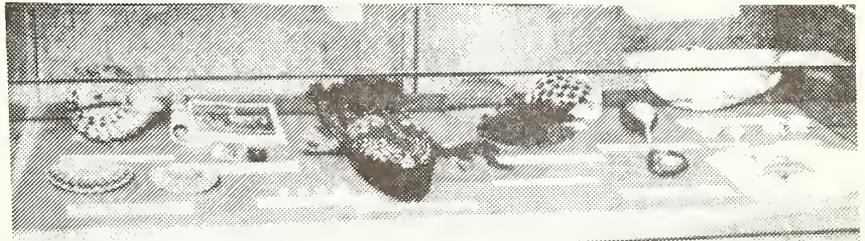
On the table with the aquarium was the folding display assembled by Nola Michel and Dave Mulliner to present macrophotos of former aquarium residents and reprints of Aquarium Observations published in the Festivus. Above, high enough for security, were two mounted displays by Bert Draper of macrophotos made of the tiny shells he collects and on which he is an authority. Under each picture he has also mounted boxes containing the shell subjects. They have a dark background but even then they can hardly be seen. A one millimeter shell becomes an inch across with magnification and is seen to have color and sculpture. Some of them are juveniles but

most are mature shells. The camera's eye makes us aware of the wonder and endlessly varied beauty of our ordered world.

The next case presents unusual shells. A close cluster of three different species of the spiny shells of Florida quickly catches the eye. They are all attached to the same base. One is a bright orange Spondylus americana, an equally brilliant Chama macerophylla and a lively brown Spondylus gussoni. An odd shape is that of Malleus albus, the 'Hammer Oyster'. It does indeed resemble a hammer. The Pennicilius gigantea, is a long curved tube, flaring at its mouth and is known as the 'Sprinkler Clam'.

It is a bivalve that, like other clams, feeds as the waves move over it, its siphons squirting. A Conus striatus accompanied by some of its poison darts is positioned just under the glass of the case with a magnifying glass placed over the darts. Xenophora robusta cements small shells and rocks to its own shell for camouflage, and some like Pitar lupinaria and Murex pecten are armed with long needle-sharp spines. M. pecten's spines are arranged in a pattern resembling the skeleton of a fish. This case was prepared by Jeanne and Don Pisor.

Uses of shell, religious, economic and personal was the theme of the next display by Messrs. Clifford and Clifton Martin. A ceremonial mask decorated with cowrie shells dominated this display. Shells have been important throughout the ages to people along the shores of the world's seas. They have been symbols and a part of religious ceremonies from ancient times.



Triton's trumpet, Charonia tritonis whose use was attributed to the sea-god son of Poseidon was used by several religious orders of the Orient as a summons to worship. Island people have used them since 'time immemorial'. Scallop shells, Pecten jacobus, were worn by penitent Christian pilgrims to the Cathedral of Santiago de Compostela, believed to be the burial place of St. James. Later they were worn as emblems of the Crusades and pilgrimages to the Holy Land. They are seen today in the heraldic arms of families whose ancestors were in the Crusades or made these pilgrimages.

In ancient Roman times the byssus of the pen shell was woven into a fabric known as Cloth-of-gold, so precious that only royalty could wear it. Until the advent of silk from the Orient, it was the richest garment material of the Mediterranean world. In this area, too, shells of both Bolinus brandaris and Hexaplex trunculus were used to obtain a rich purple dye. The live shells were crushed and boiled and the cloth placed in the resulting fluid. The nature of the process precluded any widespread use and wearing

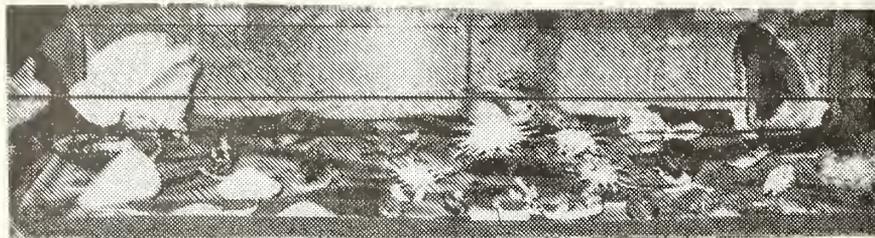
the royal purple was forbidden to any but the highest in the land.

Many kinds of shells were, and still are, used in personal adornment throughout the world. Buttons and jewelry are made today from the abalone. The use of the pearl oyster for the culture of pearls is a very important part of the economy of Japan.

The "Beautiful Shells" case by the Pisors had some truly lovely examples. They included three

of the really big shells-winged, pink-throated Strombus gigas, Charonia variegata with its rich brown markings and Cassis madagascariensis in vibrant autumnal browns.

Spondylus americanus was represented by several color-ashes of roses, orange, white, fawn and white with pink spines, all carrying the print and orange color of their baby shells.



These three, bright yellow Mimachlamys australis, and Pecten nobilis, one purple, one soft orange prompted the remark, "You just can't believe those colors. Aren't they painted?"

The fossil shells had the strongest appeal for this writer. With recent shells for comparison, one realizes the strength of a successful design. The Nautilus pompilius, (already seen several times) was seen with two fossil ammonites-all three had been cut to show the septa. The ammonites, whose ancestors' species numbered in the thousands, are represented today by only five species. One of the ancient ones (both are gem-stone replacements) was taken from an upper cretaceous shale in Big Horn Co., Wyo.-its age, 75,000,000 years. The other, Rhaeboceras halli from Bear Paw Shale formation, also in Big Horn Co., Wyo. is only 70,000,000 years old.

Cancellaria reticulata from Florida, has a fossil counterpart, C. conradiana from the Pliocene Caloosahatchee formation, age 3,000,000 years and Cypraea vitellus from the Cebu Is. in the Philippines has a fossil twin from the same Pliocene Caloosahatchee formation. In both instances the fossil and recent shells are so similar that no difference is apparent. How can the fossil be said to be 'extinct'? There it is and it Looks the same. Of course the animal isn't there. And so they go. The Pliocene, the Miocene, the Eocene and the Upper Cretaceous-all are represented.

But there is one that beats them all-a fossil Lunatia pedernalis, Roemer from the lower Cretaceous Comanche formation, near Gatesville, Texas-its age 120,000,000 years. Its recent look-alike is Lunatia lewisii Gould, 1847 taken at Carlsbad, California. It is a much smoother, more globular shell than the fossil but the relationship is still very clear.

These shells were from the collection of Clifford and Clifton Martin. Clifton took great care to select species which showed the nearest likeness in their fossil and recent forms.

The very last case matched real shells with those pictured on postage stamps from many countries. They are mostly island countries, one or two with sea or ocean borders. Papua and New Guinea, the Seychelles, Malagasy, New Hebrides, Republique of Cote d' Ivorie, Nouvelle Caledonie, Pilipinas, Archipel des Comores, Japan are a few of the countries represented in this case. Matching shells and stamps is a hobby with Virginia Hanselman and it is George and Virginia Hanselman who are responsible for this beautiful and very interesting case.

(The exhibit would do credit to any town. The members of the San Diego Shell Club who planned and arranged it should be very proud. I am proud that I have been associated with such knowledgeable and talented people. B.B.)

Collecting Substrata is Fun (?)

by Flt Lt. D A J Taylor

During the August Bank Holiday Flt. Lt. Doug Taylor and three members of the Scampton Sub Aqua Club set off from Scampton near Lincoln at 8 pm on the Friday evening for Martins Haven in South Pembrokeshire. It was considered that with two drivers taking turns at driving the party would be sufficiently rested and could dive on arrival for it was summer and it should be an uneventful trip. So much for planning! It was a shocking journey but despite the half hour of torrential rain, three hours of heavy rain, one traffic jam, being lost twice and one very minor accident the 340 miles were completed by 5 o'clock on Saturday morning.

At West Hook Farm the tent was erected, dinghy inflated, regulator and pipes fitted to the storage cylinder, water collected from the well, and a meal prepared. The rain was not really a problem- it was just steady, persistent and wet. However we were lucky, the wind was fairly strong and even though it blew down the tent a couple of times it did tend to dry us. It was not quite what had been anticipated when the trip was planned for a warm summer weekend but regardless, we were there to dive underwater, not worry about conditions on the surface. So being enthusiastic divers there was no nonsense about having a few hours sleep, we all wanted six dives each over the weekend and we were ready to go and this had nothing to do with the fact that by this time we were wet and cold. In keeping with the weekend the tent had sprung a leak and our sleeping bags were wet before we realised it, and the only way to get warm was to put our wet suits on.

Boat and gear were carried down to the beach and then the out-board engine would not start. It was not the club's engine but a borrowed one, ours had been in for repair two months and it was still unserviceable awaiting spares so we had had to hire this one. Eventually it was dried off, started and all four of us set off into the bay. The sea was fairly choppy and the off shore wind made it imperative that we did not venture out beyond the protection of the cliffs. We all dived, substrata was collected as well as a few shells for the Conchological Society of Great Britain and Ireland, sufficient scallops for supper and then after six man dives, fatigue, deteriorating weather and poor underwater visibility forced us to return to camp. Aqua lungs were recharged, a delicious hot meal of Scallops was prepared and the tent patched. Finally a visit was paid to the local inn "The Lobster Pot". Fortune continued to scowl for when one of our members wearily leant back against a large glass room divider it just disintegrated- apparently it had been cracked previously and his weight was more than it could stand.

Saturday night was rather disturbed for the rain continued and the wind reached gale force proportions. However once everyone had managed to contort his sleeping bag so as to avoid most of the drips we all slept well and awoke on Sunday to find the rain had stopped and the sun shone. A fifth member had been due to join us Ch. Tech. Frank Pembridge of Market Drayton, but he had had an accident whilst driving through the night, his windscreen had shattered and he'd finished his night wearing wet suit jacket and face mask driving around in pouring rain looking for a garage that could supply him with a new windscreen.

After waiting two hours for our missing member, three of us set off once more, myself, Cpl Jock Murray of Montrose and SAC Tony

Gratton of Gainsborough. Our fourth member was feeling unwell and remained in the tent. We all had one dive each and then the engine cut. Tools and dry rag were taken out from their sealed can, the engine ignition system dried off, then ~~then~~ slap! - a wave broke over the boat. The current was dragging the anchor on the sandy/muddy bottom 80 foot below and with two men on the oars no progress was made. The second and last wave broke over the boat. The sea was becoming rough and the current was pulling us towards St Davids Head.

Then we were out from the protection of the cliffs and the wind - later we were told it was a force 8 gale - drove our inflatable out to sea. Naturally we all wore life jackets and so there was no serious danger to life and furthermore we were still within swimming distance of the shore - provided the life jackets were not inflated, as if they had been the wearer would have blown away in a similar fashion as our inflatable was. To swim ashore would have meant abandoning our inflatable and its contents and so I decided to aim at a sandy beach that could be seen in the distance. Three hours later when even Quells had failed to provide immunity from "Mal de Mer" we were within striking range of a small sandy strip, rock studded at the base of a 200 foot cliff. We rowed as hard as we could and eventually rollers drove us up on the beach sinking the boat and throwing us and most of our equipment out.

There was a mad scramble for fifteen minutes collecting gear from the surf and everything was saved including the camera and exposure meter - the first time I'd taken one on an inflatable in six years! All our gear including the large sack of scallops, was now carried through water at about waist deep and thanks to the assistance of a number of holiday-makers was carried up a cliff path to where our vehicle would be able to pick us up. One holiday-maker was kind enough to give us a lift back to our vehicle at Martins Haven. It has been quite a day and made the point that it is not wise to venture off shore in an inflatable unless a second boat is available so as to provide mutual support. Also it is not wise to carry a camera, unless it be an underwater one. We slept well on Sunday night.

When we awoke on Monday morning we were all cold, sore and stiff, a shore dive was contemplated but all enthusiasm had waned the sea was rough, wind strong, so, without more ado camp was struck and we set off on the 340 miles journey home, swearing never to dive again. However before the journey was completed the next trip was being planned! Lightning cannot strike the same place twice!! --- or can it?

Our many thanks the RAFSAA newsletter for their permission to reprint this article.

FROM THE MINUTES OF THE AUGUST 16 MEETING

Our speaker for the evening was Dr. George Radwin who spoke on Columbelloids of the Eastern Pacific. It is amazing how shells can be interesting and beautiful as well as being TINY. (Article will follow in a later issue of the Festivus Ed.)

The Christmas party will be held December 14 at the Miramar CPO Club. Mr. Abbottsmith has notified the Club that San Diego will be his first stop on his trip around the USA. He is going to be here Jan. 23-Jan. 30, 1974. He will show the Club a program about Australian Volutes.

NEW MEMBERS

BARNES,, Estelle
5370 Hilltop Dr.
San Diego, Ca. 92114
263-4932

COLBURN, Jane T. (Mrs. E.E.)
Box 2317
APO San Francisco, Ca. 96555

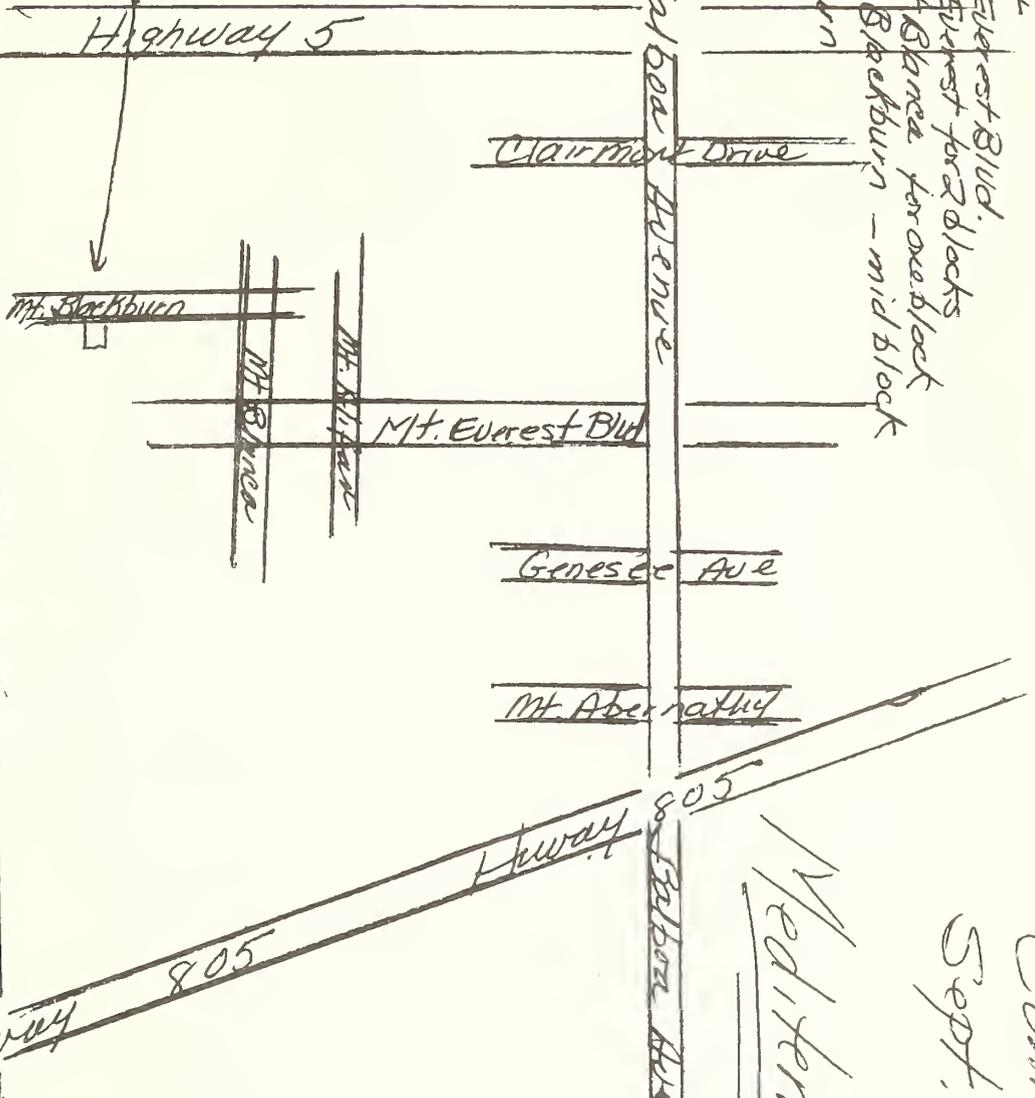
From Highway 5 take

Barboa Ave. exit
Barboa to Mt. Everest Blvd.
Right onto Mt. Everest for 2 blocks
Right onto Mt. Blanca for one block
Left onto Mt. Blackburn - mid block
3883 Mt. Blackburn

Come for
your fun
Cosplay

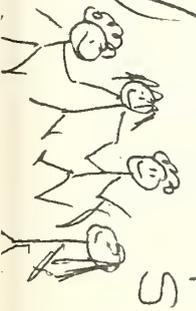
Hertz
3883 Mt. Blackburn
yellow house fence
277-6859

Entertainment
Music



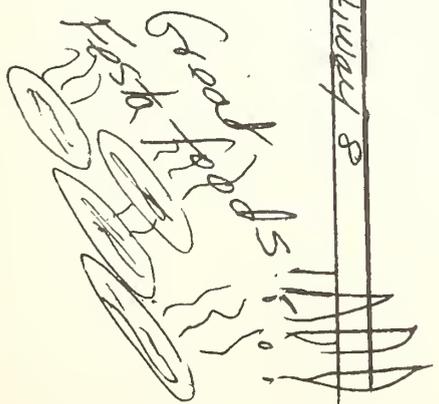
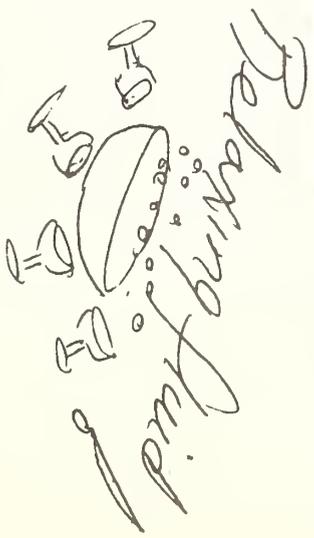
From Highway 8 take
805 to Barboa Ave (exit west)
Barboa to Mt. Everest Blvd
Left onto Mt. Everest for 2 blocks
Right onto Mt. Blanca for one block
Left onto Mt. Blackburn - mid block
3883 Mt. Blackburn

Good friends



Come to the Festa
Sept. 14 - 6 P.M.!!

Mediterranean
Festa



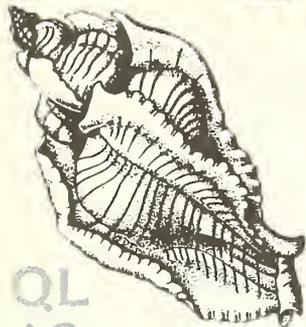
~~FRIDAY~~
~~SEPT 14/11~~
~~TEST A~~

SAN DIEGO SHELL CLUB
c/o NOLA MICHEL
4758 MT CEARIN DR.

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968



QL
401
F418
Moll.

MUSEUM OF NATURAL HISTORY - Third Thursday - 7:30 PM

PRESIDENT: Jules Hertz
VICE PRESIDENT: Joe Bibbey
RECORDING SECRETARY: Anne Schwarz
CORRESPONDING SECRETARY: Jeanne Pisor
TREASURER: June Bellmer
EDITOR: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas surface, \$3.50 - Student membership, 2.00 Payable to San Diego Shell Club, Inc., c/o June Bellmer, 4680 W. Talmadge Dr., San Diego, a. 92116.

Vol. IV

October 1973

No. 10

* Program: Gale Sphon speaking on Mitres *
* Dave Mulliner with slides from the Festa *
* Meeting date- October 18, 1973 at 7:30 P.M. *
* Christmas Party will be on December 14, 1973 at the NAS Miramar CPO Club *
* Save the date! Reservations will be accepted at the meeting thru 12/5/73 *

MEDITERRANEAN FESTA

Our Autumn Festa Cruise carried us once again to Hertz Island, (that enchanted island!) this time (floating?) in the Mediterranean. All the inhabitants were friendly (by their dress one could see they were not natives) and they had come from many countries--Spain, Italy, Greece, Persia or Turkey, Arabia Algeria--and ancient times, Rome of the Caesars and pyramid-building days in Egypt.

Everyone was in happy communion, greeting friends not often seen, savoring the antipasto, so varied and so delicious served by two lovely señoritas, and enjoying the refreshment of the punch bowl. After such antipasto, dinner was almost an anticlimax. Lasagna, salad, bread and wine, ices and sweets were eaten in the candle-lit garden with background music in Mediterranean themes.

During the evening David Mulliner showed slides of the recent exhibit placed in the Central Library by members of our Shell Club. The Club was also treated to readings of the Tarot cards by our resident Gypsy, Anne Schwarz.

It was a lovely summer evening and the Festa was greatly enjoyed by all attending. We thank everyone responsible for such a pleasurable event, especially our hosts, Jules and Carole Hertz and their two charming daughters, Ruth and Suzanne--Jules in toga and sandals and a wreath of laurel leaves, Carole, an Egyptian maiden stepped down from a temple frieze and Ruth and Suzanne, romantic young señoritas.

BOOK NOTES

Carole M. Hertz

The following publications have been donated to the Club Library by Virginia and George Hanselman. We all thank those members who generously donate their books and periodicals for the enjoyment of all the Club members.

West African Snails of the Family Achatinidae in the United States National Museum, by Henry A. Pilsbry, Smithsonian Publication #2960, 1933.

A Review of the Valbyteuthidae and an Evaluation of its Relationship with the Chiroteuthidae, by Roper and Young, Smithsonian Publication, 1967.

How to Preserve Animal and Other Specimens in Clear Plastic, by Cleo E. Harden, Naturegraph Co., 1963

The Seaweed Story, Calif. Department of Fish and Game Publication.

Kelp, Kelco Co. Publication.

The following are a continuation of the list of reprints available due to the generous donation of Gordon Robilliard.

The Family Triphoridae and Its Systematic Position, by Sadao Kosuge, Malacologia, 1966, 4(2): 297-324.

The Effect of Grazing on Marine Littoral Diatom Populations, by Richard W. Castenholz, Reprinted from Ecology, Vol. 42, No. 4, Autumn, 1961.

Zoogeography and Ecology of Macro-Invertebrates of Gulf of California and Continental Slope of Western Mexico, by Robert H. Parker, (Xerox copy) Published by American Assoc. of Petroleum Geologists, 1964.

Sexual Dimorphism in the Radula of the Muricid Genus Nassa, by Virginia Orr Maes, The Nautilus, Vol. 79, No. 3, January, 1966.

Also received was The Nautilus, Vol. 87, No. 3, July, 1973.

The librarian requests that members take books for only one month. The library is only as good as the members make it. It is disheartening for members to try to take out a book month after month only to find that someone else has failed to return it--again.

QUESTION: I have heard that an amberlike substance is regularly found in the hinge of clam shells and oyster shells found, I believe, off the east coast of the United States. Can you add something to this information?

ANSWER: The ligament in the hinge of bivalve molluscs consists of uncalcified conchiolin, which is a protein compound distantly related to keratin or horn. Amber, on the other hand, consists of fossilized tree resins. Biochemically resins are esters; compounds formed by the combining of acids and alcohols. Thus, the similarity between conchiolin and amber is only superficial. They are alike in color and texture, but not in chemical composition.

Reprinted courtesy of Sea Secrets.

\$5 million bay project includes marina, shops

BY LAURA IMPASTATO
Sentinel Staff Writer

Mission Bay's Quivira Basin will be the site of a \$5 million boat marina and "Ports of Call" village if the project is given the green light by San Diego's Regional Coast Commission.

The project has been in the works since January 1972 when Recreation Specialists Inc. was selected by the city to develop the southwest corner of the basin for recreational and commercial use.

Mission Bay Marina, as the project is labeled, will cover about 16 acres of water and approximately 18.5 acres of land.

It will provide 527 boat slips, a fuel dock, boat sales and services, and several small buildings covering a total of 35,000 square feet.

The buildings will house speciality shops, four restaurants, a public promenade and landscaped parking with 836 parking spaces.

In describing the project at a public hearing before the Coastal Commission on Friday, E. H. Graham Jr., chairman of the board of Recreation Specialists, pointed out that the buildings will cover about eight per cent of the area with 50 per cent devoted to landscaping.

He explained that the buildings will be "low profile" in design with wood shingle roofs to make them compatible with their surroundings.

Commission executive director Tom Crandall pointed out that the project has a potential environmental impact on water quality and living organisms in the area, and he referred commission members to the applicant's report on that impact.

Some of the impact detailed by the developer are: restriction of general

public access to the area; existence of docks, pilings and boat hulls which will obstruct water circulation and may have an adverse impact on water quality; generation of additional traffic in the area; and attraction of visitors to the area other than those using the bay park as a resource.

Measures offered by the developer to reduce the impact include: imposing speed limits on boats and autos in the area to reduce noise levels; requiring boats to have holding tanks; having the marina's pumpout facility connected to the existing sewer system; not allowing toxic paint to be used below the waterline or hull painting permitted in the water; placing of pilings to provide increased habitat for invertebrates and

cover for small fish, and employment of a full-time maintenance man to remove trash, debris and petroleum from both land and water areas.

The developer's report recognizes that preserving public access to the water is a primary concern of the Coast Commission, but points out that physical security of boat owners property "mandates that dock access by restricted."

Public walkways will be provided around the perimeter of the marina and landscaping to improve the visual aspects of the area.

A representative of the "Coastwatch Committee" testified that his group is not opposed to the project. One resident of the area opposed it because it is an example of "overcommercialization of Mission Bay Park," he said.

The commission will render its decision on the project at its next regularly scheduled meeting in about two weeks.

Graham estimates that if commission approval is secured, the project could be completed within nine months of the initial construction date.

This article is reprinted courtesy of the SENTINEL. It appeared in their newspaper on October 7, 1973.

READ THIS ARTICLE CAREFULLY!! Action on the project is only two weeks away. The project could be completed within nine months! Ask yourself if you would like to see Quivira Basin become a "\$5 million boat marina."

Those who prefer enjoying Quivira Basin in its present state might do well to write to their Councilman, to the Mayor, and to the Regional Coast Commission. Appearance at the Commission meeting would certainly be appropriate.

GO AND LOOK AT QUIVIRA BASIN. IT MAY BE YOUR LAST CHANCE!

NEW MEMBERS

LAN, Mr. T.C.
40, Lane 105 Liao-ning St.
Taipei, Taiwan
Republic of China

Delaware Museum of Natural History
Box 3937,
Greenville, Delaware, 19807

EX-PISCES MOLLUSCA

by

Clifton L. Martin

Mollusks collected from the stomachs of fish have probably been known to man since prehistoric times. Yet, it has been only within the past three hundred years that he has made a systematic study of mollusks and has learned the true scope and significance of this phenomenon. It may be that man's first inkling that hitherto unknown mollusks existed in the off-shore depths of the sea came about from this discovery. Whatever the reason, many new species were first described from specimens collected in this way and others are still being added to the list at frequent intervals.

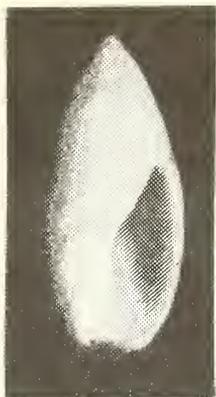
Many of the world's rarest shells have been taken from the digestive tracts of fish. Some of them have never been collected by any other method. That some of these shells are highly prized by collectors throughout the world is attested to by the premium prices asked for them on those rare occasions when they are offered for sale. This does not imply that all shells taken from fish are rare. Many of them are common species and are often found in the littoral zone but with a range extending into deeper water. However, the list of species that have been collected in this way probably contains a larger percentage of rare shells than are collected by any other means.

The rare occurrence of some of these mollusks is due to the inaccessible nature of the habitat in which they live. Most gastropod mollusks prefer rocky areas and some species are normally found on the undersides of ledges and in crevices between rocks. Since many of these areas are too deep for divers to reach and the trawl nets of fishermen are not likely to bring them up these shells can be obtained only by extracting them from the stomachs of fish. There are other reasons for the rarity of some of these species. Numerically limited species populations may have many causes. The limitation of a necessary dietary requirement is but one of them. Excessive predation is another.

Dr. Arthur H. Clarke, Jr., of the National Museum of Canada, Ottawa, has written, "During 1838 and 1839, J. P. Couthouy described twenty-three species of New England mollusks and one brachiopod which he had found in the maws of fish caught in Massachusetts Bay and nearby waters. At approximately the same time Gould, Stimpson, Mighels, Adams, and Linsley were describing many other species taken from fish caught off New England and on the Grand Banks. Many of these mollusks were represented by single specimens that were later lost and have never been collected since." He further wrote, "Even in an area so thoroughly searched as New England, fish are still yielding new and rare species."

Almost any area where mollusks and bottom feeding fish are found together is certain to bring forth shells in this way. Although many species of fish are known to eat mollusks only those species that are used extensively as food by man have been adequately investigated. Almost all of the shells collected by this method at the present time are taken from only four or five species of fish. Further investigation of species that are not of economic importance to man may prove to be a rich source of hitherto unknown mollusks.

In recent years Prof. Henry Ramos Matthews, of the Laboratorio de Ciencias Mar do Ceara, Brazil, has discovered several new species of shells by examining the stomach contents of the toad fish, Amphichthys cryptodentrotus (Valenciennes, 1837), which is commonly called Pacamon by the fishermen of that area. Among the new molluscan species that Prof. Matthews has taken from Pacamon are Ancilla matthewsi Burch and Burch, 1967, Bullata matthewsi (Van Mol and Tursch, 1967), Conus selenae Van Mol, Tursch and Kempf, 1967, and Morum matthewsi Emerson, 1967. All of these mollusks were hitherto unknown and three of them were named in honor of Prof. Matthews.



Ancilla matthewsi

Burch & Burch, 1967
Height 14 mm.



Morum matthewsi

Emerson, 1967

Height 27 mm.



Bullata matthewsi

(Van Mol & Tursch, 1967)
Height 45 mm.

Ceará, Brazil.

Ex Amphichthys cryptocentrotus.

Perhaps the fish best known to conchologists, for the variety of shells it has given them, is the Musselcracker, Sparodon durbanensis (Castlenau), from off the Natal coast of South Africa. The total number of molluscan species that have been taken from this fish is most impressive. Mrs. Helen Boswell, of South Africa, published in the Hawaiian Shell News, March 1964, a list of fifty species of mollusks in her collection, all from Sparodon durbanensis. Although her list is quite large it does not contain the total number of species that are known to have been taken from this fish. While the Musselcracker is not as large as some of the other species of the Sparidae it does attain a length of three feet and often exceeds a weight of forty pounds.

In addition to Sparodon durbanensis another, smaller fish, that is locally called Slinger, Chrysoblephus puniceus Gilchrist and Thompson, is found off the Natal coast and it also includes mollusks in its diet.

It is very likely that all coastal waters throughout the world have fish that eat mollusks. The fish called Sweetlip, Lethrinus chrysostomus, from the coastal waters of north Queensland, Australia, has contributed several species of mollusks to the collectors of that area. Another fish from that area, Plectropomus maculatus (Bloch, 1790), commonly called Coral Trout, is also known to eat mollusks.

The Broadbill Swordfish, Xiphius gladius Linne, 1758, has been known to swallow the extremely fragile shells of Argonauta cornuta Conrad, 1854, and Argonauta nouryi Lorois, 1852, both from the tropical eastern Pacific, without damage to them. In the western and southern areas of the Pacific the Broadbill Swordfish has been known to ingest Argonauta hians Lightfoot, 1786, and Argonauta nodosa Lightfoot, 1786, with no damage to them. Capt. George Pattison, former master of a four-masted sailing bark but now of Glénelg, South Australia, reported that he had taken Argonauta shells measuring one and one half inches from the pelagic Dolphin Fish, Coryphaena hippurus Linne, 1758, which he had caught two thousand miles from any land, yet the shells were extracted in perfect condition. Both Xiphius gladius and Coryphaena hippurus are found in the warm and temperate waters of all seas and both species are great favorites of deep-water sport-fishing enthusiasts. Since neither species is a bottom feeder the only mollusks likely to be found in their stomachs are cephalopods.

The size range of the different species of fish that are known to eat mollusks varies from less than two pounds, for the toad fish, to more than three thousand pounds, for the Ocean Sunfish, Mola mola (Linne, 1758). The Broadbill Swordfish occasionally exceeds a weight of one thousand pounds.



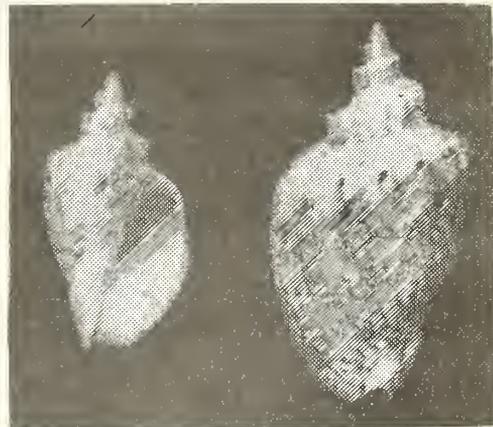
Argonauta cornutus Conrad, 1854

Sinaloa, Mexico.

Length 57 mm. Ex Xiphius gladius.

Festilyria ponsonbyi (E. A. Smith, 1901)

Natal, South Africa. Height of large specimen 98 mm. Ex Sparodon durbanensis. Note hole in body whorl of larger specimen which was caused by the fish.



It has been suggested that the locality data of shells taken from fish has little or no value since the fish could have been caught a long distance from where the mollusk was eaten. Studies have shown that this is seldom, if ever, the case. Tagging operations carried out by the California Department of Fish and Game and other agencies and institutions have shown that the reef-dwelling and bottom feeding fish have a tendency to remain in one area and do not travel great distances except under stress. Whether this is caused by a feeling of safety or security due to being in familiar surroundings is not known. It could be caused by an instinctive fear that excessive movement will attract predators. It is also possible that the reason may vary with each species involved.

Whatever the cause or causes may be they are probably motivated by an instinct either for self-preservation or for species preservation. As different as the two actions may appear, it is the same instinct that has prompted countless generations of salmon to return to the same rivers and streams their ancestors used for spawning each year. The old adage about self-preservation being the first law of nature may be very nearly right. The only fallacy being in the supposition that a numerical order can be placed on the innate primal instincts.

Tagging operations that have been carried out over a period of several years have confirmed the sedentary nature of bottom feeding fish. These operations have shown that the Sablefish, Anoplopoma fimbria (Fallas, 1814), had ranged a maximum of thirty miles in five years. The California Halibut, Paralichthys californicus (Ayres, 1859), was even more sedentary. Of 1200 fish tagged during a several year period about ten percent of those recovered had traveled not more than a mile from the point of release. The Barred Surfperch, Amphistichus argenteus Agassiz, 1854, apparently lives out its life very near to where it was born. Of nearly 2000 fish tagged more than 200 were recovered and few of these had traveled more than two miles since they had been released. The Lingcod, Ophiodon elongatus Girard, 1854, are also known to be very sedentary. One specimen was recovered in almost exactly the same spot it had been released twelve years earlier.

W. F. Clapp found, as far back as 1910, while on a fishing trawler on George's Bank, that mollusks taken from fish caught by the trawler were almost exactly the same species as those that were dredged in the same locality. When a species of mollusk has been extracted, time after time, from fish that were trawled in the same locality we must assume the mollusk actually inhabits that area. Since those mollusks that are known to have a very limited range, such as the velute, Festilyria ponsonbyi (E. A. Smith, 1901), have never been taken from fish any great distance from their habitat there is no reason to suppose that mollusks with a wider distribution, or mollusks that were hitherto unknown, were brought into the area from elsewhere. The data for shells collected from fish is as reliable as the data for those that were trawled, since the trawlers often change their locations for better fishing and sometimes tow their nets for quite long distances.

The quality of specimens collected this way will vary proportionate to the length of time they were in the fish. Many mollusks have been taken from the stomachs of fish with the soft parts intact and the shell undamaged. If the shell has been in the fish for a long enough period of time the digestive acids of the fish will have caused damage. If left to its natural conclusion the shell would eventually become completely dissolved. The amount and strength of the stomach acid will depend on the species of fish involved, since the different species would surely not all have the same digestive rates. Damage is often caused by the teeth of the fish. This is usually evident in the form of chips, scars and holes. Quite often a shell is found to have been damaged before it was ingested by the fish and may show this by one or more old growth flaws or by old breaks of the outer lip. However, this does not mean that a badly damaged shell may not be worthy of a place in the collector's cabinet. Many of these shells are of such rarity that specimens in any condition, so long as they can be identified, are well worth owning.

The second and final segment of this article will appear in the November issue.

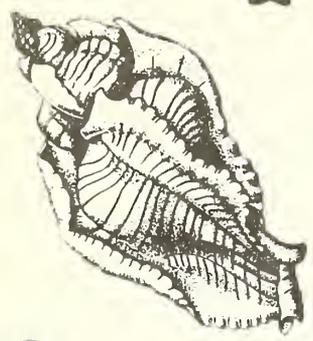
*****NEWS ITEM*****

Portions of the San Diego Shell Club exhibit, shown at the Public Library this summer, have been set up at the San Diego Museum of Natural History. Six large cases, aquarium, and photographic display are on exhibit for three months on the main floor (near the Foucault Pendulum).

KECR (93.3 F.M.) will publicize this exhibit on Nov. 1, 1973 at 12:05 and 6:10 P.M. These will be five minute bulletins in an interview format with George Radwin representing the Club and Museum.

REMEMBER--WE DO NOT PRINT AN ISSUE IN DECEMBER.

THE FESTIVUS



SAN DIEGO SHELL CLUB

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MUSEUM OF NATURAL HISTORY - Third Thursday - 7:30 PM

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Vol. IV November 1973 No. 11

* Program: Dr. Don Shasky speaking on A Trip To Panama, Nov. 15, 1973 *
* at 7:30 P.M. *
* Christmas Party will be on Dec. 14, 1973 at NAS Miramar CPD Club. Cocktail *
* Hour begins at 6:00 P.M. Reservations close Dec. 5, 1973. Map *
* with instructions is on last page of this issue. *
* WE DO NOT PRINT A DECEMBER ISSUE *

Following is the slate of officers for the 1974 year. Additional nominations will be accepted from the floor at the November meeting at which time the election of the officers will take place. Installation of officers will take place, as always, at the Christmas Party.

President: Richard Schwarz
Vice Pres: Don Pisor
Rec. Sec'y: Helen Robilliard
Cor. Sec'y: Anne Schwarz
Treasurer: Margaret Mulliner

HOW SEA ANIMALS FIGHT FALLING SALINITY

by

K. M. Reese

Zoologist Sidney K. Pierce, Jr., at the University of Maryland, College Park, is currently looking into the ability of sea animals to survive changes in salinity in their environment. Dr. Pierce already has two years of field work under his belt, at Assateague Island, Md., where the salinity and temperature of the salt marshes change regularly with the tides. Also present is a large population of the kinds of animals he's been studying: oysters, clams, sea anemones, and the like.

When salinity decreases, the change in osmotic pressure causes water to enter the cells of the animals. The cells swell, normal function is impaired, and the cells eventually will burst. They are able to reverse the trend, however, by emitting free amino acids. Alanine and glycine are commonly detected, as is taurine, a catabolic by-product of methionine. Depending on species, aspartic and glutamic acids and some others turn up occasionally. The free amino acids, at any rate, diffuse through the cell membrane, and the concomitant change in osmotic pressure causes water to leave the cell, which returns to normal.

The animals' ability to withstand decreases in salinity varies with the species and is a function of the ability to emit the amino acids. In the laboratory, Dr. Pierce is studying a ribbed mussel that can survive a decrease from full-strength sea water to almost fresh water. He's working both with whole animals and with isolated tissues. One of the goals is to learn more of how the cell membrane functions when the protective mechanism is operative. A second goal is to figure out how the sea animals counteract increases in salinity. When rising salinity overwhelms the animal's protective mechanism, the cells will shrivel up until they can no longer function, but the mechanism itself is more or less a blank at the moment.

(Permission given to reprint by Chemical and Engineering News, March 5, 1973 issue.)

NEW MEMBERS

KING, June

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4612 Terrace Dr.
San Diego, 92116

SMITH, John A21

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FPO San Francisco 96601

WOOD, B.W.

2175 Foster St.
Oceanside, 92054

Dues is due and payable on 1 Jan. 1974. Peg Mulliner asks that you make it payable to the San Diego Shell Club, and mail it to her at 5283 Vickie Dr., San Diego, Ca., 92109. Rates are listed on the front of this issue.

The following is the continuation of the article EX-PISCES
MOLLUSCA by Clifton L. Martin.

AN ALPHABETICAL LIST OF MOLLUSKS KNOWN TO HAVE BEEN TAKEN FROM FISH

Note: Those names preceded by an asterisk, (*), may not be valid since they were taken from reprints of the original descriptions. Some of them may be nude names while others are almost certain to have been placed in other genera.

No.	Name of Mollusk	Locality
PELECYPODA		
1	* <u>Astarte portlandica</u> Mighels, 1843	Casco Bay, Maine
2	<u>Astarte quandrans</u> Gould, 1841	Massachusetts Bay, Mass.
3	<u>Chlamys hastatus</u> (Sowerby, 1842)	San Pedro, California
4	<u>Chlamys tigerina</u> (Müller, 1776)	North Sea
5	<u>Chlamys tinctus</u> (Reeve)	Natal, South Africa
6	<u>Cooperella subdiaphana</u> (Carpenter, 1864)	San Pedro, California
7	* <u>Corbicula amazonica</u> "Anthony" Prime, 1870	Amazon River, Brazil
8	<u>Donax burnupi</u> Sowerby	Natal, South Africa
9	<u>Donax gouldii</u> Dall, 1921	San Pedro, California
10	<u>Leptopecten latiauratus</u> (Conrad, 1837)	San Pedro, California
11	<u>Lyonsia aeruginosa</u> (Mighels, 1844)	Casco Bay, Maine
12	* <u>Nucula cascoensis</u> Mighels & C. C. Adams, 1842	Casco Bay, Maine
13	<u>Nucula delphinodonta</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine
14	* <u>Nucula navicularis</u> Couthouy, 1839	Plymouth, Massachusetts
15	<u>Nuculana tenuisulcata</u> (Couthouy, 1838)	Phillips Beach, Mass.
16	<u>Siliqua squama</u> (Blainville)	Grand Banks, Nova Scotia
17	<u>Sphaerium nitidum</u> (Mighels & C.B. Adams, 1842)	Norway, Maine
18	<u>Spisula polynyma</u> (Stimpson, 1860)	Grand Banks, Nova Scotia
19	* <u>Thracia truncata</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine
20	<u>Voldia myalis</u> (Couthouy, 1838)	Massachusetts Bay, Mass.
21	<u>Voldia sapotilla</u> (Gould, 1841)	Grand Banks, Nova Scotia
22	<u>Voldia thraciaeformis</u> Storer	Massachusetts
GASTROPODA		
1	<u>Acirsa costulata</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine
2	* <u>Amaura canaliculata</u> (Gould, 1839)	Massachusetts Bay, Mass.
3	<u>Ancilla contusa</u> Reeve, 1864	Natal, South Africa
4	<u>Ancilla decipiens</u> Sowerby, 1897	Natal, South Africa
5	<u>Ancilla matthewsi</u> Burch & Burch, 1967	Ceará, Brazil
6	<u>Babylonia papillaris</u> (Sowerby, 1825)	Natal, South Africa
7	* <u>Bulla lineolata</u> Couthouy, 1838	Cape Cod, Mass.
8	<u>Bullata matthewsi</u> (Can Mol & Tursch, 1967)	Ceará, Brazil
9	<u>Bursa granularis</u> (Roding, 1786)	Natal, South Africa
10	<u>Calliostoma annulatum</u> (Lightfoot, 1786)	San Pedro, California
11	<u>Calliostoma canaliculatum</u> (Lightfoot, 1786)	San Pedro, California
12	<u>Calliostoma gloriosum</u> Dall, 1871	San Pedro, California
13	<u>Calliostoma occidentale</u> (Mighels & Adams, 1842)	Casco Bay, Maine
14	<u>Calliostoma trecolor</u> Gabb, 1865	San Pedro, California
15	<u>Cantharus lautus</u> (Reeve, 1846)	Ceará, Brazil
16	<u>Charonia pustulata</u> (Euthyme, 1889)	Natal, South Africa
17	<u>Chicoreus axicornis</u> (Lamarck, 1822)	Natal, South Africa
18	<u>Chicoreus banksii</u> (G. B. Sowerby II, 1841)	Natal, South Africa
19	<u>Cingula latior</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine

No.	Name of Mollusk	Locality
20	<u>Cingula latior</u> Mighels & C. B. Adams 1842	Casco Bay, Maine
21	* <u>Cingula semicostata</u> "Montagu" Mighels & Adams	Casco Bay, Maine
22	* <u>Clavatula tripartita</u> Weinkauff	Natal, South Africa
23	<u>Columbella rosacea</u> (Gould, 1839)	Cohasset, Mass.
24	<u>Conus eucoronatus</u> Sowerby III, 1903	Natal, South Africa
25	<u>Conus eumitus</u> Tomlin, 1926	Natal, South Africa
26	<u>Conus gilchristi</u> Sowerby III, 1903	Natal, South Africa
27	<u>Conus gubernator</u> Hwass in Bruguière, 1792	Natal, South Africa
28	<u>Conus infrenatus</u> Reeve, 1848	Natal, South Africa
29	<u>Conus natalis</u> Sowerby II, 1858	Natal, South Africa
30	<u>Conus selenae</u> Van Mol, Tursch & Kempf, 1967	Ceará, Brazil
31	<u>Cylichna gouldii</u> (Couthouy, 1838)	Nahant Beach, Mass.
32	<u>Cymatium olearium</u> (Linne, 1758)	Natal, South Africa
33	<u>Cymatium rubeculum occidentale</u> Clench & Turner	Ceará, Brazil
34	<u>Cypraea arabica immanis</u> Schilder & Schilder, 1939	Natal, South Africa
35	<u>Cypraea barclayi</u> Reeve, 1857	Natal, South Africa
36	<u>Cypraea beckii</u> Gaskoin, 1839	Natal, South Africa
37	<u>Cypraea broderipi</u> Sowerby, 1832	Natal, South Africa
38	<u>Cypraea carneola</u> Linné, 1758	Natal, South Africa
39	<u>Cypraea cernica</u> Sowerby, 1870	Natal, South Africa
40	<u>Cypraea citrina</u> Gray, 1825	Natal, South Africa
41	<u>Cypraea contaminata distans</u> Schilder & Schilder, 1938	Natal, South Africa
42	<u>Cypraea cruickshanki</u> Kilburn, 1972	Natal, South Africa
43	<u>Cypraea fultoni</u> Sowerby III, 1903	Natal, South Africa
44	<u>Cypraea helvola argella</u> Melsill, 1888	Natal, South Africa
45	<u>Cypraea leucodon</u> Broderip, 1828	Philippines
46	<u>Cypraea litea humphreysi</u> Gray, 1825	N. Queensland, Australia
47	<u>Cypraea marginalis</u> Dillwyn, 1827	Natal, South Africa
48	<u>Cypraea</u> sp.	Philippines
49	<u>Cypraea surinamensis</u> Perry, 1811	Ceará, Brazil
50	<u>Cypraea vitellus dama</u> Perry, 1811	Natal, South Africa
51	<u>Daphnella stegeri</u> McGinty, 1955	Ceará, Brazil
52	<u>Diaphana debilis</u> (Gould, 1839)	Massachusetts Bay, Mass.
53	<u>Epitonium novangliae</u> (Couthouy, 1838)	Cape Ann, Mass.
54	<u>Euthria fuscotincta</u> Sowerby	Natal, South Africa
55	<u>Euthria queketti</u> E. A. Smith, 1901	Natal, South Africa
56	<u>Fasciolaria strebeli</u> Fulton, 1930	Natal, South Africa
57	<u>Festilyria africana</u> (Reeve, 1856)	Natal, South Africa
58	<u>Festilyria ponsonbyi</u> (E. A. Smith, 1901)	Natal, South Africa
59	<u>Ficus ficus</u> (Linne, 1758)	Natal, South Africa
60	<u>Fusinus oblitus</u> (Reeve, 1847)	Natal, South Africa
61	* <u>Fusus africanus</u> (Sowerby, 1897)	Natal, South Africa
62	* <u>Fusus cancellatus</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine
63	* <u>Fusus harpularius</u> Couthouy, 1838	Lynn, Mass.
64	* <u>Fusus pleurotomarius</u> Couthouy, 1838	Lynn, Mass.
65	<u>Gemma gilchristi</u> (Sowerby III, 1902)	Natal, South Africa
66	<u>Harpa crassa</u> Krauss, 1848	Natal, South Africa
67	<u>Harpa major</u> Bøding, 1798	Natal, South Africa
68	* <u>Haustellum fallax</u> (E. A. Smith, 1901)	Natal, South Africa
69	<u>Latirus abnormis</u> Sowerby, 1894	Natal, South Africa
70	<u>Latirus alboapicatus</u> E. A. Smith, 1902	Natal, South Africa
71	<u>Latirus virginensis</u> Abbott, 1958	Ceará, Brazil
72	<u>Lophitoma acuta</u> (Perry, 1811)	Natal, South Africa

No.	Name of Nollusk	Locality
73	<u>Lophitoma indica</u> (Roding, 1798)	Natal, South Africa
74	<u>Lyria queketti</u> (E. A. Smith, 1901)	Natal, South Africa
75	* <u>Mangelia ligata</u> (Mighels & C. B. Adams, 1842)	Gulf of St. Lawrence
76	<u>Margarites argentata</u> Gould, 1841	Cape Ann, Mass.
77	<u>Margarites costalis</u> Gould	Massachusetts
78	* <u>Margarites minutissima</u> Mighels, 1843	Casco Bay, Maine
79	* <u>Margarites varicosa</u> Mighels & C. B. Adams, 1842	Gulf of St. Lawrence
80	<u>Marginella aureocincta</u> Stearns, 1872	Ceará, Brazil
81	<u>Melapium elatum</u> (Schubert & Wagner, 1829)	Natal, South Africa
82	<u>Mitra brasiliensis</u> Oliveira, 1969	Ceará, Brazil
83	<u>Mitra lopesi</u> Matthews & Coelho, 1969	Ceara, Brazil
84	<u>Nurex brevispina</u> Lamarck, 1822	Natal, South Africa
85	<u>Nassarius glans</u> (Linne, 1758)	Natal, South Africa
86	<u>Nassarius nanus</u> Usticke, 1959	Ceará, Brazil
87	<u>Nassarius pyramidalis</u> (A. Adams, 1853)	Natal, South Africa
88	<u>Natica fulminea</u> Gmelin, 1791	Spain
89	* <u>Oxinoe glabra</u> Couthouy, 1838	Barnstable, Mass.
90	* <u>Patella candida</u> Couthouy, 1838	Barnstable, Mass.
91	* <u>Phasianella sulcosa</u> Mighels, 1843	Casco Bay, Maine
92	<u>Pirenella boswellae</u> Barnard	Natal, South Africa
93	<u>Pisania tritonoides</u> (Reeve, 1846)	Natal, South Africa
94	* <u>Pleurotoma bicarinata</u> Couthouy, 1838	Nahant, Mass.
95	* <u>Pleurotoma decussata</u> Couthouy, 1839	Barnstable, Mass.
96	<u>Pleurotoma violacea</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine
97	<u>Polystira florencae</u> Bartsch, 1934	Ceara, Brazil
98	<u>Puncturella noachina</u> (Linne, 1771)	Southern Maine
99	<u>Scaphander punctostriatus</u> (Mighels & C.B. Adams, 1842)	Casco Bay, Maine
100	<u>Solariella obscura</u> (Couthouy, 1838)	Marblehead, Mass.
101	<u>Tachyrhynchus erosum</u> (Couthouy, 1838)	Massachusetts Bay, Mass.
102	<u>Tachyrhynchus reticulatum</u> (Mighels & C. B. Adams, 1842)	Gulf of St. Lawrence
103	<u>Turritella sanguinea</u> Reeve, 1849	Natal, South Africa
104	<u>Turritella sanguinea natalensis</u> E. A. Smith, 1910	Natal, South Africa
105	<u>Vasum truncatum</u> (Sowerby, 1892)	Natal, South Africa
CEPHALOPODA		
1	<u>Argonauta cornuta</u> Conrad, 1854	Sinaloa, Mexico
2	<u>Argonauta hians</u> Lightfoot, 1786	Northwest Australia
3	<u>Argonauta nouryi</u> Lorois, 1852	Sinaloa, Mexico
4	<u>Argonauta nodosa</u> Lightfoot, 1786	N. S. W., Australia
AMPHINEURA		
1	* <u>Chiton emersonii</u> Couthouy, 1838	Cape Ann, Mass.
2	* <u>Chiton fulminatus</u> Couthouy, 1838	Cohasset, Mass.
3	* <u>Chiton mendicarius</u> Mighels & C. B. Adams, 1842	Casco Bay, Maine
4	* <u>Chiton sagrinatus</u> Couthouy, 1838	Cohasset, Mass.

The preceding list is in no way a complete listing of all the species of mollusks that are known to have been taken from fish. The species included in this list were all taken from five widely separated localities, all but a few of them are from only two areas. None of the areas listed have a complete coverage in this report since there are many mollusks that have been taken from fish in all of them of which there are no readily available records. The Pacific Coast

of North America has had little information of this nature about its molluscan fauna even though a large fishing industry has been in operation here for nearly one hundred years. Most books pertaining to fish do not list stomach contents unless the fish was caught for scientific investigation. In all but a few references this information leaves much to be desired. Such statements as, "Two species of clams and three snails", can be quite exasperating to anyone whose primary interest is in the mollusks the fish had eaten. One especially interesting reference states, "Clams and small snails made up over half of the diet of bonefish studied in Puerto Rico." The bonefish, Albula vulpes (Linne, 1758), is found in the warm coastal waters of all seas. While it seldom exceeds a weight of two pounds on our coast it often has a weight of nearly twenty pounds in warmer waters.

The late Prof. Addison E. Verrill once stated that a complete list of the animals eaten by the haddock would doubtless include all of the species of mollusks belonging to the New England coast fauna.

The total area of the combined localities listed is but a very small portion of the coastal areas of the world. Many of those areas, not covered in this report, undoubtedly have large numbers of bottom-feeding fish. It is probable that if complete reports of mollusks extracted from fish were available from all of these regions the total species would be numbered in the thousands.



Cypraea surinamensis Perry, 1811

Ceara, Brazil. Height 27 mm. Ex Amphichthys cryptocentrotus



Tonna variegata (Lamarck)

Natal, South Africa. Height 50 mm.

Ex Sparodon durbanensis.



Cypraea fultoni

Sowerby III, 1903

Natal, South Africa.

Height 57 mm. Ex

Sparodon durbanensis.



Euthria queketti E.A. Smith, 1901

Natal, South Africa. Height 48 mm.

Ex Sparodon durbanensis.

Conus eucoronatus

Sowerby III, 1903

Natal, South Africa. Height 45 mm.

Specimen shown was collected alive but

the species has been taken from

Sparodon durbanensis.



Festilyria africana (Reeve, 1856)

Natal, South Africa. Height 66 mm.

Ex Sparodon durbanensis.



Cypraea barclayi Reeve, 1957

Natal, South Africa. Height 25 mm.

Ex Chrysoblephus puniceus.



Conus gilchristi

Sowerby III, 1903

Natal, South Africa. Height

35 mm. Ex Sparodon

Durbanensis. The species

has also been taken from

Chrysoblephus puniceus.



Fusus africanus (Sowerby, 1897) Natal, South Africa.

Height 76 mm. Ex Sparodon durbanensis.

A LIST OF FISH FROM WHICH MOLLUSKS ARE KNOWN TO HAVE BEEN TAKEN

No.	Name of Fish	Range
MARINE FISH		
1	(Green Sturgeon) <u>Acipenser medirostris</u> Ayres, 1854	Southern Alaska to San Francisco.
2	(Bonefish) <u>Albula vulpes</u> (Linne, 1758)	World-wide in tropical and warm temperate waters.
3	(Pacamon) <u>Amphichthys cryptocentrotus</u> (Valenciennes, 1837)	Total range not available but includes the north coast of South America.
4	(Barred Surfperch) <u>Amphistichus argenteus</u> Agassiz, 1854	Bodega Bay, California, to Playa Maria Bay, Baja California, Mexico.
5	(Wolf-fish) <u>Anarchias</u> sp.	Total range not available but includes New England seaboard.
6	(Wolf-eel) <u>Anarrhichthys ocellatus</u> Ayers, 1855	Kodiak Island, Alaska, to Imperial Beach, California
7	(Sargo) <u>Anisotremus davidsonii</u> (Steindachner, 1875)	Monterey Bay, California, to Magdalena Bay, Baja California, Mexico.

No.	Name of Fish	Range
32	(Winter Flounder) <u>Pseudopleuronectes americanus</u> (Walbaum)	Labrador to South Carolina.
33	(Skate) <u>Raja</u> sp.	An Atlantic Coast species, range not available.
34	(Cabezon) <u>Scorpaenichthys marmoratus</u> Girard, 1854	Sitka, Alaska, to Abreojos Point, Baja California, Mexico.
35	(Redfish) <u>Sebastes marinus</u> (Linne)	Northern Europe, and from Iceland to central New Jersey.
36	(Musselcracker) <u>Sparodon durbanensis</u> (Castlenau)	Total range not available but includes coast of Durban, South Africa.
37	(Puffer) <u>Sphoeroides</u> sp.	An Atlantic Coast species, range not available.
38	(Tautog) <u>Tautoga onitis</u> (Linne)	New Brunswick, Canada, to the Carolinas.
39	(Cunner) <u>Tautogolabrus adspersus</u> (Walbaum)	Labrador to Sandy Hook, New Jersey.
40	(Broadbill Swordfish) <u>Xiphias gladius</u> Linne, 1758	World-wide in tropical and temperate waters. An open sea species.

The above list is also incomplete and for basically the same reasons as were given for the incompleteness of the list of mollusks. A few species have been purposely omitted from this list even though they are known to include mollusks in their diets. They have not been included because the crushing action of their teeth causes too great a damage to the shells.

In addition there are a large number of fresh water fish that are known to eat mollusks. These have also been omitted, not because of a lack of information about the fish, but because information pertaining to the mollusks they ingest is not available.

I would like to take this opportunity to thank the many friends who have helped to make this preliminary study possible. To each of them my sincere appreciation. First of all, to Dr. George E. Radwin and Anthony D'Attilio, of the San Diego Natural History Museum, for answering many questions pertaining to nomenclature. To Mrs. Ellen Visage, of Durban, Natal, Republic of South Africa, for her generosity in sending so many rare and fine ex-pisces shells to enrich our collection and for information pertaining to the mollusk eating fish of the Durban area. To L. J. (Joe) Bibbey, for the loan of his copy of Tomlin's, Catalogue of Recent and Fossil Cones, and for giving me access to other rare volumes in his library. To Ruth Purdy for specimens of Argonautidae and for permitting me to photograph specimens in her collection. To Jules and Carole Hertz for the gift of a fine specimen of Chlamys tigrina (Muller, 1776) and for the Treasures, for their special efforts to obtain ex-pisces specimens for me, especially some of those from northern Brazil. To John Q. and Rose L. Burch for the gift of reprints vital to this study.

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On the following pages is a letter from Mr. Frank Abbotsmith of Balga, West Australia. He will be visiting our club in Jan. 1974. We are looking forward to his visit!

Abbottsmith

P.O. BOX 59,
BALCOMBE, W.A., 6061

Australia

-8-73

Dear Mrs. Risor,

Your prompt and early letter of 21st Feb, 73 arranged the details of my visit to San Diego so easily and to the point, that it will be an ideal locality for me to commence my American trip.

I'm thrilled at the prospect of visiting America and I set out from Perth W.A. in only another 5 months time. It is just as well that I started my preparations early. By reputation you have one of the biggest and best zoos in the world at San Diego, hence I am keen to see it. Luckily my itinerary timing is fairly leisurely and this ought to give me some opportunity to see the high lights in each place I shall visit.

My "system" of approach, which I developed recently during my Australian tour, is that after complete arrangements have been settled, I despatch a letter a couple of weeks before my arrival to let you know that all is going well. Then when I arrive I contact my friends immediately.

Hoping to meet you early in the New Year. You'll need a pair of ear-muffs. Again many thanks for all your kindness, efficiency and courtesy.

Yours sincerely,

Frank Abbottsmith

P.T.O.

Following are excerpts from Mr. Abbottsmith's mimeographed letter sent to all those clubs he will be visiting.

AVAILABLE TIME SLOT FOR SLIDE VIEWINGS.

To best assist the majority of Shell Clubs, I am programming for approximately a sojourn of a week, at each locality in which slide showings of the Australian Volutes will be presented. By arriving and departing about mid-week, allowance is made for an uninterrupted week-end for Shell activities, especially as this is the most propitious time for most people. In this manner I aim to offer some flexibility and scope for the respective Shell Clubs to select the most convenient time of the week to stage their viewing of the coloured slides.

There is only a slight probability that my visit will occur during the normal meeting time of your Shell Club, so I would suggest that consideration be given to the holding of a special meeting. This is particularly advantageous as it engenders the ideal presentation in both time and cultural enjoyment.

OPTED TIMES TO VIEW THE SLIDES.

Many Shell Clubs have elected to see all the slides in two separate evening showings. In fact some very enthusiastic Shell Clubs have opted for the initial slide showing to be offered on a Saturday afternoon, followed by a tea-break and continuing with a final slide showing during the Saturday evening. Other Shell Clubs have decided that a Sunday suits them better for the afternoon and evening sessions. This arrangement allows for some opportunity to design a "mini-convention" if so desired, to include Shell displays and kindred activities. Another popular idea, but more ambitious, is to utilize two evenings in the one week-end for slide showings. This style of program keeps the week-end days free to devote to a Shell show if required.

