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# SHELLS AND SEA LIFE

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# NEWS



Dr. William K. Emerson, Curator of Mollusks, right, and Walter Sage, Scientific Assistant, Department of Invertebrates, American Museum of Natural History, New York, examine a portion of the recent donations to the Museum's collection of Recent mollusks.

## NEW LOOK! THREE CHOICES!

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*Shells and Sea Life News* will come to you each month in a format similar to what you now have in your hand. It will have short articles, news, personal notes, current events and reader comments in compact form. We welcome your comments. The subscription rates (2 issues per year) will be \$10 (US); \$15 overseas or \$20 airmail.

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SEASHELL TREASURES BOOKS will publish catalogs periodically which will be mailed to our book customers.

We hope that these changes will satisfy your needs and wants. Some of you will only want one of the three publications, some two, and serious malacologists will probably need all three. Please do feel free to write or call us at any time to let us know what you would like to see. Some changes are simple and only "overlooked," others are not financially possible without pricing the publications out of reach for too many people. Please support us by sending information, notes, ideas, and articles.

Yours sincerely,

*Sally & Steve*

Send us your group's membership address list. We will send each member a free sample issue of SHELLS AND SEA LIFE and a subscription blank.

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### IN MEMORIAM

Levi Young (Whidby Island, Washington)  
Brian Snell (Trinidad, California)  
Lois Salvay  
(Founder, Astronaut Trail Shell Club)

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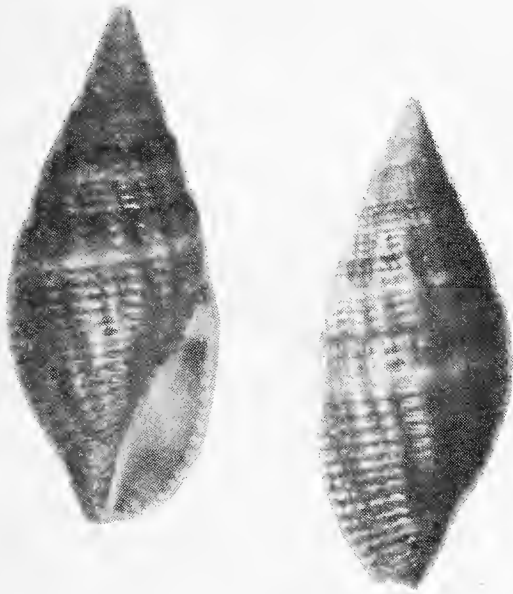
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## On the same reef as Bob Purtymun

Ian Loch

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PO Box A285  
Sydney South, NSW  
Australia 2000



*Mitra amaura* Hervier 1898

Photos by Bob Purtymun

Over the past 14 years of diving on the Great Barrier Reef including some 120 dives on reefs off Townsville, I have had the opportunity for repeated collection of species which Bob Purtymun mentions in single incidents. *Mitra amaura* Hervier (S&SL 17(10): 222) is indeed moderately common as Alan Hinton suggests. While a diver certainly won't find it on every dive, it is not unknown to find several on one dive. Species such as this which are moderately common on the Great Barrier Reef yet do not appear on dealers' lists, are part of an information short-circuit. Local scuba collectors, of whom there are only a handful competent with anything apart from cowries and cones, don't ever see any rarity/price estimation, assume it is also common elsewhere on coral reefs and only bother about immediate needs.

Other species of midtrids and costellariids also frequent a similar habitat, the rubble scree around the bases of bommies, coral heads and gutters or on the mainly bare sides of these. Some also occur on those outer reef slopes where exposure is not excessive, more frequently on the gentler sloping inner reefs rather than the steep weather faces of the outermost reefs. Moderately common species include *Mitra tabanula* Lamarck, *M. telescopium* Reeve, 1844, *Vexillum lucidum* Reeve, *V. zelotypum* Reeve, *V. uifascialis* Lamarck, *V. bernhardina* Roeding, and *V. microzonias* Lamarck. Less common in the same habitats are *Mitra chrysostoma* Broderip, *M. rubritincta* Reeve, *Vexillum militaris* Reeve, *V. crocatum* Lamarck, *V. consanguineum* Reeve and *V. millecostatum* Broderip (see Purtymun S&SL 17(5): 177).

Other species I would call rare on the Great Barrier Reef, having only ever found one or two of them and habitat information is very tentative. For example, the only live *Vexillum mutabile* Reeve I collected was crawling along the iron sides of the wreck of the S.S. "Corea" in 5 metres on Eel Reef, hardly a major habitat type. However, the occurrence of other dead specimens in dredgings around the pier at Green Island off Cairns suggests a preference for the innermost shelf reefs. *Vexillum corallina* Reeve I found twice around 30 metres on bare coral faces. Others rarely found in the same rubble habitat mentioned above include *Mitra turgida* Reeve, *M. coarctata* Reeve, *M. pyramis* Wood, *Vexillum tusum* Reeve, *V. turben* Reeve and *V. lautum* Reeve.

Many of these coral and rubble dwelling species are frequently encrusted with coralline algae and at first glance it can be difficult to distinguish *Mitra* from *Morula* or *Vexillum* from *Turridrupa* which live similarly. Species which are moderately common include *Turridrupa bijubata* Reeve, *T. cerithina* Anton and *T. cincta* Lamarck, with *T. albofasciata* E.A. Smith uncommon to rare. *Turridrupa acutigemmata* E.A. Smith prefers the soft sandy mud bottoms between the reefs and the mainland.

*Xenoturris millipunctata* Sowerby (S&SL 17(11): 243) I found only once, intertidally, but *X. cingulifera* was more common, living in sand and rubble. Like most species living in sand on reefs it occurred both intertidally and subtidally. *Turris spectabilis* Reeve also was found occasionally in coarse sand and rubble subtidally, while *Turris cryptorapaphe* Sowerby I found alive only once, in 5-7m at night on a sandy rubbly bottom amongst coral at North Point, Lizard Island. Because of the coarse nature of the preferred substrate most of these large turrids usually have eroded spires.

Collecting on the Great Barrier Reef is now further complicated by the necessity for permits to collect in those areas where access is still allowed and other permits to send the specimens out of the country. The cumulative discouraging effect of this bureaucracy will probably ensure species which may be common to the Barrier Reef remain rare in lists which Bob Purtymun consults.



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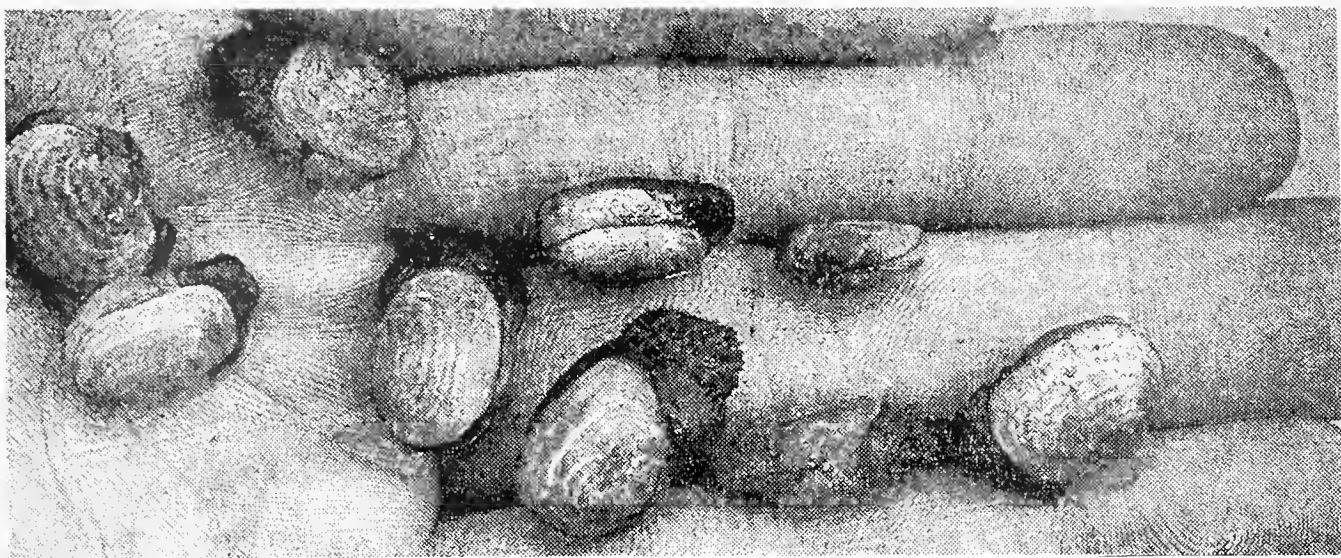
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Greg Gilbert / Seattle Times

A biologist holds five-month-old geoducks. The Hood Canal shellfish lab at Brinnon is the only geoduck hatchery in the world.

## ONE BIG CLAM

Tom Rice

P.O. Box 219, Port Gamble, WA 98364

*Panope abrupta*, commonly called the Geoduck (*P. generosa*, Geoduck, Goocyduck or Gweduck), is found from southern Alaska to Mexico. Other relatives occur in the Gulf of California, Florida, New Zealand and South Africa. *P. abrupta* is the world's largest burrowing clam. It can be collected through diligent effort near the low water mark in Puget Sound and other west coast localities.

Should you decide to attempt collecting this mollusk, go prepared to get very wet; the creatures, when adult, have siphons that extend from their burrow through nearly three feet of sandy mud to the surface. A gently sloping beach is best, check along the low tide line as the water receds -- you shouldn't even try this unless the tide will be at least a minus 2.5 feet. Keep your eyes alert for a fleshy pink clean siphon-tip sticking an inch or so above the sand's surface; those siphons of a similar size which are covered with leathery flaps, barnacles, algae, etc. belong to clams of the genus *Tresus* and while great eating, are not what you're after this tide.

To reach the body of the clam it will be necessary to dig down at least two, and probably closer to three feet. Start digging a short distance from the siphons and make it a large excavation since you will have to contend with shifting sands continually trying to refill your hole. You'll probably end up on your hands and knees with your head down into the excavation, pulling and digging with your hand to excavate this bivalve behemoth.

A large specimen will weigh more than six pounds and the animal's shell can not completely cover the flesh. The "breast" of the Geoduck is considered the best eating portion -- actually this is the clam's mantle area. The "neck" or siphon can also be skinned, pounded and fried for a great tasting feast, or it can be ground and used in chowder. The flesh has a very delicate flavor and local restaurants feature this bivalve prominently on their menus.

Because of the small area where the clam can be gathered intertidally, some research was undertaken several decades ago to see if the bivalve was really this scarce or if it usually lived more abundantly in deeper water. The latter proved to be the case and soon the Washington State Department of Fisheries discovered millions of the creatures inhabiting sandy bottoms throughout the Puget Sound and Hood Canal waterways.

Commercial divers now harvest these clams and one can find them for sale in fresh seafood markets, local supermarkets, and also from the back of pick-up trucks parked alongside the busy highways. The state leases tracts of bottom for these harvesters and currently receives \$750,000 annually in revenue from these leases on a dozen tracts. Unfortunately, Geoducks age slowly, making harvesting an area a once in 30 years event.

The Department of Fisheries has, however, started the very first Geoduck hatchery. At its shellfish laboratory at Brinnon, on Hood Canal, the biologists have been investigating adult Geoducks for many years. Now they are gathering adult clams, gathering the eggs when spawned and then fertilizing and growing them at the lab. After a few months, when the bivalves have reached a length of one-quarter inch, they are released into the wilds of Puget Sound; this year it is estimated 225,000 will be planted using a scatter method. In the future a mechanical method will be developed to enable the department to plant millions of tiny clams each year. These laboratory raised young bivalves are expected to reach harvestable size within five or six years.

During the next decade the number of clams planted is to be increased to 30 million per year. Biologists hope for a 10 percent survival ratio to make the project economically feasible but many of the tiny bivalves become food for crabs, octopus, etc. Currently, in some areas of southern Puget Sound, survival rates have been nearer to 40 percent which may eventually allow those of you in areas where this delectable bivalve does not occur naturally might someday be able to enjoy fresh Geoduck steaks purchased at your nearby supermarket.

## on the DRIFTLINE

**From Sacramento:** Bill and Lois Pitt stopped by overnite a few days ago. We hope to see them here again soon now that both are retired. Thanks for the help with the Redwood path to the hot tub!

\* \* \* \* \*

**From San Diego:** Jeff Hamann has just returned from another trip to the Caribbean. Hope it was successful.

\* \* \* \* \*

**From Alaska:** Rae Baxter spent a few days in Eureka in mid-March. We had a good time looking over old books and visiting some of Rae's favorite collecting sites around Humboldt Bay. Rae went on to Cal. Academy, Santa Barbara Museum of Natural History, and Los Angeles County Museum of Natural History before returning to Alaska to catch a boat for some field-survey work.

\* \* \* \* \*

**From Klamath Falls, Oregon:** Roger Clark is off for a season's fishing in Alaskan waters.

\* \* \* \* \*

**From Brazil:** In Susan Hewitt's article on the Field Note Book, the most important thing is not said: The notes on collecting in the book and the labels on the specimens must have **one-and-the-same Number!** I know, because I did not do that and now I have my difficulties .... -- Dr. Eveline Marcus, Sao Paulo, Brazil

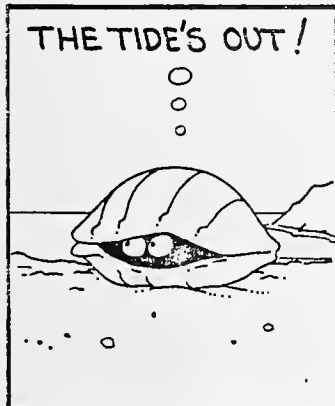
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**From Texas:** Bob Sappington is off to work in Saudi Arabia for several months. We hope to have some reports from him on the shelling there.

\* \* \* \* \*

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## CLAM - Scooter Beers



**From Sydney, Australia:** The January, 1986, has just arrived, so I'll comment on a couple of things therein: The "China Clam" *Hippopus porcellaneus* Rosewater, was on the front page of the January, 1984 issue of Australian Shell News, with a synopsis of the description inside.

*Vexillum militaris* Reeve which is mentioned by Bob Purtymun as a possible range extension, has been recorded on the Great Barrier Reef a number of times (e.g., the July 1984 issue of the Cairns Shell Club newsletter & in Robert Robertson's list of species collected at Lizard Island, published in Tryonia a few years earlier. It is a somewhat rash to make statements about range extensions unless one has access to a good library of the local literature. -- IAN LOCH, The Australian Museum, Sydney, PO Box A285, Sydney South, NSW 200, Australian

\* \* \* \* \*

**From Arizona:** Ruth Keeling and Marjorie Wing, both Southwestern Malacological Society members, have been seriously ill recently. We hope that you are both able to get back to the club meetings soon.

\* \* \* \* \*

**From Key West, Florida:** Mr. Manchione (Mervilles de la Mer, Lusanne, Switzerland) has been in Key West for the past weeks. He managed to get to the Sanibel shell show during his visit. He will be retuning to Switzerland by about mid-April.

\* \* \* \* \*

**From Los Gatos, California:** Tony Ferreira underwent major surgery in January and will be recovering for most of this year. He has been unable to work with his chiton research. We wish him the best and hope that he will at least be able to resume some limited correspondence later this year.

\* \* \* \* \*



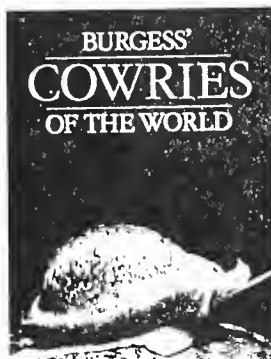
Roland Anderson  
The Seattle Aquarium  
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There are at least 11 species of the snail worm *Spirorbis* on the Pacific Coast and several of these are cosmopolitan in the world's oceans. It is very difficult to speciate them. All are very small, from one to four mm in diameter and construct spiral snail-like calcareous tubes on hard substrates intertidally to a depth of 50 feet. The anterior end of the worm is a bright orange-red crown of tentacles that sticks out of the shell for suspension feeding and respiration. The tentacular crown retracts into the shell for protection against predators and dessication; the worm closes off the opening of its tube with an operculum, another snail-like feature. At times the larval forms of the worm are so plentiful that they settle onto most anything, including kelp, seaweeds, and even other animals such as barnacles, crabs, and even sea cucumbers.

*Spirorbis* has some interesting aspects of its life cycle. It is a true hermaphrodite, the anterior segments of the worm being female and the posterior segments male. Some species are broadcast spawners, discharging their gametes directly into the water column and having free swimming larvae. Some species attach their eggs to their body wall for incubation. In some species the operculum may serve as a brood pouch, with a temporary layer of material being deposited onto it to form an envelope in which to hold the developing eggs. Some species are even viviparous. Such diversity of parental care within a single genus is truly remarkable.

S&SL News, 18(3):54



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*Conus cervus* Lamarck, 1882, Cebu, Philippines.  
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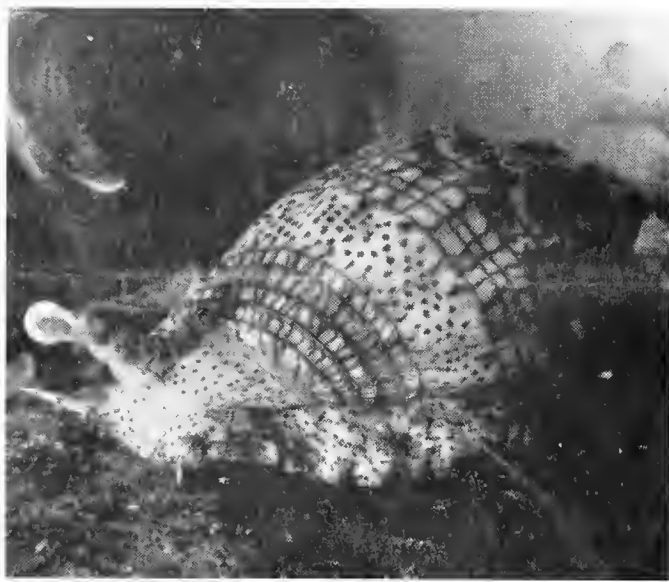
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From the Florida Keys: It's frustrating to be diving with a group of spearfishermen who know nothing about shells and who are invariably the ones to bring up the large, spectacular *Cassis madagascariensis* Lamarck, 1822, the Queen Helmet shell. These mollusks are not uncommon in my neck of the waters, but I've always been too interested in looking at smaller organisms and haven't covered enough territory to find them in my own area. I have, however, collected Helmet shells in the Florida Keys by drifting with the boat, tethered by a line, across acres of sand/grass bottom 10-20 feet below, until I spotted a shell and struggled down to get it. By this method I've also collected Queen Conchs, *Strombus gigas* Linnaeus, 1758, carrier shells, *Xenophora conchliophora* (Born, 1780), and even a Trumpet Triton, *Charonia variegata* (Lamarck, 1816). -- PEGGY WILLIAMS, Rt. 3, Box 28, Sarasota, FL 33580



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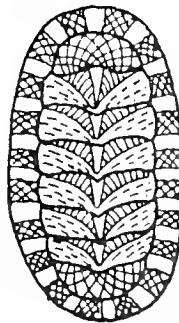
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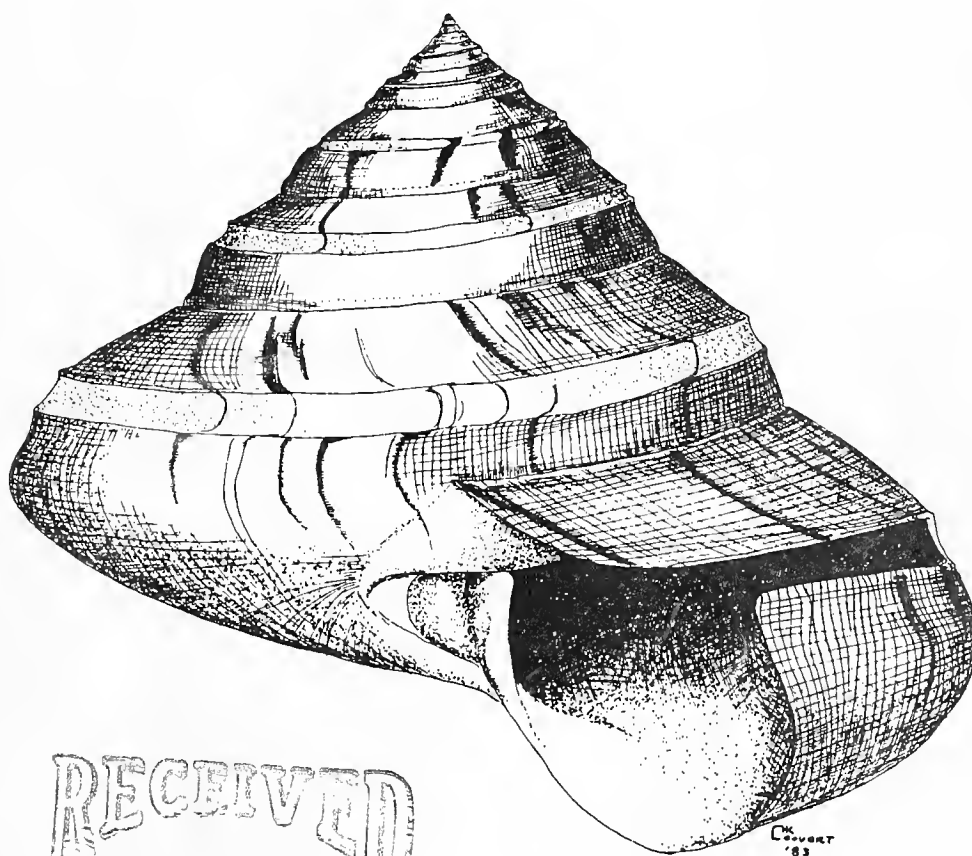
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## EDITOR'S NOTES:

Thank you for your patience during the past couple of months. The postal rate increases combined with your requests for a return to standard format and paper, have given us quite a challenge. Sally and I spent many hours on the phone and many sleepless nights trying to come up with the optimum solution. Comments from readers and friends suggested several possible approaches and we surveyed them all -- simultaneously, it seems. One very bright spot was our successful implementation of our new address/labelling data base program -- which saves us about three days labor each month!

The March issue was a revelation in some ways. Many subscribers said "Why did you change, we liked the format." Others indicated they were relieved to get rid of the newsprint. Many subscribers were concerned with the cost of subscribing to all three publications while others were happy to have only one of the three.

We believe, from your comments, that most of you appreciate the monthly 8-1/2" x 11" format we have been doing for most of the past 18 years. We also know that no matter what we do, separating publications will cost more. Postage, binding, and printing all cost more for the monthly format but we see no alternative.

Before we change SHELLS and SEA LIFE from our standard monthly format, or start a new publication, we need to see a much larger demand on the part of our subscribers. ACTA MOLLUSCA will be published when we get sufficient response in terms of subscriptions and articles.

We have finally decided that nothing possible will satisfy everyone. Each of you is looking for something slightly different in a publication. The only rational approach is to continue to do the type of publication that hundreds of you have subscribed to over the many years we have been publishing -- a monthly publication with articles for all levels of interest and all possible news and information on shells and sea life.

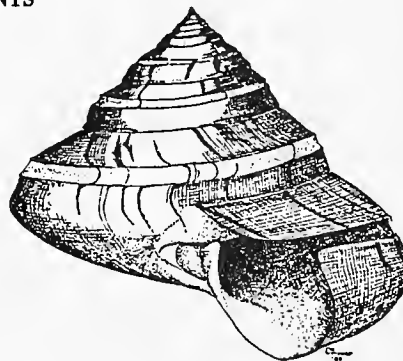
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Yours sincerely,

*Steve & Sally*

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Cover illustration - Perotrochus teramachii Kuroda, 1955. Reduction from a drawing by Holly Coovert. Prints are available from Dayton Museum.

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## SHELLING IN HAWAII

Charles E. Bowen  
School of Science  
Cal Poly University  
Pomona, CA 91768

Do you enjoy collecting a variety of shells in warm, clear and shallow water? In water so shallow that it barely reaches your knees, where wind waves are only a few inches high when the trade winds blow, and in a collecting area that must be at least a quarter of a mile wide by several miles long under blue skies with white billowy clouds? Then have I got a place for you, and its located on the relatively unspoiled island of Molokai in the state of Hawaii.

To get there, fly from Oahu on one of the smaller commuter planes. Flight time is about 20 minutes. Pick up your rental car at Molokai's quaint, small and uncrowded airport. Drive for fifteen minutes to reach the small town of Kaunakakai. Look for the coconut trees planted by King Kamchamcha V (Kapuaiwa Coconut Grove). Use this area as your base camp, but don't park directly under the palms to avoid falling coconuts and palm fronds. Several dropped near us when we were there in July.

A good place to start collecting is right in front of you. Work your way out onto the flat, brown reef. It is mainly crushed coral and pebbles. Walking is easy if you use old tennis shoes to protect your feet. Diving booties are also recommended. If the wind is low and the ripple effect moderate, you'll be able to see over large areas of shell habitat. Cone shells, auger shells, cowries, and umbrella shells are typical. Some of the locals use nets attached to metal hoops to scoop up the "gravel" bed. Shells are retained in the net while the coral and pebbles pass through the netting. Ecological damage by this technique appears to be minimal, and it is an efficient method of collecting.



Dorsal view Umbraculum sinicum. Pen is 5.5" long.

Another marvelous feature of the reef is the opportunity to collect at night. After getting used to the area and its features during the daytime go back after the sun goes down. Many of the animals normally hard to see during the day become active at night. Even though the town has a few stores, you might be better off bringing your own flashlight just to be sure.



Ventral view Umbraculum sinicum. Pen in photo 5.5"

Two of the animals indigenous to the large reef are Oak Cones (*Comus quercinus*) and umbrella shells (*Umbraculum sinicum*). The former are very sturdy and can attain a size of five inches. Umbrella shells are strikingly colored, have an exceptionally large foot and often lay partially buried in the reef debris. The umbrella shell has a foot that can vary from gray-brown to bright orange in color with white nodules on the surface. Even though they are the same size as some abalone the umbrella shells are much easier to remove from the substrate. A firm steady pull with the hand is enough force to free their grip.

Shelling on Molokai was a unique and rewarding experience for us, so the next time you are in Hawaii take the opportunity to visit this uncrowded, friendly island.

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Spaulding, P., III 1984. Molokai. Westwind Press, Honolulu, Hawaii.

\* \* \* \* \*

## TAILS YOU WIN ....

Milton Werner  
70 Richmond St.  
Brooklyn, NY 11208

It's funny, sometimes, how people match up and don't match up -- especially when it's the same people doing both at the same time.

If you're on the grapevine of malacological professional staffs, you're probably already thinking of Syzmik and Dervish. For you shell-boilers who don't get the inside dope, that's Dr. Andreas "Jangles" Syzmik, curator of mollusks at one of our prestigious institutes of natural history, and his scientific assistant, Sterling Dervish. And even if you've never heard of them, the story of how their star-crossed association came to its end should be worth a listen.

To sketch in the background for you, the two ran a nice department together, and they enjoyed chatting over a beer -- but Dervish, a sort of breezy, unbuttoned type, kept doing things, in complete innocence, mind you, that unsettled Syzmik's peace of mind. And as if this weren't bad enough, Syzmik is kind of a nervous nellie anyway. Even so, things never got completely out of hand until that big field trip.

It seems that after years of scrimping and saving, the department got enough money together to give Dervish a shot at South America. He started in Venezuela, dividing his time between marine, freshwater and land collecting, and worked his way through Colombia and into Ecuador. At first, he wrote back fairly regularly, but after a letter from Quito a long silence strung out. Syzmik began to get strung out, too, but finally a note arrived:

"Hi, Jangles -- you'll never guess where I am. Hanging out with the Jivaro Indians! Now don't go into a fantod just because they're head-shrinkers. They haven't shriveled a noggin since I got here. They've been too busy shaking the jungle for land snails! Wait till you see the stuff these birddogs have come up with -- including a flock of new species. Wow! A collector in Quito put me onto them, and even sold me a load of trade goods that got the locals off their tusches and into the bushes.

"But to get to the point -- I need more alcohol, cotton, vials, jars and tags in a hurry. And I need more money! The locals are cooling off on pcnwipers, button hooks, book marks and tea cozies, and they're getting a little testy. If I read their sign language right, they're really interested in stuff like designer jeans and calculator watches, with the heavy emphasis on Saturday night specials and leg traps. Send the supplies and money to Sr. Petrolo Fortuno, Maracaibo Shell Club. He's some kind of hot-shot executive -- I think he mentioned oil. He'll round up some jazzier trade goods and forward everything via plane, train, bus, boat, burro, oxcart and foot.

"P.S. Throw in a few foam coffee cups with lids. Before I leave I'll get the guys here to do their thing again, and the cups will be perfect for packing shrunken heads. Talk about your souvenirs!"

Syzmik, with a dry treasury and a brand-new nervous twitch, had to buck Dervish's request up to Administration. After a heroic struggle, he got the institute to shake loose of \$31, which he shot off to Maracaibo, not forgetting the supplies.

There was another long silence, toward the end of which he started doctoring for an ulcer. Then, at last, another note:

"Fortuno tells me the top brass really smashed the old piggy bank. Criminy -- they save more than that on my paycheck every week. But good old Fortuno got us all off the hook, proving that he isn't filthy rich by accident. He sent me a bunch of those little plastic viewers with pictures of bathing beauties, most of them caught by the camera standing in their tubs. Why he included mothballs and a lawn sprinkler beats me. Anyway, art succeeded where pipe cleaners and shoe horns had lost their charm. The boys have stopped wigwagging about shotguns and switchblades and started collecting again. The new species, etc. are rolling in, and I'll soon fill the last sack and start back -- with a few custom-made Jivaro miniatures!

"P.S. Even in a gourmet restaurant, never order the lizard, fungus and mothball stew."

"P.P.S. The chief's daughter took to wearing the lawn sprinkler in her hair, and all of a sudden she has to beat off the local Romeos with a stick. It makes you wonder what they see in the bathing beauties."

The note was followed by still another long silence, and when Syzmik took himself off to the annual AMU meeting he was under treatment for the heebie-jeebies. When anyone asked him, "How's ol' Sterling?" he cringed and changed the subject. Finally, pressed for an explanation, he told the open-ended story and added, "That boy is crazy to have any truck with head hunters. His trouble is, when he gets into hot collecting situations he completely loses his -- I mean, he rushes headlong -- that is, he barges in like a *Urosalpinx* at an oyster-shucking contest. I think I'll skip lunch."

One morning in the following week, a visitor suddenly appeared at his desk. The stranger, a seaman by the cut of his ensemble, was carrying a foam coffee cup -- with a lid. He set it on a corner of the desk and dropped a soiled envelope next to it. "A bloke in Maracaibo said there'd be something in it for me if I delivered this to you," he said.

Syzmik stopped breathing and stared at the cup. His ulcer went g-r-r-r. Then he swallowed, wiped a wet hand on his best suit, and pulled the envelope across the desk with two fingers.

It helped when he saw Dervish's handwriting. It didn't help when he read the scrawled note:

"A runner just arrived with a letter from you, which I'll read when I can -- if I can. I'm sending him back right now with a note asking Fortuno to spring for the postage. Along about 3 a.m. I'm gonna slide out of this place, traveling light. It seems the local buckos found out what they saw in the bathing beauties -- just a novelty. So they quit collecting and took to scrapping over the chief's daughter. Even after he made her take off the sprinkler. Between rounds they jabber at me, and it ain't buddy-talk. I just hope they'll be exhausted by bed-time."

Syzmik leaned back and sighed, sat up and fumbled for a pill, pulled a deep breath, and finally managed to croak, "ah -- do you happen to have any idea what's in the cup?"

"Happen I do," the mariner said. "Coffee, light. The skirt on the snack cart out there asked me to bring it in. Your gal is on the phone, giggling."

Continued next page

Syzmik briefly considered asking his secretary to bring in his coffee mug, so he could bounce it off her head. Instead, he went into a laughing jag and considered taking a few sick days.

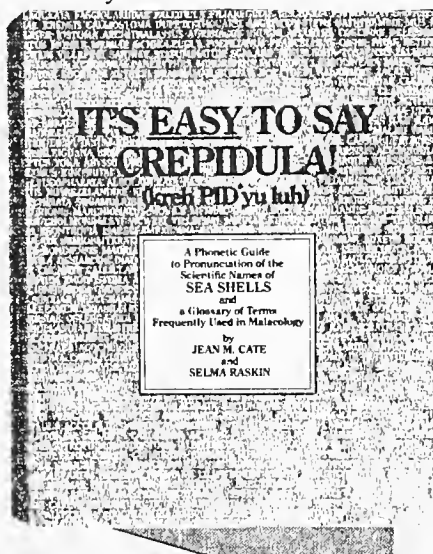
But that afternoon his condition improved suddenly at the arrival of a cablegram. It was from Quito, and it was from Dervish.

"Got out with my own head and a souvenir one. Sold the small one to send this. Begging and thumbing my way to Maracaibo. Hope to find money waiting."

Syzmik wired some money from his own pocket. He tried a little solid food again, and instead of nightmares he had dreams featuring Dervish at his begging and thumbing.

A couple of weeks later there appeared a letter from his hard-traveling assistant, but not in his own handwriting. It recounted a few of the rigors of the journey and his arrival, in a horse-drawn Edsel, in Cartagena, where he was invited to judge a shell show. It further stated that at the awards ceremony feelings ran high, which was why he was now in a hospital with multiple stab wounds, three fractures, a concussion, etc., etc. It included an estimate of the hospital bill, and noted that the chairman of the shell show, feeling a certain obligation, had not only volunteered to write the letter for him, but even insisted on paying for the stamp out of the show profits.

Syzmik arranged for a sabbatical leave, kicking it off with a nervous breakdown. And long before he came back, he'd also arranged for a higher-level position for Dervish -- at another prestigious institute of natural history.



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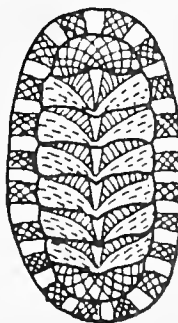
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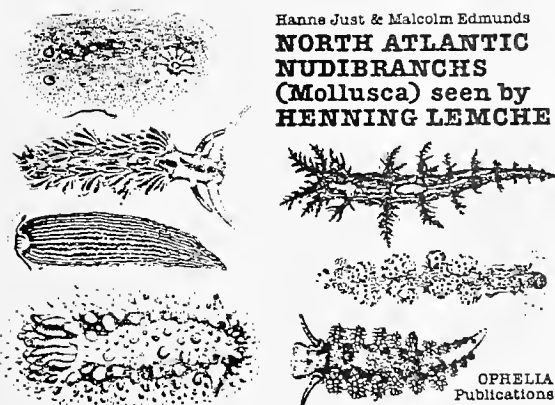
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Hanne Just & Malcolm Edmunds  
**NORTH ATLANTIC  
NUDIBRANCHS  
(Mollusca) seen by  
HENNING LEMCHE**

OPHELIA  
Publications

## BOOK REVIEW - North Atlantic Nudi- branches (Mollusca) seen by Henning Lemche. By Hanne Just and Malcolm Edmunds. With an appendix by Elizabeth Platts: An annotated list of the North Atlantic Opisthobranchia. Ophelia, Suppl. 2, 170pp., Sept. 1985. ISSN 0078-5326. Price - 500 Danish kroner (approx. US\$ 50).

The publication of this volume is a tribute to the late Dr. Henning Lemche. Dr. Lemche was the curator of Mollusca at the Zoological Museum, University of Copenhagen (ZMUC) for many years. During most of these years he produced excellent water-color paintings of most of the opisthobranchs he was able to study alive. As time went by, his artistic skills improved to a degree that some of his late paintings are more like portraits of individual sea-slugs than scientific representations of a particular species.

Dr. Lemche's intention was to compile a monograph of North Atlantic opisthobranchs illustrated with his own water-color plates of each species, but as his artistic skills improved so did his perfectionism, and he discarded many of his earlier paintings. Unfortunately Dr. Lemche passed away before he could complete his monograph.

During the years after his death several people expressed a wish that the paintings be published, but no one particularly wanted to take on the laborious task of preparing such a publication. Mrs. Hanne Just was Dr. Lemche's graduate student at the time of his death. Together with the editorial board, Dr. Jean Just, Dr. Jorgen Knudsen and Dr. Claus Nielsen, she has performed the difficult task of selecting which of Dr. Lemche's paintings were the most suitable for publication.

The collaboration with Dr. Malcolm Edmunds has been essential to ensure the scientific standard of the accompanying text. Dr. Lemche's notes were often controversial and contradictory and it was absolutely necessary to have a specialist with a detailed up-to-date knowledge of nudibranch taxonomy weed out the contradictions and sort out the controversies.

The preface and the introduction of the book describe very well the background history and the material used in the book. The introduction contains a figure illustrating most of the scientific terms pertaining to nudibranch anatomy. This figure appears very crowded but has all the terms fully spelled out in a one-page figure.

Reproduction of the color plates is excellent and was probably the most difficult procedure accomplished while publishing this book. Several series of test prints were discarded before the quality was acceptable. Even then, some of the final prints had to be discarded, so only slightly over 1,000 copies of the book are available for sale. This makes the price of the book seem almost incredibly low.

Several books with color illustrations of nudibranchs have appeared over the last few years. Some have used color photographs while others have used paintings by artists with some zoological training. Color photographs probably reproduce the actual colors most faithfully, especially with a "natural" background. However, close-up photos usually have little depth-of-field, and hence only part of the animal will be in focus. Also, animals rarely pose to display taxonomically important features. Paintings can compensate for both of these shortcomings. In spite of the often very bright color patterns, many nudibranchs have rather pale ground colors. Books with color

paintings often use black backgrounds which make the white and pale species stand out in great contrast, whereas these species are usually very inconspicuous in their natural habitat. The present book presents the color plates on a white background which gives a more natural appearance of the colors.

The text to each plate is very brief in most cases. Only description of external morphology, distribution and sometimes a few taxonomic remarks are given. Most of the other recent illustrated nudibranch books have more extensive texts with detailed descriptions of external as well as internal anatomy. The introduction of the present book states that most of the actual specimens represented on the plates are kept preserved in the collections of the ZMUC. However, I would like to warn anyone contemplating to use these (or any of Dr. Lemche's preserved nudibranchs) for studies of internal anatomy: the existence of this material may turn out to be more of a nightmare than a help. Dr. Lemche did not believe that internal anatomy was necessary for nudibranch taxonomy, and in most cases he just dumped his specimens directly into 70% EtOH. Anyone can guess what the internal organs look like after such treatment.

The size of the book may seem a little odd, i.e. wider than tall. This has been done to accommodate the plates so that the text to each plate appears on the opposing page, and only in 5 cases does the text run on to the following page. The plates are reproduced at half the size of the original paintings and the arrangement of the individual figures within a plate is the same as in the originals with very few exceptions. Dr. Lemche composed his paintings to include a dorsal, a ventral, and a lateral (right side) view of each species, plus enlarged details of certain important structures. Also he included an eggmass if available.

At an early stage in the preparation of the book Mrs. Elizabeth Platts volunteered to contribute a checklist of the distribution of North-East Atlantic opisthobranchs. This turned out to be an enormous task in itself. The result is an impressive compilation of distributional data as well as some taxonomic remarks. As with all checklists, new data have appeared during the time "in press," but as a whole this checklist is a very useful tool for anyone collecting opisthobranchs species from this area, and that alone makes it very valuable. The only point of criticism is that the taxonomy is not in accordance with that of the main body of the book. However, nudibranch taxonomy at the present time is in great need of a thorough revision.

There are very few printer's errors in this book. One of the more disturbing ones is the omission of 4 species names in the table of contents: *Doto eireana* (Plate 13, pp. 34-35), *Doto columbiana* (Plate 16, pp. 40-41), *Doto cinerea* (Plate 17, pp. 42-44), and *Doris verrucosa* (Plate 21, pp. 50-51). The 3 *Doto* species appear on plates containing two species (combined from 2 original paintings), which explains but does not excuse the deletions.

To sum up: The scientific quality of the plates of this book easily matches that of the century-old monograph by Alder & Hancock. However, this is not a monograph; it does not contain all the species found in the area; the text can be used to identify the species, but otherwise has little scientific interest. The soft cover and the format suggest that it be used as a reference book. Certainly the appended checklist is so comprehensive that it should be used extensively for reference. The high quality of the color plates and the low number of copies available warrant a position as a bibliographic publication. - KATHE JENSEN, Zoological Museum, Universitetsparken 15, DK-2100, Copenhagen 0, Denmark



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## on the DRIFTLINE

**From The Netherlands:** I work as Chief Conservator of Ceramics, Glass & Stone, at the Rijksmuseum, Amsterdam. I study molluscan evolution, fossil & recent and aim to have at least one species of every genus type that exists and from there collect specific families to greater depth. Pectinidae are my lust and love (fossil & recent). I need specimens from all over with biotype info or stratigraphical info. Beside that I study sharks (mainly recent) and fishes, mainly otoliths & scales. Sea life in general gets all my attention.

Hopefully we can start a correspondence and you can help me obtain literature and material. - C.V. HARTMAN, t'Witland 6, 1261 BM Blaricum, The Netherlands

**From Portland, Oregon:** "Write something humorous for the coming issue of SHELLS and SEA LIFE," was the request. That caused no end of far-gazing, pencil-tapping, brow-wrinkling; what's funny about mollusks? Nay, Sally, not humorous. I might call attention to some anatomical cognomens established by Linnaeus and Lamarck which my colleagues find amusing, but they do not belong here.

Instead, let me relate how I became interested in mollusks. My dear neighbor in Buffalo [New York] was Imogene Robertson; how many persons recall her, and her collaborator Clifford Blakeslee? In the 1940's I spent much time in her home, admiring the pretty shells in her cabinet. Doubtless she became weary of my questioning: "Did you dye these pretty blue snails? How did these get so frilly, and did you scallop the edges of those? How did the clam on the floor get so big?"

So she led me to her back yard and turning over a board on the ground, pointed out the snails beneath. They had a name, she told me, and if I wished she would loan a book containing their pictures and facts about them.

Did I wish! In my own back yard I found the same snails, and others in Cattaraugus Creek, and clams in Lake Erie, and, and, and! I joined the Buffalo Shell Club (it is still active) and later when Imogene died I inherited her position as secretary of the American Malacological Union.

Circumstances removed me to Wisconsin, then to the Florida Keys where I learned to snorkel. When my husband died I began a small shell business to occupy my time and to augment my Coast Guard pension. And now I live in Oregon, near my only son, John. I've joined the local (Portland) shell club, organized their library, am an honorary life member of the AMU and of a half-dozen other clubs about the country.

Enough of me. 'Tis not humorous, Sally, but in review, mighty satisfying! -- MARGARET TESKEY

**From Biloxi, Mississippi:** The 17th Annual Conference of the the International Association of Aquatic Animal Medicine was held May 4-7, 1976.

**From Bayside, California:** We are getting ready for the annual pilgrimage to the AMU/WSM annual meetings. Sally & I will be leaving Bayside on the 30th of June and returning on the 7th of July. We hope that several of you will be able to stop and see us this summer, perhaps on your way to or from the

meetings. We have plenty of room for several campers and trailers plus tents. We can also sleep a several in the two spare bedrooms. Blackberries should be ripe along with plums and early apples.

We are located about 275 miles north of San Francisco on Highway 101. Bayside is now a part of Arcata, California and lies about 1 mile south of Humboldt State University, overlooking Humboldt Bay. Heading north from Eureka, take the "Bayside Cutoff" exit from Highway 101. At the south end of Arcata, take Old Arcata Road toward Sunnybrae. Hyland Street is directly across from Jacoby Creek Elementary School.

Sally and I have been working hard and enjoying Humboldt County. Spring was beautiful with all of the fruit trees and Rhododendrons in bloom along with the Tulips, Iris, Anemones, Crocus and Daffodils. We have built a road down to the lower half of our property (by hand, with pick and shovel) and cleared out several years' growth of Himalaya berries, blackberries and other pests. The result is a parking area overlooking Humboldt Bay with about 1/2 acre meadow and trees all around. As soon as we can get the time and money together, we intend to build a small guest cabin down there. Please do come by and visit when you are in Northern California.

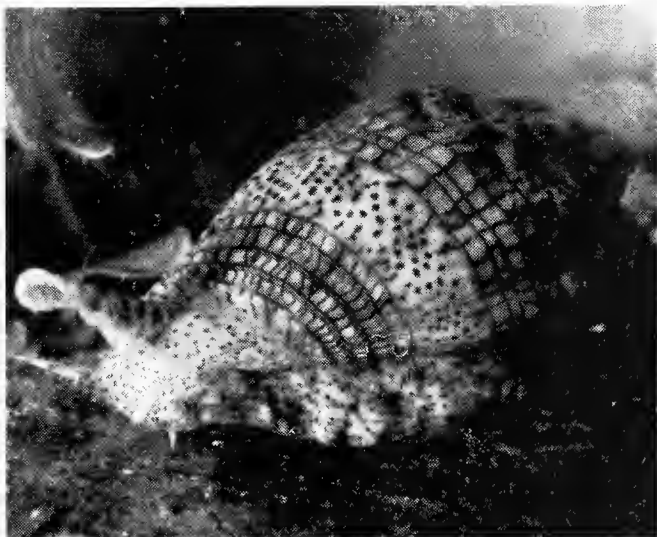
## WHAT IS IT?



Featherduster Worm - Indo-Pacific. Photo: E.R. Degginger



## FIELD NOTES



Voluta demarcoi Cayos Cochinos, Honduras

From Bonaire, Netherlands Antilles: I was pleased to bring back from a trip to Bonaire, Netherlands Antilles, several living specimens of the Music Volute, *Voluta musica* Linnaeus, 1758. I placed them in the aquarium hoping to get photographs of them while alive. It was thus I discovered one thing they like to eat, as one attacked and ate a Chestnut Turban, *Turbo castanea* Gmelin, 1791, which I was also watching. The volutes lived for several months in my aquarium.

-- PEGGY WILLIAMS, Rt. 3, Box 28, Sarasota, FL 33580 [ed. - Apologies to Peggy and our readers -- we confused photos. The correct photo and note appear together this month]



From the Florida Keys: It's frustrating to be diving with a group of spearfishermen who know nothing about shells and who are invariably the ones to bring up the large, spectacular *Cassis madagascariensis* Lamarck, 1822, the Queen Helmet shell. These mollusks are not uncommon in my neck of the waters, but I've always been too interested in looking at smaller organisms and haven't covered enough territory to find them in my own area. I have, however, collected helmet shells in the Florida Keys by drifting with the boat tethered by a line, across acres of sand/grass bottom 10-20 feet below, until I spotted a shell and struggled down to get it. By this method I've also collected Queen Conchs, *Strombus gigas* Linnaeus, 1758, carrier shells, *Xenophora conchliophora* (Born, 1780), and even a Trumpet Triton, *Charonia variegata* (Lamarck, 1816). - PEGGY WILLIAMS, Rt. 3, Box 28, Sarasota, FL 33580

## Collecting trip to Death Valley in 1922.

Emery P. Chace



Elsie M. & Emery P. Chace  
From The Tabulata, January, 1970

Left Haiwee about 2 p.m., February 14, 1922. Mr. and Mrs. Ferriss, Mrs. Chace, and myself in the Chace Lizzie. Pretty well loaded with grub, blanket rolls and suitcases. Drove to Searles, via Little Lake and Inyokern, arriving there about 5 p.m. Mr. Ferriss' car (Maud) had been parked there since Christmas. The depot and section houses were the only buildings at Searles. We took our bedrolls and made our beds on the floor of the waiting room.

Feb. 15. Up early to meet Mr. Strong and Prof. Monroe who came in on the morning train from Los Angeles. Breakfast over a camp fire and about 3 hours work getting Maud ready to go and stowing loads. Left Searles about 10 a.m. for Trona. Roads very good for desert roads. Stopped at Salt Wells Canyon and prospected for snails but no luck. Dinner at this stop. Trona about 1:30 p.m. Mr. Strong arranged for a house with table and cookstove for us. Unloaded Lizzie and Mr. Ferriss, Mr. Strong, Mrs. Chace, and I drove to Indian Joe Canyon to try for snails. Found a good lot of them and back to the house at dusk.

Feb. 16. Drove Maud today to Argus Canyon. Ferriss, Strong, Monroe, Peggy, and I. Got a fine lot of snails. Roads fair to sandy. Back to Trona at 5 p.m. Fine weather.

Feb. 17. Drove Maud to Homeward Canyon today. Mrs. Ferriss has the grippe and Mr. Ferriss stayed home with her. Roads fair to rocky and they all go right up the washes. Snails scattered in this canyon but got them on both sides of the canyon. After lunch we drove out of Homeward and up to Bruce Canyon. Stopped just before we got into Bruce Canyon and did some good collecting in a dry gulch. In Bruce Canyon we only found a few snails, but didn't have much time there. Back to Trona 6 p.m. Prof. Monroe is a good camp cook and we are enjoying fine eats.

Feb. 18. Mrs. Chace stayed at Trona with Mrs. Ferriss today. Mr. Ferriss and Prof. Monroe went to Bruce Canyon again; Mr. Strong and I went to the Iron Cap Mine, about 22 miles north of Trona. Roads very fair except over the Slate Range Hill which is steep and a bit rough. Ferriss made a good catch of snails and Mr. Strong and I did fairly well. We stopped at Water Canyon on the way back and found a few snails in the short time that we had. Trona about 6:30 p.m.

Feb. 19. Mr. Strong, Prof. Monroe, Mrs. Chace, and I started to go around the south end of Searles Lake but the roads were not passable. Too soft. Came back to Trona and out to the Stockwell Mine in the Slate Range. Road fair, everything considered. The mine had not been worked for at least a year. We had lunch (coffee and sandwiches) and then went after the snails. Made a big haul and got back to Trona in good time. A scorpion hit the tip of one of Mr. Strong's fingers but not hard enough to leave very much poison.

Feb. 20. Left Trona and drove to Tank Canyon and Andreas Canyon, east of Trona about 25 miles. All poor roads and only fair success with the snails. Mr. Strong left for Los Angeles on the evening train.

Feb. 21. Mrs. Chace stayed with Mrs. Ferriss today. Mr. Ferriss and I went to Layton Canyon, about 35 miles round trip. Roads pretty poor and not much luck with the snails.

Feb. 22. Mrs. Chace and I packed up and moved headquarters to Ballarat, 26 miles northeast of Trona, taking Prof. Monroe with us. Mrs. Ferriss not quite over the grippe. Had to put new brake linings in the Lizzie so did not do any collecting today.

Ballarat has a population of 7 and several empty houses. Mr. Owen, the Mayor, made us very comfortable. Mrs. Chace and I had a two room adobe house with a double bed and a mattress. Mr. Monroe moved into a three room shack that had a fair cookstove, a table and some chairs. Candles for light. Still having fine weather.

Feb. 23. Drove to Wild Rose Canyon 15 miles south of Ballarat. Roads good in spots. A fine trip and a good catch of snails. Some snails were found on the alluvial fans. They were in the edges of the small gutters left by the runoff of the last rain. No snails were found on the floor of the valleys anywhere.

Mr. and Mrs. Ferriss came over from Trona today.

Feb. 25 to Mar. 1. Went to Surprise, Shepards, Jackpot, January Jones, and Jail Canyons with varying success. Good weather and poor roads.

Mar. 2. Packed up and said goodbye to Ballarat. Drove south and out of the end of Panamint Valley and turned east on the road to Silver Lake. Stopped for lunch and collected a few snails about 21 miles south of Ballarat. About 3:00 p.m. we stopped to investigate a rocky hill but did not find any snails this time. I did find that I had a broken

front hub and we were delayed about 45 minutes while I put in a new hub that I fortunately had in the car. Made camp that evening about 6 miles from Leach Springs. No accommodations. Mr. and Mrs. Ferris slept in their car. Mrs. Chace and I on our car cushions in a small tent. This was our first outdoor camp. Just a little ice on the water buckets in the morning.

Mar. 3. Packed up and on the road to Silver Lake. Stopped at a good rocky sidehill and collected a few snails. Then on to Owl Springs where we stopped and had lunch. Some rocky hills here but Mr. Ferriss and I hunted nearly an hour and found no snails. A few wild flowers in bloom here. Drove all afternoon and camped at Saratoga Springs. A fine big spring with a pool at least 50 feet across and the water slightly warm and slightly alkaline. There was quite a lot of small fish from one to two inches long in the pool. An old corrugated iron building without doors or windows, but with a camp stove made this a very comfortable camp. No brush or trees near the spring and I had to go to some mesquite trees about one-half mile away for wood to cook dinner.

Mar. 4. In the morning we hit the road again and arrived at Silver Lake at noon without stopping to hunt for snails very much. Spent the afternoon and part of the next morning working on Maud.

Mar. 5. Car fixed up and drove out to Red Pass on the Barstow Road and did a little collecting. Silver Lake has a store, a depot, a freight house, and about a dozen other houses. The railroad Agent offered us the use of his little cottage so we were very comfortable the two nights that we were there, with a stove and table and chairs. Again, Peggy and I slept on our car cushions on the floor. Prof. Monroe took the train back to Los Angeles.

Mar. 6. Weather still holding fine. Left Silver Lake for Tecopa. Stopped and found snails on a rocky hill not far from the old Amargosa Mine. Struck some bad sandy roads and some up grades and had to camp in the open again. No wind to speak of and a fine moon.