However, I realize that some Shell Clubs will only be able to accept a single evening of slides. Therefore the slides selected will of necessity have to be restricted to the more important and spectacular items. Notwithstanding this curtailment I am still prepared to privately show all the slides to the keener volute collectors in their private homes.

It is merely a case of deciding what is most suitable, convenient and desirable for your respective Shell Club. These arrangements can be quite flexible as a full week does allow for subsequent adjustments if needed.

APPRECIATION.

I am most grateful and delighted with the extreme kindness bestowed on me in most American Shell Club localities, by the generous hospitality and accommodation offered to me by individual members in their own homes. I particularly have my own way of showing my thanks to them personally. The warmth of your welcome and your cordiality are delightful. I don't know who will enjoy my visit the most - you in viewing the coloured slides of the fantastic Australian Volutes - or me, as a privileged guest and tourist to your amazing country.

MY SLIDE SHOWING TECHNIQUE.

Experience gathered from a similar tour of Australia earlier this year, was invaluable to plan my pending overseas trip. Thousands of Australian collectors were pleasantly surprised and enjoyed gazing at the coloured slides of the Australian Volutes. I'm confident that you will be equally delighted and amazed. Besides the principal function of the slide showing, which is to present the large and distinctly different range of forms WITHIN each species of the Australian Volutidae, there will also be segments on fossils, egg cases, juveniles and LIVE ANIMALS, plus a few unexpected surprises of great interest and beauty. The talks are designed to be enjoyed and understood by everyone; lowly educated and geniuses; collectors and NON-collectors; adults and teenagers; yet still be full of interest and "easily-comprehended-unfamiliar-data", even to many brilliant academics. And that sure IS a TALL ORDER.

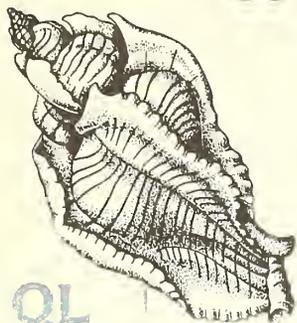
REASON FOR THE SLIDE SHOWINGS.

I would stress that the initial purpose of the slide showings is to repay those volute collectors, who have helped me with specimens and data, and encouraged me by supporting the publication of my book - Multiform Australian Volutes - and purchased a copy. Rather than show the coloured slides to these friends individually in their homes, it is easier to present the slide showing to their local Shell Clubs, where they can all see it at once as well as anyone else who might be interested.

By making a leisurely tour I can also see some of the local volute collectors and their collections. In addition I should have ample opportunity to avail myself of some single day tours and enjoy the scenery.

THE

FESTIVUS



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Vol. V

January 1974

No. 1

SPECIAL PROGRAM ON JANUARY 24, 1974!! Frank Abbottsmith from Australia will give a unique program on Volutes using two slide projectors simultaneously. Program will start at 7:00PM for this meeting.

POTLUCK DINNER AND RECEPTION FOR MR. ABBOTTSMITH at home of June and Harold Bellmer, 4680 W. Talmadge Dr. on January 26, 1974. Cocktails at 6:00 P.M. See map on last page.

A TRIP TO PANAMA

Dr. Don Shasky's record of a trip to Panama was shared with our Club in a slide-illustrated lecture at our November meeting.

Shell collectors have been visiting these shores for a long, long time. First, of course, were the Anasazi (the ancient ones) who harvested the pristine beaches and traded this wealth, by a long chain, to far-distant peoples. Collectors of much more recent time, say the last two hundred years, are some who have authored many of our shells. Portraits of a few of the earlier collectors (early to mid-nineteenth century) were shown--Hugh Cuming, W.J. Broderip, G.B. Sowerby, C.B. Adams. Title pages of early papers written by some of them were also shown. Among those mentioned as collecting here in the first years of the twentieth century were W.H. Dall, James Zetek, H.A. Pilsbry and H.N. Lowe. (The world-wide collection of H.N. Lowe is part of the shell treasure of the San Diego Museum of Natural History). More contemporary are Axel A. Olsson, Maxwell Smith, Joshua Bailey, Leo Hertlein, A.M. Strong, Ruth Turner, James McLean.

Detailed maps of Panama and the Canal Zone were very interesting since they showed so clearly the northwest by southeast alignment of the Canal. The deep curve of the isthmus and the several islands in the bays must surely provide the greatest possible stretch of shoreline in what is really a small area. Mangroves extend the habitat of the intertidal fauna and the only-slightly offshore islands are encrusted with a trillionate population. Tidal variations are extreme, the ordinary tides varying between sixteen and twenty feet. However, twenty-eight foot tides have been recorded. Dr. Shasky is convinced that this is the best intertidal collecting area in the world.

Dr. Shasky showed slides of several specimens, among them a Northia northiae. With this particular shell were lovely photos of its egg cases beautifully lighted, golden discs. He also had specimens of the various shells for close examination.

Scenes along the canal were interesting. Shaded seating at gate sites is provided that people may watch the passage of ships through the locks, a not too common experience. During cleaning of the locks it is possible to collect on the exposed walls (for a select few persons, we are sure).

A sad sight was the departing Queen Mary, far enough away to look small and lonely. She was too big for the Canal and had come around the Horn, stopping at Balboa for provisioning on her way to her last berth at Long Beach, California—a sad fate for a queen of the sea.

OUR CHRISTMAS PARTY

For the past several years the San Diego Shell Club has had the pleasure- and privilege- of holding its Christmas party in the CPO Club-rooms of the Naval Air Station at Miramar. Such was our good fortune again this year.

During the cocktail hour preceding the dinner, members were happy to greet Arthur and Emma Rose West who now live in a mountain setting on the road that runs from Fresno to Yosemite. They have their home and shell business at Oakhurst, California. They particularly enjoy their friendly association with the wild creatures who live in the area surrounding their home.

With the Christmas party we bid farewell to our retiring officers and welcome those who have accepted responsibility for the new year. Mr. Richard Dilworth was the Master of Ceremonies, introducing and thanking both the outgoing and incoming officers. Those retiring were Jules Hertz, President; Joe Gibbey, Vice-president; June Bellmer, Treasurer; Ann Schwarz, Recording Secretary; and Jeanne Pisor, Corresponding secretary. Officers for 1974 are Richard Schwarz, President; Don Pisor, Vice-President; Margaret Mulliner, Treasurer; Anne Schwarz, Recording Secretary; and Helen Robilliard, Corresponding Secretary.

Flowers were presented to all the officers, the ladies receiving orchid corsages, and the gentlemen, carnation boutonnieres.

The exchange of shell gifts was anticipated by all with the order of selection determined by lot. Many lovely shells were in those Christmas boxes under the tree.

The tables, arranged by the management, were very attractive in their Christmasy red and white, lit by the flickering glow of candles. Ivan and Agnes Thompson added the special touch of "sparkled" shells and gorgonian fans to the table decor, giving it our own signature.

The food is always very good and the service friendly and courteous. We appreciate very much the enjoyable times we have had at Miramar, hosted by those of our members who were, are, in the Naval service.

For one reason or another our numbers were less than usual but for the members, and their guests who did attend it was a very pleasant occasion.

DUES ARE DUE!! Make checks payable to The San Diego Shell Club, Inc.
c/o Margaret Mulliner. See front page for rates.

COLUMBELLID GENERA OF THE EASTERN PACIFIC

By Dr. George Radwin

The Columbelloid differs from all but a few gastropod families in several significant ways. In the first place its members can be accurately recognized as belonging to the Columbelloid by their radular dentition. Both the sigmoid, three dimensionally bent lateral teeth and the seemingly vestigial, sub-rectangular, edentulate rachidian tooth are unique to the Columbelloid. In the second place the shells of columbellid forms are so morphologically divergent that, in some cases, members of columbellid genera are less similar in appearance to each other than are members of different families to each other elsewhere in the Neogastropoda. This feature has caused the family to be readily subdivided into numerous genera. Interestingly, the form taken by the shell in some of these genera approaches very closely the form of shells in other gastropod families. For example, Parametaria could easily be mistaken for Conus and Mazatlanian resembles Terebra. Indeed, the shell morphology is so divergent from genus to genus in this family that in some cases the only basis for a columbellid placement of a genus is its radular dentition. This has caused some people to skeptically suggest that the shell morphology is probably more indicative of relationship and that the radular morphology is indicative of convergent evolution. This contention, however, does not reconcile with observable data.

The nature and form of the neogastropod radula has been shown, in many cases, to be more conservative than shell morphology. To accept the premise that the shells of some of these more extreme columbellid forms have remained relatively unchanged for many millions of years and that the radula has been altered due to evolutionary pressures is very difficult to accept. It is more difficult still to explain how all these divergently shelled forms have developed the same basic radular morphology unless some degree of common ancestry is postulated.



Mazatlanian fulgurata

The table I have drawn up lists the 49 valid, Recent genera of the world. The eastern Pacific, with 25 genera represented, and the western Atlantic, with 23 genera represented, appear to be the center of columbellid diversity today. The fact that there was once a water passage between these two regions in the area of Panama is emphasized by the apparent close relationships between their columbellid faunas. Of the 25 genera represented in the eastern Pacific, 16 are also represented in the western Atlantic, and 9 are limited to the eastern Pacific. The pattern, in many instances, is for genera represented in both the western Atlantic and the eastern Pacific to be replete with fossil species in the former and to be much more populous, in terms of Recent species, in the latter. The best example is Strombina, with numerous western Atlantic fossil species and only a single Recent one.

The eastern Pacific also has a full fossil record of Strombina species and has at least 25 Recent species.

Recognized eastern Pacific columbellid genera are:

AESOPUS

Type species: A. japonica (Japan)

eastern Pacific representative: A. myrmecoon (California, Baja Calif.)

ALIA

Type species: A. carinata (eastern Pacific) (California coast)

radular dentition of A. carinata

AMPHISSA

Type species: A. columbiana (eastern Pacific) (Alaska to mid-California)

ANACHIS

Type species: A. scalarinus (eastern Pacific) (Panama)

ASTYRIS

Type species: A. rosacea (western Atlantic) (New England)

eastern Pacific representative: A. aurantiaca (Calif. to Baja Calif.)

BIFURCIUM

Type species: B. bicanalifera (eastern Pacific) (Panama)

CILARA

Type species: C. secalina (Chile) California representative:

C. chrysalloideus (California)

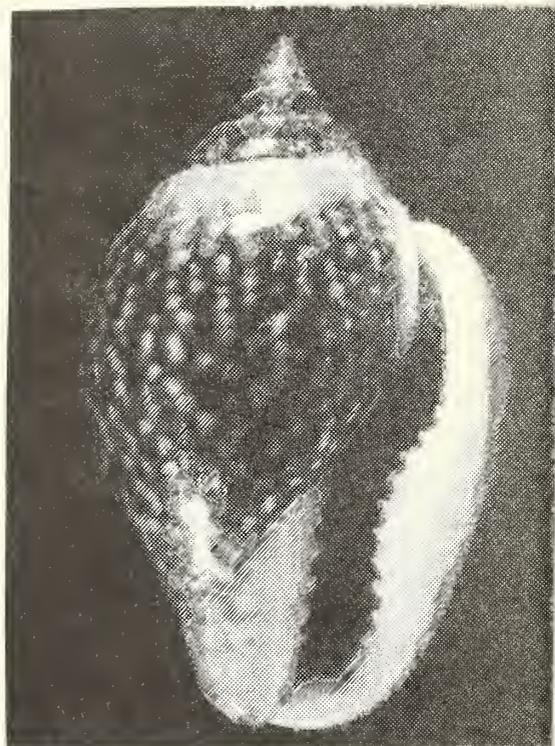
COLUMBELLA

Type species: C. mercatoria (western Atlantic) eastern Pacific

representative: C. fuscata (Panamic)

Left: Columbella
mercatoria

Right: Columbella
fuscata



COLUMBELLOPSIS

Type species: C. minor (Mediterranean)

C. sp. nov. (Gulf of California)

eastern Pacific representative:

COSMIDCONCHA

Type species: C. modesta (eastern Pacific) (Panamic)

COSTOANACHIS

Type species: C. turrita (fossil - Pliocene of Italy) eastern Pacific representative: C. gaskoini (Panamic)

MAZATLANIA

Type species: M. aciculata (western Atlantic, eastern Pacific) (Caribbean, Panamic) (see photo of M. fulgurata)

MICROCITHARA

Type species: M. mitriformis (eastern Pacific) (Panamic)

MITRELLA

Type species: M. scripta (Mediterranean) eastern Pacific representative: M. baccata (Panamic)

NASSARINA

Type species: N. bushii (Caribbean eastern Pacific representative: N. helenae)

PARAMETARIA

Type species: P. dupontii (eastern Pacific) (Panamic)

PARVANACHIS

Type species: P. obesa (western Atlantic) eastern Pacific representative: P. diminuta (Panamic)

RADWINIA

Type species: R. tehuantepecensis (eastern Pacific)

RUTHIA

Type species: R. mazatlanica (eastern Pacific) (Panamic)

SALITRA

Type species: S. radwini (eastern Pacific) (Chile)

STEIRONEPION

Type species: S. melanosticta (eastern Pacific) (Panamic)

STROMBINA

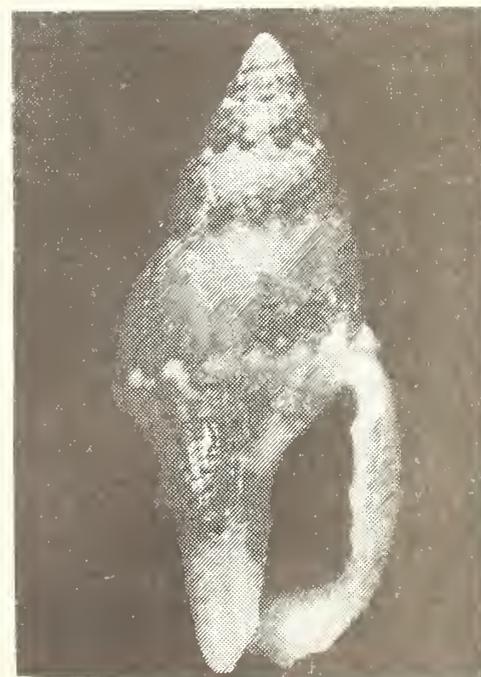
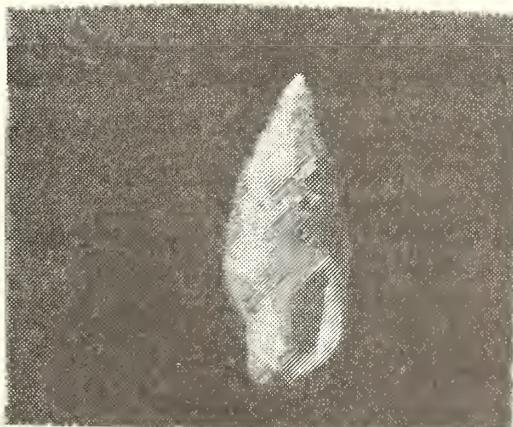
Type species: S. lanceolata (eastern Pacific) (Panamic)

ZAFRONA

Type species: Z. isomella (western Pacific) eastern Pacific representative: Z. incerta (Panamic)

Left: Zafrona isomella

Right: Zafrona incerta

ZANASSARINA

Type species: Z. poecila (eastern Pacific) (Panamic)

ZETEKIA

Type species: Z. gemmulosus (eastern Pacific) (Panamic)

Following is a list of new additions to the Club library made possible by the continued generosity of our members.

SEASHELLS HOW TO IDENTIFY AND COLLECT THEM, Golden Press, New York, Donated by Virginia and George Hanselman

OCEANS, July 1969 and July 1971, Donated by Margaret and Dave Mulliner

The following reprints were donated by Gordon Robilliard.

MINUTE JAMAICAN PROSOBRANCH GASTROPODS: STOASTOMA AND ITS CONGENERS by Kenneth J. Boss, Breviora, No. 393, 8/11/72.

SIMPLISTRIGILLA IN THE WESTERN ATLANTIC OCEAN, by Kenneth J. Boss, Zoologische Mededelingen, July 12, 1972.

THE SIGNIFICANCE OF A LIVING CHLAMYS DELICATULA FROM COOK STRAIT, Summary by H.M. Pantin.

DIMENSIONS AND SHAPES OF LARVAE OF SOME MARINE BIVALVE MOLLUSKS, Abstract, by Loosanoff, Davis, Chanley.

THE IDENTITY OF CONUS MAPPA, C. INSULANS, C. AURANTIUS AND HWASS'S INFRASPECIFIC TAXA OF C. CEDONULLI, by John Holeman and Alan J. Kohn.

TYPE OF THE GENUS ENGINA, by Virginia Orr, Nautilus reprint January 1962.

RADULAE OF FOUR SPECIES OF MITRIDAE by W.O. Cernohorsky, Abstract.

A NEW SUBSPECIES OF RANULARIA (CYMATIIDAE) FROM THE KERMADEC ISLANDS by A.G. Beu.

THE TROPICAL CORAL REEF AS A BIOTOPE by S.A. Gerlach trans. by Alan J. Kohn.

THE SEPARATION AND IDENTIFICATION OF SMALL JUVENILES OF THE SPECIES VELCUMANTUS AUSTRALIS AND PYRAZUS EBENINUS by Ebers and Rose,

FOOD HABITS OF THE GASTROPOD MITRA LITTERATA LAMARCK: by Alan J. Kohn

SHALLOW WATER MARINE PROVINCES AND CLIMATIC REGIONS IN AUSTRALIA by R.W. George.

BIBLIOGRAPHY AND ZOOLOGICAL TAXA OF PAUL BARTSCH by Florence Ruhoff, Smithsonian Contributions to Zoology, No. 143, received from the Smithsonian

The Shell Club has recently purchased Catalogue of World-Wide Shells Pack #1 on MARGINELLIDAE, put out by Sally Diana Kaicher. This includes 3x5 cards each with a black and white photograph of a species of Marginella, name, world location and brief description. Ninety-seven species are included.

This has been purchased to see if Club members are interested in this type of publication. If so, further families of file cards can be purchased as they become available. Price at this time is \$3.00 per pack. This will be available in the library in a grey plastic file box.

SEASHELLS HOW TO IDENTIFY AND COLLECT THEM

Printed and photographed in Italy and published in this country by Golden Press in 1972, this book is a bargain at \$2.95. The 149 colored photographs alone make it an enjoyable book with which to relax. The first ten pages give general information about shells, their anatomy, classes, habitats and how to collect them, and is written simply and is accompanied by drawings.

The section on collecting ends with a statement pertinent to all those who collect .

"The shell collector should be a naturalist, not merely an accumulator of specimens. Collect sparingly, for wild nature is threatened by development and pollution everywhere, as much on the shore as in the remnant of the forests and prairies, and excessive collecting can rapidly exterminate a rare or very localized species...."

**** We are so sorry that we missed a page of Clifton Martin's EX-PICES MOLLUSCA. Following is the missing page (80%) so you may place it in its proper relation. *****

- 8 (Finescale Triggerfish)
Balistes polylepis Steindachner, 1876
- 9 (Cusk)
Brosme brosme (Muller)
- 10 (Pacific Porgy)
Calamus brachysomus (Lockington, 1880)
- 11 (Ocean Whitefish)
Caulolatilus princeps (Jenyns, 1842)
- 12 (Black Sea Bass)
Centropristes striatus (Linne)
- 13 (Slinger)
Chrysolephus puniceus
Gilchrist & Thompson
- 14 (Conger Eel)
Conger oceanicus (Mitchill)
- 15 (Common Dolphin)
Coryphaena hippurus Linne, 1758
- 16 (Killfish)
Fundulus sp.
- 17 (Atlantic Cod)
Gadus morhua Linne, 1758
- 18 (King Croaker)
Genyoperus lineatus (Ayres)
- 19 (Sea Raven)
Hemitripterus americanus (Gmelin)
- 20 (Atlantic Halibut)
Hippoglossus hippoglossus (Linne)
- 21 (Batfish)
Hydrolagus colliei (Lay & Bennett)
- 22 (Sweetlip)
Lethrinus chrysostomus
- 23 (Laddock)
Melanogrammus aeglefinus (Linne)
- 24 (Pacific Tomcod)
Microgadus proximus (Girard, 1854)
- 25 (Atlantic Tomcod)
Microgadus tomcod (Walbaum)
- 26 (Ocean Sunfish)
Mola mola (Linne, 1758)
- 27 (Sculpin)
Myoxocephalus sp.
- 28 (Summer Flounder)
Paralichthys dentatus (Linne)
- 29 (Starry Flounder)
Platichthys stellatus (Pallas, 1814)
- 30 (Coral Trout)
Plectropomus maculatus (Bloch, 1790)
- 31 (Sea Robin)
Prionotus sp.
- Crescent City, California, to Peru.
- North Atlantic of Europe and America, south to Virginia San Diego, California, to Lima, Peru.
- Willapa Bay, Washington, to Cape San Lucas, Baja California Mexico.
Cape Ann, Mass. to northern Florida.
- Total range not available but includes the Natal and Zululand coasts of South Africa.
- Total range not available but includes most of the Atlantic Coast of the United States.
- World-wide in tropical and warm temperate waters. A pelagic species.
- Total range not available but includes at least a part of New England coast.
- Total range not available but includes the coast of New England and the Grand Banks, Nova Scotia.
- Total range not available but includes part of the Atlantic Coast of the United States.
- Total range not available but includes part of the Atlantic Coast of the United States.
- North Atlantic as far south as the Cattegat, in Europe, and to Montauk Point, New Jersey, in America.
- A Pacific Coast species, range not available.
- North Queensland, Australia.
- Total range not available.
- Strait of Belle Isla, Canada, to Cape Hatteras, North Carolina.
- Unalaska, Alaska, to Monterey Bay, California.
- Cape Sable, Nova Scotia, to Virginia.
- World-wide in warm and temperate waters. An open sea species.
- An Atlantic Coast species, range not available.
- Cape Cod, Mass., to the Carolinas.
- Arctic Ocean to central California.
- Total range not available but includes north Queensland, Australia.
- An Atlantic Coast species, range not available.

MAP *****

EL CATON

Saturday
Jan. 26.

WEST TALMADGE
4680 W. Talmadge Dr.

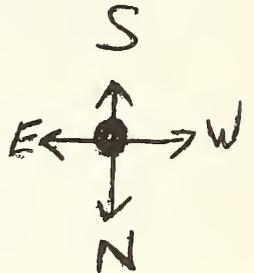
VAN DYKE

ADAMS AVENUE

ALDINE

Cocktails - 6 p.m.

Come & Meet
Mr. Abbottsnyk!!



Bring - potluck contrib.
utensils & pillow or
bridge chair

FAIRMOUNT

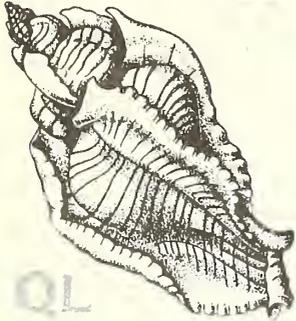
Highway 8

HAROLD & JUNE BELLMER'S
4680 W. TALMADGE Dr.

San Diego Shell Club
Co Hertz
3883 Mt. Blackburn Ave
San Diego, Ca. 92111

THE

FESTIVUS



QL
401
F418
Moll.

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Richard Schwarz
Vice President: Don Pisor
Recording Secretary: Helen Robilliard
Corresponding Secretary: Anne Schwarz
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

Annual Dues: Single membership \$3.00; Family membership \$4.00; Corresponding membership \$2.50; Overseas surface \$3.50; Student membership \$2.00.
Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

Vol. V

February 1974

No. 2

* Program: Ralph Ferguson of Ferguson's Marine Specialties in Wilmington *
* Calif. will speak on Shell Oddities. He will bring the shell *
* specimens with him. Feb. 21, 1974 at 7:30 P.M. *

MR. FRANK ABBOTTSMITH'S VISIT WITH THE SAN DIEGO SHELL CLUB

Mr. Frank Abbottsmith of Perth, Australia, who is an authority on the Australian Volutidae, was the guest speaker at our January meeting. His subject was Australian Multiform Volutes.

He has a unique method of slide presentation, using two projectors simultaneously. With side by side screens he is able to show both a group of shells and an enlargement of a single specimen from the group picture. This comparative viewing is very interesting. The slides, as one would expect, were mostly of volutes but he also showed some of flora and fauna peculiar to Australia. The flowers, of unfamiliar forms, and the birds were all brilliantly colored. The doubled views expedited the projection of the slides and we saw several hundred of the nine hundred slides he brought with him.

Mr. Abbottsmith has been a shell collector for some fifty years, collecting all types of shells until he was running out of room. He decided to specialize, choosing the volutes since there was so little known about them. Then, too, Australia had a wealth of them. He has been studying them for many years now and has written a book, illustrated with his own drawings. The book is entitled 'Australian Multiform Volutes'-no color plates, just black and white drawings.

His appearance before the San Diego Shell Club was the first engagement of an extended lecture tour which will take him many places in the United States, England, Europe and finally to Johannesburg, South Africa, from where he will fly home. This will take a year in which he hopes to see and savor many places. He said, "Every day in 1974 will be Christmas Day to me with all I'll see of people and places."

(We talked to Mr. Abbottsmith later and asked him questions about himself and Australia. He is a sixth generation descendant of the first families who came to Australia in the very early nineteenth century when Lachlan Macquarie was the military governor of the turbulent English colony. The eastern coast was the area where the first settlements were made. Present day Sydney was the earliest and here was his ancestral home.

He has a house in Sydney, where he lived until three years ago. But now he is living in Perth. The Indo-Pacific Railway runs from Perth to Sydney and a passenger can make the five-thousand-mile round trip for a hundred and fifty dollars, all expenses included—food, sleeping accommodations, music! He will travel seventeen hundred miles each way over a stretch of road as straight as an arrow flight, the longest on any railroad in the world.

He has great pride in Australia and great confidence in its future. He cited the mineral wealth, recently proved million-million tons of highgrade ore, eighty percent pure. Bauxite, nickel, and iron, copper and uranium; their creation of Lake Eucumbene in the snowy mountains for hydroelectric power and irrigation, the first among others planned to save the water, heretofore wasted in the heavy run-off of rain and snowmelt on the coastal slopes.

He told us of a shell club in Adelaide founded in 1896. They call themselves the Southern Australia Malacological Society, all of them in their nineties; original members.

Well, they have had, and their present day counterparts have a peerless hunting ground—perhaps 20,000 miles of coastline. The great, roughly-oval island is ten thousand miles in circumference. Add to this offshore islands, large and small, the deeply indented northwestern coast, inlets, Gulfs, channels, bays and many river mouths, which must surely double the length of the shoreline. They have, also, a wide variation in water temperatures from equatorial to very cool which make differences in food and differences in shell colorings. (It must be very rewarding to be a shell collector in Australia. B.B.)

EXCERPTS FROM JOYCE GEMMELL'S LETTER FROM SAN FELIPE,
BAJA CALIFORNIA, MEXICO

"...We had a 6ft. minus tide on the 8th and 9th (of January 1974). Went out in front here (Club de Pesca) the first night and to Campo Uno the second. All by myself—not a soul around, just me and my lantern. It's been cold, windy and very rough water. On the 8th we had a 16 ft. high about 1:30 AM and a rip-snorting storm. The water came up over the front slabs with the wind from the south.

The shrimp boats were all anchored in the lee of Punta Estrella—over 40 of them. The next night I went to Campo Uno and it was as calm as a mill-pond. Tide out much farther than I expected. It uncovered an old pholad bed I have only seen once before but really didn't find much at all. Guess the rough water from the night before washed everything loose out to sea. Found a live Pandora uncifera, a couple of Cancellaria urceolata and a Typhis, which I didn't take. The big hermit crabs were clunking around on the mud in big black murex shells and very amusing to watch. It was overcast and the full moon was no help at all and too cold for crabs which is what I was really after—little mask crabs with a carapace that turns up at the corners. They hook sponge and bryozoans to the little turned-up plate. Just one of many spider crabs in the area but haven't read anything about this one and its odd carapace.

Next month is another big tide and then from there on not much to get excited about although the first weekend in April is good for a daytime low."

MOLLUSKS OF QUIVIRA BASIN

by Jules Hertz

The October 1973 issue of *The Festivus* detailed the \$5 million boat basin and "Ports of Call" village project proposed for Quivira Basin, Mission Bay, San Diego. Since then an Environmental Impact Report for the project was cleared by the San Diego Coast Regional Commission. An inquiry to Mayor Pete Wilson brought the following information:

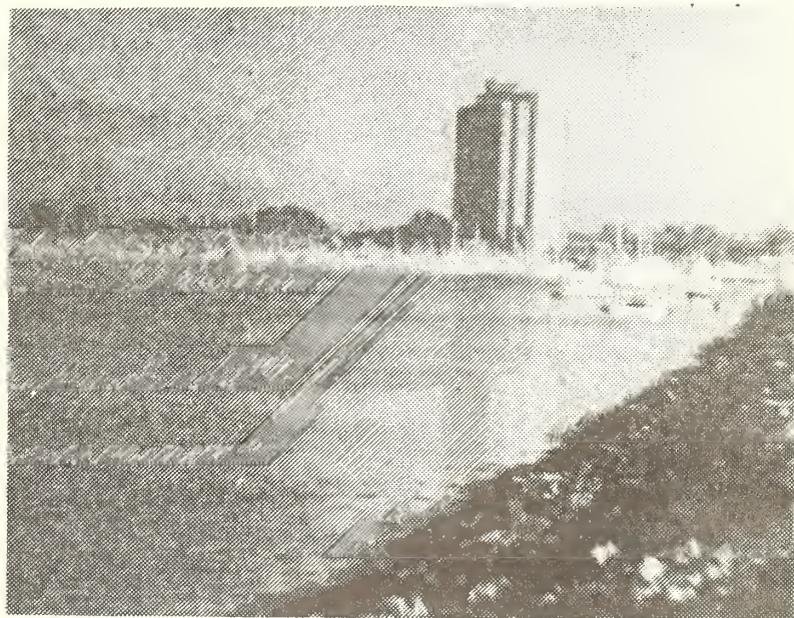
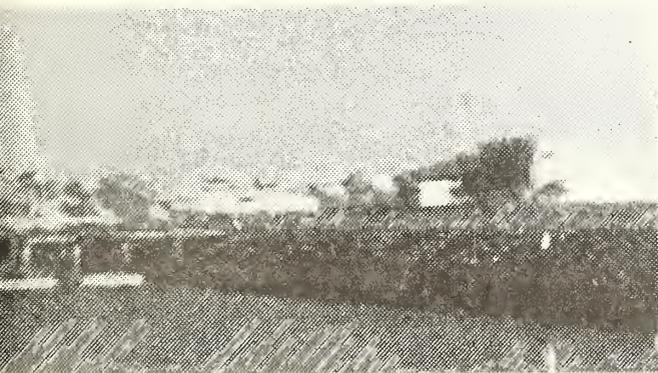
(1) The 1958 Mission Bay Park Master Plan reserved deep-water areas for boating purposes at Mariner's and Quivira Basins

(2) On March 28, 1972, the city granted an eighteen month option to Recreation Specialists, Inc. to lease approximately 18.8 acres of land and 17.5 acres of water area in Quivira Basin for development of a marina complex.

(3) On September 20, 1972, the Council voted to extend the terms of the existing Option Agreement for an additional nine months because of the delays caused by new requirements of the California Environmental Quality Act and environmental provisions of the Municipal Code.

In November 1973, a project was undertaken by Carole and Jules Hertz to record the molluscan fauna of the intertidal area at Quivira Basin. This could then be used as a baseline for assessing future damage to the Basin by increased boating or natural sources.

Initial observations were made on 11 November 1973 when there was a low tide of -1.4 at 3:59 P.M. The observations were made at the SW corner of the Basin in the extreme low tide area where some sand was exposed as well as on and under large rocks covered with dense growth of Sargassum muticum Fensholt. Additional observations were made at the low tides on November 24 and 25; December 8, 9, and 25 and January 5, (1974) covering the area from the SW corner of the Basin to the Mission Bay Park Headquarters Aquatic Control Center.



S.W. corner of Quivira Basin

Below is a list of the species observed during this period. An asterisk has been placed next to the species if the shell was initially observed empty and then a live animal was encountered at a later date. The most abundant species were the various limpets, chitons, Tegula eiseni, Pteropurpura festiva, Hinnites multirugosus, Crepidatella lingulata and Littorina scutulata.

Additional species encountered at Quivira Basin in the past (though not during this count) by this writer are Maxwellia gemma (Sowerby, 1879); Pteropurpura trialata (Sowerby, 1841); Tegula regina (Stearns, 1892); Norrisia norrisi (Sowerby, 1838); Lamellaria diegoensis Dall, 1885.

11/11/73 3:59 PM -1.4'

<i>Haliotis fulgens</i> Philippi, 1845 (juv.)	<i>Ocenebra beta</i> (Dall, 1919)
<i>Diodora aspera</i> (Rathke, 1833)	<i>Roperia poulsoni</i> (Carpenter, 1865) (dead)
<i>Megathura crenulata</i> (Sowerby, 1825)	<i>Kelletia kelletii</i> (Forbes, 1852)
<i>Lucapinella callomarginata</i> (Dall, 1871)	<i>Mitrella carinata</i> (Hinds, 1844)
<i>Collisella pelta</i> (Rathke, 1833)	<i>Olivella baetica</i> Carpenter, 1864 (dead)
<i>Collisella scabra</i> (Gould, 1846)	<i>Conus californicus</i> Hinds, 1844 (dead) *
<i>Collisella conus</i> (Test, 1945)	<i>Cyanoplax hartwegii</i> (Carpenter, 1855)
<i>Collisella asmi</i> (Middendorff, 1847)	<i>Mopalia muscosa</i> (Gould, 1846)
<i>Collisella limatula</i> (Carpenter, 1864)	<i>Lepidozona californiensis</i> Berry, 1931
<i>Tegula eiseni</i> Jordan, 1936	<i>Mytilus californianus</i> Conrad, 1837
<i>Tegula funebris</i> (A. Adams, 1855)	<i>Mytilus edulis</i> Linnaeus, 1758
<i>Littorina planaxis</i> Philippi, 1847 (dead)	<i>Leptopecten monotimerus</i> (Conrad, 1837)
<i>Serpulorbis squamigerus</i> (Carpenter, 1857)	<i>Hinnites multirugosus</i> (Gale, 1928)
<i>Crepidula onyx</i> Sowerby, 1824	<i>Pseudochama exogyra</i> (Conrad, 1837)
<i>Crepidatella lingulata</i> (Gould, 1846)	<i>Chione undatella</i> (Sowerby, 1835)
<i>Polinices reclusianus</i> (Deshayes, 1839)	(Dead) <i>Donax gouldii</i> Dall, 1921 (dead)
<i>Ceratostoma nuttalli</i> (Conrad, 1837)	<i>Protothaca staminea</i> (Conrad, 1837) (dead)
<i>Pteropurpura festiva</i> (Hinds, 1844)	<i>Lyonsia californica</i> Conrad, 1837 (dead)
	<i>Laila cockerelli</i> MacFarland, 1905

11/24/73 3:20P.M. -0.8'

<i>Calliostoma gloriosum</i> Dall, 1871	<i>Acanthina spirata</i> (Blainville, 1832)
<i>Protothaca tenerrima</i> (Carpenter, 1857) (dead)	<i>Chama pellucida</i> Broderip, 1835
<i>Tagelus californianus</i> (Conrad, 1837) (dead)	<i>Anisodoris nobilis</i> Odhner, 1907
<i>Callistochiton decoratus</i> Pilsbry, 1893	<i>Dorid</i> sp
<i>Diaulula sandiegensis</i> Bergh, 1894	<i>Bulla gouldiana</i> Pilsbry, 1893 (dead)
<i>Navanax inermis</i> Cooper, 1862	<i>Leptopecten latiauratus</i> , Conrad, 1837
<i>Dendrodoris fulva</i> (MacFarland, 1905)	

12/8/73 2:55 -1.4'11/25/73 3:57PM -0.7'

<i>Nassarius tegula</i> (Reeve, 1853) (dead)	<i>Archidoris montereyensis</i> Cooper, 1837
<i>Littorina scutulata</i> Gould, 1849	<i>Mytilimeria nuttalli</i> Conrad, 1837 (dead)
<i>Petalocochus montereyensis</i> Dall, 1919	<i>Macoma nasuta</i> (Conrad, 1837) (juv. dead)
<i>Collisella digitalis</i> (Rathke, 1833)	<i>Stenoplax conspicua</i> (Pilsbry, 1892)
<i>Calliostoma supragranosum</i> Carpenter, 1864	<i>Megatebennus bimaculatus</i> (Dall, 1871)
<i>Hiatella arctica</i> (Linnaeus, 1767)	
<i>Iselica fenestrata</i> (Carpenter, 1864) (juv.)	
<i>Anisodoris</i> sp.	

12/9/73 3:05PM -1.8'1/5/74 11:29 PM -1.1'

<i>Lamellaria sharonae</i> Willett, 1939	<i>Ostrea lurida</i> Carpenter, 1864
<i>Cerithidea californica</i> (Haldeman, 1840) (dead)	<i>Sanguinolaria nuttalli</i> (Conrad, 1837) (single valve)
<i>Cerithiopsis carpenteri</i> Bartsch, 1911	<i>Crucibulum spinosum</i> (Sowerby, 1824)
<i>Lasea rubra</i> Montagu	

12/25/73 4:10PM -0.8'

N.B. Shells are only listed the first time observed, though they may have been seen again on another date.

 DUES ARE DUE!! Make checks payable to Margaret Mulliner, 5283 Vickie Dr. S.D. 92119
 See the first page for rates.

Volute-viewing Party

With Dave Mulliner's seething Vulcanic punch as an effective warmer-upper, June and Harold Bellmer hosted a potluck get-together at their home Saturday evening, January 27th. The party was planned in order that club members could see color slides of Australian shells which Mr. Frank Abbottsmith was unable to show at the January meeting.

After drinks and dinner, the sizeable group gathered in the spacious living room for the slide show. The pictures were principally of volutes plus a segment on olives and harps. The showing was accompanied by interesting comments on each slide. Many of those shown were rare or unique. Several slides pictured the living animal -- in some cases more beautiful than the shell. Of particular interest was the body coloring of Amoria canaliculata, with yellow-centered white spots on a black background (fried eggs on burnt toast said the lecturer -- daisies on black velvet said the ladies). Striking shell coloring was exhibited by the members of the Volutoconus complex, with V. bednalli capricornus, coniformis, and grossi hargreavesi capturing our attention especially. A number of shots were of strangely deformed or uniquely marked specimens.

Mr. Abbottsmith has devised a means of eliminating glare when photographing glossy shells by setting a large cylinder of translucent tracing paper around the area to be photographed. The shells are placed on graph paper marked in millimeters so that there is no need for questions on any shell's size. The slides also depicted his method of displaying his collection wherein he attaches each specimen to a card by means of a hat elastic knotted in the aperture and then slipped over the card. The elastic cord holds the shell in place and it may be readily turned to observe the aperture when desired, while it still remains affixed to its data-notated card.

It was a very pleasant and informative evening for all, and our thanks to Mr. Abbottsmith for sharing his wealth of Australian shell knowledge and beautiful color slides, and to June and Harold for opening their attractive home to us.

by Norm Currin

THUMBNAIL SKETCHES OF OUR NEW OFFICERS

Because our President, Richard Schwarz, and his wife, Anne, are both officers this year (Anne Schwarz is our Corresponding Secretary) we will present them together.

Anne's father was in the Navy and his duty carried him and his family to many and far places with varied and interesting shorelines to explore--Calmyra, coral atolls, Japan. Inevitably they collected shells and some they brought home. For years they were stored in a trunk, more or less forgotten.

Three years ago they opened the trunk. Pandora's Box! Three-fourths of the shells were beach specimens but the others were lovely and good. Almost immediately their Book-Of-The-Month selection was Twenty-Five Million Years of Inspired Design by Marguerite Stix. This beautiful book opened a new world. The 'shell bug' had bitten them.

They looked in the directory for a shell dealer and found Arthur and Emma Rose West who had their shell shop in Chula Vista at that time. Art and Emma told them about our Shell Club, they came to a meeting, joined us -and here they are.

They are both natives of California, Anne of San Diego, and find great pleasure in nature explorations of all kinds. Their favorite shell family is the Cypraea.

Our Vice-President, Don Pisor is also a native Californian coming from Fowler in the San Joaquin Valley. Working for Pan Am, he was in Florida in 1962 where he did some skin diving and picked up shells. It happened that they-he and his wife, Jeanne- were in a town where a new shell club had just been organized and it was there that they became really interested in shells.

They moved to San Diego, and in 1963 Don came to his first Shell Club meeting at the invitation of Billee Dilworth, joining us then. Jeanne followed him the next year. They, too, name the Cypraea as their favorite shell.

Margaret Mulliner, our Treasurer, a member since 1963, does not have an extensive shell collection but admits to an increasing interest. Her favorite shell-guess-the Cypraea. She does a great deal of supportive work for her husband, David, who has a growing reputation as an underwater photographer. He is an experienced diver and has opportunity to collect many shells not available to the intertidal collector, so they can have a very ambitious collection.

Learning to scuba dive has brought a marvelous pleasure to Helen Robilliard, our Recording Secretary. Since she was a weak swimmer she was afraid that she would not be able to do it, but she has been diving for a year now and says she 'just loves it'-so many beautiful and interesting things to see and to touch. Sometimes she brings up a shell but gives it away. Her husband, Dr. Gordon Robilliard, is a marine biologist and unerewater research is a significant part of his work. Helen is a registered-and practicing-nurse.

Both Helen and Gordon were born and grew up in beautiful British Columbia. He did his university work at University of Washington in Seattle.

Back issues of the Festivus are available for purchase. Full sets, when available, cost \$2.50 for 11 issues or 30¢ an issue. For our overseas members, full sets cost \$3.50 or 40¢ an issue.

1973--full sets available

1971--full sets available

1972--full sets available

1970--May, June, August, October, November
available

Our Club Auction will be the third week in May. A definite date will be announced at the Club meeting and placed in the March Festivus. Bring your specimen shells with collecting data to the next meeting.

Some collecting tides at San Felipe during the coming year. All times are in Pacific DAYLIGHT SAVING Time, and all are in the 24-hour clock (i.e., 1:00 A.M. would appear as 0100, and 1:00 P.M. as 1300).

MARCH

Wed 6th -4.0' at 1840
 Thu 7th -3.8' at 0715
 -4.8' at 1930
 Fri 8th -4.0' at 0810
 -4.3' at 2020
 Sat 9th -4.3' at 0850
 Sun 10th -4.3' at 0850
 Mon 11th -3.9' at 0930

APRIL

Fri 5th -4.0' at 0700
 Sat 6th -5.2' at 0740
 Sun 7th -5.5' at 0740
 Mon 8th -4.2' at 0820

MAY

Sat 4th -3.9' at 0610
 Sun 5th -4.1' at 0640
 Mon 6th -4.0' at 0720

 Tue 21st -4.0' at 0710
 Wed 22nd -4.3' at 0750
 Thu 23rd -4.0' at 0830

JUNE

Wed 19th -4.0' at 0700
 Thu 20th -4.1' at 0745
 Fri 21st -4.3' at 0830
 Sat 22nd -3.9' at 0920

JULY

Thu 18th -4.1' at 0650
 Fri 19th -4.7' at 0740
 Sat 20th -4.8' at 0820
 Sun 21st -4.0' at 0820

AUGUST

Fri 16th -4.0' at 0640
 Sat 17th -4.3' at 0720
 Sun 18th -4.3' at 0750
 Mon 19th -3.9' at 0820

SEPTEMBER

Sun 15th -4.0' at 0630
 Mon 16th -4.0' at 0730
 -4.0' at 1940
 Tue 17th -4.0' at 2020

OCTOBER

Mon 14th -4.0' at 1845
 Tue 15th -4.3' at 1930
 Wed 16th -4.0' at 2015

NOVEMBER

Tue 12th -4.0' at 1830
 Wed 13th -4.1' at 1910
 Thu 14th -3.9' at 1950

DECEMBER

Fri 27th -3.9' at 1845
 Sat 28th -4.6' at 1930
 Sun 29th -4.6' at 2010
 Mon 30th -4.2' at 2050

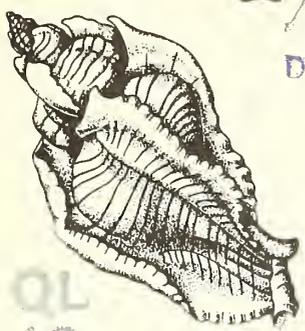
If you wish further information, consult the tide table Joyce Gemmell sent us. It will be posted inside the door of the club library at the museum.



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SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Richard Schwarz
Vice President: Don Pisor
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Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

Vol. 9 March 1974 No. 3

* PROGRAM: Twila Bratcher will speak on Shelling in Cuba accompanying her *
* talk with slides. Meeting date March 21 at 7:30 P.M. *

IMPORTANT ANNOUNCEMENTS

THIS WILL BE YOUR LAST ISSUE OF THE FESTIVUS UNLESS YOUR DUES ARE IN BY MARCH 21. OUR NEXT ISSUE WILL INCLUDE THE ROSTER OF MEMBERS.

The Club Auction

The Club Shell Auction will be on Saturday evening, May 11, 1974 at the home of Cliff and Wanjeta Ames. Bring your specimen shells with data to the next meeting or give them to any Board member. The Auction will only be as good as the shells you donate.

WSM MEETING

June 19-22, 1974 are the dates for the seventh annual meeting of the Western Society of Malacologists. The meetings will be held on the campus of California State Polytechnic College, Pomona.

Volunteers are needed to help man the telephone committee. If you will help, call Carole Heitz-277-6259.

Greater San Diego Science Fair

Our Club will again participate in the Greater San Diego Science Fair. As it was last year, the award will be limited to senior division entries in the areas of marine biology and/or ecology of marine organisms. Dr. Radwin will again head the Club committee.

The choice of prizes offered will be the same as last year, - Barnes' Invertebrate Zoology, Ricketts and Calvin's Between Pacific Tides or Abbotts' Kingdom of the Seashell.

NOTES ON EGG CAPSULES AND LARVAL DEVELOPMENT OF
 TYPHUS CLARKI KEEN & CAMPBELL, 1964

By Joyce Gemmell

Early in 1968 a report of a small intertidal population of Typhis clarki Keen & Campbell, 1964, from San Felipe Bay, Baja California, Mexico was made to Dr. George Radwin, curator of Marine Invertebrates, at the San Diego Museum of Natural History.

At the time I did not have proper identification of the specimens and the material given to the museum was misidentified as T. coronatus. Three years later, the material from San Felipe was compared with over 100 other specimens of six subgenera and was identified as Typhis clarki by Dr. Bruce Campbell.

From the time the population was first reported until the spring of 1972, monthly field checks were made on the numbers of specimens, when they were sighted in relation to tide, and on what type of substrate they were found. For over a year specimens were marked in the field and returned. This experiment, due to the method of marking, did not prove to be sound and not one specimen was ever found by me.

A breeding season did become apparent, however, over a five year period. By mid-March increasing numbers of animals move into the low intertidal depressions among the rocks, and generally by the end of May the peak is reached. Only one spring, 1969, in the five years was there communal gathering in one spot. At that time there were mature adults, sub-adults and juveniles in a small muddy depression. In subsequent years adults have been scattered in a band 25 feet wide by 200 feet long parallel to the low water line.

Between late February and the first half of June, breeding activity of various gastropods is in evidence. Several reports have been made on gastropod egg capsules from the area. (Gemmell, May, Aug., 1973, The Festivus). Several other forms were unidentified, one of them being the egg capsules of the Typhis clarki.

In May of 1973, a mature female was observed in the process of attaching capsules on a small stone. These capsules were studied in the field with a small magnifying glass and further search for egg capsules confirmed identification of others on stones in the area. Fourteen specimens were taken for aquarium observation.

The tanks used were two 12 x 6½ inch plastic shoe boxes with lids. A small diaphragm pump ran the two fine bubble aerators, one to each tank. Sea water from the area was used and completely changed about once a week. No sand or gravel was used to cover the bottom since previous experiments with keeping the animals healthy proved difficult when bottom material from the collecting area became foul in a short time and clean sand from other sites caused unnatural responses.

Twenty two days after field specimens had been in the tanks, egg capsules began appearing on the tank sides, just below the water line. (Fig. 1). Checking the tanks regularly for ovipositioning then increased until May 29, 1973, at which time a specimen was observed in the process of attaching egg capsules. At this time water temperature in the tanks varied from 80°F to 86°F which is not unusual for the locality and time of year at which the specimens were collected.

Egg capsule attachment by Typhis clarki was observed through clear plastic sides of the tanks with a 16X hand magnifying glass.

The series of events involved in attaching an egg capsule begin with the pedal sole investigating and preparing the substrate. In other genera described, (Bingham & Albertson, 1973), this initial activity is called "pedal lick". This activity, as described, was not observed in T. clarki.

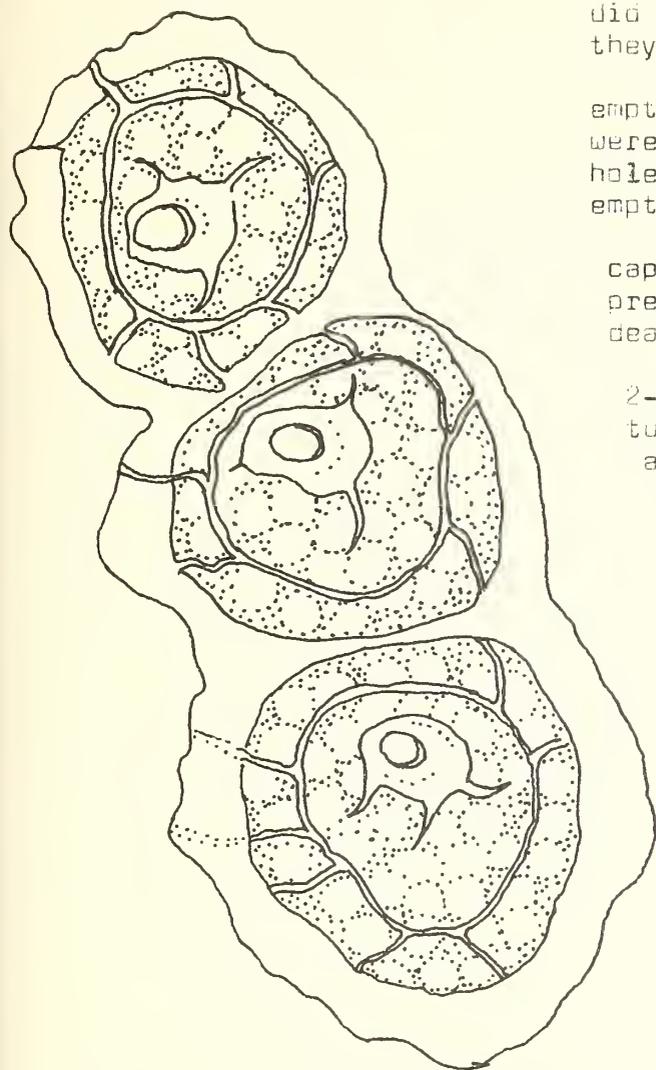


FIG.3 TYPHIS CLARKI
EGG CAPSULES
SEEN FROM ABOVE

position was at these times could not be determined.

In twelve days from hatching, most of the veligers had dropped to the tank corners. It could not be determined if this was a natural response or possibly due to lack of food. The tanks were disconnected at this time. Specimens of the egg capsules and the larval shells were given to the San Diego Museum of Natural History.

On the twelfth day the eggs hatched, however they did not hatch in the corresponding order in which they were laid, i.e. number one first.

There were no nurse eggs. The capsules emptied completely except for the few veligers that were too weak to find their way out of the escape hole. Twenty three of the capsules, completely emptied of the twenty nine total.

Dead veligers turned a magenta color in the capsules within two days. This confirmed the previous observance, in the collecting area, of dead egg capsules on intertidally exposed rocks.

The hatching veliger has a large rounded 2-lobed velum and a transparent shell of $1\frac{1}{2}$ turns. A slight flare on the right side of the aperture develops rapidly into the siphonal canal. The shell beak, a character of some larval shells of unrelated forms, disappears. The beak is an extension from the upper lip which bends over the opening of the shell between the opening of the shell between the right and left velar lobes (fig. 4).

The velar lobes have two rows of cilia for swimming and feeding, one longer than the other, prominent eye spots and a foot with an operculum. The digestive gland is dark and can be seen through the shell. Within ten days a reddish-brown pigmentation is visible on the shell and concentrated around the siphonal canal.

The veligers were very active for approximately ten days. The velar lobes were in a wide spread position while swimming up or to the side, and contracted when dropping to the bottom. Veligers were observed stationary on the tank sides and also, at times, on the surface film of the water. They detached by vigorous swimming and then dropping to mid-tank. What their clinging

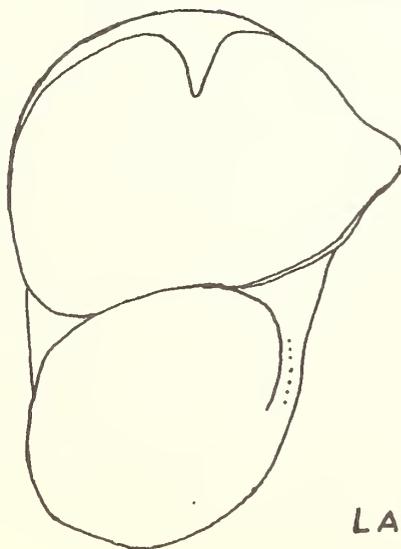


FIG.4
LARVAL SHELL

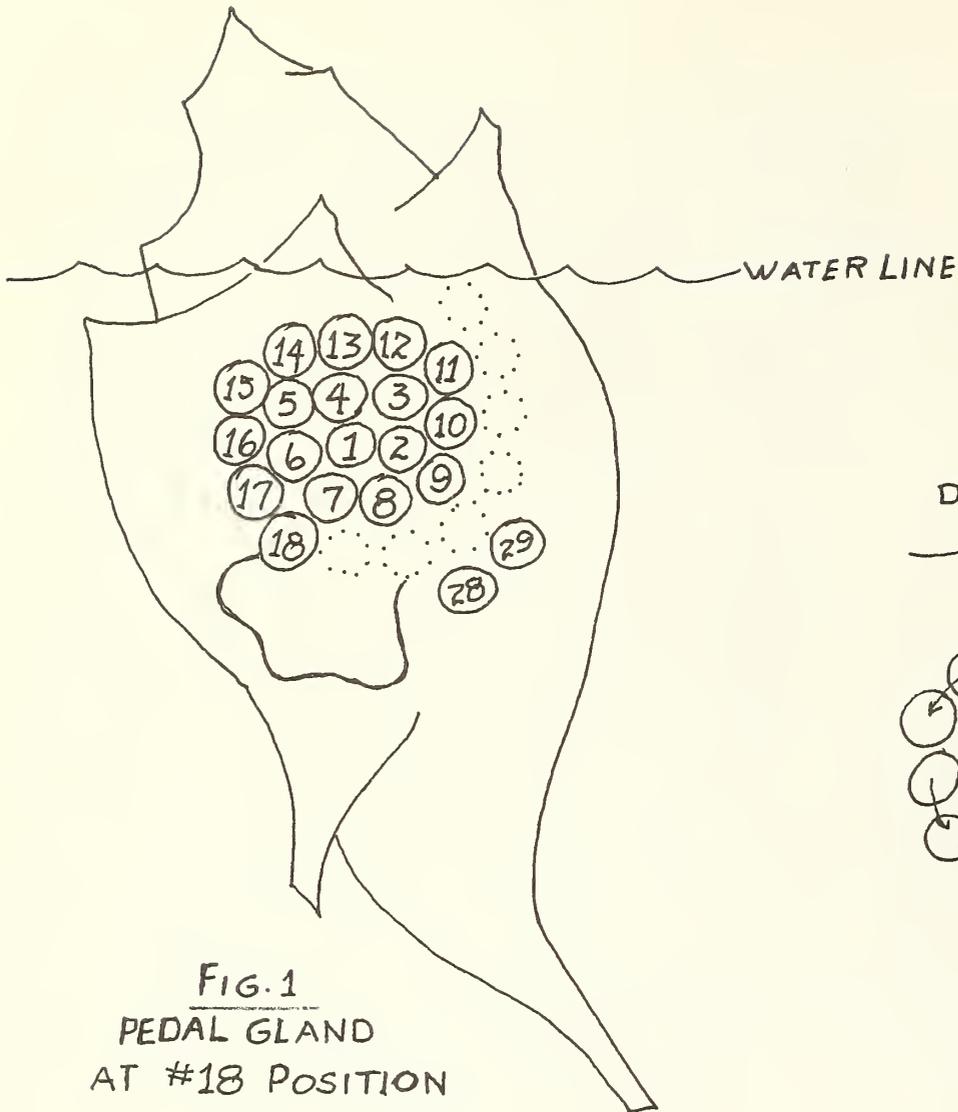


FIG. 1
 PEDAL GLAND
 AT #18 POSITION

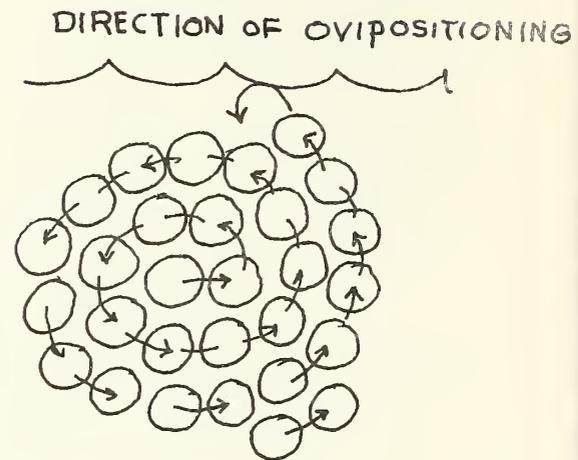


FIG. 2

The time period between stages of activity varies from a few minutes to as much as an hour. The second stage involves the passing of 30 to 50 eggs from the capsule gland to the ventral pedal gland. The opaque white eggs could be seen flowing from a slit in the pedal sole to the pedal gland for two minutes. Considerable agitation of the eggs is seen for five to seven minutes while the capsule formation and molding around the eggs takes place. This stage takes about 45 minutes before the foot moves to the next placement position.

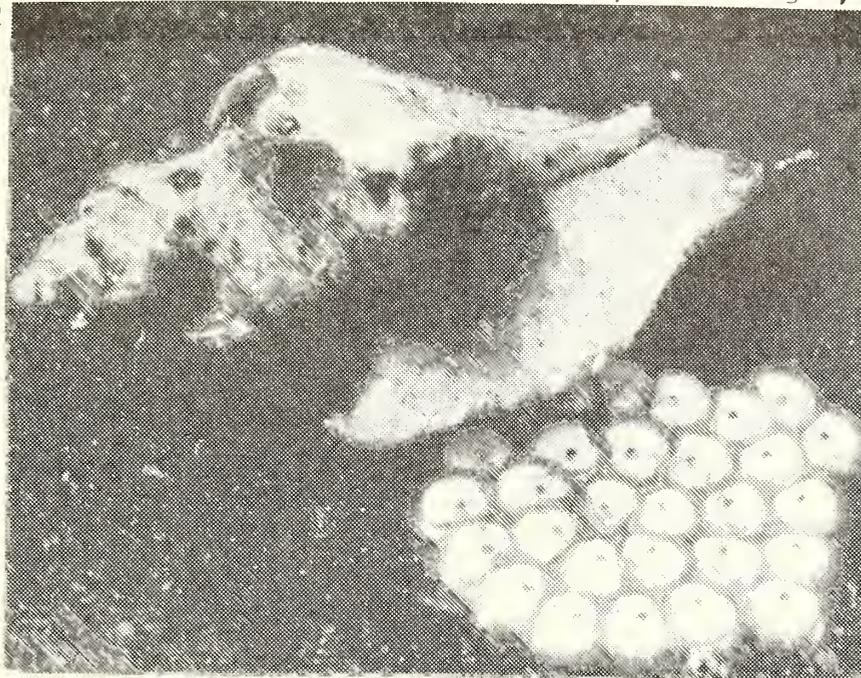
The capsules are positioned in a counter-clockwise spiral (Fig. 2). Capsule number 20, from the time eggs were extruded until the next positioning was made, took 45 minutes, while capsules number 21 took 51 minutes for the same series of events. Ten egg capsules were produced in nine to ten hours.

The initial positioning of egg capsules began about $\frac{1}{4}$ inch below the water line in the tank. As the circle increased in radius the 27th egg capsule touched the water line. The female then moved around the circumference and positioned two more capsules well below the water line. (Fig. 2).

Nine days later the developing eggs had changed color to a pale brown, and two days before hatching veligers were active inside the capsules and could be seen rotating with deeply pigmented eyes (Fig. 3).

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Typhis clarki laying eggs

Photograph by Dave Mulliner

From the Minutes - February 21.

Mr. Ralph Ferguson of Wilmington, Ca., shell collector and dealer, spoke to us on shell oddities. Over a period of many years he has been collecting them. A great many of the malformations were the shells' adaptations to injuries. Others were adaptations to habitat limitations.

Also on the program were Dave Mulliner's slides of the Christmas Party at Miramar NAS and the reception for Mr. Frank Abbottsmith of Perth, Australia held at the home of Harold and June Bellmer.

Cookies were provided by Bones Thompson and Neil Michel (younger son of John and Nola Michel). The shell drawing was won by Waneta Ames.

THIS IS YOUR MAGAZINE. Without your cooperation it can't be anything worthwhile. We need, very much, YOUR articles. Please do send them to us--and soon.

Mangrove in trouble in southwest Florida

by K.M. Reese

The nature lover's dilemma can be discerned in the discovery that a wood-boring crustacean, Sphaeroma terebrans, is undermining the red mangroves along the southwestern coast of Florida(1). The problem was uncovered by two scientists from the University of South Florida: Andrew Rehm of the department of biology, Tampa, and Harold Humm of the department of marine science, St. Petersburg. The attack is centered in the Ten Thousand Islands region, site of the greatest stand of mangroves in North America and one of the greatest in the world. Sphaeroma, in essence, is gradually cutting away the shoreline of the mainland and of the mangrove islands.

Rehm and Humm were studying algae that grow underwater on the prop roots of the red mangrove. Then they discovered that on "a major portion" of the trees in the area there were no such algae because the prop roots had been cut off at about the level of mean high water. Further investigation tied the depredations directly to Sphaeroma. With their prop roots cut off, the trees are left standing on their main axes or oldest prop roots. Waves and current cut away the soil, mainly peat, and summer squalls and hurricanes topple trees on the margin into the water.

The shrinkage has been under way for a long time. An aerial photograph taken in 1953, for example, shows an isthmus and several islands that were gone by 1964. The visible evidence diverges sharply from a prediction of 1914 that a bay in the area would be filled in by proliferating mangrove islands. A second scientist predicted, in 1940, that the Ten Thousand Islands might coalesce one day because of the mangroves.

One gets the impression that the mangrove was the pest then. Sphaeroma appears to have been on the scene in 1940, but nothing as so destructive as today. Rehm and Humm say that "An ecocatastrophe of serious magnitude... appears to be in progress," and one can draw the conclusion that they or somebody else will want to do something to save the mangroves. Therein lies the dilemma mentioned earlier. Previous predictions haven't held up, so why should any made now. The Ten Thousand Islands are in big trouble, but Sphaeroma seems never to have had it so good. Which one to zap?

(1) Science, 182, 173 (1973)

Reprinted courtesy of Chemical and Engineering News, November 5, 1973

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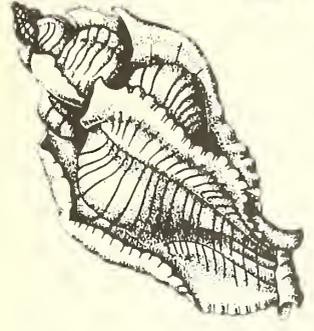
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Vol. V April 1974 No. 4

* PROGRAM: Bob Schoening will talk on Cowries of Guam accompanying his *
* talk will slides of cowries and their animals and underwater shots. *
* Meeting date- April 18, 1974 at 7:30 P.M. *

Minutes for the Shell Club Meeting of March 21, 1974

Speakers for the evening were Twila Bratcher and Billie Dillworth who had slides of their recent collecting trip to Cuba.
Our treasurer reported that as of March 2nd the club has \$371.81.
Some shells for the auction were brought but more are needed and we were reminded that the date of the auction is May 11.
The WSM Meetings this year in Pomona will be held June 19-22. Anyone who can, please attend.
The joint WSM-AMU Meeting in San Diego next year should have a liason person from the Shell Club working with George Radwin who is president of the meetings. Billie Dillworth volunteered her time and Dave Mulliner volunteered to be liason person. Twila Bratcher suggested that each club in the area put on a night or an afternoon of entertainment for those attending the meetings.
We will participate as a club in the Science Fair again this year. A prize will be awarded for the best senior exhibit and the winner will be given a choice of -- Invertebrate Zoology by Barnes, Between Pacific Tides by Richetts and Calvin or Kingdom of the Seashell by Abbotts.
An announcement was made by Twila that Walter Cernohorshy is to head a shelling expedition to Fiji next year. Anyone interested in going can see Twila for details.
Bob Noonan will be our next speaker on Shells of Guam.
Rose D'Attilio won the shell drawing.
The Festivus is short on articles and needs everyone's cooperation.
Meeting adjourned.

COLLECTING IN CUBA

by Twila Bratcher

The Guantanamo Bay Naval Station in Cuba is unique among American Naval Stations because its inhabitants are confined to the area of the base with no possibility of leaving except by government plane or ship. To keep the residents from feeling the confinement, there are endless activities offered at little or no cost: golf, tennis, scuba diving, shell collecting, rock collecting, old bottle collecting, square dancing, - and lessons in crafts, art or languages. There are horses to rent or to lease for the duration of one's stay and RRR trips to Jamaica, Haiti, or Curacao. There are also movies, outdoor but not drive-in. Judging from the people we met, it is a place of "doors" with plenty to do.

My sister, Billee, had said if a plane was going to be hijacked to Cuba she hoped to be on it. It would be the only way she could ever get there. When Vi Perrault, whom I met at the AMU last year, invited both of us to Guantanamo Bay for ten days of diving and collecting, we scarcely could believe our good fortune. Collecting in any part of Cuba today is a rare opportunity. In addition, Vi promised that every day would be a collecting day, weather-wise. It was.

When the air force plane landed us at Guantanamo bay, our hand-carried items were thoroughly searched. The lens cap of my camera was unscrewed and inspected and all my camera attachments closely examined. All the checked luggage was sniffed by a large German shepherd Dog. Then our visit began.

Though civilians are no longer permitted to stay at the BOQ, we were allowed to do so because we were scheduled to show slides and movies for the schools and a number of other groups. We also were on an hour television special about shell collecting and diving. Vi Perrault and Lou Salter, two members of the Reef Raiders Diving Club were also on the program.

Our first dive was from Vi's barrel boat, a type of boat quite popular there and ideal for the quiet waters of Guantanamo Bay. It is called a barrel boat because metal barrels filled with air support what appears to be a flat raft surrounded by a railing. It is powered by an outboard motor. Six of us had a picnic aboard and afterward made our first dive on a beautiful reef twenty to thirty-five feet below.



Diving areas at Guantanamo

It was rich in fauna: many kinds of corals, gorgonians, sponges, and fish. One purple vase sponge was so large I could nestle inside. I later collected grunge from a similar sponge. There were some small shells in it, but not as many species as I had hoped. Molluscs were not so numerous as the other fauna. Sand fanning failed to produce a single sand dweller, and the rock dwellers were the most common Caribbean species. Underwater sightseeing was worth the dive if we had not picked up a single shell.

They moved the barrel boat from the reef to a sandy mud bottom to look for Strombus pugilis Linne, which are very colorful in that area. This is not the same species as the Florida Fighting Conch, which is S. alatus Gmelin. S. costatus Gmelin were fairly common there. Billee knew she probably would run out of air first and she said she would surface near the boat, and we could stay down until we used our air. We did. When we came up and swam to the boat, Lou shouted, "Where's the other one?" meaning Billee. worried to the point of panic, I searched the surface of the water. In the distance was a swimmer carrying a scuba tank and swimming determinedly toward a barrel boat which was under way in the channel of the bay. She had surfaced with our barrel boat behind her and seen another one. Not realizing it was under way, she could not understand why her progress was so slow. I thought we would never catch up with her.



Our next dive was from shore at Cable Beach. Guantanamo has at least ten good diving areas where there is easy entrance and exits from a beach, making a boat unnecessary. Often there is a shallow pool adjacent to the beach. This gives way to deeper water beyond with small to moderate waves breaking where the pool becomes deeper. Cable is such a beach. Lou Salter was Billee's diving buddy that day. He pointed out a Cyphoma on a sea fan



Cyphoma signatum

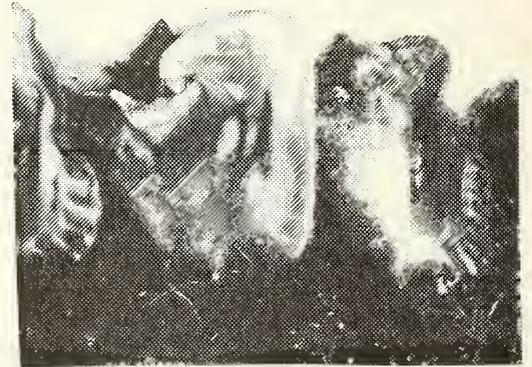
to her, and she signaled, "No, no." She already had self-collected C. gibbosum Linne in her collection. He motioned that she should take it, and again she indicated no. When he insisted again, she took it thinking she could return it to a fan coral after surfacing. It was a C. signatum Pilsbry & McGinty, and she did not have it in her collection. Sometimes conservation can be carried too far. Lou's wife had marinated a Pork roast in lemon juice, garlic, and oregano and cooked it very slowly all the previous night. After our dive we consumed it at a sumptuous picnic at the beach.

Before a night dive at Phillips Park, Tim Nichols told us he was sure we could find Cypraea cinerea Gmelin, in various stages of growth, inside the yellow tube sponge at depths of 25 to 35 feet, sometimes on the lip or at the base of the sponge. He was right, and I was pleased to see him replace juvenile ones back in their nursery inside the tube sponge. Too late I discovered that the yellow sponge exudes a navy blue dye. In reaching inside to check for cypraea, the base of my fingernails and underneath were in deep mourning. Billee's gloves were dyed navy blue. That was the easiest night dive I ever made. We jumped off a pier into calm water. Two lanterns were left burning on the pier. They glowed like two bright moons as far as we swam, even at 35 feet, telling us where to find the exit ladder. We were never cold in the water even though we did not wear our wet suits.

Pat Ferguson took us snorkling at Glass Beach to look for Terebra, my specialty. None of us found any, though while fanning sand for them, I uncovered the dorsum of a Fasciolaria tulipa Linne buried an inch and a half deep. I dug it up and learned it is a very uncommon shell there. In climbing down the cliff to reach Glass Beach I realized the cliffs are composed of fossil coral.

At Kiltery Beach we dived along the border of Castro's Cuba. While returning to shore at about 18 feet depth, I saw ahead of me a purex bottle filled with air and anchored to the bottom by a six foot line. In black letters staring me in the face, were the words, "Go west." I stopped. Then I carefully followed our guides. Afterward I learned the sign was not marking the border underwater but was for a Peef Raiders' compass dive. Ron Pauley and Bob Hooper swam on to deeper water to see if the Strombus gigas Linne were in. They were, in abundance. Billee and I each wanted a pair. I kept exchanging one of my pair for a more beautiful one until I ended with two that are positively gorgeous. Carol and Ron Pauley took them home and cleaned them for us.

Everyone was wonderful to us. People took time off from work to accompany us diving and collecting. Ron Pauley and Tim Nichols carried our tanks up and down high embankments and up to the third floor of the BOQ. Carol and Ron Pauley, who decided not to make a night dive at FORAX waited an hour and ten minutes for us to surface in order to help us with our tanks and equipment because the water was quite turbulent there. In our estimation that was the only turbulent water we encountered while at Guantanamo. During one dive Jay Bell gave up his dive to sit on top of a high coral head, underwater, and keep track of the divers below. We were invited to picnics, dinners in homes including a fabulous Thanksgiving dinner, and a steak cook-out.



Strombus gigas

Vi's promise of good weather became more important when we stopped in Jamaica on our way to Cuba. We had planned a few days of diving there. A "norther" was blowing when we arrived, and the usually blue Caribbean looked more suitable for making mud pies than for swimming. The day before we left it began to clear, and we decided to give it a try. There are two inner tubes anchored to the bottom of the ocean visible from the hotel pier. The second tube marks the beginning of a fifteen to twenty foot wide underwater canyon. We swam to it and submerged. At 25 to 45 feet visibility was improved but not

good. We did little collecting except for a sack of orange which was fairly rich in minute shells. As we ascended to the 25 foot level, I motioned for Billee to look behind her. There a six foot barracuda was grinding its sharp buck teeth together like a skulking villian. First giant barracuda Billee had ever seen. Says she wouldn't have missed that thrill. We mentioned it at the hotel afterward, and the manager said, "There are two of them out there. About the same size. They regularly check out the divers and sometimes scare the hell out of them."

Guantanamo Bay is situated in a spot that misses the storms other parts of the Caribbean receive. It rains so seldom most people there have sent rain-coats and umbrellas home. The hurricane in October did bring some rain but caused no damage. It only made the hills green for our visit in November. After spending ten days there, we can understand why, in spite of the confinement to a relatively small area, most everyone wants to sign up for another tour of duty there. Its horizons are broad.



Reef Raiders diving group



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THE LURE OF COLLECTING FOSSIL SHELLS

by Clifton L. Martin

Since my first introduction to the recent molluscan fauna came about from an interest in fossils, it is probably natural that my primary interest in the phylum has been of a paleontological nature. Such questions as, "In what epoch did the genus originate" or "In what part of the world", have been of interest to me from the beginning. For me the study of fossil mollusks has added a whole new dimension, that of time, to this very interesting fauna.

Paleontologically, the phylum Mollusca is among the oldest on earth, having a beginning at least as far back as Cambrian times which began about six hundred million years ago. The Cambrian epoch contained a vast diversity of living creatures, all of aquatic nature and all were invertebrates since the vertebrates did not develop until the Silurian period, about 175 million years later. Since the first living mollusks probably did not have shells and could have left no recognizable fossil record, it is possible that the phylum had its earliest beginnings as far back as Pre-Cambrian times. One can only speculate about the strange primal ancestors of the beautiful mollusks we collect today. One thing is certain, our planet is incredibly old and there are many times more extinct species of life found in the fossil record than are living today.

Since it is impossible for the human mind to grasp the inconceivable size of the earth, it is often better understood by the use of a reduced scale. If the entire history of our earth, since the first primordial protoplasmic cell appeared, could be shrunk to a period of four twenty-four hour days life would have occurred only at the beginning of the fourth day. The greatest age of the dinosaurs, the Cretaceous epoch, would not occur until the last five and one-half hours of our reduced scale. The beginning of human civilization would occur only during the last second of the fourth day. It must be remembered that on this reduced scale mollusks would be almost a full day old.

Many of the fossil shells from earlier geological epochs would be difficult, if not impossible, for the collector of recent species to place systematically in their proper families. The genera and species would be even more difficult. These are families of mollusks that are extinct and have left no descendants in the recent fauna. Others, such as the Cephalopoda and the Pleurotomariacea are more easily recognized even though the fossil forms may be totally unlike their living relatives. Both of these groups of mollusks thrived in great proliferation almost from the beginning of life on earth and in other geological epochs were represented by many times more genera and species than are known in the living fauna.

In the genus Nautilus at the present time there are but five recognized living species, yet the ancestry of this genus has a record dating back to the late Cambrian, more than 500 million years ago. Cephalopods were especially prevalent during the Paleozoic and Mesozoic eras. In the fossil record there are hundreds of families and thousands of genera. Nearly all of these genera had more than one species so the total number of fossil cephalopods known is almost unbelievable. Even so, new species are being discovered rather frequently. Some of the fossil Cephalopoda were quite spectacular in form. During the Ordovician epoch of the late Paleozoic one genus, Endoceras, had a long, straight, tapering shell which was not coiled. It grew to a length of fifteen feet and had a world-wide distribution in the warm seas of that period. Of those species with coiled shells, one of the most spectacular was Pachydiscus seppenradensis Landois, 1885, from the Cretaceous of Germany. A specimen found in 1895 near Seppenrade, Westphalia, has a diameter of six feet five inches. A cast model in actual size of this remarkable specimen is on display at the Los Angeles County Museum of Natural History.

Perhaps those fossils of greatest interest to the collector of recent shells are those families that have genera and species still living today. Such genera as Polinices and Turritella are found far back in the fossil record. Almost all of the fossil shells of the Tertiary (Paleocene through Pliocene) are of genera that would be familiar to the collector of recent shells. In many instances a species, such as Polinices recluzianus (Ashmead, 1839), which is found in the recent fauna of southern California and west Mexico, is found quite far back in the fossil record. Polinices recluzianus is found in the Eocene deposits of central California and has apparently thrived in every epoch to the present. There are many living species with a record of life on earth much longer than Polinices recluzianus. Genus Polinices had its beginning in the Upper Cretaceous, about 85 million years ago.

While older fossils are of considerable interest to the collector, due to their extreme age and unfamiliar form, few of them would be recognizable as to family affiliation since they have left no known descendants in the evolutionary record. As a general rule fossils from the more recent epochs are better preserved than those from older epochs. Many fossils from the epochs of the Tertiary appear at first glance to be dead collected specimens of recent origin. Some outstanding examples of this may be found in the Caloosahatchee formation of the Pliocene of southern Florida, the Pliocene deposits of Pacific Beach, California, and the Claiborne formation of the Eocene of the Mississippi embayment. Some of the reef exposures of the Claiborne formation are especially rich in beautifully preserved specimens. Conus sauridens Conrad, 1833, Dentalium minutistriatum Gabb, 1860, Distorsio septemdentata Gabb, 1860, Polinices limula (Conrad, 1833), Pseudolivea perspectiva "Conrad", in Gabb, 1860, Surcula alternata (Conrad, 1855), and Velutocobis petrosus (Conrad, 1833), are but a few of them. Even such tiny and fragile shells as Cylichnina jacksonensis (Meyer, 1886), and Niso umbilicata (Lea, 1833), have been found in a near-perfect state of preservation. About all they lack is the original color and gloss.

Because of the extreme age of the earth it is not surprising that fossils may be found on almost any area of its land surface. Every one of our states have areas in which fossils may be found. Some states are more richly endowed than others, but all will have them to some degree. Fortunately, California is very abundantly endowed with fossil marine life. Southern California is especially rich in exposures of the Tertiary.

To those who may want to collect fossils for the first time it will be good to remember that some states and even some local governments have laws regulating such collecting, especially on land in the public domain. Be sure to check on any possible ordinances in the area where you wish to collect. Do not trespass on private property, but seek the owners permission before entering his property. Many owners will, for a nominal fee, permit collecting on their property to responsible individuals. Always make such arrangements in advance and when you leave the area be sure you have left it as clean as you found it. You may want to visit the area again. This is also a good rule to follow when shelling for recent mollusks.

When you finally make your first find just remember that ages ago a small blob of protoplasmic material, by its unwitting use of a bit of calcium and an assist from nature, and all without any conscious effort on its part, left a more enduring record of its having passed this way than any man now living is likely to do.

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It has often been asked just how a collector, without a background in the field of geology, can determine from which epoch his specimens were derived. In some instances this may be impossible without expert assistance. In most cases there has been a vast literature published on almost all of the important fossil localities throughout the world. There are also geological maps available of virtually every area of the earth's surface. These show all of the different formations to be found in great detail. For the most part a fossil is not found widely separated from other fossils, but, due to the nature of their formation, are usually found in close proximity to other fossils of the same epoch. When a reef has been covered over with a deep blanket of volcanic ash, earth, or sand, all of the living organisms with shelly, chitinous, or bony parts, living on the reef will eventually, under favorable conditions, become fossils. Sometimes this process may occur directly over a stratum of fossiliferous material from an older epoch. Usually there will be a layer of non-fossiliferous material separating the two strata. Sometimes a rather large number of fossil species may be found in a very limited area, all from the same epoch. This is the case in the Pliocene deposits at Pacific Beach and at Coyote Mountain, in Imperial County, as well as the Pliocene deposits of southern Florida and the Eocene deposits of the Mississippi embayment (Sabine River, Texas, to the Alabama River). In all epochs some species came into being and became quite plentiful and widely dispersed, yet the entire life of the species was lived within a single epoch. The remains of such species are called index fossils and are very useful to the collector in determining the exact geological placement of his find. Two of the index fossils from the Pliocene, San Diego formation of this area, are Fatinopecten healeyi (Arnold, 1906), and Opalia varicostata Stearns, 1875. Both of these species were widely dispersed along the coastal area of southern California and were confined entirely to the Pliocene. Wherever they are found will be a Pliocene deposit and all other fossils found in the same formation will be of Pliocene origin. Fossil formations from other localities and other epochs will have their own index fossils.

Most of us have seen maps showing how neatly the continents of the earth would fit together if they could be moved into the proper position. This, together with other facts, has given cause for the current opinion among many geologists that originally there was but one land-mass which was broken up and the several parts drifting away from each other to form the continents. This theory has much to recommend it since the continental drift is still continuing and the rate of drift can be measured today. However, it does not explain how the continental outlines, which would fit so snugly together today, have not had their present conformation from the beginning but have been acquired through volcanic action and other means only within the last quarter of a million years or so. It would be interesting to see how the outlines would fit together if they were taken from the edges of the continental shelves. Almost every geological epoch had its own geographical conformation and almost every part of the earth's surface that is now covered by land has, at some time in the past, been a part of the sea bottom for long periods of time. As evidence, most of the central areas of all continents have vast quantities of fossil marine life. This, together with the fact that each epoch had its own distinctive life forms has a tendency to make our world seem to be a series of planets, each different from the others, rather than a single planet. It is only when we make an effort to study the geology and paleontology together as a continuing though ever-changing unit that we begin to comprehend the magnitude and the many ramifications of nature. What we see of living and inanimate nature today is but the logical result of all that has gone before.

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- PERRAULT, VIOLA
(instead of Perroult)
- RADWIN, Dr. George
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ACANTHINA LUGUBRIS Reappears in San Diego

George E. Radwin

Long-time residents of San Diego who collect shells know that there are only two species of the thaidid genus Acanthina along our shores (A. spirata and A. naucilirata); right? Wrong! As of early this year we have been "invaded". The third species in question is Acanthina lugubris (Sowerby, 1822). Although Keen (1971) lists its distribution as "southern California to Magdalena Bay, Baja California; it has also been reported in the Galapagos Islands", no specimens have been collected here, to my knowledge or that of other knowledgeable southern California shell collectors', in the past 40 or 50 years. This is undoubtedly not the first invasion by this species. In the collection of the San Diego Natural History Museum we have two lots of this species comprising five specimens collected by Dr. Fred Baker and Mr. G.W. Gripp at least forty years ago from "Jetty, San Diego and "San Diego, Cal., respectively.

It may be that Dr. Keen's report of it occurring in southern California was based on other old collections. Reliable information indicates that it occurs on the outer coast of Baja California as far north as Ensenada or possibly Rosarita Beach and also on the Coronado Islands, as well as on such offshore islands as Cedros and Guadalupe.

In January I was informed by a casual observer, Mrs. Diana Herron, that a mollusk she had not seen locally before was present in large numbers on some parts of Pt. Loma's outer coast. I verified her observation at the tidepools in Cabrillo National Monument (not her observation site).

These individuals, in substantial numbers, differ from members of the Baja populations only in being of a generally darker brown-black color. They congregate at low tides at about the mid-tide levels around the two species of sea anemones. This is probably a response to the shallow films of water that these anemones retain about them when the tide is out.

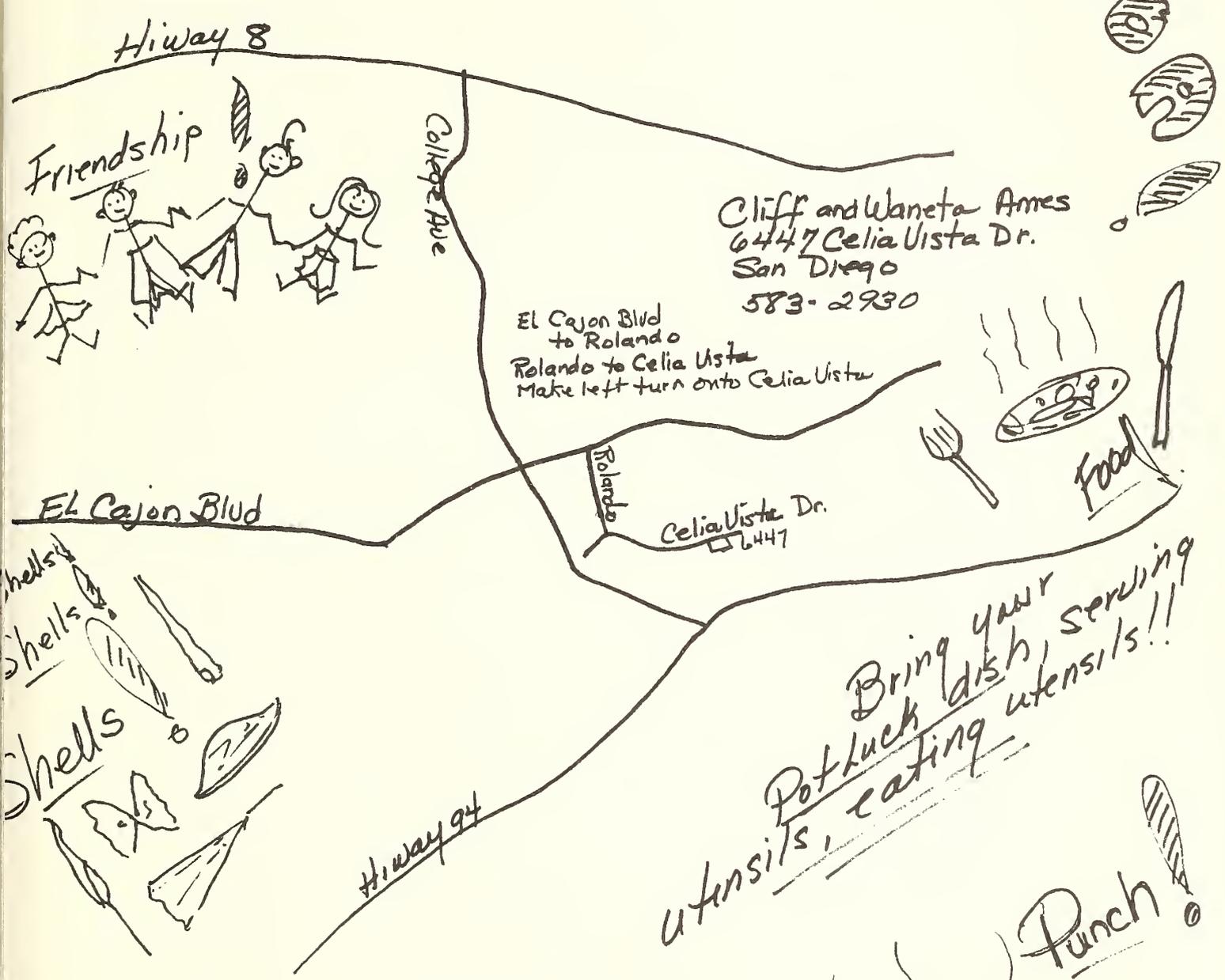
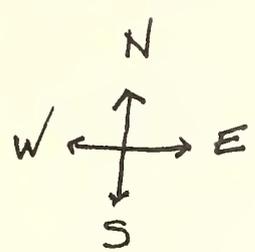
Although collecting intertidal invertebrates is presently illegal in California, observational information such as this is always of interest and importance in understanding patterns of population recruitment among marine mollusks and other marine invertebrate animals.

INTERESTED IN EXCHANGE

Mr. Lloyd B. Pistone of Casa Eva, Kent Ridge, ChristChurch, Barbados, West Indies is interested in corresponding with Club members who would like to exchange shells found locally for those found in the Caribbean. He is interested in all species.

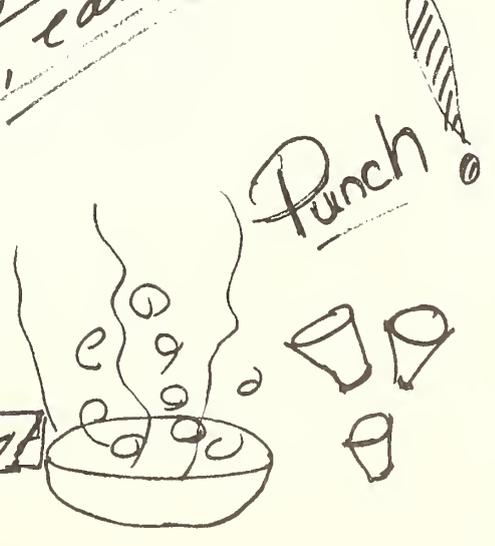
Member Waneta Ames of 6447 Celia Vista Dr. San Diego, needs our local shoreline shells of all types and would like to trade with members for them.

COOL TO THE AIR



Saturday, May 11, 1974

Altitude Adjustment Hour begins at 6:00 P.M.
 Dinner at 7:00 P.M. - or thereabouts
 Bidding, buying and outbidding - thereafter





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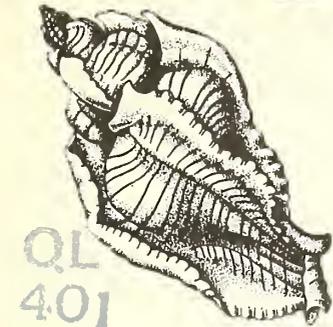
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SAN DIEGO SHELL CLUB

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7:30 P.M. - Museum auditorium

President: Richard Schwarz
Vice President: Don Pisor
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June 1974

No. 6

* CLUB MEETING DATE WILL BE JUNE 27, 1974 !!! *
* * * * *

PROGRAM: Joe Bibbey will speak on Collecting in the southwest Pacific.

Slides from the Auction/potluck will also be shown.

"A POSSIBLE ENERGY RELATIONSHIP BETWEEN A BIOLUMINESCENT REACTION AND PHOTOSYNTHESIS IN CHLORELLA"

Therese Marie LaChance

Symbiotic relationships occur frequently throughout nature, and such existances often form important links in the environmental chain. Because bioluminescence occurs in nature particularly in marine organisms, this experiment was designed to explore the possibility of a bioluminescent organism providing light for photosynthesis in a symbiotic partner; the required light otherwise being limited or unavailable in a marine environment.

Even though Chlorella pyrenoidosa is a freshwater algae, it was chosen for this experiment because it is a typical representative of the phylum Chlorophyta and the ease of rapidly growing and maintaining cultures for experimental purposes.

The optical density of a sample of the Chlorella culture was measured at varying wavelengths using a spectrophotometer. This was done to calculate the levels of light

absorbance at a particular wavelength, absorbed light being the energy source for the photosynthetic reaction. The optical densities of the culture medium were measured at the same wavelengths; distilled water was used as a blank. Next a luciferin/luciferase reaction from firefly extracts was produced in vitro to cause bioluminescence. Using a prism spectrometer and a mercury light source with known wavelengths of spectral bands, the light wavelength range emitted by the bioluminescent reaction was calculated.

The results of these two tests were subsequently graphed. High light absorbance levels in Chlorella were found in violet and red regions. Absorbance in the yellow-green range was also found to be about 48% of total absorbance level (520-560 millimicrons). Light produced by the bioluminescent reaction was found to range between 520 and 560 millimicrons.

As a subsequent test, Chlorella sample cultures were grown in light of controlled wavelengths using Kodak color gelatin filters. Red, blue, green, and a daylight-simulating filter were used. Cell concentration levels were calculated every three days for a period of twenty-four days. Because of the inadequacy of blue filters, the blue filter sample perished. The red sample reached the highest density levels. Both the test green filters sample and the daylight sample reached nearly the same levels with few fluctuations.

In conclusion based upon the light absorbed by Chlorella , the energy produced by a bioluminescent reaction is sufficient for at least limited photosynthesis. Naturally, varying factors would be the intensity and source of the light. This experiment does not prove that such symbiotic relationships originally mentioned actually exist in nature, but that bioluminescence can be utilized for photosynthesis."

Dear Shell Club Members:

I wanted to thank you very much for awarding me the San Diego Shell Club's First Place Award in the Greater San Diego Science and Engineering Fair. I was quite honored to have my project recognized in this special way by your club. I also look forward to receiving and reading the book you so kindly let me select. I know that it will be an invaluable resource in college next year.

Thank you also for inviting me to tell you about my project at your last meeting. I felt quite at ease speaking to everyone because of the friendly reception I received by many of your members before the meeting. It was a very enjoyable experience.

Thank you very much.

Sincerely,

Therese LaChance

Therese LaChance

SCAMMONS LAGOON

by Billee Dilworth

Early in March four of us decided to see a little of the new Baja California road. We wanted to spend a few days at Scammons Lagoon before the grey whales began their annual migration North.

The area south of El Rosario was the greenest and prettiest we have ever seen it. Wild flowers were blossoming and the cirio trees were covered with green leaves. The night before we left Scammons there was a strong wind with a sand storm. We worried about our friends sleeping in their little five-pound nylon backpack tent. When it started to pour we worried even more. Our worries were needless as they had spent a comfortable, dry night. On our return trip we decided to spend the night in El Rosario, as rain was still threatening. Our friends spent the night at the motel, only to be awakened in the night with the roof leaking in two places.

After years of struggling over the bad roads of Baja, driving to Scammons on the new highway seemed a miracle. With an early morning start from La Jolla, California we found ourselves past Guerrero Negro at dusk. We camped off a small road for the night. A black topped parking space and turn off to Scammons Lagoon were made easy to recognize by a sign with a picture of a whale. The 18 miles of sand road from the turn off into Scammons was good enough to have driven our motor home instead of the VW van we used. Several more whale signs clearly marked the road to the lagoon. We began seeing the big grey whales from the time we reached the lagoon. The road, which had many turn offs to camping sits, lay alongside the lagoon. The farther we went the more numerous the whales became. We continued to the end of the road. Both out in the big bay and in a smaller channel nearer to us were whales. The ones going out of the channel were noisy with their blowing.

The whales were doing spectacular acrobatics standing completely out of the water on their tails and then slowly falling into the water with a tremendous splash. We could sit by the hour looking out over the lagoon with the binoculars watching them.

Sitting around the camp fire after dark we were startled to suddenly hear a whale blow. It sounded so loud. We dashed to the waters edge. With the incoming tide the whales were going back into the smaller arm of the lagoon. It was exciting to hear them in the dark.

The tide difference was much greater than we expected, even with the full moon. On the last sand bar out into the big bay at extreme low tide Dick discovered Terebra hemphilli Vanatta. The area around Scammons Lagoon is a meeting place of the West Coast and Panamic fauna, near the end of the range of each. Though Terebra hemphilli appears to be endemic in the region around Scammons Lagoon, it is closely allied to Terebra danai Berry. The two species probably had a common progenitor. The only other live gastropods we saw were nassarius and cerithium. On the beach and scattered over the camping area were some dead Macron aethrops (Reeve, 1847). These are said to be common the the outer coast of Baja but rare in the gulf. Clams were plentiful and easily collected. We ate our fill before leaving for home.

With regret we turned North when we again reached the main highway. It would have been a beautiful time of year to continue on to the cape. To reach La Paz would have required only a couple of driving days. The whales and the highway had both measured up to our expectations.

AN UNUSUAL FIND IN SAN FELIPE

by Carole Hertz and Dave Mulliner

In June of last year the Mulliners and the Hertzses made one of their many delightful safaris to San Felipe, Baja Calif, Mexico. The tides were low, the air was clear and the company good as always.

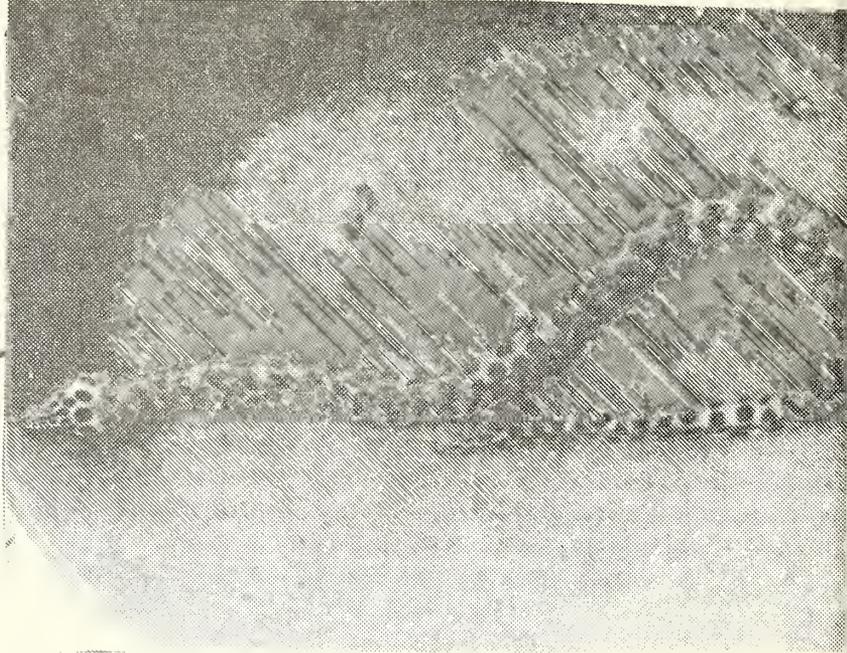
On June 2, 1973, the Mulliners, Hertzses and Joyce Gemmell collected on the morning low tide at San Felipe Point (Campo Uno). Returning wearily to camp, Dave spotted a telltale "lump" in the hard sand in the low tide zone just south of Campo Uno.

Deciding to look at the Oliva incrassata he believed to be under the lump, Dave poked at the lump with his shovel. The Oliva turned out to be an eel snake Ophichphis triserialis, a truly rare find in this area.

This strange creature was over two feet long, spotted black on sandy gold. It tried desperately to escape, digging quickly with whichever end of its body touched the sand. After much effort the eel snake was ensconced in a large bucket and brought back to Joyce's house to be later taken to Scripps Institute of Oceanography.

Only one Ophichphis triserialis had been found before in the San Felipe area and that one had been found dead and then given to Scripps.

Scripps was very interested in having a live one and so Dave brought it back with him. Unfortunately the eel snake survived only as far as San Diego and died before reaching Scripps.



Ophichphis triserialis

 THE AUCTION

What am I bid for one terrific shell auction? Once again the club has benefitted from the generosity of the shell donors and the spirited bidding of the members. With great eats and drinks and good company, the evening was muy simpatico. Our gracious host and hostess were Cliff and Waneta Ames. The super auctioneers were George Radwin and Norm Currin. SOLD to the San Diego Shell Club!

A.S.

LOST & FOUND DEPARTMENT

Articles left at the Ames' house after the auction/potluck will be brought to the June meeting. And will the person who accidentally stole Carole Hertz' tongs please bring them to the meeting?

CORRECTION

Pages 111 and 112 of the May issue of your Festivus were reversed. Please reverse the sheet and then correct the page numbers.

EVER SEE A KID WHO WASN'T FASCINATED BY A SEASHELL?

For the past few years, several of our Club members, in response to specific requests, have been going to classrooms in various schools throughout the city to tell youngsters some of the especially interesting things about sea life. Carrying with them the shells that they feel will appeal to the interest and curiosity of the children,--possibly some shells for their particular beauty, some for their cleverness in camouflage, some for size perhaps, and of course the surprising death-dealing cone,--our members have found this to be an enjoyable and interesting experience. A few live animals in a pyrex dish or small aquarium so that the children can see how these little animals navigate is a delight to them. We all like to FEEL things, so a few shells that can be passed around so that the youngsters can see for themselves makes the whole picture more real to them and more fun.

In the past, these requests have come through personal contact only. There are many other children who also would enjoy knowing more about our marine world. Ecology-awareness has become a very important factor in our lives. Now the Junior League of San Diego is coordinating such activities. Schools can now arrange for speakers in many fields directly through them, and they in turn contact a member of the particular organization involved.

The following letters are a few of many sent to Carole Hertz as a thank you for her appearance at a class of third graders. Carole, by now, has become an old-timer in this activity, and has found it both enjoyable and satisfying. She will be glad to answer questions regarding it. This school year is about over, but come fall there will be more requests. Why not add your name to the list of those who will share their knowledge with these young people occasionally. Call Carole at 277-6259 for more information.

March 28, 1974

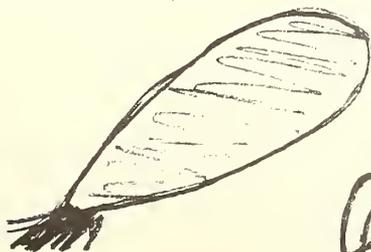
Dear Mrs. Hertz

Thank you for coming to our classroom. We enjoyed all over your shells. I liked the big sea shell and the poison cone shell. I liked to feel all of your shells and the tusks shell's were neat to feel. My mom liked what I told her about the shells. The chiton was feary weard. The pen shell you might be able to use it for a pen. I liked all of your shells. I enjoyed ever single one of your shells. I liked the razor shell and all off your shells -

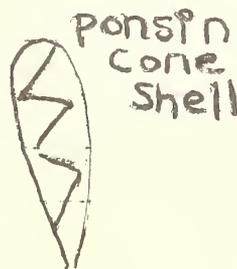
from your friend

Michelle

pen shell



olive shell



poison
cone
shell

Dear Mrs. Hertz,
 Thank you for coming to
 our class. I enjoyed your shells
 I liked them very much.
 The shells were very interesting.
 I liked all the shells the
 very best shell I like is
 the cowry, but they all
 were nice and colorful. And
 I like oceanography.

from Desi

Dear Mrs Hertz
 I like your shells be
 cause you told a lot about
 them and how the cowry
 shines itself. The one that
 like the most is the tusk shell
 because it sucks food in one
 end and shoots it out the
 other

From Duncan

ADDITIONS TO THE ROSTER

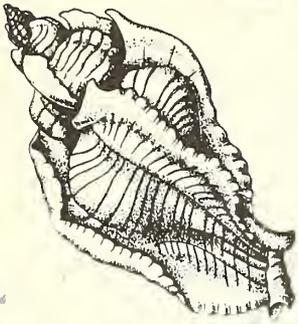
BAKER, Elizabeth (Mrs. John)
 1271 Missouri St.
 San Diego, Ca. 92109

CLOVER, Phillip W.
 P.O. BOX 83
 Glen Ellen, Ca. 95442

SNELL, Chuck
 P.O. Box AC
 Trinidad, Ca. 95571



THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

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Vol. V

July 1974

No. 7

* PROGRAM: Dr. George Radwin will speak on A Review of the Genus
* Muricopsis. Meeting date- July 18, 1974 at 7:30 P.M. *

* SAVE THIS DATE! September 21, 1974 is the date for the Club's annual
* fall party which will be held at the Mulliner's home. The
* theme will be "The Four Corners of the World!" *

FROM THE MINUTES

The speaker for the evening was Joe Bibbey who spoke about collecting in the Pacific. He told how his interest in shells began with fossils when he was a child and how it became intense when he was stationed in the islands and took to beach wandering and diving for lack of other recreational outlets. He illustrated his talk with specimens he had collected and purchased.

Jules Hertz showed Dave's slides of the shell auction during the second part of the program.

The Club voted to donate \$25. to the Veliger again this year.

A report on the WSM meeting was given by Clifford Martin.

The date for the Club's fall party, to be held at the Mulliner's home, will be on September 21.

Mae Dean Richart won the shell drawing.

NOTICE

S.B.M.S., Inc. Fifth West Coast Shell Show and Auction will be held on August 24 and 25 from 9:00am - 6:00 pm, the auction starting at 2:00pm on the 25th. It will be held at Santa Barbara Junior High School, 721 E. Cota St., Santa Barbara.

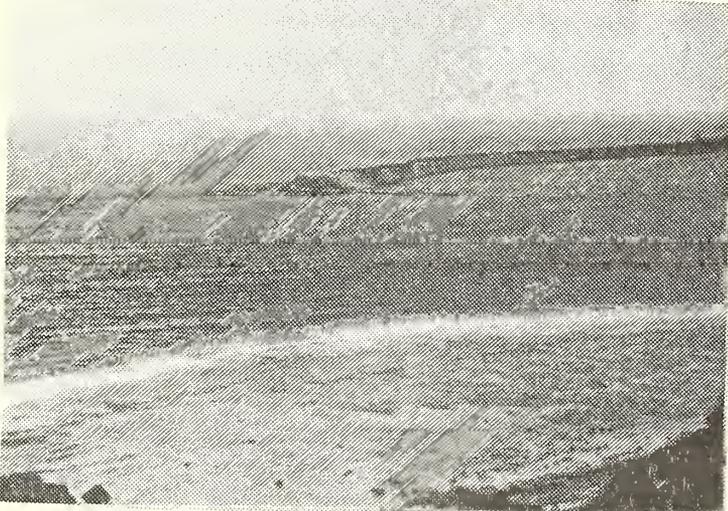
COWRIES OF GUAM

by

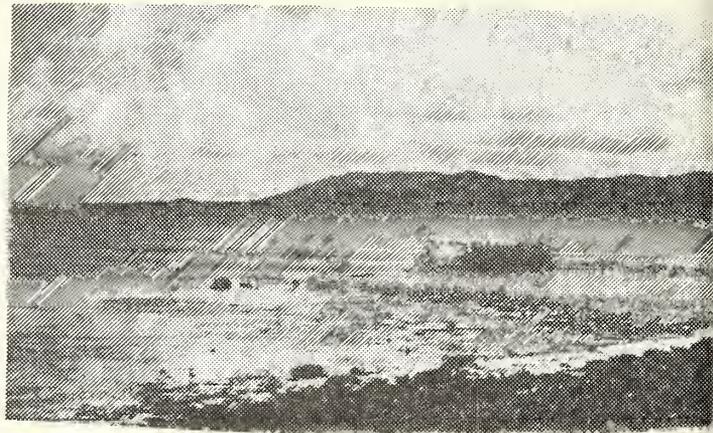
Bob Schoening

Guam is a lush, tropical island in the Marianas Islands. It is located about 3,000 miles west of Hawaii, 1500 miles south of Japan and 1500 miles east of the Philippine Islands. It is approximately 32 miles long and 8-12 miles wide. Guam is a territorial possession of the United States having an elected Governor and Legislature. The island is economically dependent on the U.S. military bases located there and Japanese tourism. The population of Guam is estimated to be around 100,000.

Guam is green the year round with a geography of mountains in the southern end, with a plateau on the northern half of the island. About 50% of the beaches are inaccessible due to the high cliffs that surround the island. There are many beautiful bays that are protected by a fringing reef. Due to the topography of the island there are many different kinds of coral formations exhibiting many types of marine life. The skin diver and SCUBA diver will encounter new and beautiful scenery at each turn with a great diversity of marine life.



Entrance to Apra Harbor and glass breakwater

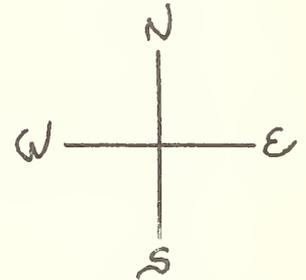
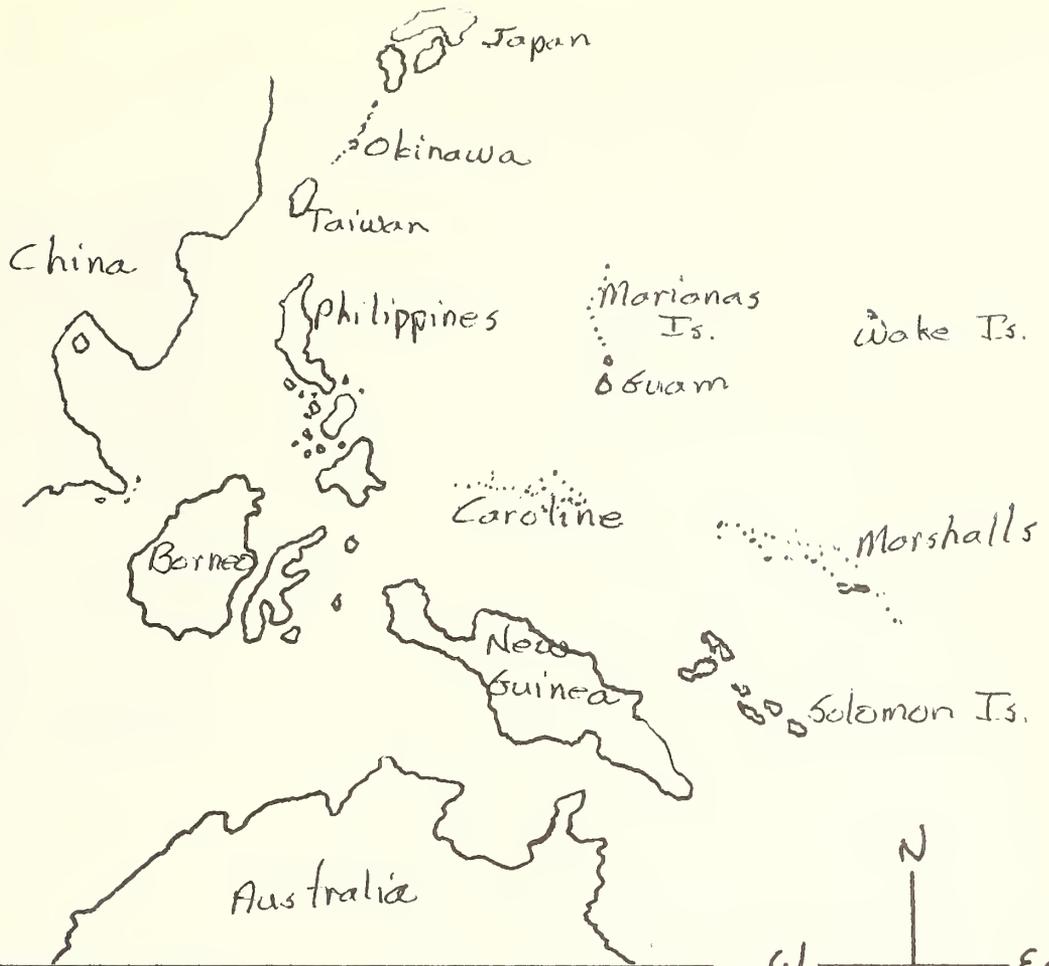


Guam taken from Cocos Island

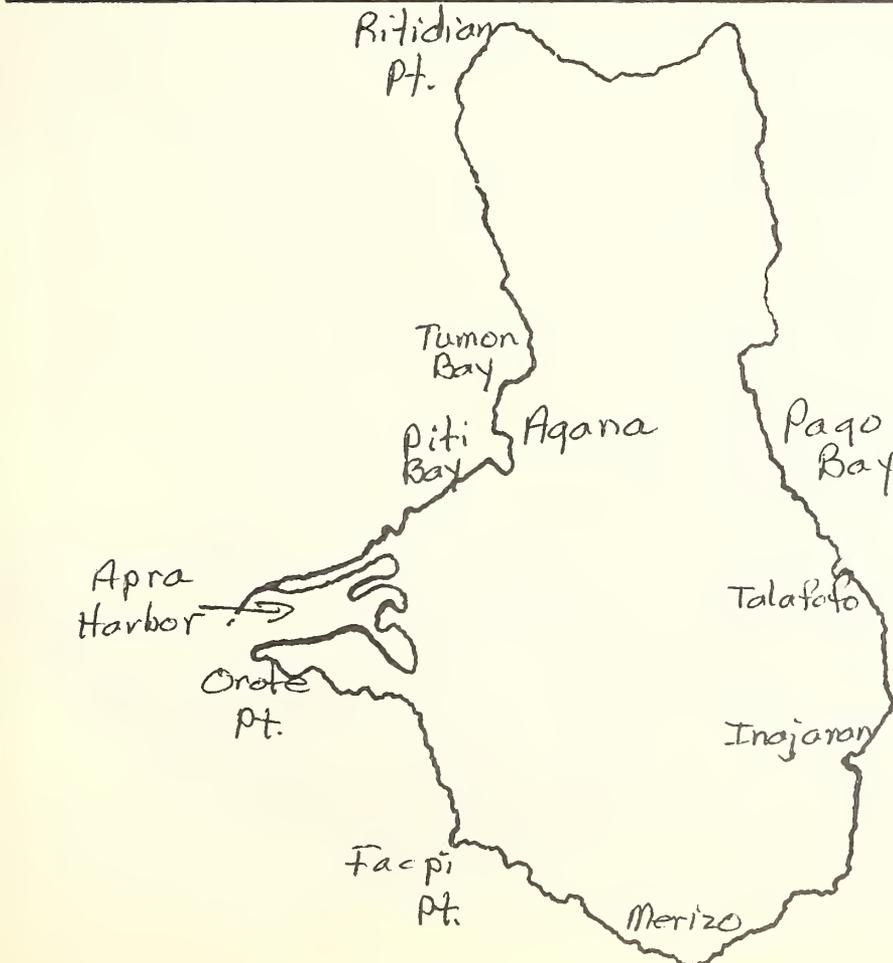
There are about 150 different species of coral life represented on the island. Marine fish of many species are located here in great numbers living among the coral formations and plant life. Sea turtles, octopi, starfish, sponges and gorgonias are among the many other different types of life to be seen. The famed Black Coral may also be found on Guam starting at depths of around 150 ft. down to 250 ft. There are many forms of dangerous marine life to be careful of including sharks, the deadly Sea Wasp, fire coral, sea urchins and the deadly cones. Among the poisonous marine fish to be careful of are the ugly Stonefish and the grotesque but beautiful Turkeyfish.

Guam also has a great variety of the family Mollusca living on the reefs and in the quiet bays and rugged cliffs. It has been estimated that there are about 5-6,000 species represented on Guam. There are representatives of the Chitons, Pectens, Tridacnas, Murex, Strombus, Mitre, Lambis, Conus and a variety of the other molluscan families. Unfortunately members of the Volutes and Marginella family are not represented on Guam.

Of the family Cypraeidae, there are approximately 59 species with some species having two or three forms. There are no cowrie species

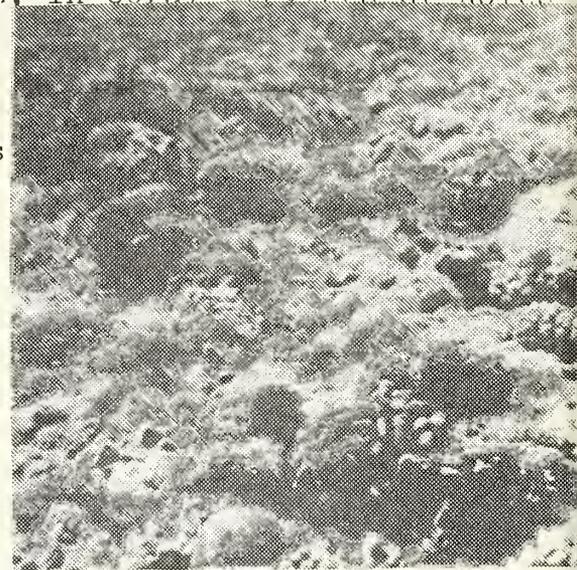


Guam
U. S. A.



that are strictly endemic to Guam but some may be found in greater numbers than elsewhere and the opposite is just as true. Some species are found only at night where some of the species can be found during daytime and nighttime. Each specie has their own living habitat which may just be under rocks with a sandy bottom, in coral crevices or holes in a hard flat rock bottom. Some species may live in a combination of these living habitats. Others may still be found only in shallow water (1-10ft), others in moderate deep water (10-60ft), and some others may be found only in deep water (60ft or greater). Some species may be found over the entire range of water depths. As you can see, the cowries of Guam have extreme variability as will be brought out in this report. The one certain rule about collecting *Cypraea* on Guam was "Shells are where you find them".

This report will be based mainly on my experiences on Guam in collecting members of the *Cypraeid* family. I would like to thank all the people on Guam who gave me assistance and guidance. I would also like to thank C. Cate for the use of their paper "Cowrie Species On Guam" which was in the "Veliger", July, 1969, issue as a list of all the different species found and to which I have added three new species. My very express thanks to Delmar and Joyce Stone of Asan, Guam for allowing me to copy their slides of the live cowries that they took pictures of during their collecting expeditions.



Underwater at Camel Rock in Piti Bay

The following members of the Genus *Cypraea* are found on Guam:

1. annulata	21. globulus	41. mauritiana
2. arabica	22. goodalli	42. minoridans
3. argus	23. gracilis	43. moneta
4. asellus	24. helvola	44. nucleus
5. aurantium	25. hammondae	45. onyx
6. beckii	26. hirundo	46. ovum
7. bistrinotata	27. humphreysi	47. poraria
8. caputserpentis	28. irrorata	48. punctata
9. carneola	29. isabella	49. raysummersi
10. caurica	30. kieneri	50. scurra
11. childreni	31. labrolineata	51. staphylea
12. chinensis	32. leviathan	52. stolidia
13. clandestina	33. limacina	53. talpa
14. cribraria	34. listeri	54. teres
15. cylindrica	35. lutea	55. testudinaria
16. depressa	36. lynx	56. tigris
17. eglantina	37. maculifera	57. ventriculus
18. erosa	38. mappa	58. vitellus
19. erroneus	39. margarita	59. ziczac
20. fimbriata	40. mariae	

Cypraea annulus-Linne', 1758

This particular species is very common on Guam. It is found on almost all the beaches in shallow water under rocks in water not over 3 ft. deep. It is both nocturnal and diurnal. They like the crevices and holes of large and small rock. The size will range from 5/8" to

to $1\frac{1}{2}$ " long. The mantle is an attractive one with thin alternating stripes of black and white. There are no visible papillae.

Cypraea arabica-Linne', 1758

This specie is one of the six members of the Arabica group found on Guam. This species is fairly well represented around the island being found on almost all of the fringing reefs in shallow water particularly where the water breaks onto the reef. It prefers water that is highly aerated. It is nocturnal but it may be found in the daytime. It lives in the coral crevices and holes on the reef. The average size is $1\frac{1}{2}$ " to 2" in length. The mantle when it is extended appears to be a dull gray in color with minute papillae.

Cypraea asellus-Linne', 1758

C. Cate lists this species as being found on Guam but says it must be considered provisionally as coming from Guam. As none of these were collected on Guam while I was there, I will have to consider it 'provisionally' collected there also.

Cypraea argus-Linne', 1758

This species is extremely rare on Guam being found only occasionally. Not very much is known about its living habitat although the few that were found were in shallow water and also in deep water. It has been found in places adjacent to live coral and rock formations. The mantle is a light brown in color with many papillae which maybe why it is hard to find.

Cypraea aurantium-Gmelin, 1791

This cowry is very rare on Guam and much sought after by anyone who collects shells on the island. This specie has been collected in deep water, 60 ft. or deeper. Not very much is known about its living habitats on Guam. It will range in size from 3-4 inches long. The mantle is a lacy black and white in color with papillae on the white spots. Guam is most likely the northernmost locality in the range of this species. Recent communication reports two more specimens have been collected. One in 30 ft. of water and the other in shallow water while snorkling.

Cypraea beckii-Gaskoin, 1836

This particular cowry is probably just as rare as the preceeding species. It has been found in water 18" deep down to depths of 100 ft. In shallow water, it was found under rocks. It will range in size from $\frac{3}{8}$ " to $\frac{1}{2}$ " in length.

Cypraea bistrinotata-Schilder and Schilder, 1937

This is another rare species that can be collected on Guam. C. Cate reports this cowry as being collected dead on beaches. It was not found on Guam to my knowledge while I was there.



Cypraea argus



Cypraea aurantium

Cypraea caputserpentis-Linne', 1758

This is a very common species being found on almost all of the island's reefs. It lives in the holes and crevices of the fringing reef down to depths of 3 ft. It can be found singly or up to as many as 5 in a small hole. It prefers highly oxygenated water. This cowry is very uniform in size being about $1\frac{1}{4}$ " in length. The dorsal color will vary from a light brown to a dark brown. The mantle is primarily black with tinges of white and green making it blend in perfectly with the color of the reef. Papillae can be observed although they are not very large in size.

Cypraea carneola-Linne', 1758

This species is uncommon on Guam. It is found in shallow water down to depths of 30 ft. It is quite variable in size ranging from $\frac{3}{4}$ " to $1\frac{1}{2}$ " in length. It can be found under rocks, coral crevices and on flat base rock with plant life. The color of the shell will be from a light red to an almost light violet in color. The mantle is black in color with spots of white.

Cypraea caurica-Linne', 1758

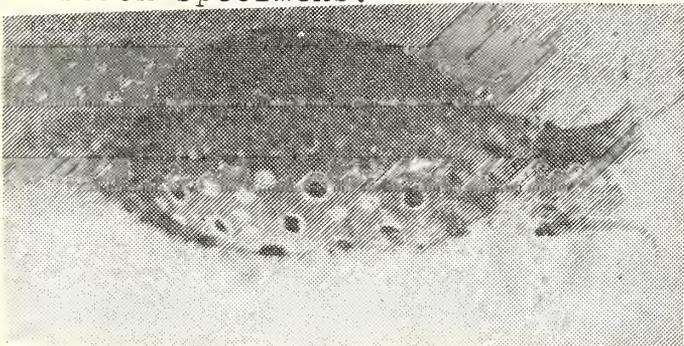
This species is extremely rare on Guamanian waters. Probably only 4 or 5 have been collected here in the last 20 years.

Cypraea chinensis-Gmelin, 1791

This member is fairly scarce on the reefs of Guam. The ones that have been collected were found to depths of 20 ft. It seems to like to hide under rocks. It averages about $1\frac{1}{2}$ " in length. The mantle is a chinese red in color with minute spots of white.

Cypraea childreni-Gray, 1825

A very scarce species throughout the Indo-Pacific, it is even more so on Guam. Only a very few specimens have been collected from deep water. Cate reports most of the ones that have been collected were beach specimens.

Cypraea beckiiCypraea chinensisCypraea clandestina-Linne', 1758

This is an uncommon cowrie that has a very restricted range on Guam. It has been found only in Apra Harbor in shallow water under rocks. The size averages about $\frac{3}{4}$ " in length.

LIBRARY NEWS

The Club has purchased two new books for our library. We have added Cernohorsky's, Marine Shells of the Pacific Volume II to accompany the first volume which is already a valuable part of our reference material. The second purchase is Seashells of Southern Africa by Brian Kensley. This will be reviewed in our August issue.

THE CLUB STRONGLY REMINDS MEMBERS THAT BOOKS ARE TO BE CHECKED OUT FOR ONE MONTH ONLY. Another member may be waiting for the book that you have at home.

SEASHORE LIFE COLORING BOOK by Anthony D'Attilio

This is much more than a coloring book! It is a beautiful collection of drawings by our own Tony. For children and adults alike, the book is a trip under the seas, a chance for your imagination to soar, and an opportunity to create your own world of color.

Seashore Life Coloring Book is published by Dover Publications, Inc. It contains 46 plates illustrating over 150 forms of marine life.

The wonder of nature is enhanced by this marvelous book. Thank you, Tony!