Mar. 7. Slow going for several miles this morning. Then we stopped to investigate some rocky hills. Got a few snails while Mrs. Chace got dinner. She baked biscuits in a dutch oven.

On the road again. Hit a steep hill and had trouble getting the cars to pull up it. Wind came up and was disagreeable. Finally made the top of the grade and ran mostly down hill to Zabriskie. Had to tow Maud the last two miles. It was dark when we got there. There was a small shack built of railroad ties big enough for a stove and rolled up corrugated iron for a stove pipe. No people -- we got dinner in the shack. There was another building without doors or windows which had been a hotel (?) and a corrugated iron freight house. Mrs. Chace and I slept in the hotel. We made ourselves at home and were very comfortable in spite of the wind that blew very hard all night.

Mar. 8. In the morning I worked Maud over and Mr. Ferriss and I drove a few miles to Shoshone and filled up with gas and water. Fair road. Dinner at Zabriskie and then a nine mile trip to Resting Springs. Only two sandy stretches.

At Resting Springs, Mr. Smith, who runs the ranch for the Tecopa Mining Company, welcomed us with open arms. He invited us to use his kitchen for our meals and gave us the use of what had been a school house at one time for our sleeping quarters. There were no doors or windows, but we were very comfortable. Mr. Smith had no family there but kept a horse and a dog. The spring is quite large and the flow of water would fill a 10 inch pipe as I remember it. There were no snails on the hillsides close to the spring but Mr. Ferriss and I walked about two miles over to the Gunsight Mountains where we found snails quite common. Friday Mrs. Chace and I went collecting in Chicago Valley and had a good day. We returned to Resting Springs at nearly 6:00 o'clock and Mr. Smith had a big supper all cooked for us.

Mar. 11. I packed the car and Mrs. Chace and I started back for Haiwee as our leave of absence was about up. We left Mr. and Mrs. Ferriss to do just a little more searching for shells. We passed through Shoshone, Salsberry Pass, and Death Valley. That night we drove up a canyon to Leach Springs where we found about an inch of snow on the ground and nothing of a shelter. So we cleared off some snow and made a bed beside the car. At about 5:00 a.m. I woke up to find it snowing in my face. So, hot coffee and then hit the road down the canyon. Out O.K. and through Pilot Knob, Johannesburg, Searles, Inyokern, and Little Lake. Back at the powerhouse at Haiwee about 6:00 p.m., Sunday, tired but happy.

[Emery Chace sent this log of his 1922 collecting trip to me about fifteen years ago. I found it among some old papers and rediscovered the charm of hearing Emery tell collecting stories with his great enthusiasm. I hope that readers will sense the cheerful determination and energy which was characteristic of "The Chaces" in all of their activities. Those who were not acquainted with Emery and Elsie Chace might enjoy reading "Keepers of the Tin Book" in *The Tabulata*, 3(1):11-15. Those great folks started collecting mollusks in 1910 and the last of their detailed collecting records was written in April, 1970.

The specimens collected on the 1922 trip have been given to the California Academy of Sciences and the Santa Barbara Museum of Natural History. -- Jack W. Brookshire.]

\* \* \* \* \*



# Conchologists of America

## C. O. A. Convention

From Fort Lauderdale, Florida: The Conchologists of America are busily planning this summer's 14th Annual Convention, a reunion of shellers, scientists, dealers and friends from around the States and the world. We're pleased to invite the readers of Shells and Sea Life to the convention, which will be held from Tuesday through Saturday, July 15 through July 19, 1986. The Broward Shell Club will host the festivities at the twin-towered Sheraton Yankee Trader Hotel, right on the beach at Fort Lauderdale, Florida. All shell collectors -- C.O.A. members or non-members, whether novice or advanced in expertise -- as well as shell dealers and scientists, are cordially invited to this consistently outstanding sheller's convention. If you have been to a prior C.O.A. convention, you know the congeniality and camaraderie which abound, and arm-twisting won't be necessary. If you have not yet had the good fortune to attend one of the earlier C.O.A. conventions, why not seriously consider making this one of your first? The summer is a perfect time for the Florida family vacation (at off-season rates!); and Fort Lauderdale provides every possible type of diversion for your non-shelling relatives and companions. Nearby superhighways zip you to Cape Kennedy, Orlando, Miami and the Florida Keys, the Everglades and Big Cypress Swamp -- if you can pry yourself away from the fun, sun, dining, dancing, live entertainment, beautiful surroundings and friendly people that are Fort Lauderdale. Plan a few extra days before or after the convention to enjoy Florida's "second season."

Convention Chairman, Ruth Chesler, reports plans for many events full of fun and interest. Convention registration begins on Tuesday morning, July 15, with programs commencing in the afternoon. Informative slide presentations, aiming to broaden the horizons of a varied audience, will be presented throughout the five-day convention by knowledgeable collectors and authorities; the meeting room promises to offer the best screen and speaker visibility yet. The Broward Shell Club will host a welcome and get acquainted party Tuesday evening at the renowned International Swimming Hall of Fame Museum, a fascinating place to explore.

Field trips are being planned, with the most adventuresome already confirmed. Wayne Harland will coordinate two trips, one for snorkelers and the other for scuba divers, to take advantage of the superb diving opportunities of the area. The waters in July are in the 80 degree+ range and usually are clear and calm; offshore reef structures offer habitat for many of the Caribbean/Florida species, including Mitra florida, Pecten mildredae, and the elusive and beautiful Conus granulatus.

Less strenuous field trips are in the offing as well, including an evening trip on the fabled Jungle Queen, a 550-passenger sightseeing vessel; you will cruise up the New River to dock for an on-shore all-you-can-eat barbeque ribs and chicken and steamed shrimp feast, followed by a hilarious, professional vaudeville revue, and a sing-a-long on the return cruise to Bahia Mar Yacht Center; the trip is a delightful marine exploration of the plush residential waterways of Fort Lauderdale.

The magnificent Dealer's Bourses are scheduled for Friday evening and Saturday afternoon. Imagine a "Sheller's Mall," with 20-30 national and international dealers displaying their common-to-rare specimen shells, shell fabrics, shell art, shell books, and other shelling items for your perusal and purchase if you so desire -- and who can resist? Nowhere else will you find as many dealers, devoted to making your most elusive shell dreams come true -- all at the same time and in the same place! These dealers, with their tempting and tantalizing treats, are an important part of the convention. Again, we have arranged for a separate, locked Bourse Room, actually located within view of the hotel's security station.

C.O.A.'s annual auction of donated shells will take place Thursday evening, following time for preview of the items up for bid. Last year, 175 lots brought over \$2,500 in proceeds, which help fund the publication of the association's Bulletin, and the C.O.A. "Grand Trophy" awards, presented at over 25 shell shows around the United States and overseas. Hundreds of specimen shells, including some of great rarity and sophistication, will find new adoptive "homes" at incredible savings! Dealers and generous shellers are requested to send their donations, preferably with accurate locality data and estimated value, to Mrs. Peggy Fox, 661 S.E. 6th Terrace, Pompano Beach, FL 33060. Any and all contributions will be greatly appreciated, and contributors will be acknowledged in the convention souvenir program booklet and in the auction catalog. Peggy will also welcome shell books, gift certificates, and additional shell-related items to be given away as door prizes for arrival no later than June 15, to allow time for the preparation of the catalog and booklet.

A grand finale banquet will close the convention on Saturday night; Dr. Clyde Roper, Curator of the National Museum of Natural History (Smithsonian Institution), will be the guest speaker. Members of the Broward Shell Club are being mysterious about other events planned for the evening; we'll simply have to attend to discover what surprises they have in store for us!

Richard Goldberg, Vice President of the Conchologists of America, has recently contacted all United States shell clubs, inviting each club to elect or appoint a C.O.A. Representative. To encourage participation, the certified representative from each club will be given a \$10 registration fee reduction at the Fort Lauderdale Convention. -- Mary Ellen Akers & Donald J. Young, Co-Chairmen, C.O.A. Convention Publicity.

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# Western Society of Malacologists



## Western Society of Malacologists & American Malacological Union Annual Meeting

The Western Society of Malacologists Nineteenth Annual Meeting will be held jointly with the American Malacological Union. The meetings will be held in Monterey, California on July 1-6, 1986, with much of the activity taking place at the Monterey Conference Center.

W.S.M. President, Terrence M. Gosliner, wants to remind everyone that the shell and book auction will be a joint affair this year, with all proceeds divided equally between the W.S.M. and the A.M.U. Both organizations use the proceeds to finance publications and/or support symposiums for the meetings. Auctioneers will be Carole M. Hertz and Richard E. Petit.

All donations of books or shells should be sent to either: Dr. James Nybakken, Moss Landing Marine Laboratories, Moss Landing, CA 95039-0223 -- or: Dr. Terrence Gosliner, Department of Invertebrate Zoology, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118.

If you prefer to bring items to the meetings, please call Terry or Jim and let them know what items you are bringing so they may be listed for the auction. Terry may be reached at the California Academy of Sciences -- Telephone 415-221-5100.

We hope to see you at the meetings this year. This is a really marvelous opportunity to see several hundred shell people together. People are expected from as far away as Australia and Europe.

\* \* \* \* \*



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# CURRENT EVENTS

## Meetings & Shows

1986

**2nd International Symposium** on Indo-Pacific Marine Biology Guam, Truk & Ponape, Sponsored by the Western Society of Naturalists, June 22 - July 9. Contact: David H. Montgomery, WSN Secretary, Biological Sciences Dept., California State Polytechnic University, San Luis Obispo, CA 93407.

**Crown Point Picnic** June 22, Stoney Run County Park. Contact: Tide-ings, Box 462, Crown Point, IN 46307.

### Western Society of Malacologists American Malacological Union

Joint Meeting, concurrent sessions, July 1-7, Monterey, California. Monterey Sheraton. Contact: Paula M. Mikkelsen, American Malacological Union, Inc., c/o Harbor Branch Foundation, Inc., R.R. 1, Box 196, Ft. Pierce, FL 33450-9719.

**Conchologists of America Convention** July 15-19, Fort Lauderdale, Florida. Contact: Mrs. Jean Redding, 1112 S.E. Third Ave., Fort Lauderdale, FL 33316. Phone (305) 524-8929 home; (305) 525-1112 (business). Sheraton Yankee Trader Hotel (Attn. Reservations), 303 North Atlantic Blvd., Fort Lauderdale, FL 33304. Phone (305) 467-1111.

**National Marine Education Association**, 1986 Annual Conference, August 4-9, John Carroll University, Cleveland, Ohio. Contact: Ohio Sea Grant Education Program, The Ohio State University, 059 Ramseyer Hall, Columbus, OH 43210, or call: 614-422-1078

**SCAMIT**, Topic for August meeting -- Bryozoa. Contact: Southern California Association of Marine Invertebrate Taxonomists, 3720 Stephen White Drive, San Pedro, CA 90731.

**North American Paleontological Convention** August 12-15, Boulder, Colorado. Field trips are planned for Aug. 4-11 and Aug. 16-17, along with workshops and access to collections. Contact: Norman L. Gilinsky, Dept. of Geological Sciences, VPI and SU, Blacksburg, VA 24061

**Unitas Malacologica** Ninth International Malacological Congress, August 31-September 6, Edinburgh, Scotland. Contact: Congress Office, Royal Scottish Museum, Edinburgh, Scotland EH1 1JF

**New Jersey Wings 'n Water Festival**, September 20-21. Contact: The Wetlands Institute, Stone Harbor Blvd., Stone Harbor, New Jersey. Call (609) 368-1211.

**SCAMIT**, November meeting topic -- Ascidiacea. Contact: SCAMIT, 3720 Stephen White Dr., San Pedro, CA 90731.

**Western Society of Naturalists**, December 27-30, University of Hawaii at Hilo. Dr. John Chan will be the local chairman. Contact: David H. Montgomery, WSN Secretary, Biological Sciences Dept., California State Polytechnic University, San Luis Obispo, CA 93407

1987

**Third California Islands Symposium**, March 3-5. Contact: Dr. Eric Hochberg, Santa Barbara Museum of Natural History, 2559 Puesta Del Sol Rd., Santa Barbara, CA 93105, Phone: (805) 682-4711.

**Western Society of Naturalists**, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

\* \* \* \* \*

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Public events only, please; commercial events should use our directory advertising. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We would especially like to hear of overseas shows and meetings. Thanks to Donald Dan for keeping us informed of many of these dates.

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## CLAM - Scooter Beers

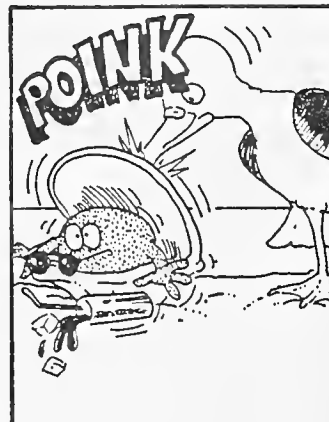
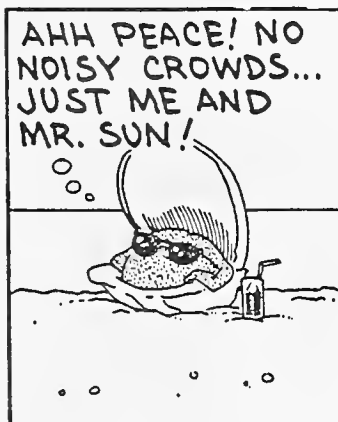
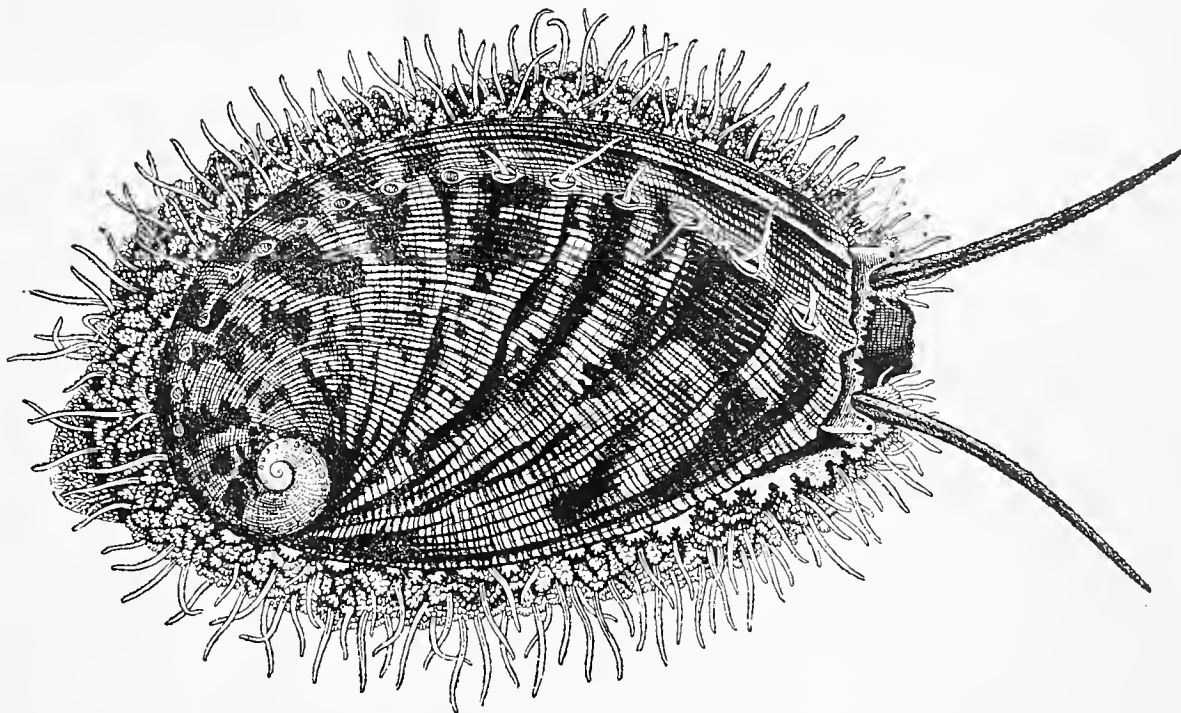




Fig. 396. — Animal de *Villobois tuberculata*, Linné, vu par sa face dorsale.  
D'après une gravure inédite de Deshayes (F.).

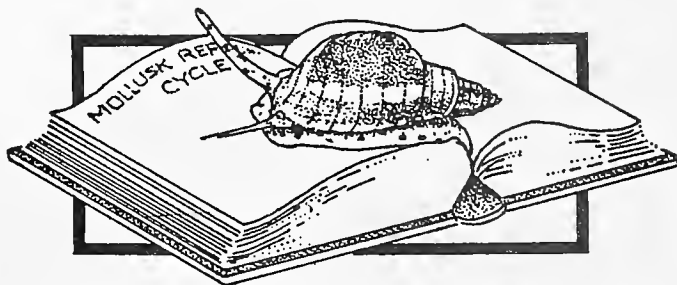


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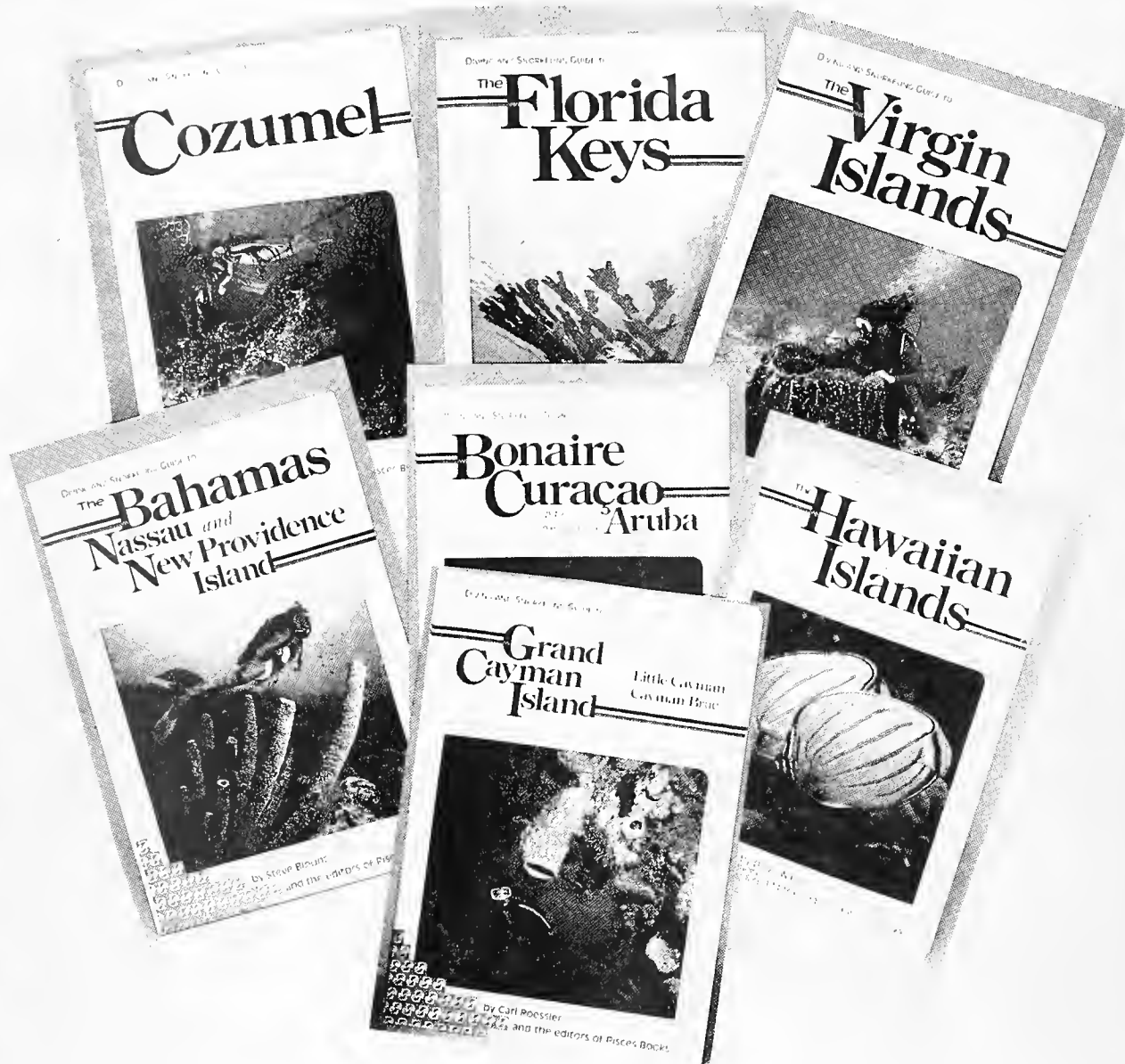
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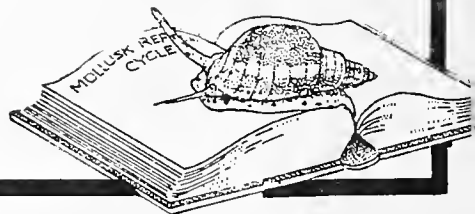
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MALACOLOGICAL SOCIETY OF AUSTRALIA, INC., c/o South Australia Museum, North Terrace, Adelaide, South Australia 5000.

MINNESOTA SOCIETY OF CONCHOLOGISTS, c/o Stan Thompson, 1032 11th Ave NE, Faribault, MN 55021. Meets 1st Thursday, Twin City Federal, Minneapolis.

NASHVILLE SHELL CLUB, c/o Michael E Davis, 223 Tanglewood Court, Nashville, TN 37211

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PACIFIC SHELL CLUB, 1st Sunday each month, September-June, 1:30 pm, Los Angeles County Museum of Natural History. Los Angeles, California.

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## EDITOR'S NOTES:

Our return to standard format has been very well received. We will continue with this size publication and hope to do a reprint edition of the large format issues of *SHELLS and SEA LIFE* if there is sufficient interest. The reprints would include *SHELLS and SEA LIFE* (volume 17(1) through 18(2)) in 8-1/2" x 11" format. The cost will be about \$30.00 postpaid, for the 300+ pages. Send us a note indicating the number of copies you require and we will ship and bill you -- do NOT send money now. This reprint edition will allow uniform binding of all volumes of *SHELLS and SEA LIFE* and the *OPISTHOBRANCH*.

*Acta Mollusca* will be published periodically. Issues will be announced in *SHELLS and SEA LIFE*. The price for each issue will vary according to the number of pages and plates included. Articles in *Acta Mollusca* will be reviewed by our editorial board.

*Opisthobranchia* will be a new publication dedicated to the Subclass OPISTHOBRANCHIA. It will be published bimonthly and be available for \$20 per calendar year in the US, \$25 overseas, and \$30 via air mail.

We are starting an important reprint with this issue. Edmund A. Crouch's 1827 edition of "An Illustrated Introduction to Lamarck's Conchology; contained in his Histoire Naturelle des Animaux sans Vertebres: being a literal translation of the descriptions of the Recent and Fossil Genera. Accompanied by twenty-two highly finished lithographic plates: in which are given Instructive Views of the various Genera, and their Divisions, drawn from Nature, from characteristic and generally well known Species." As we have space and time we will include the text and plates. We would appreciate suggestions of other important shorter works which you would like to see reprinted with future volumes of *SHELLS and SEA LIFE*.

Yours sincerely,

*Steve Long*

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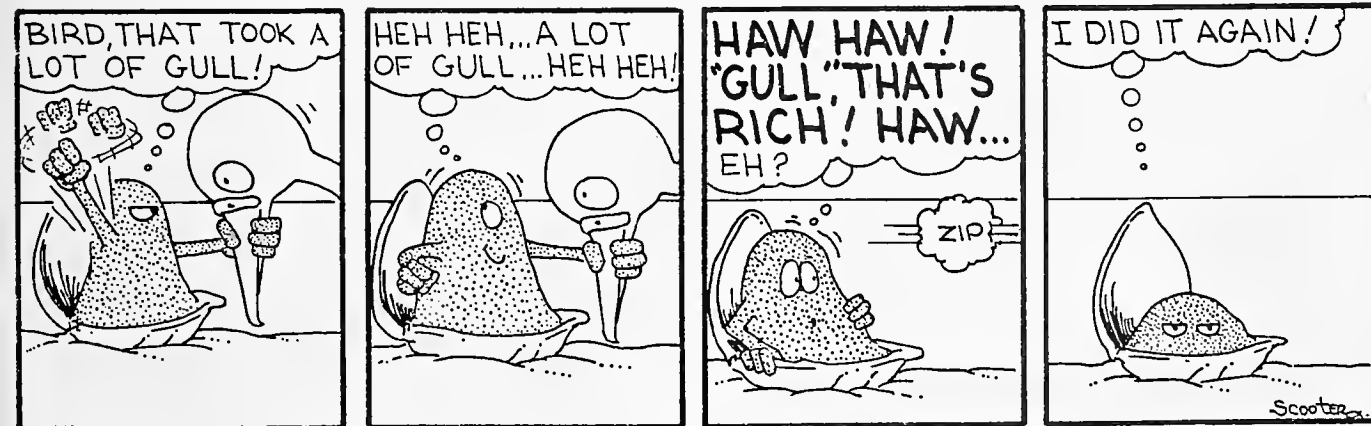
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## I N T R O D U C T I O N .

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LAMARCK'S System of Conchology, which is contained in his "*Histoire Naturelle des Animaux sans Vertèbres*," is now almost universally adopted among Naturalists; but that work being destitute of Graphic Illustrations, is rendered exceedingly difficult of comprehension to those who are not intimately acquainted with the science. The only means which are given for its attainment are written descriptions and numerous references to voluminous and expensive works: the former are frequently rendered inefficient, from the minute distinctions that characterize many of the genera; and the latter are seldom available, the works referred to being difficult of access to the student. It is the object of the present Elementary Treatise to remove these difficulties, by presenting a concise description of the various Classes, Orders, Families, and Genera composing the System, accompanied with Illustrations of characteristic and generally well known Species, drawn from nature, either from my own Cabinet or from those of obliging friends, and, where it has not been possible to meet with specimens, from the best printed authorities.

THIS work being chiefly graphic, I have purposely omitted the various classes of animals, having found it impossible to supply the requisite information; but descriptions of them will be found in Lamarck's *Histoire Naturelle*, before mentioned, or in Dubois' *Epitome of Lamarck's Arrange-*

ment of Testacea," whose Comparative and Synoptic Tables of the Systems of Linnæus and Lamarck, together with his judicious observations, will afford the greatest assistance.

THOSE Genera which are only to be found in the Fossil state are described in their natural arrangement, but are brought together in the last two plates, for the convenience of easy reference.

SOME apology may be deemed necessary for the delay which has occurred in producing this work so long after its announcement; to those who are acquainted with the vexatious casualties of Lithographic printing, it will be unnecessary; but to those who are not, it may be proper to state, that many of the drawings, from the breaking of the stones, and other accidents, have been redrawn three or four times over; these and the delays occasionally experienced in procuring specimens of some of the rarer Genera must be my excuse.

I CANNOT omit this opportunity of returning my best thanks to Mrs. Mawe, Mr. G. B. Sowerby, and Mr. J. D. C. Sowerby, for their kind assistance in furnishing me with many specimens from their rich and extensive Cabinets; also to J. G. Children, Esq. for his polite attention in allowing me access to the collection of the British Museum.

TO avoid repetitions in the following pages, where the authority is not mentioned, the specimens have been taken from my own Cabinet.

E. A. C.

# LAMARCK'S CONCHOLOGY.

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## ANNULATA

*Forms the Ninth Class of Lamarck's Division of Animal Nature.*

---

### SEDENTARY ANNULATA

COMPOSES the Third Order of the above Class. They are usually found attached to marine substances, and inhabit membranous or horny tubes; more or less incrustated with grains of sand or fragments of shells; or are solid, calcareous, and homogeneous: and are divided into Four Families, viz.—Dorsalia, Maldania, Amphitritea, and Serpulea.

#### DORSALIA.—2 GENERA.

ARENICOLA.—Has no shell.

SILICUARIA.—Shell tubular, irregularly twisted, tapering towards the posterior end, which is sometimes spiral; anterior extremity open; and a longitudinal subarticulated fissure throughout its whole length,

Plate I. Fig. 1. *S. anguina*. (*Serpula anguina*.—Linnæus.)

#### MALDANIA.—2 GENERA.

CLYMENE.—Tube slender, open at both ends, the exterior incrustated with sand and pieces of shells.

[I have not been able to procure a Figure of the *Clymene amphistoma*; of which species only the genus is composed.]

DENTALIUM.—Tube testaceous, nearly regular, slightly curved, gradually tapering towards the posterior end, open at both extremities.

(a) *Tube with longitudinal ribs or striæ.*

Plate I. Fig. 3. *D. elephantinum*. (Idem.—Linnæus.) [Mrs. Mawe's Cabinet.]

(b) *Tube smooth, or without ribs or striæ.*

Plate I. Fig. 2. *D. politum*. (Idem.—Linnæus.) [Mrs. Mawe's Cabinet.]

## AMPHITRITEA.—4 GENERA.

PECTINARIA.—Tube membranous, or papyraceous, arenaceous, in shape of a reversed cone, not fixed.

Plate I. Fig. 4. *P. Belgica*.

SABELLARIA.—Tubes numerous, united in a common mass, composed of agglutinated fragments of shells and sand; the orifices cup-shaped.

Plate I. Fig. 5. *S. crassissima*.

TEREBELLA.—Tube elongated, cylindrical, attenuated and pointed at the base; membranous, with grains of sand and fragments of shells adhering round it: open only at the apex.

Plate I. Fig. 6. *T. conchilega*.

AMPHITRITE.—Tube elongated, cylindrical, posterior extremity attenuated, membranous or coriaceous; the exterior generally naked.

Plate I. Fig. 7. *A. ventilabrum*. (*Sabella penicillus*.—Linn.) [Icon.—Journ. Sci. XIV. pl. iii. fig. 6.]

## SERPULEA.—5 GENERA.

SPIROBIS.—Tube testaceous, turned into an orbicular spire, discoidal; the lower surface flat, and fixed.

Plate I. Fig. 8. *S. carinata*.

SERPULA.—Tubes solid, calcareous, irregularly twisted, grouped or solitary, fixed; the aperture terminal, round, very plain.

Plate I. Fig. 9. *S. decussata*. (Idem.—Linn.)

VERMILIA.—Tube testaceous, cylindrical, gradually lessening to the posterior end, more or less twisted, and fixed at the base to marine substances. Aperture round, the margin armed with from one to three teeth.

Plate I. Fig. 10. *V. triquetra*. (*Serpula triquetra*.—Linn.)

GALEOLARIA.—Tubes testaceous, very numerous, cylindrical, rather angular, raised, wavy, crowded and matted together, fixed at the base, the upper end open. Aperture orbicular; the margin terminating in a projecting point. Operculum orbicular, galeiform, the upper part armed with from five to nine testaceous valves, which are fixed to its margin; the middle one linear, truncate, and larger than the others.

Plate II. Fig. 1. *G. recumbens*. Natural size. (Sowerby.)

2. Aperture and Operculum magnified.

MAGILUS.—The base of the shell turned into a short, oval, snail-like spire; the last four whorls contiguous, convex; the last larger than the others, and lengthening into an erect, wavy, elongated tube. Tube convex above, carinated beneath, plaited, and rather depressed at the sides; the plaits lamellated, crowded, undulated, vertical, thicker on one side of the tube than on the other.

Plate I. Fig. 11. *M. antiquus*. [Mr. Dubois's Cab.]

## Tenth Class.

### CIRRHIPEDA.

*Shell sessile or elevated, on a flexible, tendinous pedicle; multivalve; sometimes moveable, sometimes fixed; the inside covered by the Mantle of the Animal.*

THE CIRRHIPEDA are divided into Two Orders.—Sessile Cirrhipeda, and Pedunculated Cirrhipeda.

#### ORDER I.—SESSILE CIRRHIPEDA\*.—6 GENERA.

THE Shells of this Order are fixed on marine bodies.

TUBICINELLA.—Shell univalve, operculated, tubular, erect, a little attenuated towards the base, bound with annular transverse ribs, truncated at both ends, open at the summit, and closed at the base with a membrane. Operculum with four obtuse valves.

Plate I. Fig. 12. *T. balænarum*.

CORONULA.—Shell sessile, apparently indivisible, suborbicular, conoidal or blunt-conical, the extremities truncated, the sides very thick, the inside hollowed into radiating cells. Operculum composed of four obtuse valves.

Plate I. Fig. 13. (a) *C. balænaris*. Upper-side. (*Lepas balænaris*.—Linn.)  
(b) Inside.

BALANUS.—Shell sessile, fixed, conical, summit truncated, closed at the base by an adhering testaceous lamina. Aperture subtriangular, or elliptical. Operculum internal, quadrivalve, the valves moveable, inserted near the base of the inside of the shell.

Plate I. Fig. 14. *B. radiatus*.

ACASTA.—Shell sessile, oval, subconical, composed of separable pieces: cone formed of six unequal lateral valves united together; the base a lamina or orbicular valve, concave on the inside, resembling a patella or little cup. Operculum quadrivalve.

Plate I. Fig. 15. *A. Montagu*.

\* Lamarck has erroneously separated this Order into Two Divisions—Operculum quadrivalve, and Operculum bivalve. Sowerby has shewn, in his Genera, that the whole are quadrivalve.



CREUSIA.—Shell sessile, fixed, orbicular, convex-conical, quadri-  
valve: valves unequal,  
united together, sutures distinct. Operculum internal, quadri-  
valve.

Plate I. Fig. 16. (a) *C. verruca*. Outside. (*Lepas verruca*.—Linn.)  
(b) Inside.

PYRGOMA.—Shell sessile, univalve, rather globular, ventricose, convex above; apex per-  
forated: aperture small, elliptical. Operculum quadri-  
valve.

Plate I. Fig. 17. (a) *P. crenata*. Outside.  
(b) Inside.

---

## ORDER II.—PEDUNCULATED CIRRHIPEDA.

THE body is supported by a moveable, tubular pedicle, having the base fixed on ma-  
rine substances.—This order consists of Two Divisions, viz. 1. The shell composed of  
contiguous pieces. 2. The shell composed of distant pieces.

### DIVISION 1.—*Shell composed of Contiguous Pieces*.—2 GENERA.

ANATIFERA.—Shell compressed at the sides, composed of five valves, which are contig-  
uous and unequal; the lower side valves the greatest.

Plate I. Fig. 18. *A. laevis*. (*Lepas anatifera*.—Linn.)

POLLICIPES.—Shell compressed at the sides, multivalve, valves rather contiguous, une-  
qual; in number, thirteen or more: the lower side valves smallest.

Plate I. Fig. 19. *P. cornucopia*. (*Lepas pollicipes*.—Linn.)

### DIVISION 2.—*Shell composed of Distant Pieces*.—2 GENERA.

CINERAS.—Shell composed of five testaceous oblong valves, separate, not covering the  
whole of the body: two at the sides of the aperture; the others on the back.

Plate II. Fig. 3. *C. vittata*. [Icon.—Wood's Conch. Tab. XII. Fig. 2.]

OTION.—Shell composed of two\* testaceous small semi-lunate separate valves, adhering  
near the sides of the aperture.

Plate II. Fig. 4. *O. Cuvieri*. (*Lepas aurita*.—Linn.) [Icon.—Wood's Conch. Tab. XII. Fig. 4.]

\* This Shell has sometimes five testaceous valves; sometimes two testaceous, and three horny valves.

*Vide Sowerby's Genera.*

## Eleventh Class.

### CONCHIFERA.

*Shell always bivalve, wholly or partly covering the Animal; sometimes free, sometimes fixed: the valves mostly joined at the margin by a hinge or ligament. The shell is sometimes enlarged by testaceous, accessory pieces, not belonging to the valves.*

**THIS** Class is divided into Two Orders, viz. Conchifera Bimusculosa, and Conchifera Unimusculosa.

#### ORDER I.—CONCHIFERA BIMUSCULOSA.

**THE** shell presents, in the interior, two separate and lateral muscular impressions: this order is divided into Four Sections, viz. C. crassipeda, C. tenuipeda, C. lamellipeda, and C. ambigua or the Chamacea

##### SECTION 1.—CONCHIFERA CRASSIPEDA.

*Shell gaping at the sides when shut.*

**THIS** section contains Four Families—Tubicolaria, Pholadaria, Solenacea, and Myaria.

##### TUBICOLARIA.—6 GENERA.

**ASPERGILLUM.**—Sheath tubular, testaceous, gradually attenuating to the anterior end, which is open; the other extremity larger, and club-shaped; having two valves incrustated on one side of the club. The disk at the end of the club, convex, and perforated with subtubular holes, having a fissure in the centre.

Plate II. Fig. 5. A. Javanum. (Serpula penis.—Linn.) [Mrs. Mawe's Cabinet.]  
6. Front view of the disk.

**CLAVAGELLA.**—Sheath tubular, testaceous; the anterior end attenuated and open, the posterior club-shaped, ovate, and rather compressed with spinous tubes; one valve fixed in the side of the club, the other free in the tube.

Plate II. Fig. 7. (a) C. aperta. (Sowerby.) [British Museum.]  
(b) The free valve.

**FISTULANA.**—Sheath tubular, mostly testaceous; the posterior closed and turgid; the other end attenuated and open at the summit, inclosing a free bivalve shell; the valves of which are equal, and gape when closed.

Plate II. Fig. 8. *F. gregata*.

(a) One of the bivalves.

(b) One of the side valves.

**SEPTARIA.**—Tube testaceous and very long, gradually diminishing towards the anterior end; the interior divided by arched partitions, usually incomplete: the anterior extremity terminated by two other slender tubes, which are not divided internally.

Plate II. Fig. 9. *S. arenaria*. (*Serpula polythalamia*.—Linn.)

**TEREDINA.**—Sheath testaceous, tubular, cylindrical; the posterior extremity closed, shewing the two valves of the shell; the anterior end open.

Plate XXI. Fig. 1. *T. personata*. Fossil.

**TEREDO.**—Tube testaceous, cylindrical, flexuous, open at both ends, not belonging to the shell, and covering the animal. Shell bivalve, situated posteriorly on the outside of the tube.

Plate II. Fig. 10. *T. navalis*. The testaceous tube. (Idem.—Linn.)

(a) One of the bivalves.

(b) One of the terminating side valves.

(c) A section of the anterior part of the tube.

### PHOLADARIA.—2 GENERA.

*Shell without a tubular sheath, having accessory pieces which do not belong to the valves, and gapes anteriorly. Ligament external.*

**PHOLAS.**—Shell bivalve, equivalve, transverse, gaping at both sides, having various accessory testaceous pieces, affixed above or below the hinge. The inferior or posterior margin of the valves reflected outwards.

Plate II. Fig. 11. *P. candida*. (Idem.—Linn.)

**GASTROCHÆNA.**—Shell bivalve, equivalve, rather wedge-shaped, gaping very much; the anterior aperture large, oval, oblique; scarcely any aperture posteriorly. Hinge linear, marginal, without teeth.

Plate II. Fig. 12. (a) *G. modiolina*. Front view.

(b) Back view.

### SOLENACEA.—3 GENERA.

*Shell without accessory pieces, and gaping only at the lateral extremities. Ligament external.*

**SOLEN.**—Shell bivalve, equivalve, transversely elongated; gaping at both sides; beaks very small, not projecting. Cardinal teeth small, the number variable, sometimes none; rarely diverging; more rarely inserted in pits. Ligament external.

# PUBLICATION NOTES

For further information on these publications, write to the author, publisher, or SEASHELL TREASURES BOOKS. Publications marked "NEW" are as issued from the publisher. Publications may be single copies and are always subject to availability.

al-Abdul-Razzak, F.H.Y. 1984. **Marine Resources of Kuwait**. Routledge & Kegan Paul, Boston, xii + 243 pages, photos, tables, maps, cloth, d/w. Dr al-Abdul-Razzak begins with a discussion of Kuwait's physical characteristics, population and economic growth. She then analyses the historical importance of the Kuwaiti marine sector and both the foreign and invisible trade of Kuwait. Chapters seven, eight and nine discuss the fishing and shipping industries and freshwater and other marine resources. ISBN 0-7103-0069-7 - NEW \$55.

Al-Asfour, T.A. 1982. **Changing sea-level along the north coast of Kuwait Bay**. Kegan Paul International Ltd, Boston, xv + 186 pages, cloth, d/w, halftone & color illustrations, fold-out maps, tables. Dr Al-Asfour begins with a brief summary of the relevant literature on the Gulf and adjacent areas, the physical characteristics and the structural stability of the head of the Gulf as well as evidence of sea-level changes around it. Geology, physical geography and geomorphic evolution are discussed. ISBN 0-7103-0010-7 - NEW \$50.

Amos, W.H. & S.H. Amos 1985. **The Audubon Society nature guides. Atlantic and Gulf Coasts**. Chanticleer Press, New York, 670 pages, color, halftone & line illustrations, softbound. "A comprehensive field guide, fully illustrated with color photographs, to the birds, plants, seashore creatures, fishes, whales, and other natural wonders of North America's eastern shores, from the St. Lawrence to the Gulf of Mexico. ISBN 0-394-73109-3 - NEW \$14.95

Austin, W.C. & M.M. Deutsch 1978. **Marine Biota of the NE Pacific: A Bibliography Emphasizing Systematics and Distribution**. Khoyatan Marine Laboratory, 350 pages, 12,000 references. - NEW \$33.

Austin, W.C. 1985. **An Annotated Checklist of Marine Invertebrates in the Cold Temperate Northeast Pacific**. 3 Volumes. Khoyatan Marine Laboratory, xiv + 682 pages, plastic wire binding, 8-1/2 x 11". This is a huge listing of all the invertebrate groups -- in systematic order. The list is to be maintained and updated by Austin so we may look forward to additional information as time goes by. Everyone who works with the fauna from northern California north should have this set for their basic guidebook. - NEW \$50.

Azuma, M. 1982. **Colored Illustrations of the Land Snails of Japan**. Hoikusha Publishing Co., Ltd., Osaka, Japan, 333 pages, 64 colored plates, hundreds of text figures & halftones, cloth, plastic d/w, slipcase. ISBN 4-586-30061-2 - NEW \$45.

Bernert, G. & R. Ormond 1981. **Red Sea Coral Reefs**. Routledge & Kegan Paul, Boston, 192 pages, cloth, d/w, color photos throughout. The coastline of the Red Sea is fringed with coral reefs of dazzling beauty and teeming

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Blount, S. & H. Taylor 1984. **The Joy of Snorkeling**. The Photographic Book Co., New York, 112 pages, softbound, Color and halftone illustrations. "An essential guide to exploring the exciting world beneath the sea. THE JOY OF SNORKELING gives you all the practical advice you need to begin snorkeling on your next vacation or trip to the beach." ISBN 0-86636-020-4 - NEW \$9.50

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Brow, D. 1982. **Sea of Cortez Guide**. Western Marine Enterprises, Inc., Ventura, California, 272 pages, color soft cover, 115 photos, 96 charts, Spanish-English dictionary of fishing & boating words & phrases. ISBN 0-930030-26-5 - NEW \$20.

Cate, J.M. & S. Raskin 1986. **It's Easy to Say *Crepidula***. A Phonetic Guide to Pronunciation of the Scientific Names of Sea Shells and a Glossary of Terms Frequently Used in Malacology. Pretty Penny Press, Inc., Santa Monica, California. 155 pages, 8-1/2 x 11", softbound, ISBN 0-938509-00-4 - NEW \$19.95

Chalmers-Hunt, J.M. 1976. **Natural History Auctions 1700-1972. A Register of Sales in the British Isles**. Sotheby Park Bernet, London, 189 pages, illus., tbl., cloth, d/w. ISBN 0-85667-021-9 - NEW \$45.

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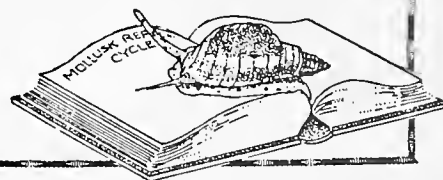
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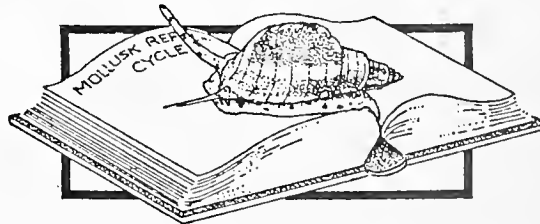
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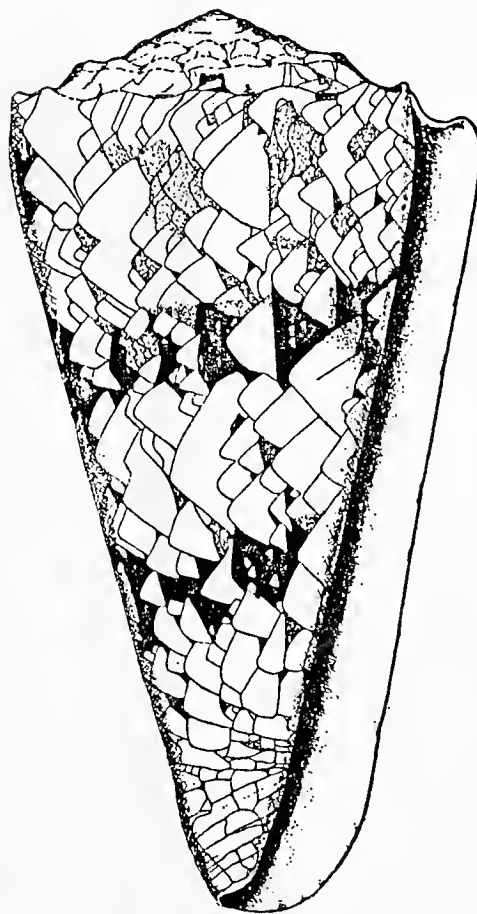
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## EDITOR'S NOTES

My wife and partner, Sally, is in Britain for a month, attending her mother's funeral and helping her father relocate. We both will miss "Rinnie" very much and regret that we could not both be with "Rinnie" and Gilbert at the end.

Please excuse our delays with magazine and books. This is a "one man operation" for the next couple of weeks. We hope to get Gilbert over here to help with mailing sometime in the next few months.

This issue continues with the reprint of Edmund A Crouch's illustrated introduction to Lamarck's Conchology. These pages along with a small segment in August, will complete over half of this valuable reference. Starting with the August, we will get back to more of our standard articles and news.

The covers of the April and May issues are reductions of prints by Holly Coovert and available from the Dayton Museum of Natural History, 2629 Ridge Ave., Dayton, OH 45414.



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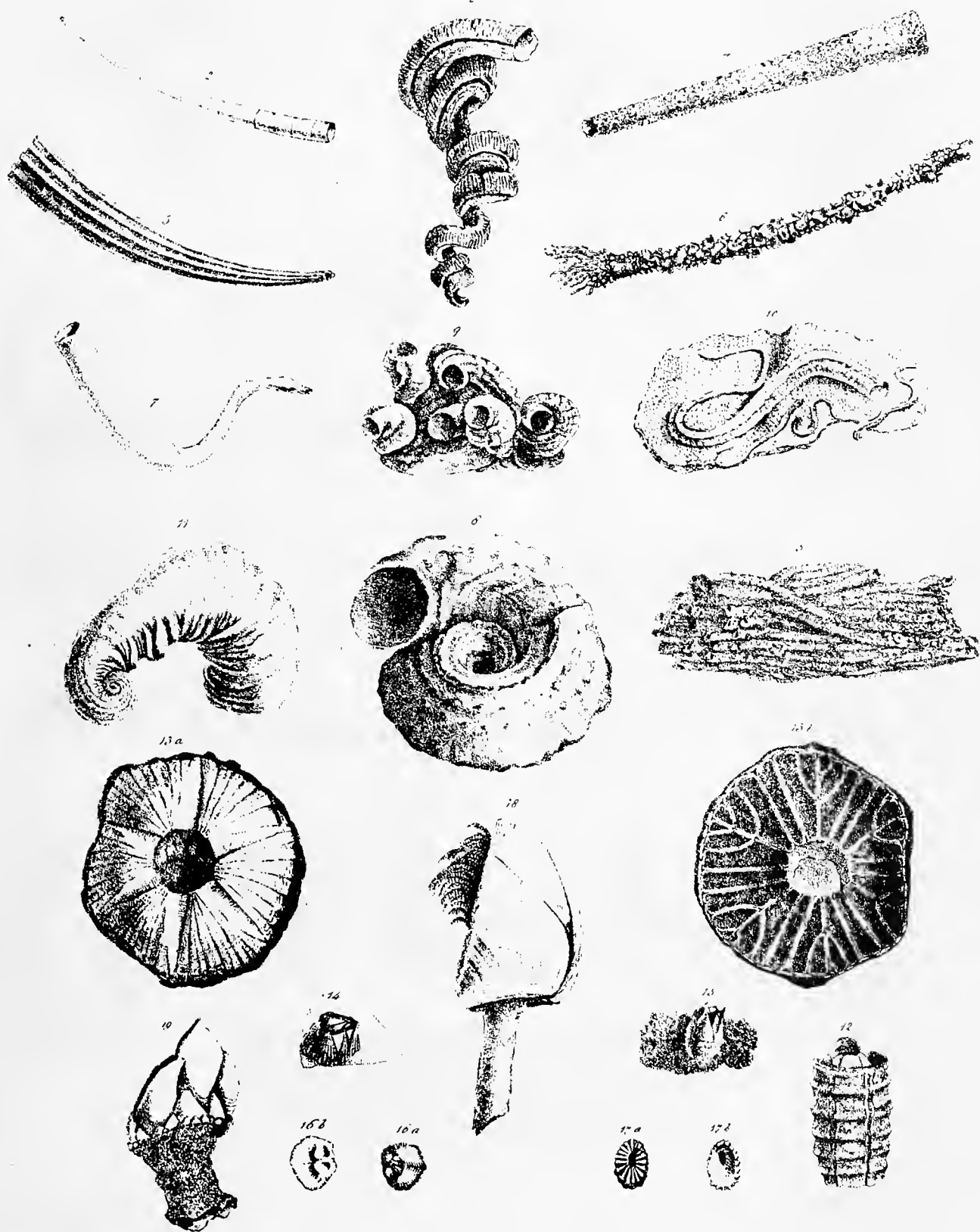
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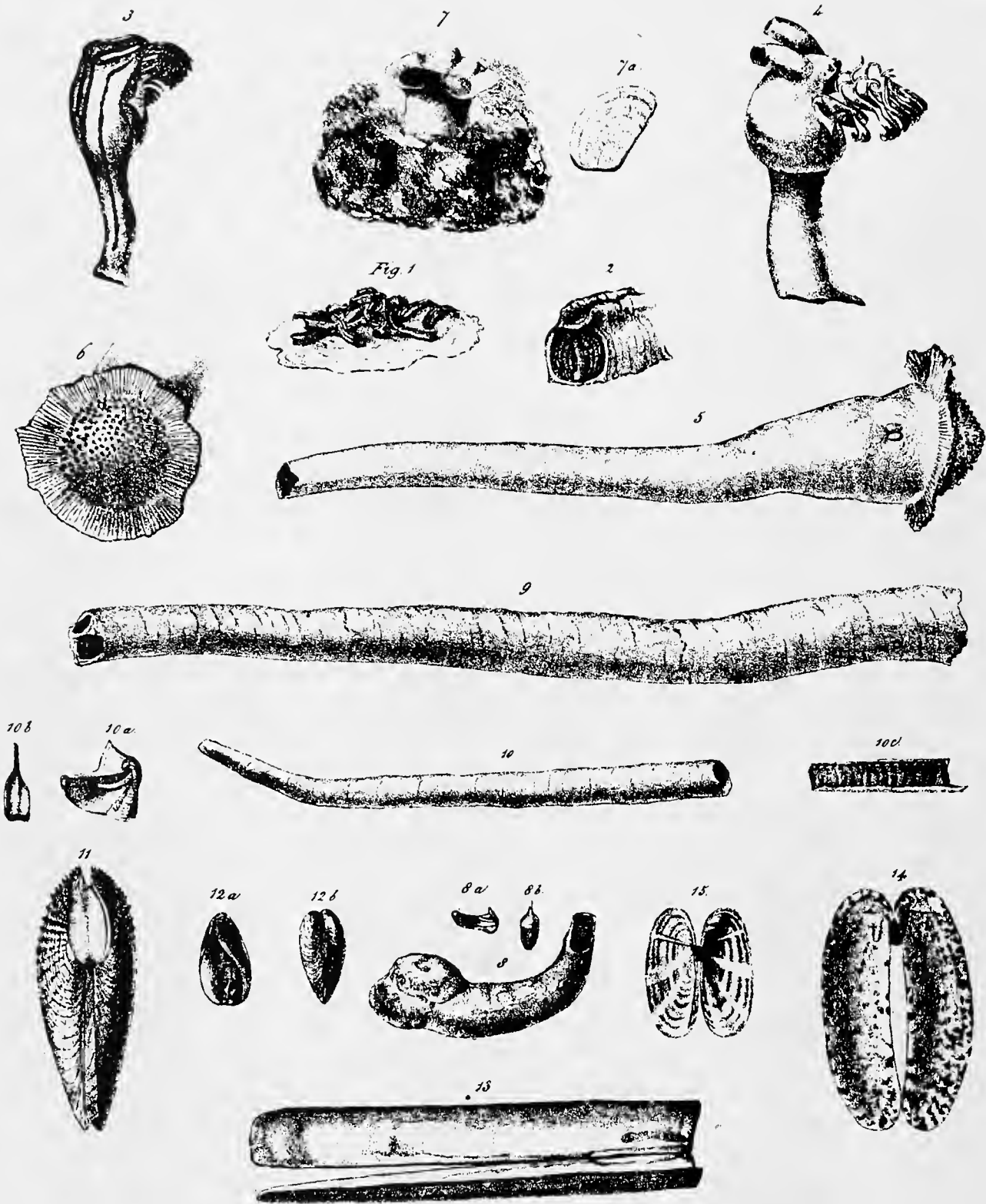
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Fig 1







(a) *The cardinal teeth contiguous to the anterior end.*

Plate II. Fig. 13. *S. truncatus*. (Dillwyn.)

(b) *The cardinal teeth a little removed from the anterior end.*

Plate II. Fig. 14. *S. cultellus*. (Idem.—Linn.)

(c) *The cardinal teeth nearer the middle than the anterior end.*

Plate II. Fig. 15. *S. radiatus*. (Idem.—Linn.)

**PANOPÆA.**—Shell equivalve, transverse, unequally gaping at the sides: one cardinal conical tooth in each valve; and near it a short, compressed, ascending callosity, not projecting outwards. Ligament exterior, on the longest side of the shell, fixed to the callosities.

Plate III. Fig. 1. *P. Aldrovandi*. (*Mya glycymeris*.—Gmelin.) [Mrs. Mawe's Cab.]

2. Hinge of ditto.

**GLYCYMERIS.**—Shell transverse, gaping much on each side; hinge callous, without teeth; nymphæ projecting outside. Ligament external.

Plate III. Fig. 3. *G. siliqua*. (*Mya siliqua*.—Chem.)

4. & 5. Inside of ditto.

#### MYARIA. — 2 GENERA.

*Ligament internal; having one large spoon-shaped tooth in each valve or in one only; to the cavity of which the ligament is attached. The shell gapes at one or both sides.*

**MYA.**—Shell bivalve, transverse, gaping at each end; having one large cardinal tooth in the left valve, broadly compressed, rather rounded, and projecting almost vertically: a cardinal pit in the other valve. Ligament internal, inserted in the prominent tooth and the corresponding pit.

Plate III. Fig. 6. *M. truncata*. (Idem.—Linn.)

7. Inside, shewing the hinge of ditto.

**ANATINA.**—Shell transverse, nearly equivalve, gaping at one or both sides; one naked, broad, spoon-shaped cardinal tooth, projecting internally in each valve, and receiving the ligament. In many species, a lamina or falcated rib runs obliquely below the cardinal teeth.

Plate IV. Fig. 1. (a) *A. myalis*. (*Mya declivis*.—Pennant.)

(b) Hinge of ditto.

#### SECTION II.—CONCHIFERA TENUIPEDA.

*The lateral gaping inconsiderable.*

THE shells of this section compose Four Families, which are separated into Two Divisions, viz.—1. Mactracea and Corbulea, having the ligament internal, with or without any external ligament.—And, 2, Lithophaga and Nymphacea, having the ligament always external.

DIVISION I.—LIGAMENT INTERNAL, WITH OR WITHOUT ANY EXTERNAL LIGAMENT.

MACTRACEA.—7 GENERA.

*Shell equivalve, mostly gaping at the lateral extremities. Ligament internal, with or without any external ligament.*

I.—THE LIGAMENT ALWAYS INTERNAL.

(1) *Shells gaping at the sides.*

LUTRARIA.—Shell inequilateral, transversely oblong or rounded, lateral extremities gaping: hinge with one tooth folded in two; or two teeth, one of which is simple, with an adjoining, deltoid, oblique pit, projecting inwards; no lateral teeth. Ligament internal, affixed in the pits.

(a) *Shells transversely oblong.*

Plate IV. Fig. 2. (a) *L. elliptica*. (*Mactra lutraria*.—Gmel.)

(b) Hinge of ditto.

(b) *Shells orbicular, or subtriangular.*

Plate IV. Fig. 3. *L. compressa*. (*Mactra Listeri*.—Gmel.)

MACTRA.—Shell transverse, inequilateral, subtriangular, gaping very little at the sides; beaks prominent. One compressed folded cardinal tooth in each valve, with an adjoining pit projecting inwards; two compressed entering lateral teeth, near the hinge. Ligament internal, inserted in the cardinal pits.

Plate IV. Fig. 4. (a) *M. stultorum*. (Idem.—Linn.)

(b) Hinge of ditto.

(2) *Shells not gaping at the sides.*

CRASSATELLA.—Shell inequilateral, suborbicular or transverse, the valves close: two rather diverging cardinal teeth, and a pit by the side of them. Ligament internal, inserted in the pit of each valve: lateral teeth, none; or obsolete.

Plate IV. Fig. 5. (a) *C. kingicola*. [Mrs. Mawe's Cabinet.]

(b) Inside of ditto.

ERYCINA.—Shell transverse, rather inequilateral, equivalve, rarely gaping: two unequal, diverging cardinal teeth, having a pit between them; and two oblong compressed, short, entering lateral teeth. Ligament internal, fixed in the pits.

Plate IV. Fig. 6. (a) *E. striata*. (Sowerby.)

(b) Inside of ditto.

II.—LIGAMENT SHEWING ITSELF ON THE OUTSIDE, OR BEING DOUBLE; HAS ONE INTERNAL, THE OTHER EXTERNAL.

UNGULINA.—Shell longitudinal or transverse, rounded on the upper part, subequilateral; valves not gaping: beaks eroded. A short, and rather bifid cardinal tooth in each

valve; with an oblong, marginal, adjoining pit, divided in two by a contraction.  
Ligament internal, inserted in the pits.

Plate IV. Fig. 7. (a) *U. transversa*. Natural size. [Brit. Mus.]  
(b) Magnified view of the Hinge.

**SOLENIMYA.**—Shell inequilateral, equivalve, transversely oblong, the extremities obtuse; the epidermis shining, and extending beyond the margin. Beaks not prominent, scarcely distinct. One cardinal tooth in each valve, dilated, compressed, and very oblique; rather concave above, to receive the ligament, which is partly internal, and partly external.

Plate IV. Fig. 8. (a) *S. Mediterranea*. [Mrs. Mawe's Cabinet.]  
(b) Inside of ditto.

**AMPHIDESMA.**—Shell transverse, inequilateral, subovate or rounded, sometimes gaping a little at the sides: hinge having one or two teeth, and a narrow pit for the internal ligament. Ligament double; one external, short; the other internal, fixed in the cardinal pits.

Plate IV. Fig. 9. (a) *A. reticulatum*. (Sowerby's Genera.) (*Tellina reticulata*.—Linn.)  
(b) Inside of ditto.

#### CORBULEA. — 2 GENERA.

*Shell inequivalve. Ligament interior.*

**CORBULA.**—Shell regular, inequivalve, inequilateral, closed, or very slightly gaping. One large conical, curved, ascending tooth in each valve, with a pit beside it: no lateral teeth. Ligament internal, inserted in the pits.

Plate V. Fig. 1. (a) *C. porcina*.  
(b) Hinge of ditto.

**PANDORA.**—Shell regular, inequivalve, inequilateral, transversely oblong; upper valve flat, and the lower convex. Two oblong, diverging, unequal, cardinal teeth in the upper valve; two oblong pits in the other. Ligament internal.

Plate V. Fig. 2. (a) *P. rostrata*. (*Tellina inequivalvis*.—Linn.)  
(b) Inside of ditto.

#### LITHOPHAGA. — 3 GENERA.

*Boring Shells, without accessory pieces or sheath, and more or less gaping at their anterior side.  
Ligament of the valves external.*

**SAXICAVA.**—Shell bivalve, transverse, inequilateral; gaping anteriorly at the superior margin: hinge almost without teeth. Ligament external.

Plate V. Fig. 3. (a) *S. rugosa*. (*Mytilus rugosa*.—Linn.)  
(b) Inside of ditto.

**PETRICOLA.**—Shell bivalve, subtriangular, transverse, inequilateral; the posterior side rounded, the anterior attenuated; slightly gaping. Hinge having two teeth in each valve, or in one only.

Plate V. Fig. 4. (a) *P. pholadiformis*,  
(b) Hinge of ditto.

VENERIRUPIS.—Shell transverse, inequilateral; the posterior side very short, the anterior gaping slightly. Hinge with two teeth in the right valve, and three in the left; sometimes three in each: the teeth are small, approximate, parallel, and but little or not at all diverging. Ligament external.

Plate V. Fig. 5. (a) *V. perforans*. (*Venus perforans*.—Montagu.)  
(b) Inside of ditto.

#### NYMPHACEA.—10 GENERA.

*Two cardinal teeth, or more, on the same valve: shell often gaping slightly at the sides. Ligament external; nymphæ, in general, projecting outside.*

This family is divided into *N. Solenaria*, and *N. Tellinaria*.

#### NYMPHACEA SOLENARIA.

SANGUINOLARIA.—Shell transverse, rather elliptical, gaping slightly at the lateral extremity; the superior margin arched, not parallel to the inferior. Hinge with two approximate teeth in each valve.

Plate V. Fig. 6. (a) *S. rosea*. (*Solen sanguinolentus*.—Gmel.)  
(b) Inside of ditto.

PSAMMOBIA.—Shell transverse, elliptical or oblong oval, rather flat, gaping slightly at each side; beaks rather prominent. Hinge with two teeth on the left valve, and one entering tooth in the opposite valve.

Plate V. Fig. 7 (a) *P. cærulescens*.

PSAMMOTÆA.—Shell transverse, oval or oblong oval, gaping a little at the sides; one cardinal tooth in each valve, sometimes in one valve only.

Plate V. Fig. 8. (a) *P. variegata*. (*Solen variegatus*.—Wood.)  
(b) Inside of ditto.

#### NYMPHACEA TELLINARIA.

Is subdivided into—I. Shells having one or two lateral teeth.—And II. Those which have no lateral teeth.

##### I.—HAVING ONE OR TWO LATERAL TEETH.

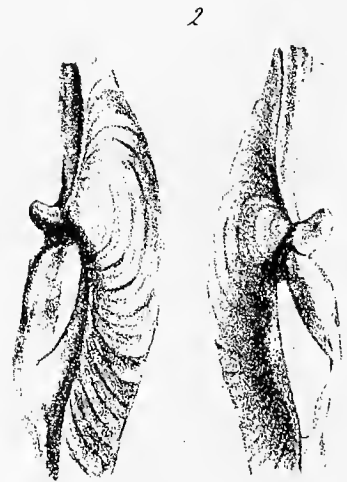
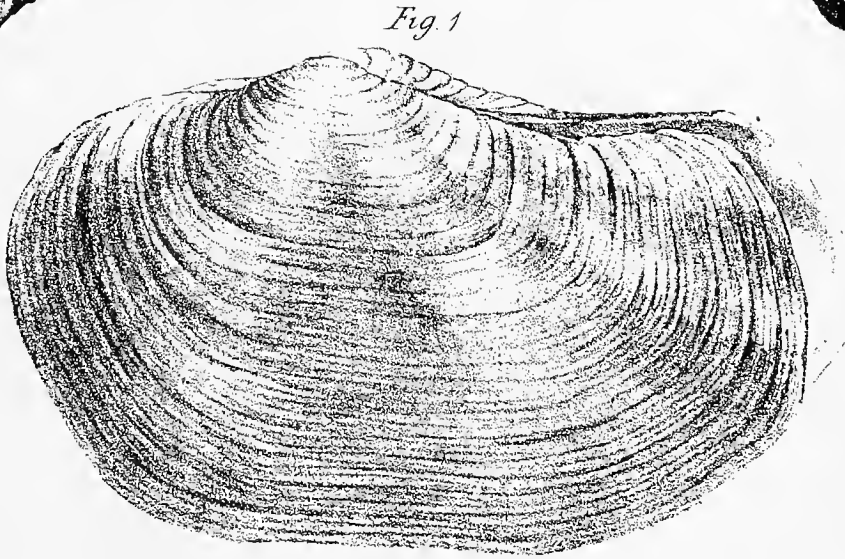
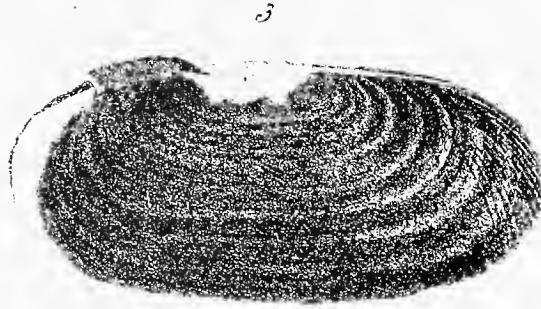
TELLINA.—Shell transverse or orbicular, in general rather flat; the anterior side angular, with a flexuous and irregular fold on the margin: only one or two cardinal teeth in the same valve; two lateral teeth, often remote.

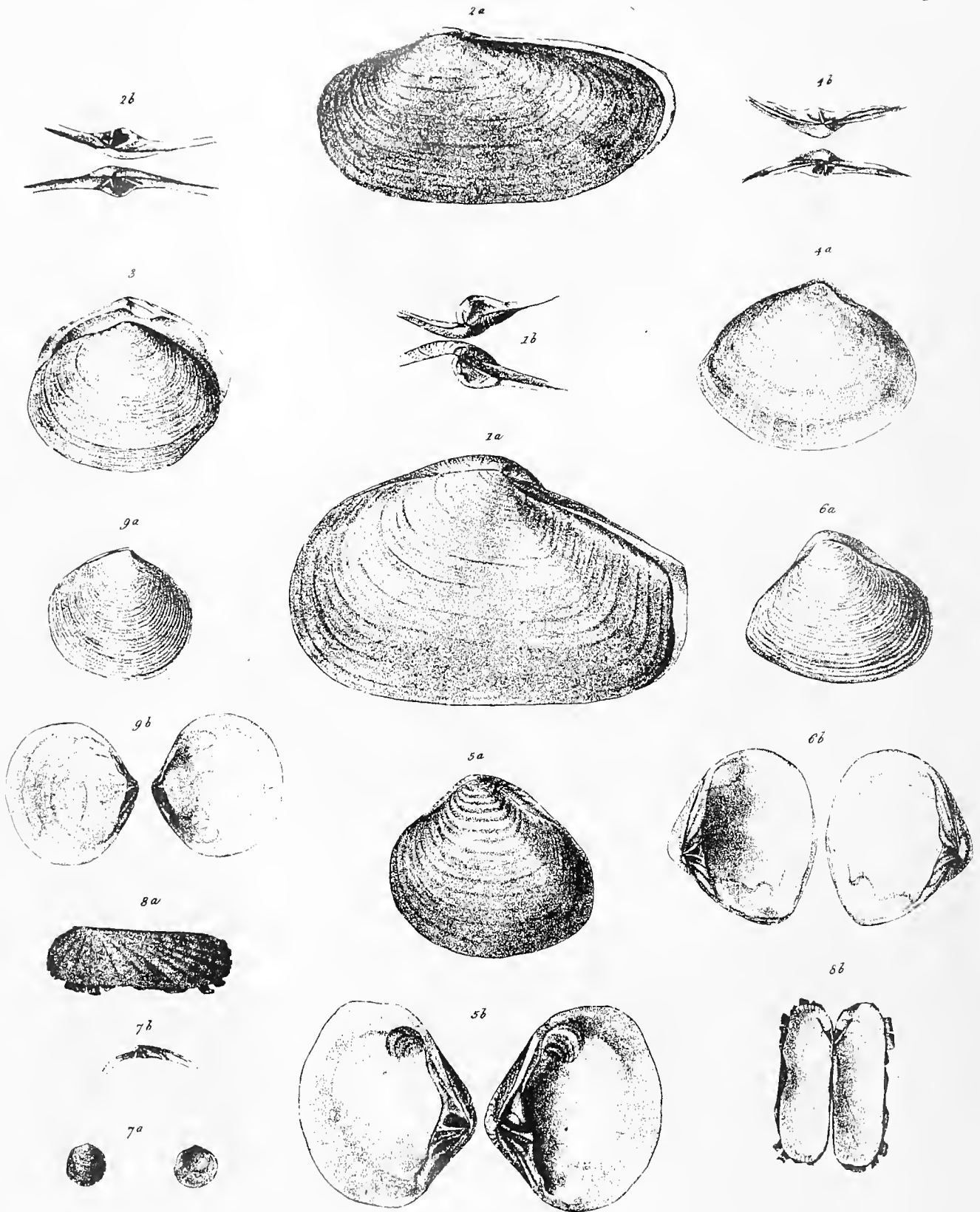
(a) *Shell transversely oblong.*

Plate V. Fig. 9. (a) *T. punicea*. (*Idem*.—Gmel.)  
(b) Inside of ditto.

(b) *Shell orbicular, or rounded oval.*

Plate V. Fig. 10. *T. crassa*. (*Idem*.—Lister.)





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**TELLINIDES.**—Shell transverse, inequilateral, rather flat, slightly gaping at the sides; beaks small and rather depressed, without the irregular fold on the margin. Hinge with two diverging teeth in each valve. Two lateral teeth, almost obsolete; the posterior of which in one valve is near the cardinal teeth.

Plate VI. Fig. 1. (a) *T. rosea*.  
(b) Inside of ditto.

**CORBIS.**—Shell transverse, equivalve, without any irregular fold on the anterior margin, having the beaks opposite and curved inwards. Two cardinal teeth; two lateral teeth, the posterior of which is nearest the hinge. The muscular impressions simple.

Plate VI. Fig. 2. (a) *C. fimbriata*. (*Venus fimbriata*.—Linn.) [Mrs. Mawe's Cabinet.]  
(b) Hinge of ditto.

**LUCINA.**—Shell suborbicular, inequilateral; beaks small, pointed, and oblique; two diverging cardinal teeth, one of which is bifid, and which vary or disappear with age; two lateral teeth, sometimes obsolete, the posterior approaches nearest to the cardinal teeth; two muscular impressions, very separate, the posterior extending in the shape of a band, sometimes very long. Ligament external.

Plate VI. Fig. 3. (a) *L. Jamaicensis*. (*Venus Jamaicensis*.—Chem.)  
(b) Inside of ditto.

**DONAX.**—Shell transverse, equivalve, inequilateral, the anterior side very short and very obtuse; two cardinal teeth, either in both valves, or in one only; one or two lateral teeth, more or less distant. Ligament external, short, inserted in the place of the lunula.

(a) *Internal margin entire, or nearly so.*

Plate VI. Fig. 4. (a) *D. cuneata*. (Idem.—Gmel.)  
(b) Inside of ditto.

(b) *Internal margin crenulated or toothed.*

Plate VI. Fig. 5. *D. trunculus*. (Idem.—Chem.)

## II. — HAVING NO LATERAL TEETH.

**CAPSA.**—Shell transverse, equivalve, close: hinge having two teeth in the right valve, and one entering bifid tooth in the other; no lateral teeth. Ligament external.

Plate VI. Fig. 6. (a) *C. lævigata*. (*Donax lævigata*.—Chem.)  
(b) Inside of ditto.

**CRASSINA.**—Shell suborbicular, transverse, equivalve, rather inequilateral, close: hinge with two strong diverging teeth in the right valve, and two very unequal teeth in the other. Ligament external, on the longest side.

Plate VI. Fig. 7. (a) *C. Danmoniensis*. (*Venus Danmoniensis*.—Montagu.)

## SECTION III.—CONCHIFERA LAMELLIPEDA.

THIS Section is divided into Five Families, viz. Conchæ, Cardiacea, Arcacea, Trigoniana, and Naiada.

## CONCHÆ.—7 GENERA.

*Three cardinal teeth at least in one valve, with as many, or less, in the other; sometimes with lateral teeth.*

THE Conchæ are divided into Fluviatiles and Marinæ.

## CONCHÆ FLUVIATILES.

CYCLAS.—Shell ovate-globose, transverse, equivalve, the beaks tumid; cardinal teeth very small, sometimes scarcely perceptible; occasionally two in each valve, one of them plaited in two; sometimes only one plaited or lobed tooth in one valve, and two in the other: lateral teeth transversely elongated, compressed, lamellar.—Ligament external.

Plate VI. Fig. 8. (a) *C. cornea*. (*Tellina cornea*.—Linn.)  
(b) Inside of ditto.

CYRENA.—Shell rounded, triangular, turgid or ventricose, inequilateral, solid, covered with an epidermis; the beaks eroded; hinge having three teeth in each valve; the lateral teeth are nearly always two in number; one of them often near the cardinal. Ligament external, inserted in the larger side.

(a) *Lateral teeth serrated or denticulated.*

Plate VI. Fig. 9. (a) *C. fluminea*. (*Tellina fluminea*.—Gmel.)

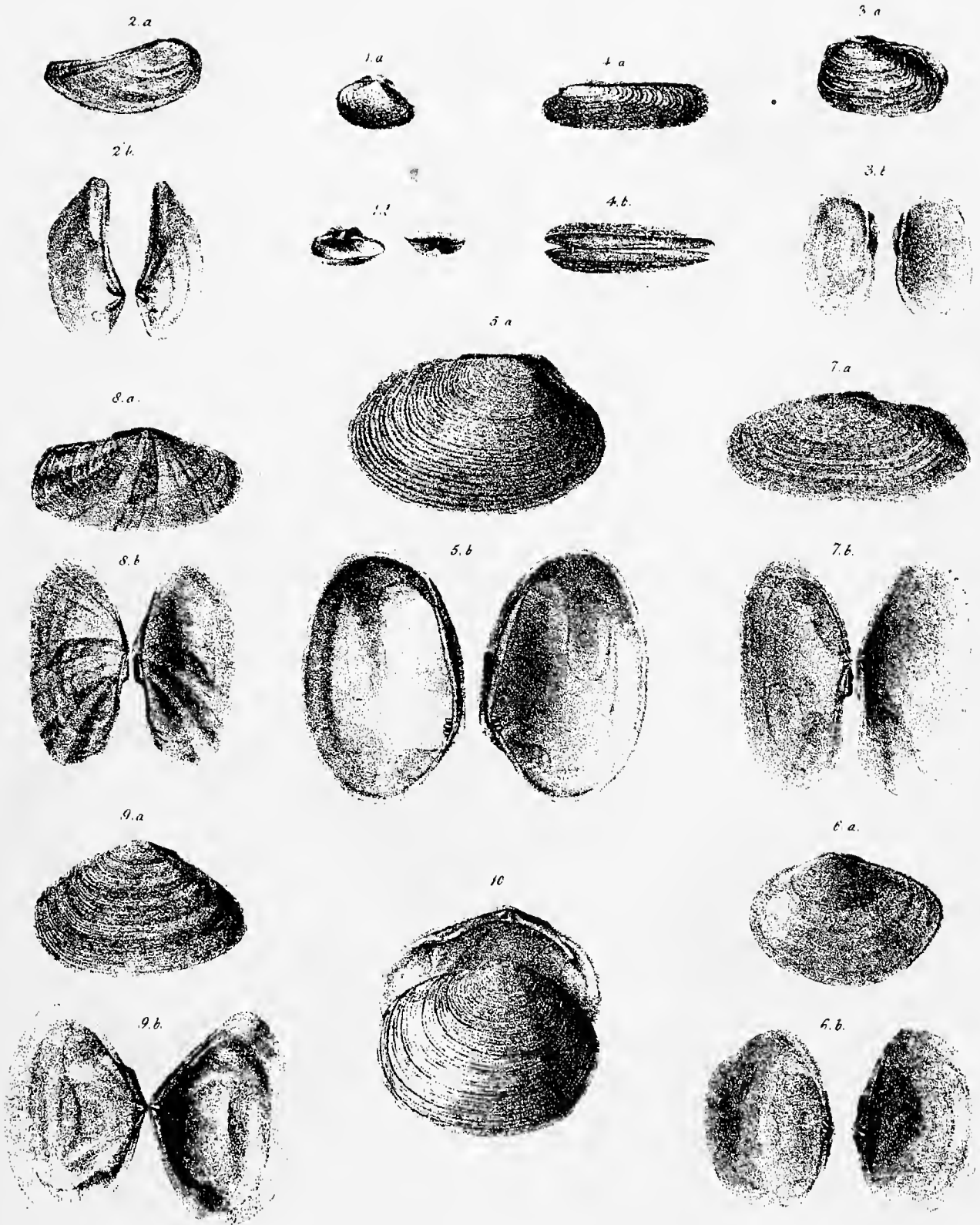
(b) *Lateral teeth entire.*

[I have not been able to procure a species belonging to this division, to make a drawing from.]

GALATHEA\*.—Shell equivalve, subtriangular, covered with a greenish epidermis: cardinal teeth sulcated; two in the right valve, approaching at their base; three in the other, the middle one advanced, and separate: lateral teeth distant. Ligament external, short, protruding, turgid; nymphæ prominent.

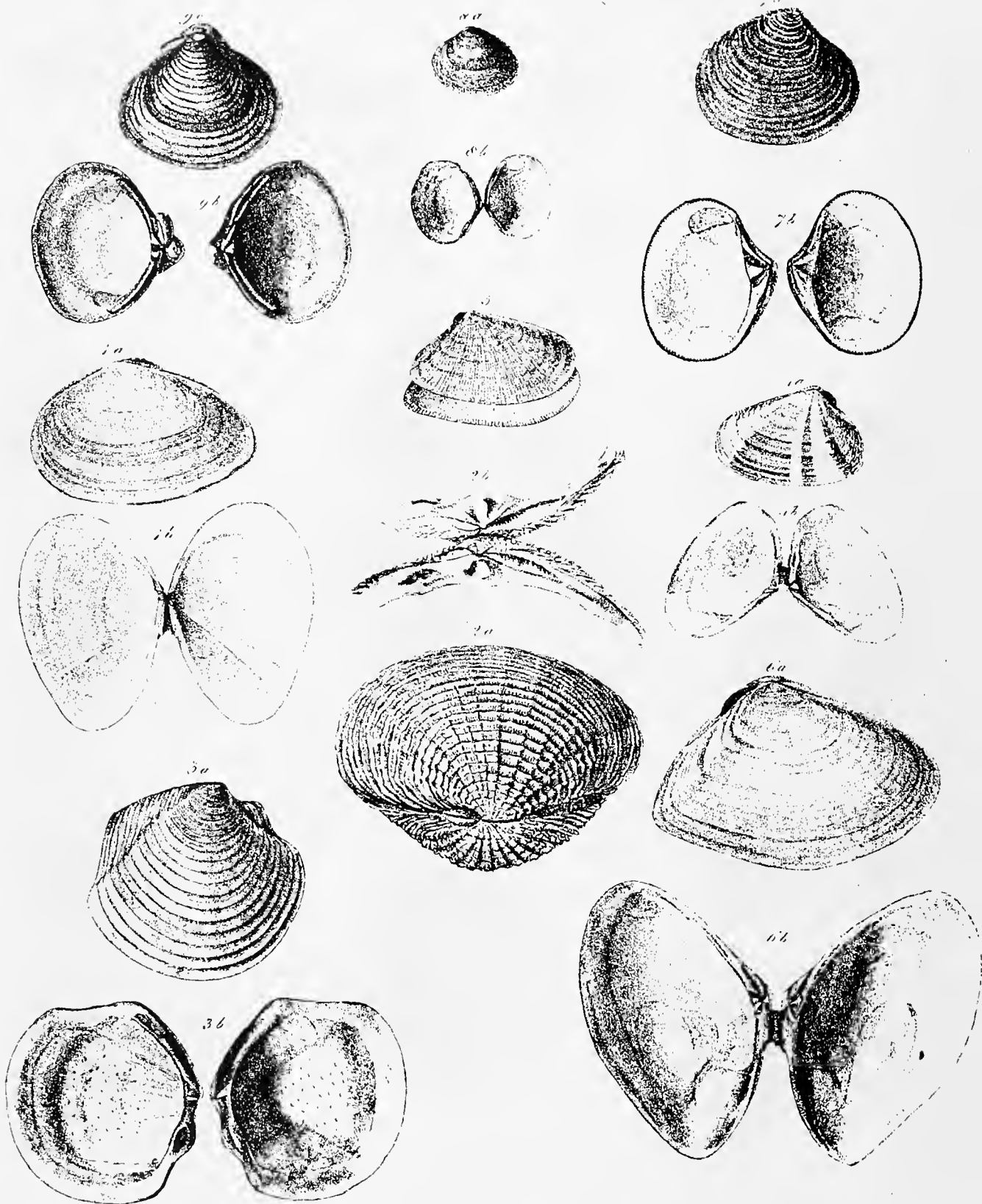
Plate VII. Fig. 1. (a) *G. radiata*. (*Venus subviridis*.—Gmel.) [Mr. G. B. Sowerby's Cabinet.]  
(b) Hinge of ditto.

\* Galathea having been appropriated to a genus of Crustacea, Bowdich has substituted Megadesma as a name for this genus.



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- Jeffreys, J.G. 1867-1869. **British Conchology.** Volumes 4 & 5 (Marine Shells). 487p., 4pls. & 259p., 8pls + 102 supplementary pls. + color frontispiece in each volume. Soft binding, badly waterstained and chipped but usable as a working copy. Previously owned by Stearns, Allyn G. Smith & Robert Talmadge. \$50.
- Johnsonia Vol. 1(1) - 5(50) (some reprint & photocopy). - \$250. Volume 1 (Reprint) - \$50 Volume 2 (Reprint) - \$50
- Jordan, D.S., B.W. Evermann & H.W. Clark. **Check list of the fishes and fishlike vertebrates of North and Middle America north of the northern boundary of Venezuela and Colombia.** Document (1055), U.S. Dept. Commerce, Bur. Fish., Rep. U.S. Comm. Fisheries ... 1928, 670 pages, cloth, 1930 2 cys. B001 & B002 - \$40. ea.
- Karpinsky, A.P. 1945. **Travaux scientifiques. I.** Acad. Sci. URSS, 521p., illus. + fold-outs and separate plates. Hardbound. In Russian. - \$55
- Keep, J. 1888. **West Coast Shells,** 1st ed. A familiar description of the marine, fresh water, and land mollusks of the United States, found west of the Rocky Mountains. Illustrated by L.M. Mellen. 230p., color frontis., 181 figs. cr8vo, original cloth with some wear. Inscribed "To H.W. Warren with kind regards of Josiah Keep. 1889." - \$80.



# SHELLS AND SEA LIFE

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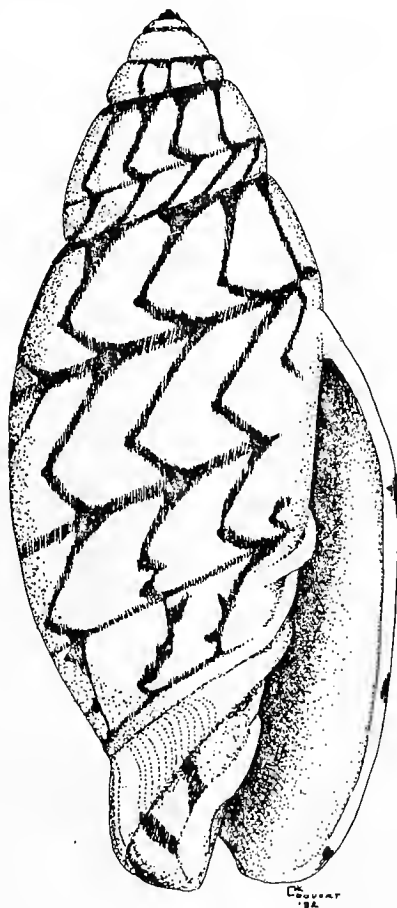
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This issue continues with the reprint of Edmund A. Crouch's illustrated introduction to Lamarck's Conchology. These pages along with a segment in August, will complete over half of this valuable reference. Starting with September, we will get back to more of our standard articles and news.

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## CONCHÆ MARINÆ.

*Mostly no lateral teeth; the whole shell frequently covered with an epidermis, except at the beaks.*

CYPRINA.—Shell equivalve, inequilateral, obliquely cordate; the beaks obliquely curved; three unequal cardinal teeth, approximating at their base, and diverging a little above: a lateral tooth distant from the hinge, placed on the anterior side, sometimes obsolete. The callosities of the nymphæ large, arched, terminated near the beaks by a pit. Ligament external, sunk in part under the beaks.

Plate VII. Fig. 2. (a) *C. Islandica*. (*Venus Islandica*.—Linn.)  
(b) Hinge of ditto.

CYTHEREA.—Shell equivalve, inequilateral, suborbicular, triangular, or transverse: four cardinal teeth in the right valve, three of which diverge and approximate at their base, and one quite insulated, situated under the lunula: three diverging cardinal teeth in the other valve, and a pit rather distant, parallel to the margin. No lateral teeth.

## I.—INTERNAL MARGIN OF THE VALVES VERY ENTIRE.

(a) *Anterior cardinal tooth having a striated canal or dentated border.*

Plate VII. Fig. 3. (a) *C. tripla*. (*Venus tripla*.—Chem.)  
(b) Hinge of ditto.

(b) *Anterior cardinal tooth without the striated canal or dentated border.*

Plate VII. Fig. 4. *C. picta*. (*Venus picta*.—Chem.)

## II.—INTERNAL MARGIN OF THE VALVES CRENATED OR DENTATED.

Plate VII. Fig 5\*. *C. meroe*. (*Venus meroe*.—Linn.)

VENUS.—Shell equivalve, inequilateral, transverse or suborbicular: three approximate cardinal teeth in each valve, the lateral ones diverging at the summit. Ligament external, covering the scutcheon.

## I.—INTERNAL MARGIN OF THE VALVES CRENATED OR DENTATED.

(a) *Shells with lamellar striæ.*

Plate VII. Fig. 6. (a) *V. verrucosa*. (*Idem*.—Linn.)  
(b) Hinge of ditto.

(b) *Shells without lamellar striæ.*

Plate VII. Fig 7. *V. flexuosa*. (*Idem*.—Gmel.)†

## II.—THE INTERNAL MARGIN OF THE VALVES VERY ENTIRE.

Plate VII. Fig. 8. *V. papilionacea*. (*V. rotundata*.—Gmel.)

\* This species is the *Donax meroe* of Lamarck; but, as it agrees in the hinge, and in other particulars, with the *Cytherea* genus, I have removed it to its present situation, where it forms, with a few others of a similar character, a very interesting group, which are distinguished by the remarkable cavity in which the ligament is situated, in addition to the crenated margin.

† Lamarck has named this species *Cytherea flexuosa*, but its hinge is decidedly that of a *Venus*.

VENERICARDIA.—Shell equivalve, inequilateral, suborbicular, mostly with longitudinal radiating ribs. Two oblique cardinal teeth, standing the same way.

Plate XXI. Fig. 2. *V. imbricata*.—Fossil. [Mr. G. B. Sowerby's Cabinet.]

### CARDIACEA.—5 GENERA.

*Cardinal teeth irregular, either in their form or in their situation; and in general accompanied by one or two lateral teeth.*

CARDIUM.—Shell equivalve, rather heart-shaped; the beaks prominent; the internal margins of the valves dentated or plaited: hinge with four teeth in each valve; the two cardinal approximate and oblique, articulating cross-wise with the two in the other valve; and two rather distant entering lateral teeth.

(1) *Shell with no particular angle on the beaks, and the anterior side at least as large as the posterior.*

Plate VIII. Fig. 1. (a) *C. rusticum*. (Idem.—Chem.) [Mrs. Mawe's Cabinet.]

(b) Hinge of ditto.

(2) *Shell with the beaks carinated, or having an angle, and the posterior side often larger than the anterior.*

Plate VIII. Fig. 2. *C. retusum*. (Idem.—Linn.)

CARDITA.—Shell free, regular, equivalve, inequilateral: hinge with two unequal teeth, one short, straight, situated under the beaks; the other oblique, marginal, and extending under the corselets.

(1) *Shell subcordate, or oval, more transverse than longitudinal.*

Plate VIII. Fig. 3. (a) *C. sulcata*. (Chama antiquata.—Linn.)

(b) Hinge of ditto.

(2) *Shells more longitudinal than transverse.*

Plate VIII. Fig. 4. *C. calyculata*. (Chama calyculata.—Linn.)

CYPRICARDIA.—Shell free, equivalve, inequilateral, obliquely or transversely elongated. Three cardinal teeth under the beaks, and one lateral tooth extending under the corselet.

Plate VIII. Fig. 5. (a) *C. Guinaica*. (Chama oblonga.—Linn.)

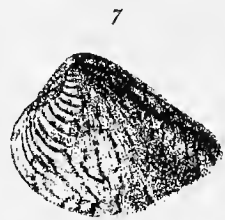
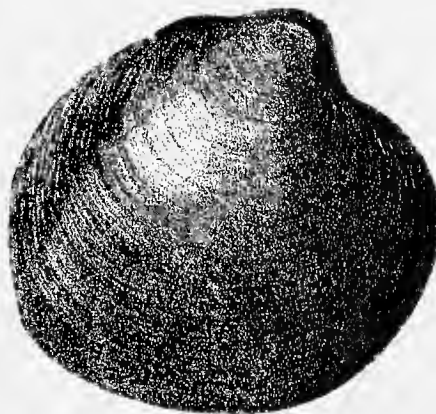
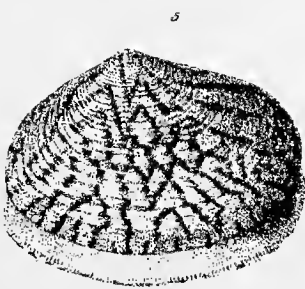
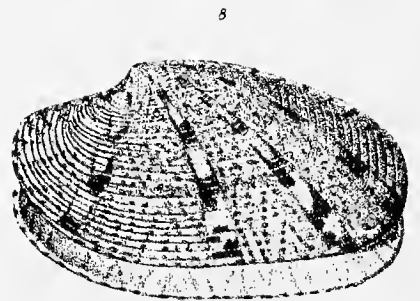
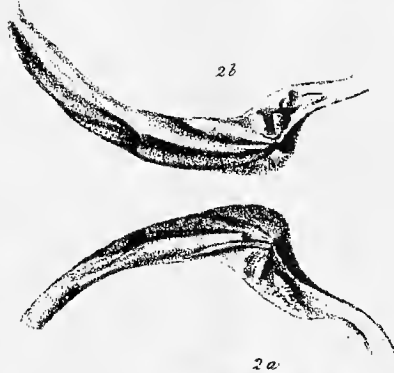
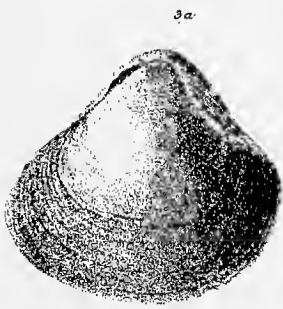
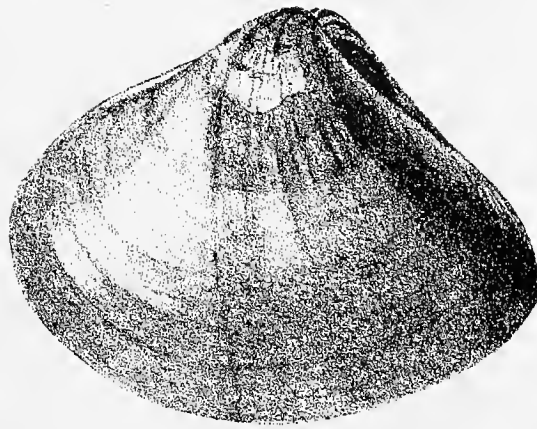
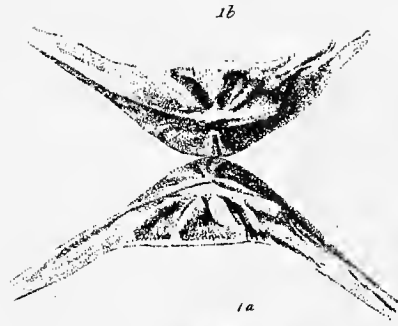
(b) Inside of ditto.

HIATELLA.—Shell equivalve, very inequilateral, transverse, gaping at the superior margin: hinge with one small tooth in the right valve, and two oblique teeth, a little larger, in the left valve. Ligament external.

Plate VIII. Fig. 6. (a) *H. arctica*. (Solen minutus; Mya arctica.—Linn.)

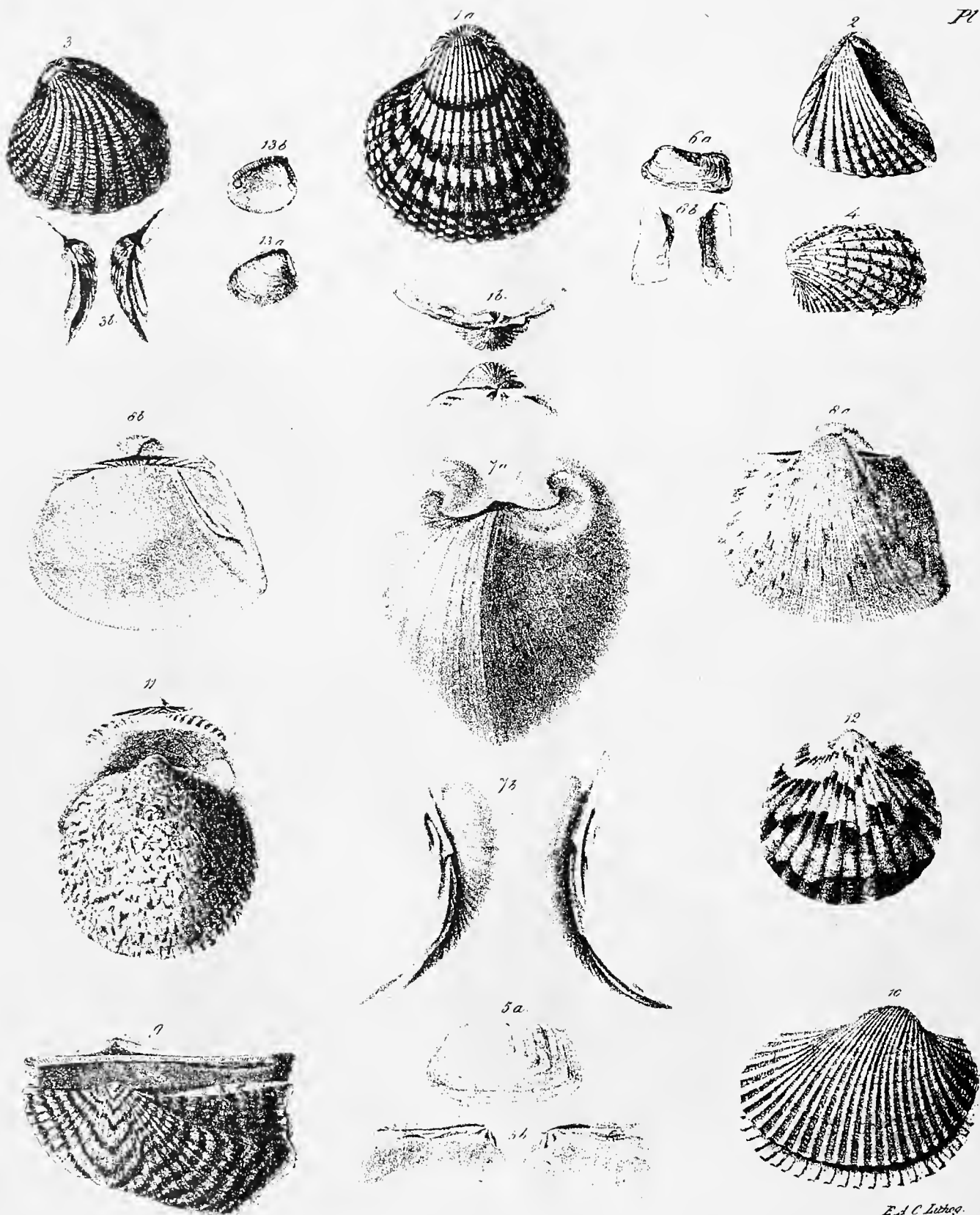
(b) Inside of ditto.

ISOCARDIA.—Shell equivalve, heart-shaped, ventricose, the beaks distant, diverging, spirally turned on one side: two flat, entering, cardinal teeth, one of them curved,



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and sunk under the beak; one elongated lateral tooth, situated under the corselet.  
Ligament external, forked on one side.

Plate VIII. Fig. 7. (a) I. cor. (Chama cor.—Linn.)

(b) Hinge of ditto.

#### ARCACEA.—4 GENERA.

*Cardinal teeth small, numerous, entering, and disposed in each valve, in a straight, arched, or broken line.*

CUCULLÆA.—Shell equivalve, inequilateral, trapeziform, ventricose; the beaks distant, separated by the facet of the ligament; the anterior muscular impression forming a projecting angular or auricular margin: hinge linear, straight, with small transverse teeth, and having, at the extremities, from two to five ribs parallel to it. — Ligament wholly external.

Plate VIII. Fig. 8. (a) C. auriculifera. (Arca cucullus.—Gmel.)

(b) Inside of ditto.

ARCA.—Shell transverse, subequivalve, inequilateral; the beaks distant, separated by the facet of the ligament: hinge in a straight line, without ribs at the extremities, and furnished with numerous serial and entering teeth. Ligament wholly external.

(1) *Shells with the superior margin not crenulated within.*

Plate VIII. Fig. 9. A. Noæ. (Idem.—Linn.)

(2) *Shells with the superior margin crenulated within.*

Plate VIII. Fig. 10. A. Indica (Idem.—Gmel.)

PECTUNCULUS.—Shell orbicular, almost lenticular, equivalve, subequilateral, close: hinge arched, furnished with numerous, serial, oblique, entering teeth; those in the middle obsolete, nearly obliterated. Ligament external.

(1) *Shells with distant longitudinal furrows, and often, besides, fine transverse or longitudinal striae.*

Plate VIII. Fig. 11. P. glycymeris. (Arca glycymeris.—Linn.)

(2) *Shells with prominent and radiating longitudinal ribs, with or without transverse striae.*

Plate VIII. Fig. 12. P. pectiniformis. (Arca pectunculus.—Linn.)

NUCULA.—Shell transverse, ovate-triangular or oblong, equivalve, inequilateral; no facet between the beaks: hinge linear, broken, many-toothed, interrupted in the middle by an obliquely extending spoon-shaped pit; the teeth numerous, often produced as in the pectines; the beaks contiguous, curved backwards. Ligament marginal, and partly internal, inserted in the pit or spoon of the hinge.

Plate VIII. Fig. 13. (a) N. margaritacea. (Arca nucleus.—Linn.)

(b) Inside of ditto.

#### TRIGONIANA.—2 GENERA.

*Cardinal teeth lamellar, transversely striated.*

TRIGONIA.—Shell equivalve, triangular, sometimes suborbicular; cardinal teeth oblong, laterally compressed, diverging, transversely furrowed; two in the right valve,

furrowed on each side, and four in the other, furrowed only on one side. Ligament external, marginal.

Plate IX. Fig. 1. *T. pectinata*.

**CASTALIA.**—Shell equivalve, inequilateral, triangular; the beaks eroded, recurved posteriorly: hinge with two lamellar teeth, transversely striated; the posterior one distant, shortened, subtrilamellar; the other anterior, elongated, lateral. Ligament external.

Plate IX. Fig. 2. (a) *C. ambigua*. [Mr. G. B. Sowerby's Cabinet.]  
(b) Inside of ditto.

#### NAIADA.—4 GENERA.

*Fresh water shells, the hinge of which is sometimes furnished with an irregular, simple, or divided cardinal tooth, and a longitudinal one, which extends under the corselet; and sometimes no tooth; or is furnished with irregular, granular tubercles, through its whole length. Muscular impression posterior, compound; the beaks decorticated, often eroded.*

**UNIO.**—Shell transverse, equivalve, inequilateral, free; beaks decorticate, almost eroded; muscular impression posterior, compound: hinge with two teeth in each valve; one cardinal, short, irregular, simple, or divided in two, substriated; the other elongated, compressed, lateral, prolonged under the corselet. Ligament external.

(a) *Cardinal tooth short, thick, not crested, and substriated.*

Plate IX. Fig. 3. *U. brevisalis*.

(b) *Cardinal tooth short, compressed, raised, and often crested.*

Plate IX. Fig. 4. (a) *U. pictorum*. (*Mya pictorum*.—Linn.)

(b) Hinge of ditto.

**HYRIA.**—Shell equivalve, obliquely triangular, eared; the base truncated and straight: hinge with two low teeth; the posterior or cardinal one divided into numerous diverging parts, of which the interior are the smallest; the other, anterior or lateral, very long, and lamellar. Ligament external, linear.

Plate IX. Fig. 5. (a) *H. avicularis*. (*Mya syrmatophora*.—Gmel.)

(b) Hinge of ditto

**ANODON.**—Shell equivalve, inequilateral, transverse: Hinge linear, without teeth; a smooth cardinal lamina, truncated, or forming a sinus at its anterior extremity, terminates the base of the shell. Two distant, lateral, subgeminal, muscular impressions. Ligament linear, external; its anterior extremity inserted in the sinus of the cardinal lamina.

(1) *Shells having no distinct angle at the posterior extremity of the cardinal line.*

Plate IX. Fig. 6. *A. cygnea*. (*Mytilus cygneus*.—Linn.)

(2) *Shells having an angle at the posterior extremity of the cardinal line.*

Plate IX. Fig. 7. *A. trapezialis*. [The late Earl of Tankerville's Cabinet.]

IRIDINA.—Shell inequivalve, inequilateral, transverse; the beaks small, reflected, almost straight; muscular impressions similar to the genus *Anodon*; hinge long, linear, attenuated about the middle, tuberculated throughout the whole length, almost crenated; the tubercles unequal, frequent. Ligament external, marginal.

Plate X. Fig. 1. *I. Nilotica*. (Zoological Journal, vol. i. pl. 2.) [Mr. G. B. Sowerby's Cabinet.]

### CHAMACEA.—3 GENERA.

*Shell inequivalve, irregular, fixed; hinge with one thick tooth, or without teeth: two separate and lateral muscular impressions.*

DICERAS.—Shell inequivalve, adhering; the beaks conical, very large, diverging, irregularly spiral; one large, thick, concave, subauricular, prominent tooth in the greater valve: two muscular impressions.

Plate XXI. Fig. 3. *D. arietina*.—Fossil. [Mr. J. D. C. Sowerby's Cabinet.]

CHAMA.—Shell irregular, inequivalve, fixed; the beaks curved and unequal: hinge with one thick, oblique, suberentate tooth, fitting in a pit in the opposite valve; two distant, lateral, muscular impressions. Ligament external, sunk.

(1) *Shells whose beaks turn from the left to the right.*

Plate X. Fig. 2. *C. Lazarus*. (Idem.—Linn.)

(2) *Shells whose beaks turn from the right to the left.*

Plate X. Fig. 3. *C. radians*.

ETHERIA.—Shell irregular, inequivalve, adhering; the beaks short, almost sunk in the base of the valves: hinge without teeth, rather sinuous, unequal; two distant, lateral, oblong muscular impressions. Ligament external, tortuous, partly penetrating the shell.

(1) *Shells having an oblong callosity in their base.*

Plate X. Fig. 4 (a), (b). *E. elliptica*. [British Museum.]

(2) *Shells without the callosity in their base.*

Plate X. Fig. 5. (a) Inside of *E. semilunata*. [Mr. J. D. C. Sowerby's Cabinet.]

(b) Outside of upper valve of ditto.

## ORDER II.—CONCHIFERA UNIMUSCULOSA.

SHELL presenting internally one muscular impression, nearly in the centre. This order is divided into Three Sections.

### SECTION I.

*Ligament marginal, elongated on the margin, sublinear.*

THIS section contains Three Families—Tridacnea, Mytilacea, and Mallacea.

#### TRIDACNEA.—2 GENERA.

*Shell transverse, equivalve, the muscular impression under the middle of the superior margin, and is prolonged to each side under it.*

TRIDACNA.—Shell regular, equivalve, inequilateral, transverse, gaping at the lunula: hinge with two compressed, unequal, anterior, entering teeth. Ligament marginal, external.

Plate X. Fig. 6. *T. squamosa*.

(a) Inside of ditto.

HIPPOPUS.—Shell equivalve, inequilateral, transverse; the lunula close: hinge with two compressed, unequal, anterior, and entering teeth. Ligament marginal, external.

Plate X. Fig. 7. *H. maculatus*. (*Chama hippopus*.—Linn.)

#### MYTILACEA.—3 GENERA.

*The ligament at the hinge subinternal, marginal, linear, very entire, occupying a great part of the anterior margin; rarely foliated.*

MODIOLA.—Shell subtransverse, equivalve, regular, the posterior side very short; beaks nearly lateral, depressed on the short side: hinge without teeth, lateral, linear.—Ligament cardinal, almost internal, situated in a marginal canal: one sublateral muscular impression, elongated, and axe-shaped.

Plate XI. Fig. 1. *M. tulipa*. (*Mytilus modiolus*.—Linn.)

MYTILUS.—Shell longitudinal, equivalve, regular, pointed at the base, fixed by a byssus; beaks almost straight, terminal, pointed: hinge lateral, mostly without teeth.—Ligament marginal, subinternal: one elongated, club-shaped, sublateral, muscular impression.

(1) *Shells with longitudinal furrows.*

Plate XI. Fig. 2. *M. erosus*.

(2) *Shells without longitudinal furrows.*

Plate XI. Fig. 3. *M. perna*.

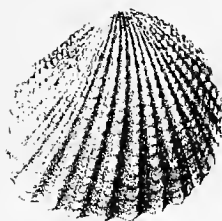
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4. a.