Anne Schwarz

ADDITIONS TO THE ROSTER

BLACK, Mr. and Mrs. C.E.
400 -5th
Coronado, Ca. 92118
435-6315

FERRIS, Maria C.
965½ Alameda
Coronado, Ca. 92118

THOMAS, The family
The Shell Shop
590 Embarcadero
Morro Bay, Ca. 93442

Exchange Wanted

"I have 300 different shells from the North Sea, East Atlantic Coast, the Mediterranean Sea, the Canary Islands and W. Africa. Will exchange lists."

Frank Nolf
Nieuwpoortsteenweg, 56
B- 8400 Oostende
Belgium

(for the letter, see Anne Schwarz)

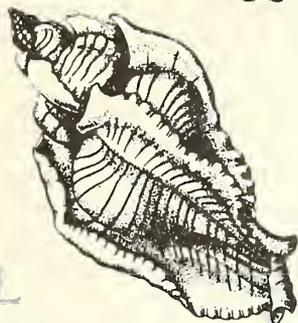
Children sure do like shells!

Dear Mrs. Hertz,
Thank you for showing us the shells. These are my favret ones hairy triton, keyhole lipect, tooth shell, cone, giant clam, Thank you for telling us about all those beautfull shells. I hope you can bring some more. Thank you for leting us hold them. I wish I had that big one.
Scott M.



THE

FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

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Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

August 1974

PROGRAM: Messrs. Clifford and Clifton Martin will speak on Deep Water Shells of South Africa. Meeting date is August 15, 1974 at 7:30 P.M.

The Four Corners of the World--September 21, 1974--the party will be at the Mulliner's home. There will be no regular meeting in September. Details will be announced at the August meeting.

MARK YOUR CALENDAR! Club Christmas party will be on Saturday, Dec. 21, at the Officers Club at Miramar. Details later.

BOOK NOTES

Carole M. Hertz

SEA-SHELLS OF SOUTHERN AFRICA - GASTROPODS by Brian Kensley, illustrated by Brian Kensley and Cora Coetzee, published by Maskew Miller Ltd., 1973
Price: \$19.95.

This is the newest addition to the Club library and a very useful book--certainly the best popular book to deal with South African gastropods. (The author hopes to cover bivalves, chitons and tusk shells in a second volume.)

More than 900 species are covered and illustrated, mostly in excellent black and white drawings done from actual specimens and extremely helpful for minute species. More than twenty colored plates are also given. There is a brief discussion on each family preceding the illustrations for that group. There is no written description or synonymy included.

A brief history of malacology in South Africa from the nineteenth century up to the present time introduces this work, followed by a short discussion of the marine provinces around southern Africa with distributional notes on the species covered. Also included is a general discussion of the biology, growth and feeding of gastropods.

COWRIES OF GUAM

by
Bob Schoening

(continued from July 1974 issue)

Cypraea cribraria-Linne', 1758

Another of the scarce cowries found on Guam. This is a member of the red mantle cowries. This cowrie can be found in shallow water down to 40 ft. It can be found under rocks or in coral crevices and holes. It can also be found living adjacent to fire coral and away from it. This cowrie has a double foot and on occasions, it has been observed to discard one foot when being collected. The reason for this unknown but

it might be a defensive mechanism. The species ranges in size from $\frac{1}{2}$ " to $1\frac{1}{2}$ " in length. The mantle is a bright red in color.

Cypraea cylindrica-Born, 1780

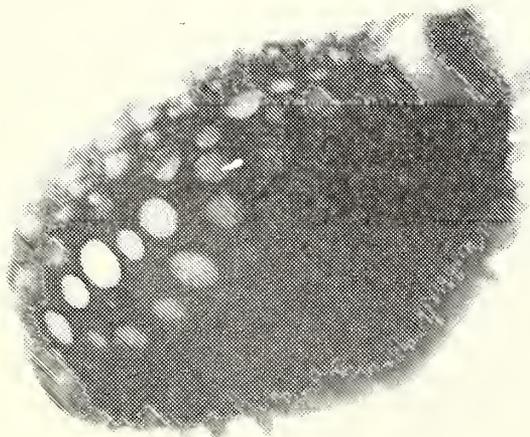
This species is common on Guam being found in Apra Harbor. It can be located by looking closely in the holes and crevices on the underside of rocks. This cowrie seemed to be the fastest moving one that I observed. It is primarily a shallow water species. It will range in size from $\frac{3}{4}$ " to $1\frac{1}{2}$ ". The mantle is a grey black in color with some moderate size papillae present.

Cypraea depressa-Gray, 1824

This is not a very common species, being collected only occasionally. It is found near the tops of the fringing reefs in water 1-2ft. deep. It lives in coral crevices and holes and at the base of corals. It can be distinguished by its depressed hump and no columnar blotches. In reality, it can be hard to tell the difference between it and a small Cyp. maculifera. The size averages about $1\frac{1}{2}$ " in length. The mantle is a dull grey-black in color.

Cypraea eglantina-Duclos, 1833

This is another member of the Arabian family that is found on Guam. This is an uncommon species, being found in the same localities as the preceding species. The size is small being about $1\frac{1}{2}$ " in length. The mantle is also a dull grey-black in color.



Cypraea cribraria



Cypraea cylindrica

Cypraea erosa-Linne', 1758

A very common species being found on almost all of the island's reefs. It is found in shallow water down to 30 ft. It can be found under rocks primarily, although at times it can be found under coral heads. It ranges in size from 3/4" to about 2" in length. It has a very pretty mantle being black and white in color with large papillae. There are three or four forms that are found on Guam.

Cypraea erronea-Linne', 1758

A very rare species on Guam hardly ever being collected. There is hardly any information on this shell being collected at Guam despite its abundance elsewhere in the Indo-Pacific basin.

Cypraea fimbriata-Gmelin, 1791

An uncommon species for Guam. It has been collected in shallow to deep water. It has been found under rocks and in coral crevices. It averages about 1/2" in size.

Cypraea globulus-Linne', 1758

Another uncommon species, being found in Apra Harbor under rocks. Not very much is known about this particular species and its living habitats on Guam.

Cypraea goodalli-Sowerby, 1832

A very rare species on Guam. It is found in shallow water under rocks. This species is about 1/2" long. There is a very good description in C. Cate's report "Cowries of Guam" on this particular species.

Cypraea gracilis-Gaskoin, 1842

A rare species on Guam while it is common elsewhere in the Indo-Pacific basin. Cate reports this species being found under coral rubble. It was not found on Guam while I was there, to my knowledge. It is about 1/2" in size.

Cypraea helvola-Linne', 1758

This is another uncommon cowrie but at nighttime it comes out and they are quite easy to find. It is found in shallow water in rocky and coral areas. The mantle is greenish with many papillae.

Cypraea hammondae-Iredale, 1939

This species is quite rare being found for the first time in 1972. Three of them were located under rocks in deep water. These specimens might be Cyp. raysummersi as there was doubt between the two species. The specimens were about 1/2" in length. If these two specimens are Cyp. raysummersi, it will still be a new species for Guam.

Cypraea hirundo-Linne', 1758

Another of the rare cowries on Guam, It is found in shallow water. It lives under rocks in small holes. The size range is about 3/4" long.

Cypraea helvolaCypraea goodalli

Cypraea humphreysi-Gray, 1825

A species that is rarely found on Guam. It is related to Cyp. lutea. It has been found in shallow water at just a couple of localities around the island. This species is also new to the list of cowries from Guam.

Cypraea irrorata-Gray, 1825

Another rare species on Guam but consistent with its findings at other localities in the Indo-Pacific area. It has been found in shallow water. Cate reports this species being found in dead coral heads in the pounding surf.

Cypraea isabella-Linne', 1758

A common species that is found in shallow water down to 30 ft. It has been found under rocks, coral rubble and in coral crevices. It has many variations of grey color and longitudinal black lines on the dorsal surface. It prefers quiet type waters. This cowrie, to my impression, appeared to be seasonal. It ranged in size from 1/2" to almost 2" in length. The mantle and animal are jet black in color. There are no visible papillae on the mantle.

Cypraea kieneri-Hidalgo, 1906

This cowrie shares the same area as Cyp. hirundo. It is also a rare species on Guam. It is frequently confused with Cyp. hirundo.

Cypraea labrolineata-Gaskoin, 1849

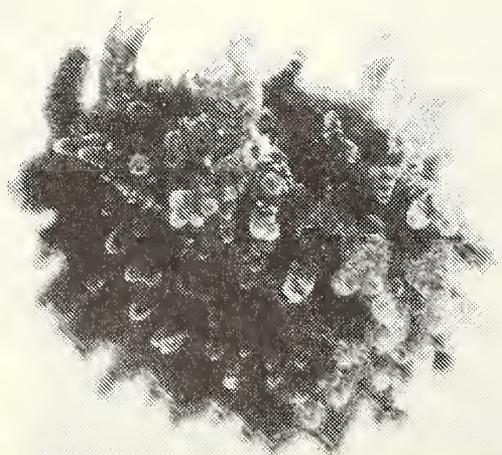
Another of the rare species, collected dead mostly, but sometimes alive. It has been collected under rocks in shallow water. It is generally about 1/2" in length.

Cypraea leviathan-Schilder and Schilder, 1937

This is the large form of Cyp. carneola. This species is rare on Guam being found on Guam only on occasion. It has been found in coral crevices in shallow and 30 ft. deep water. The size averages 2" to 2 1/2" in length. The mantle characteristics are the same as for Cyp. carneola. The two specimens I collected had a normal size (1") Cyp. carneola in the same crevice, whether it was a mate or not, I do not know. This cowrie is probably at its farthest range on Guam.

Cypraea limacina-Lamarck, 1810

This is another uncommon species on Guam even though it is moderately common in other localities. It has been found in shallow water under rocks primarily in Apra Harbor. This species displays all the typical characteristics of this shell as found elsewhere even though it is smaller in size. The size will run about 1" in length. This species has a light brown mantle with numerous large papillae resembling plant life on the underside of a rock.



Cypraea limacina

Cypraea listeri-Gray, 1824

This is not a common species on Guam compared to other localities where it is moderately common. Cate reports only a very few being collected. I do not recall any being collected while I was at Guam.

Cypraea lutea-Gmelin, 1791

A species that is uncommon in Guamanian waters. This is fairly consistent with its findings elsewhere. The few that have been collected have been collected in shallow water.

Cypraea lynx-Linne', 1758

A very common species being among the more popular species. It is found in shallow water under rocks and coral heads. They can be found singly or in colonies numbering up to 20 specimens. The size ranges from about 1" to 1 1/2" on the average. The mantle is primarily black with white spots. There are visible papillae on the mantle.

Cypraea maculifera-Schilder, 1932

Another member of the Arabica family. This species is the most common of this family on Guam. It is found on almost all of the fringing reefs in the coral crevices and holes. It prefers highly oxygenated water. It ranges in size from 1" to 2" making it smaller than the average size found in Hawaii. The mantle is a dull grey-black with minute papillae present.

↑ Cypraea maculiferaCypraea mappa →Cypraea mappa-Linne', 1758

This species is probably the most popular of all the cowries on Guam to collect. They are not common on the island except in Apra Harbor where they might be classified as common. There are two distinct sub-species on Guam divided by their respective sizes. That specimens that are under 2" in length are considered dwarf forms. The dwarf forms are completely mature in all aspects although they appear to be narrower than the regular form. The specimens that are over 2" in length are considered normal for the species. Cyp. mappa with the pink base are also found. They are found under rocks and in rocky crevices in shallow and moderately deep water (35ft.). This is different from other localities in the Indo-Pacific area. Their mantle is a reddish-brown with minute papillae.

Cypraea margarita-Dillwyn, 1817

This is another uncommon species but probably the most common one out of the Pustularia family found on Guam. I believe the ones that were found were in deep water down to 30 ft. deep and under rocks in the small holes and crevices. They average about 3/4" in length.

Cypraea mariae-Schilder, 1927

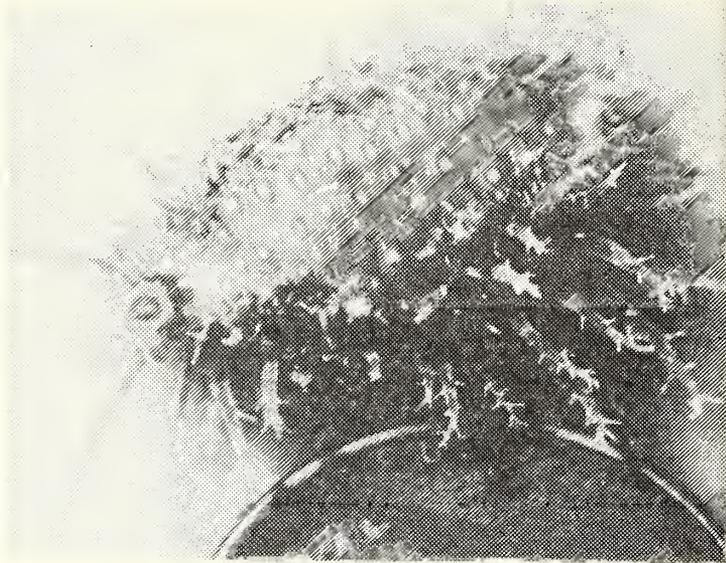
A very uncommon species that is collected dead more often than it is collected alive. It has been found in shallow and deep water. The size is about 1/2" in length. They appear to be smaller than the specimens from the Philippine Islands.

Cypraea mauritiana-Linne', 1758

A very common species if looked for in the right places. They like to live in very deep crevices and holes and also under large boulders. They prefer highly oxygenated water so they will generally at the high tide mark and sometimes in the inter-tidal zone. They are strictly nocturnal so collecting them can be hazardous and should be done with much caution. They average in size from 2" to 4" in length. Their mantle is dull black in color with minute papillae.



↑ Cypraea mauritiana and C. ventriculus
Cypraea nucleus →

Cypraea minoridans-Melvill, 1901

This is an uncommon species on Guam being closely allied to Cyp. fimbriata. It is found in shallow and deep water under rocks. It averages about 1/2" in length. It is differentiated from Cyp. fimbriata by the narrower aperture.

Cypraea moneta-Linne', 1758

This species is probably the most common cowrie on Guam. It is found on all of the island's reefs in the holes and crevices of the reef. It is also found under and around rocks in the quieter part of the bays. There are a couple of different forms, one form having a slight gold ring and another form may be extremely knobby around the base. They average in size from 1/2" to 1 1/2" in length. They have a mantle with alternating thin black and white stripes. There are no visible papillae.

Cypraea nucleus-Linne', 1758

An uncommon species on Guam. It is found in shallow water under rocks. It averages about 3/4" in length. The mantle is a faded yellow color with large papillae making it look like a piece of plant growth.

Cypraea onyx-Linne', 1758

A very uncommon species with only one or two being found on Guam in shallow water. This varies quite a bit from the Philippine Islands where it is reasonably common.

Cypraea ovum-Gmelin, 1791

Another very rare species on Guam. It is found under rocks in shallow water. This and the previous species are probably at their most extreme range here on Guam.

Cypraea poraria Linne', 1758

This is an uncommon species on Guam. It is found in shallow water on the edge of the fringing reef. It likes to hide under rocks and in small clumps of small coral growth. It is strictly nocturnal, not being found at all during the daytime. It is generally about ½" and a little larger in length. The mantle is light pink in color with many moderate sized papillae.

Cypraea punctata-Linne', 1758

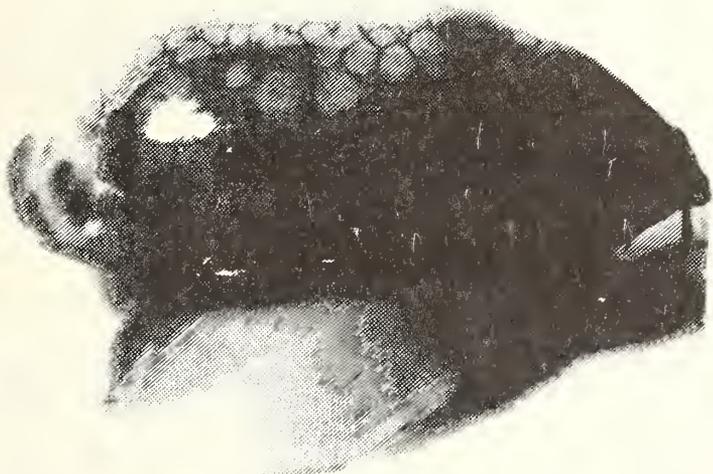
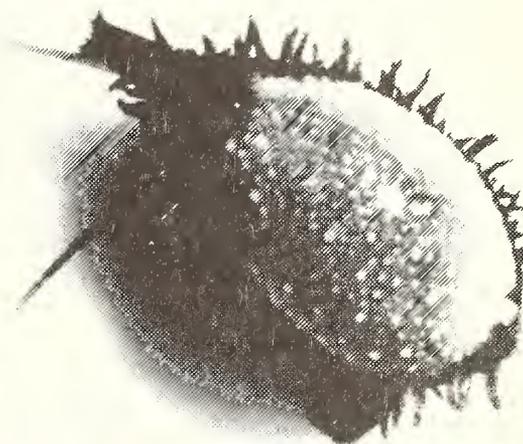
Another of the uncommon species. It is found under rocks in shallow to 30 ft. deep water. The brown spots are very prominently marked on the dorsal surface of this species.

Cypraea raysummersi-Schilder, 1960

This species may be confused with Cyp. hammondae. See the notes under Cyp. hammondae.

Cypraea scurra-Gmelin, 1791

This member of the Arabica family is the rarest one found on Guam. It is found in deep water under rocks. It averages about 1 1/2" in length. The mantle is also a dull grey-black color with papillae.

Cypraea scurraCypraea staphyleaCypraea staphylea-Linne', 1758

This species is the most common of the "bumpy" surface cowries. It is found under rocks in shallow water. It averages about 3/4" in length. The mantle is jet black with many papillae.

Cypraea stolidia-Linne', 1758

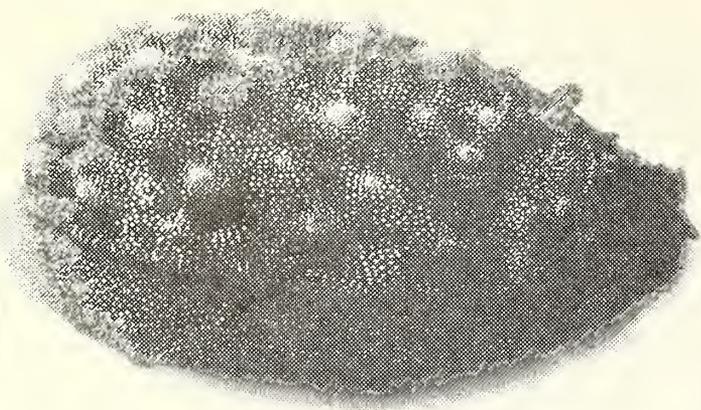
This species is not quite uncommon but it requires some diligent searching to locate it. It can be found in shallow water to down water 30 ft. deep. It likes to hide under piles under of coral rubble. The average size is about 1" in size. The mantle has slight yellow color.

Cypraea talpa-Linne', 1758

This is an uncommon species as it is elsewhere. It is found under rocks and coral heads in shallow water. It averages about 1 1/2" to 2 1/2" in length. The mantle is a mossy green in color with large, blunt papillae. When the mantle is out, it looks like a piece of moss.

Cypraea teres-Gmelin, 1791

A common species on Guam but not as common as elsewhere in the Indo-Pacific basin. It lives in rocky areas adjacent to fire coral in shallow water. It is generally about 1 1/2" in length or smaller.



Cypraea talpa



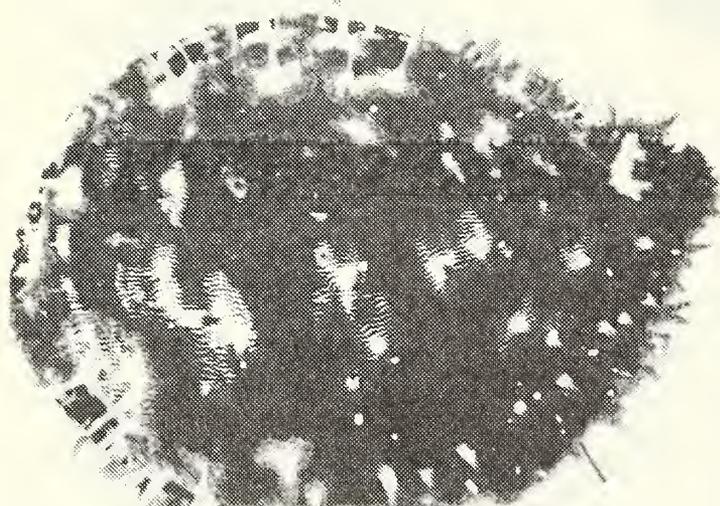
Cypraea testudinaria

Cypraea testudinaria-Linne', 1758

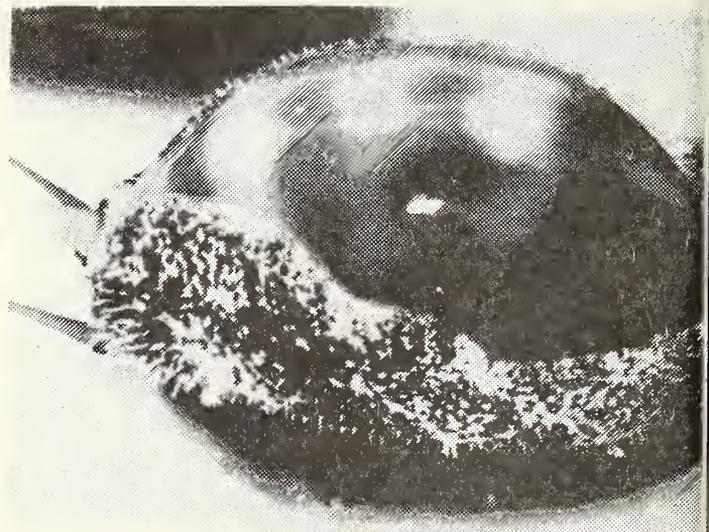
An uncommon species consistent with its findings elsewhere. It is found in shallow and deep water under rocks and coral ledges and pockets. The size is about 3 1/2" in length. The mantle is light brown with small papillae.

Cypraea tigris-Linne' 1758

This is a common species on Guam. It appears to be more common elsewhere in the Indo-Pacific area. Cate reports the ones on Guam as being related to the Hawaiian form. They will be found under rocks and in staghorn coral in shallow to deep water. They will be found in pairs quite often. It will range in size from 2 1/2" to almost 4". The mantle is a light grey with numerous small papillae that are very short for the size of the shell.



Cypraea tigris



Cypraea ventriculus

Cypraea ventriculus-Lamarck, 1810

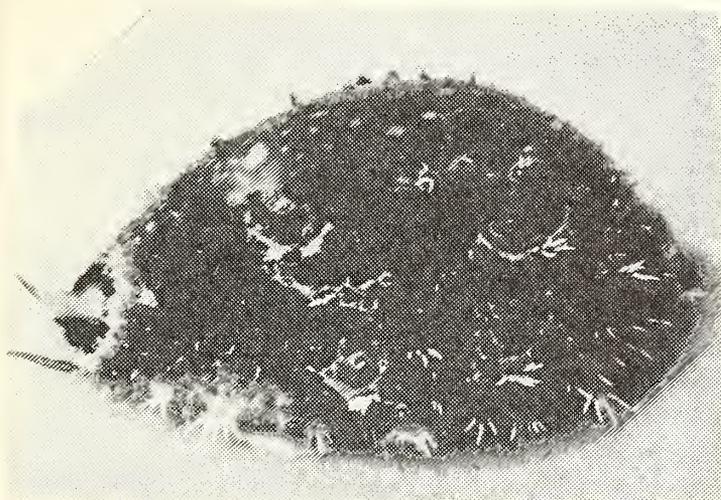
A common cowrie, but again extremely hazardous to look for. It lives in deep coral crevices and holes right at the surf line. It can be located quite easily by its very carnelian dorsal surface. It reaches a size of around 2" making it generally larger than the ones found elsewhere. The mantle is black with multiple minute white spots.

Cypraea vitellus-Linne', 1758

This is a common species on Guam being found in shallow to deep water. It lives under rocks and in coral pockets. It has a very variable size range from 3/4" to 3" in length. The brown color of the dorsal surface will be a light brown to a very deep brown. The mantle is a grey color.

Cypraea ziczac-Linne', 1758

Another rare species on Guam. Probably about 25 specimens have been collected. It is found in shallow to deep water.

Cypraea vitellusCypraea zic-zac

In conclusion, Guam has a quite a number of cowries found along a coastline of about 72 miles. Many of them are in the uncommon to rare status. This is probably due to its distance from other land masses. There are forms representative of Hawaiian and Okinawan-Philippine forms. This can be attributable to the many ocean currents that come by Guam.

I collected on Guam for about 3 years in which time I collected 35 of the 59 species listed here. It would take a person about five to seven years to collect about 95% of the specimens listed using proper collecting methods and acquired knowledge.

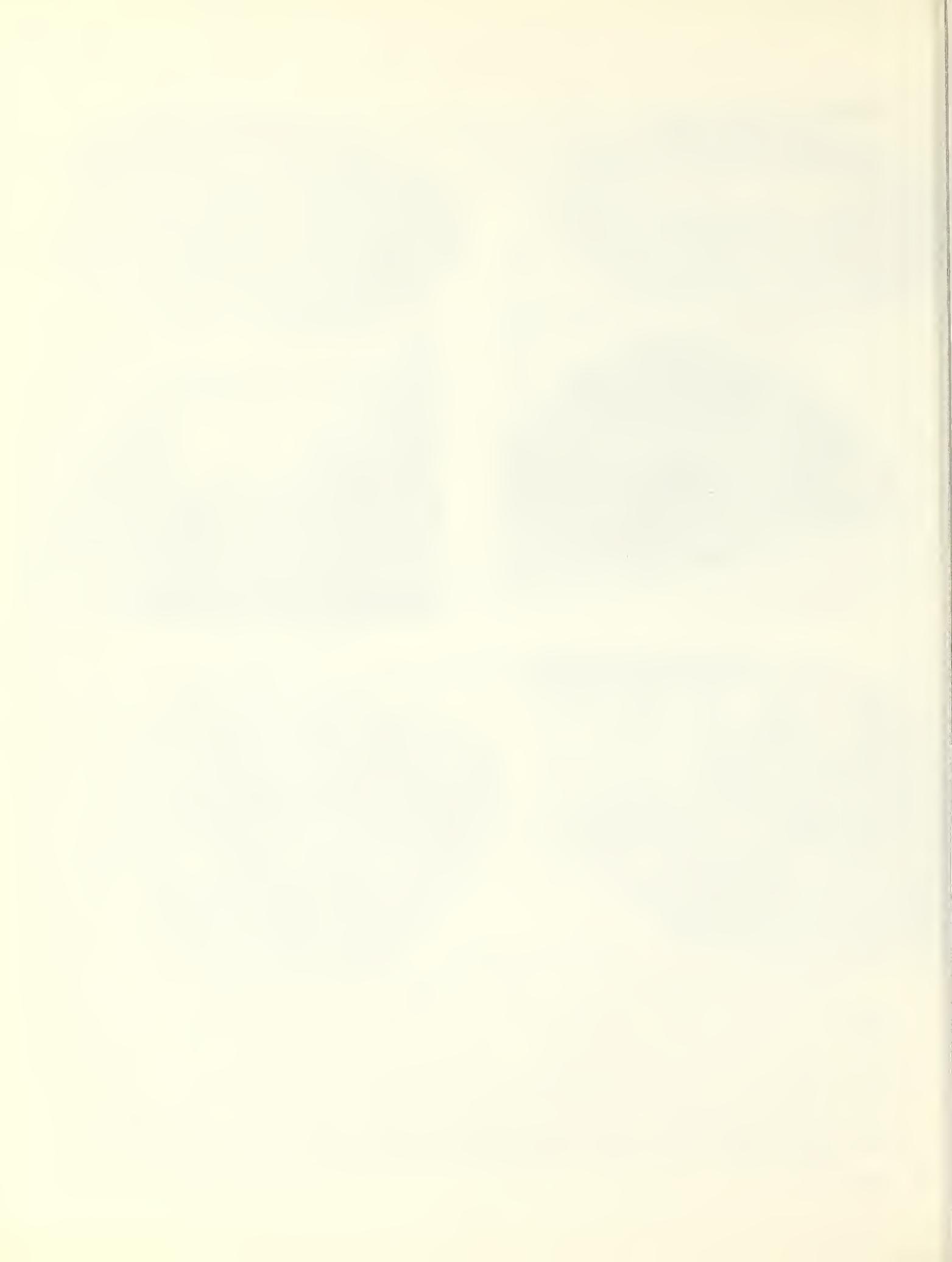
FROM THE MINUTES

The speaker for the evening was Dr. George Radwin who spoke on A Review of the Genus Muricopsis. This was a talk originally given at the WSM meeting this year. (A summary of his presentation will appear in the September issue of the Festivus.)

The Fall party will be on the 21 of September at the Mulliner's home. The theme will be the Four Corners of the World. (All help cheerfully accepted.)

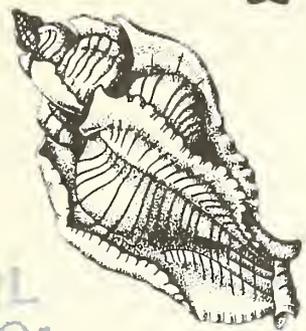
It was announced that the Santa Barbara Shell Show and Auction will be held on August 24 and 25, 1974 at Santa Barbara Junior High School.

Following a brief business meeting, Rhoda Radwin won the shell drawing.



THE

FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Richard Schwarz
Vice President: Don Pisor
Recording Secretary: Helen Robilliard
Corresponding Secretary: Anne Schwarz
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

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Moll.

Annual Dues: Single membership \$3.00; Family membership \$4.00; Corresponding membership \$2.50; Overseas surface \$3.50; Student membership \$2.00.
Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

Vol. V September 1974 No. 9

* COME TO THE PARTY!!!! The theme is the Four Corners of the World. The *
* date is Sept. 21, 1974. The party begins at 6P.M. at the Mulliner's home. *
* Come in costume. (You have the whole world to choose from.) For details *
* and map see last page of this issue. *
* * * * *

* The Club Christmas party will be on Saturday, Dec. 21, 1974 at the *
* Officers Club at Miramar. (New location this year) Details later. *
* * * * *

FROM THE MINUTES

Clifford and Clifton Martin showed slides of South African shells and had with them many of the beautiful shells from their collection. (An article on their talk will appear in a future issue. Eo.)
The treasury now has \$500.00.
Christmas party plans were discussed. It will be held at the Miramar Officers Club Sat. Dec. 21. No host cocktails start at 6 P.M. and dinner (a delicious 10 oz. prime rib) will start at 7 P.M. Dinner costs only \$5.85.
A sign-up list for tables, chairs, entertainment and food was passed for the September party.
The shell drawing was won by Mary Markowski.

New Members

- | | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| BRADNER, Hugh and Marge
2612 Torrey Pines
La Jolla, Ca. 92037
453-6511 | SEAY, James and Eunice
3290 San Carlos Dr.
Spring Valley, Ca. 92077 | CHANGE OF ADDRESS |
| Burch, Beatrice (Mrs. Thomas)
236 Kuuhoa Place
Kailua, Oahu
Hawaiian Is. 96734 | VOSO, Mr. and Mrs. Edward
Terrace Mobile Homes #134
1815 Sweetwater Rd.
Spring Valley, Ca. 92077 | HAIGH, Ernest s.
5381 La Verne Circle
Westminster, Ca.
92683 |

A Review of the Genus Muricopsis (Muricidae; Muricacea)

George E. Radwin

(Excerpt from a talk given to the San Diego Shell Club)

The genus Muricopsis, the type genus of the muricid subfamily Muricopsinae, has seventeen species presently assigned to it and a worldwide distribution. It may be distinguished from other muricopsine genera by the strongly denticulate nature of the inner surface of the ovate or lenticular aperture and the pustulose inner apertural lip. In addition, the protoconch generally consists of one or two sharply tabulate whorls, in some instances with the whorl-angulation marked by a spiral ridge; in a few cases the protoconch may be more or less typically muricoid, consisting of one to two and one-half convex whorls.

The radular dentition is muricopsine, consisting of many transverse, three-across rows of teeth, each with a single rachidian tooth, flanked on each side by a single sickle-shaped lateral tooth. As in other muricopsine genera the rachidian resembles that of many ocenebrine forms but differs in a) the depth of the tooth - greater in the Muricopsinae, b) the general lack of denticles between each lateral cusp and the adjacent base-end, c) the presence of a single point at the lower corners of the base, instead of the pair of points seen in ocenebrine dentitions, and d) the independence of the intermediate cusps relative to the laterals, rather than appended to or coalescent with the lateral cusps, as in most ocenebrine dentitions. The radular dentition in this genus shows the most clear-cut muricopsine features in that denticulation, occasionally present in the dentition of some of the species of Favartia and Murexiella, is rarely, if ever, exhibited in Muricopsis.

The species herein assigned to Muricopsis seem to be derived from two or three lines that are so closely related that they could not be separated, at the present time, at any but a subgeneric level or below. The species, grouped geographically are: *

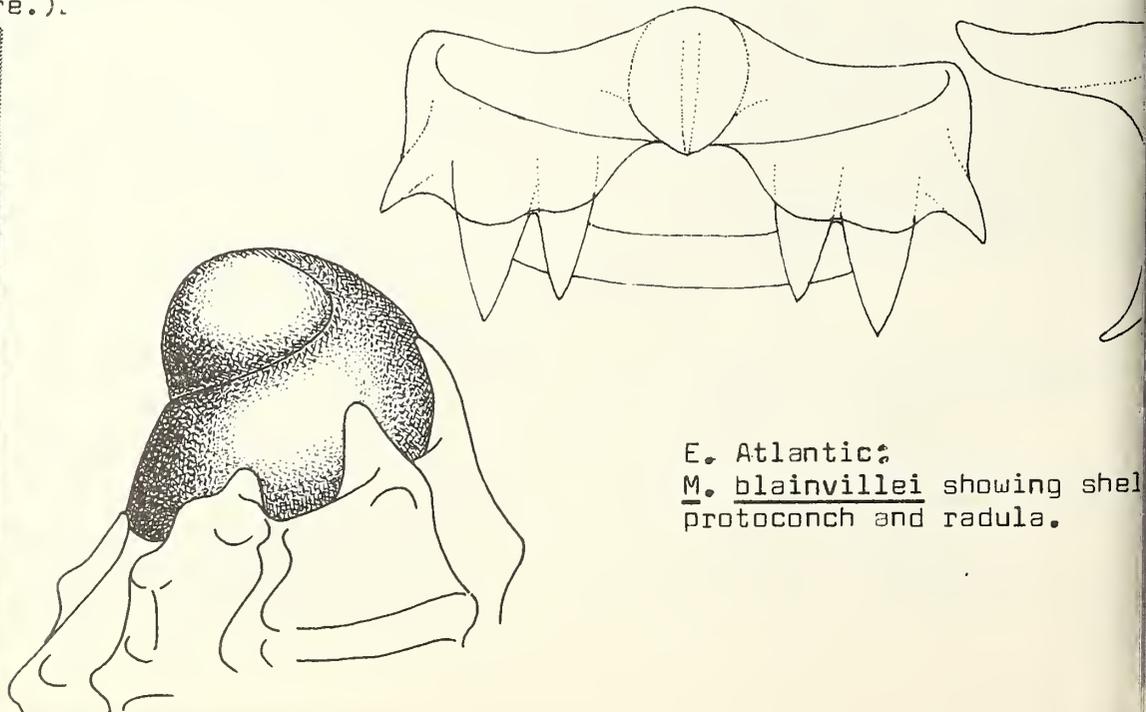
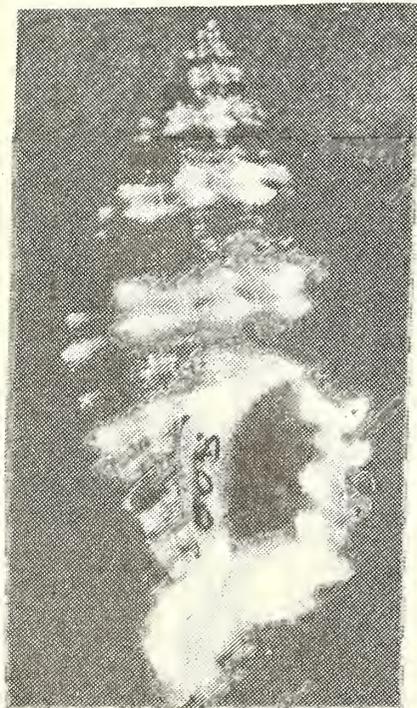
W. ATLANTIC: oxytatus M. Smith, nicocheanus Pilsbry.

E. PACIFIC; armatus A. Adams, jaliscoensis Radwin & D'Attilio, A. Adams, zeteki Hertlein & Strong, pauillus A. Adams.

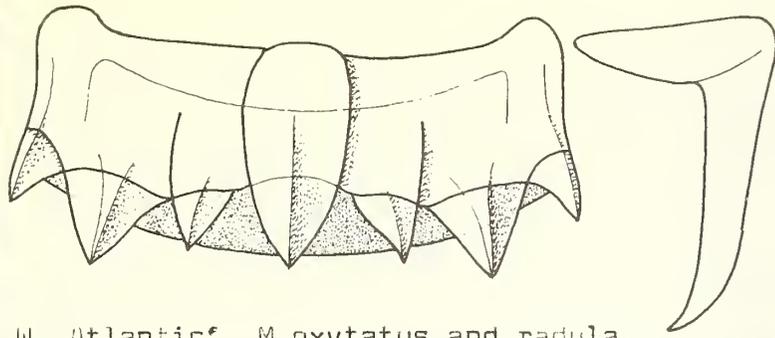
INDO-WEST PACIFIC: bombayanus Melvill, cuspidatus Sowerby, brazieri Angas.

E. ATLANTIC; blainvillei Payrandaou, crustatus Brocchi, and angolensis Odhner.

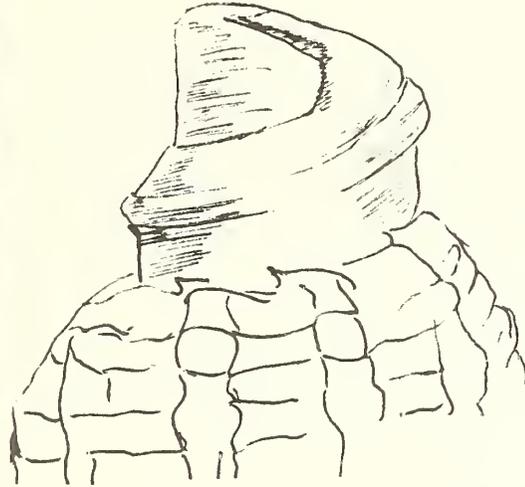
* (Dr. Radwin has stated that several other species will be assigned to Muricopsis but that the details will be forthcoming in a scientific publication and so are not included here.).



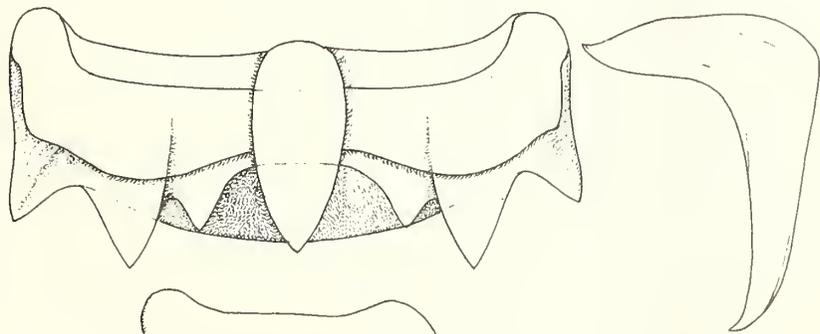
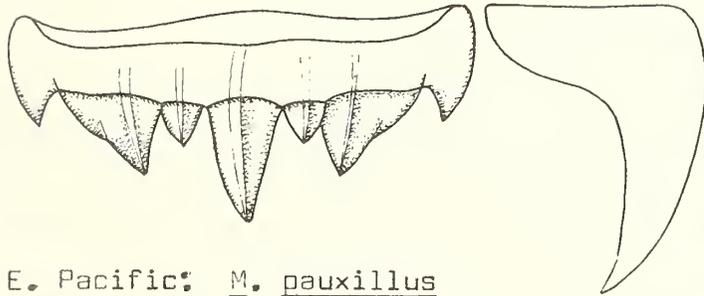
E. Atlantic;
M. blainvillei showing shell
protoconch and radula.



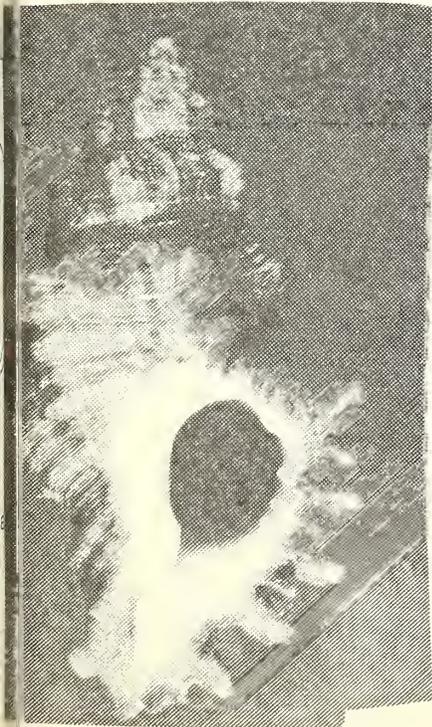
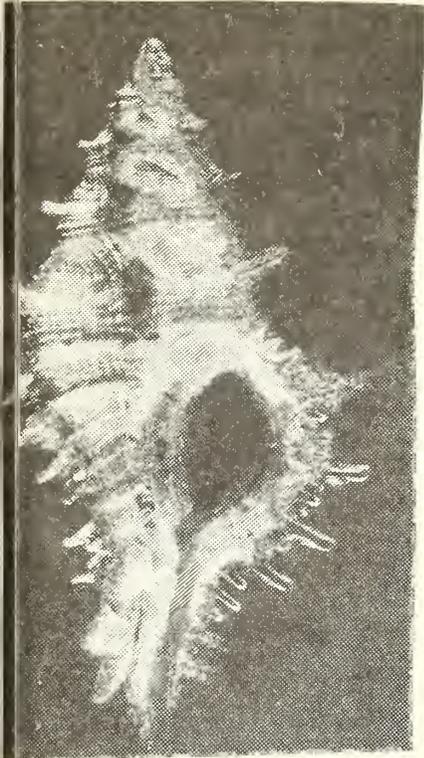
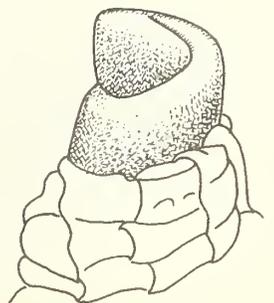
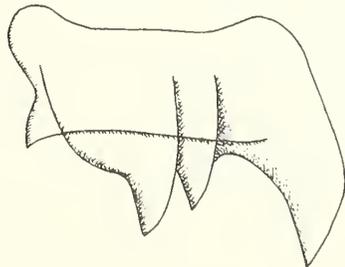
W. Atlantic: M. oxytatus and radula.

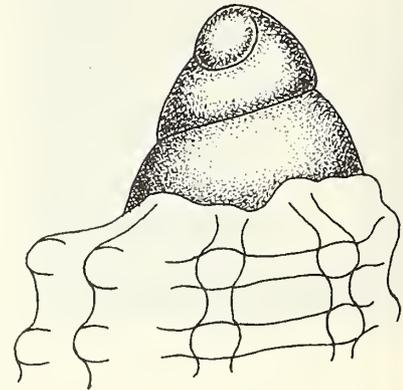
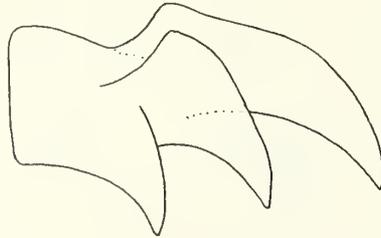
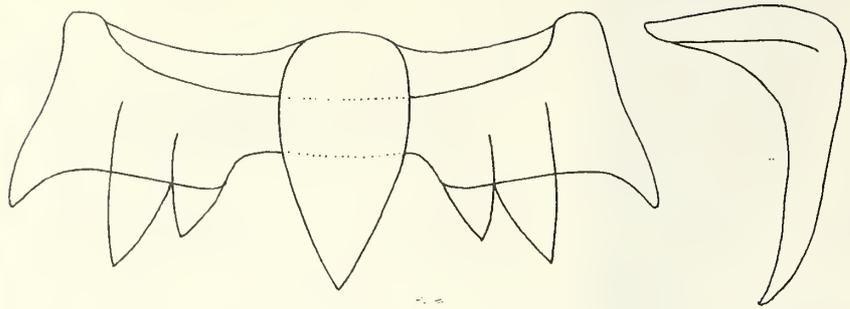


E. Pacific: M. pauxillus
with protoconch and radula



E. Pacific: M. jaliscoensis
with protoconch and radula





E. Pacific: M. zeteki with radula and protoconch

Drawings are by Anthony D'Attilio.
Original photos by George Radwin.

THOMAS NUTTALL, 1786-1859,
HIS CONTRIBUTIONS TO THE NATURAL SCIENCES

by Clifton L. Martin

Although the name of Thomas Nuttall is familiar to everyone who is interested in the molluscan fauna of the Pacific Coast, not all of us are aware that his major contributions to the biological sciences were in fields other than conchology and malacology. Although he had a passionate interest in all aspects and manifestations of nature his primary interests were in the fields of botany and ornithology.

Thomas Nuttall was born in Settle, Yorkshire, England, January 5th, 1786. In his youth he learned the printing trade in the shop of his uncle in Liverpool. It was here that a large part of his spare time was spent in the study of all subjects pertaining to the biological sciences. It was here too that his interest in the natural sciences became such an obsession that he decided to devote his life to it. In 1808, at the age of twenty-two, he left England and emigrated to America. It is known that before moving to Philadelphia he had acquired a considerable knowledge of mineralogy, an interest he maintained throughout his life. It was in Philadelphia that Benjamin Smith Barton, the Philadelphia naturalist, introduced him to the study of botany. This was to become his life work. His deep interest in the native flora of the eastern United States took him on collecting trips from Delaware and New Jersey to Virginia and North Carolina, and eventually to Florida and the Mississippi valley.

In 1809-11 he, together with John Bradbury, the Scotch naturalist, accompanied the Astor expedition up the Missouri River. This expedition was under the leadership of the famous frontiersman, Wilson Hunt. They got as far as the Arikari villages which were somewhat south of the Mandan villages. These two naturalists were the first trained scientists ever to enter the American far west. The seemingly endless array of unknown plants kept Nuttall in such a state of excited interest that he was frequently informed by the voyageurs of the party that he was not only endangering his own life but also Mr. Astor's money when he strayed so far from the party in search of specimens. But in such a paradise danger or the possibility of disaster did not exist for Nuttall, there was only the flora that no trained botanist had ever seen before. So the voyageurs cursed him, decided that he was touched and tried to keep an eye on him. He made the return trip downstream with Manuel Lisa, who had raced Hunt up the river under a cloud of unjustified suspicions.

In 1818-20 he accompanied another expedition beyond the frontier, this time to the southwest. He traveled along the Arkansas and Red Rivers from Arkansas to Louisiana and the land of the Osages. All of these expeditions provided the necessary training to qualify him for the greatest one of his career, a journey across the continent to Oregon and the Columbia River area. This was not to occur until 1834-1835.

In 1813 he was made a member of the Linnaean Society of London, and four years later he was elected to memberships in both the American Philosophical Society and the Philadelphia Academy of Natural Sciences. In 1822 he was appointed curator of the Harvard University Botanical Garden and held the title of Lecturer on Botany and Zoology. For the next ten years he gave lectures and carried on researches in the cultivation of rare plants. His resignation from this position came at the age of forty-eight, as a result of his decision to join the Wyeth Expedition to Oregon.

It was during his tenure at Harvard that his reputation as one of America's foremost ornithologists was established. The works of Wilson and Audubon had already been published but to these Nuttall added his 'Manual of the Ornithology of the United States and Canada' in 1832, and his paper, 'Remarks and Inquiries concerning the Birds of Massachusetts,' in 1833. His authority in the field was immediately recognized and the first ornithological club founded in America was named in his honor. Among his more important contributions to botany during his stay at Harvard were, 'The Genera of North American Plants, and a Catalogue of the Species,' to the year 1817, which was published in 1818 and for which he set most of the type; a continuation of F. A. Michx's 'The North American Sylva' (vols. IV to VI, 1842-1849); 'An Introduction to Systematic and Physiological Botany' (1827); and several articles pertaining to plants which were published in the Journal of the Philadelphia Academy of Natural Sciences, the Transactions of the American Philosophical Society, and Stillman's 'American Journal of Science'. He also published papers on mineralogy and paleontology and in 1821 he published his 'A Journal of Travels into the Arkansas Territory, during the year 1819,' with detailed notes pertaining to meteorological observations and the history of various Indian tribes within the area covered.

Nathaniel C. Wyeth, who had headed a previous expedition to the far West and had generously collected plant specimens for Nuttall, was planning another trip. This time to go all the way to Oregon and the mouth of the Columbia River. It must be remembered that at this time, 1834, most of America west of the Mississippi River was as yet unchartered, although the Lewis and Clark Expedition had been made earlier in the century and Zebulon Pike and others had explored parts of it. Tales were constantly coming back to the States, sent by those undaunted trailblazers the fur trappers, about the unlimited opportunities for wealth to be had there. Besides those expeditions sent out by the fur trade other people were becoming interested in the lands of the west. Most of these were interested in the settlement of farming communities but expeditions containing qualified personnel had to explore and report on conditions found in the many locations before final decisions were made. To miss an opportunity to accompany an expedition such as that being planned by Nathaniel Wyeth was unthinkable to Nuttall. He resigned his appointment at Harvard and joined the Wyeth Expedition. He also persuaded a colleague and friend, John Kirk Townsend, a young Philadelphia physician but who was better known as an ornithologist, to join the expedition. Townsend, who was then twenty-five years of age, got himself appointed as the representative to both the Academy of Natural Sciences of Philadelphia and the American Philosophical Society. On the forthcoming trip he was to serve them, as well as American science, art, and literature well. On his return he was to publish one of the most important chronicles of the time and which even today is of great importance to historians. (Narrative of a Journey Across the Rocky Mountains. The 1839 edition of which is very rare.)

Although the Lewis and Clark Expedition had brought back a considerable amount of material and information pertaining to the flora and fauna of the American Far West it had not been accompanied by a trained naturalist. Nuttall and Townsend were the first of this special breed of men ever to make such a journey. Theirs were the first efforts ever made to add exact observation and classification to the knowledge that had been accumulated by the mountain men. A man almost fifty years old and another about half his age, these two were to lay the groundwork for a scientific study of the West has continued to the present.

Nuttall and Townsend arrived in St. Louis on March 24, 1834, where they met Wyeth and had him help them get outfitted with buckskins, blanket capotes, and the hard wool hat that was the progenitor of the Stetson worn by cowboys. Five days later they started to hike across Missouri just to see the country and to condition themselves for the forthcoming trip. They were delighted with everything they saw, frontiersmen, birds, plants, and the countless manifestations of nature that were to be seen everywhere. They had gotten only as far as Boonville, twelve days out, when they again met Wyeth who was aboard a steamboat coming up the Missouri River. They also boarded her and on April 14th arrived in the rowdy frontier town of Independence, which had been designated as the starting place for the expedition.

At Independence they had two weeks of preparation before the long journey was to begin. Other members of the party had not arrived yet and horses and mules had to be procured. These two weeks were

greatly enjoyed by Nuttall and Townsend who devoted much of their time to riding about the prairie, getting accustomed to camp life, and studying the habits of the frontier. Not all was well however, since at that time a cloud of apprehension hung over the settlement. During the previous winter the inhabitants had driven out a religious sect who had settled there because of a manifestation from God that Judgment Day was certain to arrive within the next two years and when that inexorable event occurred the perfect society of Heaven would be administered from Independence. The 'Mormonites', as Townsend called them, had been driven out of Jackson County into the unsettled lands of Clay County. There were rumors that they were preparing to descend on their Zion and put the heretics to the sword. Actually, back in Ohio Joseph Smith, who was known for his militant attitude, had raised a small force of believers and was marching on Independence. This expedition did not reach its goal however since it was nullified by an outbreak of cholera.

The Wyeth Expedition left Independence on April 28th and contained about fifty men and 140 horses and mules. This did not include men and animals that were traveling independently with them for protection. Among this latter group was a Christian missionary, Jason Lee, who was a large, voluble, and hard-working man. He was going to Oregon to establish a mission and redeem the souls of the Indians. During the course of the journey he proved himself in many ways, volunteering for even the most tedious tasks. However, he was completely dismayed at the untamed trappers in the Wyeth party and wrote in his diary that they were 'complete infidels and had no thought for the damnation awaiting them'. He was also shocked at Wyeth's custom of occasionally issuing a ration of alcohol to his crew since they naturally got drunk on it. He was also greatly perturbed by the Wyeth decision to keep the expedition moving on the sabbath. Jason Lee was probably the first prohibitionist to reach Oregon.

It appears that Nuttall and Townsend were also unconcerned about any future divine reckoning. For them paradise was right here and they were encountering new species every day. Since Townsend was also an ornithologist Nuttall devoted all of his time to botany, filling his bag with plant specimens by day and sketching and annotating them by the evening fire. Townsend was likewise busy and on the way to Laramie Fork he wrote, 'I think I never before saw so great a variety of birds within the same space.' The collections he and Nuttall made suffered mischance and damage during the next two years but eventually got safely to the States. Some of Townsend's specimens were used in the last part of Audubon's 'Birds', some of his notes got into the 'Ornithological Biography', and many of the Western plates in the 'Quadrupeds' were prepared from his specimens and drawings. With Nuttall the results were similar. Knowledge of American botany was vastly and permanently enlarged because of his work on this expedition.

The Wyeth Expedition reached its destination September 16th, 1834. The journey had taken almost five months but had been the most rewarding period in the lives of the two scientists. They had finally arrived at Fort Vancouver, capital of the Hudson's Bay Company, a few miles up the Columbia River from the mouth of the Willamette. It was here that the missionary, Jason Lee, set up his mission. It was here too that Townsend signed on with Dr. John McLoughlin, whose name to many was synonymous with the Hudson's Bay Company. Townsend's new position was not as an ornithologist however, but as a surgeon. He began collecting anthropological specimens. Nuttall also remained here for awhile, resting from the journey and enjoying the flora of the area. Finally an opportunity came for him to board a ship enroute to the Sandwich Islands (Hawaii) which he eagerly accepted.

Toward the end of April, 1836, another Harvard man and a friend of Nuttall was in San Diego aboard the Alert. He was on his way home to Boston and his name was Richard Henry Dana. Two years before he had rounded the Horn aboard another ship, the Pilgrim, on its way to California. Now he was going home and would write a great book about the experiences he encountered on that voyage (Two Years Before the Mast). He was both pleased and surprised to see the Pilgrim drop anchor in San Diego a few days after the arrival of the Alert. He would have a final opportunity to visit with his old shipmates before sailing for Boston. One of the Pilgrim's mates told Dana the Pilgrim had brought down from Monterey 'a sort of oldish man who came from Dana's college and spent all of his time picking up flowers and shells and such truck and packing them in barrels.' Although Dana was quite curious as to the identity of the Harvard man he could not imagine who it could be. Then he saw an old gentleman with graying hair, 'in a sailor's peajacket, with a wide straw hat, and barefoot, with his trousers rolled up to his knees picking up stones and shells'. Dana recognized Nuttall immediately and in his own words, 'would hardly have been more surprised to have seen the old South Steeple shoot up from the hide house'. The two friends greeted each other and Nuttall informed Dana that he had only recently returned from the Sandwich Islands. For Nuttall another journey was coming to an end, he took passage on the Alert to Boston.

These were somewhat trying times for a citizen of the United States to be in California. Many of them had been beaten and robbed and a few had been murdered yet the local courts would refuse to prosecute. On one occasion a group of mountain men, together with a few other Americans and British in the vicinity, had taken over the town and the courts in Los Angeles to get justice for a murder. The alcalde had refused to take action so the mountain men held a trial for the accused who was found guilty and summarily shot. The local officials were then told that there had better be no incriminations or retaliations or there would be further 'justice' dispensed. With indignation on both sides running quite high it is natural that relationships between the citizens of the two countries were somewhat less than cordial.

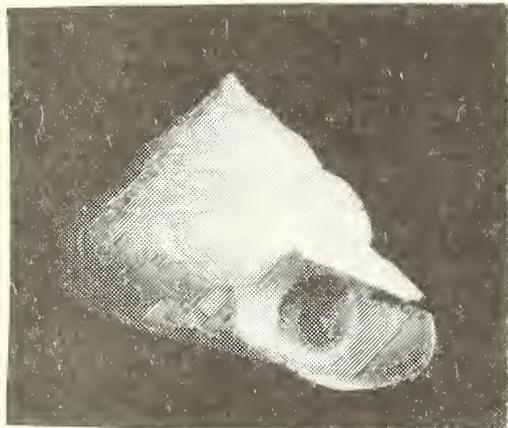
In 1842 Nuttall received word that he had been bequeathed his uncle's estate, "Nutgrove", near Liverpool, England. To this estate he retired for nine months of each year. After returning to Philadelphia for the final time in 1847-1848 he settled on his estate and died there September 10th, 1859, at the age of seventy-three.

Among molluscan names honoring Thomas Nuttall are the following: AMPHINEURA. Genus Nuttallina Dall, 1871. (Type; Acanthopleura fluxa Carpenter, 1864.); genus Nuttallochiton Plate, 1899. (Type; Schizochiton hyadesi Rochebrune, 1889.); Cyanoplax hartwegii nuttalli (Carpenter, 1865). PELECYPODA. Subgenus Nuttallia Dall, 1899. (Type; Sanguinolaria nuttalli Conrad, 1837.); Lucinisca nuttalli (Conrad, 1837); Mytilimeria nuttalli Conrad, 1837; Saxidomus nuttalli Conrad, 1837; Sanguinolaria nuttalli Conrad, 1837; Tresus nuttalli (Conrad, 1837). GASTROPODA. Ceratostoma nuttalli (Conrad, 1837).

THE DEEP-WATER MOLLUSKS OF SOUTHERN AFRICA

by Clifton L. Martin

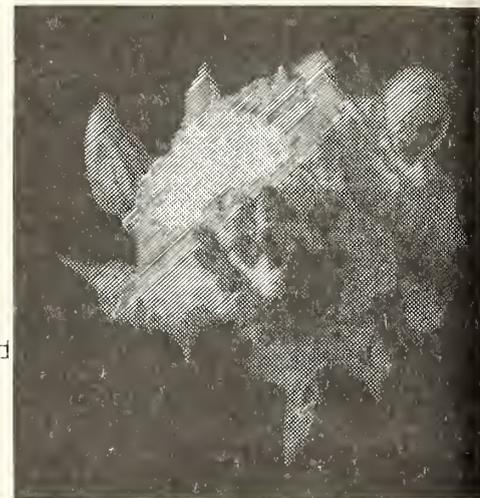
The areas covered in this paper are the subtidal and off-shore waters of both coasts of southern Africa south of the twentieth parallel. The waters of this region are among the richest in molluscan fauna of any in the world. This is due to the normal oceanic currents which flow southward along both coasts of southern Africa bringing the warm waters of the tropics into the area. Although a few of the species discussed in this report may occasionally be found in the littoral zone they are all species which are normally collected either by diving or by dredging or trawling. Some of the deep-water species are often collected in depths exceeding 100 fathoms. Many species from this area have been trawled in depths of more than 1,500 fathoms but these are of such rarity that they are not likely to find their way into the cabinet of a private collector and will not be discussed here.



Pleurotomaria africana Tomlin, 1948
Diameter, 108 mm. Trawled off Durban, Natal,
South Africa, in 225 fathoms.



Conus visagenus Kilburn, 1974
Height, 33mm. Off the coast
of Natal, South Africa. Trawled
in 280 fathoms.



Xenophora pallidula (Reeve, 1841)
Off the north coast of Natal,
South Africa in 175 to 180 fathoms.
This unusual specimen has both
Festilyria queketti and Voluto-
corbis gilchristi accreted to
its surface.

To the average collector the shells of this region are probably less known than are shells from any other area of the world, with the possible exception of those from the west coast of South America south of the equator. Anyone who has exchanged shells extensively with collectors in southern Africa will know what a frustrating experience it can be. It can also be very rewarding and challenging since almost every parcel received will contain one or more species which cannot be identified by the available literature. The few books that have been published do not adequately cover the molluscan fauna of this area and have been quite persistent in the use of invalid names. Even those published since 1960 often use such names as Fusus, Nassa, and Tritonalia even though these names had been invalid for many years at the time of publication. In Contributions to the Knowledge of South African Marine Mollusca, by K. H. Barnard, 1958-1963, all of these names are used. He also listed a large number of dissimilar turrid species under genus Drillia although it is apparent they may belong to several genera. The three volumes of the 'Contributions' are also inadequately illustrated. Unfortunately, the latest book from that area, Seashells of Southern Africa, by Brian Kensley, also uses several invalid names.

In recent years, beginning with the publication of Deep Sea Mollusca From West of Cape Point, South Africa, by K. H. Barnard, *Annals of the South African Museum*, vol. XLVI, part XVII, April 1963, an impressive and growing number of new molluscan species from the waters of southern Africa have been described. In this publication by Barnard a total of twenty-three new species were described and seven other un-named species were discussed but not named. All of these new species were trawled by the research vessel, *Africana II*, in depths of 600 to 1,760 fathoms and were obtained by Dr. F. H. Talbot of the South African Museum.

Since 1963 an increasing number of important papers pertaining to new species of mollusks from off southern Africa have been published. Clifton S. Weaver, in *The Veliger*, vol. 10 (4), 1968, published his description of *Festilyria duponti*. This was followed by *Volutocorbis* and *Fusivoluta*, Two Genera of Deepwater Volutidae from South Africa, by Dr. Harald Rehder, *The Veliger*, vol. 11 (3), 1969, in which four new volutes were described. These are *Fusivoluta barnardi*, *Fusivoluta clarkei*, *Volutocorbis boswellae*, and *Volutocorbis disparilis*. In 1972 Dr. Rehder published another paper in *The Veliger*, vol. 15 (1), in which *Volutocorbis mozambicana* was described and another un-named species of volute was discussed but not named. In *The Nautilus*, vol. 88 (2), April 1974, are two more papers describing three new species of *Volutocorbis*. The first paper is by Rehder and Weaver and contains the description of *Volutocorbis semirugata*. The second paper is by Rehder and has the descriptions of *Volutocorbis nana* and *Volutocorbis kilburni*. All three of these species are from off the coast of Natal, South Africa.



Fusivoluta clarkei Rehder, 1969
Height, 112 mm. Off the coast of Natal, South Africa.
Trawled, depth unknown.



Fusivoluta barnardi Rehder, 1969
Height, 133 mm. Trawled off Durban, Natal
in 70 to 100 fathoms.

In addition to the papers mentioned above several important papers describing new species of mollusks have been published in South Africa. Most of these were written by R. N. Kilburn of the Natal Museum, Pietermaritzburg. These papers were published in the *Durban Museum Novitates* and in the *Annals of the Natal Museum*. Among the new species described by Kilburn are *Babylonia pintado*, 1971; *Columbarium eastwoodae*, 1971; *Volutocorbis glabrata*, 1971; *Benthovoluta krigei*, 1971; *Cypraea cruickshanki*, 1972; *Nassarius fenwicki*, 1972; *Demoulia ventricosa nataliae*, 1972; *Vexillum rhodarium*, 1972; *Conus lohri*, 1972; and *Conus visagenus*, 1974. One other deep-water species attributed to Kilburn, by a South African collector, is *Latiaxis scobina*. I have been unable to find verification of this name in the literature available to me. The species closely resembles *Latiaxis winckworthi* Fulton, 1930, and may be that species. The minor differences I have noted could possibly be found between different specimens in the same population area. It is also possible that they are due to differing ecological conditions rather than to genetic causes.



Benthovoluta krigei Kilburn, 1971
Height, 78 mm. Off Inhaca Island, Mozambique.
Trawled in 280 fathoms.



Cypraea cruickshanki Kilburn, 1972
Height, 31 mm. Trawled off Durban, Natal, South Africa,
depth unknown.

Another Latiaxis from off the coast of Natal, with a species name of doubtful validity, is Latiaxis helenae Azuma, 1973 (see The Veliger, vol. 15 (3), p. 231, 1973). Azuma noted the likeness of this species to Latiaxis kawamurai Kira, 1959, from Japanese waters, but stated that Latiaxis helenae differs from Latiaxis kawamurai by not having the scale-like striations found on the western Pacific species. This statement is true only of very large specimens of Latiaxis helenae, which may attain a height of 70 mm. or more. It is unfortunate that Azuma did not compare specimens of comparable size with Latiaxis nakamigawai Kuroda, 1959, which it more closely resembles. Such specimens, if mixed together, would be difficult if not impossible to separate.

Conus papillaris A. Adams & Reeve, 1848
Height, 80 mm. Walvis Bay, South-West Africa.
Trawled, depth unknown.

Latiaxis helenae Azuma, 1973
Height, 71 mm. Trawled off Durban, Natal, South Africa,
depth unknown.



Even a brief summary of the deep-water mollusks of southern Africa would make this paper much too long, as would an alphabetical listing of all of the species involved. In the family Volutidae alone there are currently twenty-one species found, yet the Volutidae is not one of the larger molluscan families in the area. Below is a list of only a few of the species most desired by collectors. This list does not include any of the recently described species mentioned above, all of which are very desirable shells.

Pleurotomaria africana Tomlin, 1948, Haliotis midae Linné, 1758, Haliotis parva Linné, 1758, Haliotis queketti E. A. Smith, 1910, Astraea andersoni (E. A. Smith), Cypraea barclayi Reeve, 1857, Cypraea broderipii Sowerby, 1832, Cypraea fultoni Sowerby, 1903, Cypraea fuscorubra Shaw, 1909, Phalium craticulatum (Euthyme, 1885), Argobuccinum gemmifera (Euthyme, 1889) Argobuccinum argus (Gmelin, 1791), Cymatium africanum (A. Adams, 1854), Cymatium cingulatum (Lamarck, 1816), Charonia pustulata (Euthyme, 1889), Colubraria alfredensis Bartsch, 1915, Columbarium rotundum Barnard, 1959, Columbarium formosissimum Tomlin, 1928, Columbarium radiale (Watson, 1882), Fasciolaria heynemanni Dunker, Fasciolaria rutila (Watson, 1882), Latirus abnormis Sowerby, 1894, Festilyria africana (Reeve, 1856), Festilyria queketti (E. A. Smith, 1901), Festilyria ponsonbyi (E. A. Smith, 1901), Volutocorbis gilchristi (Sowerby, 1902), Volutocorbis abyssicola (A. Adams & Reeve, 1848), Volutocorbis lutosa Koch, 1948, Callipara bullatiana Weaver & du Pont, 1967, Neptuneopsis gilchristi (Sowerby, 1898),

Afrivoluta pringlei Tomlin, 1947, Conus eucoronatus Sowerby, 1903, Conus milneedwardsi Jousseume, 1894, Conus patens Sowerby, 1903, Conus papillaris A. Adams, & Reeve, 1848, Conus torquatus von Martens, 1901, and perhaps the extremely rare Vasum crosseanum (Souverbie, 1875). Many workers in South Africa have thought the species may be found in the Mozambique Channel. If they are correct the species may be found in a portion of the area covered in this paper. Vasum crosseanum is of such rarity that only two specimens are known and it is not likely to become sufficiently available for the private collector ever to have a specimen.

Conus milneedwardsi Jousseume, 1894
Height, 130 mm. Trawled off Beira, Mozambique.
Depth unknown.



Afrivoluta pringlei Tomlin, 1947
Height, 120 mm. Trawled off Port Elizabeth, South Africa.
Depth unknown



Cymatium africanum (A. Adams, 1854) Height, 114 mm.
Trawled off Jeffrey's Bay, South Africa in 18 to 20 fms.



Charonia pustulata
(Euthyme, 1889) Height, 159mm. Trawled off the coast of Natal, South Africa, depth unknown.



Callipara bullatiana Weaver & duPont, 1967. Height, 65mm. Jeffrey's Bay, South Africa. Dredged, depth unknown. Has not been collected alive.

The above list is but a very small portion of the total number of species that are found in deep-water off the coasts of southern Africa. Other collectors may have other opinions about which species should have been included in this list. However, I believe we can all agree that any of the shells listed would be most welcome to our collections.

SHELLS BY THE TOUCH SYSTEM

Billee Dilworth

There are many ways of shell collecting: looking under rocks or coral, fanning sand, searching sea fans, coral or the tops of reefs. I think we found a new way. At least it was new for us.

We were on the island of Hiva Oa in the Marquesas. Twila had mentioned that we should search the fresh water streams where they enter the sea for Neritina, which are often found there in tropical countries. The day before we were to leave the island our hosts, the Rauzy family, took us on a family picnic to Hana Tapa, a bay on the other side of the island.

After a delicious picnic of freshly caught and grilled fish and other exotic foods, we were packing our collecting and diving gear ready to leave for home. Someone mentioned that M. and Mme. Rauzy had gone for a dip in the fresh-water stream. I hurried to find the stream. Sure enough there were little black shells in it but they did not resemble any Neritina I had ever seen. The aperture was not flaring at all. They were little, almost round black shells with several sharp spines protruding from the dorsum. They looked like tiny sputniks. Our host was walking back to the car, so I had time to grab only half a dozen.

M. Rauzy told us they could be found on our side of the island also. He dropped us off at a stream near our village of Atuana. There the heavy rains had made the water of the stream quite muddy. We could find no Neritina in the stream near the road. We decided to try the stream closer to the mouth. It was high tide, but our last opportunity for collecting. We waded into the murky water. With our bare feet, we could easily locate the Clithon coronata. Those little spines were very sharp. Shelling by feel was too easy!

The next night Twila and Vi worked for forty-five minutes before they removed a spine which had broken off in the bottom of my heel. We would have preferred clearer water, but since it was our last day and almost dusk, we were delighted with the success of our "collecting by feel" even with its spiny drawback.

NEW MEMBER

Van de Velde, Dr. and Mrs. R.L.
1518 Flippen Court
Anaheim, Ca. 92802

CHANGE OF ADDRESS

Of Sea and Shore
c/o Tom Rice
P.O. Box 33
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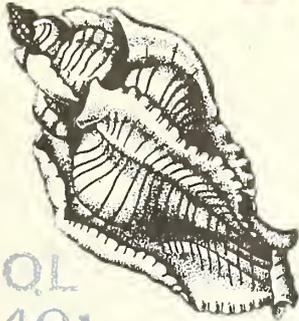
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Vol. V November 1974 No. 11

PROGRAM: Clifton Martin will give Part II of his talk on Deep Water and Intertidal Shells of South Africa. Meeting date is November 21 at 7:30 P.M.

CLUB CHRISTMAS PARTY: Party will be held at the Miramar Officers' Club on December 21. Cocktails at 6:00 P.M. Dinner at 7:00 P.M. Deadline for reservations is 12/5/74. Send checks to Margaret Mulliner at above address by December 5 indicating dinner choice. Boneless Roast Sirloin \$6.90 or Prime Rib \$7.75. As always we will have a private room and there will be dancing after the dinner and exchange of gifts. Bring exchange shell gift to the party. Put general area on outside and complete collecting data on the inside of your wrapped gift. Map is on last page.

THE FESTIVUS DOES NOT PRINT A DECEMBER ISSUE!

Minutes of October Meeting

Our guest speaker for the evening was Ruth Greenberg from the Tidepool Gallery in Malibu. She took us on a world tour via memories recalled by her shells. Great! The suggestion that the shell club sponsor a Shell show in 1975 was brought to the attention of the membership. A committee headed by Joe Bibby will present more information of this idea when facts have been gathered. Anne Schwarz won the shell drawing. A \$50 check was sent to the Goods to replace an aquarium borrowed and subsequently damaged. The Christmas party is coming up soon- plan to be there!

NEW MEMBERS

GOOSEN, Bob and Dorothy
59 Bays de Village
Newport Beach, Ca. 92660

GREENBERG, Ruth
c/o Tidepool Gallery
22762 Pacific Coast Highway
Malibu, Ca. 90265

An Unusual Find and an Unusual Occurrence
by Carol M. Hertz

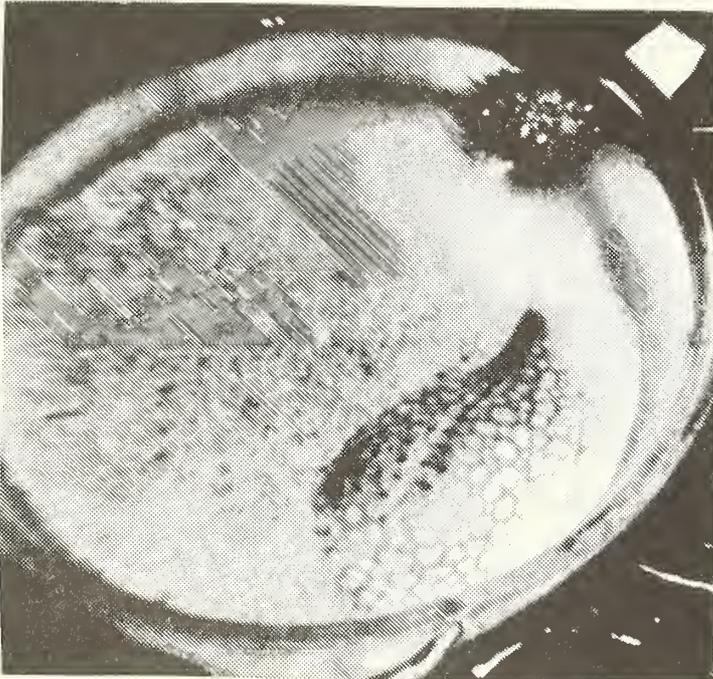
In June of 1973, the Mulliner and Hertz families went to San Felipe, Baja Calif., Mexico for relaxation and the low tides. On returning from collecting during the morning low tide on June 1, our daughter, Suzanne, found a live Ficus ventricosus almost completely buried in the wet sand of the low tide zone. It was the find of the trip for us and we wanted to keep it alive so that we could observe it in our home aquarium. By changing its water twice daily we kept it alive in our motel room (where Dave Mulliner took its picture showing its magnificent mantle extended.

However, after the six hour ride back to San Diego, the Fig seemed nearly dead. We put it in a large dish with fresh seawater and it appeared to revive somewhat. We had read in "A Guide to Field Identification Seashells of North America" by R. Tucker Abbott, that the Ficus feed on echinoderms. Since we had an urchin in our tank (to feed our *Bursa californica*) we thought that, perhaps, we could entice our Fig shell to eat.

In this we were unsuccessful and the Fig lived only a few days. But when we placed the purple sea urchin, *Strongylocentritus purpuratus*, in the dish with the Fig, the water became milky almost immediately. We didn't know what had happened and hastened to change the water. It was after we'd changed the water that we saw the urchin exuding the milky substance that clouded the water. We quickly took the picture with our less than adequate equipment as the water became cloudy again.



Ficus ventricosus



Urchin in bowl (with Ficus) exuding
milky fluid

We wondered if this was a defense mechanism on the part of the urchin or if we had observed the passing of eggs into the water. The incident was strange because the urchin had been in our small aquarium for weeks and the passing of the milky fluid occurred only moments after putting the urchin in another dish in the same room with water not too different in temperature from that in the aquarium. We've not seen this behavior since with any other urchins in our tanks.

FROM.. " OUR SOUTH PACIFIC HOLIDAY 1974"

by Marj Bradner

Five weeks is the longest vacation we've ever taken and the usual restlessness that comes toward the end never arrived this year because our final week was on REEFS OFF THE WESTERN COAST OF FIJI!

We arrived in Nadi in late afternoon on July 17 and went directly to the Nadi Travelodge where the Shell Collecting Expedition was gathering. We called Dr. Cernohorsky, the expedition leader. Dr. Walter Cernohorsky lived in the Fiji area for several years and started collecting as a hobby and as his collection, interest and knowledge increased he became a world authority on mollusks. He is now Curator of the Auckland Museum.

We barely had time to move into our room, clean up a bit and meet the group for cocktails. It was an interesting group (most of them didn't 'drink'). As shell collectors they ranged from expert to novice (we were novice), in age 6½ to over 70. Their professions were wide ranged: doctors, architect, sculptor, engineer, minister, farmer, teacher, etc. Nationalities: Australia, New Zealand and U.S. After a Fijian lovo (meat and vegetables cooked in the earth oven), kodoka (raw fish) served in a tridacna shell and Fijian meke (dance performance) at the Travelodge, we retired early to await a 4:00 a.m. call for the start of our Fijian Reef Expedition.

Surprisingly, we were all pretty well awake and eager to start shelling. But not immediately. About a one hour drive from Nadi to Lautoka (the harbor), then climbing across two docked boats with our assortments of luggage to the third boat, the Ratu Bulumakau ("Big Bull and Cow") which was to be our reef-side home for the next week. We saw the sun rise as we proceeded across the large lagoon encircling the west side of Fiji. A couple of hours later we arrived in a channel separating two small islands, Tai and Levuka. Our luggage was transferred to a small shore boat for delivery to Levuka, better known as Treasure Island, where there was a very fine first-class resort hotel which would be our shore home for the week.

Once the luggage was off-loaded we took off for the first shelling grounds. We arrived alongside a small reef island, TAVARUA one hour before low tide and transferred to our shore boat. There were many coral heads and even the small boat had to make its way carefully between them until we hopped off in two or three feet of water with our collecting bags, swim fins, snorkles, face plates and long handled dredges. It was a motley group going ashore. Billee and Twila were in their full coverage black and white sptiped shirts and dungarees (costume reported to be a good shark repellent because they look like poisonous sea snakes. But recent tests show this costume attracts shark attacks). Many of us wore woven hats with colorful trim embroidered with cowrie shells that Erva had picked up in the Nadi market the day before. All of us with shelling bags long and short, large and small, various colors white to plaid. As soon as we hit the island everyone dispersed...each to his own on a shelling expedition. The dredgers made long sweeping strokes in sandy areas at least a hundred yards from the next nearest dredger; the rock turners stretched for hundreds of yards out toward the reef, some of them in water up to their waists, turning, lifting, carefully examining the underside of rocks in search of the elusive, rare mollusks for which were were all searching...and, returning the rock to its original position (underside down) so the minute particles of vegetable and animal clinging to the rock would not die from exposure. (It is said proper shelling will never deplete a reef, but failure to return the rocks to their original positions could destroy a reef in a single afternoon). Others were snorkeling and diving over trails in the sand.

The snorklers paired up. Brad swam with Vi (who was having difficulty diving more than ten or twelve feet) so she would follow the trail, point out to Brad the spot to dive, and he would return with a sand-covered terebra. Coming in from this swim, Brad found the first strombus (7-finger) of the expedition. I stayed on shore for beach shelling as I was still recovering from my Rarotongan cold. It took all of twenty minutes to complete a leisurely shell collecting tour of the shore line. Lots of shells and shell fragments at the high water line. I found a well-worn argus cowrie and one of the Fijian boys from the ship who joined me for a part of my tour gave me a beach washed testudinaria.

After circling the island, I decided I'd better board the shore boat and go out to the reef. The boat had disappeared. Then I noticed that some of the shellers were already out to the edge of the reef, others almost there, and that the receding tide had left no more than about a foot of water anyplace from the shore to the edge of the reef three or four hundred yards away. So I laced my heavy basketball shoes, gathered up my shelling bag, adjusted my straw hat, donned my heavy canvas and leather gloves and waded out into the Fijian seas. The first rock I turned exposed one of the small money cowries, the only shell which from previous experience I am an expert at finding. I looked for Brad. Was he one of those specks out at the edge of the reef? I made my way past collectors absorbed in examining their particular rock and they shared the excitement of their finds with me. Each person I met taught me a little of shelling and reefs. I finally reached Brad out at the edge of the reef and helped him turn a huge stone. On the underside were eleven cowries of five different varieties! Carneola, lynx, vitellus, eglantina, annulus. (Found out later that what we thought was carneola was really schilderorum). Brad also collected a small black and white striped cowrie, Palmadusta assellus. Brad's main interest was in the tiny cowries while mine at this time was to advance to finding something larger than the common money cowrie. For a novice shell collector this reef was magnificent! We felt like kids in a candy store, but being long time conservationists, ecologists, etc., we collected no more than two or three of each species.

Brad also found several different varieties of cones. Alphabetically ranging from arenatus to rattus and in size from under one inch to over four inches. It took most of the week before I recognized a cone because they are covered with a periostracum, a thin covering that makes them look like a rock on the reef. Others on our expedition found additional varieties of shells...mitres, olives, terebra, murex to name a few.

After a few hours on the reef the incoming tide forced us to make our way from our various outposts toward the island. The shore boat was waiting to transfer us to the ship. As soon as we were all safely aboard and the shore boat secured by a strong rope, the captain hoisted anchor and we headed toward our Treasure Island home. Walter Cernohorsky held forth at the bar (stocked with beer and soft drinks-sometimes iced) as we all crowded around him with our treasures. Some of the experts asked detailed questions and carried on involved scientific discussions. Sometimes Walter would borrow my glasses to more thoroughly examine a small specimen. I just asked "What's this?". Walter patiently identified my mostly very common cowries while I carefully made notes in my small copybook. It took us close to three hours to get back from TAVARUA to Treasure Island; a bunch of tired but happy shellers.

Treasure Island Resort is a new development. The hotel was completed and they took their first guests about two months before we arrived and had just recently started operating to full capacity. There is nothing on the island except the resort. I estimate that there are close to half a hundred bures (guest bungalows), staff dormitories, manager's home, central housekeeping facility, large open dining pavillion with an excellent bar where a four piece orchestra (occasionally increased by a guest joining in) played at the edge of a small dance floor. The conga line seemed to be in vogue this year and happy and boisterous tourists wound their way in and out of the building and among the diners.

The place has to be completely self-contained. Everything must be brought to the island by boat. Each morning the fresh water barge comes from Lautoka and pumps its precious cargo into the island tanks. Signs in conspicuous places read "Please conserve water." This was not difficult because the pressure was so low when we all showered after shelling that there was no more than a trickle. But they did use some water on the tropical plants scattered beside the paths and the fragrance of their blooms pervaded the area. At least it did until the shell collectors took over!

We each had a gallon of metholated spirits and lots of plastic bags. Our first order of business was to dilute the spirits to a 70% solution and place the days' collection in the plastic bags with this mixture. We did this. Brad hung his strombus upside down from the rafters on our lanai before we went to dinner. The perfumed tropical evening had taken on the smell of a malacological laboratory.

We had originally signed up for the expedition for only three days because we knew nothing about shelling, we didn't know the group, and we wanted to see a little something of Fiji. But after the first day we wanted to stay with the expedition for the full time. Walter said O.K. but there was no assurance of hotel space. Each day we asked about cancellations...nothing. Saturday night was booked solid, and on Saturday morning Walter moved his bags aside and Brad moved in with him. Twila and Billee consolidated their belongings and I arrived with my things.

I'm not writing this as a complete diary because some reefs and activities are just not worth recording such as; Captain's Choice #1 - Namotu and Namotu Barrier Reef, or Captain's Choice #2 - Reef north-west of Tai island, or Captain's Choice #3 - Malevu Reef. However, on some of the Captain's choices memorable experiences are worth recording.

Billee's Cowrie - Several members of the expedition were prepared for SCUBA and had ordered tanks delivered each day. On one of these dives Billee found a tiny, rare cowrie, *C. bregeriana*, at the reef edge in about twenty feet of water - the prize specimen of the 1974 Fiji Shell Collecting Expedition.

Brad's Dive - The SCUBA divers were gathering their equipment for transfer to the shore boat when someone dropped Twila's face plate with attached snorkel over the side. Ron dove in immediately but couldn't reach it as it slowly sank into the lagoon until it was out of sight. Brad went in next and dove until he could see it. Brad's conviction is that he can reach anything he can see. He hyper-ventilated and went down. He disappeared. I started counting seconds. He didn't come up. I looked around the boat to see if he had come up in another place. No Brad. As I was beginning to get worried, he broke surface with Twila's face plate and snorkel in his hand. He said going down wasn't so bad, but coming up was a struggle. Brad has done free diving to 85 feet and we didn't know the depth of this dive, but he knew it was over 60 feet.

There are two reefs that I would like to mention in particular. MALOLO REEF and YAWALO REEF. The reefs in Fiji are different from the reefs we know in French Polynesia. The reefs that we are acquainted with in Huahine, Maupiti, Moorea, etc. are all comparatively narrow and the coral slabs are cemented together. When we read of shell collectors turning rocks on the reef, it sounded impossible. On the Tahitian reefs the only places to find cowries were in the holes and crevices in the reef. But in Fiji the reefs stretch for hundreds of yards from the lagoon edge to the outer edge. Where the sea breaks the reef is solid, but the major portion of the reef was covered with large loose rocks, some completely exposed at low tide. We heard a crackling and snapping as the mud and sand and vegetable matter contracted and shrank under the tropical sun.

MALOLO is not an isolated reef. The island of Malolo is close by and the channel between the island and the reef is not much over a quarter of a mile. On the island facing the reef is a resort that has been there for many years. I believe it is called the Plantation. There are also Fijian villages on the island. The reef has been a favorite shelling spot for a variety of people

for many years, for generations of Fijians, I'm sure. In spite of massive shelling for a long time, the reef was alive with shells. Almost every turned rock exposed brightly colored cowries, large ones, small ones, dozens of varieties. Brad found three *C. mappas*. A group of Fijians were also on the reef. With great pleasure, I showed one of them the small *errones* I had just found. He reached in his back pocket and produced a large tiger cowrie which I admired and he gave it to me. The most exciting find on the reef was the *Palmadusta humphreysi*. We had been searching for this small cowrie all day but had not found it. Their locale was explained to us---in the heavy dense leafed weeds exposed or in a few inches of water at low tide where there is a muddy bottom. We returned to the same reef the next day and we concentrated our searching in the muddy areas and saw the brilliant red gelatinous mass which was the matle covering the quarter inch *humphreysi*. We found several for our collection and also in the same thick weeds we found the even smaller pure white *trivia*.

YAWALO REEF is near the mainland, an hour or less by boat between the reef and the Lautoka dock. This was our destination on our last shelling day. Low tide was late in the afternoon so proximity to the Lautoka harbor was important. We packed in the morning for leaving Treasure Island. We closely supervised the transfer of our luggage from the island to the shore boat and onto the RATU BULUMAKAU. Three days before a shore boat was transferring tourists and their luggage from the island when a gusty wind came up and flipped the boat. A couple of men were trapped but fortunately there was also enough trapped air and no one was injured. The luggage filled with clothes floated but the duty free tape recorders, cameras etc. sank to the bottom. At the time of our transfer the seas were heavy and the shore boat had to be loaded on the lee side of the island.

It was late when we arrived alongside YAWALO Reef. The first group got into the shore boat and the motor wouldn't start. We had been having trouble for some time with the outboard motor. The dredgers started paddling with their dredges in a joyous mood amid gales of laughter from the ship. The motor finally took hold and the first group was deposited on the reef. The second trip was without incident.

The shellers scattered rapidly in all directions. One headed toward the mangrove swamp, the only vegetation that we had seen on any of the reefs. Another dashed off toward the center of the reef where the very large cowries are found. One of our Fijian crew searched the nooks and crannies in the reef with his forked spear hunting for octopus. The boys in the shore boat powered out into the lagoon where the shore boat rode higher and made better speed than when it was filled with shellers and their equipment. We could see them off in the distance again having trouble with the motor. We found YAWALO Reef an exciting place. The common shells were larger than any we had found on other reefs. The common *vitellus* here was two and a half inches in length. Brad's *mappa* from this reef was at least twice as long as the ones from MALOLO. And this is the reef where I convinced myself that I had progressed from a novice to a genuine sheller when I found two small *staphylaea* and a *limacina*. We saw some cowries that we did not disturb...nesting cowries...mantle spread out covering hundreds of tiny white eggs. We wondered why the cowries were larger here. Perhaps the mangrove swamp at the edge of the reef provided extra nutrients.

The sun was sinking fast and when it was hidden behind a dark cloud we started drifting back to the edge to meet the shore boat. The boat was still out in the lagoon and drifting farther and farther away with the wind and the current. We could see the two Fijian crew members working up a sweat repeatedly pulling the starting rope against the motor to no avail.

The water was above our knees and rising rapidly. A chill wind came up and the incoming tide brought with it the colder waters from the lagoon. The sun broke out from behind the clouds and we watched our final Fijian sunset in waist deep water on YAWALO Reef. Our Captain was maneuvering the ship down current and getting as close to the reef as possible in case of the necessity of a speedy evacuation under our own power. Fortunately, a put-put in the distance... the shore boat was on its way to our rescue! The shorter girls had not much

more than head and shoulders above water. Walter shouted "non-swimmers first". The shore boat was almost swamped with the onrush. I held back because I do know how to swim, but the ship looked pretty far away in the falling evening. Isabel said in a quiet voice, "I don't swim very well." Walter said, "Get in." Then it was my turn. "I don't swim very well either." I got over the side and settled amidships on a board already occupied by a couple of people, and "CRACK!" The three of us ended up in the bottom of the boat. Walter said, "Everybody in." As the last sheller clambered over the side, Brad shoved us off the reef and jumped on board himself. We were low in the water, a few inches of free board only. We were afloat on the lagoon. The motor did not start after repeated attempts. Walter and Brad grabbed the splintered boards that had been a seat amidships and started paddling. We were making headway. Passengers, scarcely breathed, afraid of disturbing the delicate balance in our craft. The wind and current and paddling carried us into the lagoon. The RATU BULUMAKAU was down-wind of us, and finally contact was made via a long fishing pole and we came safely aside our ship.

The rest of the trip was uneventful...made Lautoka in good time. Taxis waiting to take us to the Travelodge. A long hot shower, a tall cold rum punch and a Fijian feast and warm farewells to a really great group of friends and a wonderful leader.

CONCERNING A PROPOSED SHELL SHOW

At the September board meeting of the San Diego Shell Club, a proposal was made by Don Pisor that consideration be given to sponsoring a shell/show/auction/sale during the coming year. The proposal was discussed at length by the board members and because it would require support by Shell Club members, it was decided to bring the proposal to the next regular meeting for club discussion. Because of the structure of the Shell Club Constitution and the forthcoming election of officers, it was recommended at the October board meeting that a final decision should be postponed until next years officers are installed. It was however agreed that a committee be formed to investigate the proposal and report back to the Shell Club if the general membership concurred. At the October regular meeting, Joe Bibby presented the proposal in the absence of Don Pisor and discussion was held. It was voted by the membership to investigate the club's involvement in such an endeavor and Joe Bibby volunteered to head the committee.

The basic question to be resolved by Shell Club members is whether a shell show be sponsored by the Shell Club. To answer this the following must be answered;(1) are Shell Club members sufficiently interested to support this effort to insure its success,(2) would it overextend the club's resources in the forthcoming year, and(3) what benefits would the Shell Club realize from such a project. This is an important item to be considered by each member since it would require a great deal of work many volunteers, all in a year in which we have to support the joint meeting of the AMU and WSM.

IN MEMORIAM

We are saddened to report the death of John Q. Burch who passed away in August.

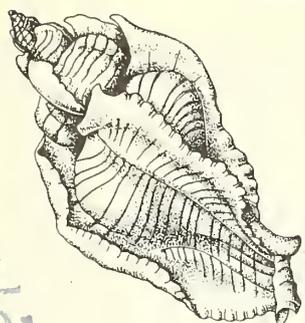
Mr. Burch was not only a well known book and shell dealer in southern California but wrote many articles on molluscan life. He was editor of the Minutes of the Conchological Society of Southern California and initiated the Directory of Malacologists.

Our deep condolences to his wife, Rose.

THE

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SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Carole Hertz
Vice-President: Bob Schoening
Recording Secretary: Blanche Brewer
Corresponding Secretary: Virginia Hanselman
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

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Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

Vol. VI January 1975 No. 1

* PROGRAM: Phil Clover will speak on Collecting in West Africa. Meeting *
* date is January 16 at 7:30 P.M. *
* Slides of the Christmas Party will be shown. *

OUR CHRISTMAS PARTY

This year our Christmas party was held December 21 at the Commissioned Officers' Club at Miramar, with John Souder as our host. With Christmas colors, the tables were beautifully decorated by John Smith and the shells used were from his own collection. Orchid corsages and boutonnieres were presented to the officers on arrival.

During the cocktail hour-or so- we had time to socialize with friends, some not seen for a long time.

Following dinner, the new officers were introduced by our outgoing president, Richard Schwarz. Then Richard made some presentations. The illuminated Roll of Charter Members was passed to the keeping of Carole Hertz; John Souder was given the trophy, awarded some years ago to the San Diego Shell Club, for its exhibit at the County Fair in Del Mar; Blanche Brewer received the printing blocks used for the masthead of our share of the "Newsletter", a magazine to which four other California shell clubs contributed, and gone, these several years. (The magazine-and our Club, for that matter-owed their beginnings to Dr. Rudolf Stohler. We sent our material to Berkeley, and the students of Dr. Stohler's classes printed and assembled it, mailing it in bulk to the separate clubs, who then sent it out to their members.)

The shell gift exchange did not take quite as long as usual, since we were fewer, but it was fully enjoyed by all-we are all kids, maybe, and love the suspense and reward of opening those bright packages. Shells, and their enjoyment, are truly very special. The very late date of our party was perhaps the main reason for the small attendance-barely thirty.

Merry Christmas farewells, and home through a woolly fog. B.B.

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BOOK REVIEWS

by Clifford A. Martin

American Seashells, second edition, by R. Tucker Abbott. 663 pp., 24 color plates and more than 4000 black and white illustrations. Van Nostrand Reinhold Company, 450 West 33rd Street, New York, N. Y. 10001. \$49.50. 1974.

The new edition of American Seashells is larger than the first edition in size as well as in the number of pages it contains. Sections pertaining to all classes of mollusks have been greatly enlarged. There are more than 14,000 items listed in the index and collectors will find many up-dated name changes. The pages are printed in double columns and for the most part illustrations and descriptions of each species are printed on the same page. Illustrations and descriptions of each species are given identical numbers for easy identification. The vast coverage encompassed, together with an Introduction containing bibliographies and a section on Systematics of the Mollusca will make this edition indispensable to students and collectors alike. This is the most comprehensive single volume ever published on the marine molluscs of North America and is highly recommended.

A Collector's Encyclopedia of Shells, edited by S. Peter Dance. 288 pp., and more than 1,500 illustrations in color. McGraw-Hill Book Company, New York. Printed in Great Britain. \$19.95. 1974.

This new book measures about 8" x 10" and the pages are printed in triple columns. The coverage is world-wide and there are more than 2,000 species of molluscs listed in systematic order. Illustrations are, for the most part, on the same page as the description of the species. The collector will find several name changes and a few old and familiar names are apparently doomed. Illustrations and descriptions are not numbered in this book and could be confusing to some collectors. An Introduction, an Identification Key, which is an easy guide for the identification of families, and a Glossary of commonly used terms will make this book quite useful. There is also a Select Bibliography. Peter Dance is well known to collectors and malacologists throughout the world as one of Europe's leading authorities. The number of color photographs alone would make this book a good buy.

A Call From Dr. Stohler
Carole M. Hertz

Last month this writer received a very welcome phone call from Dr. Rudolf Stohler. He called concerning the article, "An Unusual Find and an Unusual Occurrence" which appeared in the November 1974 issue of The Festivus.

In this article, the author had wondered why the urchin, Stronglocentrotus purpuratus, when taken from the aquarium and placed in a bowl of salt water with Ficus ventricosus, had exuded a milky substance which clouded the water.

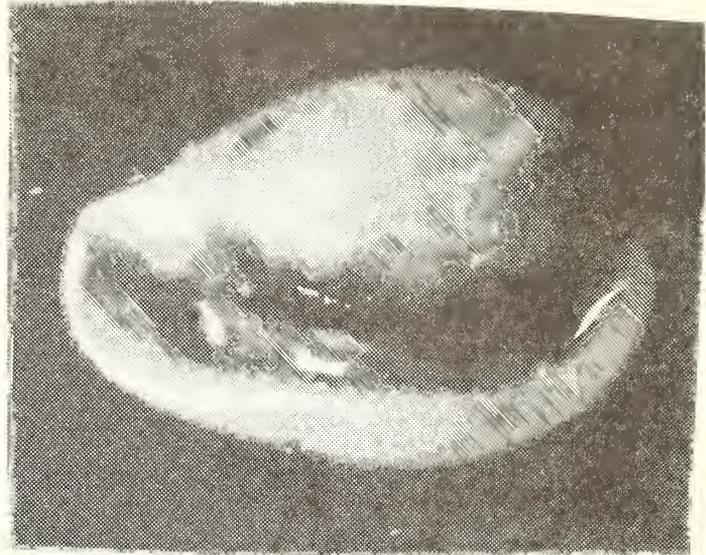
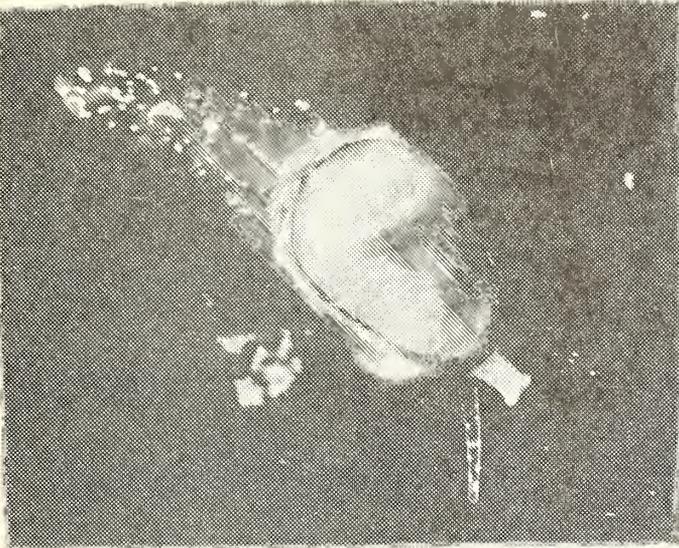
The occurrence had nothing to do with the Ficus. Doctor Stohler explained that the urchin had shed its gametes. (Since the shedding was white, it was a male urchin; the female's shedding is yellow.) He continued that "when the time is right" and the urchin is removed from the water and then put back in again-similar to what occurs at a low tide- it sheds its gametes into the water.

Oh, that we'd had a female also and could possibly have observed the development of the young!

A TREAT FOR THE SNORKELER
Carole M. Hertz

On September 8, 1974 while snorkeling in the Flood Control Channel in San Diego in approximately three feet of water, this writer noticed movement on the spines of a live purple urchin, Strongylocentrotus purpuratus. On closer examination, two specimens of Granulina margaritula (Carpenter, 1857) were observed on the spines.

The genus Granulina Dousseau, 1888, has this one representative in the eastern Pacific. Shells in this genus are small and white, have a denticulate outer lip, and an aperture extending over the spire.



Granulina margaritula with animal extended

Shell of Granulina margaritula

Photography by Dave Mulliner

MINUTES OF NOVEMBER MEETING

Clifton Martin presented Part II of his talk on Deep Water and Intertidal Shells of South Africa, with accompanying slides.

Officers selected by the nominating committee were elected unanimously, (see masthead for listing).

The matter of the Shell Show was brought up for discussion, the conclusion being that it was impractical at this time. This year the combined WSM-AMU meeting will be held in San Diego; next year Santa Barbara will have a shell show. A motion to table the project until the third year was passed.

Frank Good won the shell drawing.

NEW MEMBER

Tucker, Jean
2136 Montgomery
Cardiff, Ca. 92007

CHANGE OF ADDRESS

Smith, John E. AQ1
WF 154
NAS Miramar, Ca. 92145

("Dangers in diving for shells")

(Part 1, "A day at Ghost Reef") by John Phillips

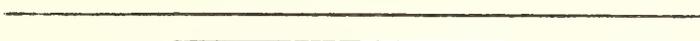
Diving for specimen seashells is one of the true thrills for anyone who has the ability and inclination to properly train him(her)self for this journey into a mysterious and beautiful "other world". My 21 years of specimen diving has taken me up and down our productive California coast and across the seas to intriguing waters filled with lush coral reefs. I would not want to discourage a single soul from possibly experiencing the countless joys afforded to me by King Neptune; however, I can most assuredly tell all that there are certain dangerous elements beneath the waves which require a certain respect, not necessarily a fear. On a recent day of diving I experienced one of the truly terrifying moments of my life, which I shall try to share with you as follows.

My day begins at 6:30 A.M. with a 70 mile drive from my home in Santa Barbara to the remote Point Concepcion area. I have worked here for the past 10 years as a commercial Abalone diver, and I might add that this is one of the "red hot" collecting areas along our coast; many rare species may be found here via skin, scuba, or compresson diving (unfortunately, "land lubbers" who prefer the intertidal collecting cannot collect here, or anywhere else in California, due to certain state laws against shell collectors!!). I keep my diving vessel moored in a small, natural harbor which is located about one mile southeast of Point Concepcion; this haven is called Coho (or Cojo, or Coxo) Anchorage, actually Old Coho Anchorage. After the 70 mile jaunt through a very picturesque countryside and an assortment of private ranches, I arrive at Coho, unload my gear, and carry everything down on the sand. Next I launch a small shore skiff and push out through the surf and row to the moored diving vessel, which at the time of this experience was "The Manatee", a 36 foot U.S. Navy double-ended whale boat, which has been converted into a diving barge. After two or three days of pursuing the increasingly-elusive red abalone (Haliotis rufescens) I row the catch ashore, ~~to~~ abalone to a tow-sack, carry them across the sand, and load them into the back of my truck. Once again the picturesque drive and finally the day ends at Pierce Fisheries; the abalone is fully processed here for presentation to fish brokers, fish markets, etc.

On this particular day it was slightly overcast and the water looked quite clouded with an over-abundance of red tide, a very unwelcome phenomenon amongst divers. For the past two days my partner and I had been exploring a recently found offshore reef, which we named the "Ghost Reef"; it lies about 1-1/4 miles off the San Augustine Ranch House on the Hollister Ranch (near Gaviota). This huge reef shoots up out of the depths from 120 feet plus, to 30 or 85 feet; it is entirely honeycombed with deep ravines, caves, and canyons-the perfect type of bottom for giant red abalone, which we found in large numbers, some of their shells measuring over 11 inches!! Along the edge of the reef were assorted boulders and flat rocks, under which we located a nice selection of the rare and beautiful flat abalone (Haliotis walallensis). The sand and rubble channels between rock plateaus were rich with finds like Cancellaria cooperi, Pecten diegensis, Megasurcula carpenteriana, and others. All in all, I would call it a "choice spot", and I was thoroughly enjoying myself and could care less about the occasional clouds of red tide that would cut visibility from 30 feet to 6 feet. I had a full bag of red abalone, probably 2-1/2 dozen or so, and my free bottom-time was up; so, it was time to inflate my lift bag, which aids in carrying the catch back to the boat (it also gives me a free ride straight up from the bottom to the surface-very, very fast).

Topside things are going according to Hoyle, except that there are a dozen or so commercial dragboats trawling for Bonito all around our diving area. My return route took me through a thick layer of red tide which was located about 30 feet under the surface; above the haze it was crystal clear, and I could see the silhouette of the "Manatee" about 50 feet ahead of me. At that moment a really big shark ramrodded through the murk just below my fins and shot past me like a rocket. The fish was approximately 8 feet in length, very fat in the body, and with a crescent-shaped tail; it also had extremely large eyes, very unlike any shark that I had ever seen before. I later identified it as a Salmon Shark (Lamna ditropis), a very rare fish in our onshore waters and with a very nasty reputation regarding its disposition towards Homo sapiens. To continue my narrative, the shark streaked by as stated above, probably 20 or 30 feet, then he did a 180 degree turn "on a dime" and started in fast towards my dangling feet. I tucked up my legs and slammed the bag of abalones (which weighed about 125 pounds) into his snout. The shark was obviously very surprised and stunned, as he then veered off to my right; however, not to be outdone by a mere human, he turned back and considered another pass at me. This time he went wide, missed me, and very quickly highballed his way back into the red tide below. In all probability he was in hot pursuit of the terrified schools of Bonito which were trying to outrun the encircling nets of the purse seiners, that is until he observed a more tender morsel-me! By this time I was comparatively close to the stern of the "Manatee", and I lost no time in swimming the short distance and removing myself from this foreign environment via the waiting diving ladder. After a brief period of steadying my shook nerves I related the experience to my diving compadres and suggested an immediate move from the Ghost Reef area (haven't been back since).

In ending this tale of the sea I will offer only the very gloomiest advice to any staunch soul who so desires a collecting trip to the Ghost Reef.



In order to function smoothly, our Club needs the participation of all members. Below is a list of positions necessary to the Club, some still unfilled. If you will help, please notify Carole Hertz at 277-6259 or at the January meeting.

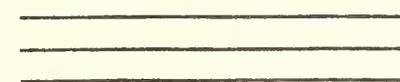
Librarian - Clifford Martin
Telephone committee - Jeanne Pisor, chairperson
Rita Scheck



Hospitality
 (set up & put away
 for coffee break)

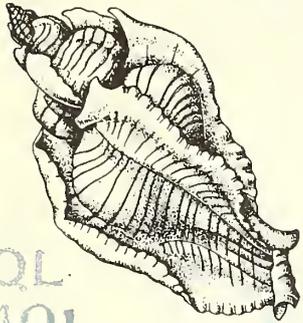
Shell Drawing

Typists for Festivus Frank Good



DUES ARE DUE!!

THE FESTIVUS



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SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

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Vol. VI February 1975 No. 2

* PROGRAM: The Antarctic Revisited --with emphasis on the marine life of
* this area. The program will be given by Dr. Gordon Robilliard
* who will accompany his talk with slides of both the underwater
* and land areas. DATE: February 20 at 7:30 P.M.
*
* MARK YOUR CALENDAR: The Club Auction will be held on the evening of
* April 19, 1975. It is time begin selecting your specimen shells
* to donate. Bring them to the Club meeting or to a Board member.
*

Collecting in West Africa

After an absence of five years, we were happy to welcome Phil Clover, a member of the San Diego Shell Club, as our speaker, January 16. He has recently returned from a long navy assignment at Rota Bay in Spain. While there he made several shelling trips to surrounding areas, among them locations in western Africa.

The political climate in most of these small republics, disturbed by revolutions and quarrels with neighboring states, is uncertain and consequently, unfriendly to visitors. They are alarmed by any machinery--certainly, diving gear and are very distrustful of photographers, to whom they turn their backs or cover themselves as thoroughly as possible.

However, the French colony of Senegal is more advanced and Phil and his wife Joyce, traveled by air to the old port city, and capital, Dakar. In Dakar there are modern conveniences and a more relaxed attitude toward visitors. Phil's particular interest here was in collecting Marginella. The only specimens he had previously seen were beach shells.

It turned out that fantastic collecting was available only two hundred feet from their hotel. The water was beautifully clear and shells were extravagantly abundant. (One small island seemed to be composed of a single specie of of bivalve since it was completely and deeply covered by this shell.)

Slides were shown of the collecting areas, the hotel, the markets displaying abundant and various foods, craftsmen working in many media- and the people. They looked healthy, well fed, were clothed in bright colors, and, yes, there

was a record of the resentment of photographers--a scowling boy, leaning against a wall.

There was a grim and shameful reminder of the slaving days--the island of Goree, several miles offshore. It was there behind high stone walls, and threatened by guns, that the captured blacks were held, like cattle, for the slave ships.

No individual specimens of Marginella were pictured but trays of several animals of two or three species were shown.

NIGHT ADVENTURE IN FIJI

by Marj Bradner

On a recent shell collectint trip to Fiji led by Walter Cernohorsky, fourteen of us showed up for night collecting. Our destination was a reef which is exposed at low tide but completely covered at high tide.

At 10:30 we departed from Treasure Island, where we were based, aboard the RATU BULUMAKAU. The stars were twinkling overhead. The sea was calm. The air was warm. We were excited with the prospect of our first night shelling. We had carried heavy underwater lights to the South Pacific for this night and this experience. We had checked out all the equipment and everything was in working order.

As we approached the reef, our cautious Captain sent the launch ahead to check the location of the edge of the reef and determine the best place for anchoring. We started gathering our things, making sure our collecting bags were safely anchored to our belts. Heavy gloves, collecting bottles, bars for turning rocks...everything was ready. Suddenly CRUNCH! WHAM! We hit the reef.

"Everybody forward," shouted the Fijian Captain. Fourteen people rushed to the bow of the boat. The throttle was in full reverse. That didn't work.

"Everybody aft!" We rushed to the back as the throttle was full forward. No luck.

"Everybody port side!" Again we scrambled. With each action and with each gunning and reversing of the twin-deisel engine, we became more firmly stuck on an unnamed reef in the middle of a vast expanse of water. Until the tide completely receded and rose again enough to float the ship, there was no way to determine whether the sharp coral reef had put a hole in her hull, or whether she would sink or float--miles from the mainland or nearest island.

What to do? We came to go shelling. "Let's go shelling." We looked over the side of the boat. There was a reef all around us. Deep channels penetrated the reef edge. The shallow drafted launch pulled along side. We stepped into one side of the launch, walked across to the other side, and stepped out onto the reef. The tide was getting low, but water was still up to our waists. Instead of scattering once we were on the reef, as we did for daytime shelling, togetherness suddenly became popular. One person would see a likely looking rock. Two would submerge and bring it to the surface. Four underwater lights and five pairs of eyes would search the underside for any signs of mollusks. Ten feet away another group was going through the same operation on their rock. The rocks were not very productive. Mark found one small shell but did not realize until the next day it was a Cypraea punctata Linne 1771. One rock produced a couple of small chitons. Brad tried snorkling but was no more successful than the others--just wetter. The cypraea, which were supposed to be on top of the coral and reef at night, had not received the word; or the tide was still too high; or the fate of the RATU BULUMAKAO was in the back of our minds. We didn't spend too much time on the reef but hastened to the questionable security of the ship.

The launch left, and we could barely see it in the moonlit distance when its out-board motor conked out and left it adrift. It finally did return, and for a brief moment we discussed trying to get back to Treasure Island in the launch. There was not enough gasoline to make such a distance, and besides the motor was not dependable. There was little chance we could ever make it, even with gasoline.

By this time the Captain had gone to sleep in the wheel house after leaving orders for everyone to remain on the port side of the ship. Inga said she was going to sleep and stretched out. Everyone seemed determined she would not. Every ten or fifteen minutes someone would shout, "Inga! Are you asleep?"

Since we would have to stay until the tide was out completely and then became high enough to re-float the RATU BULUMAKAO (IF she would float) we decided to make ourselves as comfortable as possible, perhaps even try to sleep.

Then someone said, "Don't complain about insufficient time on the reef."

"And we worried about where the Bradners would spend the night."
(Reservations had been difficult.)

The quips and laughter continued. When a chilling wind came up. "Will someone please turn off the fan!"

When we saw the running lights of an airliner overhead, someone said, "They're going to drop us a CARE package."

Even the description of the eighteen man life raft we had aboard, "A small raft with handholds for eighteen people to hang in the water," brought peals of laughter. We must have been drunk on adventure.

As the hours wore on we huddled together on one side of the RATU BULUMAKAO. We tried to doze in our wet clothing, but one shivering body would send a sympathetic ripple through the rest. Changing position disturbed the whole row. Shortly after 1:00 a.m., the Captain turned on his radio. In the middle of the dark sea in Fiji, hard aground on a reef, with the twinkling lights of Lautoke thirty miles in the distance, we listened to Brahms. The music was hauntingly lovely. The stars of the Southern Cross hung low. It was a magic moment. Someone declared it must be Hayden's water music.

The serenity didn't last long. The tide was rising, and the Captain began passing out life jackets! No one panicked, but no bright remarks were made, until we learned why he was distributing them. He reasoned that we would be more comfortable stretched out someplace using the life jackets as pillows. He was right. Some of us used our life jackets to fend off the breeze rather than as pillows. Soggy clothing and night breeze felt particularly untropical. Brad sacked out on a seat at the back of the boat. The Morrrows stretched out on deck using the bulkhead as a backrest for their pillows. Some of us dozed sitting upright, wedged between two others for warmth. All was quiet.

Then at 3:30 a.m. we began to feel the RATU BULUMAKAO start to rock gently. She was afloat! The Captain started the engines. The crew scrambled aboard from the launch with their rolled sleeping mats under their arms. There were cheers as we got underway.

Now our worry was for those of our party back at Treasure Island. We had expected to return from night shelling about 1:00 a.m., not after four. There were wives, family, friends expecting us long ago. We knew they probably would be organizing a search party but would not know where to search. We arrived back at Treasure Island to find NO ONE had missed us! We all agreed none of us had laughed so much in years.

FINDING MITROMORPHA CARPENTERI IN SAN DIEGO

by Jules Hertz

The beautiful little turrid, Mitromorpha carpenteri Glibert, 1954, is listed by McLean (1969) as "not uncommon in gravel at low tide and sublittoral zones. Range: Monterey, California to Coronado Islands, northern Baja California." Bishop and Bishop (1973) list this species as common at Bird Rock in 1971 under rocks at low tide. This writer had never observed live specimens of the species in San Diego even with considerable intertidal collecting extending back to 1966.

However, in the period of November 1974 to January 1975 approximately 20 specimens were observed at the foot of Archer Street, (Pacific Beach) San Diego under rocks at minus tides in the low tide zone. Two specimens were also observed at Sunset Cliffs, (Ocean Beach), San Diego at an extreme low tide on January 26, 1975 in a similar environment. One specimen was under a rock while the second was on eel grass at some distance from the nearest rocks.

Literature Cited

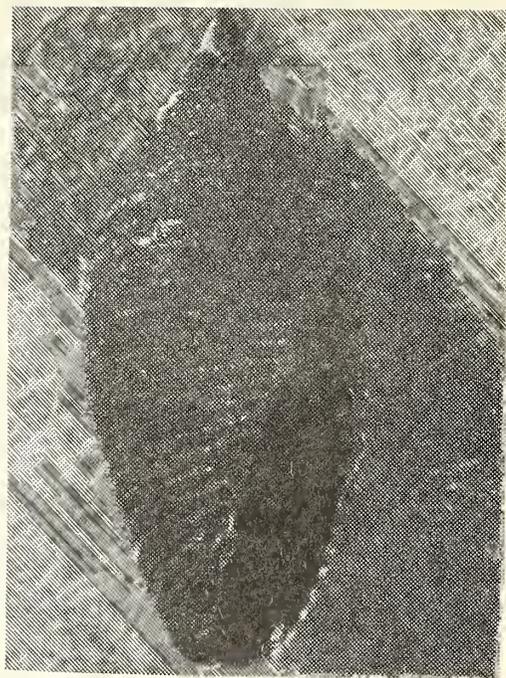
McLean, James Hamilton

1969. Marine Shells of Southern California. Los Angeles County Mus. Nat. Hist. Sci. Ser. 24, Zool. no. 11: 104pp.; 54 text figs.

Bishop, M.J. and Bishop, S.J.

1973. A census of marine prosobranch gastropods at San Diego, California. The Veliger 16(2):143 (1 October 1973).

Mitromorpha carpenteri Glibert →



STUDENT RESEARCH GRANT OFFERED

The Western Society of Malacologists will award a grant of \$500 to an undergraduate or graduate (first or second year) student for the academic year 1975-1976. The grant is offered to initiate or further research concerned with molluscs, in systematics, biology, ecology, paleontology, anthropology, or related fields

REQUIREMENTS. Part- or full-time upper division under-graduate (junior or senior) or graduate (first or second year) students at a college, university, or marine or field station may apply. The completed application and research proposal must be accompanied by an outline of the student's academic background and by a letter from a faculty member, instructor, advisor, museum curator or other professional scientist supervising or knowing of the student's work.

Applications and accompanying materials due by May 2, 1975. Application forms may be obtained by Writing: James T. Carlton, Department of Geology; University of California at Davis; Davis, California 95616.

THUMBNAIL SKETCHES OF OUR OFFICERS FOR 1975

Bob Schoening, our vice-president, is relatively, a newcomer in the ranks of shell collectors. In 1971 he was stationed on Guam where, very naturally, the beaches are the main recreation areas. When he saw the shell collectors coming in--and the contents of their bags--he was immediately interested.

There are two large shell clubs on Guam. (he was president of one of them, later) with a membership drawn from the Air Force and civilian residents. It follows that the waters of Guam are heavily collected. To keep these fields from being ruined by over-collection, certain areas are closed for stated periods to allow them to recover, as particularly, a three mile strip of fringing reefs.

With "Shells of the Western Pacific" by Kira and "Seashells of the World" by A. Gordon Melvin, he began his study of shells. During leaves he visited islands in the Trust Territory, among them Saipan, Rota and Palau. The Palau islands--a hundred and fifty in the group--he found the most beautiful and rewarding and plans to return there.

In a comparatively short time, he has collected 400 species of world-wide shells in many families, and has not specialized in any one group. However, he has a particular interest in volutés which are found, for the most part, in the Southwest Pacific.

He is a hospital corpsman first class, and at present is an instructor in bacteriology at the Naval School of Health Sciences.

The other members of the staff have been previously "thumb-nailed" having served at other times in other capacities, or, as in Margaret Mulliner's case, succeeding themselves.

Blanche Brewer has been an ACTIVE member of the San Diego Shell Club for quite some time. Asked when she joined the Club she said, "I joined the night Dr. Baily talked about some kind of clam. It's been a long time." (Feb. 1963. Dr. Baily's topic was "Reversal of Asymmetry in Bivalves!" The clam Blanche referred to was probably the Chinese fresh water clam Arconaia which he discussed in that talk.)

At first Blanche's interest was in using beach shells for mosaics and figures. She read about the Club and came to a meeting hoping to get information on where to find the shells she needed--Club members weren't too helpful she said. It wasn't until later on that she became interested in specimen shells and the animals within. The first shell Blanche ever collected live was a Chama. She brought it home to clean it and cook it out "but it smelled so good I ate it!"

Blanche has been Editor of the Festivus since its inception and before that she edited our Club's contribution to "News of the Western Association of Shell Clubs" from 1964 until 1969 when our Club decided to 'go it alone' with the Festivus.

She has also been our Club hostess for several years, greeting guests to our meetings and making them feel welcome. This year Blanche has added the elective position of Recording Secretary to her other contributions to the Club. Blanche Brewer is a very ACTIVE member.

 THE SCIENCE FAIR

Our Club will again participate in the Greater San Diego Science Fair to be held in March. As is our custom, the award will be limited to senior division entries in the areas of marine biology and/or ecology of marine organisms. The winner may choose from Barnes' Invertebrate Zoology, Ricketts and Calvin's Between Pacific Tides or Abbott's Kingdom of the Seashell.

Dr. Gordon Robilliard will head the Club committee consisting of Anthony D'Attilio, George Hanselman and David Mulliner.

MINUTES

11.

Dr. George Radwin announced the dates June 22 through 26 for the combined meeting of WSM and AMU to be held in San Diego at San Diego State University this summer. Our Club will be host for the first afternoon at a luau on the grounds in front of the lounge. In case of rain, this building will be available. Visitors will use the dorm for sleeping accommodations and meetings will be held in the Student Union.

We were reminded that the Science Fair is in March, that our Shell Auction will be in April this year to allow more time for preparation for the WSM-AMU gathering. Donations for the auction are in order, needed and welcome from now on; immediately is not too soon.

Richard Schwarz told the members of a coming vote on an amendment to our constitution concerning gifts of money to individuals.

Margaret Mulliner reported \$434.50 in our treasury. Norval Brewer won the shell drawing

Slides of our Christmas party were very much enjoyed.

PROPOSED AMENDMENT TO SAN DIEGO SHELL CLUB CONSTITUTION

The San Diego Shell Club, Inc. and its duly elected or appointed members of the Board of Officers, shall not be permitted to make monetary donations on behalf of the San Diego Shell Club to private individuals, nor sponsor nor lend their names to said donations. The San Diego Shell Club, Inc. and its Board members shall be allowed to make donations to institutions or publishers of material in the concological, malacological, and related fields of study for educational, scientific, or research purposes as provided for in the constitution and by-laws of this club. This amendment expressly allows individual members of the San Diego Shell Club, Inc., including members of the Board, to make monetary donations to private individuals in their own name.

NEW MEMBERS

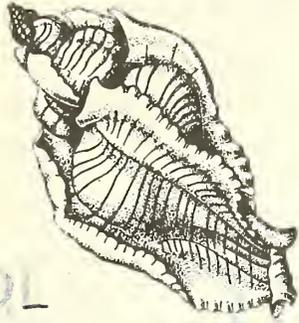
HALL, Donald & Marie
1635 Dahlia Ave.
San Diego, Ca. 92154

McPEAK, Ronald H.
10370 Limetree Lane
Spring Valley, Ca. 92077

1975 Tide Calendar for the NORTHERN GULF OF CALIFORNIA

FEB. 23	-4.0 at 7 PM (MST)	Mar. 24	-4.0 at 6:00 PM (MST)
FEB. 24	-6.0 at 7:30 PM	Mar. 25	-3.5 at 6:30 AM
FEB. 25	-4.0 at 7:30 AM		-4.5 at 6:30 PM.
	-6.0 at 8 PM	Mar. 26	-5.0 at 7:00 AM
FEB. 26	-5.0 at 8:00 AM		-5.0 at 7:00 PM
	-6.0 at 8:30 PM	Mar. 27	-6.0 at 8:00 AM
FEB. 27	-5.5 at 9:00 AM		-4.0 at 8:00 PM
	-4.0 at 9:00 PM	Mar. 28	-6.0 at 8:30 AM
FEB. 28	-4.5 at 10 AM	Mar. 29	-5.0 at 9:00 AM
		Mar. 30	-4.0 at 9:30 AM
			(EASTER VACATION WEEK)
April 11	-4.0 at 7:00 AM (MST)		
April 12	-4.0 at 8:00 AM	May 24	-4.0 at 7.00 AM
April 13	-4.0 at 9:00 AM	May 25	-4.5 at 8:00 AM
April 23	-4.0 at 6:00 AM	Mat 26	-4.0 at 9:00 AM
April 24	-5.0 at 7:00 AM		(Memorial Day Week-end)
April 25	-6.0 at 7:30 AM		
April 26	-6.0 at 8:00 AM		
April 27	-5.5 at 9:00 AM		

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Carole Hertz
Vice-President: Bob Schoening
Recording Secretary: Blanche Brewer
Corresponding Secretary: Virginia Hanselman
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

Annual Dues: Single membership \$3.00; Family membership \$4.00; Overseas surface \$3.50; Student membership \$2.00.
Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

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401
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Moll.

Vol. VI

MARCH 1975

No. 3

* PROGRAM: Collecting in the Marquesas will be the topic of the program to be *
* given by Twila Bratcher. Her talk will be accompanied by slides. *
* Date: March 20 Time: 7:30 P.M. *
* DUES ARE PAYABLE NOW! Make checks payable to the San Diego Shell Club, Inc. *
* Your dues must be paid this month to be included in the roster issue in April. *
* The Club Auction is April 19, 1975. Bring your shells to the March meeting or *
* to a Board member. *

FROM THE MINUTES

The program for the evening was an illustrated talk by Dr. Gordon A. Robilliard on the Antarctic after his third visit there. The history, physical features and animal life of the continent were discussed in addition to exciting underwater slides emphasizing the richness of the marine life. (Dr. Robilliard has promised an article on this subject for a future issue of the Festivus. Ed.).