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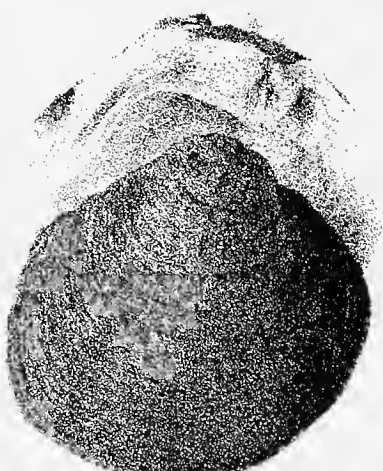
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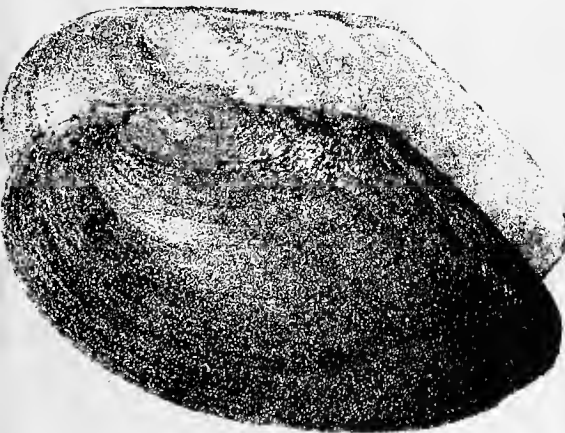
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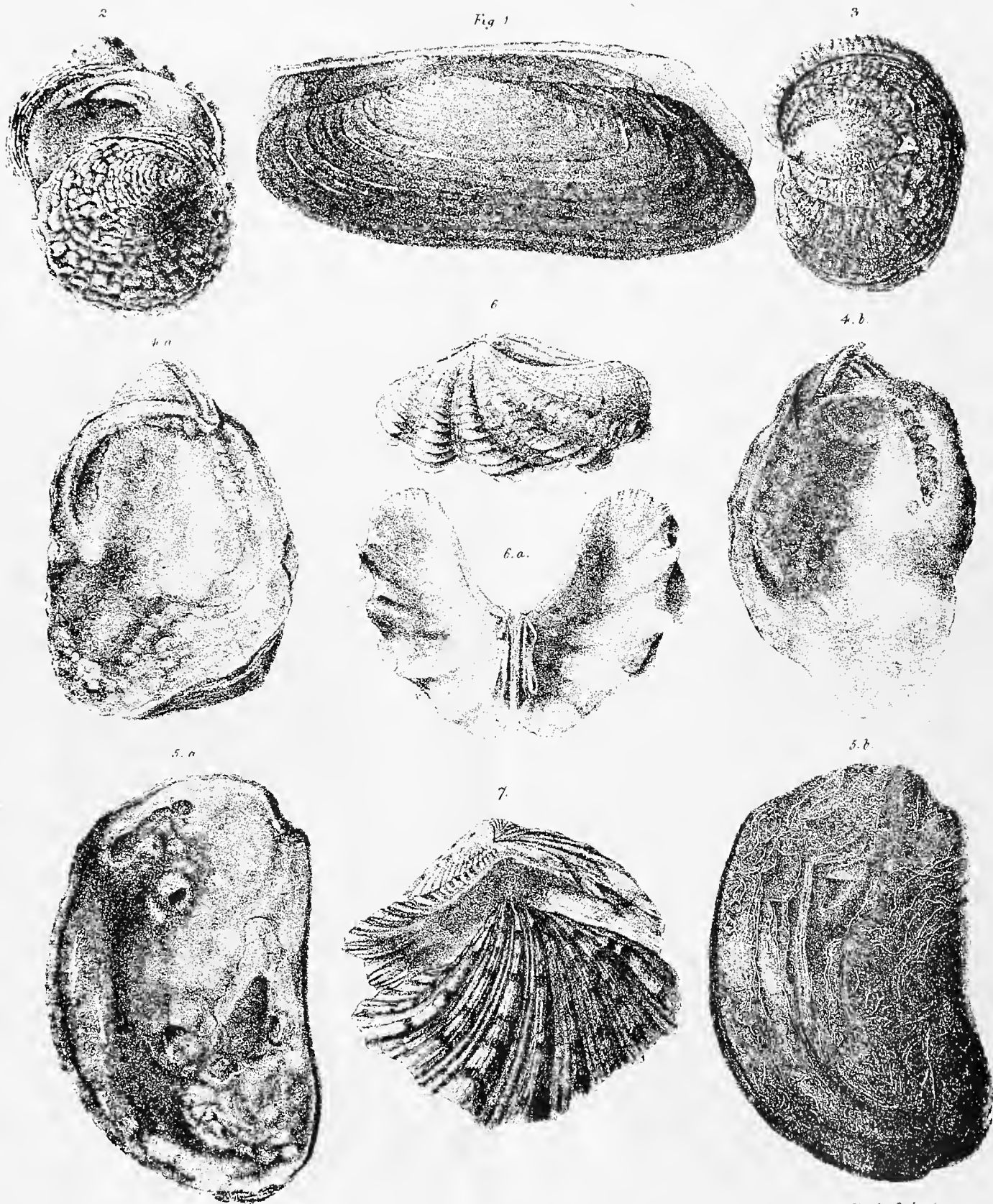
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7.



Fig. 1



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**PINNA.**—Shell longitudinal, wedge-shaped, equivalve, gaping at the summit, pointed at the base, the beaks straight: hinge lateral, without teeth. Ligament marginal, linear, very long, almost internal.

Plate XI. Fig. 4. *P. muricata*. (Idem.—Linn.)

# MALLACEA.—5 GENERA.

*Ligament marginal, sublinear, either interrupted by indentations or serial teeth, or wholly simple.*

*Shell subinequivalve, foliated.*

**CRENATULA.**—Shell subequivalve, flat, lamellated, rather irregular; no particular opening or pit for the byssus: hinge lateral, linear, marginal, indented; indentations serial, callous, hollowed into pits, which receive the ligament.

Plate XI. Fig. 3. *C. mytiloides*.

**PERNA.**—Shell subequivalve, flattened, rather deformed, texture lamellar: hinge linear, marginal; composed of furrow-like, transverse, parallel, non-entering teeth, between which the ligament is inserted. A posterior sinus, slightly gaping, situated at the extremity of the hinge for the passage of the byssus; sides callous.

Plate XI. Fig. 6. *P. ehippium*. (*Ostrea ehippium*.—Linn.)

**MALLEUS.**—Shell subequivalve, rude, deformed, mostly elongated, sublobate at the base; beaks small, diverging: hinge without teeth; an elongated conical pit situated under the beaks, traversing obliquely the facet of the ligament. Ligament partly external, short, inserted in the sloping facet of each valve.

Plate XI. Fig. 7. *M. albus*.

**AVICULA.**—Shell inequivalve, fragile, rather smooth; base transverse, straight; the extremities produced, the anterior caudiform or tail-like; a sinus in the left valve: hinge linear, unidentate; a cardinal tooth in each valve under the beaks. Facet of the ligament marginal, narrow, channelled, not traversed by the byssus.

Plate XI. Fig. 8. *A. crocea*.

**MELEAGRINA.**—Shell subequivalve, rotundate, nearly square, externally squamose; the inferior cardinal margin straight, not caudate anteriorly; a sinus at the posterior base of the valves for the passage of the byssus; the left valve being at this place narrow and channelled: hinge linear, without teeth. Facet of the ligament marginal, elongated, nearly external, dilated in the middle.

Plate XI. Fig. 9. *M. margaritiferus*. (*Mytilus margaritiferus*.—Linn.)



## SECTION II.

*Ligament not marginal, contracted into a short space under the beaks; always visible, and not forming a tendinous cord under the shell.*

THIS Section is divided into Two Families, viz. Pectinida and Ostracea.

## PECTINIDA.—7 GENERA.

*Ligament internal, or demi-internal. Shell in general regular, compact, not foliated.*

**PEDUM.**—Shell inequivalve, subauriculated, lower valve gaping; beaks unequal, distant: hinge without teeth. Ligament partly external, inserted in an elongated and channelled pit, formed in the lower side of the beaks. Lower valve notched near the posterior base.

Plate XII. Fig. 1. *P. spondyloideum*. (*Ostrea spondyloidea*.—Gmel.) [Mrs. Mawe's Cabinet.]

**LIMA.**—Shell longitudinal, subequivalve, auriculated, gaping slightly on one side between the valves; beaks distant; their internal facet inclined outwards: hinge without teeth. The cardinal pit partly external, receiving the ligament.

Plate XII. Fig. 2. *L. glacialis*. (*Ostrea glacialis*.—Gmel.)  
(a) Inside of ditto.

**PLAGIOSTOMA.**—Shell subequivalve, free, subauriculated, the cardinal base transverse, straight; beaks rather distant, their inner sides expanding into transverse, flattened, external facets, one straight, the other obliquely inclined: hinge without teeth; a conical cardinal pit situated below the beaks, partly internal, opening outwards, and receiving the ligament.

Plate XXI. Fig. 4. *P. spinosum*. [Mr. G. B. Sowerby's Cabinet.]

**PECTEN.**—Shell free, regular, inequivalve, auriculated; the lower margin transverse, straight; the beaks contiguous: hinge without teeth; a cardinal triangular pit, wholly internal, receiving the ligament.

(1) *Shells with ears equal, or nearly so.*

Plate XII. Fig. 3. *P. maximus*. (*Ostrea maxima*.—Linnæus.)

(2) *Shells with the ears unequal.*

Plate XII. Fig. 4. *P. varius*. (*Ostrea varia*.—Gmel.)

**PLICATULA.**—Shell inequivalve, not auriculated, attenuated towards the base, the superior margin rounded, subplcate; the beaks unequal, and without an external facet: hinge having two strong cardinal teeth in each valve; a pit between them, receiving the ligament, which is wholly internal.

Plate XII. Fig. 5. *P. ramosa*. (*Spondylus plicatus*.—Gmel.)

**SPONDYLUS.**—Shell inequivalve, adhering, auriculated, echinated or rough; the beaks unequal, the lower valve having an external, flattened, cardinal facet, divided by a channel which lengthens with age: hinge having two strong teeth in each valve, and an intermediate pit for the ligament, communicating by the base with

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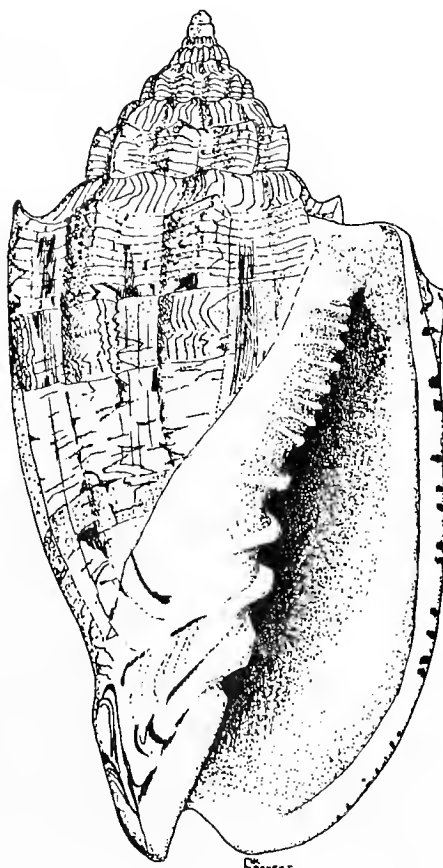
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Sally is due back in Bayside around the middle of August and we should get the September issue together in time to mail on the first of the month. I have been keeping up with most of the book orders. My apologies for any delays.

We need information from all clubs and dealers for the update to the **SEA LIFE DIRECTORY**. We expect to print in mid-September and mail before the end of September. Please have any corrections or additions to us as early in September as possible so they may be included. Display advertising is available for \$10 per square inch with a minimum ad size of 3 square inches. At least 15,000 copies of the directory will be distributed throughout the world. Donations to help defray printing and mailing costs are welcome. Quantity orders are available for a donation to cover printing and mailing costs. Please contact us prior to September 15th, 1986.

This issue continues with the reprint of Edmund A. Crouch's illustrated introduction to Lamarck's Conchology. Starting with September, we will get back to more of our standard articles and news.

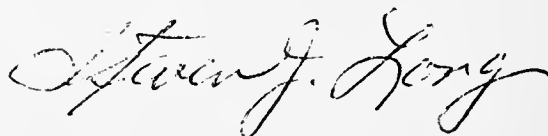
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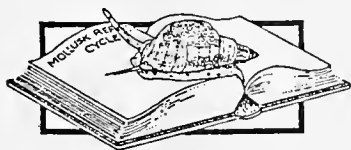
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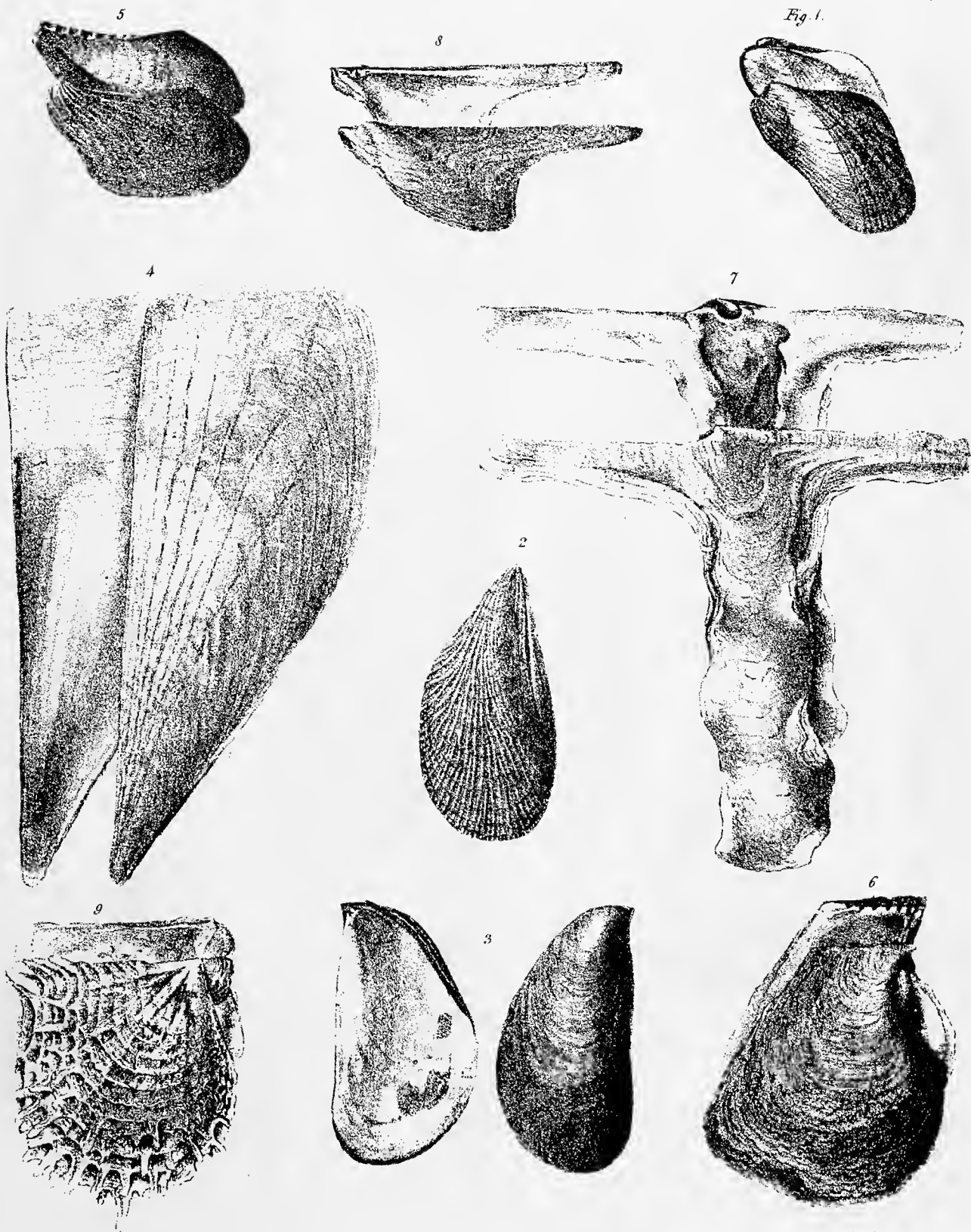
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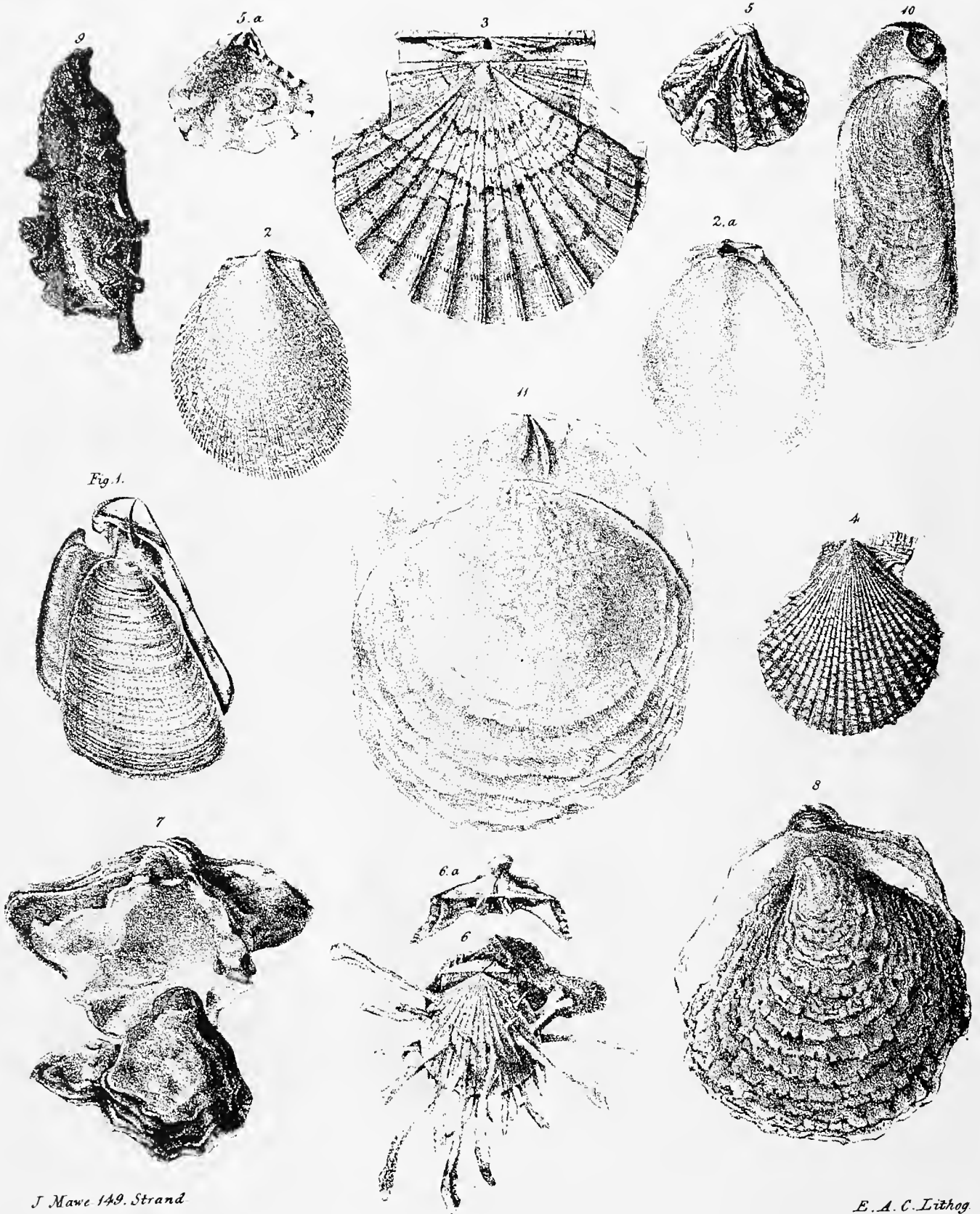
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Fig. 1.



E. A. C. Lithog.







the external channel. Ligament internal; the remains of former ligaments are seen outside in the channel.

Plate XII. Fig. 6. *S. gæderopus*. (Idem.—Linn.)

**PODOPSIS.**—Shell inequivalve, subregular, adhering by the inferior beak, not auriculated, the lower valve largest, most convex, and the beak most produced: hinge without teeth. Ligament internal.

Plate XXI. Fig. 5. *P. truncata*. Fossil. [Icon.—Encyc. Method. Pl. 188. Fig. 6.]

## OSTRACEA.—5 GENERA.

*Ligament internal, or demi-internal. Shell irregular, foliated, sometimes very thin.*

THIS Family is separated into Two Divisions.

(a) *Ligament demi-internal. Shell foliated, and often very thick.*

**GRYPHÆA.**—Shell free, inequivalve, the lower valve large, concave, terminated by a projecting involute beak, the upper valve small, flat, and opercular: hinge without teeth; an oblong, arched cardinal pit; only one muscular impression in each valve.

Plate XII. Fig. 7. *G. angulata*.

**OSTREA.**—Shell adhering, inequivalve, irregular; beaks distant, becoming very unequal by age, and the upper valve gradually removed during the life of the animal: hinge without teeth. Ligament demi-internal, inserted in the cardinal pit of the valves; the pit of the lower valve increasing by age, sometimes to a great length.

(1) *Margin of the valves simple or wavy, not plicate.*

Plate XII. Fig. 8. *O. edulis*. (Idem.—Linn.)

(2) *Margin of the shells distinctly plaited.*

Plate XII. Fig. 9. *O. folium*. (Idem.—Linn.)

**VULSELLA.**—Shell longitudinal, subequivalve, irregular, free; the beaks equal: hinge with a prominent callosity in each valve, depressed above, shewing an impression of a conical and obliquely arched pit for the ligament.

Plate XII. Fig. 10. *V. lingulata*. (*Mya vulsella*.—Linn.)

(b) *Ligament internal. Shell thin, papyraceous.*

**PLACUNA.**—Shell free, irregular, flat, subequivalve: hinge internal, having two sharp longitudinal ribs in one valve, approximate at their base, and diverging in form of a V; and, in the other valve, two impressions which correspond with the cardinal ribs; to which is attached the ligament.

Plate XII. Fig. 11. *P. placenta*. (*Anomia placenta*.—Linn.)

**ANOMIA.**—Shell inequivalve, irregular, operculated, adhering by the operculum: lower valve perforated, generally flattened, having a hole or channel at the beak; the other valve rather larger, concave, entire. Operculum small, elliptical, osseous, fixed to marine substances.

Plate XIII. Fig. 1. *A. ephippium*. (Idem.—Linn.)

(a) Operculum of ditto.

## SECTION III.

*Either no ligament, or none known; or represented by a tendinous cord, which supports the shell.*

THIS Section contains Two Families—Rudista, and Brachiopoda.

## RUDISTA.—6 GENERA.

*Ligament, hinge, and animal unknown; shell very inequivalve. No distinct beaks.*

**SPHÆRULITES.**—Shell inequivalve, orbicular-globose, rather depressed above, echinated externally with large, subangular, horizontal scales; upper valve smallest, rather flat, opercular; the internal surface furnished with two unequal, subconical, curved, and prominent tuberosities; lower valve largest, rather ventricose, the external margin radiated with scales; cavity obliquely conical, and forming on one side, by the folding of the internal margin, a crest, or projecting keel: internal side of the cavity transversely striated. Hinge unknown.

Plate XXI. Fig. 6. *S. foliacea*. Fossil. [Icon.—Encyc. Method. pl. 172. fig. 7.]

**RADIOLITES.**—Shell inequivalve, externally striated; the striæ longitudinal, radiating: lower valve turbinated, and largest; the upper, convex or depressed conical, opercular. Hinge unknown.

Plate XXI. Fig. 7. *R. turbinata*. [British Museum.]

**CALCEOLA.**—Shell inequivalve, triangular, turbinated, flattened beneath; the larger valve hollowed or hood-shaped, obliquely truncated at the aperture; the cardinal margin straight, transverse, a small notch or indentation in the middle; the superior margin arched: the small valve flat, semi-orbicular, opercular, having a tubercle on each side of the cardinal margin, and, in the middle, a pit with a small lamina.

Plate XXI. Fig. 8. *C. sandalina*. [Mr. J. D. C. Sowerby's Cabinet.]

**BIROSTRITES.**—Shell inequivalve, bicornute, the disk of the valves elevated conically, unequal, obliquely diverging, nearly straight, horn-shaped, the one enveloping the other at the base.

Plate XXI. Fig. 9. *B. inæquiloba*. [Mr. J. D. C. Sowerby's Cabinet.]

**DISCINA.**—Shell inequivalve, oval-rotundate, rather depressed, valves nearly equal, each having an orbicular disk in the centre, very distinct; disk in the upper valve not perforated, with a mammillated protuberance in the middle; that in the other valve very white, divided by a small transverse slit.

Plate XIII. Fig. 2. *D. Norvegica*. (*Orbicula Norvegica*.—Sowerby's Genera.) [Mr. G. B. Sowerby's Cabinet.]  
(a) Lower valve of ditto.  
(b) Upper valve of ditto.

**CRANIA.**—Shell inequivalve, suborbicular, lower valve almost flat, perforated in the internal surface by three unequal and oblique holes; the upper valve very convex, furnished interiorly with two prominent callosities.

Plate XIII. Fig. 3. *C. personata*. (*Anomia craniolaris*.—Linn.)  
(a) Lower valve of ditto.  
(b) Upper valve of ditto.

## BRACHIOPODA.—3 GENERA.

*Shell bivalve, adhering to marine bodies, either directly or by a tendinous cord.*

**ORBICULA.**—Shell suborbicular, inequivalve; without any apparent hinge: lower valve very thin, flat, adhering to marine substances; the upper valve subconical, the summit more or less elevated.

[I have not been able to meet with any shell agreeing with the above description.]

**TEREBRATULA.**—Shell inequivalve, regular, subtriangular, attached to marine bodies by a short tendinous pedicle; the beak of the larger valve produced, often curved, perforated at the summit by a round hole, or by a notch: hinge with two teeth; two nearly osseous, slender, elevated, forked, variously ramified branches rise from the disk of the small valve, and serve as a support to the animal.

(1) *Shell smooth, without longitudinal striæ or furrows.*

Plate XIII. Fig. 5. *T. vitrea.* (*Anomia vitrea.*—Gmel.)

(2) *Shell striated longitudinally.*

Plate XIII. Fig. 4. *T. psittacea.* (*Anomia psittacea.*—Gmel.)

**LINGULA.**—Shell subequivalve, flattened, ovate-oblong, truncated at the summit, rather pointed at the base, elevated on a fleshy tendinous pedicle, fixed to marine bodies: hinge without teeth.

Plate XIII. Fig. 6. *L. anatina.* (*Patella unguis.*—Linn.)

(a) Inside of ditto.



## Twelfth Class.

### M O L L U S C A.

*Body sometimes naked, either destitute of any solid internal parts, or inclosing a shell or other hard substance, and sometimes provided externally with a shell covering or sheathing, but is never composed of two opposite valves united by a hinge.*

**T**HIS Class is divided into Five Orders, viz. Pteropoda, Gasteropoda, Trachelipoda, Cephalopoda, and Heteropoda.

#### ORDER I.

##### PTEROPODA. — 6 GENERA.

*Some only are furnished with a thin, cartilaginous or corneous shell.*

**HYALÆA.**—Shell corneous, transparent, ovate-globose; tridentated posteriorly; open at the summit, and at the two posterior sides.

Plate XIII. Fig. 7. *H. tridentata*. (*Monoculus telemus?*—Linn.)

**CLIO.**—This genus has no shell.

**CLEODORA.**—Shell gelatinous, cartilaginous, transparent, in shape of a reversed pyramid, or lanceolate, truncated and open at the summit.

Plate XIII. Fig. 8. *C. pyramidata*. (*Clio pyramidata*.—Linn.)

**LIMACINA.**—Shell thin, fragile, papyraceous, spiral; the whorls re-united in a discoidal manner, like the *Planorbis*.

Plate XIII. Fig. 9. (*a*) *L. helicalis*. (*Clio helicina*.—Gmel.) [British Museum.]

**CYMBULIA.**—Shell gelatinous, cartilaginous, very transparent, crystalline, oblong, in shape of a shoe, truncated at the summit; aperture lateral and anterior.

Plate XIII. Fig. 10. *C. Peronii*. [Icon. Encyc. Method. pl. 464. fig. 4 b.]

**PNEUMODERMON.**—This genus has no shell.

## ORDER II.—GASTEROPODA.

*Some are naked, others have a dorsal shell, not enveloping: again, others have a shell more or less hidden in their mantle.*

THIS Order is divided into two Sections—Hydrobranchiæ and Pneumobranchiæ.

### SECTION I.—HYDROBRANCHIÆ.

CONTAINS Six Families, viz. Tritoniana, Phyllidiana, Semi Phyllidiana, Calyptraciana, Bullæana, and Aplysiana.

#### TRITONIANA.—6 GENERA.

*Without shells, either external or internal.*

GLAUCUS.—No shell.

EOLIS.—Ditto.

TRITONIA.—Ditto.

SCYLLÆA.—Ditto.

TETHYS.—Ditto.

DORIS.—Ditto.

#### PHYLLIDIANA.—4 GENERA.

*Some are without shells, either internal or external: others are wholly or partly covered by a shell, sometimes composed of one single piece, sometimes of a range of moveable and distinct pieces.*

PHYLLIDIA.—Has no shell.

CHITONELLUS.—Body elongated, rather narrow, like a caterpillar, the middle of the back furnished with a multivalve shell; valves alternate, mostly longitudinal; they are nearly connected by their extremities.

Plate XIII. Fig. 11. *C. striatus*. [Mrs. Mawe's Cabinet.]

CHITON.—Body oval-oblong, convex, rounded at the extremities; bordered all round by a coriaceous skin; partly covered by a longitudinal series of testaceous, imbricated, transverse, moveable pieces, set in the borders of the mantle.

Plate XIII. Fig. 12. *C. Magellanicus*. (Idem.—Gmel.)

PATELLA.—Shell univalve, not spiral, covering the animal, shield-like, or retuse-conical; concave and simple below, without any fissure on the margin; the summit entire, and inclined anteriorly.

Plate XIII. Fig. 13. *P. miniata*. (*P. sanguinolenta*.—Gmel.)

(a) Inside of ditto

#### SEMI-PHYLLIDIANA.—2 GENERA.

PLEUROBRANCHUS.—Shell internal, dorsal, thin, flattened, often oblique-oval.

Plate XIII. Fig. 14, 14 (a). *P. plumula*. (*Bulla plumula*.—Montagu.)

E

UMBRELLA.—Shell external, orbicular, sub-irregular, nearly flat, slightly convex above, white, with a small apex near the middle; margin acute, internal surface rather concave, having a callous disk, coloured, depressed in the centre, surrounded by a smooth border.

Plate XIII. Fig. 15, 16. *U. Indica*. (*Patella umbellata*.—Gmel.)

### CALYPTRACIANA.—7 GENERA.

*Shell always external, covering the animal.*

PARMOPHORUS.—Shell oblong, subparallelipipedal, slightly convex above, obtuse at the extremities, anteriorly channelled by a slight sinus, and having, towards the posterior part, a small pointed apex, inclined backwards; the lower surface slightly concave.

Plate XIV. Fig. 1. *P. australis*. (*Patella ambigua*.—Chem.)  
(a) Under side of ditto.

EMARGINULA.—Shell shield-like, conical; summit inclined; the cavity simple, having a notch or hollow cut on its posterior margin.

Plate XIV. Fig. 2. *E. rubra*.

FISSURELLA.—Shell shield-like or depressed conical, concave below, perforated at the summit; without any spire; the perforation oval or oblong.

Plate XIV. Fig. 3. *F. pustula*. (*Patella pustula*.—Chem.)

PILEOPSIS.—Shell univalve, obliquely conical, anteriorly recurved; apex bent, almost spiral; aperture rounded-elliptical; the anterior margin shortest, acute, slightly sinuated, the posterior largest and rounded: one elongated, arched, transverse muscular impression, situated under the posterior margin.

Plate XIV. Fig. 4. *P. ungarica*. (*Patella ungarica*.—Linn.)

CALYPTRÆA.—Shell conoidal, summit vertical, imperforate, subacute; base orbicular: the cavity furnished with a convolute lamina, or a spiral diaphragm.

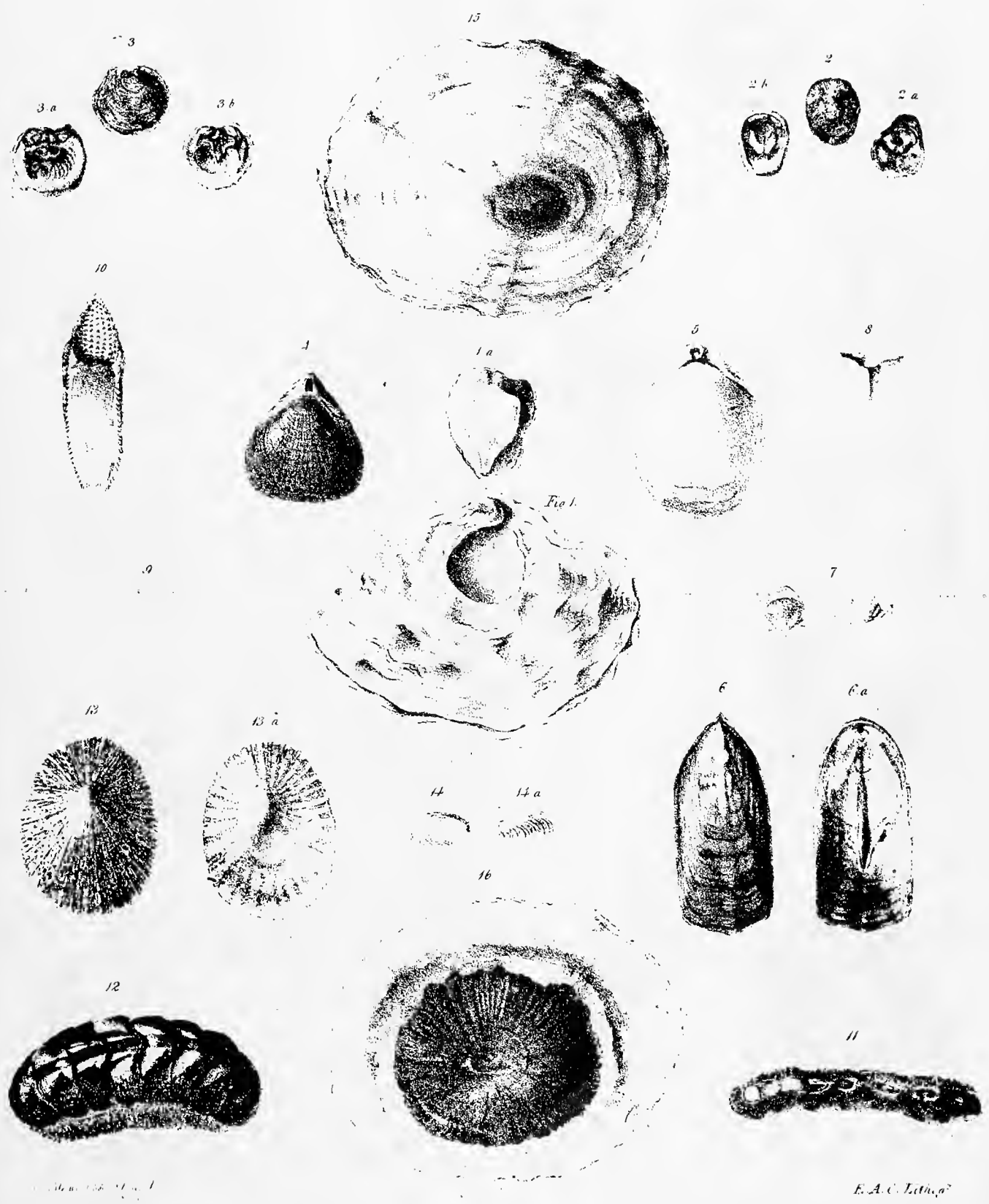
Plate XIV. Fig. 5. *C. equestris*. (*Patella equestris*.—Linn.)  
(a) Under side of ditto.

CREPIDULA.—Shell ovate or oblong; the back almost always convex; concave underneath; the spire very much inclined towards the margin: the aperture partly closed by a horizontal lamina.

Plate XIV. Fig. 6 (a). *C. fornicata*. (Idem.—Linn.)  
(b). Under side of ditto.

ANCYLUS.—Shell thin, obliquely conical, the summit pointed, inclined backwards; aperture oval; the margin very simple.

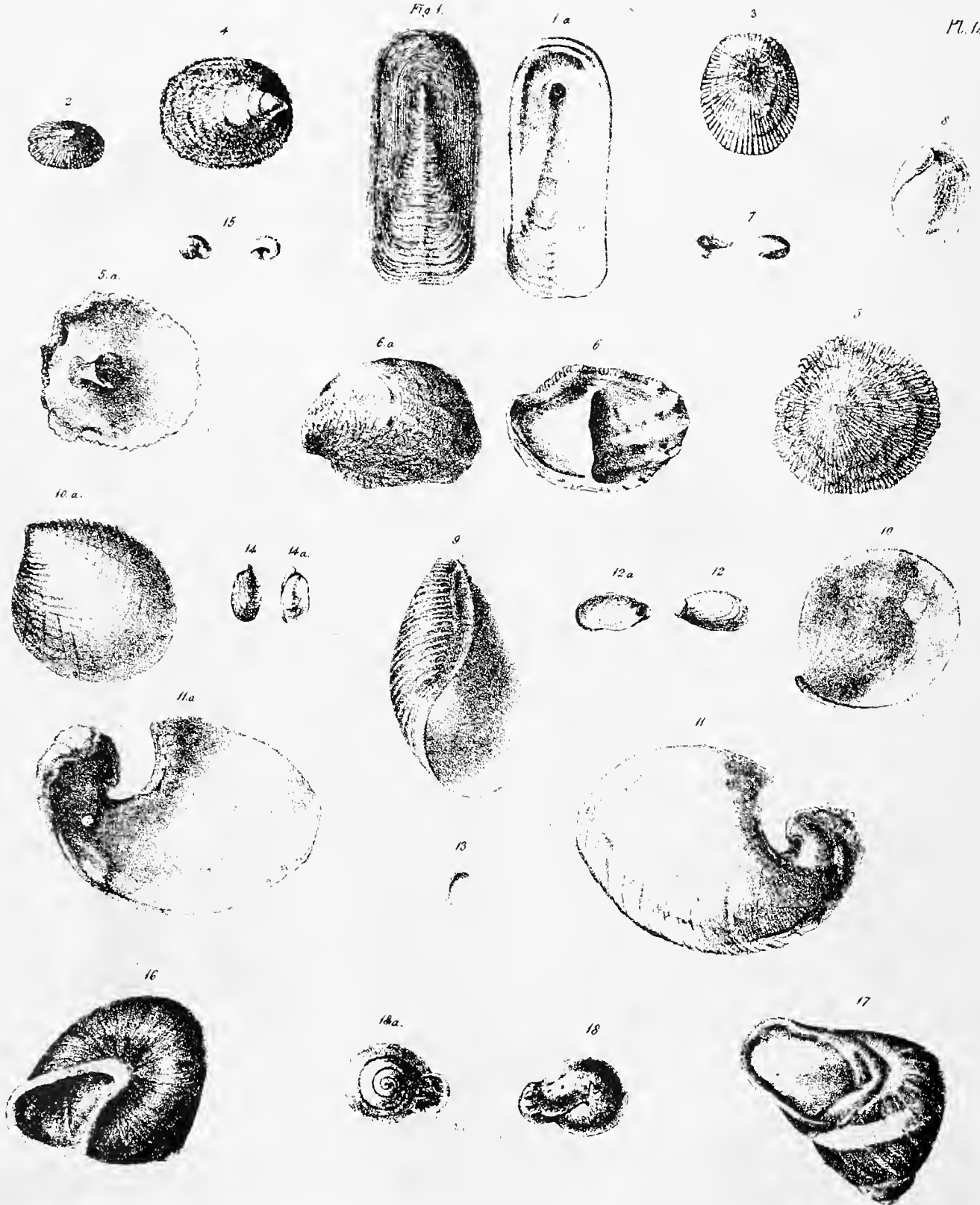
Plate XIV. Fig. 7. *A. fluviatilis*. (*Patella fluviatilis*.—Gmel.)



E. A. C. Lathrop



Fig. 1.



*J. Mawby & Co. Lith. Paris*

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## BULLÆANA.—3 GENERA.

ACERA.—This genus has no shell.

BULLÆA.—Shell very thin, partially rolled and spiral on one side, without columella, and without spire; the aperture very large, dilated at the upper part.

Plate XIV. Fig. 8. *B. aperta*. (*Bulla aperta*.—Linn.)

BULLA.—Shell univalve, ovate-globular, convolute, no columella, spire not projecting: aperture the whole length of the shell; external margin sharp.

Plate XIV. Fig. 9. *B. lignaria*. (*Idem*.—Linn.)

## APLYSIANA.—2 GENERA.

APLYSIA.—Shield dorsal, semicircular, subcartilaginous.

Plate XIV. Fig. 10. *A. radiata*.

(a) Outside of ditto.

DOLABELLA.—Shell oblong, slightly arched, hatchet-shaped, contracted, heavy, callous, almost spiral on one side, and larger, flatter, and thinner, on the other.

Plate XIV. Fig. 11. *D. Rumphii*. (*Bulla dubia*.)

(a) Under side of ditto.

## SECTION II.—PNEUMOBANCHIÆ.

THIS Section contains only One Family, viz. *Limaciana*.

## LIMACIANA.—5 GENERA.

ONCHIDIUM.—This genus has no shell.

PARMACELLA.—Lamarck has given a description of the animal of this genus, but only mentions that the scutcheon contains a shell, without describing it.

Plate XIV. Fig. 12. *P. calyculata*. (Sowerby's Genera.) [Mr. H. Stutchbury's Cabinet.]

(a) Under side of ditto.

LIMAX.—Lamarck merely mentions that the animal is “furnished with a coriaceous sub-rugose shield.

Plate XIV. Fig. 13. *L. rufus*. [British Museum.]

TESTACELLA.—Shell very small, external, rather ear-shaped, slightly spiral at its summit; the aperture very large, oval, obliquely dilated; the left margin involute.

Plate XIV. Fig. 14. *T. haliotide*. [Mrs. Mawe's Cabinet.]

(a) Under side of ditto.

VITRINA.—Shell small, very thin, depressed, terminated above by a very short spire, the last whorl very large: Aperture large, rounded-oval; the left margin arched, slightly involute.

Plate XIV. Fig. 15. *V. pellucida*.

## ORDER III. — TRACHELIPODA.

THE shells of this Order are spirivalve, ensheathing. It is separated into Two Sections, viz. Phytiphaga and Zoophaga.

## SECTION I. — TRACHELIPODA PHYTIPHAGA.

*Aperture of the shell entire; base without any ascending dorsal notch or canal.*

THIS Section contains Ten Families, viz. Colimacea, Lymnæana, Melaniana, Peristomiana, Neritacea, Janthinea, Macrostromiana, Plicacea, Scalariana, and Turbinacea.

## COLIMACEA.—11 GENERA.

*Shell spirivalve, with no other projecting parts on the exterior than the striæ of growth; the right margin of the aperture is often recurved or reflected outwards.*

**HELIX.**—Shell orbicular, convex, or conoidal; sometimes globular, the spire rather elevated: aperture entire, transverse, very oblique, contiguous to the axis of the shell; the margins disunited by the projection of the penultimate whorl.

Plate XIV. Fig. 17. *H. hæmastoma*. (Idem.—Linn.)

**CAROCOLLA.**—Shell orbicular, more or less convex or conoidal above; the circumference or periphery angulated or keeled: aperture transverse, contiguous to the axis of the shell; the right margin or lip subangular, often toothed or plaited beneath.

Plate XIV. Fig. 16. *C. albilabris*. (*Helix carocolla*.—Linn.)

**ANOSTOMA.**—Shell orbicular, the spire convex and obtuse: aperture round, toothed within, grinning or showing the teeth, turned upwards to the side of the spire; the margin of the lip reflected.

Plate XIV. Fig. 18, 18 (a). *A. globulosa*. [Mrs. Mawe's Cabinet.]

**HELICINA.**—Shell subglobular, imperforate: aperture entire, demi-oval. Columella callos, transverse, rather flat, margin acute, forming an angle at the lower base of the right lip: operculum corneous.

Plate XV. Fig. 1. *H. major*. [Gray, in Zool. Jour. Vol. I. p. 251.]

**PUPA.**—Shell cylindrical, generally thick: aperture irregular, demi-oval, the lower part rounded and subangular; the margins nearly equal, reflected outwards, disunited at the upper part by an interposed columella lamina, always affixed.

Plate XV. Fig. 2. *P. mumia*.

**CLAUSILIA.**—Shell mostly fusiform, slender, the summit rather obtuse: aperture irregular, rounded-oval; the margins united throughout, free, reflected outwards.

Plate XV. Fig. 3. *C. torticollis*.

**BULIMUS.**—Shell oval, oblong, or turreted; aperture entire, longitudinal; the margins very unequal, disunited at the upper part. Columella straight, smooth, the base entire, not channelled.

Plate XV. Fig. 4. *B. citrinus*. (*Helix perversa*, Variety *b*.—Linn.) [Mrs. Mawe's Cabinet.]

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# SHELLS AND SEA LIFE

A MONTHLY PUBLICATION ON MOLLUSKS AND MARINE LIFE

ISSN 0747-6078

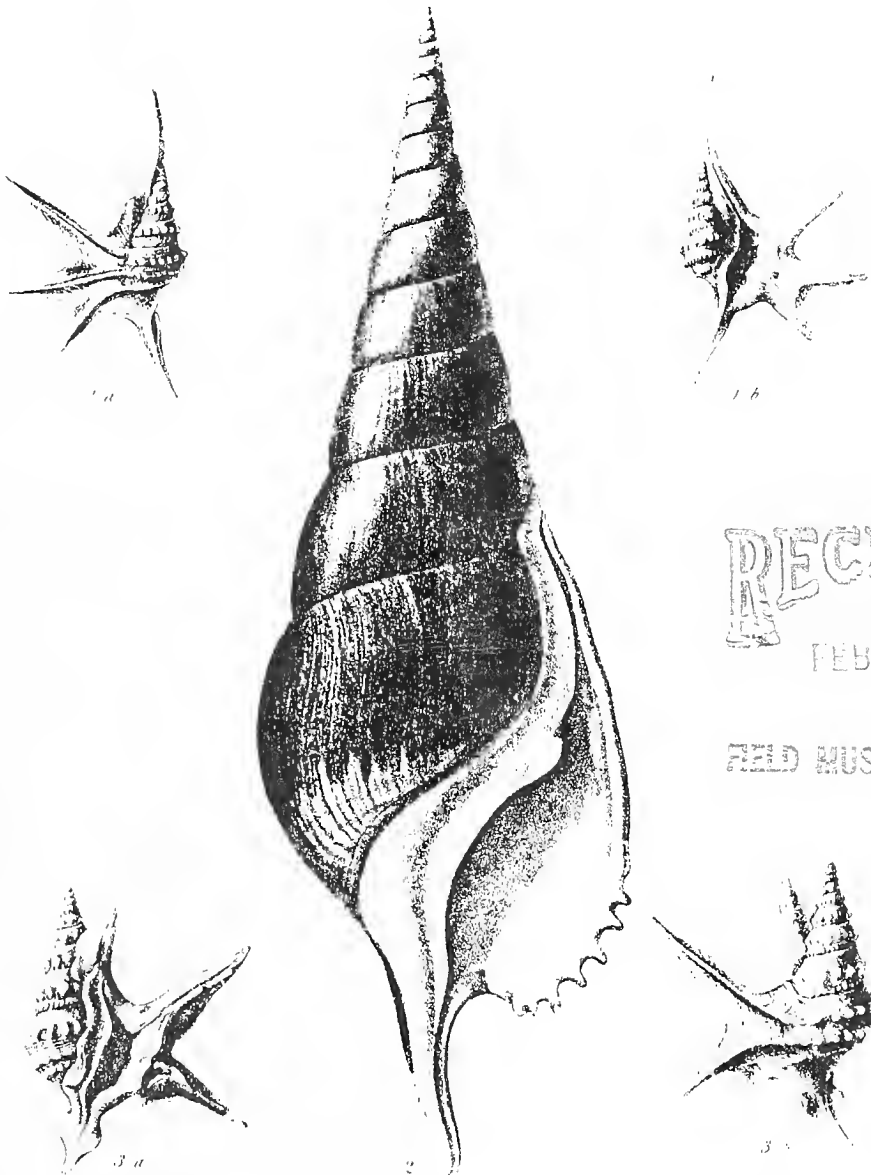
September, 1986

Vol. 18, No. 9

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## EDITOR'S NOTES:

Thank heavens -- Sally is back from England. I am impressed all over again by how much she does around here. We are catching up on the mailing and correspondence as quickly as possible. If you are waiting for a letter or a book it will probably be there about the same time as this issue.

If everything goes as planned, this September issue will be mailed out on or before the first of September -- something we have been trying to accomplish for many months. This also means that our deadline for material to include in each issue moves back to the 15th of the preceding month (e.g., October material must be ready to print by September 15th).

We get a few complaints regarding the amount of **Seashell Treasures Books** advertising in issues. A magazine lives or dies on advertising -- not subscriptions, which seldom pay the actual printing and mailing costs. We will be pleased to have so much dealer advertising that there is no room for **STB** or (even better) so much that we can increase the number of pages and perhaps even add color to each issue. Until we get the advertising support from shell dealers and others, we will have to depend on advertising for **Seashell Treasures Books** to pay the printing bills. I might add that many of our subscribers are primarily interested in the books.

On a similar subject, our minimum price of \$3 per item is simply the cost of providing the service to you, our customers. A single photocopy page must be listed bibliographically, the listing printed, then distributed, the page filed, orders quoted by letter or phone, the page re-located, packed, shipped, and billed. All of that should cost at least \$20 for time and energy. It would be far easier to throw the page away but the information would not be available to you for your research. Those of you who would rather try to locate, inter-library loan, wait, and then photocopy your own, are encouraged to do so. Or if you are at a non-profit or government institution you can have it all done for nothing and have the taxpayers foot the bill. Even in that case it would be far cheaper for the taxpayers if you ordered from our list.

At the recent American Malacological Union/Western Society of Malacologists meetings we had a large group of opisthobranch workers from around the world. The group was very much in favor of a separate publication for opisthobranchs, similar to the *Opisthobranch Newsletter* and I offered to publish bimonthly if there were 25 people actually willing to sign up at the meeting. Sorry to report that the response was simply not sufficient for a separate publication. **SHELLS and SEA LIFE** will continue as a monthly publication for all shells and sea life. Any other publications will be sold separately and simply listed in **SHELLS and SEA LIFE** when they are completed.

We need information from all clubs and dealers for the update to the **SEA LIFE DIRECTORY**. We will print as soon as all the information and advertising is ready. Please send any corrections or additions to us as soon as possible so they may be included. Display advertising is available for \$10 per square inch with a minimum ad size of 3 square inches. At least 15,000 copies of the directory will be distributed throughout the world. Donations to help defray printing and mailing costs are welcome. Quantities of the "DIRECTORY" will be available for use of clubs, dealers, marine stations and other groups. A donation to cover printing and mailing costs is requested. Please contact us as soon as possible with your requirements.

Edmund A. Crouch's illustrated introduction to Lamarck's Conchology reprint will continue as space is available. The entire work will be available separately after the reprinting is complete.

Yours sincerely,

**Shells and Sea Life** accepts advertising in good faith, assuming that advertisers will deal fairly with their customers. Inclusion of advertising in **Shells and Sea Life**, however, is not intended to imply endorsement to the advertiser. If in doubt, investigate first.

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**SHELLS AND SEA LIFE NEWS** accepts notes on any aspect of malacology, fossils or related marine life. Articles should be submitted typed and double-spaced. Authors receive 10 free reprints. Additional reprints are available for purchase. Send for free booklet "Suggestions for Preparing Manuscripts for **SHELLS AND SEA LIFE**." We undertake no responsibility for unsolicited material sent for possible inclusion in the publication. No material submitted will be returned unless accompanied by return postage and packing.

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NEW OPISTHOBRANCH RECORDS FOR THE WEST COAST OF  
BAJA CALIFORNIA

By

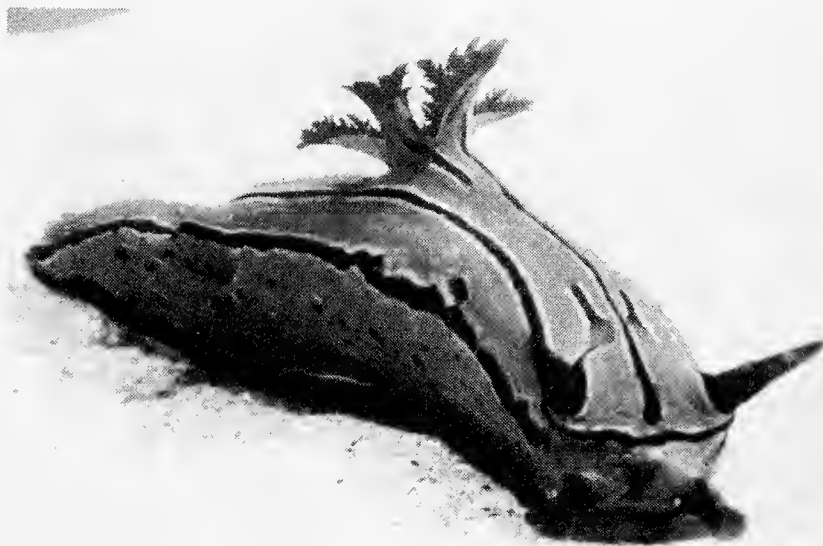
David W. Behrens

Route 1, Box 70-A, Templeton, CA 93465

and

Jim Gatewood

7584 Amethyst, Rancho Cucamonga, CA 91730



Data on the opisthobranch fauna of the west coast of Baja California, Mexico is quite limited (Farmer 1963, Farmer & Collier 1963, Collier & Farmer 1964, Hamann 1981, Behrens 1980, 1983, Bertsch 1982, Bertsch & Aguilar 1984, Bertsch & Kerstitch 1984, Gosliner & Bertsch 1985) in comparison to the Gulf side or east coast of the peninsula. This is in part due to the infrequency of scientific and collecting expeditions to this coastline. A recent excursion to the localities of Isla San Martin, Roca Ben, Johnson's sea mount, Arrecife Sacramento and Islas San Benitos produced 31 species of opisthobranch molluscs (see Gatewood, Shells and Sea Life 17(4): 128-131, April 1985 for details of the expedition).