The treasury shows a balance of \$450.

The proposed constitutional amendment was brought up for discussion and will be voted upon at the April meeting.

Dave Mulliner gave a report on the progress of the WSM-AMU meeting to be held in San Diego in June

NEW MEMBERS

SEEBOLD, John
5034 35th St.
San Diego, Ca. 92116
281-0708

SCHULER, Martin
5170 Baxter S.E.
San Diego, Ca. 92117
274-6541

WIENBOLD, Peter
8508 Ivory Coast Dr.
San Diego, Ca. 92126
271-1729

ELSIE MARGARET CHACE

With sorrowful regret we report the passing of a very cherished member, Elsie M. Chace. She died in Lomita, California, her long-time home, February 28, 1975.

There are few people in the shell collectors' world who have been as deeply involved in learning-and sharing their knowledge-about shells as Elsie Chace and her husband, Emery P. Chace. From the time of their introduction to shells in the late summer of 1910 at San Pedro, California, through nearly sixty following years, shells were not just a hobby with them, but were a determining factor in the pattern of their lives.

With blanket rolls and other camping gear, and later, accompanied by their young family, they explored the areas available to them at the time--those that could be reached by streetcar. They used every opportunity to gather shells and learn about them. A Christmas present this first year of collecting was Josiah Keep's "West Coast Shells".

In 1913 Elsie Chace was invited to join the Conchological Club of Southern California, a club limited to a membership of twelve, meeting at the homes of members. To this membership she gave her first talk about shells. About 1916 the Club was invited to meet at the Southwest Museum (and later at the Los Angeles City Public Library) and to open their membership to anyone interested in conchology.

In the following years their collecting spread up and down the west coast as they gathered marine shells and fossils; into mountains and deserts where they collected land shells. Always they carried notebooks in which they recorded their findings. This lore provided the material for the many papers they were to write--separately, together and in collaboration with other collectors.

They guided scientists to fossil shell beds, led students on field trips, their circle of friends always widening in their world of shells. They authored several shells and had several (10) named for them--chacei. They collected in rich fields (and in a few poor ones) that no longer yield such finds, and some have been lost to housing development, military reservations, others spoiled by industrial waste. Along the way they also enjoyed collecting, gastronomically.

In 1954 when Mr. Chace was past 70, they came to San Diego and the Museum of Natural History where Mr. Chace was to spend thirteen years as Curator of Marine Invertebrates. Elsie Chace was his assistant a major part of this time. They still had time to collect and savored the newer fields in Baja California and northern Mexico.

In 1961 they helped to organize the San Diego Shell Club and through them we were able to have our meetings in the Natural History Museum. They always contributed to the interest and enjoyment of our meetings with their knowledge of shells, special people and events. Elsie Chace had a marvelous mind. With the knowledge she had acquired, our questions brought instant answers. She was warm and friendly-appreciative, and always cheerful even when she was suffering the pain of arthritis, which scourged her in her later years.

Mr. Chace retired in 1967 and they moved back to Lomita, where they could be near their daughter, Ruth Chace French and their son, Gail P. Chace.

All through their years of collecting they shared and traded their shells. Many of the shells collected by the Chaces are in the study cases of the San Diego Museum of Natural History. The Los Angeles Museum of Natural History also has many of their shells.

STOPOVER IN BAJA

(from a letter to Twila and Billee from
Mrs. George Cook.)

We arrived in La Paz late in the evening- our plane was over three hours late; we had left Honolulu the evening before. The next a.m., we found the Sombrero Trailer Park and were told by Rudy that Jim Bailey was at Pulmo. We planned to go there, of course, and looked forward to meeting him. After looking over the city of La Paz and confirming our return reservations, we drove to the ferry landing, looking for the cut-off roads to the water as we passed by. There were a few, nearer La Paz than the ferry, with many good-looking areas made inaccessible by car, due to the built-up shoulders of the new road - too narrow for parking on the side. After snorkeling at Playa del Balandras (to cool off), we ate our picnic lunch on that lovely beach and looked over our goodies: five Terebra intertincta (I think- new to us), a Mitra trista, six Conus nux and two Oliva spicata (a pretty variety with brown zigzag lines and strong dark purple folds on the anterior end of the columella). We cut over to Playa Pichilinge and were happy to find more of the same Oliva spicata, also a large Conus princeps, Sonus nux, two Cyprea annettae and several small shells I have yet to identify. George found several Strombus galeatus but had to leave them for, though large- they still had juvenile lips. It was a fun day and we were looking forward to more.

The next day was cold and rainy (mostly overcast) but we wanted to shell in the A.M. before going on to lower Baja (expecting to return for a day of shelling at the end of the week). Again we looked over the area from the ferry to La Paz and picked out a spot where we could drive close to the water, to save time. We had a great time, found two Terebra hindsii, Oliva, lovely cup and saucers, large Natica chemnitzii, and others to identify. We found several different families (dead) including cones- a real tease because there were so many miles of shelling and no time. Now that we know the type of shelling, we are anxious to return. There are so many old roads along the beach- we could even park across the road and walk to a good area and/or swim from there.

The waves were high and we couldn't collect in front of Las Palmas (low tide was at 5:00 P.M.), so we decided to find Pulmo Reef before we got too involved. That day was HOT and sunny, very dusty with no rain in lower Baja for a year. Our map was inaccurate, the turn-off was not marked and we ended up at San Jose del Cabo. This was sort of fun in a way - sightseeing on a beautiful day - so we continued to the end- Cabo San Lucas, "inspecting" the hotels and enjoying the beauty of the ocean and beaches there (not the prices, however).

George had gotten detailed instructions at San Jose del Cabo on how to find Pulmo- on the Hotel Punta Colorado road. We found the turn-off from the main highway- marked "La Rivera", nothing else. At the town of La Rivera we found the signs pointing to Punta Colorado, El Pulmo, Los Frailes. We stopped at Hotel Punta Colorado in clouds of dust, found that the price was \$40.00 and Pulmo was about 15 miles farther down the same road. It was afternoon and a bit late for more exploring so we make reservations there for the next few days- felt that thirty miles a day, round trip, in a rented car was preferable to sixty - seventy miles. A big mistake, but how were we to know that the next day would not only bring the first rain for a year, but with it a crippling tropical storm with high winds, a "eye", and resultant damage to the whole of lower Baja? Cabo San Lucas was flooded and people had to be housed in the school on the heights!

We were excited about shelling on Pulmo for the next three days and considered driving on to see the area. However we were hot and dusty and wanted to try the snorkeling at Buena Vista. Thirty extra miles on those narrow, dirt roads- and expl-

oring- would mean no swim or no dinner.

We had only about an hour but enjoyed the Buena Vista area immensely. Found: Cypraea albuginosa (our first), a large Conus purpureus, a freshly dead Cymatium gibbosum (also our first), dark Cypraea annettae, a Mitra tristis and two Parametaria dupontii! We found the shells that were available in this area, a sampling, and were even more excited about getting to Pulmo. We had chatted with guests at Buena Vista in the A.M. and heard of a shell-collecting taxi driver. He was there in the P.M. but had mostly beach shells, just one live-collected shell--a large Strombus galeatus which we bought for \$3.00- our last live shell of the trip!:

The next morning it was raining slightly but we were assured there would be no trouble getting to Punta Colorado; a light rain was welcome to minimize the dust. They did not know (no telephones) that the rain had started the night before down there. We had our picnic lunch, should be at our new home by 10:00 at the latest, dump our bags and on to Pulmo. We got to Punta Colorado at 12:30! About four miles from there on the dirt road we suddenly found ourselves sliding in mud, an adobe, clay-like mud. The car slid sideways- a slow motion 180° turn and stopped in foot-thick mud. We were shocked, completely helpless and alone. After about fifteen or twenty minutes a truck with two young men approached from the hotel. We could see their grinning faces. Then they started sliding, a 180° turn facing the other way. They stopped grinning. They worked with George, trying to push us back to the hard sand. They were able to straighten the car but it slid and stuck over the edge of the road into the ditch. Two more cars approached, stopped by the truck. One was driven by Bob Van Wormer, the Hotel owner. More people to push but more frustration. Then a big truck with four-wheel drive and two more men arrived, and finally we were on solid terra firma again. One by one the truck and other cars were brought out of the mud area. We should have returned to Las Palmas then, but we were so anxious to get to Pulmo Reef. Bob V.W. assured us that the Pulmo road was impossible that day but by the next day all would be dry and clear. We followed him on another, longer road to the hotel, mostly hard-packed sand but with arroyos or dry-river beds of slippery mud in two areas- getting stuck once more but easily pushed because of more hard-packed mud. We ate our picnic lunch in our room and watched the storm increase in intensity, with heavy rain, wind; the ocean dark, rough and angry.

For four days we were marooned, with numerous other people, for the planes were also grounded. Our room and bath were large and comfortable, except during the worst of the storm when leaks appeared around the windows, etc. It was a wet walk to the dining room. The food was good, though they ran out of some items. George had to drink his coffee black. One day we donned wet suits and with plastic bags etc., we walked for miles along the beach. We found lots of dead goodies- a 3½" Oliva incrassata, a large piece of Conus dalli indicating a 2½" or more shell. So frustrating. We tried snorkeling but the water was so very rough and the visibility less than six inches. I got seasick! The last day the sun came out and the water appeared calm. We hired a skiff with motor and a promise of Pulmo Reef. It took over two hours, probably three, to get there, with the waves increasing in size until we bounced and were drenched by each one.

We were way out, could not get into the bay, and had to turn back. I was practically in tears. The boatman was willing to stay out in the sea while we swam in through the big waves for, how many miles? We said, no thanks. It was a rough, cold trip back- even with wet suits. The wind and high waves increased and we had to have help to land the boat. We returned to our "cottage" at 4:00 P.M. (we had left at 9:00 A.M.) with our wet lunch. We never saw Pulmo Reef, we never saw Jim Bailey! Then we got the word and were packed and ready by 5:30 P.M. We followed the work crews out, careful to drive in their tracks. It had taken three days to make a new road up over the limestone hills and through pasture lands, necessitating stopping to open and close gates, and on to connect to the hard-sand road. The arroyos on the old road and into Pulmo were still full of water, three to five feet deep, and would take at least a week or more to dry up. We finally got to the hard top (after about

twelve miles- at least an hour) and drove like mad to La Paz and the Hotel Guaycura, arriving at 8:30 in time for dinner (9:00 deadline),

Unfortunately, there's more. The next day our 10:30 a.m. plane (from Mexico City to L.A. via La Paz) was changed to 5:30 P.M. El Presidente left Mexico City for Rome in his plane, with two others escorting him, and no other planes could arrive or leave before, during, or after this event for reasons of security! So many unhappy people! We were due in San Francisco that night and finally got on a local that stopped in Tijuana. We picked up our stored Convention bags in Los Angeles, flew to San Francisco and arrived at the Hilton at around 6:00P.M. We waited with mobs of others for two hours to get our room (reserved for six monthes), We followed the California USC football game; the alumnae and other rooters were housed in the Hilton. They did \$15,000.00 damage and the college was billed \$25,000.00, an annual event! Telephones ripped out, pictures yanked off the walls, Japanese screens slashed. We found unfinished pizza under the bed, closet door broken, etc,- at \$50.00 a day in the Tower (no meals). It took two days before we were able to move - into a lovely clean room- and were able to smile as we continued the hectic day and night life of a convention.

GIVE SHELLS

NOW

THE CLUB MUST HAVE YOUR SPECIMEN SHELLS
WITH DATA NOW IF WE ARE TO HAVE A FUN
AUCTION AND POTLUCK NEXT MONTH.

BRING YOUR SHELLS TO THE MARCH MEETING.
IF YOU CANNOT ATTEND, CONTACT A BOARD
MEMBER AND MAKE OTHER ARRANGEMENTS.

REMEMBER THAT OUR AUCTION PROCEEDS ARE
OUR ONLY SOURCE OF INCOME OTHER THAN
DUES. WITH THIS WE DONATE TO THE
SCIENCE FAIR, THE VELIGER, PUBLISH THE
FESTIVUS, SUBSIDIZE OUR SOCIAL FUNCTIONS
AND PROVIDE OPERATING FUNDS.

FOR THE AUCTION-POTLUCK

ABALONE REGULATIONS UNDER STUDY

by Jules Hertz

During the months of February and March 1975, The San Diego Union has featured several articles discussing California's Department of Fish and Game's (DFG) proposed changes in regulations on harvesting of abalone. It is generally accepted that the abalone resource is in danger, and that measures such as reduced seasons, reduced numbers of commercial fishermen, specified commercial quotas etc. are necessary.

The DFG wants to reduce the sport season by three months (making it a seven instead of a ten month season); terminate the present allowance of three daily bag limits of abalone on a multi-day sportfishing trip; split the commercial season to a March-June and November-December interim; trim the number of commercial divers to 70 within five years from the present number of 360; lower the legal size limits for pink, white and green abalone; and establish a commercial quota (suggested quota of 400,000 fewer abalone next year than were harvested last season).

At the recent public hearing, none of the 75 public participants questioned the need for tough controls. There were different proposed methods of obtaining the desired objective, i.e. saving the abalone. Some of these included reduced daily limits for sportfishing, more enforcement of regulations, requirement for diving logs, etc. The one area where there was complete disagreement with the DFG's proposed changes was in the lowering of size limits. The DFG claims that when size limits are set too high, "stunting can result." It also contends that lowering size limits would reduce losses due to bar cutting and removal and replacement of undersize abalone. Under discussion, it was brought out that the DFG testing which preceded the development of proposed regulation changes occurred in "protected areas" and not where the commercial divers work. It was suggested that the testing grounds may be "dormant beds." It was also the opinion of the public that losses due to bar cutting and removal and replacement of undersize abalone would occur regardless of the size limit set.

This writer is in complete agreement with the need for immediate action to avert complete disaster to the abalone population. Reducing size limits doesn't appear to be the right approach since "stunting" was no problem when there were adequate numbers of abalone available. It is important to get at the heart of the problem, i.e. to assure adequate numbers of available abalone for breeding purposes to increase the population rather than keep it at a status quo. It is surprising to this writer that there were no proposals reported to eliminate the exporting of abalone from the State of California. The legalizing of exports only occurred within the last ten years, and surely elimination of exporting would reduce the pressure on the abalone population. Restocking of the diminished populations by small commercially grown abalone might also be highly desirable.

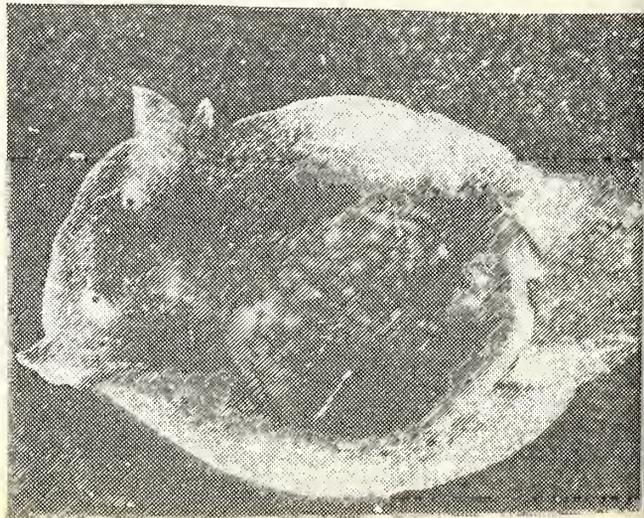
FINDING HAMINOEA VIRESCENS INTERTIDALLY

By Carole M. Hertz

During the low tide on September 14, 1974, Jules and I went to the base of Archer St. in San Diego to observe the intertidal life.

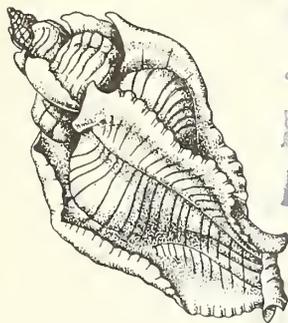
We were surprised to see live Haminoea virescens (Sowerby, 1833) under a rock in the low tide area. We had only found this bubble intertidally along the open coast one before (in 1971 at Windansea Beach in La Jolla.) Our usual experience has been to see this small creature in quiet waters with a muddy substrate.

Photo of Haminoea virescens by Dave Mulliner



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SAN DIEGO SHELL CLUB

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MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Carole Hertz
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VOL. VI

April 1975

No. 4

** PROGRAM: Annual Club Auction and Potluck, April 19, 1975 at 6P.M. at the
** home of Jim and Eunice Seay. Map and details on last page of
** this issue.

SHELLING IN THE MARQUESAS

The story of a trip to the Marquesas by plane was related by Twila Bratcher at our March meeting. With her sister, Billee Dilworth, Twila was one of some twenty shell collectors who flew to this most northeasterly group of the many, many islands that constitute French Polynesia.

They made a "white knuckle" landing (quoting Twila) on a just adequate field sliced across the top of the mountain that is the island of Hiva Oa. For most of its circumference its sheer rock walls rise sharply from the sea and there are few beaches. It is heavily vegetated, comfortably populated and very acceptable accommodations are available.

The beauty of the women, celebrated by Gauguin, was attested in several slides; so were the blazing colors that abounded, surrounded and dumbfounded. They were almost unbelievable--the reddest reds, the most golden yellows, intense blues and vibrant greens.

The shelling was very rewarding and a bonus to our Club was a chance to examine the specimens collected. The rarest shell of their whole trip was a beach specimen of Cypraea cassiaui Burgess 1965 found in the Marquesas.

We are hoping that we can have an article from Twila at a later date.

FROM THE MINUTES

The amendment to the Club Constitution concerning gifts of money to private individuals was read and voted upon. The amendment passed by a count of hands. George Radwin reported on the progress of WSM-AMU plans. The auction will be at the home of Jim and Eunice Seay on April 19. at 6 P.M. A letter was read asking our support in requesting a postage stamp issue honoring conchological clubs. After discussion, it was decided that we write opposing this suggestion. The consensus favored a stamp issue featuring shells but not clubs. No vote was taken.

Comments on a "Draft Report on Recent Abalone Research in
California with Recommendations for Management"
by Gordon Robilliard

Carol Hertz brought the following report by Rolla Williams in the January 18, 1975 issue of the San Diego Union, to my attention.

"The Department of Fish and Game served notice on abalone fishermen yesterday that it plans to shorten both commercial and sport fishing seasons for the shellfish while allowing the take of smaller abalone. The abalone fishery, which has increased on both sport and commercial fronts while catches have sagged to about half that of 1957, was studied for 18 months and the "Draft Report" was the result.

Besides sea-otter foraging, over which it has no control, DFG cited sea urchin encroachment, environmental degradation, improper size limits, the taking of "shorts," and "excessive picking pressure" as key factors in the ailing fishery.

"Picking pressure" means the mortality resulting from prying the shellfish from rocks, carrying them to the surface for measuring and, when undersized, replacing them on the bottom.

The remedy DFG suggests is to trim the present ten month season to six months for commercial fishermen, seven months for sports fishermen, put a moratorium on any new commercial diving permits, formulate landing quotas, and reduce, by fractions of inches, what now are considered legal 'abs'. It also would reduce abalone limit to four in Central and Northern California, but leave it at five in the south."

I obtained a copy of the draft report, which was prepared by three technically capable and competent California Fish and Game biologists, Richard Burge, Steven Schultz, and Melvyn Odemar and which was presented to the California Fish and Game Commission. In this article, I have made comments and observations on this report.

First though, some clarifications and ground rules are necessary. The main "red flag" raised in the article quoted above is "... formulate landing quotas and reduce, by fractions of inches, what now are considered legal 'abs'." To most shell collectors, malacologists, many other biologists and numerous gourmets, the other recommendations such as shortening the commercial and sport seasons, putting a moratorium on new commercial diving permits, and reducing the bag limit to four in Central and Northern California are all "good" ideas; i.e., these regulations would tend to reduce the catch by the fishery and leave more abalone in their natural state.

This brings up a second point; i.e., is it more desirable to leave abalone in their "natural" state or to harvest and manage this resource to the economic and gustatory benefit of man? Obviously, the premise under which DFG conducted this work is the latter whereas most readers of the "Festivus" are likely to hold the former view. Rather than get embroiled in this philosophical debate in this article, I intend to cop-out to a certain extent and generally restrict my comments to the technical aspects of the report. That is, for the present, I will accept the DFG premise that the abalone are a resource that should be managed and harvested, and analyze the data and interpretations presented for consistency with the proposed recommendations.

The report cites statistics which show a 300% increase in the commercial fleet (from 75 to over 210 boats) since the early 1950's, yet the harvest (excluding black abalone) is only about 30% of that in the 1950's. In Southern California, there has been more than a 400% increase in sports diving for abalone since 1965, yet only a 250% increase in catch. In Central and Northern California where commercial exploitation is minimal or prohibited, there was a 400% increase in sports diving effort between 1960 and 1972, yet only about 200% increase in catch. Finally, there has been a dramatic decrease in the harvest of abalone in the Morro Bay region since 1967. Prior to 1967, the harvest was more than one million pounds, but in 1968, it dropped to 650,000 pounds and decreased to less than about 190,000 pounds in 1970, 1971, and 1972.

There are several possible explanations for these decreases, some of which the

report mentions or implies, and some of which are ignored. The report states:
 "The reasons for the declining abalone PRODUCTION (emphasis mine) are
 multifold and complex, but can generally be grouped in nine categories."

The description of each of these nine categories is quoted below with my comments following each category.

CATEGORY 1. "Excessive picking pressure on sublegal abalones. The constant picking and replacing of abalones slightly short of legal size results in a high mortality rate from bar cutting and predation on replaced abalones."

Data presented later in the draft report show quite conclusively that a significant proportion of the abalone which are "picked", i.e., pried off the substratum with a knife or ab iron, are cut and that they bleed to death. Another large proportion are lost to predators after the diver discovers they are undersize and replaces them on the bottom, before the abalone is able to reattach safely. This finding was the impetus for the regulation which appeared in the 1974 Sport Fishing Regulations; i.e., abalone could not be collected using any sharp-pointed or sharp-edged instrument such as a knife or the old "ab iron".

Presumably this excessive "picking" pressure is due to both commercial and sports harvest. It will be difficult to regulate sports divers and, indeed, the report does not even recommend trying except through public education programs.

However, the DFG does recommend that the commercial fishermen be regulated, specifically:

"To significantly reduce the excessive commercial picking pressure on sublegal abalones, we recommend a limited entry fishery and shorter seasons."

To accomplish this, they propose to reduce through attrition the number of diver permits to about 70 from the present approximately 360 through several measures namely:

- 1) Establish a immediate moratorium on issuing diving permits to new divers.
- 2) Reissue permits only to those divers that purchased a diving permit the preceeding year.
- 3) Do not reissue a permit to a diver who:
 - a. Does not buy a diving permit for one year.
 - b. Lands less than 50% of the average divers landings, or dives less than 30 days a year.
 - c. Flagrantly violates fish and game laws such as size limits and seasons.
- 4) Increase the diver permit fee to \$200.00 in 1975 and to \$500.00 in 1980.
- 5) When the number of divers drops below 70, issue new permits on the basis of line tending experience, diving experience and test results.

Overall, these measures should reduce the number of novice divers and thus the "picking" pressure. Experienced, "professional" abalone divers seldom make mistakes in estimating size of near-legal abalone; most of them can estimate size to within 1/8th inch. In addition, they cut fewer abs while removing them.

However, there are two problem areas with the proposed measures. First, 3(c) suggests not issuing a permit to a diver who FLAGRANTLY violates fish and game laws. It is my opinion that a permit should not be issued to a diver who in any way violates the laws (and is caught at it). Otherwise, who is to decide what is flagrant? Second, who is going to be responsible for determining that a diver has the necessary experience (see #5)? Most DFG biologists are not commercial ab divers and they may not have the necessary experience to judge someone else. This regulation would undoubtedly result in confusion, red-tape, and probably some illegal pay-offs.

There is another consideration here. Later in the draft report and in this paper is a discussion pertaining to reduction in legal size limits of some species. This will mean that the commercial and sports divers will have to learn again to estimate what constitutes a legal size abalone. At first, they will probably make a lot of mistakes and the "picking" pressure will probably increase, or at least remain about the same as it is now, for a few seasons. However, if the above measures are enforced, the loss due to "picking" of sublegal abs should rapidly decrease as the "professional"

commercial divers become more experienced and familiar with the new size limit.

CATEGORY 2. "Improper size limits. Present size limits are too large to allow for optimum utilization of pink, white, and green abalones."

As I said earlier, this is based on the premise that utilization of a fisheries resource at the "maximum sustained yield" level is "good". On this basis, the statement is generally correct and defensible. However, there are a couple of problem areas.

One is the lack of mention of red or black abalone; in fact, they are seldom mentioned anywhere in the report despite the fact that they comprise the major portion of the present catch. I can only assume that the present size limit for reds and blacks is "proper".

Second, early in the report, the statement is made that "Greens, which were first fished consistently in the early 1960's, reached a peak (harvest) of 1.1 million pounds in 1971 following a size limit reduction, and in 1973 fell to only 156,000 pounds." This suggests that lowering the size limit again will only result in a sudden increase in harvest the year that the limit is reduced followed by a rapid decline in harvest

as the majority of the legal-size abs are harvested. The dramatic increase in harvest of any commercial species following a relaxation of the regulation or quotas, and the subsequent decline in harvest to even lower limits within a relatively short period is classical. It has happened to whales, salmon, herring, anchovies and will be true for the green, white, and pink abalone populations.

Fortunately, DFG has recognized the potential for a short-lived "bonanza" fishery, and they have recommended a yearly quota for each species. After this quota is reached, the season would be closed for that year. The quotas are somewhat arbitrary but based on historical data; thus they should be a reasonable first approximation. The quota could be adjusted in ensuing years to maximize the harvest and yet maintain a population large enough to sustain the future of the species, i.e., "maximum sustained yield".

An obvious problem with the quota system is who will determine the quotas? Will it be the biologists of the DFG Marine Resources Division, or the Fish and Game Commission, or the fishermen. If the recommendations come from the Marine Resources Division and are accepted by the Commission, then the quota system will probably work. If the fishermen or the Commission have the final say, then there is every chance that the quotas will be too high and the harvest will rapidly decline. Past experience with the International Whaling Commission, the California anchovy and sardine fishery, the Canadian herring fishery, and the International Tuna Commission do not give us much confidence that self-interest groups will act in a manner to ensure the long-term existence of a fishery over the short-term economic benefits of overharvesting.

CATEGORY 3. "The adjustment from fishing on an accumulation of unfished stocks during the 1950's and early 1960's to a lower annual yield basis in recent years."

What this means (I think) is that when the ab divers of the 1950's and early 1960's depleted the abalone populations of one area to the point where the catch per unit effort was not profitable, they moved to another, previously unexploited area. For example, after the Pt. Loma-La Jolla kelp bed populations were essentially eliminated, the commercial divers moved to the Channel Islands or to other nearby areas.

However, in recent years, all of these previously unexploited stocks of abalone have been found and harvested to a greater or lesser degree. Now the divers must depend on going from one area to another and harvesting fewer abs in each area. This situation is partly a result of overfishing and partly a result of all the other reasons listed here for the decline in abalone populations.

CATEGORY 4. "Sea otter foraging off San Luis Obispo and Monterey counties in rich red abalone beds that once produced over one million pounds annually. Approximately 130 miles of coastline are now depleted of abalones, sea urchins, clams, crabs, and many other invertebrates by sea otters."

This statement is just plain garbage from both an ecological and an evolutionary standpoint though it may be reasonable from a resource management standpoint.

First, to state that 130 miles of coastline are depleted of all these species is to imply that they are all gone. Yet, the same DFG biologists state in several other in-house reports that red sea urchins are becoming much more abundant in the Diablo Cove area in recent years. And anyone who has been diving off Monterey knows that none

of these species are depleted though their numbers may be lower than they would be if the sea otters were not present (as was the case in the 1950's).

Second, DFG, abalone fishermen, and others who claim that the sea otters threaten to eliminate one or more of their prey species seem to forget that these species evolved and co-existed several millenia prior to the advent of white men. So far as we know, the predation by sea otters did not eliminate any prey species during that time. Undoubtedly, the populations of many of the prey species as well as the sea otters were lower than they are presently though they were in "balance". Virtual elimination of sea otters by fur traders by the early 1800's upset this "balance" and released the prey species from predation pressure. Thus, their populations increased to "artificially" high levels. It was during this period of high populations that divers began to exploit the abalone populations, i.e., in the early 1950's. They were able to harvest large numbers because they were the only major "predator".

In the past few years, the sea otter populations have been expanding and they undoubtedly have exerted some predation pressure on abalone as well as other prey species. However, in areas like the Monterey coast south of Point Pinos where there are numerous sea otters and commercial or sport abalone fishing is prohibited, there are large numbers of legal red abalone as well as other molluscs, urchins, etc. The abalone escape predation by hiding in narrow cracks where the otters can not reach them. The abalone that are taken are probably those which venture out from the safety of these cracks during daylight, feeding hours of the otters. Thus there is strong selection pressure for abalone to remain hidden in the presence of otters.

Third, blaming the otters for the decrease in abalone might be feasible in Morro Bay, but it is completely unupportable for Southern California. There have been no otters in the Point Loma kelp bed for several decades, yet there are few legal red abalone left. The evidence for this is in the fishermen themselves; most of them have quit fishing there and have gone to the Channel Islands.

Fourth, there is some experimental and descriptive evidence from studies conducted by Dr. John Pearce and his students at University of California (Santa Cruz) to show that "... the fish and game department is unjustly blaming otters for the disappearance of abalones and clams. The study says humans are at least partly to blame, harvesting huge amounts of shellfish, including some that are immature." (S.D. Union, Feb.6, 1975)*

CATEGORY 5. "Environmental degradation along some portions of the southern California mainland that once produced substantial numbers of abalone."

Pollution or environmental degradation is a good catch-all to blame when anything changes from what it was in the "good old days". But without better documentation and without definition of more specific cause-effect relationships, I view this statement as a cop-out and meaningless.

It may be true that thermal discharges, municipal waste discharges, harbor pollution, decreased runoff, and other pollutants have had a significant direct or indirect effect on the abalone populations but except possibly for specific local situations, I doubt it. In any event, there is no hard data to support these statements, either DFG's or mine.

CATEGORY 6. "Urchin encroachment in areas where only abalones were harvested, creating severe competition for food and space."

The statement is true and one only has to dive in the Point Loma kelp bed to see the large expanses of rock walls covered with shallow, concave depressions, each of which used to hold an abalone, and almost all of which now hold urchins.

Although competition for food and space may be of some importance a more likely explanation for the lack of abalone is that the urchins eat the larval or tiny abalone if they try to occupy these depressions. The feeding structure of the urchin, called 'Aristotle's lantern', is comprised of five jaws which act in unison to scrape the surface of the rock and anything on it toward the mouth located in the center of these jaws. Algae, small worms, crustaceans, diatoms, and larval or juvenile forms of many species

*I have not seen the report itself and I realize I may run some risk of misinterpretation of the study if I quote the newspaper; after all, that is what generated this critique. However, I am aware of Dr. Pearce's work from personal interviews and from other papers.

including abalone are thus ingested.

One possible explanation for why urchins are so successful in these areas is that abalone were "over-harvested", and in too short a period of time. This would leave too few abalone, and mostly small ones at that, to keep the depressions free of urchins.

Another partial explanation is that the elimination of sea otters removed one of the urchins main predators thereby allowing the urchin populations to expand rapidly. They may have simply "over-run" the habitat formerly occupied by abalone, especially when the abalone were not present to fully occupy the habitat.

CATEGORY 7. "Poor larval recruitment and/or inadequate nursery habitat along several areas of the mainland and offshore islands."

I cannot comment on this except to wonder if there is any really good data on the larval recruitment of abalone and/or the presence of nursery habitat. I am also prompted to wonder if maybe reducing the standing crop of large, sexually mature adults might not be a major factor in the poor larval recruitment.

CATEGORY 8. "Loss of fishing areas due to closures including sections of San Nicolas, San Clemente, Anacapa, and Santa Barbara Islands."

Certainly closing these areas to abalone divers will reduce the number of abalone that could be harvested, at least in the short term. On the other hand, it is conceivable that the presence of these unexploited populations is necessary for the continued survival of the several species involved, i.e., the large, mature adults here may provide a large portion of the recruitment for the southern California fishery. So far as I know, there are no data which support or refute this hypothesis.

Interestingly enough, DFG has proposed and still is proposing to capture "excess" sea otters in the Morro Bay and Monterey Bay area and ship them to San Nicolas Island. Based on their own data and claims, that action will almost surely result in the elimination of abalone populations around the island. Furthermore, it is quite likely that the otters will then spread to the other channel islands, where there is presently extensive commercial fishery, and eliminate these fisheries.

CATEGORY 9. "Illegal activities by a few fishermen. The taking of large numbers of short abalones from a single bed reduces the recruitment of the legal fishery, reduces the spawning population, and allows faster encroachment by sea urchins. However, our surveys indicate that the take of sublegal abalones is not widespread."

I am only curious as to how one conducts a survey to get fishermen to admit they have done anything illegal. No fisherman in his right mind will admit to taking shorts or, if he is caught with some, to having done it more than once.

Reiterating the premise that management of the abalone resource for utilization by people is a laudable objective, I feel that in principle the DFG proposed regulations and quotas could permit management of the abalone on a long-term maximum sustained yield basis. However, I think that neither the data available nor the data presented in the report support many of the statements concerning the present decline in harvestable abalone populations. There is a conspicuous lack of mention or emphasis of overfishing by commercial fishermen, yet this could very well be one of the major causes of the decline.

In my opinion, the DFG proposals may be more or less idealistic. There is no reason to believe that the fishing industry will police itself anymore than this or any other fishing industry (except those of so-called "primitive" tribes) has or does police itself. The economics of survival within the industry as in all industries in our society dictate a "feast today and to hell with tomorrow" attitude. Yet, there is no indication that the DFG enforcement staff would or should be increased to ensure compliance with the proposed regulations.

Some other more basic questions are not dealt with in the report but should be considered by all those concerned with abalone populations. For example:

- 1) Should California limit out-of-state export of abalone and insist that the product be sold only within the state? This might reduce fishing pressure for awhile.

- 2) Should there be a complete moratorium on abalone fishing by sports and commercial fishermen for several years in order to allow the standing crop of sexually mature adults to increase?
- 3) Should certain areas be completely protected on a rotating basis and very carefully managed in terms of harvesting pressure?
- 4) Should we be concerned about abalone at all? Why? Are they important in the ecosystem or are we concerned about them on moral, emotional, and aesthetic grounds? At this point, I would suggest that we don't know how important they may be and for this reason alone, we should be concerned about their fate and survival.

As of this writing, I do not know the current status of the proposed regulations though it seems likely that there will be further consideration of the proposals by all concerned before the regulations become law. Hopefully, the regulations will be implemented soon, and refined as time and new information dictate.

COLLECTING IN THE SAND

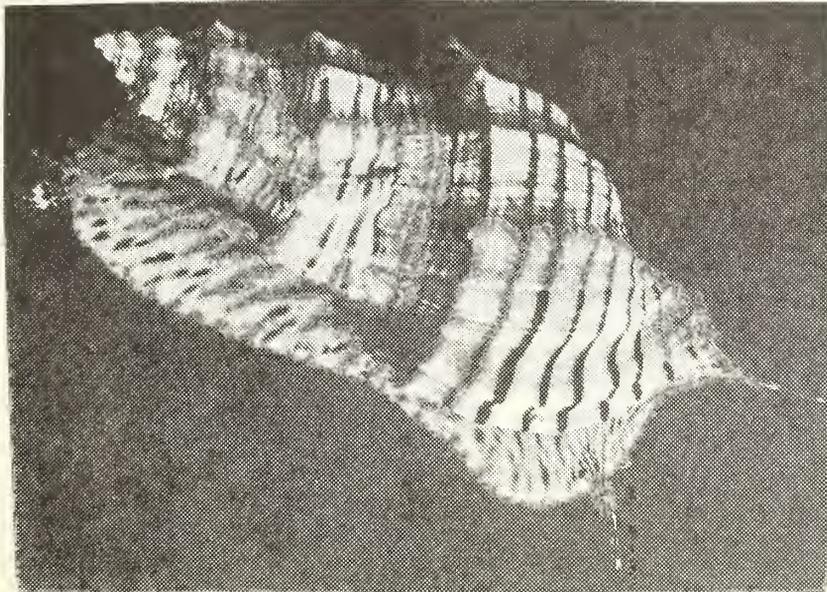
David K. Mulliner

Looking east from John Myers' boat, anchored over the sand bottom, the big bull kelp (Pelagophycus porra) is only 100 yards away. Beyond the extensive kelp beds (Macrocystis pyrifera), Pt. Loma rises in steep cliffs 30-100 feet high and then slopes upward. Along the slopes are Pt. Loma College (formerly Cal Western) and Naval Electronics research facility. It is off this part of San Diego that we make our week-end dives, exploring, photographing and collecting.

Down the anchor line, an "everything" OK signal from your diving buddy and down you go. On dives over 100 feet deep we use very little weight on our belts and are therefore quite buoyant on the surface, so we pull and kick our way down the anchor rope. We pause several times on the way down to check each others equipment and to clear the pressure in our ears.

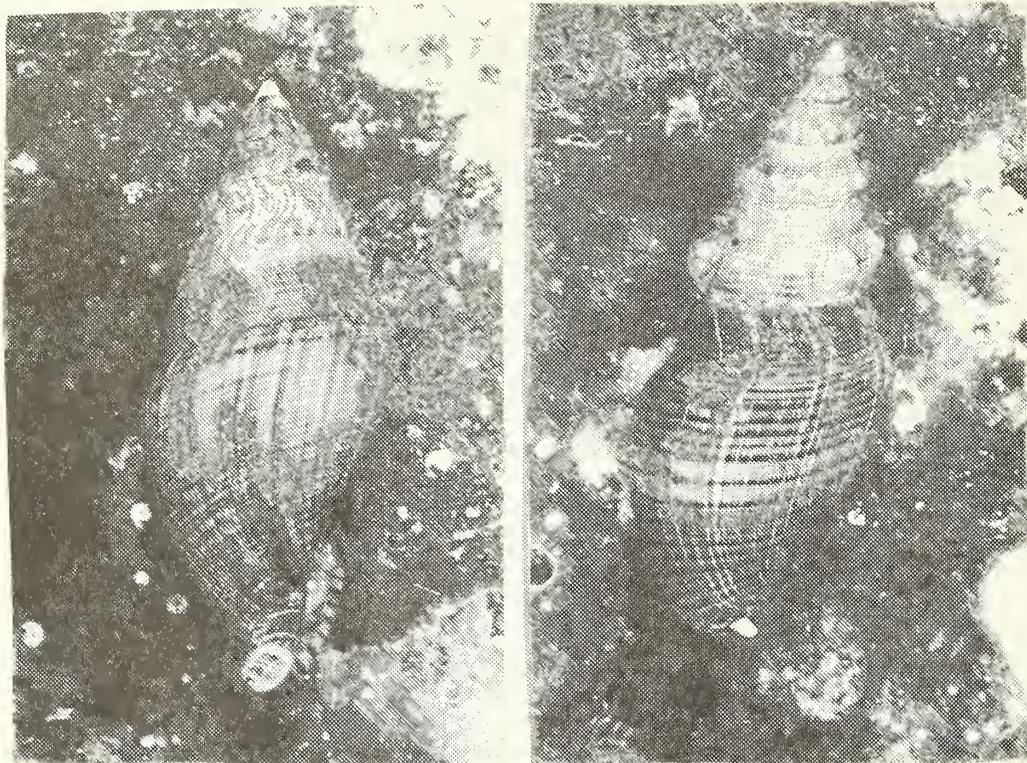
The water was clear and cold but getting colder and darker as we neared the bottom. We touched down in a swirl of silt, the depth gauge read 120 feet deep. Checking our compasses, we headed east towards shore. John was swimming about ten feet away and parallel with me. We twisted and turned as we swam so as not to miss anything of interest along the way.

My light illuminated a Bursa californica and then another. Several single valves of Pecten diegensis were collected. Many hermit crabs in parts or whole shells of Kelletia kelletii, Polinices lewisii and other common shells were seen. I found several Megasurcula stearnsiana (syn. M. remondii) and Crassispira semiinflata. Then all of a sudden the most beautiful animal and shell loomed in my light-- it was a Cancellaria cooperi. Moments later John sig-



Cancellaria cooperi Gabb, 1865

naled that his air supply was running low. We surfaced and headed for the boat and a hot cup of tea with honey in it. On board we compared our finds. John had a beautiful hermit crab specimen of Cancellaria cooperi, so freshly dead it looked live taken. Mine was live and measured 46mm. We had both taken several specimens each of Megasurcula stearnsiana and M. carpenteriana.



Two forms of Megasurcula carpenteriana (Gabb, 1865)

In the following weeks we added several more of each species to our collections and also found Terebra pedroana. The bottom in this area is always dark and cold, and the least bit of surge causes silt storms that reduce visibility. On our last dive there we could tell we were on the bottom only when we suddenly stopped. We aborted this dive as futile. On some previous dives the visibility had been 30-40 feet horizontally. It was on those dives that we made our best finds.

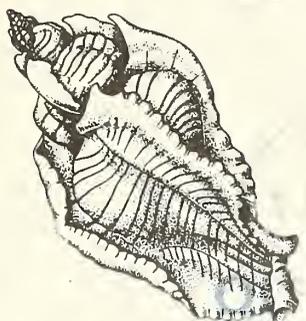


Terebra pedroana Dall, 1908

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MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

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Vol. VI

May 1975

No. 5

* PROGRAM: Bob Schoening will speak on Shells of Guam with Emphasis on Bones *
* Meeting date- May 15 at 7:30 P.M. *
* Slides of the Club auction will also be shown. *

AS PLEASED AS PUNCH!
Dickens- Hard Times

The success of this year's Shell Club Auction was due to a marvelous combination of: the hospitality of Jim and Eunice Seay, the terrific auctioneering talents of Norm Currin and George Radwin, Peg Mulliner's quick pen, Dave Mulliner's quick "punch", generous donors, great food, and good friends.

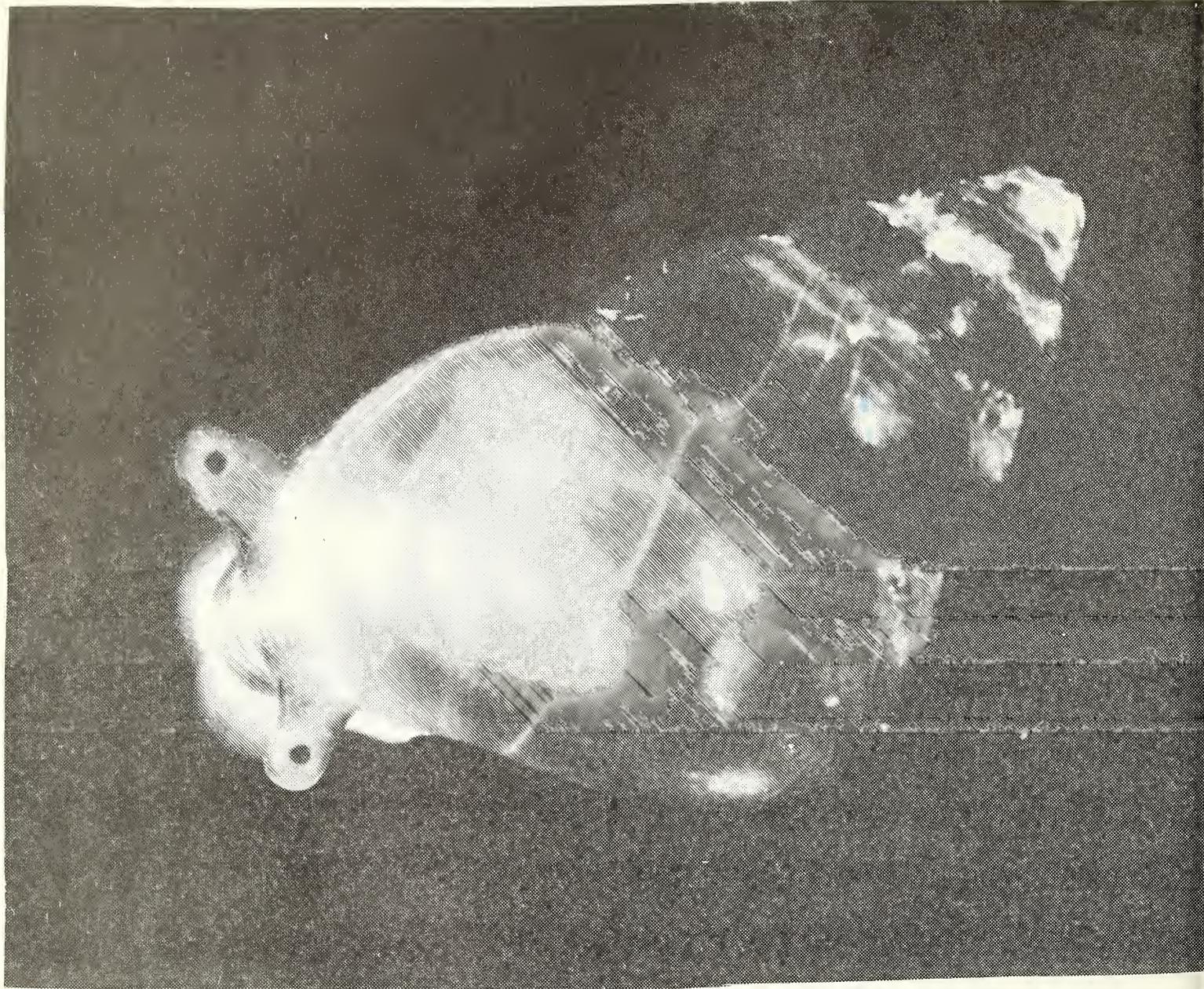
All these combined to make a most enjoyable evening as well as a profitable one! (To the tune of \$528.00!).

A. Schwarz

ADDITIONS TO THE ROSTER

BAUER, Mrs. Laura M.
2126 45th St.
Galveston, Texas 77550

RUHL, Deborah Ann
10699 San Diego Mission Rd. #303
San Diego, Ca. 92108
284-1083



Assiminea californica

60X

The above photograph of Assiminea californica Tryon, 1865 was taken by David Mulliner who collected the specimen on March 4, 1975 and provided the information which follows.

The animal was collected above the high tide line in mud at the base of Salicornia (pickleweed) in San Diego Bay at the foot of L Street in Chula Vista.

The shell is approximately 2.5 mm. in length and is reddish-brown. The animal is grayish white with eyes on eyestalks.

In the animal photographed, several air bubbles were apparent within the shell and can easily be seen in the above photograph. Why are they there? Do they form a flotation mechanism?

Thanks to the efforts of Barbara Good, the Festivus has received permission from Bernard Young of Durban, South Africa to reprint the following:

PARTIAL LIST OF ERRATA IN B.F. KENSLEY'S BOOK
"SEA-SHELLS OF SOUTHERN AFRICA"

"The following does not purport to be a complete list of errata. Some groups (e.g. Columbelloidea, Turridae, Marginelloidea), are so poorly figured that the illustrations are impossible, often, to match. Similarly, in several families (e.g. Turridae, Columbelloidea, Mitridae, etc.) modern classifications differ so widely from those used, that corrections would be too extensive for listing. Points of personal belief or controversy are also excluded. Nor have authors or distribution data been checked.

(a) Erroneously listed as being South African.

133 Turbo chrystosomus

618 Fusus torulosus (shell is Fusinus forceps Perry, which is not South African either.)

825 Conus gilvus

(b) Erroneously listed from Mocambique.

21 Haliotis assiniha (sic - asisina)

138 Turbo petholatus

368 Cypraea ocellata

819 Conus eburneus

(c) Wrongly named.

116 Not Cinysca forticostata (first fig. of 117 is this), but cannot resolve.

201 "Tectarius granosus" = Nodilittorina mullerana (Phil)

269 "Cerithium morus" Lam. = Cerithium tuberculatum Linn.

374 "Cypraea ursellus" = Cypraea oweni Sowerby

411 Upper figure is Phalium faurotis (Jousseau)

428 "Gymatium clandestinum" = Cantharus undosus (Linn) (Buccinidae)

445 "Bursa crumena" = Bufonaria crumenoides (Val)

462 "Drupa aspera" = Morula margariticola (Brod)

470 "Iopas situla" = Nassa francolina (Blainv)

503 "Thais bitubercularis" = Thais tuberosa (Röd)

621 "Latirus alboapicatus" = Latirus burnupi Smith

628 "Peristernia leucothea" = Peristernia forskalii forskalii (Tapp. Canef.)

593 "Nassa fenestrata" = Nassarius albescens gemmuliferus (A. Adams)

629 "Peristernia leucothea" = Peristernia forskalii forskalii (Tapp. Canef.)

595 "Nassa glans" = Nassarius mucronatus (A. Adams)

651 (652) "Mitra punctostriata" = Mitra incompta Lightfoot

327 "Natica marochionensis" = Natica qualteriana Recluz

643 "Oliva elegans" = Oliva tigrina Lamarck

660 "Mitra cadaverosa" = Vexillum pacificum (Reeve)

810 "Conus aplustre" = Conus infrenatus, (left figure) and Conus bairstowi, (right figure).

817 "Conus coronatus" = Conus piperatus Dillwyn

836 "Conus mozambicus lautus" = Conus tinianus.

838 "Conus musicus" = Conus sponsalis Hwass

849 "Conus scitulus algoensis" = Conus tinianus

861 "Terebra apicitincta" = Hastula albula (Menke)

895 "Bullina ziczac" = Micromelo guamensis (O.&G.)

(d) Wrong family or wrong name.

287-289 "Subfamily Triphorinae" = Family Triphoridae

442 Ithalassocyon is Ficidae

298-299 "Amaltheidae" = Hipponicidae

300-301 "Capulidae" = Calyptraeidae (?)

302 "Capulidae" = Hipponicidae

673 "Mitra teretiuscula" = family Volutomitridae

394-395 Strombidae

406 Oocorythidae = Tonnidae

(e) Obsolete genera

- 116 Cynisca = Cinysca
 161 Melanella = Balcis
 174 Scala = Epitonium
 298 Amalthea = Hipponix
 335 Sigaretus = Sinum
 387 Amhipera = Ovula
 470 Iopas = Nassa
 420 Cymatiella = Sassia
 565 Nassaria = Hindsia
 585 Nassa = Nassarius
 613 Fusus = Fusinus
 884 Haminea = Haminoea
 881 Bullaria = Bulla
 897 Solidula = Pupa

(f) Placed in wrong genus.

- 201, 202. Nodilittorina, not Tectarius
 268 Rhinoclavis kochi, not Cerithium knochi
 321 Stellaria solaris, not Xenophora solaris
 462-466, 468 Morula spp., not Drupa (467 is true Drupa)
 471 Vexilla vexillum, not "Topas" vexillum
 561 Latirus filmerae, not Euthria filmerae
 564 Pisania crenilabrum, not Metula crenilabrum
 868 Hastula diversa, not Terebra diversa
 673 Microvoluta teretiuscula, not Mitra teretiuscula

(g) Wrong authors

Not thoroughly checked. For "Bolten" in all cases read Roding, for "Solander" read Lightfoot. Chemnitz, Martini and Meuschen are not valid authors.

- 471 Author, Gmelin
 439 Author of Cymatium ranzanii is Bianconi

(h) Obsolete specific names (synonyms)

- 17 Patella variabilis = Patella concolor Krauss
 108 Stomatella articulata = sulcifera Lamarck
 140 Turbo splendidulus = laetus Phil.
 148 Nerita plexa = textilis Gmelin
 196 Littorina glabrata = Kraussi Rosewater
 299 Amalthea barbata = Hipponix pilosus (Desh.)
 329 Natica taeniata = Natica alapapilionis (Roding)
 466 Drupa morus = Morula uva (Rod.)
 463 Drupa cancellatum = Morula cariosa (Wood)
 506 Thais carinifera = Thais mutabilis (Link)
 511 Thais gemmulata = Thais alouina (Rod)
 555 Burnupena papyracea tigrina = Burnupena pubescens (Kuster)
 556 Cantharus carinifera = Cantharus subcostatus (Krauss)
 569 Volema paradaisica = Volema pyrum (Gmelin)
 584 Demoulia retusa = Demoulia ventricosa (Lam.)
 619 Fusus verriculatus = Fusinus ocelliferus (Lam.)
 644 Oliva ispidula = Oliva oliva (Linn.)
 650 ("648") Mitra episcopalis = Mitra mitra Linn.
 652 (651") Mitra pontificalis = Mitra stictica Link
 662 Mitra crenifera = Neocancilla clathrus (Gmelin)
 674 Mitra texturata = Pterygia scabricula (Linn.)
 672 Mitra subulate = Vexillum costatum (Gmelin)
 863, 864 Terebra casta (and var. natalensis) = Hastula albula (Menke)

(i) wrong locality data (very incomplete)

- 338 Cypraea algoensis - not Natal
 477 "Murex" wahlbergi = Table Bay, not Natal
 539 Pyrene floccata - not Western Cape
 744 Marginella rosea - not P.E..

(j) Misidentified, but figure undeterminable.

615 "Fusus colus"
790 "Philbertia capensis"
858 "Conus zeylanicus"

(k) Misspellings.

p. 14 - "operculi" = opercula
30 "scutella" = scutellum
37 "ruppellii" = rueppellii
50 "Scutum" = Scutus
52 ("51") "Tugalia" = Tugali
385 "vescicularis" = vesicularis

(l) Reversed numbers (excluding those on published errata list)

3=5	4=3	5=4
51=52	52=51	473=474
474=473	560=568	568=560
689=690	690=689	699=698
698=699		

(m) Miscellaneous

p.7 Crepidula larval development takes place in the plankton.
p.15 In the diagram, columella base is labelled "umbilicus" and shoulder is labelled "periphery".

MISCELLANEOUS ODDS AND ENDS

(The following are very helpful bits from Waneta Ames. Her wonderful and beautifully organized collection attests to her expertise.)

Some of my boxes are square, without hinges, so to keep them from coming loose, I use a smitch of wax at the corners. Wax is also good to keep bivalves together and to join the plates of the larger chitons.

Sometimes Scotch tape has to be used to keep a plastic box closed tightly. Best to turn an end under just a bit before putting it on the box. Saves finger nails when one wants to take it off.

Tags for the large shells: best to wrap the tag in a glob of cotton, so it won't get lost way inside the shell. If it is in a box, just make another tag for the box, and if the loose tag is misplaced, one can always check the tag in the glob of cotton inside the shell.

Fixing tiny shells in plastic boxes: put the shells in the box and use some kind of large pin or needle to push them around in place. If they won't stay in place-some will scoot around-wet them a bit and they will stay put most of the time. When they are the way you want them, put the foam or cotton on top, then the tag, and close the box.

If one ever uses acid to clean off the hard white specks of lime, be sure to always wear glasses to protect your eyes. Acid can be used with an ear swab for the tiny specks, but wash the shell often while doing this. If one is using a small grinding tool to get off hunks of hard lime, be sure to remove any rings you might be wearing.

When mailing packages: most of us do trade in other countries, or etc. With postage so high these days, here are a couple of tips to save on it and help keep shells safe. Use small plastic bags for the smaller shells and one doesn't have to use alot of paper as they pack fine that way. Save the plastic bags from the cleaners, as they are soft and make wonderful wrappings for spiny or fragile things and weigh hardly anything. When the box is packed, put a tag inside on top with the person's name and address to whom it is going and a list of the contents-so they can check and not lose any in the wrappings-also your name and address.

Keeping track of your shells: as we have over 4,000 different species in our collections it would be hard for me to keep track cataloguing them so I use the "Guide to Contents" -families and numbers of the Indo-Pacific Mollusca.

I use index cards-colored ones with top tabs for the superfamilies, cream colored top-tabbed ones for the families, then plain white cards for the shells. I keep them in alphabetical order according to the species, not the genera, as there are so many different genera in a family. For instance: all the Trochidae and the many different genera in that family. So, keeping the species in alphabetical order makes it easy to see if I have a certain shell or not. Here is how I make the cards out.

Trochidae: 02-000	SF Trochacea
<u>Trochus niloticus</u> , Linne 1767	
Indo-Pacific	Syn: maximus, Philippi, 1844 (this in red ink)
Brief description, sizes etc., books they are shown in with pl. and shell no. and text pg.	
ABTS. Zim. 29-4	Sally's Blue 2-18
B. Reef, 1-16	Nat'l Geo. 7/49 (48-75)
Habe II (4-1)	Allen Sh. 57-59 (129-#2)
Aust. Sea Sh #94	Rogers 312 (218 #7)
Kite 9/10 #4 w/syn	Japan Moll (8) #7,8.

Then, on the other side of the card I put the date I receive the shell or shells and from whom. And if I should trade one of them off, I put that down also, and that way I can keep track of what and how many I have of each-in the private collection, that is.

The San Diego Union reported last month that Dr. William J. Zinsmeister, a scientist from Ohio State University who just returned from a 2½ month investigation on Seymour Island in the antarctic, found fossils of many new species of mollusks. He believes the mollusk fossils to be about 55 million years old. Also found were fossils of a broadleaved tree and fossil fragments of an extinct 6-foot tall penguin.

He believes these fossils reinforce geological theories that the antarctic was at one time linked with New Zealand and that Seymour Island was at that time twenty degrees north of its present location.

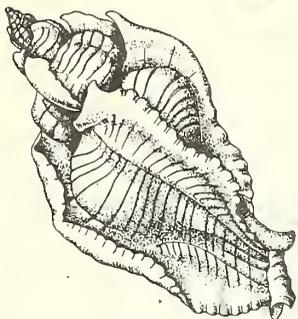
Announcements

The Club needs volunteers to help with the luau for the WSM/AMU meeting in June. If you are willing to help, please call either Billee Dilworth 459-1087 or Carole Hertz 277-6259.

The Festivus need articles---again---as usual. Your collecting experiences, observations in the field or of aquarium occurrences, travels, dive trips etc. make for worthwhile and interesting articles. Give or send your material to either Blanche Brewer or Carole Hertz.

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FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MUSEUM OF NATURAL HISTORY - Third Thursday -
7:30 P.M. - Museum auditorium

President: Carole Hertz
Vice-President: Bob Schoening
Recording Secretary: Blanche Brewer
Corresponding Secretary: Virginia Hanselman
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

Annual Dues: Single membership \$3.00; Family membership \$4.00; Overseas surface \$3.50; Student membership \$2.00.
Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

Vol. VI

June 1975

No. 6

* THERE WILL BE NO REGULAR JUNE MEETING! Instead, our Club will host the luau *
* on the first night of the WSM-AMU meetings (June 22 at 5:30 p.m., Olmeca *
* Hall lawn, San Diego State University). *

It is hoped that ALL Club members will attend and participate. You do not need to be a member of WSM to attend. If you have not been contacted and will help, please call Carole Hertz 277-6259 or Billee Dilworth 459-1087.

A map of the meeting area and the luau area are printed with instructions on the last page of this issue.

BRIEF SCHEDULE FOR WSM-AMU

Registration-- Sunday, June 22, 10 a.m.-1 p.m., Olmeca Hall
cost- \$10. includes program, parking and total participation in meetings and events. You will receive your program when you register.

Sessions -- Sunday, 1-4 p.m.
Monday, Tuesday Wednesday, - Morning sessions 9-12.
Afternoon sessions 1-4.

Thursday- 9- ? Several papers and business meeting of WSM
Evening sessions- 8-10. These are informal sessions on Sun. & Mon.

Auction--Tuesday evening 8-10.

Banquet--Wednesday evening- preceded by No host cocktails at 5 pm, 6-10, banquet.

Group photo--1 p.m. Tuesday-for those registered.

Club sponsored and hosted parties-- Sunday evening luau 5:30-? S. D. Shell Club
Monday evening party 5:30-? Conch. Club of Southern California.

MINUTES OF THE MAY MEETING

The speaker for the evening was Bob Schoening. He gave us a slide and talk show on the shells of Guam and shelling in Guam.

The treasurer's report came next and we have a balance of \$501.39 with more auction payments to come!

George Radwin gave a report on the joint WSM-AMU meeting being held here in San Diego. Registration will be Sunday, June 22, at 10:30 a.m. in Olmeca Hall, San Deigo State Univ. (\$10.00) There will be a wide variety of speakers, papers presented, slide shows, a luau, a banquet, field trips etc. Sunday, June 22, the San Diego Shell Club is sponsoring a luau. It will start at 5:30 on the lawn of Lomeca Hall. A sign-up sheet was passed around for Club members to sign up for their donations of food and time. Sounds like great fun! Billee Dilworth explained the luau and its needs.

Slides were shown of the Shell Club Auction. They defy description!

John Smith won the shell drawing.

THERE WILL BE NO REGULAR MEETING IN JUNE. THE WSM-AMU MEETINGS WILL BE OUR MEETING THIS MONTH

A DAWN TRIP TO THE TIDEPOLS

By Martin Schuler

On March 30, 1975, my friend, Peter Wienold, and I went down to Shell Beach in La Jolla to meet a -0.8 tide which would present itself to us at 5:30 a.m.. We made it down to the Cove about 5:30 and found the tide slowly receding. We broke out our flashlights and scrambled down to the rocks on the south end of Shell Beach.

To my surprise, the majority of animals found were between the high tide zone and the middle tide zone. Among the kelp crabs and masking crabs were found a number of nudibranchs. This was partly expected on my part as I knew this was the breeding season for the little 'branches'.

The nudibranchs that I discovered were a Hermisenda crassicornis, a Diaulula sandiegensis, two Anisodoris nobilis and two Hopkinsia rosacea. I also discovered several 'branches' that I have never seen in the pools before. They were one Coryphella fisheri, a Dirona albolineata and an Aeolidiella oliviae. Along with these were the common Navanax inermis and the sea hares (Aplysia californica). Beside the nudibranchs, I found a fairly good sized Apple seed shell (Erato columbella).