The collection localities are given in Figure 1 and Table 1. A species account is presented in Table 2. Of the 31 species collected, four are unknown to science. These are designated in the table by a single asterisk (\*). The collections account for eight extensions of known geographic ranges (designated by a double asterisk \*\*). The southern most range for each species is given in the table also, except for those species whose distribution along the west coast of Baja California is not well known. Citations for range limits are also given where the original reference is known.

All collections were subtidal while diving on SCUBA. Collections were made from 5 - 10 August 1984. All specimens are being retained by D. W. Behrens or the Invertebrate Collection of the California Academy of Sciences, San Francisco, CA.

Of particular interest was the collection of four undescribed species. The undescribed *Dendrodoris* is well known from southern California (Behrens 1980, species #141) to Pescadero Point, Carmel Bay and Monterey in northern California (McDonald & Nybakken, 1981). The *Phyllidia*, first reported in Behrens (1980, species #144), has a striking resemblance to *Phyllidia rolandiae* Pruvot-Fol 1951 from the Mediterranean. Eight specimens were collected on this trip, at

two of the five collecting locations. The unidentifiable Flabellina (see photo Shells & Sea Life 17(4) pg 129, top left) is identical in external coloration to Flabellina trilineata (O'Donoghue 1921) except that it does not have the typical, and distinctive, three white longitudinal lines along the body. Lastly, the undescribed facelinid is identical to species #155 of Behrens (1980). A photograph of this species is also featured in Shells & Sea Life 17(4) pg 129 (bottom). Close examination of radula, jaws and reproductive system suggest that the species may be difficult to assign to an existing genus. Six specimens were collected at Islas San Benitos.

Numbers of species, shown in Table 2 by collection site may be a good indication of species diversity, but may be weighted by sampling effort. An analysis of catch per unit effort (CPUE) calculated as species/diver hour, seems to support this conclusion (Table 2). One dive made at Johnson's Sea Mount, produced the greatest number of species, and concomittantly the greatest CPUE. At the other extreme however, the lowest CPUE was calculated for Islas San Benitos, the collection site having the second highest species count. CPUE here is most probably artificially reduced due to the large sampling effort expended (40 hours collection time). In this instance increased effort did not add to the species inventory.

We would like to express our thanks to Marc Chamberlain, Patty Mariano and all the other members of this Sea Challengers expedition for enthusiastically assisting in the collections.

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Table 1	
Latitude and longitude of collection localities	
Isla San Martin	30°29'N; 116°07'W
Roca Ben	30°26'N; 116°07'W
"Johnson's Sea Mount"	30°20'N; 116°05'W
Arrecife Sacramento	29°45'N; 115°47'W
Islas San Benitos	28°20'N; 115°40'W

Table 2  
Species Inventory

<u>Systematic Account</u>	<u>Collection Localities</u>				
	Isla San Martin	Roca Ben	Johnson's Sea Mount	Arrecife Sacramento	Islas San Benitos
Bullomorpha					
<u>Navanax inermis</u> Cooper 1862		X			X
Panama					
Aplysiomorpha					
<u>Aplysia californica</u> Cooper 1863	X				
Range unknown on west coast of Baja					
Isla San Martin (Behrens 1983)					
Pleurobranchomorpha					
<u>Tylodina fungina</u> Gabb 1865					X
Costa Rica & Galapagos (Brusca 1980)					
** <u>Berthellina citrina</u> Ruppell &	X		X		
Lueckart 1828					
San Clemente Is.					
Sacoglossa					
** <u>Elysia hedgpethi</u> (Marcus 1961)	X				
La Jolla, CA					
Nudibranchia					
Doridacea					
** <u>Hopkinsia rosacea</u> MacFarland	X				
1905					
Ensenada (Farmer & Collier 1963)					
<u>Triopha maculata</u> MacFarland 1905			X		
El Tomatal (Bertsch & Anguilar 1984)					
<u>Laila cockerelli</u> MacFarland 1905					X
Cape San Lucas					
** <u>Polycera atra</u> MacFarland 1905			X		
Bahia Todos Santos (Bertsch 1982)					
<u>Cadlina flavomaculata</u> MacFarland 1905			X		
Pt. Eugenia					
** <u>C. limbaughorum</u> Lance 1962			X		
Bahia Puerto Escondito (Bertsch 1982)					
<u>C. luteomarginata</u> MacFarland 1905		X			
Pt. Eugenia					
<u>Glossodoris dalli</u> (Bergh 1879)					X
Magdalena Bay (Bertsch 1978)					
<u>C. macfarlandi</u> Cockerell 1901			X		
Bahia Magdalena (Bertsch 1978)					

<u>Mexichromis porterae</u> (Cockerell 1901)	X		X	X	X
Cedros Is (Behrens 1980, 1983)					
<u>Hypselidoris californiensis</u> (Bergh 1879)			X		
Westcoast of Baja (Brusca 1980)					
<u>Rostanga pulchra</u> MacFarland 1905			X		
Chili					
<u>Diaulula sandiegensis</u> (Cooper 1862)			X		
Cabo San Lucas (McDonald & Nybakken 1981)					
** <u>Jorunna pardus</u> Behrens & Henderson 1981	X			X	
Isla San Martin (Behrens 1983)					
<u>Discodoris heathi</u> MacFarland 1905	X				
Bahia San Quintin (McDonald & Nybakken, 1981)					
<u>Dendrodoris krebsi</u> (Morch 1863)					X
Vizcaino Bay (Collier & Farmer 1964)					
* ** <u>Dendrodoris. sp.</u> (Species #141 Behrens 1980)				X	X
La Jolla, CA (Behrens 1980)					
<u>Doriopsilla albopunctata</u> (Cooper 1863)	X		X	X	
Pt. Eugenia (Behrens 1980)					
* ** <u>Phyllidia sp.</u> (Species #144 Behrens 1980)			X		X
Pt. Loma, CA (Behrens 1980)					
<u>Tambja eliora</u> (Marcus & Marcus 1967)					X
Vizcaino Bay (Behrens 1983)					
Arminacea					
<u>Janolus barbarensis</u> (Cooper 1863)		X			
Cedros Is. (Behrens 1983)					
Aeolidacea					
<u>Flabellina iodinea</u> (Cooper 1862)		X	X	X	X
Cedros Is. (Behrens 1983)					
* <u>Flabellina. sp.</u> (first account)			X		
* <u>Facelinid</u> (Species #155 Behrens 1980)					X
Cedros Is. (Behrens 1980, 1983)					
<u>Hermisenda crassicornis</u> (Eschscholtz 1831)	X	X	X		
Pt. Eugenia (Farmer & Collier 1963)					
<u>Phidiana pugnax</u> Lance 1962		X			
Cedros Is. (Farmer & Collier 1963)					
<u>Total number of species</u>	8	6	15	5	11
<u>Species/diver hour</u>	5.3	5.0	7.5	2.7	0.28

## on the DRIFTLINE

From Southern California: Just returned from a month in Alaska & Canada. I'm off tomorrow on a graduate study tour; then a week in Florida to see my stepmother. Also planning a dive trip to Guaymas before school opens on Aug. 18th. I'm way behind on my shell-work -- 21 shoe boxes to be entered. I think I'm a bit behind. - ANONYMOUS, 22 July.



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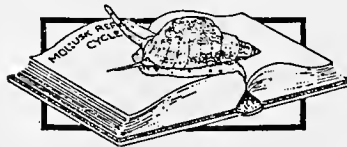
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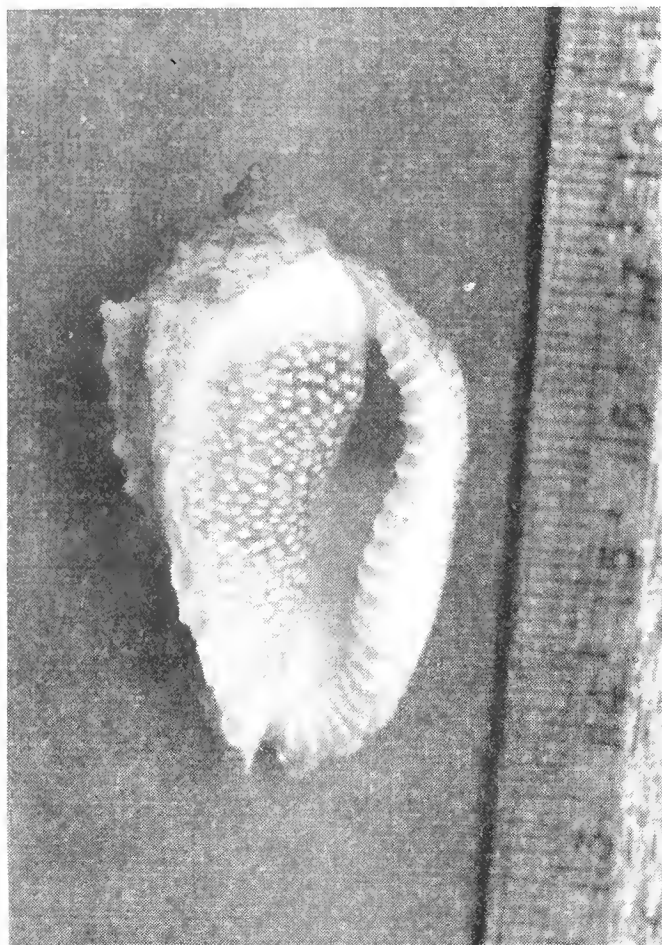
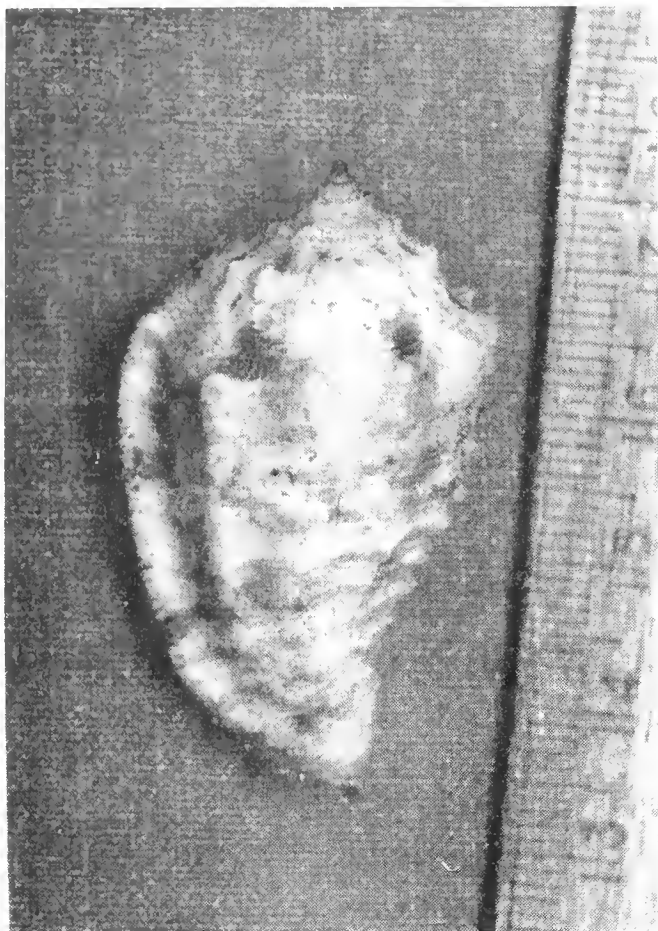
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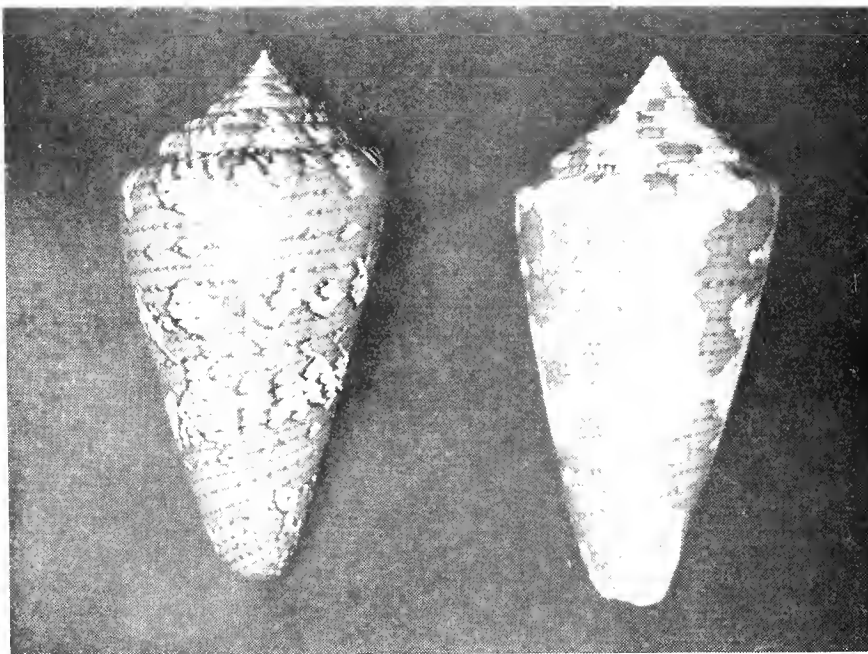
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## FIELD NOTES

From Barbados, West Indies: Top photos are dorsal and ventral of *Morum dennisoni* (Reeve, 1842), crabbed in a 100m depth trap. At left are two examples of *Conus cedonulli* Linnaeus, 1767. The left specimen was live-taken from St. Vincent while the specimen on the right was dredged in 133m depth off Barbados. -- DAVID HUNT, Gregg Farm, St. Andrew, Barbados, West Indies.



## CURRENT EVENTS

### Meetings & Shows

1986

**Unitas Malacologica** Ninth International Malacological Congress, August 31-September 6, Edinburgh, Scotland. Contact: Congress Office, Royal Scottish Museum, Edinburgh, Scotland EH1 1JF

**New Jersey Wings 'n Water Festival**, September 20-21. Contact: The Wetlands Institute, Stone Harbor Blvd., Stone Harbor, New Jersey. Call (609) 368-1211.

**SCAMIT**, November meeting topic -- Ascidiacea. Contact: SCAMIT, 3720 Stephen White Dr., San Pedro, CA 90731.

**Western Society of Naturalists**, December 27-30, University of Hawaii at Hilo. Dr. John Chan will be the local chairman. Contact: David H. Montgomery, WSN Secretary, Biological Sciences Dept., California State Polytechnic University, San Luis Obispo, CA 93407

1987

**Astronaut Trail Shell Show**, January 23-25, Melbourne Auditorium, Melbourne, Florida. Contact: Bobbi & Jim Cordy, 385 Needle Blvd., Merritt Island, FL 32952, (305) 452-5736 or: Doris Underwood, 9022 Brighton Court, W. Melbourne, FL 32904, (305) 724-2449.

**Third California Islands Symposium**, March 3-5. Contact: Dr. Eric Hochberg, Santa Barbara Museum of Natural History, 2559 Puesta Del Sol Rd., Santa Barbara, CA 93105, Phone: (805) 682-4711.

**Western Society of Naturalists**, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

\* \* \* \* \*

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Public events only, please; commercial events should use our directory advertising. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We would especially like to hear of overseas shows and meetings. Thanks to Donald Dan for keeping us informed of many of these dates.

\* \* \* \* \*

## What is it?

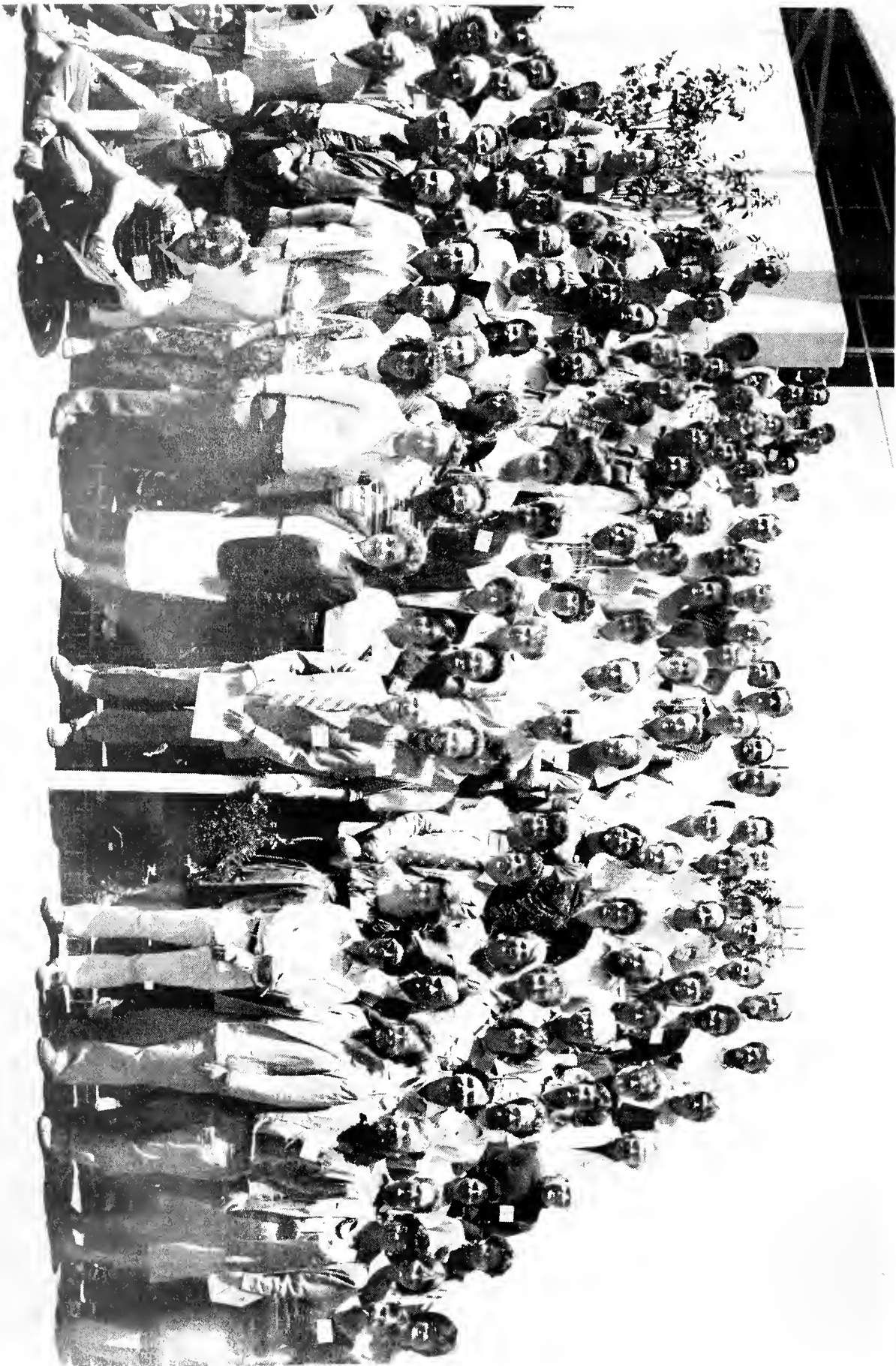


No. 34 Cerianthus sp. Caribbean. Photo: E.R. Degginger

## CLAM - Scooter Beers







Western Society of Malacologists - American Malacological Union  
JOINT MEETING - JULY 1986

ACHATINA.—Shell oval or oblong: aperture entire, longitudinal; the right lip sharp, never reflected. Columella smooth, truncated at the base.

(1) *Shells with the last whorl ventricose, not depressed.*

Plate XV. Fig. 5. *A. virginea*. (*Bulla virginea*.—Linn.)

(2) *Shell with the last whorl depressed, or attenuated towards the base.*

Plate XV. Fig. 5 (a). *A. albo-lineata*. (*Voluta leucozonias*.—Gmel.) [Mrs. Mawe's Cabinet.]

SUCCINEA.—Shell oval or ovate-conical: aperture large, entire, longitudinal; the right lip sharp, not reflected, united at the lower part to a smooth, sharp, attenuated columella. No operculum.

Plate XV. Fig. 6. *S. amphibia*. (*Helix putris*.—Linn.)

AURICULA.—Shell suboval or ovate-oblong: aperture longitudinal, very entire at the base, contracted at the upper part, where the margins are disunited. Columella with one or more plaits; the lip or margin sometimes reflected outwards, sometimes simple and sharp.

(1) *Shells with the margin reflected outwards.*

Plate XV. Fig. 7. *A. Judæ*. (*Voluta auris Judæ*.—Linn.)

(2) *Shells with the margin simple and acute.*

Plate XV. Fig. 8, 8 (a). *A. monile*. (*Voluta flava*.—Gmel.)

CYCLOSTOMA.—The shape of the shell variable; whorls of the spire cylindrical: aperture round, regular; the margins circularly united, or reflected by age. An operculum.

Plate XV. Fig. 9. *C. volvulus*. (*Helix volvulus*.—Linn.) [Mrs. Mawe's Cabinet.]

#### LYMNÆANA.—3 GENERA.

*Shell spirivalve, the external surface mostly smooth; the right margin of the aperture always sharp, and not reflected.*

PLANORBIS.—Shell discoidal, spire depressed, the whole of the whorls shewn above and beneath: aperture oblong, lunate, very distant from the axis of the shell; the margin never reflected. No operculum.

Plate XV. Fig. 10. *P. corneus*. (*Helix cornea*.—Linn.)

PHYSA.—Shell convolute, oval or oblong; the spire prominent: aperture longitudinal, contracted at the upper part. Columella twisted: right lip very thin, sharp, partly projecting above the plane of the aperture. No operculum.

Plate XV. Fig. 11. *P. rivalis*. (*Lymnæa rivalis*.—Sowerby.)

LYMNÆA.—Shell oblong, sometimes turreted; the spire prominent: aperture entire, longitudinal, outer lip sharp; the lower part ascending over the columella, forms a very oblique plait, re-entering the aperture. No operculum.

Plate XV. Fig. 12. *L. stagnalis*. (*Helix stagnalis*.—Linn.)

## MELANIANA.—3 GENERA.

*Margins of the aperture of the shell disunited, the right always sharp.*

MELANIA.—Shell turreted: aperture entire, oval or oblong, effuse at the base; columella smooth, incurved. Operculum horny.

Plate XV. Fig. 13. *M. amarula*. (*Helix amarula*.—Linn.) [Mrs. Mawe's Cabinet.]

MELANOPSIS.—Shell turreted: aperture entire, oval-oblong. Columella callous at the upper part; truncated at the base, separated from the right margin by a sinus. An operculum.

Plate XV. Fig. 14. *M. lævigata*.

PIRENA.—Shell turreted: aperture longitudinal, right lip sharp, having a sinus at the base, and another at the summit. Base of the columella curved towards the right margin: operculum horny.

Plate XV. Fig. 15. *P. terebralis*. (*Strombus ater*.—Linn.)

## PERISTOMIANA.—3 GENERA.

*Shell operculated, conoidal or subdiscoidal, the margins of the aperture united.*

VALVATA.—Shell discoidal or conoidal, the whorls cylindrical, spiral cavity complete, not modified by the penultimate whorl; aperture round, the margins united, sharp. An orbicular operculum.

Plate XV. Fig. 16. *V. piscinalis*.

PALUDINA.—Shell conoidal, the whorls rounded or convex, spiral cavity modified by the last whorl: aperture rounded-oval, oblong, angular at the summit; the two margins united, acute, never reflected outwards. Operculum orbicular and horny.

Plate XV. Fig. 17. *P. vivipara*. (*Helix vivipara*.—Linn.)

AMPULLARIA.—Shell globular, ventricose, umbilicated at the base, without any callosity on the left lip: aperture entire, oblong, margins united, the right not reflected. An operculum.

Plate XV. Fig. 18. *A. Guyanensis*.

## NERITACEA.—4 GENERA.

*Shell fluviatile, or marine, semi-globular or flattened-oval, without columella, the left margin of the aperture resembling a half partition.*

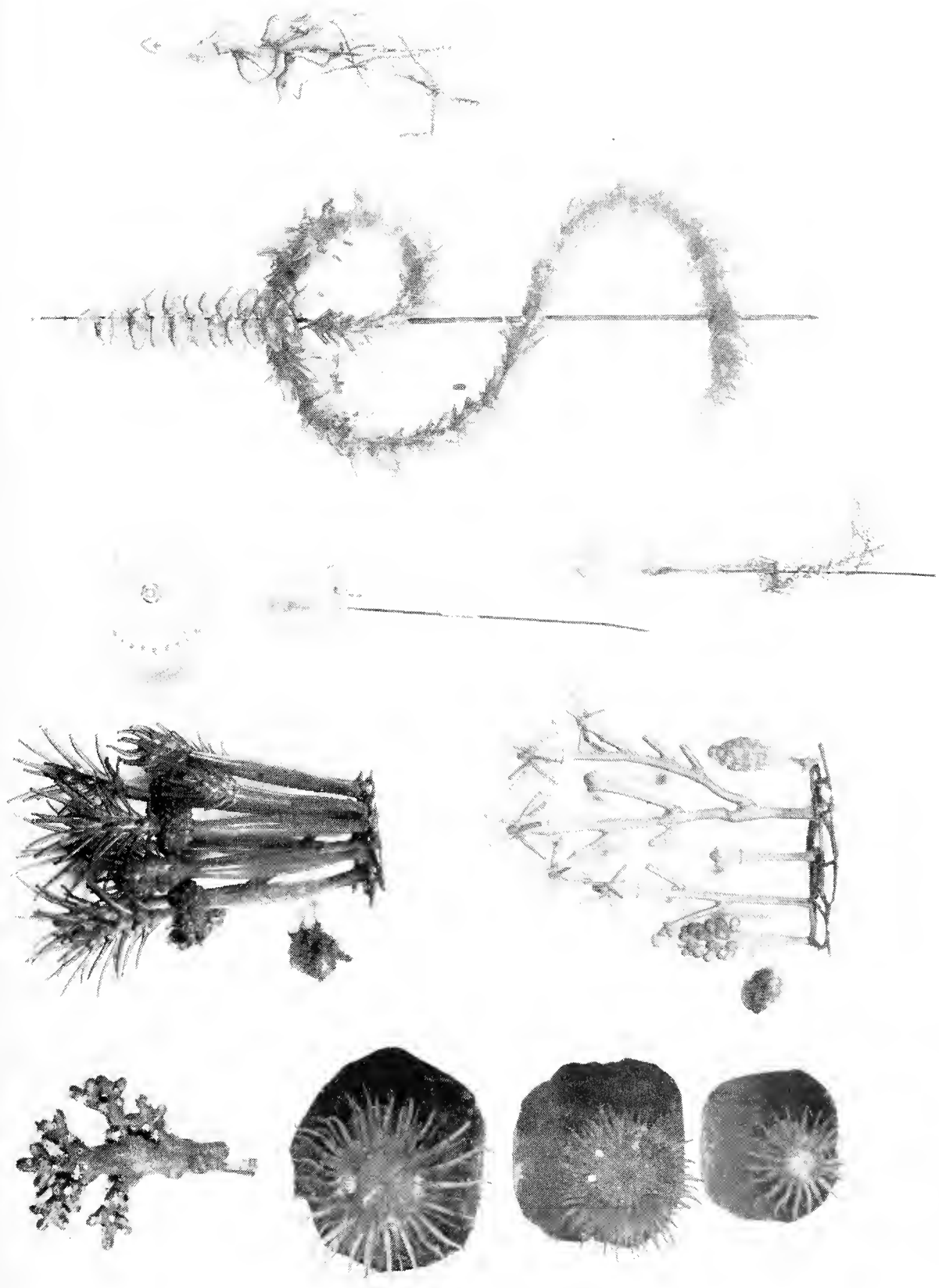
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NAVICELLA.—Shell elliptical or oblong, convex above, summit straight, depressed to the margin, concave beneath; the left lip flattened, sharp, narrow, without teeth, transverse. A solid flat operculum, having an acute and lateral tooth.

Plate XV. Fig. 19, 19 (a). *N. elliptica*. (*Nerita porcellana*.—Chem.)

NERITINA.—Shell thin, semi-globular or oval, flattened beneath, not umbilicated: aperture semi-circular, the left margin flattened, sharp; no teeth or crenulations on the surface of the right margin. Operculum furnished with a lateral tooth.

Plate XV. Fig. 20, 20 (a). *N. dubia*. (*Nerita dubia*.—Chem.)



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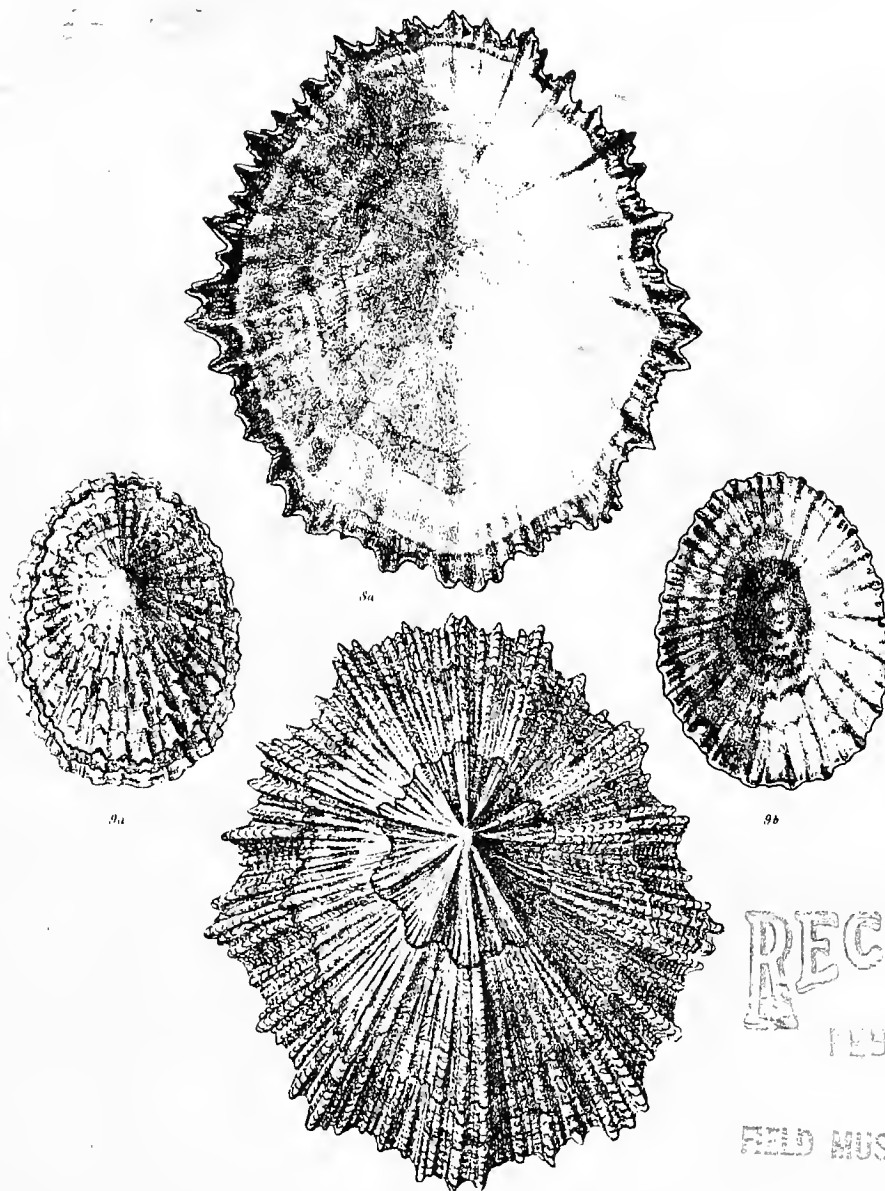
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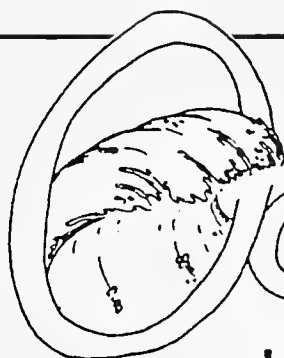
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Thanks to all of you who have written or called congratulating us on our return to standard format. We are bringing back some full color with the next issue courtesy of our advertisers. Please do mention **SHELLS and SEA LIFE** when you write to them. Timing has been too short for color for this issue but we hope that some of you will provide the photos and money to print more color in the November issue. If you can provide the color separations please call for exact specifications. If we provide the color separations we must ask a donation of \$50.00 per photo to help cover the separation costs. This is a donation and in no way affects our willingness to print your photos -- only our ability to do so. Donations are always welcome to help pay for your color work.

We are trying to get all subscriptions on a calendar year basis so that we can bill only once and save the time and postage. To help accomplish this goal we are accepting payments now for 1987. You will receive the remaining issues for this year as well as all of 1987 issues for \$20 US or \$25 overseas. Counting this issue, you will get up to three extra free issues -- and at a lower price of only \$20.

For all the Opisthobranch people, I am going to do the O.N. on an informal basis. The O.N. will be published when I have time and mailed to everyone on my list. I suspect there will be about 4-6 numbers per year and they will be numbered sequentially. Pages will vary with my time and the material available. I am not setting a subscription rate -- if you are interested, send me information and reprints regularly. Donations of other books and separates or money are also welcome. Format and style will follow the **Opisthobranch Newsletter** pattern. If you are subscribing to **SHELLS and SEA LIFE**, simply notify me in writing that you want the O.N. also.

Yours sincerely,

*Steven J. Long*

\* \* \* \* \*

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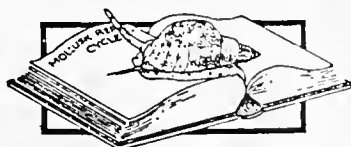
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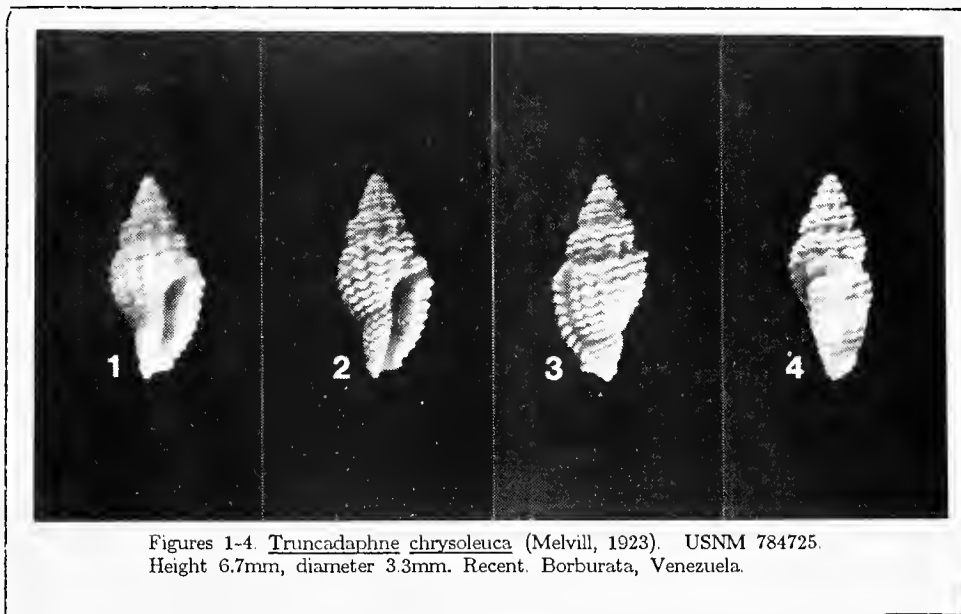
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# Reassignment of the Caribbean Lienardia chrysoleuca Melvill, 1923 (Mollusca: Gastropoda), and a range extension.

J. Gibson-Smith & W. Gibson-Smith, Quinta Puerta del Sol,  
Calle Tucupido, San Roman, Las Mercedes, Caracas 1060, Venezuela



Figures 1-4. Truncadaphne chrysoleuca (Melvill, 1923). USNM 784725.  
Height 6.7mm, diameter 3.3mm. Recent. Borburata, Venezuela.

## ABSTRACT

The small, rare daphnelline, *Lienardia chrysoleuca* Melvill, 1923, known from Cuba, the Greater Antilles and the Netherlands Antilles, is reassigned to the formerly monotypic genus *Truncadaphne* McLean, 1971, the type species of which is "*Philbertia*" *stonei* Hertlein & Strong, 1939, from the Galapagos Islands. The Caribbean form has now been found in Venezuela.

## INTRODUCTION

A small, but very distinctive turrid in our Venezuelan Recent collection for long defied identification. The diagonally reticulate protoconch suggested that it was a daphnelline, but nothing similar was found in our available Caribbean literature. Eventually, a related species was recognized by McLean (Keen, 1971, p.762): *Truncadaphne stonei* (Hertlein & Strong, 1939) from the Pleistocene and Recent of the Galapagos Islands, and living at a

depth of 64 to 110m. The Venezuelan form was clearly distinct, and was considered to be a new species. Virginia O. Maes concurs with the assignment to *Truncadaphne* McLean, 1971, (in litt., 21 December, 1984) but noted that the Caribbean form had been described twice previously: originally as *Lienardia chrysoleuca* Melvill, 1923, from Cuba, and secondly as the junior synonym *Glyphostoma permiscere* Nowell-Usticke, 1969, (not seen) from St. Thomas, St. Croix and Klein Bonaire. It has also been found by Jack Worsfold in the Bahamas.

The two genera, *Lienardia* Jousseaume, 1884, and *Glyphostoma* Gabb, 1872, are not daphnellines. McLean (Keen, 1971, p.129) established the monotypic genus *Truncadaphne*, the type species being "*Philbertia*" *stonei* Hertlein & Strong, 1939. *Lienardia chrysoleuca* has the attributes of, and is here transferred to, *Truncadaphne*, to become the second known species. At the same time, a range extension from the Netherlands Antilles to the north coast of South America is noted.

In the circumstances it is thought worthwhile to describe and figure again this little known Caribbean taxon, and differentiate it from the East Pacific form.

### TAXONOMY

Family TURRIDAE Swainson, 1840

Subfamily Daphnellinae Casey, 1904

Genus *Truncadaphne* McLean, 1971

*Truncadaphne chrysoleuca* (Melvill, 1923)

*Lienardia chrysoleuca* Melvill, 1923. Proc. Mal. Soc. London, p.170, pl.5, fig. 18. Cuba

*Glyphostoma permiscere* Nowell-Usticke, 1969. A Supplementary Listing of New Shells (Illustrated), p.29, fig.1214.

#### Figures 1-4

Description - Shell small, turreted, whorl shoulder tabulate, suture a little impressed, body whorl higher than spire. Protoconch narrow, subcylindrical, of 3-1/2 tan whorls with diagonal reticulate sculpture. Teleoconch of 5-1/4 whorls; spire whorls slightly convex, body whorl somewhat globose. Sculpture on the first teleoconch whorl of 10 axial ribs noded by 2 spiral cords. Later spire whorls with 2 spiral cords at the shoulder, a more prominent cord at the mid-whorl and a weaker one below. The 15 axial ribs of the body whorl with wider interspaces, are crossed by 8 spiral cords giving deep, rectangular interspaces; both ribs and cords diminish in prominence towards the whorl base; intersections strongly noded. Three, close-set spiral threads lie between the shoulder and the suture. Anterior fasciole long, separated by a sulcus and crossed by 7 noded spiral cords. Aperture narrow, elongate, tapering to anterior canal. Outer lip thickened into a broad, flat varix, deeply excavated and overhanging behind, and crossed by the spiral cords; 7 neat, sharp denticles within, coincident with the spiral interspaces. Sinus deeply U-shaped, laterally directed and surrounded by a rim of callus; the raised fasciole with growth striae ends at the back of the varix. Columella smooth, but appearing

denticulate due to the nodes on the spiral cords of the anterior fasciole. Anterior canal short, deeply notched, and slightly recurved. Shell white or tan, a narrow brown band at the shoulder, and a broader band on the whorl base.

Voucher specimens - USNM 784725 (figured specimen); ANSP 379113; AMNH 202293; BM(NH).

Discussion - The material, all from coral reef habitats, consists of 15 specimens from Borburata, Carabobo State, all occupied by hermit crabs; one dead specimen from Isla La Orchila, and a fragment from Isla La Tortuga. *Truncadaphne chrysoleuca* differs from *T. stonei* in having non-bulbous protoconch whorls, a narrower aperture, a different colour pattern, and a finer clathrate sculpture with, consequently, more denticles within the outer lip. It is worth mentioning that juvenile *Daphnella lymnei-formis* (Kiener, 1840), the type species of *Daphnella* Hinds, 1844, is sympatric with, and resembles *T. chrysoleuca*. Apart from the similar protoconch, the first four spire whorls in *D. lymnei-formis* are tabulate at the shoulder, and the sculpture is clathrate and nodose. The later sculpture and whorl outline, however, are very different.

### ACKNOWLEDGEMENTS

We thank Mrs. Virginia O. Maes for setting us on the right track, and for supplying the missing references.

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Thanks to Bue Antipora of CRB Sea Shells Center for this photo.



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### Meetings & Shows

1986

**SCAMIT**, November meeting topic -- Ascidiacea. Contact: SCAMIT, 3720 Stephen White Dr., San Pedro, CA 90731.

**Western Society of Naturalists**, December 27-30, University of Hawaii at Hilo. Dr. John Chan will be the local chairman. Contact: David H. Montgomery, WSN Secretary, Biological Sciences Dept., California State Polytechnic University, San Luis Obispo, CA 93407

1987

**Astronaut Trail Shell Show**, January 23-25, Melbourne Auditorium, Melbourne, Florida. Contact: Bobbi & Jim Cordy, 385 Needle Blvd., Merritt Island, FL 32952, (305) 452-5736 or: Doris Underwood, 9022 Brighton Court, W. Melbourne, FL 32904, (305) 724-2449.

**Third California Islands Symposium**, March 3-5. Contact: Dr. Eric Hochberg, Santa Barbara Museum of Natural History, 2559 Puesta Del Sol Rd., Santa Barbara, CA 93105, Phone: (805) 682-4711.

**Western Society of Naturalists**, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

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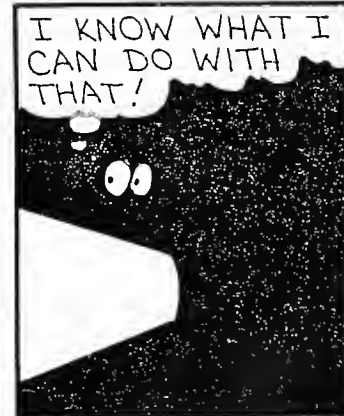
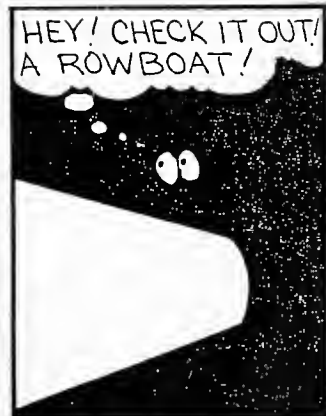
## AMERICAN MALACOLOGISTS EXPANDS AND SHEDS THE NAUTILUS

Dr. R. Tucker Abbott's book publishing firm, American Malacologists, has expanded by opening a New England Division in Burlington, Mass. where all future sales will be handled. This will give Dr. Abbott an opportunity to concentrate on research and writing new books. His daughter, Cynthia Abbott, will fulfil orders for books. Book dealers should now contact American Malacologists, P.O. Box 1192, Burlington, MA 01803.

E.J. Brill, a 350-year-old Dutch publishing company has recently acquired the back stock and rights to The Standard Catalog of Shells and Monographs of Marine Mollusca, but Dr. Abbott will continue as editor of both. Bob Wagner will continue as editor of the World Size Records. Brill has placed the North American distribution rights to S. Peter Dance's new History of Shell Collecting in the hands of American Malacologists.

The 100-year-old journal, The Nautilus, which was edited by Dr. Abbott for 28 years, has been transferred to the non-profit Trophon Corporation of Maryland and will be edited by Dr. M.G. "Jerry" Harasewych of the Smithsonian Institution. Dr. Abbott will continue to serve as a consulting Associate Editor. Subscriptions and manuscripts should be sent to The Nautilus, P.O. Box 3430, Silver Spring, MD 20901-0340. Back volumes will be available from Dr. W. Backhuys, P.O. Box 9000, 2300 PA Leiden, The Netherlands.

## CLAM - Scooter Beers





## FIELD NOTES

From Alaska: Was on the fishery research vessel "Miller Freeman" south of Kodiak Island for about 3 weeks. Collecting for mollusks was very poor unless you like *Fusitriton oregonense* and juvenile *Boreotrophon stearnsi*. Did get a couple of dozen *Liomopsis akutanica* which usually are uncommon. --  
RAE BAXTER

From Osprey Reef, Coral Sea, Australia: In December, 1984, I spent several days collecting at Osprey Reef, an isolated atoll in the Coral Sea, 97 miles from the Australian mainland and 69 miles beyond the nearest Barrier Reefs. It consists of an almost closed lagoon about 15 miles long in 1200-2000 metres of water, with no part permanently above water. An osprey would have to bring his own perch.

The opisthobranch fauna, as expected, was not particularly rich, comprising 2 species of *Elysia* including a curious white species also found on the nearest Barrier Reefs, 2 *Chelidonura*, 1 *Haminocia*, 2 *Pleurobranchus*, 1 *Dolabella*, 1 *Aplysia*, 5 phyllidiids, 5 chromodorids and 2 other cryptobranchs, 3 phanero-branchs, 1 *Dermatobranchus*, 2 acolids and a *Tritoniopsis*, 28 species in all (11 dives). In comparison, collecting on outer Barrier Reefs on the way to and from Osprey (14 dives) yielded 42 species, although generally "common" species were ignored for this area. These species comprised 4 *Elysia*, 3 *Chelidonura*, 1 *Philineopsis*, 1 *Aplysia*, 1 *Stylocheilus*, 3 *Pleurobranchs* including the large *P. grandis*, 4 phyllidiids, 1 *Dendrodoris*, 11 chromodorids, 5 other cryptobranchs, 5 phanerobranchs including a white pustulose *Gymnodoris* and a *Trapania* both new to me, 2 acolids and 1 tritoniid.

No species was found on Osprey which was not also collected on the Barrier Reefs on this or previous trips. Similarly with the macro-prosobranchs, all the species occur on the Barrier Reefs with none of those "typical" Coral Sea species such as *Gourmya gourmyi* Crosse, *Lalirus barclayi* (Reeve), and *Strombus* thersites Swainson, being found. These species are found very rarely or not at all on the Barrier Reefs. So from this superficial visit, it would appear that Osprey Reef derives its impoverished fauna from the Great Barrier Reef to the west, rather than other Coral Sea reefs to the east and south.

One final observation was on the cephalaspid *Chelidonura inornata* Baba, 1949. While I have seen up to 3 specimens of this common species crawl across live heads of massive corals, on a dawn dive on St. Crispins Reef I noticed a specimen in a mucous cocoon lying at the edge of a brain coral. As it remained immobile for the few minutes of observation, I eventually tore the cocoon and the *Chelidonura* crawled off without any apparent ill-effects. Which animal secreted the cocoon and the apparent immunity of *C. inornata* to the corals remain a puzzle to me. - IAN LOCH, The Australian Museum, Sydney, Dept. of Malacology, PO Box A285, Sydney South, NSW, Australia 2000

\* \* \* \* \*

From Natalia Keller: In September 1985, while on an expedition of the new "Vityaz" I had the opportunity to study the macroepifauna of Sargassum algae in the Sargasso Sea. In the area where we made

our studies 2 species of *Sargassum* were found: *S. natans* and *S. fluitans*. They turned out to be the home and substratum for rather numerous fauna of vertebrate and invertebrate animals. Among them a particular pattern of development is obtained by the attached forms: encrusting Bryozoa (*Membranipora* sp.), Polychaeta Sedentaria (*Spirorbis* sp.) and numerous hydroids (nine genera). These sedentarian sestonophagous animals for covering of diverse density on "leaves", vesicular and stem parts of algae.

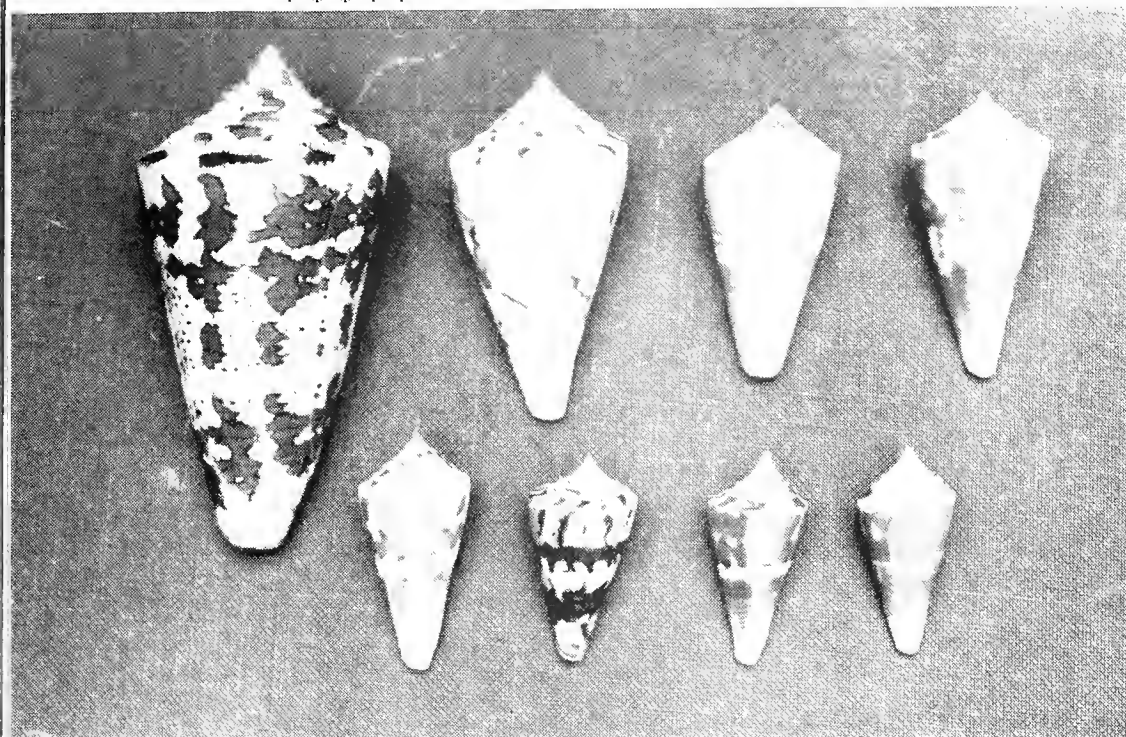
Among these one can observe patchy aggregation of mobile carnivores (usually around bits of carrion), no less important than the sestonophagous animals. Among these the most numerous are the Gastropoda Prosobranchia *Litiopa melanostoma* Rang (Brown sargassum snail), *Polychaeta errantia*; *Platynereis dumerilii*, Audouin and Milne-Edwards) and one species of Turbellaria Polycladida. Gastropoda Opisthobranchia (Nudibranchia): *Doto* sp. and *Fiona pinnata* (Eschscholtz) (det. I. Roginskaya). Pantopoda and Isopoda are monotonous and innumerable both in specific and in quantitative respects. Most striking are the delicate dimensions of the epifaunal carnivores (specimens of *L. melanostoma* do not exceed 1.5 mm in height and 0.8 mm in width) and the high productivity and low biomass of the population. We noted a clear-cut selection in the choice of substrata: a fundamental mass of animals, predominantly *L. melanostoma* and *P. dumerilii*, settled on the *S. natans* and, only in the absence of this form, on the *S. fluitans*. I would appreciate if you or any readers of *SHIELLS and SEA LIFE* can give me any information whether anyone has established reasons for this preference which I find so fascinating? I suppose the answer might lie in the varying degrees of roughness in the substrata, which facilitates the settling of larvae, or possibly in the density of the "leaf" covering, although this does not exclude the possibility that this matter depends on the varying concentration of biologically active substances. The latter were recently extracted by Taiwanese researchers (Lin C. Tsai S., Yang S., 1983) from the tall of sargassum. In my opinion the most interesting result is the following: I defined the biomass for the *L. melanostoma* and *P. dumerilii* taken from sargassum caught in and outside the cold rings of the Gulf Stream. As it turns out, it reaches maximum number values at the center of the ring's cold spot (30 times greater than in the adjacent waters of Sargasso Sea), characterized by low productivity).

Benthic biomass values 20 times greater than in adjacent waters were also observed at stations taken at the "trace" site of the second cold ring and along the periphery of the third ring where an influx of cold slope waters from the north also occurs. Minimum benthic biomass values were found in direct proximity of the Gulf Stream current. By studies of a number of specialists (for example, Wiebe, 1976) a significant rise of primary production in slope waters isolated in the Gulf Stream rings, have been shown (the 90% increase of primary production in the young rings, and 40-50% increase in the 3-month-old rings). The younger the ring is -- the higher the burst of life. It seems to me that as far as I know this is the first time that similar results for epifauna of the cold rings of Sargasso Sea have been obtained.

Would you or any of your readers happen to know anything about the tendency? I specialize in the

study of deep water Madreporaria, but the more vast problems of Ocean Life interest me as well. -- NATALIA KELLER, Moscow, U.S.S.R.

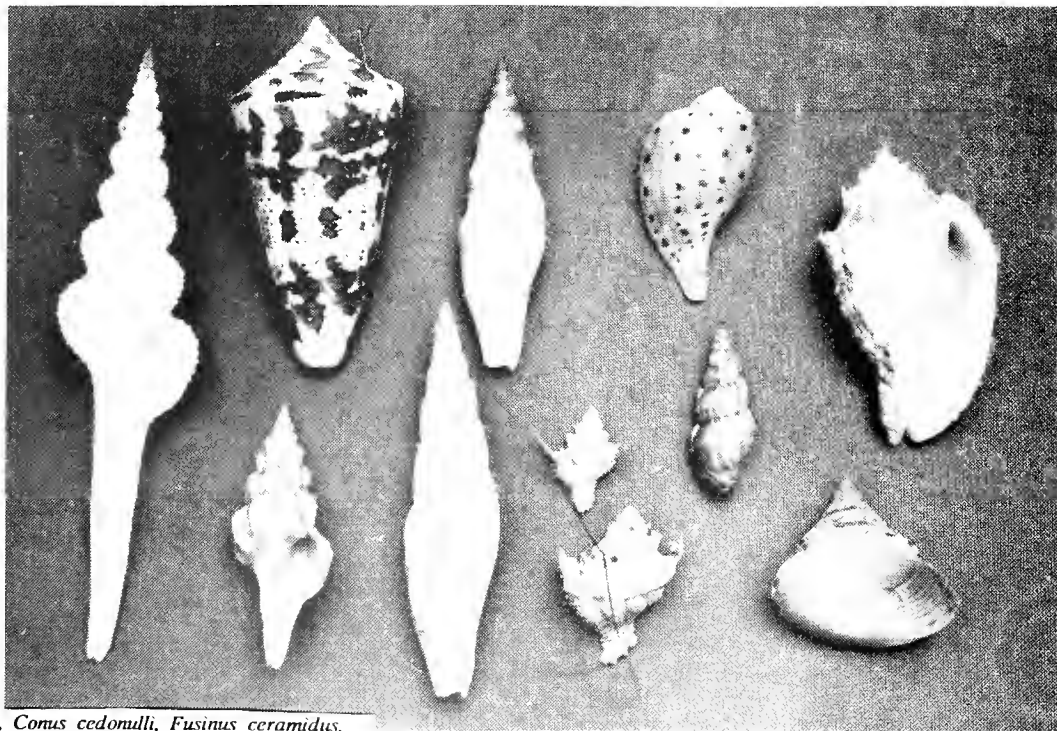
\* \* \* \* \*



Rare Cones from deep water, off the west coast of Barbados, West Indies.

Top row, left to right: *Conus cedonulli*, *C. centurio*, *C. ampliurgus*, *C. villepinii*. Bottom row, left to right: *C. villepinii* (similar to type illustration), purple form of *C. villepinii* named *C. hunti* Wils & Moolenbeck, 1979), and two solid-color forms of *C. villepinii*.

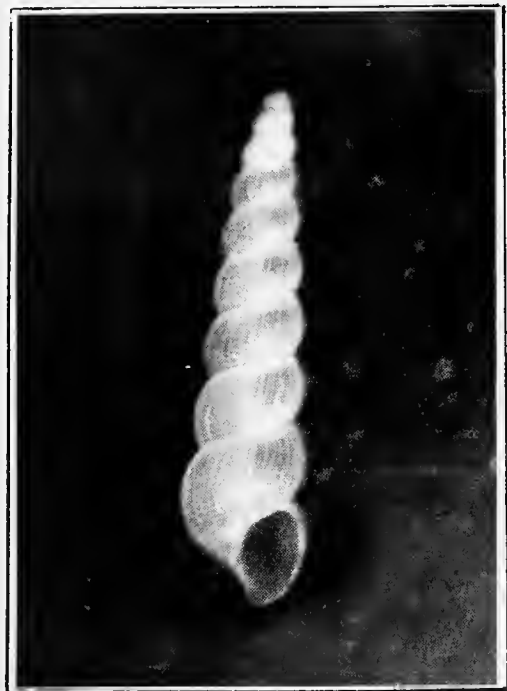
Photo by David Hunt



Jewels of the deep benthos. left to right: *Fusinus eucosmius*, *Conus cedonulli*, *Fusinus ceramidus*, (two) *Mitra (antillensis?)*, *Ficus howelli*, (two) *Latiaxis dalli*, *Phos beau*, *Morum dennisoni*, *Calliostoma* sp. These rarities from 400-600ft. depth, west coast Barbados, West Indies. Photo by David Hunt

# Notes on micromollusk collecting in the Caribbean Province.

Joanne Lightfoot, PO Box 2295, Sedona, Arizona 86336



*Aclis underwoodae* (Bartsch, 1947) Actual size 3mm. Collected from wave line, Delray Beach, Florida.

Two collecting sites in Florida have provided the material for these notes -- Atlantic Dunes Park, Delray Beach (open beach) and the small islands that support Ocean Blvd. Bridge, spanning Indian River, from Stuart to Hutchinson Island (protected bay area). All specimens were taken from beach drift, shallow water dredgings, or the wave line of both incoming and outgoing tides. In addition, since Atlantic Dunes Park has been renourished twice in the last 15 years, there is much dredge material from deeper waters deposited on the beach. The existing range of each species is from "American Seashells", Second Edition, R.T. Abbott, 1974.

## SCISSURELLIDAE

*Scissurella cingulata* O.G. Costa, 1861. One, good specimen, lip broken, wave line, Delray Beach. Size 0.9mm. Range - West Indies, Bermuda. "Distribution of Shallow-Water Marine Mollusca, Yucatan Peninsula, Mexico", H.E. & E.H. Vokes, 1983, figures this species and lists it from this area.

## RISSOIDAE

*Alvania gradata* (Orbigny, 1842). Seven, good to perfect specimens, wave line and dredge material, Delray Beach. Size 1 to 2.5mm. Range - West Indies. Vokes figures this species and lists it from the Yucatan.

*Cingula floridana* (Rehder, 1943). Three, almost perfect (white, semi-clear, no brown color), from dredge material, Delray Beach. Size 3 to 4mm. Range - Florida Keys and Gulf of Mexico to Puerto Rico.

## VITRINELLIDAE

*Vitrinella texana* Moore, 1965. Twenty specimens, fresh dead (still translucent) to whitened, all in good condition, from beach drift, Indian River. Size 0.8 to 1.5mm. Range - Texas coast. "Shells and Shores of Texas," J. Andrews, 1977, figures this species and notes the range as Florida, southern Texas.

*Episcynia inornata* (Orbigny, 1842). One, perfect specimen, from dredge sand, Delray Beach. Size 2.2mm. Range - Texas, Campeche Bank and Greater Antilles. Also, one perfect specimen from beach drift, Palm Island, west coast of Florida.

## CAECIDAE

*Caecum condylum* Moore, 1969. One, perfect specimen from dredge sand, Delray Beach. Size 2mm. Range - off Texas coast; Virgin Islands.

*Caecum heladum* Olsson & Harbison, 1953. Eight specimens, all in good condition, from beach drift, Indian River. Size - 2 to 3.8mm. Range - west coast of Florida.

## ACLIDIDAE

*Aclis underwoodae* (Bartsch, 1947). Two, perfect specimens from the wave line, Delray Beach. Size - 1.5 and 3mm. Range - Tampa Bay.

*Bermudaclis tampaensis* Bartsch, 1947. One, fair specimen, from the wave line, Delray Beach. Size 1.8mm. Range - Tampa Bay.

*Schwengelia floridana* (Bartsch, 1911). Thirty, perfect specimens, from about one pint of material, taken from the wave line -- incoming tide -- the bulk of which was just plain sand, Delray Beach. There were at least this number again of broken shells. Size 2 to 4mm. Abbott describes this species as rare and in deep water.

*Henrya morrisoni* Bartsch, 1947. Thirty specimens, fair to perfect, from beach drift, Indian River. Size 0.5 to 1.8mm. Range - Tampa to Marco, west Florida. Abbott lists two other species under this

genus, one of which, *Henrya goldmani* Bartsch, 1947, is figured in Vokes. *H. morrisoni* looks identical with *H. goldmani* and the habitat of all three species is the same -- mangrove and saline bays. It is significant that this genus is represented commonly in beach drift from the east coast of Florida and Little Torch Key where it has not previously been reported. More work is needed to ascertain if this is just one species.

#### COLUMBELLIDAE

*Deciphus sixaolus* Olsson & McGinty, 1958. The, fair to good specimens, from dredge material, Delray Beach. Size 3.2 to 4.5mm. Range - Bahamas to the lower Caribbean.

#### MARGINELLIDAE

*Marginellopsis serrei* Bavay, 1911. Three specimens, good to perfect, from wave line, Delray Beach. Size 1 to 1.4mm. Range - Lower Florida Keys and the Caribbean, Brazil.

#### PYRAMIDELLIDAE

*Odostomia teres* Bush, 1885. Sixteen specimens from beach drift, all in good condition, Indian River. Size 2 to 4mm. Also collected over 30 specimens from dredge material, Delray Beach. All perfect, still porcelaneous -- size 3 to 7mm. Range - off North and South Carolina, Cape Hatteras; Texas.

*Odostomia jadisi* Olsson & McGinty, 1958. Eleven, fair to perfect specimens, dredge material, Delray Beach. Size 2 to 3mm. Range - Atlantic Panama to Brazil. Vokes figures this species, finding it in one of seven collecting stations.

*Odostomia abbotti* Olsson & McGinty, 1958. One, good specimen, from wave line, Delray Beach. Size 1.5mm. Range - Western Caribbean. Vokes figures this species.

*Cingulina babylonica* (C.B. Adams, 1845). Three, fair to good specimens, from dredge material, Delray Beach. Size 2 to 2.5mm. Also, two fair specimens, 2mm, from shallow dredgings, Little Torch Key. Range - Bermuda and the West Indies.

#### LEPTONIDAE

*Lepton lepidum* Say, 1826. Four, single valves, perfect, from beach dredge material, Delray Beach. Size 3.8 to 5mm. Range - South Carolina, Texas.

#### SPORTELLIDAE

*Ensitellops* sp. Twenty single valves, chalky, good condition, beach drift, Indian River. Size 6.5 to 13mm. Abbott lists.

*Ensitellops protexta* (Conrad, 1841), off North Carolina, from 22 fathoms and rare; and *Ensitellops pilsbryi* (Dall, 1889), off North Carolina in 49 fathoms. Vokes figures *Ensitellops tabula* Olsson & Harbison (no date given), uncommon in their data. It is significant that this genus is found in these numbers at this location.

All of the above-mentioned species are figured in one of the three books used as reference, with the exception of *Aclis underwoodae* (Bartsch, 1947), which is figured here.

A few additional remarks about wave line collecting may be helpful. The best results have been obtained from beaches that yield a good variety in the obvious drift accumulation. The line the wave makes on the sand is collected, dried and then sifted. There is very little to be seen with the naked eye. The first sift yields the largest material, aclis, caecidae, pyramidellids, large pteropods, and small, common shells. The second, finer sift yields shells 1mm or less. Much of this material is difficult to identify, i.e. protoconchs, tiny pteropods and many unknowns. This material is similar to what is seen when viewing plankton through a low power microscope. It is a painstaking and time consuming task, but one that is very rewarding. Even after two siftings, there are microscopic shells left in the residue, with three and four whorls that measure 0.2mm!



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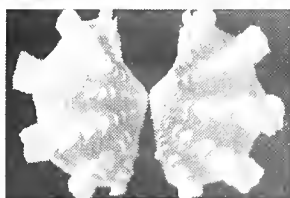
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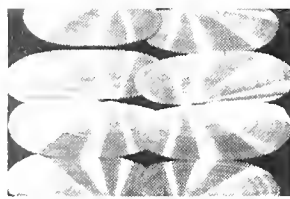
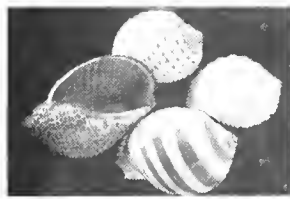
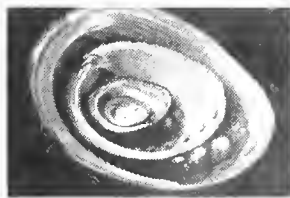
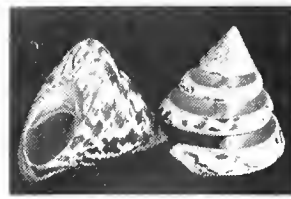
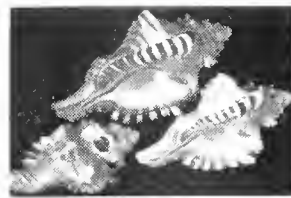
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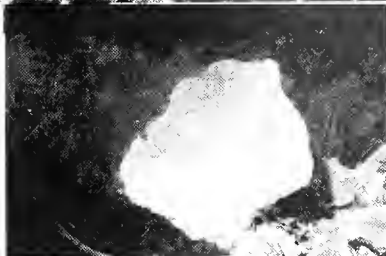
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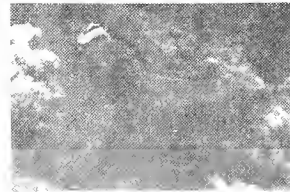
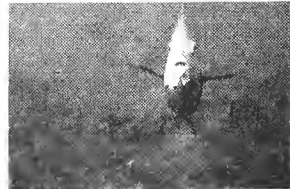
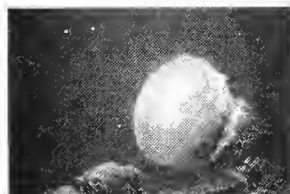


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## on the DRIFTLINE

**From Guam:** Phil Crandal made a recent trip to the Philippines and will be going again in November.

**From the Netherlands:** W. Backhuys has been to the U.S.A. for the A.M.U./W.S.M. meetings and to the C.O.A. He then travelled to the European Malacological Congress in Scotland, and, most recently, to Iceland for another conference.

**From New York:** I have organized another shell club for shellers living in the Rochester Area. "The Shell Collectors Club." It has progressed beyond my expectations. In September, 1985, we became a bonified club with officers and committees and dues. Ahead of that I had held a few meetings on a trial basis in which I gave lectures illustrated with shells. This is a day time club as many of us can no longer drive at night. The old Rochester Shell and Shore Club that I organized in 1963 has disbanded. -- Mrs. Bernice Plummer, 47 Tulane Parkway, Rochester, NY 14623

**From Virginia:** Tom Shepherd spent some time in Europe recently. One of his visits was with Kety Nicolay and her husband. *LA CONCHIGLIA* is alive and well and working to promote the Mediterranean mollusk fauna.

**From Qatar:** Has another year really gone by? I enclose herewith my subscription to *S&SL* by airmail to the usual address.

We have been away for a couple of months and it gave me an opportunity to work on the book which I hope reaches fruition by some time next year -- I never envisaged the work involved. Still I guess no one ever does.

Your advertisement realized several replies for which I am most grateful to you -- now have to fit in time to reply and satisfy all the inevitable demands on my time -- as I have to work as well! -- TONY WOODWARD

**From Florida:** For "microshell" collectors references and identification are still the major problem. Your *SHELLS and SEA LIFE* could perform a valuable service by continuing the effort started by Tom Rice -- of publishing illustrations and descriptions of microshells not described in the major references -- such as Keen, Abbott, Kay. Interest in the "micros" is growing. The publication of illustrations and descriptions would also stimulate more people to collect and learn more about these interesting little mollusks. -- JIM KEELER

**From Alaska:** [30 May, 1986] Had a poor mollusks trip on the edge of the shelf south of Kodiak Island. Mostly *Fusitriton*, a few small *Arctomelon*, and *Neptuncas*. -- RAE BAXTER

**From Brazil:** Michael Small (Canada) has transferred to Brazil and will be staying there for some time.

**From Maine:** I have only recently become interested in shell collecting and I find your publication to be a gift from above. I and my wife are in the Navy and just recently completed a three year tour

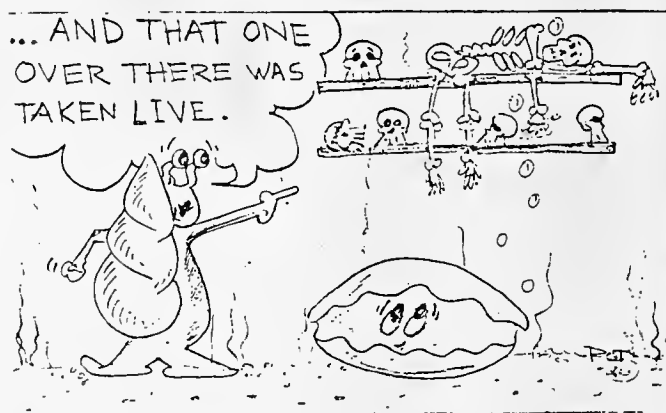
on the island of Guam. From the first moment I entered the warm (shell-filled) waters I was hooked. My collection is quite small, but that is because like most beginners I am sticking to CYPRAEA. About 1/2 of my collection is CYPRAEA and that comprises approximately 100 species of CYPRAEA. I wait with baited breath each month for my issue. I have written to several friends back on Guam and I am sure that they too will be writing. I am counting the days until Christmas when we will be taking a vacation in Florida where we plan on some diving and some collecting. Thank you for saving me from the informational doldrums. -- DANIEL K GIGSTEAD

**From Brazil:** Eveline Mareus broke her leg in Europe and spent quite a while in the hospital before she was allowed to return to Brazil. Our best wishes to you.

**From the Philippines:** Carlos Leobrera (Carfel) is shipping *Shells of the Philippines* and has been busy travelling around promoting the book.

**From Florida:** Allow me to extend my admiration and compliments to your creative solution to your publishing problems -- very impressive!

Now, although my stand on live shell collecting is not exactly a popular one, it's apparently acceptable to one degree or another by most folks I've encountered. I decided to "raise the consciousness" of the readers of the weekly newsletter I write down here in shell land and asked a young artist friend, Roger Owen Trier, to illustrate a "cartoon" I came up with. While I would not want to step on the toes of the enormously talented Scooter Beers, whose cartoons are probably destined to syndication, I hoped you may be able to print Roger's and my offering in one of your publications. -- PAM SCOTT, 16861 Davis Rd. SW #824, Ft. Myers, FL 33908



**From Illinois:** My interest in specimen sea shells began in 1967, as an active diver and collector of shells off the coast of Puerto Rico, while assigned to Ramey Air Force Base in Puerto Rico, for three years, as a Captain, USAF. Since returning to the United States in a civilian status in late 1970, I have been a resident of a suburb close to Chicago, Illinois, with my wife and three children and have contented myself with shell club participation, with infrequent diving trips to Puerto Rico and the Florida Keys and with expanding my modest collection of several thousand specimens which I acquired through diving --



with trades and purchases, to include shells worldwide, several dozen "key" shells, and two hundred or so current and out of print books on shells and sea life. Being in financial and regulatory management for Illinois Bell Telephone Company, an attorney, a college instructor, an elected public official and a avid tennis player as well as a marathon runner -- I freely admit that not all of my waking moments have been spent devoted to shells and related subjects -- although, for sure, some of my most pleasurable have been, and certainly some of the nicest people I have met, I have come to know through shelling and related interests.

Looking through the Dealer Directory published in the June Supplement of **SHELLS and SEA LIFE** -- made me realize that it has been several years since I made a general mailing for free dealers lists and catalogues, which I actively use to develop my collection. I would greatly appreciate your lists and/or catalogues. Please respond to: -- H. RICHARD WINTERS, 23 Blue Grass Court, Oak Brook, IL 60521

**From Qatar:** Seems sad in some ways to leave Doha after 6 years but I am really looking forward to Dubai and the U.A.E. in general. At least I should be able to devote more time to shells soon as I have been able to hand over chairmanship at the Doha Sub Aqua Club to someone else. Along with commitments to the Natural History Society and guest lectures, TV programs, etc. plus a full time job it was all becoming a bit too much.

Had a really good 2 week trip to the Seychelles, more of that later I hope -- and some very good dives around a 2-1/2 year old oil tanker some 4 hours out from Doha. It sank after a fire (not a war casualty) and thankfully caused no pollution. It lies in 30 meters of water and has become a paradise for fish

and invertebrate life. The finds I have had there are well worth an article which I promise I will do my best to write soonest! Also received some close up lenses for my Nikonos camera but sadly the flash had to go to Japan after a flood. So after repair I hope to send some underwater shots of interest.

After September, 1986, my address will be: A. Woodward, c/o Al Habtoor Motors, PO Box 9879, Dubai, U.A.E.

**From Denmark:** Other news: I spent 3 weeks in Hong Kong in April, participating in the 2nd International Workshop on the Marine Flora and Fauna of Hong Kong and Southern China. I got 3 new species of Ascoglossa, besides several of the species I found during my last visit in 1983. This time I also had the time to do some experimental work on the feeding behavior of these animals. - KATHE JENSEN, Zoologisk Museum, Universitetsparken 15, DK 2100, Kobenhavn, Danmark

**From Philippine Islands:** ... I have just started a shell club here in San Miguel (Sand Miguel Sand Dollars) and would like to amass a club library -- we are an off-shoot of the San Miguel Coral Climber Scuba Club. ... I am interested in starting a monthly newsletter. I was in the Guam Shell Club with Capt. Alexander Roth for several years and was **SHOCKED** to find out that there was no operating shell club at Subic Bay, Cubi Point or San Miguel -- I mean, this is the Philippines -- Shell Heaven! I will most likely start a club at Subic as well -- that is where I work. San Miguel is a small temporary housing/communications base 50 minutes drive north of Subic Bay. I do a lot of nite diving -- excellent coral reefs -- beautiful! -- Danny McBride, Naval Communication Station Philippines, Box 504, FPO San Francisco, CA 96656-0007

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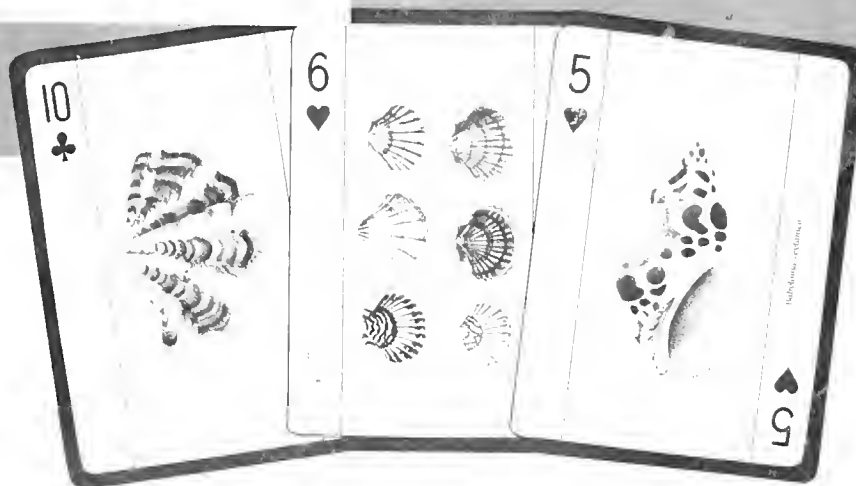
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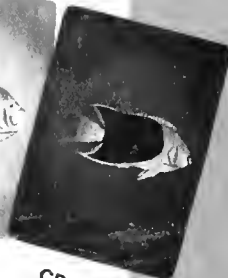
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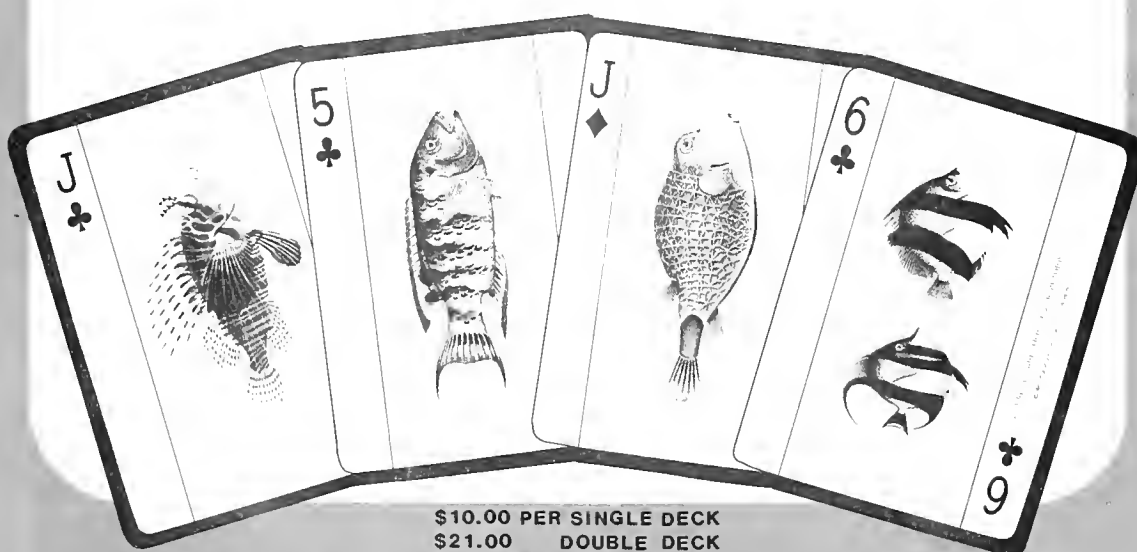
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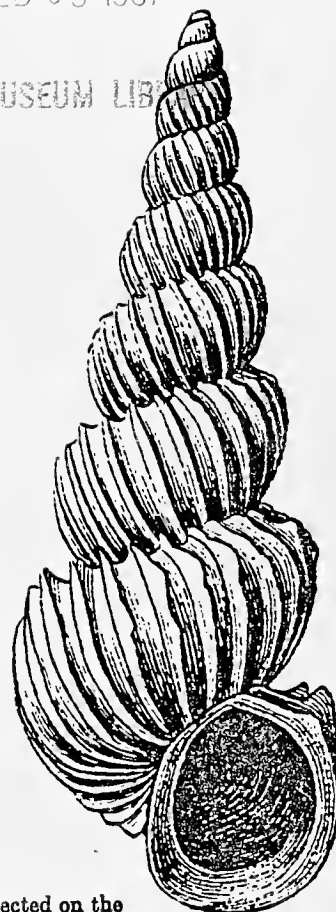
*Epitonium indianorum* (Carpenter, 1864)  
Money Wentletrap

Forrester Island, Alaska, to Baja California.



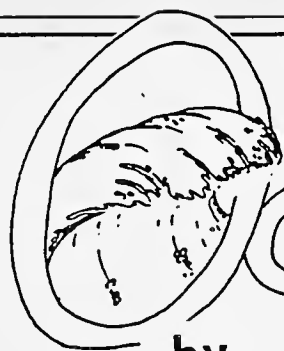
EPITONIUM SAWINAE Dall, 1907.

This species has 16 to 19 varices more or less flatly reflected on the base, and ranges from Vancouver Island to San Diego, California, and possibly to the Gulf of California.



Figures from: Abbott, 1974. American  
Seashells. & Dall, 1921. Summary  
...Marine Shellbearing Mollusks....

In This Issue: *Xenophora*, wentletraps, anemones, nudibranchs -- and more!



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## EDITOR'S NOTES:

We will highlight various aspects of shells and sea life during 1987. One of the first issues will highlight clubs, conventions and shows as soon as we get enough response from the individual groups. Several clubs have already sent information and we hope that many more will respond. We need to know all events scheduled for 1987 as well as the basic information on meeting dates, club publications and membership information. Other lists under consideration include shell dealers, publications, dive shops and travel resources.

The December issue should follow closely after this issue. New publications, Truk Lagoon Shelling, the 1986 index and other articles will be included along with regular features.

We have made another investment in equipment to improve the quality of *Shells and Sea Life*. The new type styles should be much more readable -- let us know. If there is a strong preference for the "Times Roman" type fonts used in past issues, we can return to them.

Yours sincerely,



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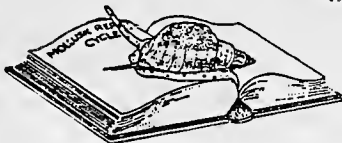


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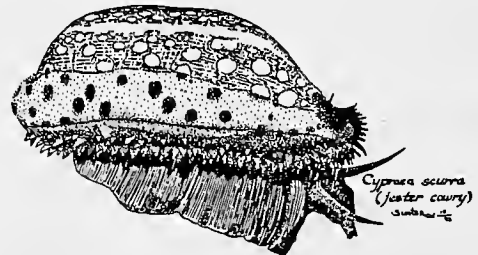
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## IN MEMORIAM

Virginia Orr Maes - October 27, 1986



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*SHELLS and SEA LIFE* accepts notes on any aspect of malacology, fossils or related marine life. Articles should be submitted typed and double-spaced. Authors receive 10 free reprints. Additional reprints are available for purchase. Send for free booklet "Suggestions for Preparing Manuscripts for *SHELLS and SEA LIFE*." We undertake no responsibility for unsolicited material sent for possible inclusion in the publication. No material submitted will be returned unless accompanied by return postage and packing.

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# CURRENT EVENTS

## Meetings & Shows

### 1987

**Southwest Florida Shell Show**, January 16-18, Fort Myers. Contact: John Vaughan, Box 05962, Tice, FL 33905, (813) 693-1913.

**Astronaut Trail Shell Show**, January 23-25, Melbourne Auditorium, Melbourne, Florida. Contact: Bobbi & Jim Cordy, 385 Needle Blvd., Merritt Island, FL 32952, (305) 452-5736 or: Doris Underwood, 9022 Brighton Court, W. Melbourne, FL 32904, (305) 724-2449.

**Greater Miami Shell Show**, January 30-February 1, North Miami Armory. Contact: Beverly Larson, 8850 Byron Ave., Surfside, FL 33314, (305) 868-0145.

**Broward County Shell Show**, February 6-8, Pompano Beach. Contact: Richard Sedlak, 4501 S.W. 30th Way, Ft. Lauderdale, FL 33312, (305) 989-8051.

**St. Petersburg Shell Show**, February 14-15, Treasure Island. Contact: Bob & Betty Lipe, 440 75th Ave., St. Petersburg Beach, FL 33706, (813) 360-0586.

**Sarasota Shell Show**, February 20-22, Sarasota, Florida. Contact: Betty E. Hamilton, 1240 Primrose, Venice, FL 33595, (813) 497-2809.

**Naples Shell Show**, February 20-22, Naples, Florida. Contact: Terry Fitzgerald, 660 York Terrace, Naples, FL 33942, (813) 598-2579.

**Third California Islands Symposium**, March 3-5. Contact: Dr. Eric Hochberg, Santa Barbara Museum of Natural History, 2559 Puesta Del Sol Rd., Santa Barbara, CA 93105, Phone: (805) 682-4711.

**Sanibel Shell Fair**, March 5-8, Sanibel Island, Florida. Contact: Ralph Moore, 1214 Gulf Dr., Apt. E2, Sanibel, FL 33957, (813) 472-4202.

**Marco Island Shell Show**, March 10-12, Marco Island, Florida. Contact: Evelyn & Malcolm Currier, 809 Dandelion Ct., Marco Island, FL 33937, (813) 394-7898.

**Shellarama 87**, March 13-15, Sea World, Orlando, Florida. Contact: Dave Green, Central Florida Shell Club, 5883 Pitch Pine Dr., Orlando, FL 32819, (305) 345-0286.

**Western Society of Malacologists**, June 21-25, 20th Annual Meeting, San Diego State University, San Diego. Call for papers is out. Contact: Carole M. Hertz, San Diego Natural History Museum, PO Box 1390, San Diego, CA 92112, (619) 232-3821 ext. 228.

**Western Society of Naturalists**, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

\* \* \* \* \*

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We would especially like to hear of overseas shows and meetings. Thanks to Donald Dan for keeping us informed of many of these dates.

\* \* \* \* \*

## AMERICAN LITTORAL SOCIETY 1987 Field Trip Schedule

January 1	Annual New Year's Day Beachwalks
January 31-Feb. 7	Tortola Dive/Study
March 11	Film Symposium, New York City
March 21	Oyster Dive I, Chesapeake Bay
April 4-11	Belize: Rain Forest and River
April 19-24	Cumberland Island Camping
April 29-May 3	Dismal Swamp Canoe/Camp
May 15-17	Cape Cod Whale Watch
May 17	Red Knots/Horshoe Crabs, Delaware Bay
June 5-7	Pine Barrens Weekend I
June 11-14	Maine Coast Weekend
June 19-21	Montauk Weekend
June 28	Gulf Stream Billfish Tagging, Hatteras
July 12	Wreck Diving I
July 17-20	Island Ecology, Isle of Shoals
July 18	Shark Tagging
August 2	Annual Crab Feast, Oxford, MD
August 9	Wreck Diving II
September 11-13	Pine Barrens Weekend II
September 20	Wreck Diving III
September 25-27	Cape May Birding Weekend I
October 9-12	26th Annual Meeting (Tentative)
October 16-18	Capy May Birding Weekend II
November 4-8	Suwannee River Canoe/Camp
November 19-22	Assateague Fall Weekend
November 20-27	Bonaire Dive/Study
November 21	Oyster Dive II, Chesapeake Bay
December 6	Diver's Environmental Institute
December 12-19	Sanibel/Captiva Week, FL

For more information, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

\* \* \* \* \*





# A diet that stings; sea anemones as food for snails.

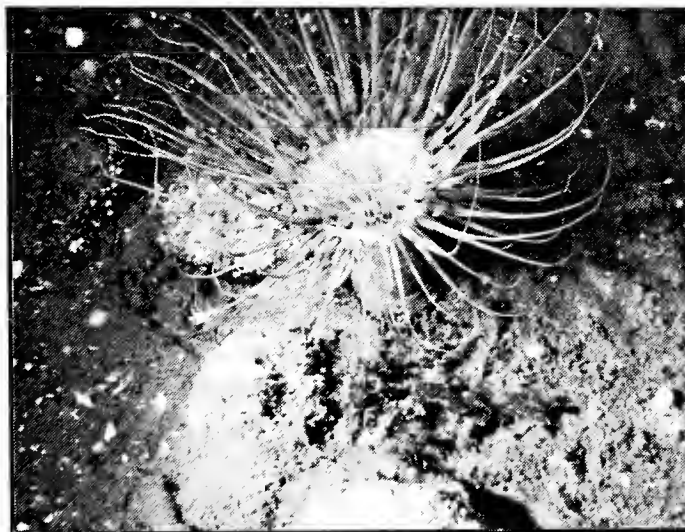
Ronald L. Shimek, PO Box 69793, Seattle, Washington 98168

We are accustomed to thinking of opisthobranchs as predators of cnidarians such as sea anemones, hydroids, and sea pens, and probably most of the molluscan predators of these groups are indeed opisthobranchs. Nonetheless, some prosobranchs are also predators on coelenterate flesh. In temperate waters, perhaps the most notable of these are wentletraps, *Opalia* and *Epitonium*. Subtidally, in the Pacific Northwest, several species of *Epitonium* are found, but seldom are they abundant.



*Epitonium indianorum* near *Pachycerianthus*. Waldron Island, Washington, -20m, July 2, 1982. Ronald L. Shimek photo.

One of the largest of these, *Epitonium indianorum*, is found in areas that have high concentrations of its prey, the tube dwelling cerianthid sea anemone, *Pachycerianthus fimbriatus*. In these areas, the snails can be found around the base of the anemone's tube. The cerianthids are very sensitive to disturbance and will withdraw rapidly into their tubes when they are touched. This response appears to help them avoid being eaten by their major predators in this region, the large *Dendronotus iris*, which can consume entire anemones in rather short order. The wentletraps get by the defenses of the anemone by stealth and sloth... Moving at a snail's pace, they creep under the crown of tentacles, and approach the side of the tube. Apparently they move so slowly, that they just don't disturb the anemone enough to trigger the escape response. Then they insert their proboscis through the tube and into the anemone, which does not seem to respond to the puncture. The snail remains buried next to the column of the anemone eating its flesh, while the anemone seemingly ignores it.

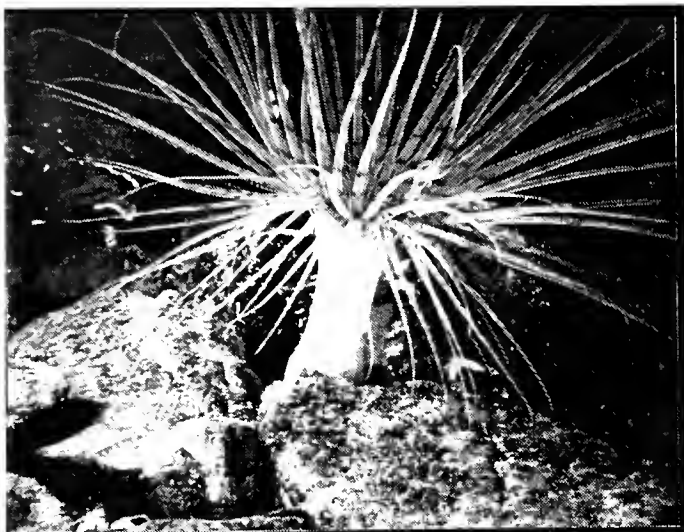


*Pachycerianthus fimbriatus*. Camano Island, Washington, Camano State Park, -10m, July 4, 1976. Ronald L. Shimek photo.

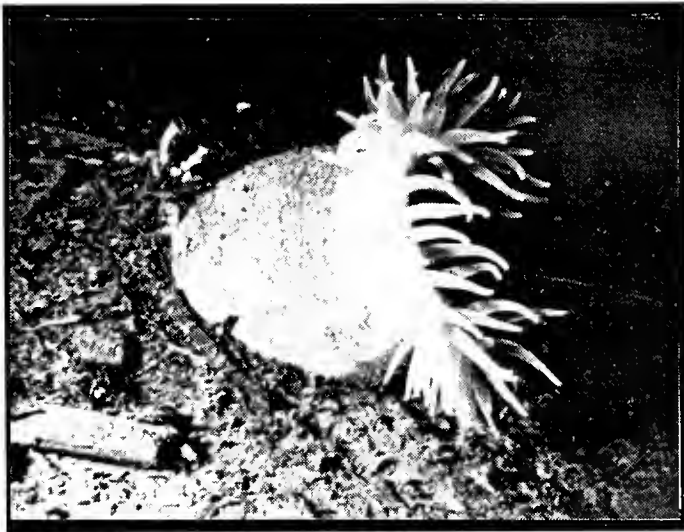


*Dendronotus iris* and eggs. Wizard Island, B.C., Canada, -17m, June 24, 1983. Ronald L. Shimek photo

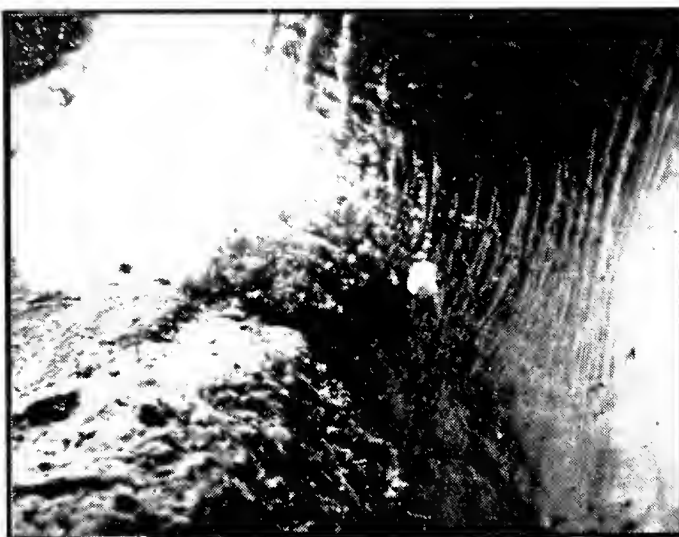




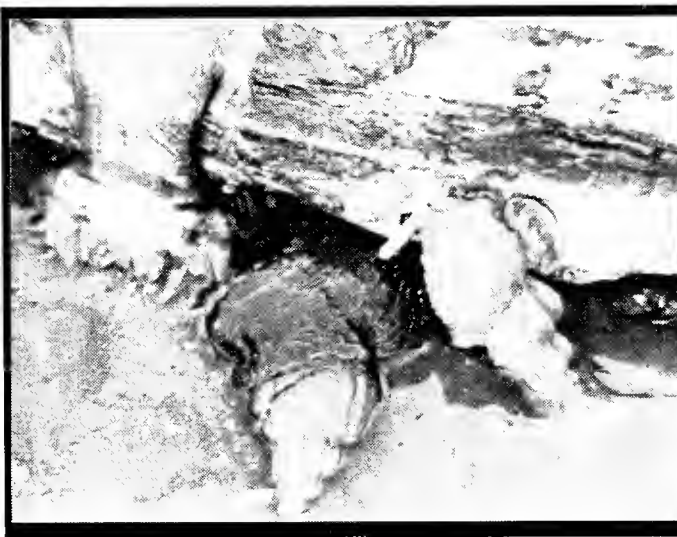
*Pachycerianthus fimbriatus*. Saanich Inlet, B.C., Canada, -20m, March 30, 1983. Ronald L. Shimek photo.



*Stomphia didemon*. Lowell Point, Alaska, -25m, November 13, 1977. Ronald L. Shimek photo.



*Epitonium sawinae* on *Stomphia didemon*. San Jose Island, B.C., Canada, -20m, July 13, 1984. Ronald L. Shimek photo.



*Beringius kennicottii* eating *Urticina crassicornis*. Note proboscis of upper snail, Homer, Alaska, September 7, 1979. Ronald L. Shimek



*Stomphia didemon* with *Epitonium sawinae* on the column. British Columbia, Canada, -27m, June 15, 1984. Ronald L. Shimek photo.

A smaller wentletrap, *Epitonium sawinae*, is found in deeper waters and preys on the swimming anemone, *Stomphia didemon*. When *Stomphia* is approached by any of several species of sea star predators, it will detach from the substrate and swim clumsily away. Sometimes, this same response is elicited by the opisthobranch, *Aeolidia papillosa*. The response is not triggered by the *Epitonium*, this small snail appears to be able to crawl up the column of the anemone without the anemone starting its escape response; when it finds a suitable site, it inserts its proboscis, and starts to feed. I have seen as many as six snails on the sea anemone consuming its tissue.

A similar method of feeding is seen in the much larger buccinid gastropod of the northern seas, *Beringius kennicottii*. Although this species is most commonly found in the shallow subtidal environments of south central Alaska, and the Aleutians, it occasionally ventures into the intertidal in areas where the tidal range is extreme. Around Homer, Alaska, on the southern Kenai Peninsula, *Beringius* can sometimes be found in the low

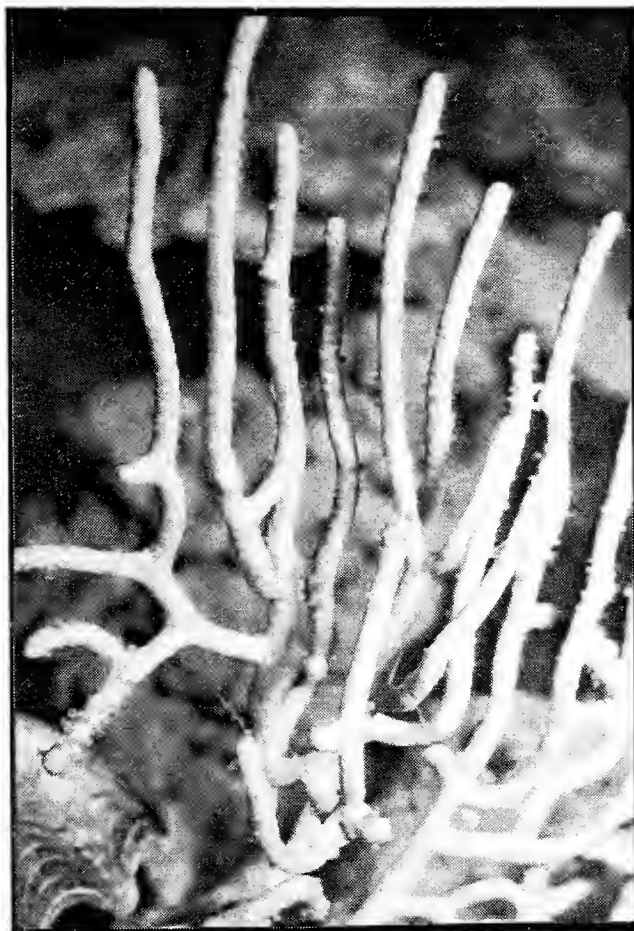
intertidal areas on extreme tidal exchanges. In these areas, *Beringius* eats the relatively large intertidal sea anemone, *Urticina (Tealia) crassicornis*. This anemone reaches diameters of 10 centimeters or more in those areas, and it is relatively common. When a hungry *Beringius* encounters a suitable anemone, it extends its proboscis, cuts a hole in the outer epidermis of the anemone and proceeds to eat the inner tissues of the prey, leaving just the outer husk. The meal takes a couple of days, and then the snail crawls away.

Other prosobranchs, particularly in the tropics where *Cyphoma* and *Simnia* specialize on gorgonian soft-corals, eat the flesh of cnidarians. Nonetheless, in the temperate seas, the cnidarians seem to be much more at risk from the depredations of their much more common and voracious opisthobranch predators.

## What is it?



*Anemonia sulcata*, Blue Sea Anemone. Photo by E.R. Degginger



Gorgonian coral, Sri Lanka. Photo by E.R. Degginger

# Xenophora (Subgenus Onustus) Swainson 1840 - The Flange Builders

Kate St. Jean, Longview, Washington

Several thousand miles separates the four *Xenophora* that are the flange builders. The *Xenophora* (*Onustus*) *indica* Gmelin, Pliocene, Seria Formation, Sarawak Malasia, and the *Xenophora* (*Onustus*) *exuta* Reeve 1842, Pliocene, Japan; the *Xenophora* (*Onustus*) *caribaea* Petit, 1857; and the *Xenophora* (*Onustus*) *longleyi* Bartsch from the Caribbean, also with no known fossil record, have evolved a new method of protection. Instead of agglutinating shells, rocks and other debris from the ocean floor to the periphery of their shells to form a flange, those four species have produced a wide peripheral flange replacing the agglutinated material.

Two other *Xenophora* have produced a flange of prominent blunt digitations. *Xenophora* (*Stellaria*) *solaris* Linne, 1764, with no attachments on the digitations, and *Xenophora* (*S.*) *testigera digitata* von Martens, 1878, have agglutinated to each digitation a tiny piece of shell.

The flange raises the shell about 6 to 29mm above the substrate thus facilitating the animals movements over the rubble of the ocean floor. It provides a wide base so that the shell with its heavy load of debris will not become top heavy and topple over. The flange provides a canopy under which the animal can graze in safety for longer periods of time. The flange also gives the animal olfactory protection thus making it less susceptible to predation by making it more difficult to smell the animal.

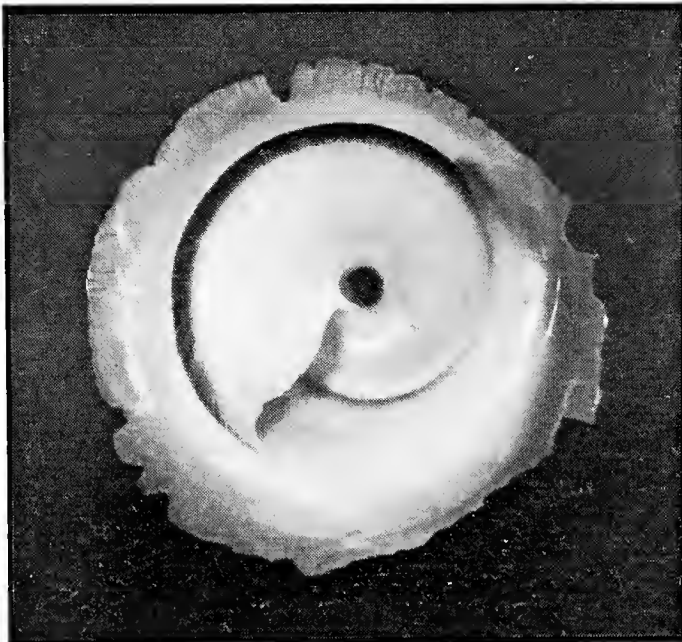
The evolution of the flange began in the Eocene period of England with the fossil *Xenophora* (*Xenophora*) *extensa* Sowerby, 1871. This flange closely resembles those of the four Recent species in the *Xenophora* (*Onustus*) group. The *extensa* has a wide peripheral flange which is porcelaneous beneath with an umbo closed by a callus. The shell is thin and has a few attachment scars. The other Eocene species, *Xenophora* *aegyptica* Oppenheim, 1906, from Egypt, and an unnamed species known from a mold in the British Museum, from the Eocene-Oligocene of Jamaica, are taller-spined but otherwise appear to be similar to *extensa* and species of the *Onustus* in general.

## *Xenophora* (*Onustus*) *indica* (Gmelin, 1791)

Johann F. Gmelin, 1791, came from a distinguished German family of scientists, botanists and chemists. He was a professor at Tuebingen University and edited an edition of Linne's *System Natura*. In 1791 he described and named *Trochus indicus* Gmelin, which was subsequently renamed *Xenophora Onustus indica* (Gmelin, 1791).



*Xenophora indica* (Gmelin, 1791) Dorsal view. Photo by George St. Jean



*Xenophora indica* (Gmelin, 1791) Ventral view. Photo by George St. Jean



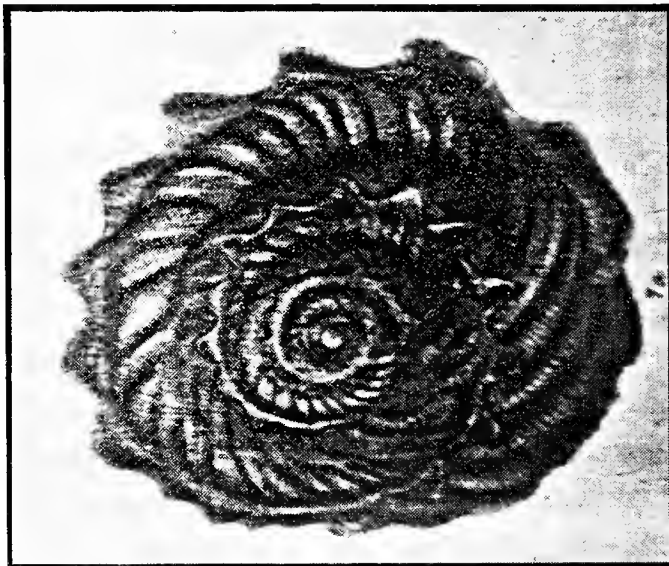
In 1797 George Humphrey, a well known English shell dealer, named the genus *Onustus* which was subsequently described by the Adams brothers in their *Genera of Recent Mollusca*, vol. 1, 1854. "Shell trochiform... covered with fragments of shells and stones near the suture and apex, periphery surrounded by tubular spines or radiating processes; umbilicus wide and deep; outer lip produced above, receding far beneath.

William Swainson, an important English conchologist and publisher, published (1840) *The Treatise on Malacology* in which he named and described the sub-genus (*Onustus*) Swainson, the Genus in which the four *Xenophora* that produced flanges are now placed. Swainson's description of the *Onustus indica* follows:

The *indica* has a thin shell, with a wide peripheral flange, simply and weakly digitated. Porcelaneous below. Umbilicus narrow to wide, sometimes plugged with a callus. Foreign objects attached to the apex are small and inconspicuous, leaving most of the shell surface exposed. *Onustus* means burdened or loaded which is a curious name for a genus that has few if any attachments. Flange measures 70mm.

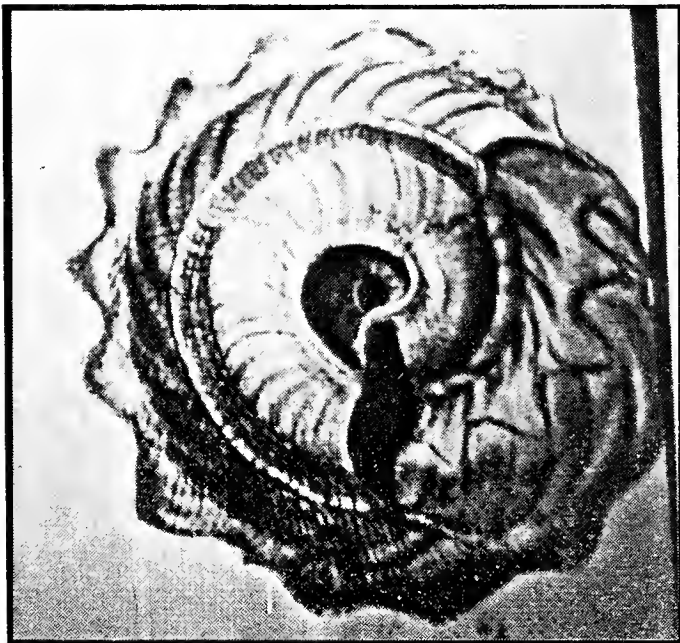
Lovell Reeve in his *Conchologia Systematica* (1841-42) describes the *indica*. "Shell orbicular, convex, sharp at the apex, very thin, very finely striated, white rose tinted toward the upper part, the periphery of the whorls is dilated, very acute, under the surface deeply umbilicated, and brown banded." I never remember seeing this shell with any shells or pebbles attached to it but the first two or three whorls sufficiently indicate that some have been agglutinated to it at one time or another by the numerous indentations which they exhibit.