Peter's nudibranch findings included a Hermisenda crassicornis, one Dirona albolineata and another dorid which was slender and an orange color with the cerata being a lighter shade of orange. Peter's shell of the day was a marginella. With daylight approaching, we decided that the animals had seeked shelter for the day. We then left and looked up our findings. I feel that this trip was a well spent morning at the tidepools, as there were times that we were skunked.

As summer approaches, we can expect the more colorful species of nudibranch such as Chromodoris macfarlandi, Chromodoris californiensis and Chromodoris porterae. I will be planning more dawn trips and will be glad to bring anybody along with Peter and me who can be awake at 4:30 in the morning.

SHRIMP BOAT SHELLING

Joyce Gemmell

Shrimp boats blinking and throbbing during the black still night, snug in a sleeping bag and star watching, listening to the steady drum of offshore engines, these are fond memories of camping trips to the Gulf of California's west coast around San Felipe.

Shell collectors always ask about the possibilities of getting shells from the boats. It's assumed by most people that shells in quantities are scraped up by the shrimp nets and that they can be had for the asking. Unfortunately this is not true and for various reasons, the first being that the shrimp nets do not scrape along the sea floor to catch shrimp. On a gently undulating bottom of mud and sand, as it is in the San Felipe area, an occasional large shell will be scraped off a ridge. Or under certain other conditions a concentration of a particular shell animal will be netted from a comparatively small area. Small shells under two inches are seldom brought up because of the mesh size of the nets.

Another reason, and most important, as far as the captain and crew of the boat are concerned, is the time it takes to sort the shrimp from the trash fish and the lack of facilities for keeping a few shells that soon decompose. Unless a boat captain is particularly interested in shells, the crew seldom watches for them in the trash.

One night my husband and I were invited to take an all night trip on a local shrimper that was to be working just east of San Felipe Bay. We boarded about 4 p.m. and shortly after getting underway the cook had dinner started. About eight miles out from the anchorage the ship started its first northwest to southeast run and let the nets down. The five man crew, including the captain, had everything ready for the night's run by the time dinner was ready and we sat down with the captain and first engineer to a hearty meal. The galley about 6 X 8 feet, had a built-in bench and table that sat four. This bench turned out to be my cat-nap shelf for the night. After the rest of the crew had eaten, the men following their usual nights routine, disappeared to sleep or read or what ever jobs were theirs to do.

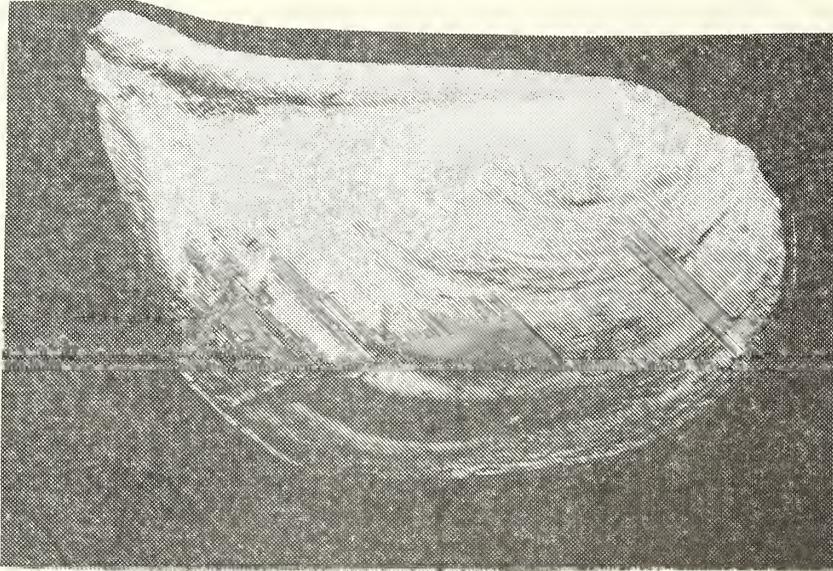
While the nets were down for anywhere from 1 to 2½ hrs, a pilot net was also run alongside. This is an exact replica of the large nets only in miniature, even to the otter boards that keep the nets down and separated. Its function is to sample the catch being picked up by the main nets. It is much quicker to winch in this miniature and check the contents, which might be only one or two shrimp - or sometimes none. A count is kept of the shrimp every hour the pilot net is raised. When the magic number is reached, up comes the large net.

The first haul of the pilot net right after dinner brought in several large shrimp and shortly the main net was emptied on deck. It was still light enough to scan the ton of trash fish and shrimp and I felt this was going to be a very active night with something of interest in every haul.

As the night progressed, (the next two hauls were farther apart in time), I became more interested in the pilot net when I noticed the crewman throwing overboard what appeared to be broken pieces of shell. I quickly moved over to look. By the time I was close enough to look into the net there was only one little white piece of shell left. As I reached for it, I suddenly knew what it was, a Pandora. Never having seen a live Pandora before I was surprised by the size and the narrow band of bright red periostracum along the ventral margin. I had found single valves on the sand flats north of San Felipe Point many times but most were worn and the brittle edges ready to crumble. The true shape and size could never be determined. Other Pandora species are, at times, found in sea star stomachs but being small they are hard to identify without a microscope to study the cardinal teeth.

Here in the dark on the deck of a shrimp boat I held a Pandora cornuta about

an inch and a half long with a soft chalky deposit and that bright red band. I didn't sleep much that night. The large nets were brought up about ten times during the sixteen hours we were on board. Shrimp were scarce, but the pilot net came up every hour like clock work and I was right there each time. I ended up with ten specimens and unforgettable memories of porpoise and sea lions surfacing suddenly alongside the boat as they felt the engine vibrations slow down, hundreds of birds asleep on the water, the throbbing gliding boats passing in the night and a rose pink sunrise that urns the mountains to that rare desert lavender.



Pandora cornuta C.B. Adams 1852

Photo by Dave Mulliner

AN UNUSUAL FIND

By Jules Hertz

During the April low tides, the Hertzes and Mulliners collected in the San Felipe (Baja California, Mexico) area with Joyce Gemmell. On April 26, 1975, an empty shell of Cantharus elegans Griffith & Pidgeon, 1834, ex Gray, M S) was found by Jules Hertz in the low tide area of Playa Alicia (approximately 20 miles South of San Felipe) at a -6.0 foot tide. The shell was in excellent condition, with the periostracum still intact. Joyce stated that this shell is not found in the San Felipe area and possibly could have been brought North by a shrimp boat. Because of the similarity between this shell and Solenosteira macrospira Berry, 1957 and Solenosteira capitanea Berry, 1957, it is possible that specimens of Cantharus elegans have been overlooked in the past in the San Felipe area.

NEW MEMBERS

BEKEN, Robert & Estella
3982 Jewell Street
San Diego, Ca. 92109
273-4744

HOGAN, Tim & Karen
4079 Huerfano Ave. #115
San Diego, Ca. 92117
273-2495

HOFFMAN, Mrs. E.E.
P.O. 603
Coronado, Ca. 92118
435-0909

CHANGE OF ADDRESS

D'ATTILIO, Tony & Rose
2415 29th Street
San Diego, Ca. 92104
281-9731

EGGS OF *HORMOSPIRA MACULOSA*

By Carole and Jules Hertz

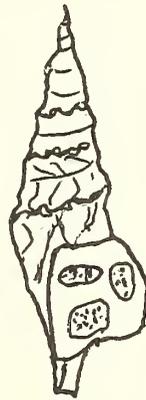
On April 25, 1975, the Hertz family collected a large specimen of *Hormospira maculosa* (Sowerby, 1834) in wet sand, among rocks at a -6.0 ft. tide at San Felipe Pt., San Felipe, Baja California, Mexico. The specimen was kept alive for two days in a container of salt water and then transported to San Diego. It was then deposited in a ten-gallon aquarium with a number of other species. On May 14, 1975, it was observed that the *Hormospira* had deposited 21 egg cases, two of which were on the bubbler.

The cases looked like flattened water droplets. They were transparent and gelatinous in appearance. The base diameters and heights were approximately 6mm and 2mm, respectively. Each capsule (see sketches below) contained about 200 to 300 whitish eggs, each of which was approximately 0.2mm in diameter. The egg capsule deposition occurred in less than a 16 hour period since there were no capsules visible when the tank was observed on the evening of May 13. When first observed on the morning of the 14th, the *Hormospira* had three egg capsules under her foot.

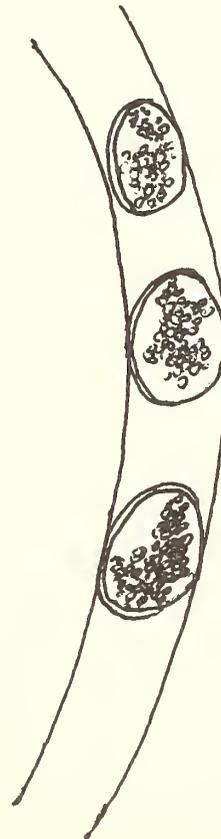
Several days after deposition, all the capsules containing eggs that were on the tank wall were eaten by the tank's resident *Cypraea spadicea* Swainson, 1823.

Hormospira maculosa (not egg-laying specimen.)

Photo: Dave Mulliner



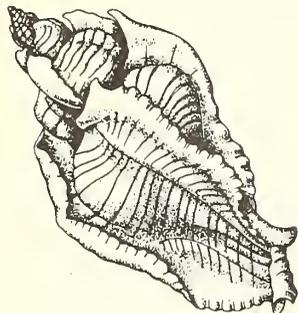
Drawing showing egg capsules on foot of animal.



Sketch showing trail of egg capsules of *Hormospira* on wall of aquarium.

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Vol. VI

July 1975

No. 7

PROGRAM: July 15, 1975, 7:30 P.M.

Anthony D'Attilio will speak on "The Typhine Shell, Theme, Development and Elaboration" with slides made from his camera-lucida drawings accompanying his talk.

Also on the program will be a presentation of gift to the Club's choice for winner from the Science Fair. Robert Herz will give the Club members a short discussion of his project, "Effect of Oil on Growth Rate of Skeletonema."

NOTICE

Please plan to attend the July meeting and remain for the business portion. An important matter has come up which requires Club participation.

The Museum has found it necessary to institute charges for evening meetings to cover custodial costs. This will come to approximately \$20.00 per meeting at the rate of \$6.50 per hour. The Club is trying to arrange to share the custodial costs by meeting on the same night as another club and alternating use of the auditorium and classroom.

It is necessary to discuss our options and plan for our future meetings.

NEW MEMBERS

BENNETT, Mrs. Sally
514 W. Rose Lane
Phoenix, Ariz. 85013

CATE, Crawford & Jean
P.O. Box Office Drawer 710
Rancho Santa Fe, Ca. 92067

MALLORY, Gene & Cynthia
5656 Buffalo Ave.
Van Nuys, Ca. 91401

CROWE, Thelma
237 North 3rd
Port Heuneme, Ca. 93041

RENEWALS

SKOGLUND, Carol
3846 E. Highland Ave.
Phoenix, Ariz. 85018

HEWITT, Susan
4 Park Terrace
Cambridge, England

A REPORT ON THE AMU - WSM MEETING

by Clifford A. Martin

The first joint meeting of the American Malacological Union and the Western Society of Malacologists was held June 22-26, at San Diego State University, with a total number of members and guests attending well over 250 people. This was probably the largest gathering of famous malacologists ever assembled in the United States. Because of overlapping interests there was a fair sprinkling of geologists, paleontologists, etc., present also. Certainly, it was the largest meeting of its kind ever held on the West Coast and all credit for its outstanding success must go to Dr. George Radwin, President of the Western Society of Malacologists. It was he who conceived the idea and successfully carried it through. It was a real pleasure being a member of his team.

There had been only 112 applications for reservations received up to registration day and one would normally anticipate an additional 50 or 60 people who would attend but did not send in applications. This would have made an estimated attendance of not more than 175 people. This was not the case however, since more than 250 people attended the meeting.

Seeing that this huge crowd were all registered was no small task, since it presented many problems. Registration was very capably done by Blanche Brewer, Bert and Lucinda Draper, Clifton Martin, Roland and Kay Taylor, and Jeanne Pisor. Roland and Kay were the official host and hostess of the meeting.

Many other problems had to be overcome in order to make it a successful meeting. The problem of providing dinner for this huge crowd had to be met on two separate evenings. The San Diego Shell Club and The Conchological Club of Southern California handled the problem to everyone's complete satisfaction even though last minute telephone calls had to be made to obtain more food. The San Diego Shell Club provided a luau on the first evening and The Conchological Club of Southern California hosted with a chuck-wagon dinner on the evening of the 23rd. Both events were immensely successful. The luau given by our club was the result of many of our members preparing and bringing the food. Drinks were served before and during the dinner, to the complete enjoyment of everyone. Twila Bratcher entertained the diners with a hula dance, which everyone enjoyed. This very talented lady is a member of both the San Diego Shell Club and the Conchological Club of Southern California. She is also a past president of the WSM.

The Conchological Club of Southern California sponsored the chuck-wagon dinner on the evening of the 23rd. Their problem was even greater than that faced by our club since theirs was a catered affair. Last minute calls were made for 50 more chickens for the dinner. Everything arrived on time and was enjoyed by all.

Space does not permit a complete list of all of the noted professional and non-professional malacologists who attended the meeting. I will list only a few. Dr. S. Stillman Berry, Dr. Wendell P. Woodring, Dr. Joshua Baily, Dr. A. Myra Keen, Dr. Harald Rehder, Dr. Joseph Rosewater, Dr. Robert Robertson, Dr. George Davis, Dr. William K. Emerson, Dr. Harold Vokes, Dr. Emily Vokes, Dr. R. Tucker Abbott, Dr. Clyde Roper, Dr. James McLean, Dr. Alan Solem, Dr. George Radwin, Dr. Eugene Coan, Dr. Judith Terry Smith, Dr. James Nybakken,

Dr. Gordon Robilliard, Dr. Louie Marincovich, Dr. Vida Kenk, Dr. Donald Shasky, Mr. Hans Bertsch, O. F. M., Mr. Emory P. Chace, Mr. Anthony D'Attilio, Mrs. Fay Wolfson, Mr. Crawford Cate, Mrs. Jean Cate, Mr. Gale Sphon, Mrs. Helen DuShane, Mrs. Twila Bratcher, Mr. William E. Old, Jr., and Mr. Robert Talmadge.

The program of papers that were read at the sessions held something of interest for everyone since they covered the entire molluscan field as well as three outstanding papers of a biographical nature which were based on the life of William Healey Dall. The abstracts that were prepared for this meeting will be published before the 1976 meeting of the WSM and will be free to members of the WSM and the AMU. Dr. Donald Shasky, who was in charge of the program of papers, deserves the highest credit for his superb achievement.

The annual auction of the WSM was held the evening of June 24th with Bob Schoening acting as auctioneer. Bob was assisted by members of the Southwestern Malacological Society, of Phoenix, Arizona. When the final sale was made it was found that the WSM had netted over \$1100.00. This was the most ever made at a WSM auction and was due to Bob's salesmanship.

Several field trips were planned for the attending members. Trips were taken to Scripps Institution Aquarium, The San Diego Natural History Museum, the tide pools at La Jolla, and one to a fossil formation. Roland and Kay Taylor, hospitality host and hostess, must have been quite busy in planning and directing these trips.

Several very interesting and informative exhibits were set up in the lounge of Olmeca Dormitory. Among these were an outstanding exhibit of tropical west American Cancellariidae by Dr. Donald Shasky, an exhibit of American malacologists, past and present, was presented by Dr. R. Tucker Abbott; Phil Clover exhibited Marginellidae of west Africa and Zoila (Cypraeidae) of Australia; Leroy and Forrest Poorman exhibited "Some Giants of the Species"; James Lance and Dave Mulliner exhibited some outstanding photographs. Other exhibits were by A. M. Frias Matins, of the Azores, William and Lois Pitt, of Sacramento, The Southwestern Malacological Society, of Phoenix, Bernadine Hughes and Barbara Good.

The banquet was held Wednesday evening, June 25th, and was preceded by a no-host cocktail hour. This was presided over by two very genial "bartenders", Joe Bibbey and Jim Seay.

The speaker for the banquet was Sam Hinton, from the University of California, San Diego. His subject was "The Taxonomy of Common Names" and was most entertaining as well as informative. Party favors for the banquet were prepared by The Yucaipa Shell Club under the direction of Mrs. Gertrude Wahrenbrock.

The only meeting scheduled for June 26th was the business meeting of the WSM. This was a relatively short meeting with the following officers elected to serve in 1976. President, Dr. James Nybakken; 1st Vice-president, Helen DuShane; 2nd Vice-president, Dr. Peter D'Eliscu; Secretary, Clifton Martin, and Treasurer, Merton Goldsmith.

This joint meeting was a real mile-stone in American malacology and is not only a great achievement for Dr. Radwin but for both of the organizations involved.

A WSM - AMU FIELD TRIP

by David Mulliner

Field trips are a part of the fun happenings at a convention. So, according to plan, fifteen of us met at San Diego State University at 5:00 a.m. for a Dawn Nudibranch Hunt. The many questions posed by non-San Diegans included: Will it be light enough to see? Will it be warm enough and is the tide really low enough to find anything?

Leaving San Diego State and heading down the valley to Mission Bay, the gray dim lightened into dawn. We parked the cars at Shell Beach, just south of Casa Cove in La Jolla. The tide pool area was green and brown with alga of many species for a hundred yards to sea. The morning air was still and warm--the sweaters were not even needed. The ocean was quiet with only an occasional one foot wave.

The group soon scattered on the verdant sea shore pocked with tide pools. Cries of delight and amazement were soon heard--Come see the big Aplysia californica in this pool! Hey, this octopus squirted ink as he jetted across the stream! Look at this beautiful nudibranch and I found a Trivia solandri!

Many species of shells were seen--Epitonium tinctum, Astraea undosa, Conus californicus laying eggs, Dove shells on the seaweed, Nuttalina fluxa, the chiton that burrows pits in the soft rock, Cypraea spadicea, and littorines in the high tide area.

The nudibranch hunt was most successful. In all, nineteen species were found. Two of the animals found are still unnamed. Some of the branches were taken under a scientific collecting permit for further study and photos. Following is a list of the animals taken; Acanthodoris lutea, Aegires albopunctatus, Ancula pacifica, Aplysia californica, Coryphella trilineata, Dendronotus frondosus, Dialula sandiegensis, Doris S.L., Doriopsilla albopunctata, Hermisenda crassicornis, Hopkinsia rosacea, Janolus sp., Phidiana pugnax, Polycera atra, Spurilla oliviae, Thordisa bimaculata, Trinchesia albocrusta, Tiipha grandis and Triopha maculata

At breakfast many of the people were still speaking of the great tidepool experience and, as a result, many other people became interested. Inquiries were made by several others as to directions so that they too might go hunting the following morning.

 ALOHA LUAU
 AT OLMECA HALL, S.D.S.U.

June 22. It was late afternoon. Hawaiian music filled the air, long tables were festive with exotic flowers and greenery, and a busy breeze carried the aroma of warm food. The punch was punchy and positioned to serve a double line. In short, everything was in readiness for our Club to host a luau for our guests, the visiting members of WSM and AMU. Even the sun, which had been reluctant for days, was there to warm the scene.

Twila Bratcher's beckoning hands and warm smile charmed everyone as she greeted them in a gay dance of welcome.

Our guests from the East were intrigued with our Aloha Luau--we are sure there were few, if any missing--and everyone relished the food. The main dish, Hawaiian Chicken (with turkey) was a great success, with many requests for the recipe.

Good organization and just plain hard work insured the success of our luau. Many people,--flower gatherers, chair and table toters, bakers, cooks and punch artists were responsible. We thank them all!

MICROSCOPIC OBSERVATIONS

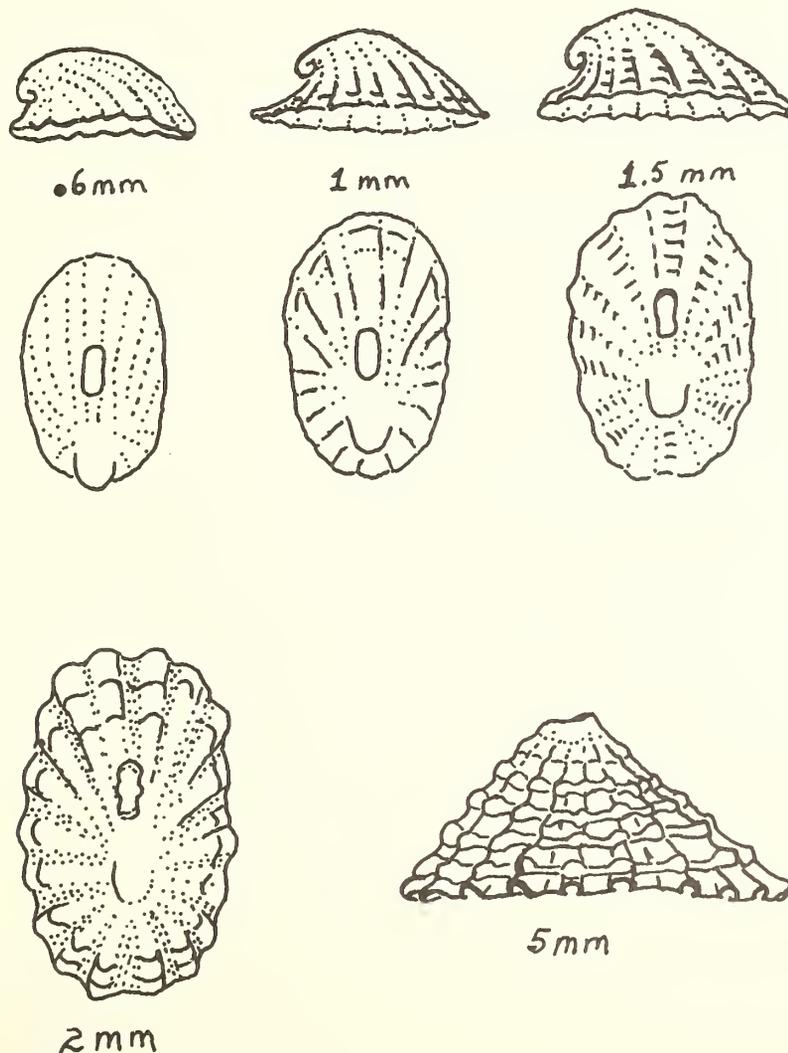
by Joyce Gemmell

Recently, while going through some fine grunge from San Felipe, Baja California, Mexico with a microscope, I came across what I thought was a new genus for my collection.

At first glance I was sure it was a Rimula--a small limpet-like shell with a slit on the anterior slope. I was ecstatic. I had remembered seeing the illustration in Dr. Keen's book, "Sea Shells of Tropical West America," and knew it was unusual.

For several days I hunted feverishly through my pint of grunge for another specimen. The first one had only been a half-millimeter long. The next two were one millimeter each. I began looking for published information on my microscopic jewels. I could hardly contain myself and I wished to write to other collectors about my find. Finally I found the information I needed and my joy turned to doubt. A more careful study of the shells, following the description through the unmistakable eye of the microscope, changed my Rimula to a Diodora.

The closer study of the series of shells, showing each step in growth, was fascinating and my hoped for exotic was forgotten. Diodora alta, strongly cancellate, and Diodora inaequalis, finely ribbed, are both common in this area. I now have five of the juvenile shells from one half millimeter to five millimeters. (Dr. Keen (1971) gives the adult size as Length, 13mm; width, 10mm; height, 8mm.) Seeing the growth series, side by side, gives one a visual lesson in the basic characteristics of the species even at the one and two millimeter size, if one remembers the differences in the subfamilies of Fissurellidae.



The smallest specimen has the apex near the posterior margin and the orifice, an elongated oval, halfway up the anterior slope. At this stage of growth the radial ribs are dominant and there is a faint indentation around the interior of the orifice. The second specimen is only a half-millimeter larger and the rapid thickening of radial ribs and concentric threads crossing them have produced a slight beading. A definite ridge is seen inside behind the orifice. The third stage begins to show considerable elevation and the cancellate pattern is more pronounced. The shell is becoming thicker.

The next two shells are the same size, both showing a strong cancellate sculpture around the margin but not up the sides. The interior callus is squared off and well defined. The orifice is now much closer to the apex. Up to and including this stage, the shells are glassy white.

The last stage in the growth series is the change in the orifice and apex. As the orifice callus is thickened, the apex is gradually absorbed. The continued thickening of the shell and the completion of the cancellate and color pattern conclude the change to the adult form like frosting on the cake.

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 IV Carpenter's Mazatlan Collection.
 A. Myra Keen, The Veliger, Vol. 10; #4, p. 403.
 Leaflets in Malacology; #24, p. 148, S.S. Berry, 1964.

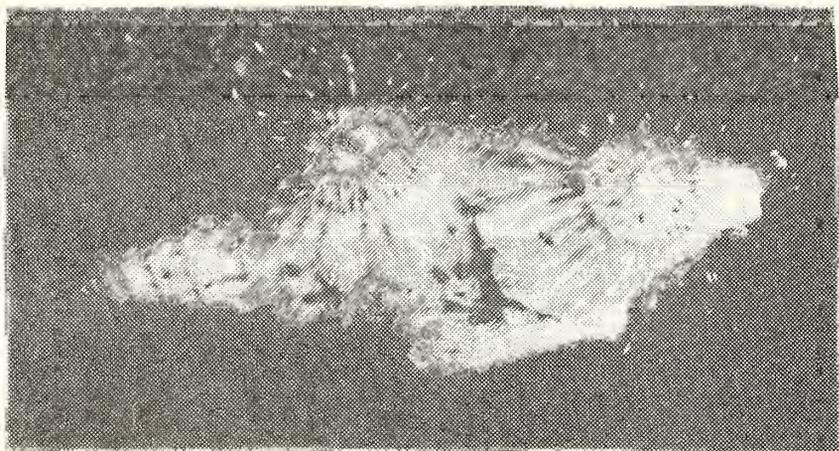
ANTHOTHOE CARCINOPHILA VERRILL

Anyone who has collected in San Felipe, Baja Calif., Mexico has probably noticed that some of the shells wear strange, mauve-colored "hats"--sometimes several to a shell. These anemone "hats" can be found on a wide variety of

living mollusks such as the Hormospira maculosa, here pictured, Polinices reclusianus and on shells inhabited by hermit crabs.

The most interesting point, to this writer, is that this anemone, Anthothoe carcinophila Verrill cannot survive long if removed from its roving residence.

Photo by Dave Mulliner



Because there were numerous requests for the recipe for the Chicken Hawaiian served at the Luau, it is printed below.

Chicken Hawaiian (to serve six)

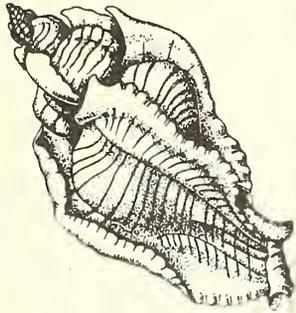
2 cups medium cream sauce	1 small package mushroom or ¼ lb. sliced
2 tbsp mayonnaise	2 cups boned, cooked chicken
2 tbsp sherry	2 pkg chopped, frozen spinach, <u>well drained</u>
¼ cup grated parmesan cheese	Toasted cocoanut

Mix first six ingredients. Put layer of chicken in bottom of greased, flat baking dish. Add spinach as next layer. Pour cream sauce over the two layers. Top with toasted cocoanut. Bake at 350° for thirty minutes or until bubbly.

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THE

FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MUSEUM OF NATURAL HISTORY - Third Thursday -
7:00 P.M. - Museum auditorium

President: Carole Hertz
Vice-President: Bob Schoening
Recording Secretary: Blanche Brewer
Corresponding Secretary: Virginia Hanselman
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

Annual Dues: Single membership \$3.00; Family membership \$4.00; Overseas
surface \$3.50; Student membership \$2.00.
Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner,
5283 Vickie Drive, San Diego, Ca. 92109.

Vol. VI

August 1975

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* PROGRAM: Mr. Bert Draper will speak on "Shelling at Choya Bay, Sonora *
* Mexico!" His talk will be accompanied by slides from the trip. *
* Date- August 21, 1975 Time- 7:00 P.M. *
* *
* SAVE THE DATE! The Caribbean Carnival will be on Sept. 20, 1975 at *
* the Bradner's home. More information at the meeting. Maps *
* will be included in the September issue. *
* *
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NOTICE

We will again be meeting in the Museum this month. As a result of our letter to the Museum, a conference was held with Club and Museum representatives. The Museum administration waived the flat fee of \$15. per meeting in our case and will permit us to share custodial costs with the Field Ornithologists. This should cost the Club a maximum of \$10. a meeting.

The Field Ornithologists have agreed to share the costs and facilities with the Club, alternating the use of classroom and auditorium. Both Clubs will meet jointly on a trial basis this year.

Other possibilities for future meeting places are still being explored and will be brought before the membership for discussion.

Our meeting will begin at 7:00 P.M. to coincide with the Field Ornithologists.

CHANGE OF ADDRESS

Mr. and Mrs. Don Hall, Bldg. 830, P.W.T., N.A.S. North Island, Coronado, Ca. 92135

THE NUDIBRANCH DENDRONOTUS FRONDOSUS - ONE SPECIES OR FOUR?

by Dr. Gordon A. Robilliard

(as presented to the WSM/AMU Symposium - June 1975)

The hypothesis upon which this paper is based is that:

The nudibranch "species", *Dendronotus frondosus*, as presently described, is not one species, but is comprised of three, possibly four, ecologically and genetically discrete populations each of which should be considered a separate species.

The taxonomic literature combines these populations as one species which is simply considered variable in color and external morphology. Admittedly, using the usual taxonomic characteristics of dendronotacean opisthobranchs -- radula, jaws, reproductive system -- the several forms are essentially indistinguishable. As I will show you, there are some distinct ecological differences, and possibly genetic isolation between populations.

The framework into which this work fits concerns the question of what constitutes a species. It is an old question, probably asked by Linnaeus, and certainly by Darwin, in one form or another. The species concept has been a recurring problem in the taxonomic and systematic scientific literature, and has recently become a major issue in the ecological/genetic literature, especially with respect to plants.

The taxonomic/systematic definition of a species is usually based on morphological/anatomical features and seldom takes into account the biology -- i.e., behavior, distribution, natural history, etc. -- of the "species".

The ecological/genetic definition is based primarily on the answer to one question -- IS THERE GENETIC EXCHANGE BETWEEN POPULATIONS OF THE SAME "SPECIES". If not, then the possibility that the populations should be considered distinct "species" and so named should be carefully investigated. If there is genetic exchange, especially between so-called separate "species", the possibility that one or more "species" names should be dropped must be considered.

Though there are several mechanisms by which genetic isolation of populations may occur, I do not propose to attempt to list or discuss them all. However, the more important or better studied ones are:

- Geographic isolation, either in the past or present, in form of physiographic barriers, etc.; e.g., mice populations, many insects, many species of land snails and freshwater molluscs, but relatively fewer marine species.
- Behavioral isolation of co-occurring populations; e.g., salmon returning to specific streams; fish and birds which have evolved subtle, but specific differences in courtship rituals.
- Ecological isolation of populations which may overlap in time or space, or both. Ecological isolation may not be easy to separate from behavioral isolation.

By my definition, behaviorally isolated populations would be those which are essentially indistinguishable except in their mating and reproductive behavior while ecologically isolated populations are those which are distinguishable on the basis of one or more aspects of their natural history (including reproductive behavior).

In this paper, I would like to discuss a specific example of a "species" which may be comprised of several genetically isolated populations even though these populations co-occur in both time and space.

The species is *Dendronotus frondosus*, a nudibranch which is circumboreal and in the Pacific Ocean, occurs from the Arctic waters to southern California and probably along the outer Baja California coast.

As I implied initially, the descriptions of the "species" which appear in the literature, including my own paper concerning the systematics of the whole genus *Dendronotus*, all acknowledge the variation in external morphology and color in *D. frondosus*. However, this variability is usually attributed to the fact that it is a widely distributed "species" living in numerous different habitats, and the variability is a phenotypic manifestation of the ecological differences of these microhabitats.

There are at least three and possibly four phenotypes of *D. frondosus* found in the southern British Columbia-Washington area. These phenotypes are distinguishable on the basis of color and I have labelled them: red-mottled, white, light-brown, and dark-brown phenotypes. There is some variation in the color pattern and intensity within each phenotype and, in a few cases, specimens have been difficult to assign to one phenotype or another solely on the basis of color.

However, when the ecology/biology of *D. frondosus* is investigated, it becomes apparent that there are some significant ecological differences between these phenotypes. One of the important factors here is that these phenotypes are not widely separated from each other. All these data were obtained from a small geographic area, the SAN JUAN ARCHIPELAGO in the state of Washington.

I only found the red-mottled form on a very few occasions, always on floating docks in the summer and always on or near the hydroids *Syncoryne* sp. or *Tubularia* spp. Beyond this, I have no substantial ecological data. With respect to its morphology and color, there is some overlap with another species, *D. rufus*. Because of these uncertainties, I will not discuss the red-mottled form in the remainder of the paper except to say that both its ecology and its taxonomic/systematic status needs to be determined.

The data in Figures 1-3 were obtained between January-December 1970; qualitative observations made between June 1965 and December 1971 are in good agreement with these data. In general, the data show that there is relatively little overlap between the white, light-brown, and dark-brown phenotypes with respect to locality, water current speed, substratum, and prey; i.e., each phenotype occupies essentially discrete microhabitats (Figure 4).

The overlap between phenotypes that does occur in the first three categories can be explained by the fact that the categories are relatively broad. For example, in Figure 1, we see that 16 specimens of the light-brown and 22 of the white phenotypes were found at Edwards Reef. However, the light-brown ones were in shallow water eating the hydroids *Obelia* sp. while the white ones were in deeper water and eating *Hydrallmania distans*. Similarly, in Figure 2, "solid surfaces" is a catch-all category including solid rock, large pipes, breakwater and seawalls, sunken ships, etc., hence the overlap between the white and dark-brown phenotypes.

There is no overlap between phenotypes in prey (Figures 3 and 4) except that both the white and the dark-brown phenotypes have been found on *Abietinaria amphora* and to a much lesser extent *Thuiaria argentea*. However, in no case, were both phenotypes found on the same hydroid colony at the same time. Furthermore, the white phenotype strongly prefers *Hydrallmania distans* while the brown phenotype prefers *Abietinaria* spp.

In addition to the ecological isolation, there appears to be some reproductive isolation in both time and space. In terms of spatial isolation, there is little overlap in location and, on a microscale, in prey between phenotypes. Thus, it would be difficult for mating between phenotypes to occur though the possibility could occur between the white and the dark-brown forms.

In terms of temporal isolation, the light-brown form spawns in summer mostly and has usually disappeared by late fall or winter. The dark-brown apparently does not spawn at all so far as I can tell (at least, I never found a sexually mature specimen) and it is scarce in winter/spring. The white form spawns all year long, though at reduced rate from late fall to early spring.

However, the question of genetic isolation must be studied in more detail to establish if, in fact, each phenotype which seems to be ecologically distinct really is genetically distinct. This work will need to be done in the laboratory using mass culture

techniques and will involve a thorough study of larval behavior, population dynamics, and genetics. Some of the questions that need to be answered are:

- Are the phenotypes environmentally induced; i.e., do the veligers all come from a common gene pool and is the adult form a result only of the substratum upon which it chose to settle? If this is true, then we must know how and why the veligers choose different substrates.
- Can the different phenotypes be induced to copulate and produce reproductively successful second generations, or does each phenotype "breed true"?
- Can the veligers of each phenotype select their preferred substratum if they are given a choice?
- Does the dark brown form reproduce successfully or is it, in fact, a genetic dead end? If so, then what is the selective value of its existence to the species?

These and probably other questions must be answered, but until they are, I propose to leave *D. frondosus* as a single species for the present with the caveat that it may in fact be a group of several species, at least in the genetic/ecological sense.

Table 1. TOTAL NUMBER OF INDIVIDUALS OF EACH PHENOTYPE
OF Dendronotus frondosus OBSERVED IN EACH
SUBDIVISION OF THE LOCALITY

LOCALITY	white	dark brown	light brown
Cowlitz Bay	10	0	0
Turn Island	2	0	0
San Juan Channel	0	9	0
San Juan Park	0	8	0
Smug Harbor	0	0	10
Floats in Friday Harbor	0	0	29
Victoria Breakwater	10	1	0
Lonesome Cove	11	1	0
Edwards Reef	22	0	16
Harney Channel	1	0	0
Cantilever Pier	35	4	0
Eagle Point	3	13	0
Shady Cove	126	9	0
Reid Rock	0	5	0

Table 2 TOTAL NUMBER OF INDIVIDUALS OF EACH PHENOTYPE OF
Dendronotus frondosus OBSERVED IN EACH SUBDIVISION
OF THE CURRENT AND SUBSTRATUM

CURRENT	fast >2.5K	medium-fast 1.5 - 2.5K	medium 0.5 - 1.5K	slow >0.5K
white	138	59	13	10
dark brown	15	10	25	0
light brown	0	0	13	39

SUBSTRATUM	cobble	floats	solid surfaces	sand-mud	shell-sand gravel
white	145	0	35	0	40
dark brown	17	0	24	0	9
light brown	0	40	4	0	0

Table 3; TOTAL NUMBER OF INDIVIDUALS OF EACH PHENOTYPE
OF Dendronotus frondosus OBSERVED IN EACH
SUBDIVISION OF THE PREY CATEGORIES

PREY SPECIES	white	dark brown	light brown
<u>Abietinaria rigida</u>	0	22	0
<u>Abietinaria amphora</u>	19	16	0
<u>Abietinaria traski</u>	0	7	0
<u>Hydrallmania distans</u>	139	0	0
<u>Obelia commissuralis</u>	0	0	20
<u>Obelia griffini</u>	0	0	16
<u>Sertularella tricuspidata</u>	8	1	0
<u>Aglaophenia struthionides</u>	1	0	0
<u>Thuiaria argentea</u>	11	3	0

Table 4; OVERLAP BETWEEN THE PHENOTYPES OF Dendronotus frondosus
WITH RESPECT TO CURRENT, LOCALITY, SUBSTRATUM, AND PREY

	WHITE sublittoral- dark brown sublittoral	white sublittoral- light brown wharf	dark brown sublittoral- light brown wharf
current	0.638	0.089	0.249
locality	0.445	0.076	0.000
substratum	0.765	0.074	0.250
prey	0.082	0.000	0.000

MINUTES FOR JULY MEETING

The North Clairemont Community Center was our meeting place this month. New requirements require new arrangements. The meeting was called to order by our President, Carole Hertz. David Mulliner introduced Robert Herz, the Club winner in the Annual Science Fair. He presented Mr. Herz with a copy of Barnes' "Invertebrate Zoology", as special recognition from our Club. Mr. Herz, a six-

teen year old student in the tenth grade read his paper to the membership.

Mr. Anthony D'Attilio spoke on "The Typhine Shell, Theme, Development and Elaboration" with slides made from his camera-lucida drawings. (His talk will be featured in a future issue of the Festivus.)

Following coffee break, our business meeting was held. A letter to Admiral Davis, Director of the Natural History Museum, was read which detailed our several-year's association with the museum. A unanimous vote decided it be sent, as read, to Admiral Davis.

After discussion, it was decided that we remain at the Center while looking for a more suitable place. It is used by several groups and is noisy and small.

George Radwin reported receipt of many letters expressing appreciation for our Luau for the guests of WSM and AMU.

The September meeting was discussed briefly and volunteers for the working committee were Marge Bradner, Billee Dilworth, Karen Hogan, Martin Schuler and Blanche Brewer

The shell drawing was won by Mary Freske.

Great pictures of the joint meeting of AMU/WSM were shown by Dave Mulliner.

MEMORIES OF DR. WILLIAM HEALEY DALL

BY DR. JOSHUA L. BAILY JR.

(as presented to the WSM/AMU Meetings - June 1975)

Dear Friends,

You have paid me a very great compliment by inviting me to speak to you about my memory of Dr. William Healey Dall. Although I met him to speak to only once, and although I had heard him lecture only once, I had the privilege of correspondence with him for more than a quarter of a century, a most profitable and enjoyable experience.

My interest in Malacology dates from the earlier days of this century when I was living in La Jolla. My principal guide in this study was a little book by Professor Josiah Keep of Mills College, called "West Coast Shells." Those of you, who like me, owe your introduction to Malacology to Professor Keep will recall that in that work there was an appendix in which was set out some brief biographical data concerning those who can justly be called the Founders of Malacology. I was very innocent in those days. I did not look at the title page of that book. Had I done so I would have noticed the book was older than I was, and that much water had passed under the bridge since it was published. I figured that it would be to my advantage to get acquainted with some of these personages, so I sat down and wrote letters to Mr. George W. Tryon of the Academy of Natural Sciences in Philadelphia, to Dr. Wesley Newcomb of Cornell University, and to Dr. Dall of the National Museum. In a few days I received a letter from the secretary of the Philadelphia Academy, informing me that Mr. Tryon had died the year before I was born. Then after a few days the letter which I had written to Dr. Newcomb was returned to me, with the words, "Unknown. Return to Sender" stamped across the face of it. It was quite a shock to me to learn how quickly a really great man could be completely forgotten by his associates after his death, especially one who had done so much to advance the cause of Malacology on the Pacific Coast.

However, Dr. Dall was still living, I am happy to say, and in a few days I received from him the nicest kind of letter that a boy like myself (for I was a boy in those days) could possibly receive from a man in Dr. Dall's position. He enclosed a letter of introduction to Mr. Frederick W. Kelsey, the president of San Diego Commercial College, and owner of one of the two largest collections of shells in the city. That letter was the beginning of another long and enjoyable friendship, but that is another story.

Dr. Dall also gave me the names of three books which he thought would be helpful to me. These were; Woodward's Rudimentary Treatise on Recent and Fossil Shells, Cooke and Shipley's volume on Molluscs and Brachiopods which these authors contributed to the Cambridge Natural History, and Tryon's Structural and Systematic Conchology. All of these were out of print, but I was fortunately able to obtain copies of the first two almost immediately, and a few years later I obtained a copy of the third one. I still have those books which have meant much to me in the passing years.

Dr. Dall also invited me to send him, for identification, any shells I might have which I was unable to identify by myself, and I was quick to take advantage of his generosity and his patience. And finally he reminded me that there were plenty of shells on the beaches of San Diego County that were as yet non-descript, and advised me to be on the lookout for some of these, which I might donate to the National Museum. The thought that I might find species not represented in the collection of the National Museum was a great stimulus to my activity, as it had never entered my mind.

On one occasion I sent to Dr. Dall a large number of very minute shells which I had picked off the actinians in a bed in South La Jolla. In his reply he mentioned that he had gathered many shells from the actinians at Monterey more than forty years previously. My good friend Maxwell Smith was living in La Jolla at the time and I showed him Dr. Dall's letter. His comment was, "Well, if Dr. Dall collected shells more than forty years ago, just think what a terribly old man he must be now." Shortly before Maxwell's death I reminded him of this incident, and although he had completely forgotten having made such an observation we both had a good laugh over it.

One of the shells which I sent Dr. Dall at that time was Carpenter's species, Vitrinella complanata. It was represented in Mr. Kelsey's collection, and his material had been identified for him by Dr. Dall. When Dr. Dall returned my material to me it had the same name on it, so that I feel reasonably sure that the identification was correct. The peculiar thing about it is that I cannot find that Carpenter ever used this name. It is not in the Mazatlan Catalog; not in the report to the British Association; not in the Smithsonian reprint of some of Carpenter's papers. It is also not in the monograph of Pacific America Vitrinellidae by Pilsbry and Olsson and not in Dr. Palmer's Treatise on Carpenter's types. The only printed reference to the name which I have been able to find is in Professor Keep's, West Coast Shells, edition of 1910, where it appears as a nomen nudum. I would appreciate hearing from any reader of this article who can throw any light on the identity of Vitrinella complanata or who can give me any information as to where the name was published.

The time that I heard Dr. Dall deliver a lecture was at the Centennial Anniversary of the Philadelphia Academy of Natural Sciences. I have forgotten what he spoke about, but he made a great impression upon me because he was one of the few speakers who spoke so that his audience could understand him. Most of the speakers at that celebration did not seem to care whether their audiences understood them or not. Long ago I forgot what he talked about, but I have never forgotten how much I enjoyed hearing him. When he got through, so many people crowded around him to ask questions and to shake his hand that I did not have the opportunity to get through to him, and I doubt if he ever knew that I had been in his audience.

The time that I met him to speak to was when I was travelling through Washington and had several hours between trains. I took advantage of the opportunity to call on Dr. Dall. He had just received a shipment of fossils from one of the South Pacific Islands, among them a volute which was ancestral to a recent species from the shore of the same island. He pointed out to me the resemblances and the differences between the two. This led to a discussion of the question as to how far a species must depart from its ancestral condition to be considered to have become a new species. Again I have forgotten his conclusion but I have not forgotten how much I enjoyed his discussion of this problem.

After making my home here in San Diego for about twelve years, the way opened for me to visit the scenes of my adolescence in Philadelphia, and one of the things that I had looked forward to accomplishing at that time was a visit to Washington to renew my acquaintance with Dr. Dall. On the train from Philadelphia to Washington I purchased a daily paper, and on looking through it I came across Dr. Dall's obituary and realized that I was too late, and that I would never see him again in this world.

During Dr. Dall's lifetime several abortive attempts were made to unite the malacologists of America into an organization similar to those of Britain, France and Germany but the people backing these enterprises seemed more interested in defeating the plans of contemporary groups than in promulgating their own ideas, and Dr. Dall's failure to get two of these groups to cooperate with each other was a disappointment to him. I think the American Malacological Union was not established until after his death so that he never heard of it. But if he could have known that his early efforts to found such an organization were destined eventually to achieve

success, and that we would be gathered together to hold a symposium in his memory, I think he would have been greatly pleased. Perhaps he does know about it. Let us hope so.

One of the first publications of the American Malacological Union was a brief brochure dealing with the life and career of Dr. Dall, and upon reading it I became acquainted with two rather important facts about him with which I had previously been unaware. One of these was that although he devoted his entire life to the service of the U.S. National Museum, he never had any official, organic connection with that institution. He was always a member of the U.S. Geological Survey, which "farmed him out" to the National Museum and that organization supplied him with an office and a laboratory in which all of his scientific work was done.

The other thing that I learned about him was that he wrote poetry. In the brochure of which I have spoken, one of his poems is reproduced in its entirety. It is too long to quote here, and in any case I have mislaid my copy-temporarily, I hope. The poem is an appreciation of the sea. My recommendation to any of you who have never read this poem would be to try to obtain a copy of it from the Union in order to become acquainted with the light which it throws on the character of this many-sided genius who was not only a great malacologist and a great paleontologist, but also a great poet as well. Thank you.

FINDING CHLAMYDOCONCHA ORCUTTI DALL, 1884

Not commonly observed in San Diego waters is the animal pictured below, Chlamydoconcha orcutti. Dave Mulliner observed and collected several of these animals while diving with Gordon Rohilliard in 50ft. of water off Pt. Loma, San Diego, Calif. in November 1972. The location was off Pt. Loma College (formerly Cal Western) in a heavy kelp area having fairly jumbled rocks, some of which were turnable. The animals were attached to the bottoms of large turnable rocks. When first observed, it was thought that the animals were Lamellaria, but on closer examination (above water) they were found to be the Chlamydoconcha orcutti, the only member of the genus found on the Pacific Coast.

The amber-colored animal was approximately 1/2" in length with a whitish, translucent shell. This shell appears chitinous although it is not. The animal was observed to have a strong foot which it used much like a strombus. While in the collecting jar, the animal leaped about in the space available by "pushing off" on its foot.



Chlamydoconcha orcutti Dall, 1884

Abstract

The Effect of Varying Oil Concentrations
on the Marine Diatom Skeletonema costatum

By Robert Herz

Skeletonema costatum is widely distributed in shallow water near the coast. A static bioassay was employed

Skeletonema costatum is widely distributed in shallow water near the coast. A static bioassay was employed with Skeletonema as the test organism. (Bioassay: determination of the biological activity or potency of a substance... by testing its effect on the growth of an organism.) There are, in general, two types of bioassay; static and continuous flow. Static bioassays receive an initial dose of contaminant which is usually not renewed during the remainder of the test. These experimental conditions, for short duration tests, probably closely simulate a single release or accidental discharge of oil.

Three tests were made using five different concentrations of oil that spanned the spectrum of oil concentrations found in the ocean. Concentrations of 50ul, 25ul, 10ul, and 5ul (per sample) were chosen. The cultures were made up of 50ml of media and 3 drops of inoculum. They were maintained at a temperature of 18°C in 14 hrs. of light and 10 hrs. of dark at a light intensity of 840 ft. candles (avg.)

Subsequent to an initial count the oil was added in the following manner; the oil was autoclaved at 20psi for 20 minutes at 120°C. Then using a capillary tube, the oil was pipetted and sterilely transferred to the flasks. The initial count and the counts subsequent to the oil addition were made microscopically using a Hemacytometer. These counts were made every day and were continued until the growth rates peaked.

There was growth in all the cultures but growth was inhibited in those cultures in which oil was added. Inhibition increase# with the greater concentrations of oil and in some of the tests culture death occurred at the higher concentrations of 25ul and 50ul. The growth rates, as hypothesized, varied inversely to the concentrations of oil the cultures were exposed to.

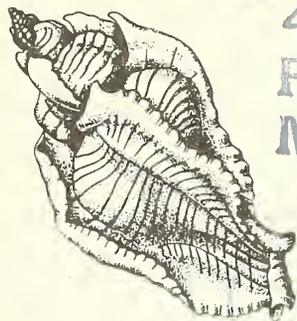
The ecological significance of this experiment is suggested because the results substantiate that certain concentrations of crude oil do affect growth rates of phytoplankton, specifically Skeletonema costatum, and in some cases cause death.

Care must be taken in extrapolating the results of laboratory experimentation to the natural environment. Oil, once it is released in the sea, changes as a number of processes occur, including volatilization, dissolution, and biological degradation, the rates of each process being dependent, in part, on the type of oil spilled. Yet not only the type of oil, but also the area in which it is released (e.g. embayment vs. open sea) and the sea conditions as well as other factors will determine the extent of damage caused by a spill. The extent to which oil or its compounds come in contact with phytoplankton populations in the natural environment is dependent upon the various factors mentioned above.

(Robert Herz' project was chosen San Diego Shell Club winner for 1975 by our Science Fair committee. He was presented with his prize of Barnes' Invertebrate Zoology at our July meeting and gave a brief explanation of his project to the membership. Ed.)

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Vol. VI

September 1975

No. 9

* COME TO THE CARIBBEAN CARNIVAL!! September 20, 1975 at the home of the *
* Bradners.--Party starts at 6 P.M. Map on last page of this issue. *

COLLECTING IN CHOLLA BAY

'Due to circumstances beyond control', our August meeting, scheduled for 7p.m. in the Museum of Natural History, was held instead in a meeting room of the Casa Del Prado.

Mr. Bert Draper, our member from Los Angeles, was our speaker, showing slides taken on recent collecting trips to Cholla Bay. This is an area just south of Puerto Penasco on the mainland side of the Gulf of California. The Bay is very shallow. When the tide is out a mile-and-a half-wide mudflat is exposed, very rich in tidal fauna, even after many years of collecting have taken their toll. Bert and his wife, Lucinda-and friends- gathered many species. Pelican Point and Trout Ledge were particular collecting points for the tiny shells that are Mr. Draper's special interest. These little shells are often jewelled beauties when depicted by macrophotography, a medium in which Mr. Draper excels.

The 152 slides shown- the settlement, collecting areas and specimens, and the trays of specimen shells of every species collected gave a very clear picture of the possibilities in a collecting trip to Cholla Bay, Sonora, Mexico. (We will publish a checklist later.)

NEW MEMBERS

PERRIN, Wm. F. & Marilyn
2947 Luna Ave.
San Diego, Ca. 92117
272-1285

PERRY, Pollyann
639 North Citrus Ave.
Escondido, Ca. 92027

CHANGE OF ADDRESS

ROBILLIARD, Dr. Gordon
1854 Landana Drive
Concord, Ca. 94519

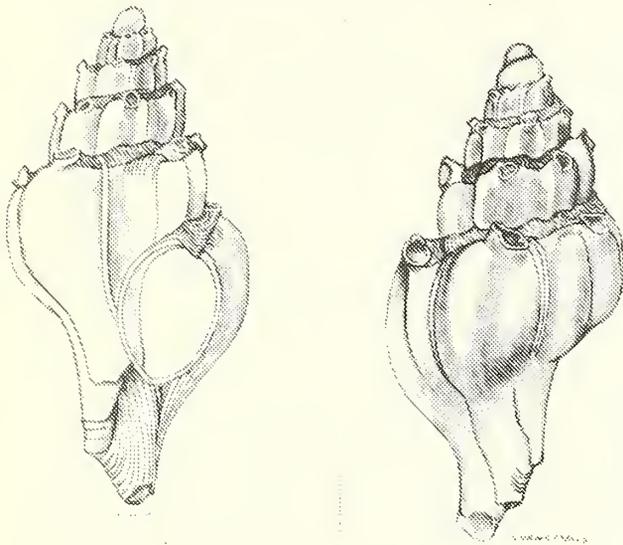
THE TYPHINE SHELL: THEME, DEVELOPMENT AND ELABORATION
by Anthony D'Attilio

(as presented to the WSM in June 1974)

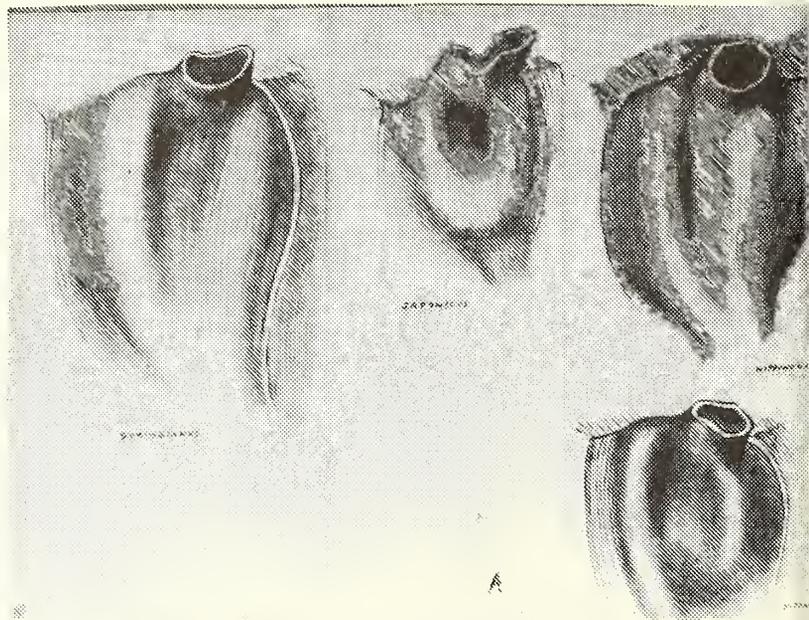
The forms of the species in the subgenera of the subfamily Typhinae, in the Muricidae are richly elaborated in comparison to other Muricacean groups. I have prepared this paper to demonstrate one viewpoint of shell morphology without regard to any Systematic scheme already proposed. The logic of the study demonstrates how elaboration takes place starting with a primarily simple functional element of form, best expressed as an idea in the "theme and variations" terms used in music.

In order to understand the subject properly from this premise, the shells of many species from different generic groups were viewed selectively in a sequence starting from the simplest form of the structure--the statement of "the theme". It then became possible, from my viewpoint, to note how one feature alone within the intervarical area can lead to seemingly many variations and still permit the retention of subfamily characters to a remarkable degree.

The most striking feature in the Typhine shell is the presence of an anal tube within each intervarical area. However, I found this character to vary morphologically very little within the subfamily. The development of complexity and elaboration takes place rather on the remaining portion of the intervarical area. This will best be shown, here, from pictures made from my camera lucida drawings of the shell characters under discussion. I wish to credit Dr. Paul Vella, an Australian, for really putting me on to the subject of intervarical sculpture or its previous neglect.



Siphonochelus syringianus

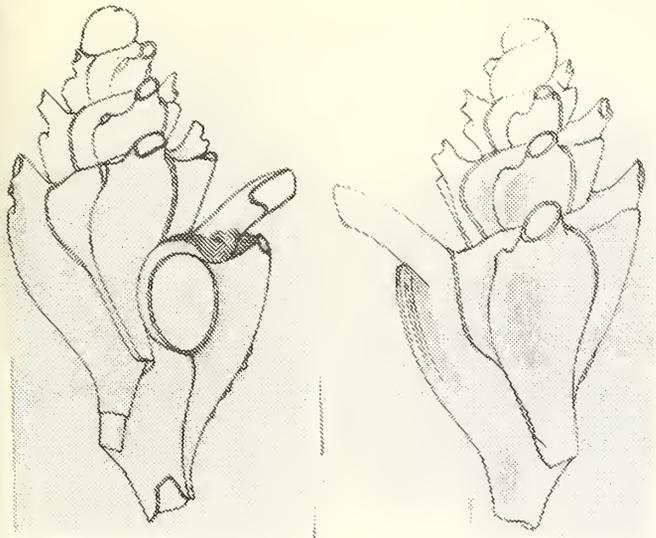


syringianus

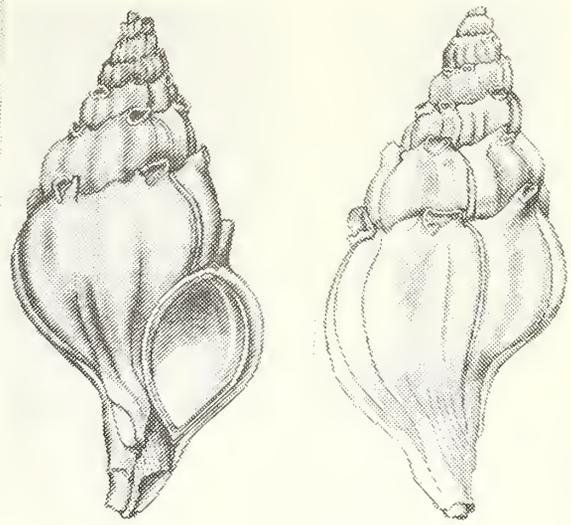
Siphonochelus japonicus

nipponensis

The Typhine shell, except for the Tripterotyphis group has generally four varices; very rarely five. In Siphonochelus, the fusoid shell has a well-defined, continuous, though rounded shoulder; the suture is not interrupted or hidden anywhere. The intervarical areas are defined by weakly raised margins, and a single intervarical swelling or bulge is present between margins. This swollen area is depressed, more or less centrally, and the tube arises on the shoulder periphery, either centrally or, more usually, to the right side, closer to the preceding varix. The tube may also project in various ways from the shoulder; with length, shape in cross-section and direction of the tube at times varying on the same shell.

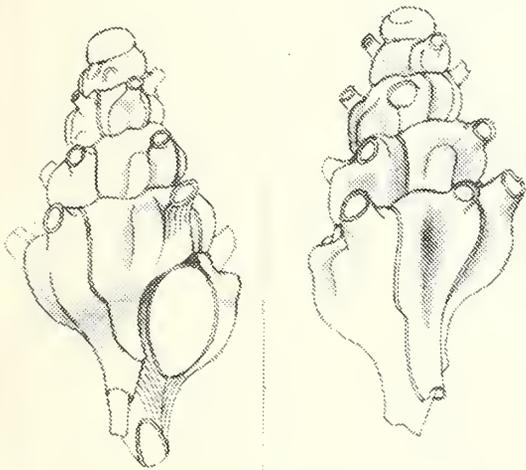


Siphonochelus species from Yucatan

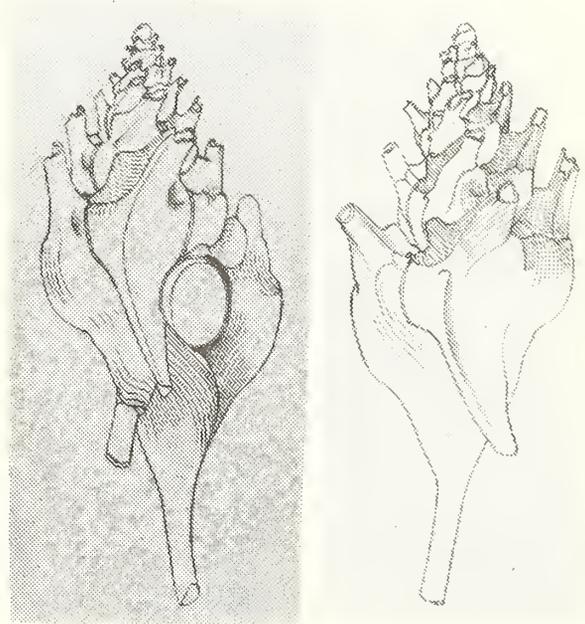


Lyrotypis cuniculosa

A Siphonochelus with a variation noticeably different is from the Celebes area. The species name is not known, if any. It has a tubercle like projection which is the first indication of development on the leading side of the intervarical swelling. It is in this left area and close to the leading varical margin that all subsequent sculptural elaboration will take place.