Reeve gives the habitat as Conchin China and Dr. Ponder lists the habitat as the tropical Indian Ocean, excluding the Arabian Sea, Indo-China and western Pacific and tropical eastern Australia.



*Xenophora exuta* Reeve, 1842, dorsal view. Photo by George St. Jean of photo in Reeve, *Conchologia Systematica*.

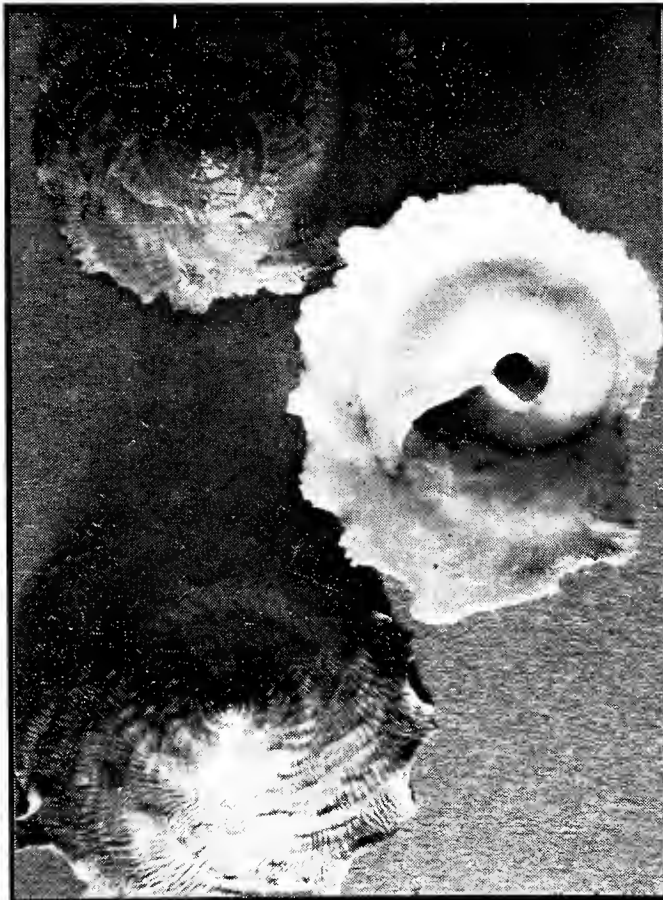
flange which consists of creamy white scallops. The flange measures 65mm in width. The whorls on the shell are visible and are lighter at the apex, growing darker at the periphery where there is no sign of attachments. The umbo is completely open, and is diagonally curved with grooves and striae. The base is a shiny cream color varying from orange to brown or white. A few tiny imprints of attachments are visible on the protoconch.



*Xenophora exuta* Reeve, 1842, ventral view. Photo by George St. Jean of photo in Reeve, *Conchologia Systematica*.

### *Xenophora* (*Onustus*) *exuta* Reeve, 1842

This shell is very similar to *Xenophora indica* and resembles it in general features, but it is flatter, has a stronger and more undulating edge to the peripheral

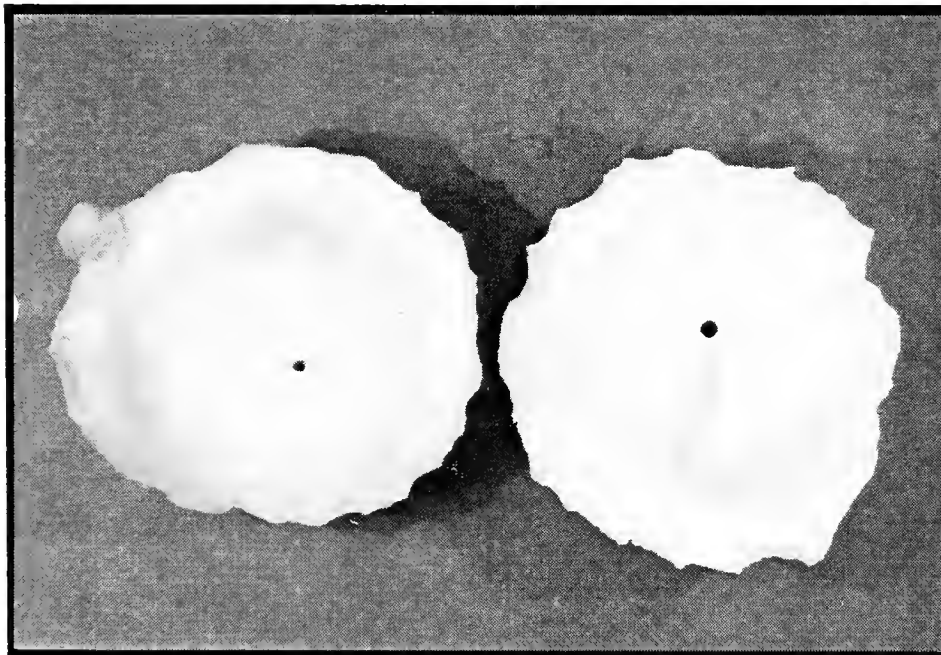


*Xenophora exuta*, dorsal & ventral view. Photo by George St. Jean

Dr. Ponder lists the distribution and habitat as central Indo-Pacific from southern Japan to southern Indonesia, tropical Western Australia and Papua. The two species are sympatric throughout much of the Indo-Pacific and can be distinguished by scalloped peripheral of the *exuta* and the smooth flange of the *indica*.



*Xenophora caribaea* dorsal view. Photo by George St. Jean



*Xenophora caribaea* ventral view. Photo by George St. Jean

### *Xenophora* (*Onustus*) *caribaea* Petit de la Saussage, 1857

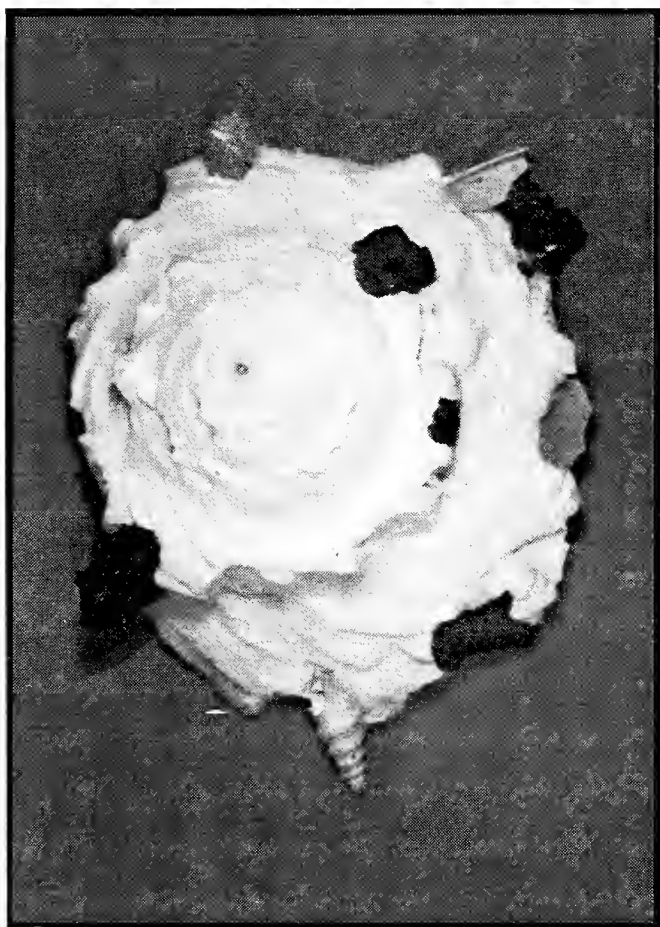
The shell is about 55mm in width (not including foreign attachments), and is umbilicated and light in structure. There are 8-8.5 whorls regularly increasing in size. The cape extends well below the body whorl and is irregularly scalloped along its margin forming the flange which is 25-35mm in width. The shell is the color of milk or glassy white, while the base is creamy.

The sculpture on the base is made of very fine concentric growth lines which develop into ridges within the umbilicus which is completely open. The attachments are few and placed regularly and neatly on the periphery and include small shells, shell fragments and other small objects.

The shell of this species can be readily distinguished from *Xenophora* (*Onustus*) *longleyi* by its smaller size and the less concave base which has a ridge around its outer edge, just inside the peripheral flange. *Xenophora caribaea* tends to occupy shallower water than the *longleyi*, the average depth for the latter species being about 400-30mm, while that of *Xenophora caribaea* is about 300-33mm. The *caribaea* ranges from N.E. Gulf of Mexico, the Caribbean Sea, and Brazil. Flange measures 60mm.

It is probable that the types of the *caribaea* are in the collection maintained by the *Journal de Conchyliologie*, France. The type locality is the island of Marie Galante near Guadelupe, Lesser Antilles collected in 20-75 fathoms.

(continued next page)



*Xenophora longleyi* dorsal. Photo by George St. Jean.

### *Xenophora* (*Onustus*) *longleyi* Bartsch, 1931

"During the summer of 1931, Dr. William H. Longley, Executive Officer of the Marine Biology Laboratory of the Carnegie Institute at Tortugas Florida, made a number of deep sea dredge hauls. In one of the hauls large living *Xenophora* were obtained in 98-125 fathoms of water, which proved to be an unidentified species of *Xenophora*, which I take pleasure in naming for Dr. Longley." - Dr. Paul Bartsch, U.S. National Museum, described the shell.

Shell reaches 140-159mm in width not including foreign attachments. It is umbilicated and light in structure. The whorls number 8-8.5 regularly increasing in size. The cape extends well below the body whorl, and is somewhat irregularly scalloped along the margin. The spire is usually extended, forming an angle of about 85 degrees. The sculpture on the base is of fine but very strong concentric growth lines.

*Xenophora longleyi* has been found at 98-150 fathoms, the 150 fathoms extending deeper than any recorded depth for *X. caribaea*. It appears to be a much more rare shell than the *X. caribaea* as it is recorded at far fewer stations than the records of the Atlantic expedition. The range is listed as off Cape Fear, North Carolina, south to Barbados.

The holotype is in the United States National Museum no. 82689 found south of Loggerhead Key, Dry Tortugas, Florida in 98-125 fathoms. W.H. Longley collector, 1931. Paratype from the same locality and station. Common name Longley's collector shell.



*Xenophora longleyi* ventral view. Photo by George St. Jean.

### Comparison of *longleyi* and *caribaea*

*Xenophora longleyi* differs from the *X. caribaea* in possessing strongly shingled or overlapping whorls, having a wider umbilicus, but lacking the submarginal depression. The basal margin is concave at the aperture and possessing fine bladeliike ridges which buttress the cape. The two species are similar in their general shape, their light structure, and in possessing fine, irregular ripple-like sculpture.

\* \* \* \* \*

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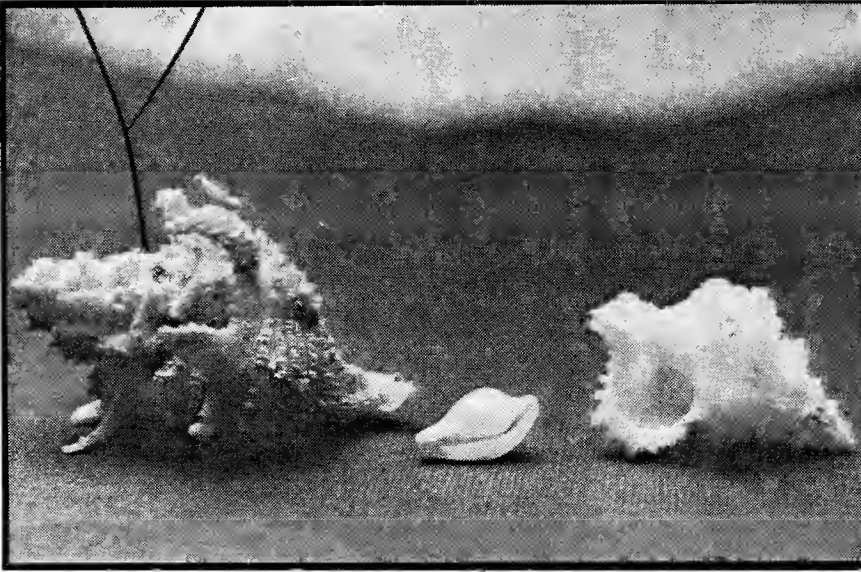
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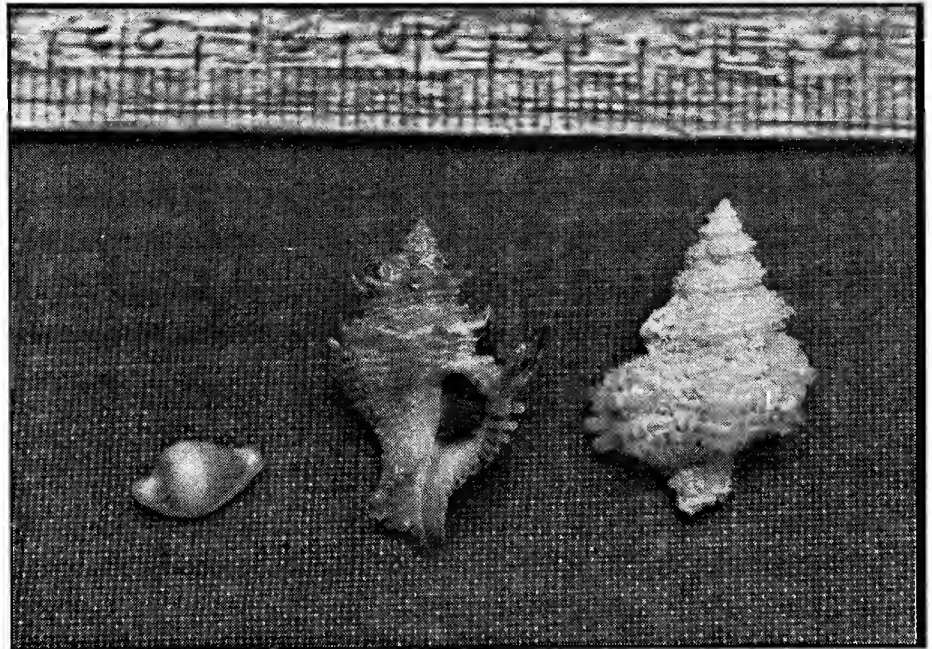


# Barbados Shells

David Hunt, Gregg Farm, St. Andrew, Barbados, West Indies



Left to right: *Latiaxis dalli* (165m depth), with small black coral tree growing on its dorsum; *Primovula carnea* Poirer, 9mm shell dredged alive at 100m depth; *Latiaxis* sp. (165m depth) that may be new to science? Photo below has same 3 species with the *L. dalli* and the *Primovula* reversed. All three shells from the west coast of Barbados, West Indies. Photos by David Hunt.

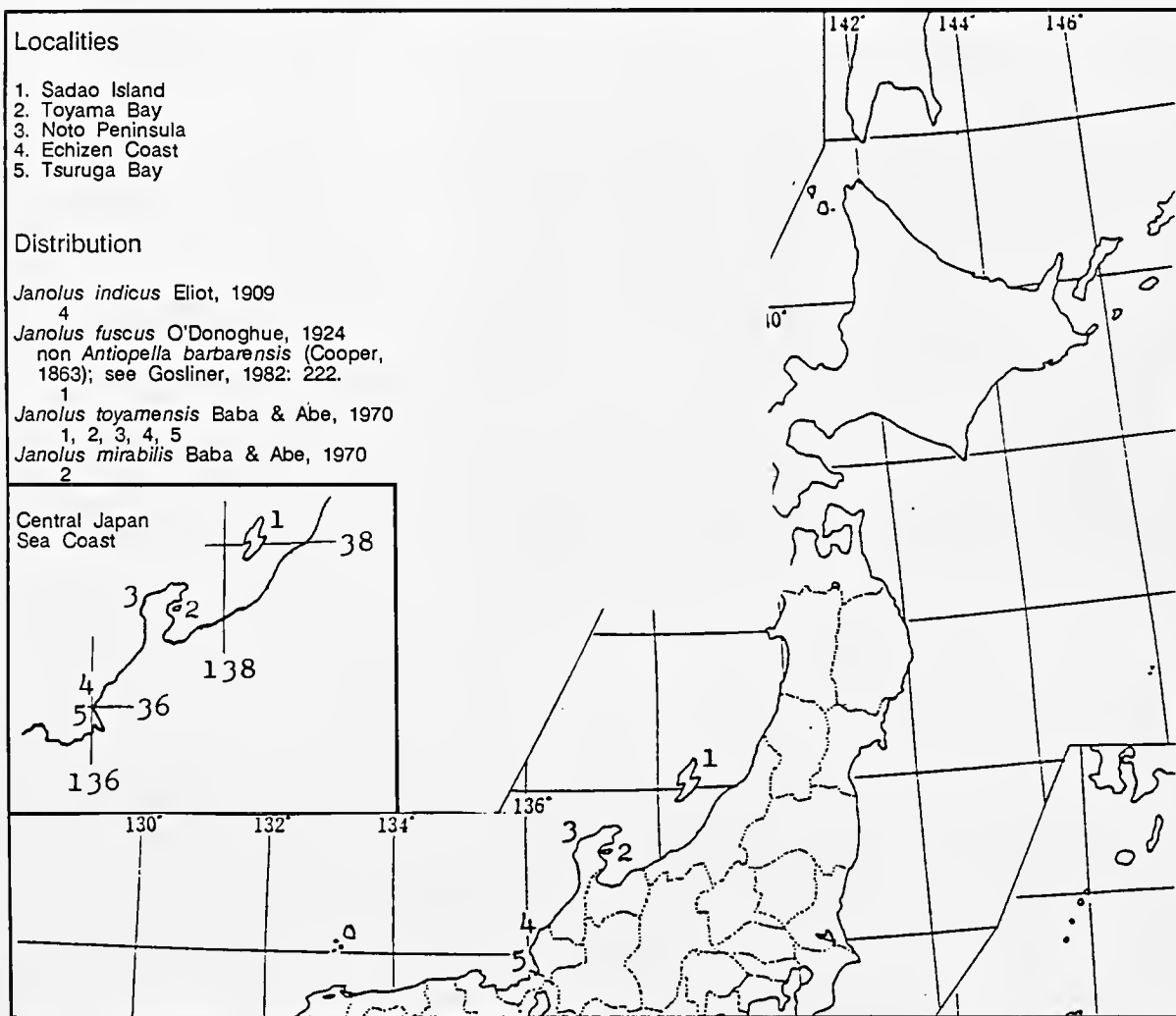


I'd be grateful if any reader that may be a serious student of either *Latiaxis* or *Mitra*, particularly Western Atlantic, would write to me, hopefully with comments, identifications, on some of the shells in the photo.

# Janolus in Japan

Kikutaro Baba, Shigigaoka 35, Minami-II-ryo, Sango-cho, Ikoma-gun, Nara-ken, Japan 636

## Data map of *Janolus* in Japan.



Gosliner, T.M. 1982. The genus *Janolus* (Nudibranchia: Arminacea) from the Pacific Coast of North America, with a reinstatement of *Janolus fuscus* O'Donoghue, 1924. *The Veliger* 24(3): 219-228.

Takaoka Biological Club 1978. Distributional list of the Opisthobranchia on the Central Japan Sea Coast. 146p., 1+10 pls., 170 meps. (in Japanese)

Takaoka Biological Club 1978. Photographic illustration of the Opisthobranchia on the Central Japan Sea Coast. 53p., 1 map, 114 figs. (in Japanese)

## *Janolus indicus* (Eliot, 1909); *Antiopella* from Tamagawa, Echizen Coast, Japan.

*Janolus indicus* (Eliot, 1909; *Antiopella*).

Tamagawa-koyanagi-umiushi.

*Antiopella indica* Eliot, 1909: 143-144. - Okhmandal, India

*Janolus indicus*. Gosliner, 1981: 30, 32-33.

**Material:** Tamagawa, Echizen Coast, Japan, 1 sp., collected by the Takaoka Biological Club, VIII-13-1966, length 30mm alive. The animal was figured by Izumi by pencil and by Abe in color.

General ground color of body brownish yellow with dark brown (chocolate brown) minute spots scattered on the back, rhinophores, inter-rhinophoral crest, branchial papillae (cerata) and sides. Orange yellow spots and a fine network of opaque white occur also on the central region of the back. The sole is brownish yellow with dark brown spots and an opaque white network. Minute conical papillae are visible on the posterior surface of the rhinophores. The branchial papillae are smooth. The liver diverticulum is branched in these papillae. The jaw plates are strong, bearing a few (2 or 3) blunt denticles on the edge. Radula much reduced in size. Radular formula 40(?) x 15-20.1.15-20. The central tooth and all the lateral teeth are smooth. Genitalia not examined.

The present animal agrees with the type of *J. indicus* in the brown-spotted body-color and in the morphology of the denticulated jaw-plates and smooth radular teeth.

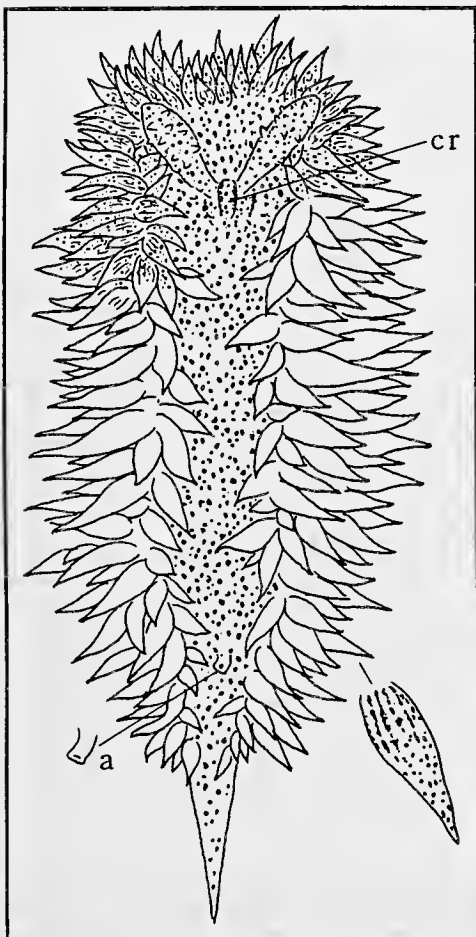


Fig. 1. *Janolus indicus* (Elliott, 1909); *Antipelle* from Tamagawa, Echizen Coast, VIII-13-1966, length 30mm alive, figured by Izumi and Abe. a - anus; cr - Inter-rhinophoral crest.

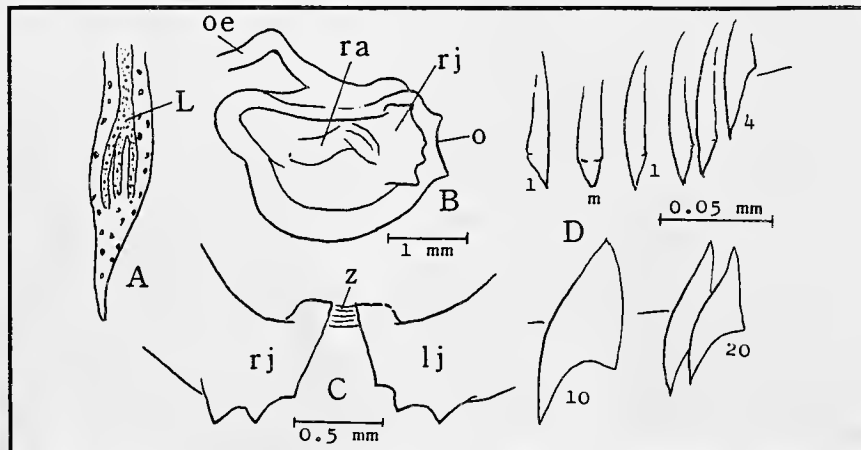
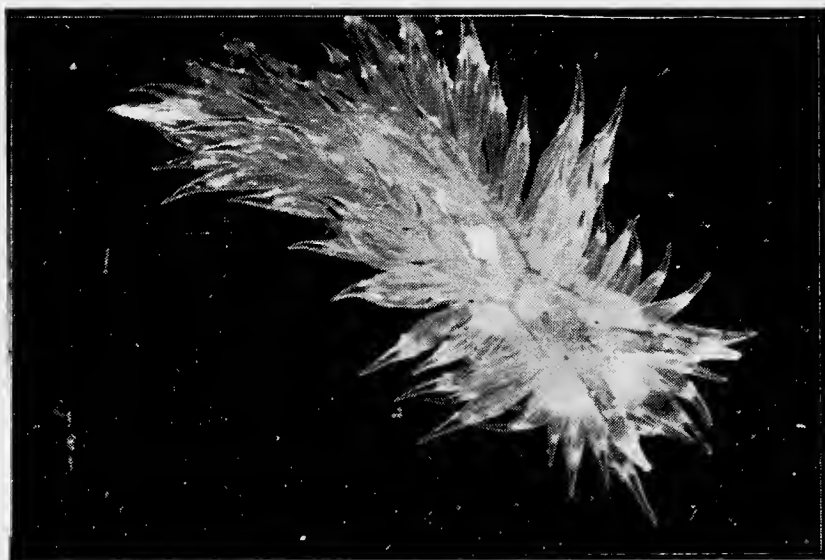


Fig. 2. *Janolus indicus* (Elliott, 1909; *Antipelle*) from Tamagawa, Echizen Coast, VIII-13-1966, length 30mm alive. Anatomy by Baba. A: Branchial papilla; B: Pharynx from the right side; C: Paired jaw-plates in front view; D: A right half-row of radula. L - Liver; Ij - left jaw; m - central tooth; o - opening of the pharynx; oe - oesophagus; ra - radula; rj - right jaw; z - ligament.

Elliott, C. 1909. Report on the nudibranchs collected by Mr. James Homell at Okhamandal in Kattliawar in 1905-6. In: Report to the Government of Baroda on the marine Zoology of Okhamandal in Kattliawar, 1: 137-145.  
Gosliner, T.M. 1981. The South African Janolidae (Mollusca, Nudibranchia) with the description of a new genus and two new species. Ann. S. Afr. Mus., 86(1):1-42, 1 pl. (color).

BABA, K., H. IZUMI & T. ABE (submitted by K. Baba, Shigaoka 35, Minami-Ii-cho, Sango-cho, Ikoma-gun, Nara-ken, Japan 636)

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*Janolus toyamensis* Baba & Abe, 1970, Kinoura, Noto, Japan, Takaoka Biological Club collection. August, 11, 1985, length 6mm. Photo by Kikutaro Baba.

\*\*\*\*\*

### *Janolus toyamensis* Baba & Abe, 1970 from Nuka, Echizen Coast, Japan.

*Janolus toyamensis* Baba & Abe, 1970.

Koyanagi-umiushi.

*Janolus toyamensis* Baba & Abe, 1970: 63-65, f. 1. - Toyama Bay; Gosliner, 1981: 31, 32-33, f. 26, C; f. 27, E; f. 28; G - Hawaii.

Material: Nuka, Echizen Coast, 3 species, collected by the Takaoka Biological Club, VIII-15, 16-1975, length 8mm alive.

General ingeugement of body pale brownish yellow with opaque white lines on the back, branchial papillae and sides. Opaque white pigment is thick on the pericardium, anal papillae and tail end. Rhinophores slightly corrugated, they are dark brown below but opaque white at the tip. Inter-rhinophoral crest black. Liver system in the body is greenish brown. It passes into the branchial papillae, and forms branches. Externally these papillae are smooth, or sparsely tuberculated. Each branchial papilla has a reddish brown tip and subapical yellow spot.

Foot sole yellowish white with opaque white lines as above. Jaw-edge with a few (2 or 3) blunt denticles. For the radula see Baba & Abe, 1970: 63, f. 1. Penis may be protruded.

*Janolus toyamensis* Baba & Abe, 1970 from Akazumi, Noto Peninsula, Japan.

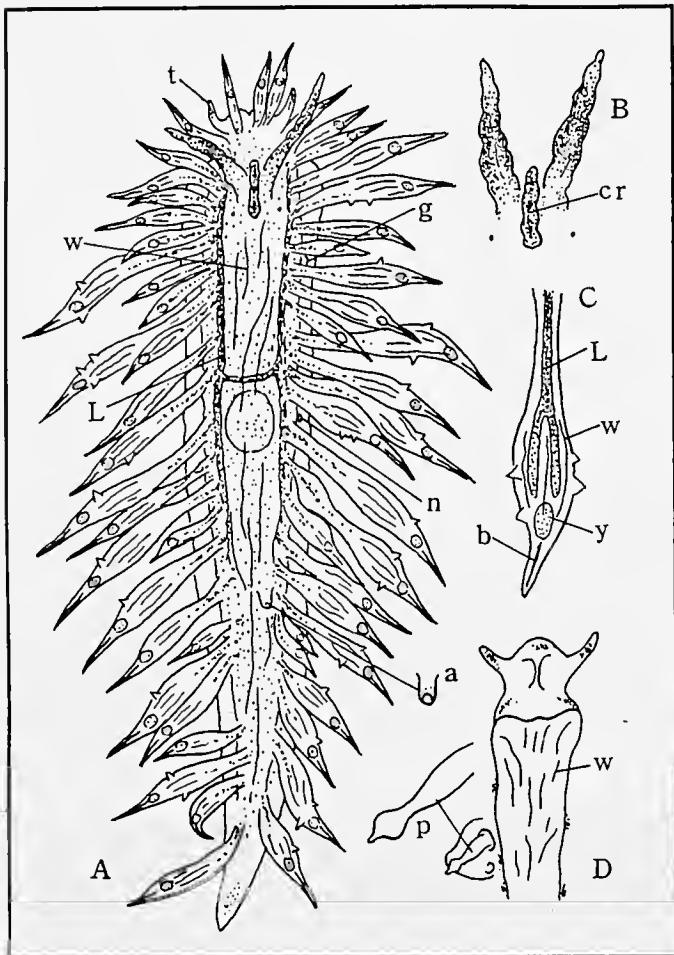
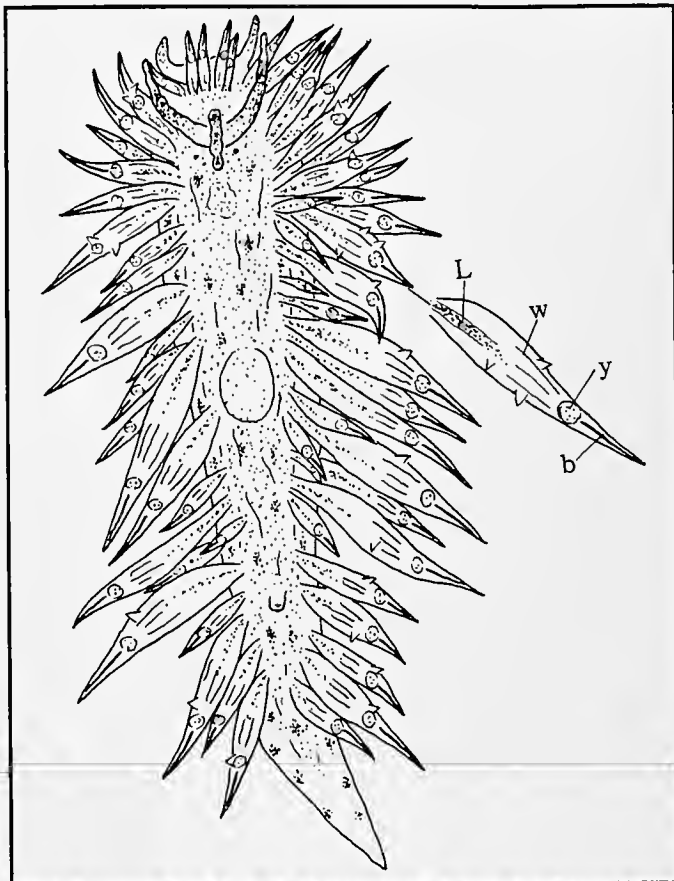


Fig. 1. *Janolus toyamensis* Baba & Abe, 1970 from Nuka, Echizen Coast, VIII-15,16-1975, length 8mm alive. A: Fully extended animal in dorsal view; B: Rhinophores; C: Branchial papilla; D: Head end foot from below. e - anus; b - reddish brown; cr - inter-rhinophoral crest; g - genital orifice; L - liver; n - nephroproct; p - penis; t - oral tentacle; w - opaque white lines; y - yellow spot.



*Janolus toyamensis* Baba & Abe, 1970. Koyanagi-umiushi. Azuma, Noto Peninsula, VIII-10-1974, 2 species, Takaoka Biological Club coll., length 7-10mm.

General integument of body yellowish white with opaque white lines and dark brown flecks on the back, sides and sole. Rhinophores dark brown, inter-rhinophoral crest black. b - reddish brown tip; L - liver; w - opaque white lines; y - yellow spot.

Jaws and radula in the type specimen of *Janolus toyamensis* Baba & Abe, 1970 (revised).

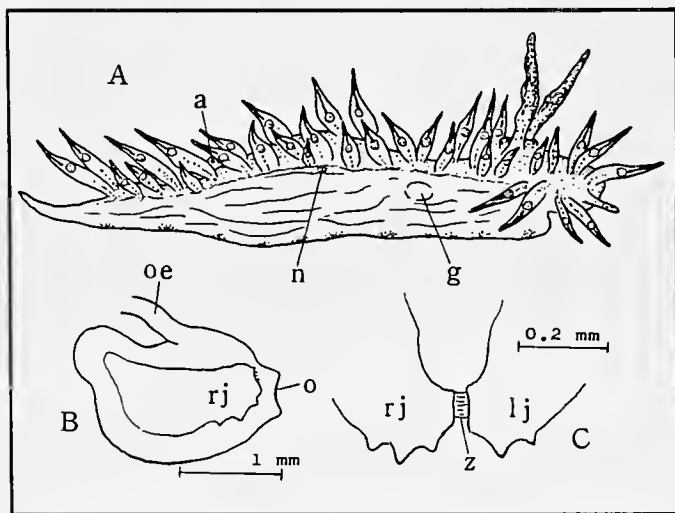
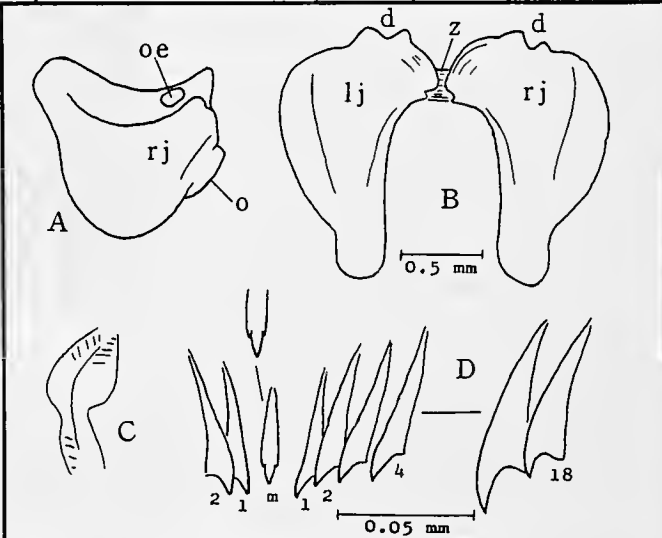


Fig. 2. *Janolus toyamensis* Baba & Abe, 1970 from Nuka, Echizen Coast, VIII-15,16-1975, length 8mm alive. A: Animal from the right side; B: Pharynx from the same side; C: Paired jaw-plates in frontal view. e - anus; g - genital orifice; lj - left jaw; n - nephroproct; o - opening of the pharynx; oe - oesophagus; rj - right jaw; z - ligament.

Baba, K. & T. Abe 1970. Two new species of Janolidae from Toyama Bay, Japan (Gastropoda: Nudibranchia). The Veliger, 13(1): 63-66.

Gosliner, T.M. 1981. The South African Janolidae (Mollusca, Nudibranchia) with the description of a new genus and two new species. Ann. S. Afr. Mus., 86(1): 1-142, 1 pl. (color)



*Janolus toyamensis* Baba & Abe, 1970 from Nakate near Abugashima, Toyama Bay, VIII-4-1960, length 10mm. A: Pharynx from the right side; B: Paired jaw-plates from outside; C: Radula; D: A right half-row of radula (20 x 10-20.1, 10-20). d - denticles; o - oesophagus; lj - left jaw; m - central tooth; rj - right jaw; z - ligament.

Baba, K. & T. Abe 1970. Two new species of Janolidae from Toyama Bay, Japan (Gastropoda: Nudibranchia). The Veliger 13(1):63-66.

# on the DRIFTLINE

~ ~ ~

## From Qatar

The book - well it is on shells of Qatar and though it is at the printers at the moment for an estimation of the costs involved per 500 copies there is still quite a lot of work to do - completing the errors etc. and identifying the few species that could not be found from my library and through friends. The work is based on my own collection - mainly because there is to my knowledge no other collector in Qatar doing any serious work who is willing to come forward and help!

The museum, although an award winning design and a very pleasant building (converted from an old Emir's palace on the seafloor) has an aquarium of super dimensions - occasionally has a shark or two and lots of grouper etc. but no malacology department. I was asked to try and sort one out but frankly I haven't had the time. I took over as chairman of the diving club here (Doha Sub-aqua Club) and enjoy that scene very much. It also greatly helps expand the scope of collecting. Some recent dives over sponges have produced lots of spectacular nudibranchs. Maybe I will try to include a few photos in the book but at this time it will be difficult especially as identification is really not my forte. Anyway I am getting into the area of micro's so another publication is possible and to beef up that one the nudibranchs would be a good complement don't you think? [ed. - YES!]

It may be that I will have to finance this book myself, I really don't know but it is also possible that a translated copy into Arabic - the first? - will goad someone into paying for it. The Government are perhaps willing to finance this one but what happens is that their Publications Department then keeps all the copies to give out on an ad hoc basis and that is not what I want - it should be available to collectors as well as interested persons everywhere. - A. WOODWARD, Doha, Qatar

## From Pennsylvania

Bonnie Cristofel of The Shell Connection is moving to Florida. She will be moving her shell business sometime before the end of February. We will list her new address and telephone number as soon as available.

## From Hungary

In the Hungarian Agricultural Museum library we have very bad, old and few seashell journals or compendiums and no seashell books. This year the Society for Popularization of Scientific Knowledge wants to exhibit my shell collection but I don't have very many shells from Central America or the South Pacific. My personal favorites are mostly Volutidae.

I will be happy to exchange Mediterranean Sea, Black Sea, Baltic Sea, Senegal, Madagascar and Asian-Arctic mollusks. All have accurate scientific names with precise locality information. In the case of deep water species, latitude and longitude data will be given along with depth. GAMBOR TOMPAI, Zoology - Invertebrates, Strobl A.u.7., H.e.p.11.em.204., H - 1087 Budapest, Hungary

## From Australia

I live 40km miles from Townsville on the Highway 78. Have an extensive non-scientific collection of shells and fossils and would welcome one or two visitors if near Townsville. I chanced to meet Clifford & Mabel Koesler of Electric City USA while they were in Queensland around ten years ago. - ARNOLD E. JOHNSON, (off Fields Road), Woodstock 4816, Northern Queensland, Australia.

## From Central California

One of my students is working with Dr. Richard Willan in New Zealand on global differences in *Berthellina citrina* (= *B. engelii*). The student, Paul Dunn, badly needs preserved material for California, Hawaii, and other known localities. Contact me for assistance getting material to Paul. - D.W. BEHRENS, P.G.&E. Bloassay Lab, PO Box 117, Avila Beach, CA 93424

## From Romania

All of my serial *Gastropoda Romaniae* is written in the Romanian language, not "Hungarian" as listed in *Shells and Sea Life*. Volume 1 has appeared in 1986 and is on the way to you. It includes a General Part (gastropod history, classification problems, general characteristics, ecology, etc.), and the subclasses Prosobranchia and Opisthobranchia from Romania. Volume 2 is at the printers. [ed. - My apology; I will correct the next listings of these books] - Prof. Dr. ALEXANDRU V. GROSSU, Facultatea de Biologie, Universitatea Bucuresti, Splaiul Independentei, 93, Bucuresti, ROMANIA

## From Alaska

There just are not enough days in the week or hours in the day to get every thing done I want to do. Back Friday [26 September] from 2 months in the Western Aleutians on a N.O.A.A., National Marine Fisheries Service chartered vessel doing resource assessment. Now have another year's worth of mollusks and fish to work up in addition to the year's worth I already had. For 1986 I already have 285 stations with about 4,000 lots of mollusks. .... Got some major range extensions - Washington to the Aleutians for 2 species of nudibranchs among others.

I leave tomorrow [2 October] for a couple of months to the lower Cook Inlet area....

As I read the letters to the editor in *Shells & Sea Life* from people complaining about the book lists in your paper I think they should think about subsidizing your operation if they don't like the way you have to do it in order to survive. I appreciate the book list as a source to improve my library (probably because I do my own collecting and do not collect, through purchase, just the large, fancy, and colorful). - RAE BAXTER, Box 96, Bethel, AK 99559

## From The Netherlands

Dr. Backhuys will be travelling in the U.S.A. during December. If he makes it to the West Coast we hope to see him in Bayside.

## From New York

We listed Richard Goldberg's phone number incorrectly in his *Driftlines* ad. Worldwide Specimen Shells correct telephone number is (718) 357-6467. Sorry for the inconvenience.

## From Denmark

There are no actual malacological journals in Denmark. The Danish Natural History Society has a journal which contains a fair number of marine articles: *Videnskabelige Meddelelser fra dansk naturhistorisk Forening*. The present editor is Dr. Ole S. Tendal, Institut for Populationsbiologi, Universitetsparken 15, DK-2100 Copenhagen O, Denmark. Almost all the articles are in English. ...there is a Norwegian marine journal *Sarsia*, which I believe is published by the marine laboratory in Bergen.

I just returned [March 86] from a brief vacation in the Canary Islands (Gran Canaria). The beach there was pretty interesting - many different algae that looked like suitable food for ascoglossans, but I only saw one species of *Elysia*. - KATHE JENSEN, Zoologisk Museum, Universitetsparken 15, DK 2100 Kobenhavn, Denmark

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A heavily annotated catalog of the most important engravings and the watercolors and drawings which were prepared as models used mainly in the "Quadrupeds," "British Birds," and "Fishes."

2 SCHUCHERT, C. *Historical Geology of the Antillean-Caribbean Region or the lands bordering the Gulf of Mexico and the Caribbean Sea.* With 16 pls. and 107 figures. 8vo, pp. xxvi, 811, very good (some wear, name stamp on pastedown), NY, 1935 \$37.50

3 FARRER, R. *On the Eaves of the World.* 2 vols., 64 half-tone photos, folding map. 8vo, pp. xii, 311, viii, 328, very good (cover wear, esp. spines, some foxing), 1st edn., London, 1917 \$115.00

4 PHILLIPS, J.C. *A Natural History of the Ducks.* With 74 color and 28 plain plates by F.W. Benson, A. Brooks, L.A. Fuertes and H. Gronvold and 118 distribution maps. 4 vols., tall 4to, pp. 1545, near fine in d.j., and worn slipcases, original boards, canvas backs, uncut, partially unopened, Boston and NY, 1922-26 \$3000.00

This rare work stands in the front rank of modern illustrated monographs. It is an exhaustive account of the ducks of the world, with synonymy, description, distribution, and characteristic habits, etc. of each species.

5 JORDAN, D.S. and B.W. EVERMANN. *American Food and Game Fishes.* A popular account of all the species found in America north of the equator, with keys for ready identification, life histories and methods of capture. With 10 color pls., numerous half-tone pls. and drawings by A.R. Dugmore. 4to, pp. 1, 572, very good (bkpl., some foxing), Garden City, 1922 (1902) \$45.00

6 MULLENS, W.H. and H.K. SWANN. *A Bibliography of British Ornithology, from the earliest times to the end of 1912.* 8vo, pp. xx, 691, new, cloth, 1917 Facsimile Reprint, Hitchen, 1986

Comprises not only detailed descriptions of the books but biographies of the authors and critical comments on their work. \$65.00

7 JACKMAN, E.R. and R.A. LONG. *The Oregon Desert.* With 16 color illus., numerous b&w photos. 8vo, pp. xiii, 407, very good in d.j., Caldwell, 1965 (1964)

From Caxton Printers, Ltd. \$20.00

8 HUME, H.H. *Camellias in America.* With 49 color pls. and 46 b&w pls. 4to, pp. xvi, 350, very good (ink insc. on endpapers), 1st edn., 1946 \$55.00

9 *Poisonous Snakes of the World.* A manual for use by U.S. Amphibious Forces. Dept. of Navy Navmed P-5099. With color pls. and numerous b&w photos, drawings and charts. 4to, pp. viii, 212, very good (light foxing), Wash., DC, ca. 1965 \$30.00

10 MCCOOK, H.C. *The Natural History of the Agricultural Ant of Texas.* A monograph of the habits, architecture, and structure of *pogonomyrmex barbatus*. With 23 pls. of engravings on tan background with a page of explanation for each pl. 8vo, pp. 311, very good (wear at extremities, cloth is age darkened, water stains at upper corners of pages in index), Author's edition, Philadelphia, 1879 \$150.00

A presentation copy inscribed by the author. Nissen lists the book as published 1880.

11 THORNBURN, A. *British Birds.* With 80 colored plates showing over 400 species. 4 vols., 4to, original red cloth, very good (wear and staining of spines, some overall wear but very sound, some text foxing, obviously due to the quality of 'war-time' paper.) London, 1917 \$550.00

Vols. 1 and 2 third edition, Vol. 3 second edition and Vol. 4 first edition. The supplement containing two extra plates, which was issued separately with the first edition is not included.

12 ECKSTEIN, K. *Die Schmetterlinge. ihr Bau ihre Lebensweise und wirtschaftliche Bedeutung nebst Anleitung zur Beobachtung, Aufzucht und zum Sammeln.* With 18 color pls. of moths and caterpillars and 52 b&w illus. 8vo, pp. viii, 263, very good (blue pencil notes have been made on pages containing color pls. made by a collector), cloth, Wiesbaden, 1922 \$18.00

13 SERVENTY, V. *Australia's Great Barrier Reef.* With 32 pp. of illus. including 8 pp. in color. 12mo, pp. 87, very good, Melbourne and London, 1955 \$9.00

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Abbott, R.T. 1973. *American Malacologists*. 494p., soft cover. - \$16.00; hard cover - \$18.95

Abbott, R.T. 1975. *American Malacologists*. 1975 Supplement. pp.495-609, soft cover. - \$9.00

Adams, C.C. 1915. *The variations and ecological distribution of the snails of the genus Io*. Nat. Acad. Sci., NY, Vol. 12, 2nd Memoir, 164p., 81 pls. (including fold-out maps), slight water-stain, neatly rebound in boards, 4to. - \$45.00

Allan, J. 1959. *Australian Shells*. With related animals living in the sea, in fresh-water and on the land. [rev. ed.] Georgian House, Melbourne, Australia, 487p., text figs. 112, 44 pls. (many in color), cloth, worn. - \$40.00

Angel, H. 1978. *Sea Shells of the Seashore*. Book 2. Jarrod Colour Publications, Norwich, 32p., color soft cover, color illus. - \$3.00

Anguelli, S. 1978. *The seas and their shells*. A collector's guide to the seashells of the world. [translated by Jean Richardson]. Doubleday & Co., Inc., Garden City, NY, 334p., 262 illus. (250+ in color), cloth, d/j torn, lg8vo. - \$20.00

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Bergh, L.S.R. 1893. *Opisthobranchia provenant des campagnes du yacht l'Hirondelle*. Res. Camp. Sci. Albert ler., No. 4, p.1-35, pls. 1-4, 11 x 14" uncut, some spotting. - \$45.00

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Harry, H.W. 1968. *Studies on bivalve molluscs of the genus Crassinea in the Northwestern Gulf of Mexico: anatomy, ecology and systematics*. Publ. Inst. Mar. Sci., Texas, 11:85-89, figs. 1-17, photocopy. - \$3.

Hertlein, L.G. & A.M. Strong 1940-1951. *Eastern Pacific Expeditions of the New York Zoological Society. XXII. Molluscs from the West Coast of Mexico and Central America. Part I. through Part X*. Zoologica, New York Zoological Society, About 500 pages in photocopy, bound with plastic spiral binding. - \$48.00

Hofstetter, R.P. 1965. *The Texas Oyster Fishery*. Bull. 40, Texas Parks & Wildlife Dept., 39p., illus., orig. wrps. - \$3.90

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Korringa, P. 1951. *The shell of Ostrea edulis as a habitat*. Arch. Neerland. Zool., 10:32-152, 13 figs., ths (1 foldout), separate, orig. wraps. - \$18.15

Laskey, J. 1811. *XVIII. Account of North British Testacea*. Mem. Wernerian Nat. Hist. Soc., 1:370-417, front & back page photocopy. - \$5.40

Long Beach Shell Club 71948. *Shells and Shell Collecting*. Long Beach Shell Club, Long Beach, California, 72p., text figs., 8-1/2 x 11", original wraps worn & torn all spine. [Contributed papers from H.R. Hill, J.E. Rogers, E.M. Clark, E.P. Chance, J.Q. Burch & other members] - \$14.50

Masuda, K. 1972. *602. On the aspect of the Northern Pacific*. Trans. Proc. Paleont. Soc. Japan, N.S. 27:39-408, pls. 48-49. - \$4.25

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Nicol, D. 1950. *Recent species of the lucinoid pelecypod Fimbria*. J. Wash. Acad. Sci., 40(3):82-87, figs. 1-9, separate. - \$3.

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Platt, R. 1949. *Shells take you over World Horizons*. National Geographic, 96(1):33-64, 57 photos, 41 in full color, cr8vo bound in brown cloth, Fine. - \$25.00

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Taylor, J.D., W.J. Kennedy & A. Hall 1969. *The Shell Structure and Mineralogy of the Bivalve. Introduction. Nuculacea - Trigonacea*. Bull. Brit. Mus. (N.H.), Zoology, Suppl. 3, ca. 185p., 29 half-tone pls. [A clean photocopy] - \$17.50

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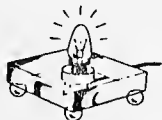
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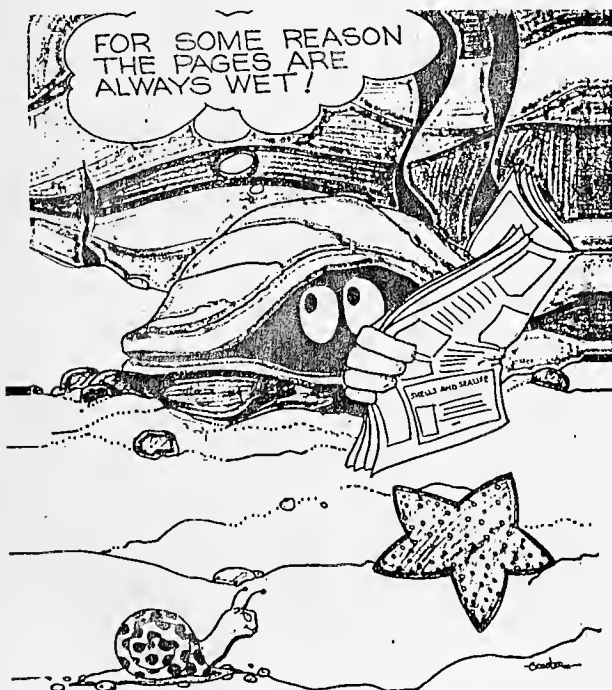
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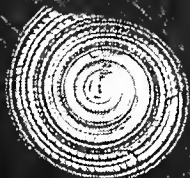
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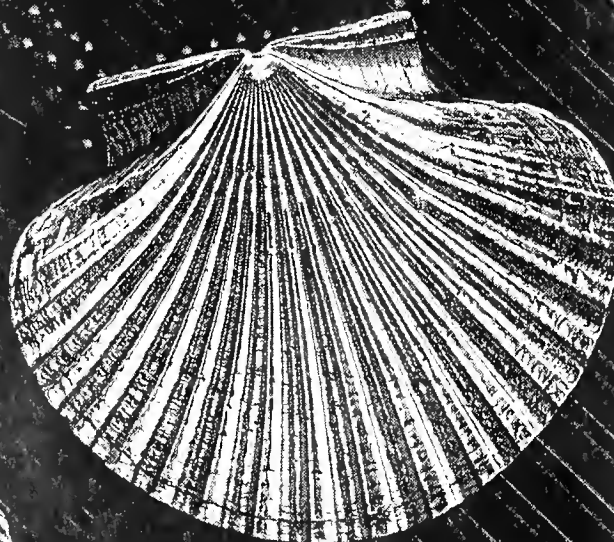
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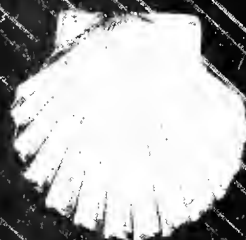
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# SHELLS AND SEA LIFE

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ISSN 0747-6078

December, 1986

Vol. 18, No. 12

## Shelling in Truk Lagoon.

Charles E. Bowen, California State Polytechnic University, Chemistry Department, 3801 West Temple Ave., Pomona, California 91768



*Haliotis pustulata* Photo by C.E. Bowen

Six thousand miles southwest of Los Angeles, California, at 7 degrees north latitude, is a 40-mile long atoll called Truk Lagoon. The lagoon and its more than a dozen islands were the site of one of America's greatest naval battles in World War II. More than 40 Japanese ships lie on the bottom of the lagoon. Although it is now illegal to remove anything attached to the ships, including shells, the numerous coral reefs nearby support a variety of mollusks that can be collected by the adventurous sheller.