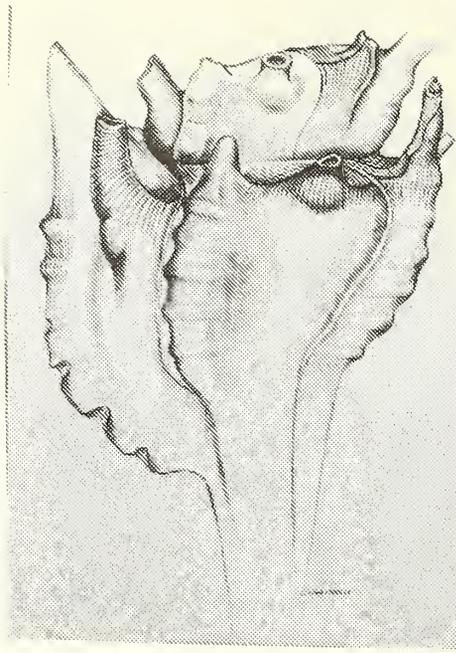


Siphonochelus from the Celebes



Trubatsa longicornis

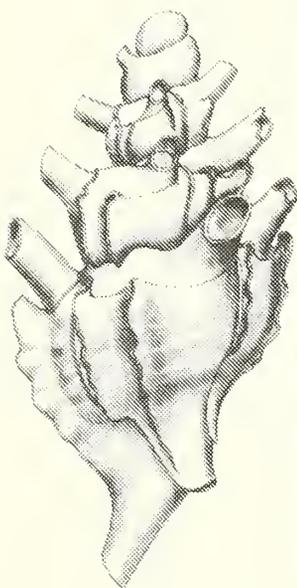
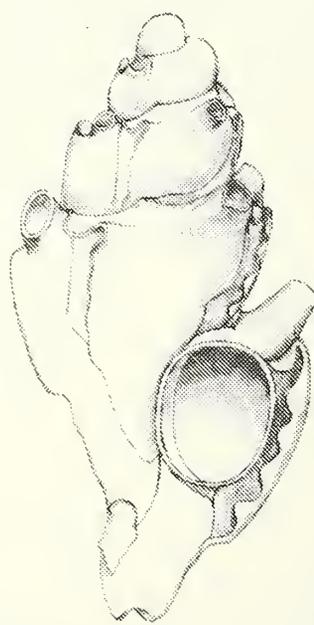
The genus Trubatsa Dall is next in line of variation on the Siphonochelus theme. The intervarical area is still occupied by a single varical wide swelling which is depressed towards the center. However, the tube is much more broadly based and flattened below, with its inner side contiguous with the suture. The left side of the varical swelling is extended above the shoulder and now is attached, buttress-like, to the preceding whorl. The tubes are aligned diagonally to the axis of the shell and each tube often obscures the base of the one above it.

Trubatsa pavlovaHaustellotyphis cumingii

Haustellotyphis has the tubes well defined on the shoulder periphery toward the preceding varical margin. On the left side, the intervarical swelling is prolonged into a knob-like structure. Some spiral cords are found on the body whorl.

Next to these simple generic characters, we find some species beginning to show new forms of development. This is primarily apparent on the left side of the intervarical swelling, which is much reduced and takes on the character of a secondary marginal-like varix. In the species, nitens, genus?, the tube is swept back and the secondary margin forms a varical flange. This flange

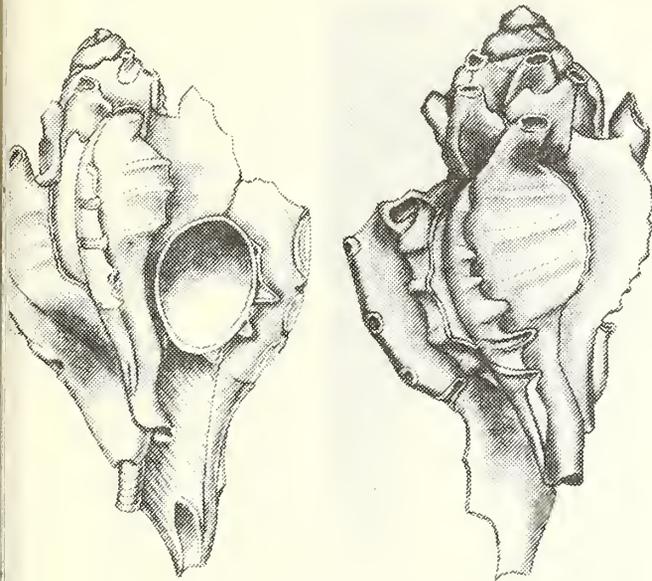
is weakly elevated except at the aperture when the varix curls forward and, has a scalloped edge. Above, this secondary varix proceeds across the shoulder hugging the tube and running parallel to the true varical margin, to the suture where it ends.

Typhina bivaricatanitens genus?

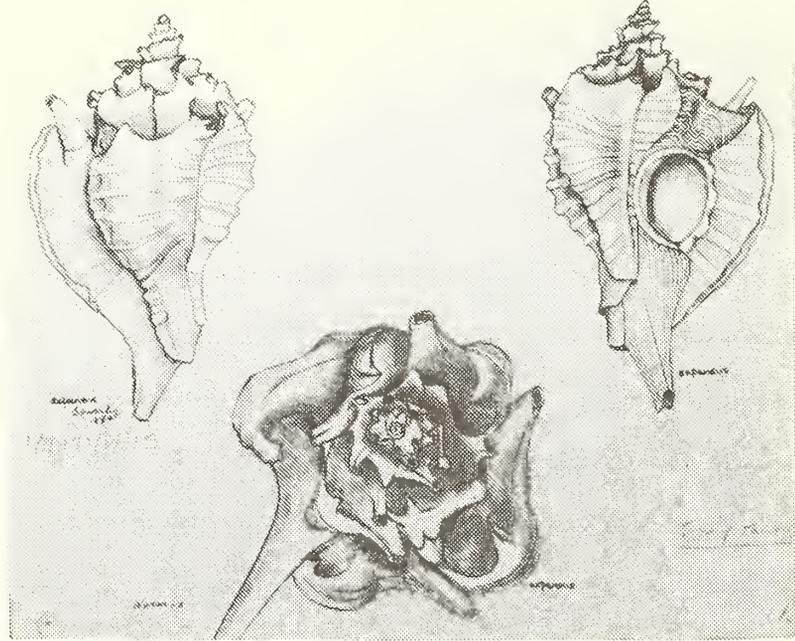
In bivaricata, in addition to the secondary varical margin, the left side of the intervarical swelling is raised into a sharp triangular, costate structure. At the shoulder, the margins also turn toward the tube, hugging it and the three margins overlap one another.

In the fossil species, parisiensis, the tube remains with little change on the right side but on the left side the intervarical swelling has developed into a recurved, undulating flange.

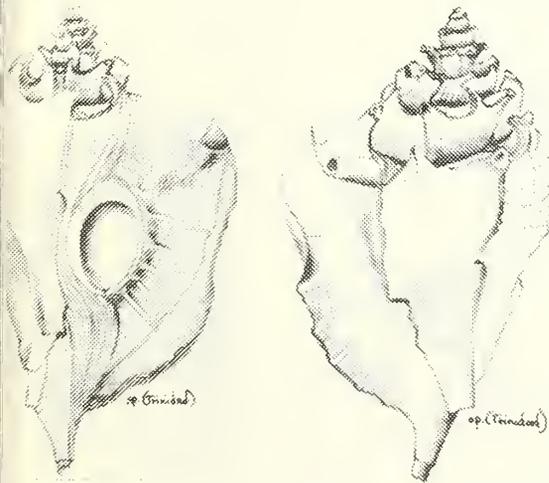
Talityphis species characters between varical margins show little variation from the preceding species. The left side of the intervarical swelling is drawn out above the shoulder into an incurved spine; the tube is swept back, broadly based at the shoulder, and on its inward side extending to the suture. Spiral cords are present as in Talityphis expansus.



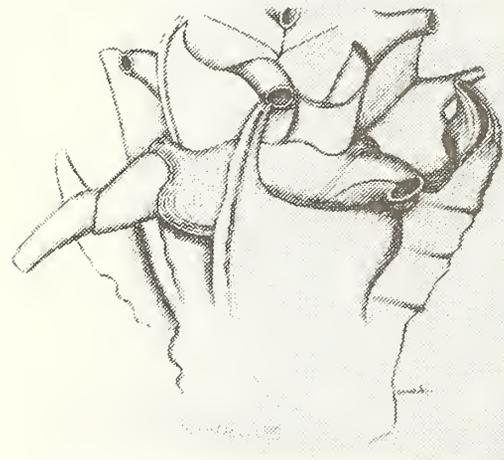
Fossil species, parisiensis



Talityphis expansus



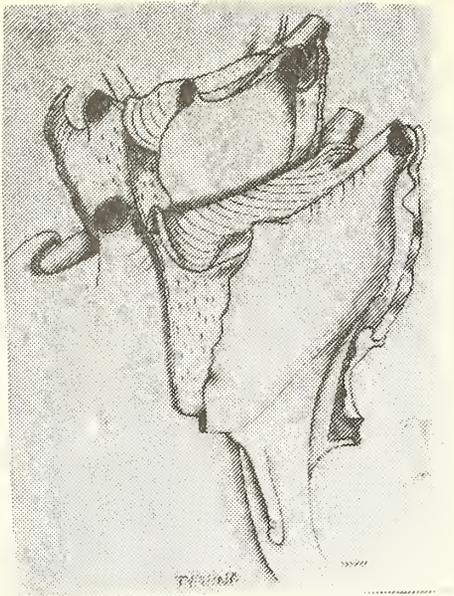
An undescribed Talityphis species (from Trinidad) showing all essential characters of the type.



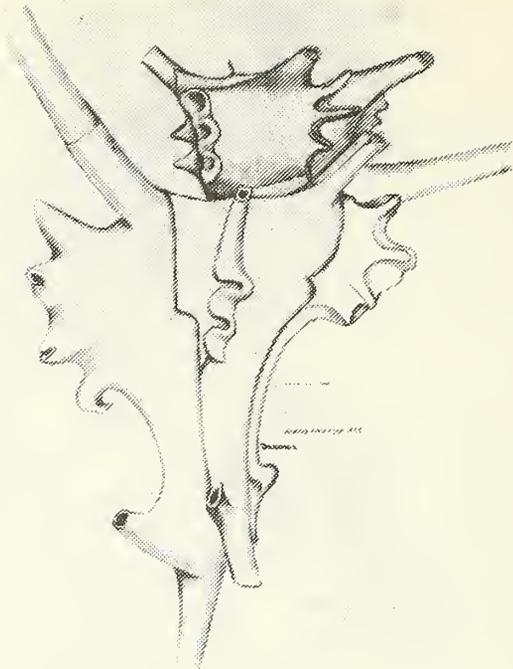
Typhinellus sowerbyi

In Typhinellus sowerbyi, the type of this genus, the left side of the intervarical area has a secondary varix or varical swelling which is prolonged into an open spine. The tube projects almost at right angles to the axis of the shell.

Typhina, exemplified here by the species yatesi, shows a secondary varix on the left side. This is drawn up and pinched in at the shoulder into a, more or less, open spine. The tube is not particularly distinguished in position or form.



Typhina vatesi

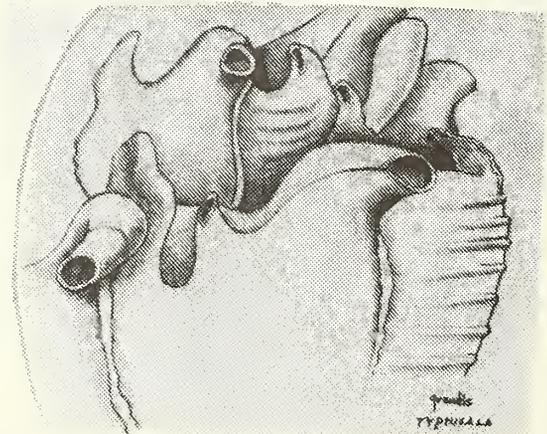
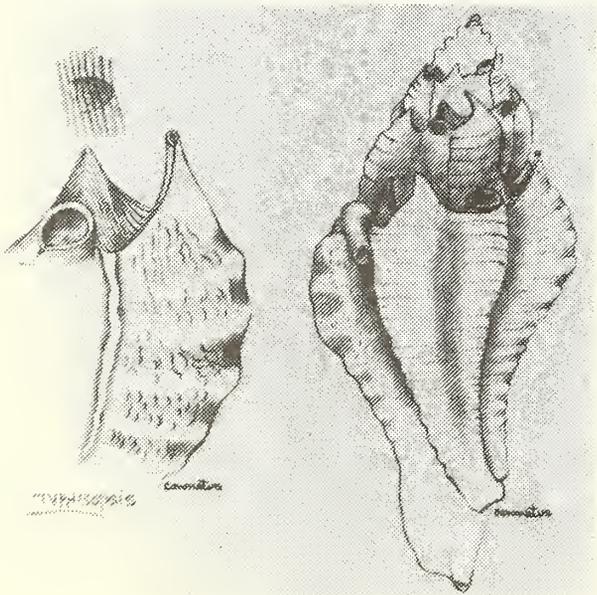


Monstrotypis tosaensis

Monstrotypis tosaensis has a much attenuated, large shell with a tabulate shoulder. The intervarical bulge is flattened, the tube is in its customary position; there is a secondary marginal varix which is pinched together along its margin into three short spine-like elements. The one at the shoulder is more strongly tube-like. The species is, in addition, uniquely distinguished by the presence of an open spine on the canal.

Typhisopsis coronatus has the intervarical area well divided with the tube on the shoulder at the right side; the left side bears an incurving spine. The varical margin becomes a multi-lamellate structure on the shoulder and proceeds across the shoulder to form an elevated buttress against the tube and then is attached to the preceding whorl. Spiral cords and a malleated surface are often characteristic of this species also.

Typhisala grandis has the intervarical area broken up into a number of sculptural elements. On the extreme right is the tube, curved backward and downward. A smaller, open-ended spine follows it at the left. A deep downward indentation of the shoulder follows and then there is a flange at the varical margin which hugs and re-inforces the tube. Cutting across the shoulder, the flange is elevated and attached to the whorl above. There are also a large number of spiral cords encircling the shell.



Typhisala grandis

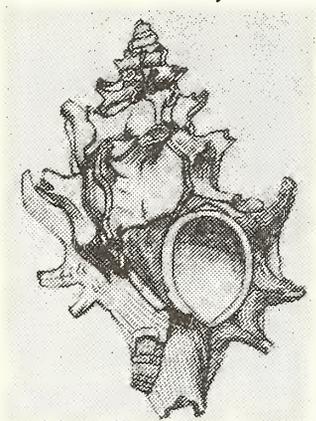
← Typhisopsis coronatus

Typhisala clarki has the secondary varical margin raised into a lamellose ridge which is folded at the shoulder in an open spine. It then continues across the shoulder overlapping the true varical margin, becoming elevated and lamellose as it is attached to the preceding whorl. It thus becomes a buttress, reinforcing the tube on its left side.

Hirtotyphis pungens, a fossil, is much like other members of this group. The shell generally has two secondary varical margins. The most inner one is closed and folded into a single tube-like spine. Close to this and situated between the last element and the true varical margin, there are three tube-like spines; the upper one is somewhat above the shoulder margin, the remaining two are found at the base of the body whorl.



Typhisala clarki



Pilsbrytyphis gabbi

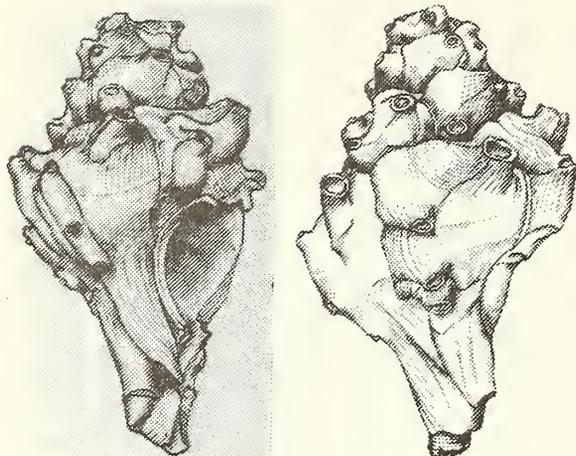


← Hirtotyphis pungens

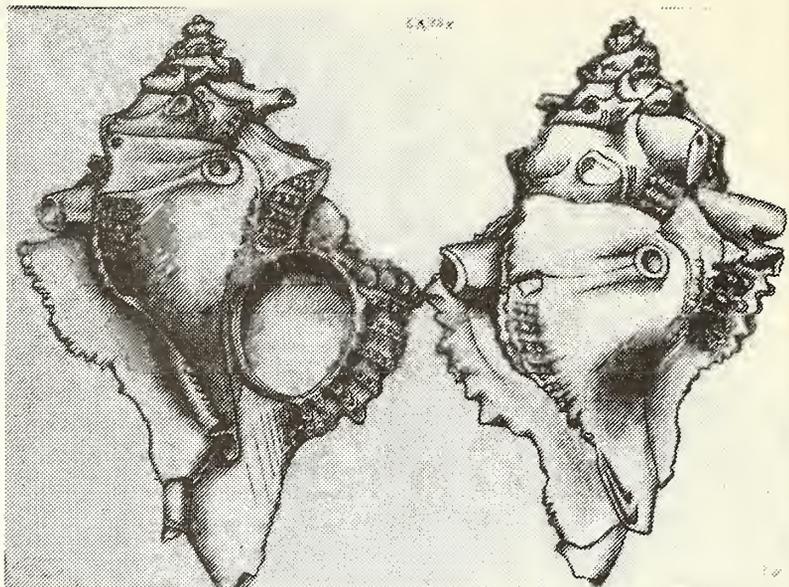
Pilsbrytyphis gabbi is the type of a genus differentiated principally by the irregularly folded, wavy and undulate surface the shell. The tube is in the usual position, more or less adhering to the previous varical margin. The intervarical, centrally depressed body swelling of Siphonochelus is present. The left side of the swelling extends into a projecting flange-like buttress attached to the whorl above, thus in its major structural characteristics, hardly differing from Trubatsa species.

Neotyphis tepunga has a broad tube following the preceding varical margin. On its forward side the varical margin is folded into three spine-like elements, barely dissimilar from Hirtotyphis. The three tube-like spines are oriented vertically from the center of the body whorl to its base.

Rugotyphis francescae, the type has a broad, strongly-built shell, the tube is bent back from the shoulder periphery and is situated a short distance from the preceding intervarical margin. The forward and leading varical margin is wavy, has a parallel margin to it of low scabrous lamellae above. When well-developed, the lower part of this margin is recurved and undulate. Above, the varical margin slopes upward and is attached above the suture to the preceding whorl.



Neotyphis tepunga

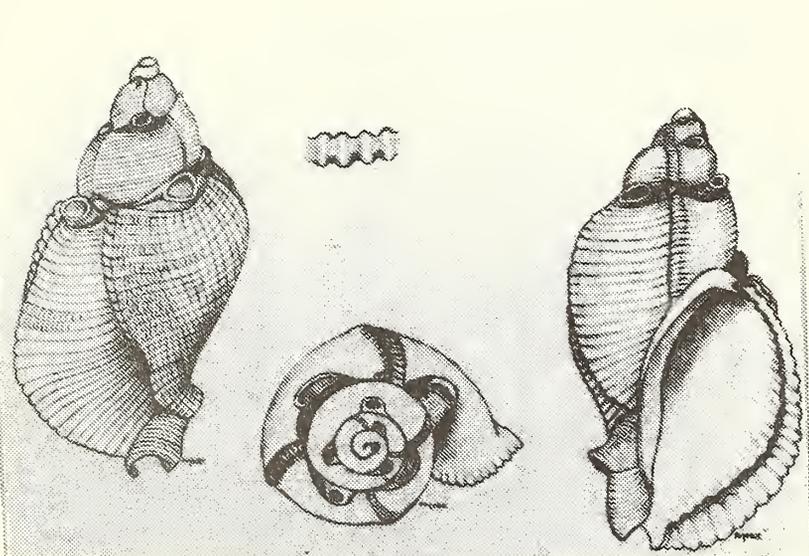


Rugotyphis francescae

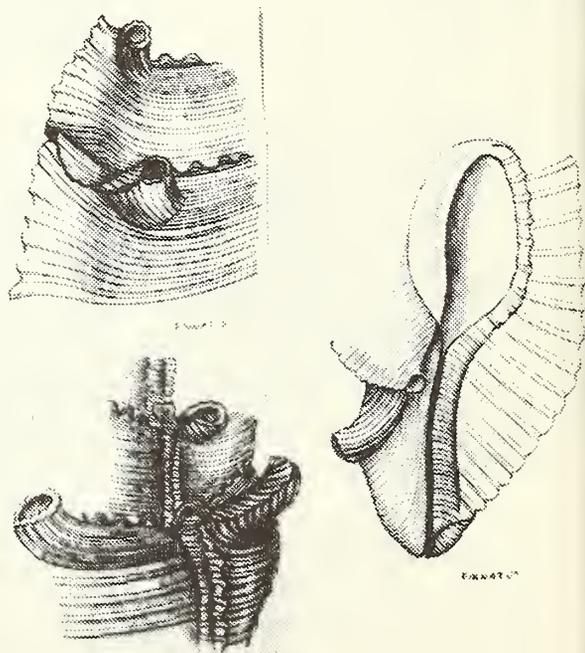
The group of genera allied to Tripterotyphis all differ by having three varices per whorl with consequently only three tubes per whorl; in contrast to four or more as in the remaining genera. The position of tube is of primary significance in these genera. Beginning with Cinclidotyphis myrae there is no noticeable shoulder and no intervarical swelling. The tube is centered between varices and the entire shell is closely, spirally ribbed. There is a narrow varical costa close to the varical margin.

Pterotyphis pinnatus shows, in this genus, the shifting of the tube much closer to the leading varical margin. The spiral sculpture and varical costae are the same as in Cinclidotyphis. 24a

Tripterotyphis shows the final possible modification of the tube position, as it is now confluent with and formed simultaneously by the mantle with the varical margin. A few scabrous cords are the only other ornamentation in addition to a secondary varical margin.

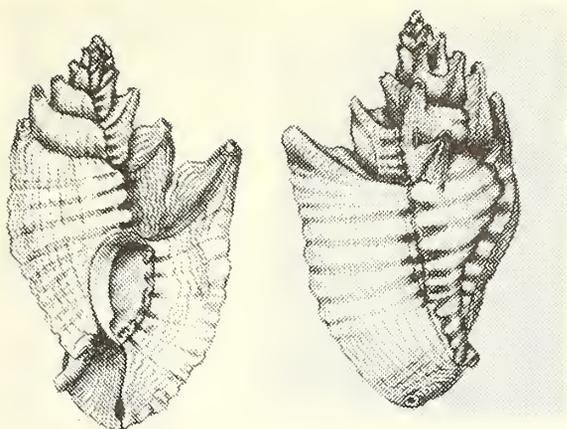


Cinclidotyphis myrae



Pterotyphis pinnatus





Tripterotyphis lowei

In summary it may be stated that all previous classifications of this sub-family, based entirely on the position and number of tubes, omit other important or essential characters that are, in my opinion, useful for generic classification. These other characters are those found in every intervarical space of a given shell excluding those found around the apertural region which I have not studied.

It is hoped that these studies will be found useful when the Typhinae, both recent and fossil, are again taxonomically revised.

Drawings by Anthony D'Attilio

Photos of original drawings by David Mulliner

FROM THE MINUTES

Bob Schoening, our Vice-President, presided since our President was on vacation.

Our Caribbean Carnival was discussed, the hot dish will be decided by committee. The treasurer, Margaret Mulliner, was also on vacation, so not treasurer's report.

Bob announced that a site for our Christmas Party was not yet determined and asked for suggestions, preferably a place where dancing later would be possible, and not a military location.

William Perrin won the shell drawing. With his wife, Marilyn, he had just joined the Club during the coffee break.

If you are coming from North of San Diego
 Take La Jolla Village Dr, exit from highway 5
 Turn Right on to Torrey Pines Rd.

COME TO THE CARIBBEAN

North

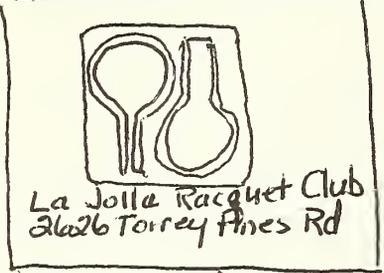
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 Dinner - 7 p.m.

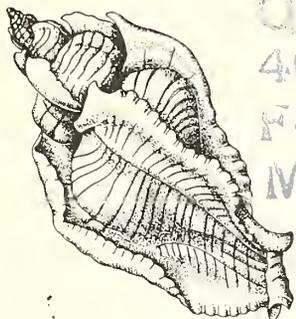
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 - * 2- Limbo Contest - with prize
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 - * 4- Swimming available - bring (wear) your suit
 - * 5- Caribbean music

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SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
CASA DEL PRADO BALBOA PARK
(Across from Natural History Museum)
MEETS THIRD THURSDAY --7:00 P.M.

President: Carole Hertz
Vice-President: Bob Schoening
Recording Secretary: Blanche Brewer
Corresponding Secretary: Virginia Hanselman
Treasurer: Margaret Mulliner
Editor: Blanche Brewer

Annual Dues: Single membership \$3.00; Family membership \$4.00; Overseas surface \$3.50; Student membership \$2.00.
Payable to San Diego Shell Club, Inc., c/o Margaret Mulliner, 5283 Vickie Drive, San Diego, Ca. 92109.

* PROGRAM: Underwater off San Diego, Calif. Slides and shells of life in the *
* deep water off our coast. Speakers-Barbara and John Myers. *
* * * * *
* Nomination of officers for the 1976 year. Presentation of prizes *
* to the winners of the Limbo Contest. *
* * * * *
* SAVE THE DATE!! The Christmas party will be on December 13, 1975, 6P.M. at *
* the Casa Del Prado. More details at the meeting. *
* * * * *

CARIBBEAN CARNIVAL

Too many familiar faces were missing from our Caribbean Carnival. For several reasons our numbers were less than usual at our fun gatherings. Still, it was a lovely evening, weatherwise and in enjoyment.

The Club rooms and pool of the Racquet Club gave our Fall party a different complexion than those of other years. The pool was especially appreciated. A few came prepared to swim. Sillee Dilworth and Twila Bratcher performed a beautiful water ballet for an audience so enthralled, that there was complete quiet until they had finished.--And then delighted, hearty applause!

There was a Limbo 'contest' in which we all joined--some of us, of course, not quite so 'limbo' and an introduction to the Ska--a happy, calisthenic dance--by Twila.

And Dave's delicious punch was dispensed at poolside.

Our thanks to our gracious, sponsoring hosts, Hugh and Marge Bradner, to Bob Schoening for setting up the 'mood' music, to Dave Mulliner, our Mix-master, and to all of our good cooks. The recipes for the special Caribbean dishes follow in this issue.

The winners of the Limbo contest, Sherry Pickford and Mary Schuler will receive their prizes at the October meeting.

CHANGE OF ADDRESS

KING, June
4269 Hawk Street
San Diego, Ca. 92103
296-0574

NOTES ON FUSITRITON

By Robert R. Talmadge*

(Read at the joint A.M.U.-W.S.M. Meeting, San Diego, June 1975)

For many years I had accepted, without question, the generalized statement that Fusitriton oregonensis (Redfield, 1846) were not only eaten by the peoples of Japan, but also by our Indian peoples living in the Pacific Northwest. On several occasions I had made an effort to render the flesh of these gastropods palatable, but at no time was I able to tenderize the flesh to less than the consistency of a truck tire. The flesh was not only extremely bitter but had a strong iodine-like flavor (Dr. Clyde Roper, U.S.N.M. in discussing this flavor in the flesh of the Great Squid, Moroteuthis robusta Verrill, 1876, had learned that such was induced by an ammonia compound within the tissues). Added to these two problems was a third, which irritated the distaff member of my family, --odor. When the snails were boiled they gave off the usual smell of clams or other marine snails, but when the flesh was placed on a hot griddle this suddenly altered to a most obnoxious smell which penetrated the entire house. So my culinary efforts were banished to the back yard and the camp stove.

On one trip to the generalized Puget Sound region, my son and I spent several days at Neah Bay. This was the locality from which the Rev. Swan provided P.P. Carpenter with so many species which were later described as new, and anyone making specialized studies of some of the genera and species knows the great value of topotypic material for comparison. As expected, Bob Jr. and I soon had an entourage of Makah children assisting in collecting specimens within the breakwater at the Bay. Several large Fusitriton oregonensis were found by the children, and at that time it dawned on me to ask how these large snails were prepared for the table by these "Pacific Northwest Indian People". When the question was asked, the reaction was far more than expected. I was given a horrified look, and although I cannot now present a definite quote, the answer was that, "Mister, no one eats these, they taste bad, and not even the dogs will eat them." The latter was exemplified at a later high tide when we watched the children play catch with the Fusitriton. When the shells rolled along the beach, their pet dogs would run up to the gastropods, take one sniff, and then walk stiff-legged back away from these snails.

In later years I found similar situations among the Nootka at both Berkeley and Clayquot Sounds, and the Esquimau on Prince William Sound, Alaska. At the latter locality we had been asked to check on the diet of the abundant population of Sea Otter, Enhydra lutris Linnaeus, and noted that although they exposed Fusitriton when rolling rocks for their favorite (there) food, the Urchins, Strongylocentrotus drobachiensis (Müller), the Fusitriton were ignored. Both Raven, Corvus and Gull, Larus scavenged the areas left exposed by the Otter along the rocky reefs and at no time did I note a Fusitriton being eaten. It appears that the only predator to this snail is Homo sapiens. And at this time I have been unable to verify the use of Fusitriton for food purposes in the Pacific Northwest.

In Japan I found a very different situation. In some areas Fusitriton were eaten and in other regions they were discarded. My first contact with the genus was at the National Science Museum where I had the opportunity to visit with Dr. Tadashige Habe, who opened their collection so that I could better understand certain genera of far western Pacific mollusca. Three species were found in the collection, --F. oregonensis (Redfield), F. galea (Kuroda and Habe), and the small, bathyl F. midwayensis Habe and Okutani.

My next contact with this gastropod was at the Tokyo Central Fish Market, where after considerable searching amid the fish, two small baskets of the snail

were found. The fishmonger's cooperation was excellent and I learned that Fusitriton were considered to be a more or less inferior product and that these had probably been taken somewhere in the north at Akita (on the Sea of Japan coast of northern Honshu) or perhaps at Amori on the Tsugaru Straits or even at Hokodate on Hokkaido. The snails had been received from a purchasing jobber and no locale data was available. I asked about F. galea and the fisheries people informed me that because of heavy industrial pollution, the flesh was in poor condition over much of the range of that species. Because of this there had been overfishing in the remaining commercial range of the species, and my best bet to obtain living specimens was to go to Tosa Bay off Shikoku and see if some local fishermen had any in the smaller village fish markets.

I used Sapporo on Hokkaido for my headquarters for some time and visited various fisheries establishments on the Tsugaru Straits, including Hokodate. There I found an interesting situation; Fusitriton oregonensis are taken with Neptunea arthritica (Bernardi, 1857) which are considered more palatable, and which are more valuable on the commercial fisheries market. So, locally, Fusitriton are eaten by the fishermen or local inhabitants, while the Neptunea go to market.

Some time was spent at Abashiri, the home port of many of the northern Whelk Fleet, fishing not only the Sea of Okhotsk, but the Bering Sea and more shallow portions of the north Pacific. Here, all Fusitriton are discarded and the trash cans are full of such residue--Fusitriton, Clinopegma, sponge, etc. The estuary is full of the living Fusitriton. During the process of unloading, anyone noting this snail will toss it away and those that land in the water are safe. The ones that land on the dock or quay; (if they survive the wheels of the truck or feet or the workers) may be saved since the quay is hosed down when the boats are finally unloaded, and everything is washed into the bay.

While at Abashiri (and with Fusitriton so common) I laid out units of 100's on several occasions in an effort to see if there were any indications of sexual dimorphism or geographical morphology in shell characteristics. I could find neither. The only shell morphology that I noted was with age,--the older the snail, the thicker and broader the shell, plus a thickening of the operculum.

Oh, yes. I did find out how the Japanese prepare these gastropods. They were removed from the shell, ground up, and soaked in "Sweet" of common baking soda overnight. Then they were mixed in with various herbs and spices to form a sauce to go over rice, noodles, or green vegetables. It does appear that the ecological conditions have a strong effect upon the taste of the Fusitriton.

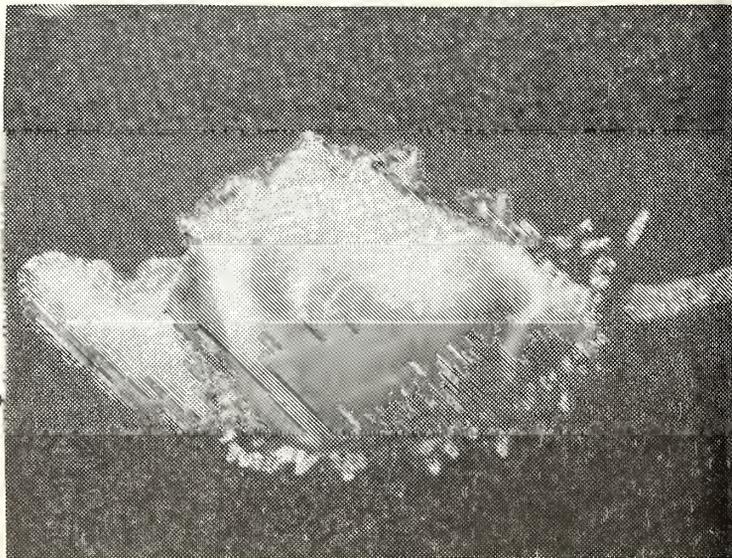
*Curator of Natural History, College of the Redwoods, Eureka, California, 95501

ON FINDING ERATO VITELLINA

In January 1975, while diving near the ancient sea cliffs off Point Loma, San Diego, California, in about 55 ft. of water, Dave Mulliner found the pictured Erato amid the rubble on the plateau of the sea cliff.

This reddish-brown, pear shaped shell is slightly larger than $\frac{1}{4}$ " (6-7mm) The animal's shell causes the mantle to appear more colored than it actually is. The mantle is covered with golden-brown papillae and the proboscis and tail are a mottled off-white color.

Erato vitellina Hinds, 1844
Picture by Dave Mulliner



MUSEUM MUSINGS
By Twila Bratcher

During April and May of this year I had occasion to visit seven museums in Europe doing research for a monograph on the family Terebridae. Here are a few of my rambling impressions.

BRITISH MUSEUM OF NATURAL HISTORY: This is a place where a serious worker may photograph, measure, and compare a wealth of type material in peace and quiet. The only things I needed to borrow, a microscope with light and an electrical plug fitting to fit my electric strobe recharger, were cheerfully furnished. I was even allowed to work one Saturday afternoon.

LINNEAN SOCIETY: The Linnean types are kept in a vault-like walk-in bank vault. The types are in glass fronted drawers in the vault under Linnaeus' original designation. The Terebra I was to photograph and measure for myself and some Nassarius for Walter Cernohorsky were all together with the others originally described in the Buccinidae by Linnaeus. There was a long, narrow table in the vault on which I began to assemble my photographic gear until the young man who opened the vault said, "No, not here." Then I was taken to an office and given a desk on which to work without interference. With all the security, I had half expected to have someone peering through my camera lens with me while I photographed the hallowed specimens, but that was not the case.

MUSEUM OF NATURAL HISTORY AT GENEVA: I had written to Dr. Binder asking if the museum would be closed on Saturdays and stating that we would arrive in Geneva as early as possible on Friday. He answered that the museum was indeed closed on Saturday and that he would be out of the city on Friday. He said, however, that he would return about 5:00p.m. on Friday and would pick me up at my hotel. He did. He opened the museum for me and allowed me to work for about four and a half hours on the Lamarck and Kiener collections. He was delightfully gracious.

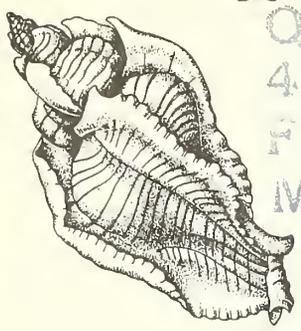
ZOOLOGISCH MUSEUM AMSTERDAM: I was constantly surprised by the excellent English spoken by everyone in the department. I was served tea; given reprints, and warmly welcomed and allowed to work with the collection. (Shepman's holotypes from the Siboga Expedition are there). They apologized for the odor of the room in which the specimens were stored. I mentioned that it was nothing unusual in a room with so many specimens of mollusks. The young man said, "Oh, but this odor comes from the zebra pens outside the window." The malacological department is housed in the zoo.

SCHOOL OF MINES PARIS: Very little English is spoken there. The molluscan department is on the fourth floor--walk up. All of the Deshayes Terebra material is together and labeled as such,-- part of it covered with dust that could be from Deshayes' time (1857). None of the holotypes have been marked. I was able to isolate eight of the Deshayes' holotypes. There were other Deshayes' species among which there should have been types, but I was unable to find the actual type specimens. The director of the department was pleased to have the types isolated.

NATIONAL MUSEUM OF PARIS: When I arrive all the types I had mentioned in my letter were on a desk separated from the collection along with some Terebra specimens they wanted identified.

The Museum had set up a fine, newly opened molluscan exhibit for the public in a building in the park across the street. There was an admission charge, and they were doing a brisk business. I was given a pass. In one room colored slides and motion pictures of living molluscs were being shown. In the exhibition hall was a fine and showy exhibition of worldwide shells. Around the walls were 8X10 color transparencies lighted from behind. These were mostly of Cypraea with their mantles extended and spectacular shots of nudibranchs, many of them taken by our own David Mulliner with credit given for each picture. Nice to meet you in Paris, Dave.

THE FESTIVUS



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VOL. VI NOVEMBER NO. 11

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* PROGRAM: Nov. 20, 1975; 7:30 P.M. Rm. 101 of Casa Del Prado
* Speaker: David Thomas of Morro Bay will speak on his trip to
* Easter Island. His talk will be accompanied by slides.
*
* Election of Officers
* Pictures from the Caribbean Carnival.
*
* CHRISTMAS PARTY-- December 13, 1975 (Saturday ) See last page for
* details.
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FROM THE MINUTES

This first meeting held in the Casa Del Prado (our new permanent meeting place) featured Barbara and John Myers' informative talk, with slides, on shells from deep water off our coast. (See article this issue).

The membership voted on Zolezzi's Italian Restaurant as the choice for our Christmas party. (See last page).

The nominating committee's slate of officers for 1976 was presented to the membership. The slate is as follows:

President: Bob Schoening
Vice-Pres.: Hugh Bradner
Record. Sec'y: Blanche Brewer
Corres. Sec'y: John Smith
Treasurer: Martin Schuler

Nominations from the floor will be accepted at the November meeting. Officers will be elected at this meeting and installed at the Christmas Party.

THE FESTIVUS DOES NOT PUBLISH AN ISSUE IN DECEMBER.

Checklist of Shells Collected at
Cholla Bay, Sonora, Mexico*

By Bert C. Draper

Cholla Bay

1. Cerithium stercor^suscarum
2. Oliva spicata
3. Oliva incrassata
4. Olivella dama
5. Comus regularis
6. Comus perplexus
7. Terebra adairensis
8. Terebra armillata
9. Terebra berryi
10. Terebra churea
11. Terebra variegata
12. Terebra bridgesi
13. Terebra larviformis
14. Cerithidea albonodosa
15. Fusinus fredbakeri
16. Strombus gracilior
17. Turritella goniostoma
18. Turritella leucostoma
19. Melongena patula

South near Pelican Pt.

20. Crucibulum spinosum
21. Calyptreae mammillaris
22. Crepidula striolata
23. Polinices bifasciata
24. Natica chemnitzii
25. Epitonium hindsii
26. Hexaplex erythrostomus
27. Muricanthus nigritus
28. Muricopsis zeteki
29. Eupleura muriciformis
30. Neorapana tuberculata
31. Solenosteira macrospira
32. Nassarius tiarula
33. Nassarius moestus
34. Epitonium replicatum
35. Glycymeris gigantea
36. Pecten vogdesi
37. Argopecten circularis
38. Trachycardium panamense
39. Protothaca grata

Following shells found at Trout Ledge,
looking back across Cholla Bay.

40. Tegula rugosa
41. Turbo fluctuosus
42. Anachis coronata
43. Columbella aureomexicana
44. Nassarius iodes
45. Pilsbryspira bacchia

Following shells collected at Pelican Pt.

46. Anachis scalarina
47. Anachis varia
48. Anachis vexillum
49. Anachis hilli

50. Disipifus macleani
51. Mitrella granti
52. Mitrella guttata
53. Columbella strombiformis
54. Parametaria macrostoma
55. Phos dejanira

Some minute shells from under the rocks
or from bottom skim at Pelican Pt.

56. Tricolia variegata
57. Littorina albicarinata
58. Rissoina mexicana
59. Rissoina woodwardi
60. Episcynia medialis
61. Teinostoma amplectans
62. Caecidae (8 species)
63. Metaxia convexa
64. Turveria encopendema
65. Pyramidella adamsi
66. Morula ferruginosa
67. Liocerithium judithae
68. Theodoxus luteofasciatus
69. Euclathurella carissima
70. Pyrgocythara scammoni
71. Pyramidella panamensis
72. Crassispira bifurca
73. Turbonilla soniliana
74. Turbonilla excolpa
75. Peristichia hermosa
76. Iselica fenestrata
77. Sulcoretusa paziana
78. Collisella stanfordiana
79. Ostrea palmula
80. Nerita scabricosta
81. Nerita funiculata
82. Acanthina angelica

Shells taken at Norse Beach, locally
called Sandy Beach

83. Cerithium maculosum
84. Nassarius angulicostis
85. Crassispira pluto
86. Pilsbryspira nymphia
87. Triphora excolpa
88. Lepidoaona subtilis

Shells collected in grunge taken from
Manua, Estero.

89. Melampus mousleyi
90. Balcis gibba
91. Balcis recta
92. Iselica kochi
93. Turbonilla stenogyra
94. Litiopa melanostoma
95. Macromphalina (2 species)
96. Discopsis (1 species)
97. Pedipes liratus

* Checklist was part of Mr. Draper's presentation at our August meeting. (Ed.)

EXOTIC
BROWN FOREST

By
Barbara W. Myers

For the collector fresh from rich tropical seas, the contrast between our Southern California coast and his usual collecting haunts may cause him to comment that ours is a rather drab environment. In terms of Cypraeidae and Conidae it is bleak for we have just one of each. Cypraea spadicea Swainson, 1823, though of medium size is not distinguished by exotic coloring, being a rich but unexciting brown. Conus californicus Hinds, 1844, is small and also (you guessed it) brown. We have no species of the family Strombidae and no species of the family Volutidae, two more favorites with collectors.

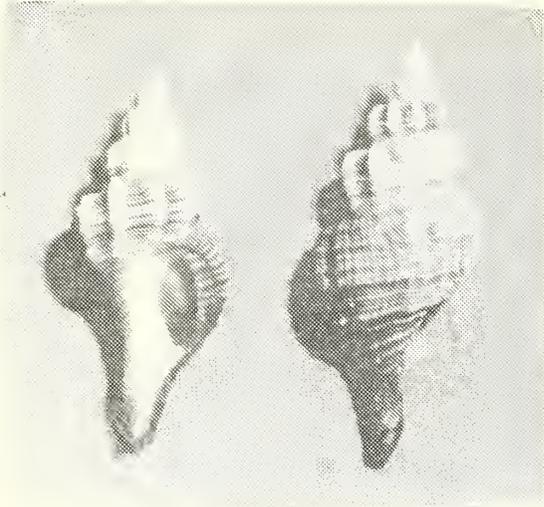
What we do have are the Pacific Coast kelp beds. Macrocystis pyrifera, the giant bladder kelp, fastest growing in the plant kingdom is found at depths of 30 to 70 feet. Sometimes intermingling with the Macrocystis but usually growing along the outer edges of the beds at depths of 90 feet or more is the largest of our sea plants, Pelagophycus porra, the bull or elkhorn kelp.

This extensive submarine forest creates a unique environment for a great variety of marine creatures, many species of fish etc. Sheltering among the blades and stipes, its rich brown carapace matching their color, the fairly large kelp crab Epiplatys nuttalli Randall finds protection and food as does the mollusk Norrisia norrisii (Sowerby, 1838) its smooth brown shell only betrayed by the scarlet red of the living animal. Looking carefully among the fronds you may discover Calliostoma gloriosum Dall, 1871, C. annulatum (Lightfoot, 1786) or the rare C. tricolor Gabb, 1865. Feeding on the kelp and owing their existence to this plentiful supply of their favorite food are the California abalone, five of the seven species living in this offshore environment -- Haliotis rufescens Swainson, 1822, H. corrugata Wood, 1828, H. sorenseni Bartsch, 1940, H. walallensis Stearns, 1899 and H. kamchatkana assimilis Dall 1878. The other two species, H. cracherodi Leach, 1814 is an intertidal species and H. fulgens Philippi, 1845 is usually found no deeper than 25 feet.

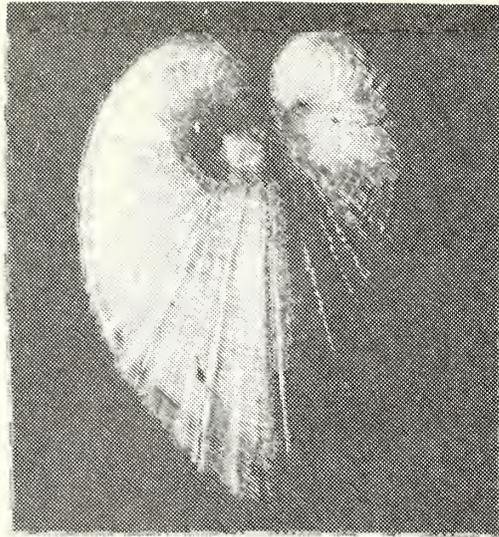
Hybrids are occasionally found among the Haliotis and in my collection I have five different hybrids all identified from their epipodiums -- a hybrid of H. corrugata Wood, 1828 and H. walallensis Stearns, 1899; a hybrid of H. rufescens Swainson, 1822 and H. sorenseni Bartsch, 1940; a hybrid of H. rufescens Swainson, 1822 and H. k. assimilis Dall 1878; a hybrid of H. walallensis Stearns, 1899 and H. k. assimilis Dall, 1878 and a hybrid of H. sorenseni Bartsch, 1940 and H. walallensis Stearns, 1899. In my opinion H. k. assimilis Dall, 1878 shows great variation in both shell and epipodium characteristics which leaves me with several possibles, but only two positive hybrids with H. k. assimilis Dall, 1878.

The Muricidae are well represented in this environment -- Pteropurpura macropterus (Deshayes, 1839) often eroded or with broken wings, occasionally banded with white, P. vokesae Emerson, 1964, a rare find, Maxwellia santarosana (Dall, 1905), Ocenebra foveolata (Hinds, 1844) and O. atropurpura Carpenter, 1805 to name a few.

Astraea gibberosa (Dillwyn, 1817), Tegula regina (Stearns, 1892), Lamellaria diegoensis Dall, 1885, Trivia californiana (Gray, 1827), Pseudomelatoma grippi (Dall, 1919), Ventricolaria fordii (Yates, 1890) and Fusinus kobelti (Dall 1877) are inhabitants of this environment.



Fusinus kobelti (Dall, 1877)

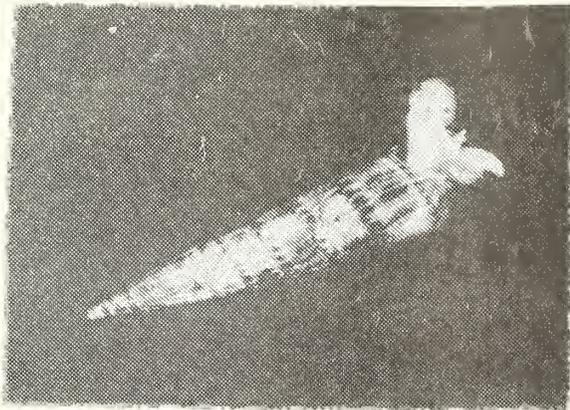


Ventricolaria fordii (Yates, 1890)



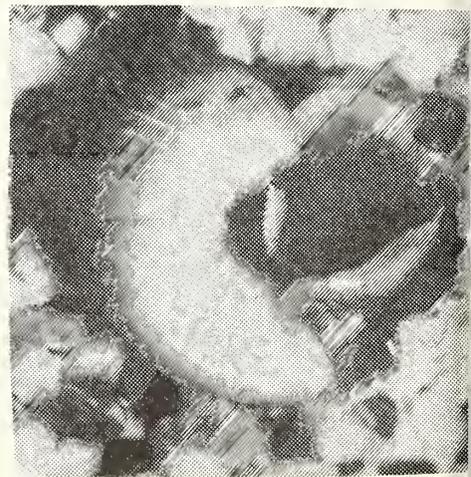
Pseudomelastoma grippi
Dall, 1908

Photo by Dave Mulliner



Pteropoda harrisi Dall, 1908

A number of species of chitons can be found, Oligroydia percrassa Dall, 1894 and Placaphorella velata Dall, 1879, being rare, but Lepidozona mertensii Middendorff, 1847, Callistochiton decoratus Pilsbry, 1893, in several color forms, C. crassicostatus Pilsbry, 1893 and C. palmulatus (Carpenter in Pilsbry, 1893) are all moderately common.



Three views of Polinices draconis (Dall, 1903)

Dropping down now to 100 feet, you may find Bursa californica (Hinds, 1843), Megasurcula carpenteriana (Gabb, 1865), M. stearnsiana (Raymond, 1906), Crassispira semiinflata (Grant and Gale, 1931) and very rarely Terebra pedroana Dall, 1908, Cancellaria cooperi Gabb, 1865 and Polinices draconis (Dall, 1903).

These are a few of the species to be found off our coast, convincing proof that our area cannot be described as drab.

Photographs by Barbara Myers unless otherwise noted.

THE COMMON COWRIES OF FANNING ISLAND

By Hugh Bradner

Fanning Island is a small atoll near the equator, almost directly south a thousand miles of open water from Hawaii. Four of us, Dr. Martin Vitousek, director of the University of Hawaii Field Station at Fanning; Dr. Deetsie Chave, ichthyologist, Associate Director of the Honolulu Aquarium; Phil Lobel, Deetsie's brilliant student; and this writer, professor of Engineering Physics and Geophysics at the University of California, San Diego, arrived there after an eight and a half hour flight in Marty's Piper Aztec which was heavily loaded with seismic and electronic instruments and diving gear. My purpose was to establish a seismic station. My hope was to also find time to look for *Cypraea*. We arrived during a tropical rain, hauled the Aztec under a protecting canopy, made quick trips behind the nearest bushes, then piled our gear into two jeep trailers and drove a mile to the field station. The rain had stopped by the time we arrived. It was the only daytime rain except for a heavy down-pour as we taxied down the runway for our departure ten days later.

The field station is an abandoned British transpacific cable relay station. Marty has done a remarkable job of reconditioning and running the establishment with the help of a dozen carefully selected Gilbertese families. The tile-floored, tile roofed, concrete dwellings and laboratory buildings have ample good water for washing and drinking. They are clean, watertight and well screened (though there were few mosquitos). The laboratories have DC and AC power. Electric lights burn during early morning and evening hours. There are excellent stores of surplus materials that Marty hauled down on a surplus barge with a surplus tugboat. There is an air compressor for SCUBA tanks; there are two jeeps busy with station duties and transporting scientists and school children. The station can accommodate about a dozen scientists on occasional large expeditions, but there are rarely more than three or four. The only serious shortage is gasoline, which must be brought in by infrequent freighters diverted from Christmas Island two hundred miles southeast. Food is no problem. Meals are tropical fruit, seafood and chicken supplemented by rice from a wrecked Korean fishing boat, and canned goods left from previous large expeditions. Deetsie Chave expressed some concern about poisonous fish that are found in the region; but the toxin is apparently concentrated in the food chain of the larger older predators, so the young small fish can be eaten safely.

Fanning Atoll is seven miles in diameter. Its shallow, turbid, fertile lagoon has one deep pass on the lee side and two barely navigable canoe-depth passes on the windward side. A five knot current runs in the leeward pass during ebb and flood tides. The station, three miles from the lee pass, has coral sand beach with wonderfully clear ocean whose 83° water abounds with coral and fish. A hundred yards off-shore it drops steeply to great depths. Sharks are rarely seen here, though they congregate at the pass where the nutrient-rich lagoon water flows out to sea.

The mollusks of Fanning were catalogued during the 1924 Whippoorwill Expedition, and were surveyed briefly by E. Alison Kay during the 1970 University of Hawaii Fanning Island Expedition. The Whippoorwill Expedition listed 22 species of *Cypraea*. The region has rarely been visited by amateur shell collectors, so I was not surprised when a brief snorkel-dive on the reef by the station revealed several *C. caputserpentis*, *C. depressa* and *C. moneta*. I was surprised, however, by the small number of *C. moneta* along most of the lagoon shore, and by the great abundance of several species near the leeward pass. On the first morning of our stay Deetsie and Phil drifted with faceplates above an area of soft coral in the leeward pass. They reported seeing five *Ovula ovum* feeding there. One of the specimens they selected at random was over four inches long and in good condition. The soft coral, looking like violet piles of fluted vases or convoluted velvet robes, extended in a band 50 to 100 feet from the edge of the channel. I judge that the *ovum* feed there in daylight as well as at night during the brief periods of slack tide. We did not see any of them when the current was flowing rapidly.

Cypraea tigris, in contrast, were abundant throughout the time of flood tide, huddled with mantles withdrawn near rock in exposed areas of the channel and among flat coral slabs near the seaward edge of the pass. Phil and Deetsie counted a dozen in as many minutes in those areas. All the shells examined were scarred, presumably from hitting rocks.

Sheltered rocky shores of the lagoon a quarter mile from the pass were equally prolific in common reef shells. I was able to find *C. caputserpentis*, *C. depressa*, *C. mauritiana*, *C. annulus* and *C. moneta* in far greater abundance than on the ocean reefs. The distribution was strange: *C. caputserpentis* were as abundant on the lagoon rocks as the *C. annulus* or *C. moneta* are in Tahiti. Often there were five on a single rock. *C. annulus* were far more abundant than *C. moneta*. I collected a handful of *C. caputserpentis* and two or more fine specimens of each of the other species before finding a good pair of average size *C. moneta*.

Enthused by the abundances of common cowries in these locations, I turned rocks at 80 ft. depth beyond the seaward end of the lee pass, and at the shallow edges of the lee and windward passes. Except for occasional *C. moneta* and *C. annulus* and one beautiful *C. teres*, the areas were quite barren. I asked the Gilbertese foreman of the Fanning Island station about shelling. He said that none of the inhabitants had any interest in collecting, but that previous scientists had found the same distribution that we had observed. He offered me his one very nice immature *C. mauritiana* with the comment that they could be easily found in the lagoon rocks where I collected.

Beach shells also showed spotty distribution, but that can often be attributed to waves and currents. I noted *C. talpa*, *C. isabella* and *C. erosa* as well as the *Cypraea* that were live collected in the lagoon and the pass.

Except for the great localized abundance of common species, Fanning Island is most memorable for its unspoiled beauty, not for shelling. --- The coral gardens and countless fish in warm crystal-clear water; the tradewinds, blue skies and great white clouds; the island road that is a narrow track through ill-kept coconut groves; the land crabs that strike a menacing pose against an oncoming jeep, then scurry away, occasionally tumbling backward in their haste; the red-clawed fiddler crabs that dot the sand along backwaters of the lagoon; the brightly colored parakeets that are indigenous to the island. These are the things I remember most vividly.

WANTED: A chance to go to the Gulf of California to do some shell collecting. Can only make weekend trips or holidays. Will share in the gas and whatever. If you're planning a trip and would like an extra passenger, please contact Marty Schuler, 5170 Baxter St. San Diego, Ca. 92117 or phone 274-6541.

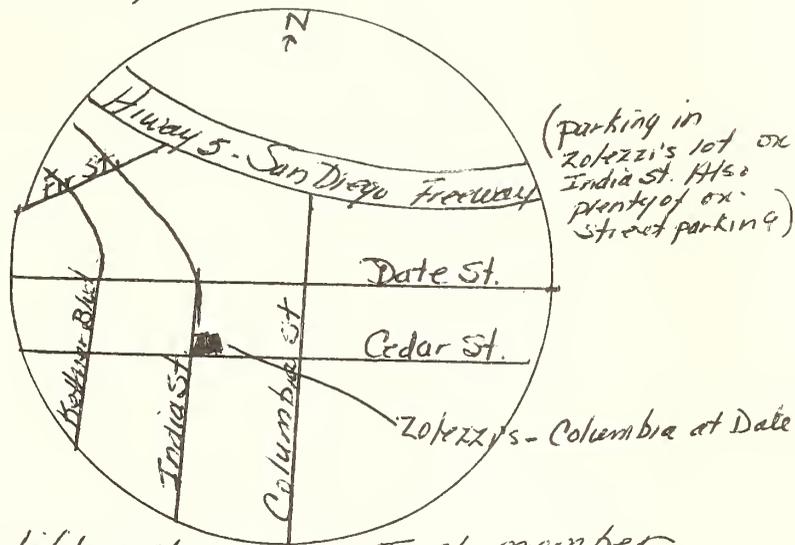
SHELL CLUB CHRISTMAS PARTY

Saturday, 13 December 1975

Our gala party will be at Zolezzi's Italian Restaurant
1703 India Street
We will have the banquet room for the evening

No host Cocktails - 6³⁰ pm
Champagne wine \$1.00 ea.

Dinner begins at 7:30 p.m.



We have a choice of entrees at different prices. Each member should decide on his dinner and list the choice on the checks to be sent to Margaret Mulliner, 5283 Vickre Drive, San Diego 92109. Reservations must be in (checks) by 7 December. Please do not pay in cash.

Dinner choices and prices (including tax and gratuity)

Lasagna - \$5.50

Ravioli & Spaghettini - \$5.50

The two dinners above include garlic bread, Italian salad and coffee.

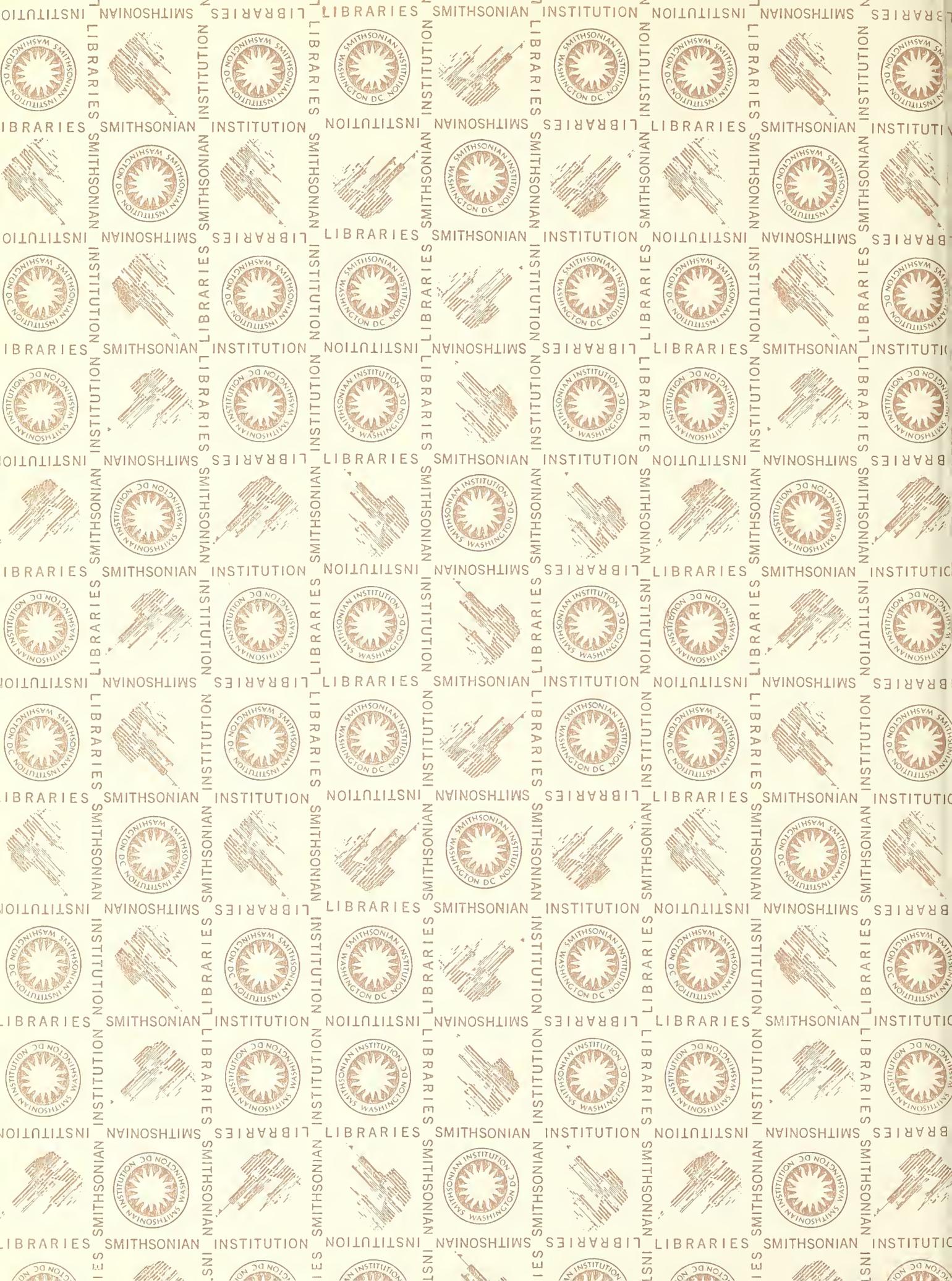
Chicken cacciatore \$7.00

Veal parmigiana \$7.50

The two dinners above include garlic bread, Italian salad, pasta, vegetable and coffee

We will have tape recorded music during the evening's festivities

REMEMBER: Bring a gift wrapped shell to be placed under the tree. Put only the general area of the world from which the shell comes, on the outside. - On the inside - complete data. If you bring a gift, you will be able to choose a gift.





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