Diving near the wrecks within Truk Lagoon is vastly different from California kelp bed diving. With water temperatures of 85°F in the lagoon, a full wetsuit is unnecessary. The visibility in some locations exceeds 100 feet with only a slight current. (e.g. I was able to stand upright on a horizontal deck pipe at 35 feet without hand support.)

The fluted oyster, *Lopha cristagalli* is a familiar sight on the wrecks. It can support a surprisingly massive coral structure on the moveable valve and when disturbed this bivalve closes and an entire colony of coral polyps is set into motion, quite a sight. Perusal of the wreck's overgrown superstructure reveals a variety of murex, triton and top shells.

On one dive, an abalone shell, *Haliotis pustulata*, was discovered, which could be the most eastern extension of this species' range reported. According to Clark Graham, manager of Micronesia Aquatics at Truk, abalone are relatively scarce in Truk Lagoon.

Scuba divers aren't the only ones in Truk Lagoon to obtain a variety of interesting shells. By walking or snorkeling the reef, cowries,

cones, top shells and many other mollusks can be found. Two animals indigenous to the shallow lagoon water are *Conus distans* and the finger shell, *Lambis crocata*.

After a day of shelling, snorkeling and sightseeing, I would return to my room in the late afternoon. In the afternoon, small wooden outriggers carry native snorkelers to the edge of the reef where they were visible from my second floor room. As many as 11 people have been seen to fit in the small, wooden vessels. The Truks are carried between the islands in 18-foot boats with 50-horsepower outboards.



*Conus distans* Photo by C.E. Bowen

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*Lambs crocata* Photo by C.E. Bowen

When the shadows of the afternoon lengthen a single large bat begins its evening ritual. This flying mammal of the night freely flitted from tree to tree in search of some unseen object. As the light grew dimmer and the night sounds became more distinct, I could hear the scurrying of the green lizards in the palm trees, interrupted occasionally by the kissing sounds made by the everpresent geckos. The coconut crabs, whose holes were everywhere, would now commence their nocturnal adventures. During daylight, these crustaceans are seen only briefly since they are very wary.

All too soon it was time to take the shuttle bus to the airport. After a 15 minute ride, we arrived at the single story, white, wooden building that served for check-in, baggage claim, car rental and customs clearance. The town had turned out in large numbers to meet this particular airplane since many on board were students returning to the island's prestigious Xavier High School, which draws the best minds from all of Micronesia. Next it was our turn to depart, and soon I was watching the waves break on the outer reef from the airplane's window. I remembered the three immortal words made famous by another American of an earlier era, "I shall return."

### ADDITIONAL READING

Brosi, F.B. & R.D. Coale 1981. *A Guide to Collecting in the Kwajalein Atoll*. Charles E. Tuttle Co., Rutland, Vermont & Tokyo, Japan.

Cemohorsky, W.O. 1978. *Tropical Pacific Marine Shells*. Pacific Publications, Sydney, Australia & New York.

Stanley, D. 1985. *Micronesia Handbook*. Moon Publications, Chico, California.

## Editor's Notes

Thanks to all of you who have supported us during the past year. We have finally dug out from under the Christmas rush. Now on to 1987 and a new look for **SHELLS** and **SEA LIFE**.

The 1987 volume will maintain our standard size but change to three columns throughout to match up with the photo sizes we most often use. Classified ad columns are wider but text and display ads are slightly narrower. Each of our current display advertisers will get an extra month free as a bonus.

We will be doing supplemental publications for longer works. Our first special publication will cover the Alaskan mollusks by Rae Baxter. Rae has spent many years collecting in Alaska and has produced a valuable monograph including land, freshwater, intertidal & benthic mollusks. It will be available in early April, 1987.

Several other publications and directories will be published in the months ahead. One of these will be a publication highlighting clubs, conventions and shows as soon as we get enough response from the individual groups. Several clubs have already sent information and we hope that many more will respond. We need to know all events scheduled for 1987 as well as the basic information on meeting dates, club publications and membership requirements. Other issues under consideration include shell dealers, publications, dive shops and travel resources.

Best wishes for 1987!

*Steve & Sally*

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## New fishy home for mollusks.

R. Tucker Abbott

P.O. Box 2255, Melbourne, FL 32902

Rarely does one discover an entirely new association between mollusks and members of another phylum, much less a vertebrate, but recently a young biology couple, while scuba diving in Okinawa, found a dorid nudibranch sea slug that attaches itself to the fins of a goby fish.

The Datehaze Goby lives in the sandy burrows made by the pistol or snapping shrimp. In six separate cases, a single, blackish, 1/3-inch-long dorid was found firmly attached to the dorsal fin of the 3-inch-long goby. The nudibranch can also survive detached from its host.

Dorids normally feed on sponges, small crustaceans, or the eggs of other sea creatures. What this strange species eats is still a mystery. Any why should it be attached to this kind of fish? Some related gobies nibble off parasites from other fish. These "cleaner fish" have a black stripe. Our host goby, *Amblyeleotris*, does not; but the long, black dorid attached to the dorsal fin may give a camouflaged effect similar to that of the "cleaner fish".

Ernest and Lucy Williams made 39 shallow-water scuba dives near the Sesoko Marine Science Center on N.W. Okinawa in 1985. They illustrated their unique finds in the journal *Venus*, vol. 45, pp. 210-211. Can there be similar cases of such an association in American waters?

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NOTE: This is a confession signed by deviant individuals recorded in the book, Radula, found on the planet Gastropodia.

The several stages of deviation observed on this planet have been classified as follows in the chapter "Take Your Hand Off My Shell":

(1) The purist - planatoid type who is only addicted to self-collected, live taken mollusca. Controlled deviant - considered dangerous. Believes all other deviant types "unclean", "impure". Rigid personality disorder.

(2) The impurist - self-collected live or dead molluscan forms are acceptable to this disordered personality. Modestly gross aberration. Fairly malleable disorder.

(3) The selectivist - self-collected or purchased mollusca are acceptable to this twisted mind but are restricted to specific families. Occasional "flareups" observed during which the deviant makes a radical shift to another family. A deluded variant to be handled cautiously during the "mood shift" phase.

(4) The generalist - any specimen, live, dead or freak, self-collected, traded or purchased in any family is sought by this aberrant deviant - "who cares from whence it cometh?" All molluscan forms sought equally and avidly admired. Full blown freak. Affable aberrant individual. Considered weird but non-dangerous.

(5) The fossillist - a disordered personality focused on "oldies but goldies" in the molluscan world. A mildly deranged condition. Considered harmless but capable of digging up and spreading a lot of dirt. To be observed cautiously.

ALL DEVIANTS SHOULD BE REPORTED TO GASTROPODA CENTRAL SHELLACHOLIC LABORATORY FOR REALIGNMENT.

(Need gentle controlled withdrawal treatments with molluscan rewards infused periodically. No known complete cures cited. Acquisition spasms can be modified. Mild resurgent flareups observed; appear lifelong in duration.

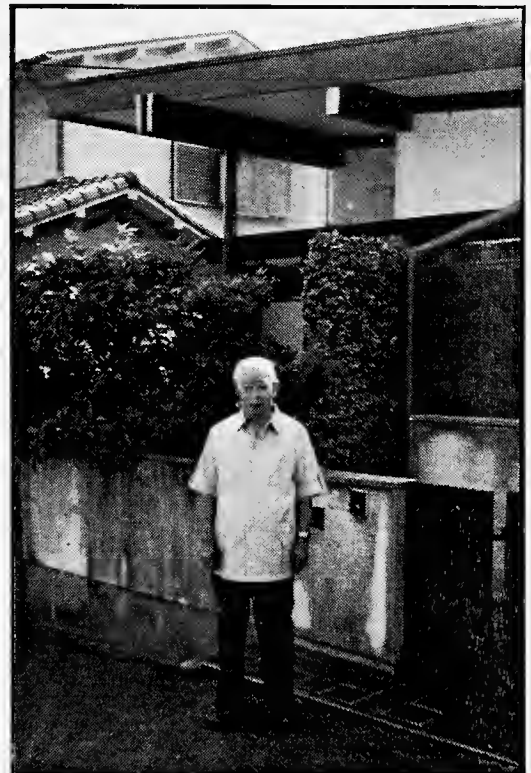
Give 2 Shells And Call In The Morning.

Originally authored by JUNE JONES and appeared in the Shell and Tell News, October 12, 1988

## Shellfolk

Dr. Kikutaro Baba has been a long-time supporter of SHELLS and SEA LIFE and the Opisthobranch Newsletter (one of the original group of subscribers). He sent us this picture last year, taken outside his home in Nara-Ken, Japan.

The opisthobranch mollusks are Dr. Baba's specialty and he has published more than 100 articles and notes on the group. He has also published several papers on the solenogasters. We have several of his notes and articles in process for publication in future issues.





# on the DRIFTLINE ~ ~ ~

## Correction

In my article on micro mollusk collecting in the Caribbean Province, S&SL October, 1986, there was an error in the identification of *Vitrinella texana* Moore, 1965. After an exchange of shells, Dr. Harry G. Lee of Jacksonville, Florida, correctly identified what I had found, as *Solanorbis blakei* (Rehder, 1944).  
- JOANNE LIGHTFOOT, PO Box 2295, Sedona, AZ 86338

## The Oregon Society of Conchologists

I appreciated receiving a copy of your recent roster of clubs, etc, and looked it over with considerable interest. It will be presented at the next meeting of our Club, which will be in September.

One correction; we have had much trouble in other organizations understanding our correct address. Here is the true address: The Oregon Society of Conchologists, 4324 N.E. 47th Ave., Portland, OR 97218.

We felt it best to use the secretary's address for all communications, as this office seems to have continuity, and the former address is no longer valid in any way.

Our Society has shown good signs of growth this year. We have had some field trips, to Port Orford, Southern Oregon coast, and to the San Juan Islands with divers, etc. A club library has been organized, under Margaret Teskey. Our annual Shell Show, at the Oregon Museum of Science and Industry, will be in late October. As usual, many good awards will be made there. Personally, I am still on the prowl for the more rare abalones, and Xenophoridae as well, subject to cost, availability, condition, etc. Really hard to find!  
- Byron W. Travis, Secretary, Oregon Society of Conchologists, 4324 N.E. 47 Ave., Portland, OR 97218

## "Galloping" Snails

We noted Roginskaya's (S&SL 17(4):125) "galloping" movement clearly with our local *Helix* species on our front walk during May of this year. - STEVE & SALLY LONG

## From New Zealand

I have to agree with Ian Loch's remarks in the March issue of S&SL concerning the range of distribution of *Vexillum* (*Costellaria*) *militaris* (Reeve): unless one specializes in a certain group of molluscs, the distributional range of a species is a mystery unless one has studied as many collections as one possibly can, and even then there is always someone, somewhere, who has collected the species in an out of the way place. Readers may be interested to know that *V. (C.) militaris* is known to occur in the Andaman Islands, the Philippines, Papua New Guinea, Northern Australia, the Solomons, and Fiji Islands. It has also been reported from Aden by Shopland and from Japan by A. Adams, however, these records require confirmation since they could have been based on misidentifications.

By the way, in Queensland *V. (C.) militaris* has been collected on Lizard Island, also on Moore Reef, east of Cairns, and Broadhurst Reef, east of Townsville. - WALTER O. CERNOHORSKY, Curator of Malacology, Auckland Institute and Museum, Private Bag, Auckland 1, New Zealand

## From Alaska

Collecting of mollusks has slowed down. Was out last night [Nov. 14] but got few mollusks. Winter collecting in Alaska is different. The low tides occur after dark and I used a Coleman gas lantern, both for light and to keep my hands warm. A few species are much more active after dark. These often are species that live deep in the rocks and therefore are much more common in the after-dark collections. The problem is that they stay in the water to keep from freezing so I get ice build-up on my boots wading around collecting. The nice thing is that everything freezes fast, usually expanded, so that I do not have to clean them up right away. Next week or next month is soon enough as long as I leave them outside.

The other thing that makes winter collecting possible is that I have a wood-fired steambath. A big load of wood in the stove makes the bath just right when I get back from collecting half frozen. - RAE BAXTER, PO Box 96, Bethel, AK 99559

## Pacific Northwest Shell Club

Yesterday [April 86] 12 of us from the shell club held a chiton study group and potluck lunch at a member's home. Doug Eernessee came down from Friday Harbor to join in. He just finished writing his doctorate on the subject so it was a lively session. Next Sunday for our regular April meeting, Bert Draper is coming up to put on the program. We enjoy sharing all his knowledge on a variety of things. Phil Clover is coming the following month of May and June we are holding the meeting over at Tom Rice's Port Gamble place. The next month of July will be another pot-luck and shell sales of Dorothy Gety's collection from her Port Angeles shop. The proceeds will help benefit Burke Museum at the University of Washington where our member, Elsie Marshall, works so hard with fellow club member Bill Rice's help. August will be our own shell club auction. The main goals of our club are to have fun, share our knowledge in the community and support studies in the field of malacology thru scholarships, museums, Friday Harbor Laboratory etc. We meet on the 3rd Sunday of each month and would love to have you join us while up here if you can. - LOIS LUCUM, 702 Alder, Edmonds, WA 98020

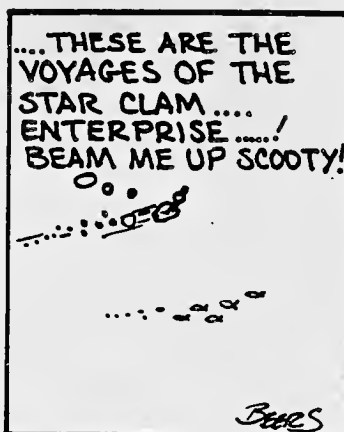
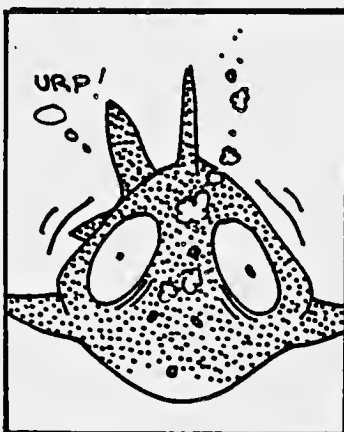
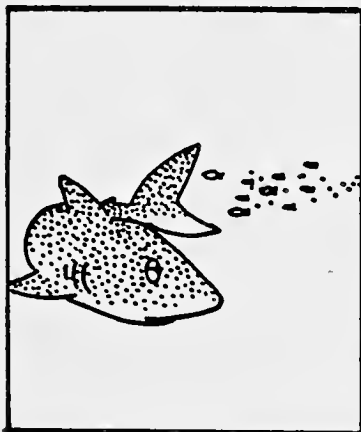
## From the West Indies

I have a 19ft fiberglass hull, equipped with a winch, and a davit-pole so I can get dredge-baskets and fish/shell traps in and out of the boat with ease. It's the only boat with dredging capabilities (by virtue of the winch) on the island, so I get to do a little research work for the local Marine Institute run by McGill University when they want deep benthic samples, etc. My interests are Western Atlantic cones, and what murexes I happen to catch locally, but that's about it. I'm into rare shells, since we have several classic spp. here, but that is more because of the business side of my operation. - DAVID HUNT, Gregg Farm, St. Andrew, Barbados, West Indies

## Conchological Club of Southern California

Meets 1st Monday of month unless holiday intervenes, then following Wednesday, in Lounge, 7:30pm, Natural History Museum, Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007. For information write: HELEN DUSHANE, 15012 El Soneto Dr., Whittier, CA 90605

## Clam - by Scooter Beers



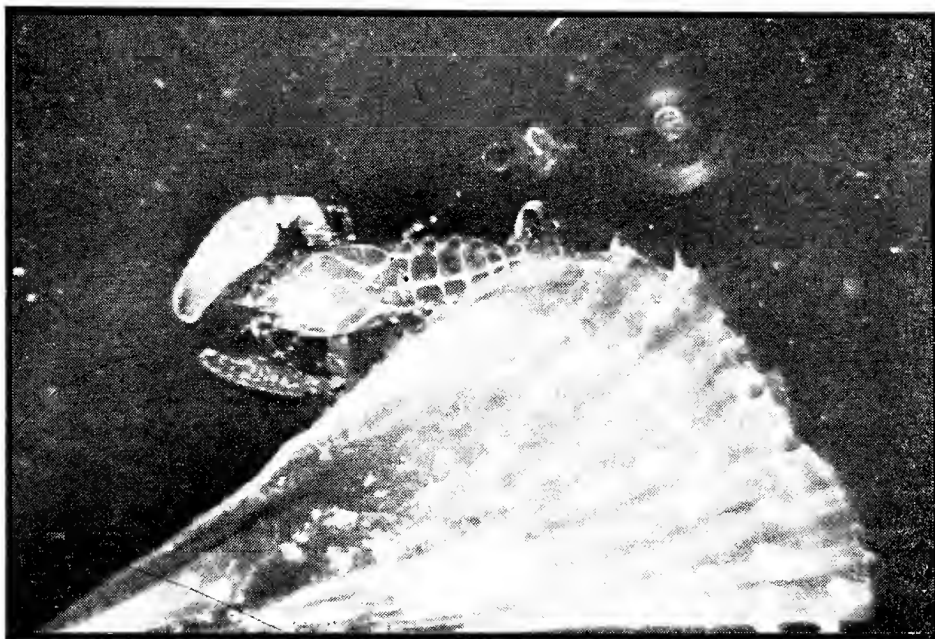
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Peggy Williams

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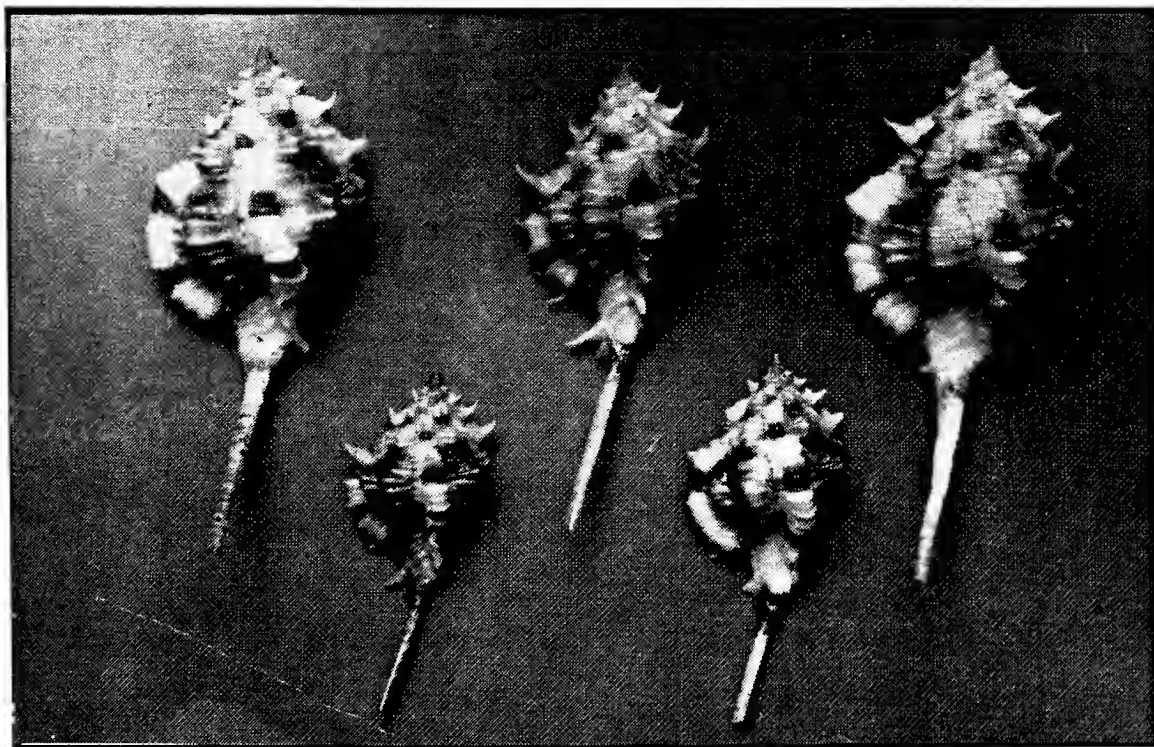
I was surprised to find, in a specimen of *Pinna carnea* Gmelin, 1791 that I collected on Providenciales Island in the Turks and Caicos, a pair of commensal shrimp of the group called "snapping shrimp." These animals have one large claw like a tiny lobster and use it to make a loud snapping noise (in an aquarium it seems the glass has cracked!). The ones in the pen shell were nearly transparent and otherwise colored exactly the lovely amber color of the shell itself. Other specimens of the shell had pairs of shrimp as well.



## Murex motacilla (Gmelin, 1791)

David Hunt, Gregg Farm, St. Andrew, Barbados, West Indies.

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Pilsbry & Olsson, 1952 - Vitrinellidae  
Panamic Province: II.  
Richardson, Abbott & Davis, 1979 - TRYONIA article  
ROSSINIANA (Vol. 1).  
Shikama, T. 1964 - Selected Shells of the  
World Illustrated in Color, Vol. 1 of 2.  
Usticke - any of the private publications on  
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## *Pusillina marmorata* (Hedley, 1907)

Specimens from Harbor at Kawaihae, Hawaii from grunge, government dredge in 40-50 ft. leg. B. Draper October, 1981. Largest specimen 1.2mm. Generic placement changed from *Vitricithna* to *Pusillina* by Ponder, 1985. Photo by Bert Draper.



# Book News

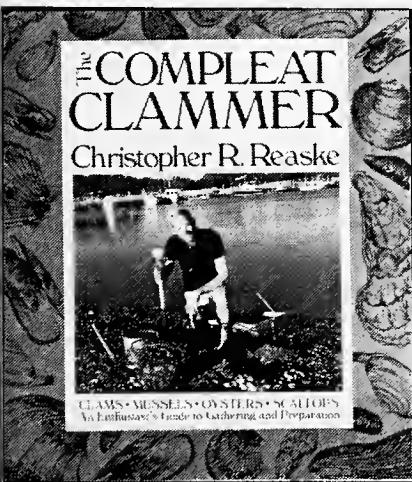
Eisenburg, J.M. 1981. A collector's guide to seashells of the world. [Reprinted 1986]. McGraw-Hill Book Co., New York, 239p., 158 color plates, 145 drawings, Hard cover, dust jacket, ISBN 0-07-019140-9. - \$26.95

"All species are listed with their scientific and popular names, geographical distribution, range of sizes, forms, rarity and valuation. In the index all known species of the most popular groups such as cowries, cones, murex, olives and volutes are listed and evaluated. The characteristics of 142 seashell families are described in detail, with an accompanying illustrated identification guide. Nearly all of the shells are illustrated in 2/3 to full scale. The specimens on each full plate are all shown in the same scale. Each major gastropod family is illustrated on a different color background."

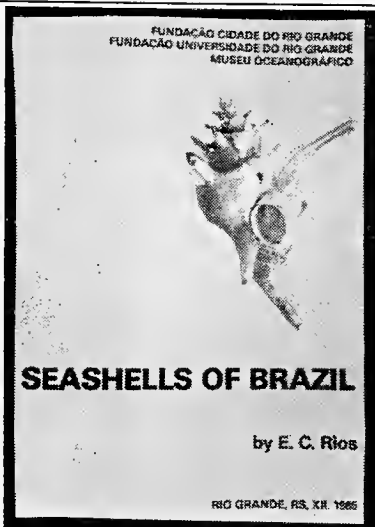
Farley, M.B. & L.K. Farley 1986. Diver's Guide to Underwater Mexico. Marcor Publishing, Port Huenemen, CA, 270p., color & halftone illustrations, soft cover. - \$14.95

"Diver's Guide to Underwater Mexico is a comprehensive sportdiving guide to the oceans of Mexico...including the Pacific Ocean, the Sea of Cortez, the Caribbean and the Gulf of Mexico. Richly illustrated with detailed maps and beautiful photographs, this book provides detailed dive/travel information for all of the major coastal tourist regions of Mexico. The book contains an up-to-date listing of dive shops, dive sites, charter boats, underwater parks, weather and water conditions, tourist and travel information, and descriptions of the marine life and aquatic environments for each region. This informative guidebook for travelers also features a full color photo section of Mexico's diverse marine life. This book is a valuable tool for planning Mexico trips beforehand; and will also serve as an on-the-spot field guide to Mexico's vast ocean realm."

Petuch, E.J. & D.M. Sargent 1986. Atlas of the Living Olive Shells of the World. Coastal Education & Res. Found., Charlottesville, VA, 253p., 39 color plates, figures, tabs. Cloth ISBN 0-938415-00-X - \$68.50



Reaske, C.R. 1986. The Compleat Clammer. Clams Mussels Oysters Scallops. An Enthusiast's Guide to Gathering and Preparation. Nick Lyons Books, New York, 152p., illustrations, Hard cover ISBN 0-941130-15-0 - \$16.95; soft cover ISBN 0-941130-11-8 - \$9.95



Rios, E.C. 1986. Seashells of Brazil. Museu Oceanográfico, Rio Grande, Brazil, 328p., 102 pls. (1421 illus.), softcover, 8 x 11". - \$30.00

Brazil, the largest country in the Americas, has one of the most diversified and interesting marine faunas. Its long shores are influenced by four major zoogeographical regions - the colorful, tropical Caribbean province to the north; the temperate, cool Argentinian and Uruguayan influence in the south; the highly endemic Pernambuco subprovince; and the occasional invasion of transatlantic species coming from West Africa.

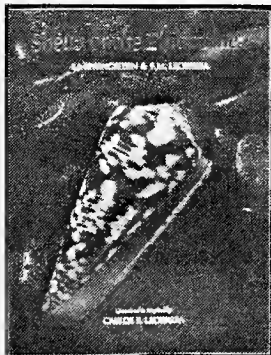
Dr. Eliazar Rios, Director of the Museum of Oceanography in Rio Grande, has met the challenging and massive array of over 1400 Brazilian marine mollusks by now producing a huge new tome with superior photographs of all species, and accompanied by English descriptions and detailed locality and habitat records. There are illustrations of 1000 gastropods, 30 scaphopods, 380 bivalves and 26 species of cephalopods. This book picks up where American Seashells leaves off. It is not only a thorough coverage of the Brazilian marine mollusks, but is also a guide to many of the common shells of the Caribbean and Uruguay.

The book is easy to use, with each of the species properly assigned to order, family, genus and subgenus, and with a convenient reference number which allows the user to find quickly the proper photograph among the 102 plates of black-and-white photographs. Authors, dates and synonymies are given for each species, and there is a large bibliography of 800 references to scientific papers dealing with South American marine mollusks - perhaps the largest ever offered to the public. The index has 4,000 scientific names alone. We are spared the indignity of any new species being proposed in this book.

Despite the brief title, this book will be a useful reference tool and a much-consulted illustrated guide to the shores stretching from the islands of the West Indies to the beaches of northern Argentina. No recent book for its modest price has so much to offer. - R. TUCKER ABBOTT

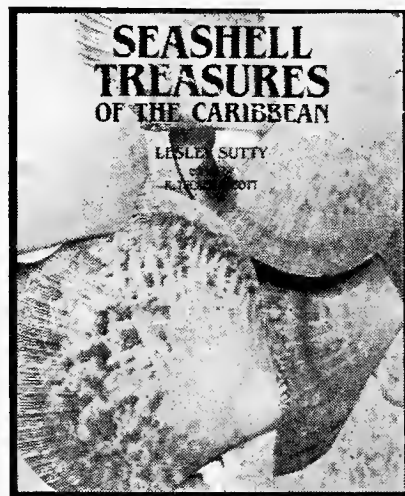
Roberts, M.F. 1984. Pearl Makers. The Tidemarch Guide to Clams, Oysters, Mussels and Scallops. Saybrook Press, Old Saybrook, CT, 168p., 66 drawings, flexible cover, ISBN 0-917941-00-4 - \$6.95

It details and discusses the common U.S. east coast shoreline bivalve mollusks and also explains how they are harvested and eaten.



Springsteen, F.J. & F.M. Leobrera 1986. Shells of the Philippines. Carrel Seashell Museum, Manila, 377p., 100 color plates, cloth, d/j, ISBN 971-91029-0-x - \$80.00

Sterrer, W. [ed.] 1986. Marine Fauna and Flora of Bermuda. John Wiley & Sons, New York, N.Y., 742p., color and halftone plates, many hundred line drawings, hard cover, dust jacket. \$99.95



Suttly, L. 1986. Seashell Treasures of the Caribbean. [edited by R. Tucker Abbott] Dutton, New York, 128p., 138 color plates, cloth, dust jacket, ISBN 0525-24411-5 - \$19.95

"From the undersea gardens of the Windward Islands come some of nature's finest treasures. Unlike most shell books, this one has beauty, romance, and adventure. It is a splendid example of how a nature lover and ocean enthusiast can delve into the unknown lives of West Indian mollusks and relay her enthusiasm to others."

"Lesley Suttly has roamed and prodded into almost every sea cave and sandy substrate of the Lesser Antilles, and her abilities as a color photographer are exceeded only by the charm and excellence of her scientific observations. If you are an amateur conchologist with a yen for collecting, this book will set you afire. If you appreciate beautiful shells, the photographs will seduce you into learning more about these extraordinary creations of nature. And if you just plain love shells, the book will entrance you."

Publications listed here have recently been received by SHELLS and SEA LIFE. We welcome copies of any publication on marine life and will list them here as space permits. Almost all can be ordered from the publisher. Many of these are also available from Seashell Treasures Books (1701 Hyland St., BaySide, CA 95524.) Prices are in U.S. dollars unless otherwise noted and are subject to change without notice. Postage and handling is a minimum of \$3.00 additional.

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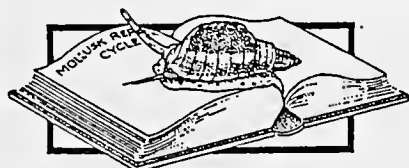
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# Calendar 1987

## JANUARY

Southwest Florida Shell Show, January 16-18, Fort Myers.  
Contact: John Vaughan, Box 05962, Tice, FL 33905, (813) 693-1913.

Astronaut Trail Shell Show, January 23-25, Melbourne  
Auditorium, Melbourne, Florida. Contact: Bobbi & Jim Cordy,  
385 Needle Blvd., Merritt Island, FL 32952, (305) 452-5736 or:  
Doris Underwood, 9022 Brighton Court, W. Melbourne, FL  
32904, (305) 724-2449.

## FEBRUARY

Greater Miami Shell Show, January 30-February 1, North  
Miami Armory. Contact: Beverly Larson, 8850 Byron Ave.,  
Surfside, FL 33154, (305) 868-0145.

Broward County Shell Show, February 5-8, Pompano Beach.  
Contact: Richard Sediak, 4501 S.W. 30th Way, Ft. Lauderdale,  
FL 33312, (305) 989-8051.

St. Petersburg Shell Show, February 14-15, Treasure Island.  
Contact: Bob & Betty Lipe, 440 75th Ave., St. Petersburg  
Beach, FL 33706, (813) 360-0586.

Sarasota Shell Show, February 20-22, Sarasota, Florida.  
Contact: Betty E. Hamilton, 1240 Primrose, Venice, FL 33595,  
(813) 497-2809.

Naples Shell Show, February 20-22, Naples, Florida.  
Contact: Terry Fitzgerald, 680 York Terrace, Naples, FL 33942,  
(813) 598-2579.

## MARCH

Third California Islands Symposium, March 3-5. Contact:  
Dr. Eric Hochberg, Santa Barbara Museum of Natural History,  
2559 Puesta Del Sol Rd., Santa Barbara, CA 93105, Phone:  
(805) 682-4711.

Sanibel Shell Fair, March 5-8, Sanibel Island, Florida.  
Contact: Ralph Moore, 1214 Gulf Dr., Apt. E2, Sanibel, FL  
33957, (813) 472-4202.

Film Symposium, March 11, New York City. Contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Marco Island Shell Show, March 10-12, Marco Island, Florida.  
Contact: Evelyn & Malcolm Currier, 809 Dandelion Ct., Marco  
Island, FL 33937, (813) 394-7898.

Shellarama 87, March 13-15, Sea World, Orlando, Florida.  
Contact: Dave Green, Central Florida Shell Club, 5883 Pitch  
Pine Dr., Orlando, FL 32819, (305) 345-0286.

Oyster Dive I, Chesapeake Bay, March 21, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

## APRIL

Belize: Rain Forest and River, April 4-11, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Cumberland Island Camping, April 19-24, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Dismal Swamp Canoe/Camp, April 29-May 3, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

## MAY

Cape Cod Whale Watch, May 15-17, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Red Knots/Horseshoe Crabs, Delaware Bay, May 17, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

## JUNE

Pine Barrens Weekend I, June 5-7, contact American Littoral  
Society, Highlands, New Jersey 07732. (201) 291-0555

Maine Coast Weekend, June 11-14, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Montauk Weekend, June 19-21, contact American Littoral  
Society, Highlands, New Jersey 07732. (201) 291-0555

SIC87, 6<sup>ème</sup> Salon International du Coquillage, June 20-21,  
Lausanne, Switzerland. Contact Dr. Ted W. Baer, CH-1602 La  
Croix, Switzerland. Phone (0)21 39 37 71.

Western Society of Malacologists, June 21-25, 20th Annual  
Meeting, San Diego State University, San Diego. Contact:  
Carole M. Hertz, San Diego Natural History Museum, PO Box  
1390, San Diego, CA 92112, (619) 232-3821 ext. 228.

Gulf Stream Billfish Tagging, Hatteras, June 28, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

## JULY

Wreck Diving I, July 12, contact American Littoral Society,  
Highlands, New Jersey 07732. (201) 291-0555

Island Ecology, Isle of Shoals, July 17-20, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shark Tagging, July 18, contact American Littoral Society,  
Highlands, New Jersey 07732. (201) 291-0555

## AUGUST

Annual Crab Feast, Oxford, Maryland, August 2, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Wreck Diving II, August 9, contact American Littoral Society,  
Highlands, New Jersey 07732. (201) 291-0555

## SEPTEMBER

Pine Barrens Weekend II, September 11-13, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Wreck Diving III, September 20, contact American Littoral  
Society, Highlands, New Jersey 07732. (201) 291-0555

Cape May Birding Weekend I, September 25-27, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

## OCTOBER

American Littoral Society, 26th Annual Meeting (Tentative),  
October 9-12, contact American Littoral Society, Highlands,  
New Jersey 07732. (201) 291-0555

Cape May Birding Weekend II, October 16-18, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

## NOVEMBER

Suwannee River Canoe/Camp, November 4-8, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Assateague Fall Weekend, November 19-22, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Bonaire Dive/Study, November 20-27, contact American  
Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Oyster Dive II, Chesapeake Bay, November 21, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

## DECEMBER

Diver's Environmental Institute, December 8, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Sanibel/Captiva Week, Florida, December 12-19, contact  
American Littoral Society, Highlands, New Jersey 07732.  
(201) 291-0555

Western Society of Naturalists, December 27-30, California  
State University, Long Beach, California. Dr. Don Reish will be  
the local chairman.

If we have missed an event that you are aware of please  
excuse us, and send the information. We welcome  
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### MOLLUSKS

Abbott, R.T. [ed.] 1979. Indexes to The Nautilus: Geographical (Vols. 1-90) and Scientific Names (Vols. 61-90). American Malacologists, Melbourne, Florida p. i-iv + 1-238, 8 x 10.5" cloth, fine. - \$18.50

American Malacological Union 1943-1966. Annual Reports and Bulletin of AMU and American Malacological Union Bulletin. 32 reports in original wraps., various sizes, 1943, 1956-1981, Index 1934-1974, Vol. 1 & 3-4 of AMU Bull. Some soiling, especially on earliest reports. All text good condition. - \$350.00

American Malacological Union 1971 & 1972. Bulletin of the American Malacological Union, Inc. Two annual reports for 37th & 38th annual meetings. - \$14.00

American Malacological Union 1971-1975. Bulletin of the American Malacological Union, Inc. Four annual reports for 1971-1973 & 1975, 8 x 10.5" orig. wraps. - \$27.50

American Malacological Union 1971-1979. Bulletin of the American Malacological Union, Inc. 6 annual reports for 1971-1975 & 1977, 8 x 10.5" orig. wraps. - \$45.00

American Malacological Union 1971-1980. Bulletin of the American Malacological Union, Inc. 8 annual reports for 1971-1975, 1977 & 1979-1980, 8 x 10.5" orig. wraps. - \$65.00

American Malacological Union 1972. Bulletin of the American Malacological Union, Inc. 64p., illus. 38th Annual meeting report. - \$7.50

Bartsch, P. 1932. The Philippine Land Mollusks of the Genus *Opisthoporus*. Proc. USNM 6(6):323-327, pls. 81-82, 8vo wraps. uncut. - \$3.00

### PALEONTOLOGY GEOLOGY

Guzman, E.J. 1956. XX Congreso Geologico Internacional. Symposium sobre yacimientos de petroleo y gas. Proceedings, 5 vol. 8vo wraps in cloth storage box (box worn). Over 1700 pages with fold-out illustrations and text figures. Contents fine condition. - \$175.00

Russian papers 1949 & 1950. Two reprints on ammonites in Russian, 8vo orig. wraps., Akademia Nauk CCCP. 222p., 15 pls. & 206p., 17 pls., both with stamp on back cover. - \$35.00

Russian paper 1980. Fossil mollusk paper published in Russian. Akademia Nauk CCCP, 114p., 18 pls., figs., tpls., photos. 8vo orig. wraps., spine tear top & bottom, owner initials. - \$17.50

### INVERTEBRATES

Ashmead, W.H. Descriptions of new Hymenoptera from Japan. Proc. USNM 30(1448):169-201, pls. 12-15, 8vo new wraps. - \$5.20

Clarke, J.F.G. 1965. Microlepidoptera of Juan Fernandez Islands. Proc. USNM 117(3508):1-105, pl. 1, figs. 1-111, 8vo new wraps. - \$11.60

Cook, O.F. American oniscoid Diplopoda of the order Merocheta. Proc. USNM 21(1154):451-468, pls. 29-32, 8vo new wraps. - \$3.80

Cook, O.F. African Diplopoda of the genus *Pachybolus*. Proc. USNM 21(1168):657-666, pls. 50-52, 8vo new wraps. - \$3.00

Coquillett, D.W. Report on a collection of Japanese Diptera, presented to the U.S. National Museum by the Imperial University of Tokyo. Proc. USNM 21(1146):301-340, 8vo new wraps. - \$4.00

Coquillett, D.W. New Diptera from North America. Proc. USNM 25(1280):83-126, 8vo new wraps. - \$4.30

Fouts, R.M. Revision of the North American wasps of the subfamily *Platygasterinae*. Proc. USNM 63(2484):1-145, pl. 1, figs. 1-10, 8vo new wraps. - \$15.00

Gerould, J.H. The Sipunculids of the Eastern Coast of North America. Proc. USNM, 44(1959): 373-437, pls. 58-62, 8vo new wraps. - \$8.90

Handlirsch, A. A new blattoid from the Cretaceous Formation of North America. Proc. USNM 29(1439): 655-656, fig., 8vo new wraps., edge chip repaired. - \$3.00

Hozawa, S. Report on the calcareous sponges collected during 1906 by the United States Fisheries Steamer Albatross in the Northwestern Pacific. Proc. USNM 54(2247): 525-556, pls. 84-85, 8vo new wraps. - \$4.10

Huber, L.L. A taxonomic and ecological review of the North American chalcid-flies of the genus *Callimome*. Proc. USNM 70(2663):1-114, pls. 1-4, 8vo new wraps. - \$13.40

Metcalf, M.M. 1940. Further studies on the opalinid ciliate infusorians and their hosts. Proc. USNM 87(3077):465-634, figs. 21-157, 8vo new wraps. - \$17.50

Ritter, W.E. The simple ascidians from the Northeastern Pacific in the collection of the United States National Museum. Proc. USNM 45(1989):427-505, pls. 33-36, tpls., 8vo new wraps. - \$9.80

Rohwer, S.A. Descriptions of new species of wasps with notes on described species. Proc. USNM 40(1837):551-587, 8vo new wraps. - \$3.60

Rohwer, S.A. Descriptions of new species of wasps in the collections of the United States National Museum. Proc. USNM 41(1869):447-478, figs. 1-24, 8vo new wraps. - \$4.10

### CHILDREN

Automobile Association 1972. Seaside quizzes, games and puzzles. Drive Publications Ltd., 64p., drawings, soft cover, 4.8 x 4.8", worn, back cover repaired. - \$2.95

### GENERAL

Ricketts, E.F., J. Calvin & J.W. Hedgpeth 1968. Between Pacific Tides. 4th Ed. Stanford Univ. Press, Stanford, CA, 614p., 302 halftones & figs, 22 color photos, 8vo cloth, dust jacket worn, owner stamp title page. - \$20.00

U.S. Department of Agriculture 1974. Shopper's Guide. 1974 Yearbook of Agriculture. U.S. Dept. Agriculture, 358p., many illustrations & photos, 8vo cloth, soiled spine, otherwise very good. - \$17.50

U.S. Department of Commerce 1943. United States Coast Pilot. Alaska Part I. Dixon Entrance to Yakutat Bay. 9th ed. U.S. Dept. Commerce, xii + 466, fold out color map. Also 7 page supplement loose in front, cr4to cloth. - \$38.50

Wahlstrom, E.E. 1979. Optical Crystallography. 5th Ed. John Wiley & Sons, New York, 488p., many illus., roy8vo cloth, worn. - \$19.50

Webster, P. 1972. The Mighty Sierra. Portrait of a Mountain World. Amer. West Publ. Co., 287p., color & halftone photos throughout, 4to cloth slight wear, dust jacket almost perfect. - \$28.75



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**Estival, J.C. 1981. Cone Shells of New Caledonia and Vanuatu.** Societe Nouvelle des Editions du Pacifique. 126 pages, 41 full color plates, French and English text, hardbound. Regular price \$24.95; S&SL Subscriber price - \$18.95

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**Pitman, R. Journey to Falcon. The search for *Cypraea mus*.** 70 page paperback with color and halftone illustrations including maps and tables. Original price - \$4.95; S&SL Subscriber price - \$2.95

**Zeigler, R.F. & H.C. Porreca 1969. Olive Shells of the World.** 96 pages, color plates, clothbound with dust jacket. Olive collectors and students will want this book in their library. Regular price - \$15.95; S&SL Subscriber price - \$10.95

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# Shells

## SEA LIFE



**VOLUME 19 ~ 1987**



# SHELLS AND SEA LIFE

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January, 1987

Vol. 19, No. 1

## Röding's "Museum Boltentianum"

Richard E. Petit

P.O. Box 30, North Myrtle Beach, SC 29582

J.F. Bolten was a German physician who died in 1796, leaving a large shell collection, catalogued in detail according to a system of his own. A catalogue of his collection was published in 1798 by P.F. Röding, who added references in order to make Bolten's names intelligible. Under the rules of nomenclature, these references make the newly introduced names valid. Unfortunately, many of these new names predate names proposed by Lamarck in 1799 (and later) which were commonly used by systematists until this century.

Röding's new names went virtually unnoticed until 1906 when Dall published a list of Röding's genus-level taxa, showing the Lamarckian equivalents. Incidentally, at that time the new names in the "Museum Boltentianum" were attributed to Bolten, the identity of the real author not having been brought to light. Dall, however, was not the first to use the Röding taxa as some had previously been utilized by Mörch (1852-1853) and by H. & A. Adams (1853-1858).

It was only with the publication of Dall's paper that the Röding genera were, so to speak, forced upon the malacological community. There was considerable objection to the adoption of the Röding names; some authors refusing to use them for many years. Now most of these names are universally accepted and are in common usage. Not all of Röding's species-level taxa have been treated in modern systematic work, and anyone doing monographic work should check the "Museum Boltentianum" carefully.

As the original of the "Museum Boltentianum" is very rare, it was reprinted by the English bibliophile-malacologists Sherborn and Sykes in 1906 in a limited edition (75 copies) which is now almost as rare as the original. It has now been reprinted again by the American Malacological Union as the first in a planned series of rare malacological works. Copies are available from malacological booksellers or the American Malacological Union.

For information on Röding and his taxa, the following list of references is offered, some of which have been utilized in this short article:

DALL, W.H. 1904. [Letter on the use of Bolten's names]. *Nautilus* 18(7):84.

DALL, W.H. 1906. Early History of the Generic Name *Fusus*. *Journ. Conch.* 11(10):289-297.

DALL, W.H. 1915. An Index to the Museum Boltentianum. *Smithsonian Inst. Spec. Publ.* 2360, 64p.

DANCE, S.P. 1966. *Shell Collecting, an Illustrated History*. Berkeley and Los Angeles, 344p., 35pls.

IREDALE, T. 1921. Molluscan Nomenclatural Problems and Solutions. *Proc. Malac. Soc. London* 14(4):198-208.

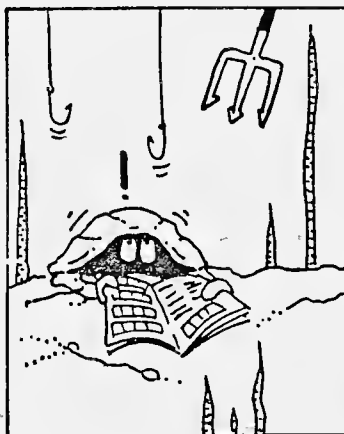
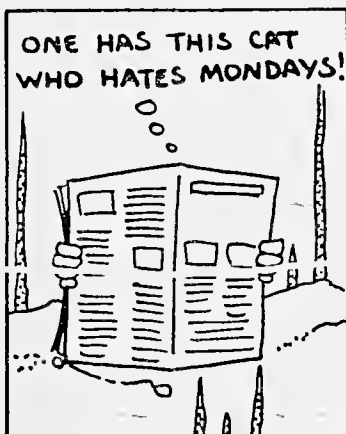
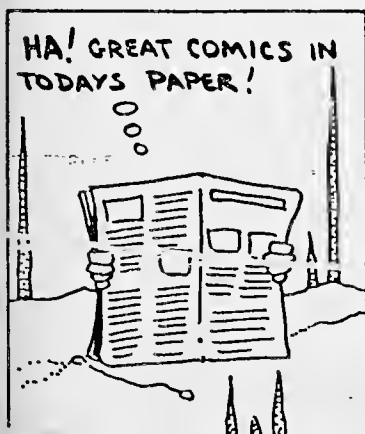
REHDER, H.A. 1945. A note on the Bolten Catalogue. *Nautilus* 59(2):50-52.

RÖDING, P.F. 1798. *Museum Boltentianum ... Pars secunda continens Conchylia, etc.* (Edited by P.F. Röding, with a preface by A.A.H. Lichtenstein.) Hamburg. 129p.

WINCKWORTH, R. 1945. The types of the Boltentian genera. *Proc. Malac. Soc. London* 26:136-148.

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# Calendar

## 1987

### APRIL

Seattle Shell Show, April 4-5, Museum of History & Industry, Seattle, Washington. Pacific Northwest Shell Club, Evelyn Adkins, Corresponding Secretary, (206) 362-1634.

Belize: Rain Forest and River, April 4-11, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Pacific Shell Club Auction, April 5, Los Angeles County Museum of Natural History, Los Angeles, California.

Cumberland Island Camping, April 19-24, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Cincinnati Shell Show, April 24-26, Cincinnati, Ohio. Contact: Lois Nizny, 3953 Rose Hill Ave., Cincinnati, OH 45229. (513) 861-5875

Oismal Swamp Canoe/Camp, April 29-May 3, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

### MAY

Cape Cod Whale Watch, May 15-17, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Red Knots/Horshoe Crabs, Delaware Bay, May 17, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

### JUNE

Pine Barrens Weekend I, June 5-7, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Maine Coast Weekend, June 11-14, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Montauk Weekend, June 19-21, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

SIC87, 6<sup>ème</sup> Salon International du Coquillage, June 20-21, Lausanne, Switzerland. Contact Dr. Ted W. Baer, CH-1602 La Croix, Switzerland. Phone (0)21 39 37 71.

Western Society of Malacologists, June 21-25, 20th Annual Meeting, San Diego State University, San Diego. Contact: Carole M. Hertz, San Diego Natural History Museum, PO Box 1390, San Diego, CA 92112, (619) 232-3821 ext. 228.

Conchologists of America, June 23-27, St. Louis, Missouri.

Gulf Stream Billfish Tagging, Hatteras, June 28, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

### JULY

Wreck Diving I, July 12, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Island Ecology, Isle of Shoals, July 17-20, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Shark Tagging, July 18, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

American Malacological Union, July 19-23, 53rd Annual Meeting, Casa Marina Resort, Key West, Florida. Contact: President William G. Lyons, 4227 Porpoise Drive S.E., St. Petersburg, FL 33705

Jacksonville Shell Show & Auction, July 30-August 1, Flag Pavilion, Jacksonville Beach, Florida. Contact: Allan Walker, 1036 Montes Ave., Jacksonville, FL 32205

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### AUGUST

Annual Crab Feast, Oxford, Maryland, August 2, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Wreck Diving II, August 9, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Shellfishing and Coastal Management: A Global Perspective, August 19-21, Hofstra University, Long Island, NY. Contact: Terry Baker, Associate Dean, Office of Education, Hofstra University, Hempstead, NY 11550.

XVI Pacific Science Congress, August 20-30, Korea. Contact Prof. Choon Ho Park, Secretary-General, K.P.O. Box 1008, Seoul 110, Korea. Phone: (2)733-4478.

### SEPTEMBER

Pine Barrens Weekend II, September 11-13, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Wreck Diving III, September 20, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Cape May Birding Weekend I, September 25-27, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

### OCTOBER

American Littoral Society, 26th Annual Meeting (Tentative), October 9-12, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Cape May Birding Weekend II, October 16-18, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

### NOVEMBER

Suwannee River Canoe/Camp, November 4-8, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Assateague Fall Weekend, November 19-22, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Bonaire Olive/Study, November 20-27, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Oyster Olive II, Chesapeake Bay, November 21, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

### DECEMBER

Diver's Environmental Institute, December 6, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

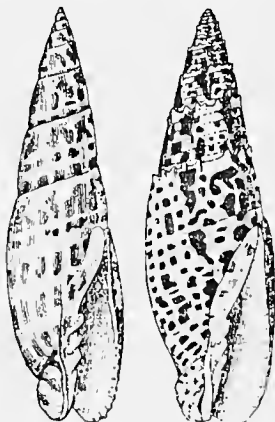
Sanibel/Captiva Week, Florida, December 12-19, contact American Littoral Society, Highlands, New Jersey 07732, (201) 291-0555

Western Society of Naturalists, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We would especially like to hear of overseas shows and meetings. Thanks to Donald Dan for keeping us informed of many of these dates.

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Send your organizations non-copyright address list and we will send each member a complimentary copy of SHELLS and SEA LIFE.



Mitra episcapalis  
(Lamarck).

Mitra papillosa  
(Lamarck).

## Editor's Notes

This 211th issue starts our 19th volume. Last year we brought the publication back to 8.5 x 11 inch format and changed to a more expensive paper. We also purchased a major upgrade to our typesetting equipment. In November, we lost our printing company. To keep our format we used cut-sheets for the November and December issues and started to look seriously for our own in-house printing capabilities.

Two weeks ago, we purchased our own printing press and brought it up here from San Francisco. We are working with it now and setting up to print our monthly issues on better paper and with some COLOR! Right now we are about half way there with the printing press installed. We still do not have the capability to do our own photographs or printing plates.

We hope to purchase the additional required equipment to produce SHELLS and SEA LIFE within a few weeks but we need your help. We need several thousand dollars to set up a darkroom, buy supplies and purchase the camera and platemaker. Please, buy something and encourage your friends to buy. Extend your personal subscription for a year, send a friend a gift subscription, buy the book you have been waiting to buy, donate some shell books that we can sell or send a cash donation!

As I am preparing these comments I don't know how this issue will be printed. I will try to get the press running with paper plates and if that does not work we may have to use the copy machine for the next issues until we can purchase the remaining equipment and supplies.

Thank you for your patience during the past year. I believe that we are moving forward to provide an excellent publication for your enjoyment.

Best regards,

*Steven J. Long*  
Steven J. Long, editor

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# on the DRIFTLINE ~ ~ ~

## from Denmark

In September, 1985, I went to Roscoff, France and Plymouth, England with a graduate student from the Zoological Museum to collect marine organisms for the Chemistry Department at the University of Copenhagen. Of course I collected ascoglossans (and a few nudibranchs as well) for myself. I am presently working with the behavioral ecology in connection with diet switching in Danish and French/British *Elysia viridis*. - KATHE JENSEN, Zoologisk Museum, Universitetsparken 15, DK 2100 Kobenhavn, Denmark

## from Illinois

May I suggest you add to your mailing list the following: Shell Museum & Research Foundation, Inc., P.O. Box 1580, Sanibel Island, Florida, 33957. This is a group of well-organized people trying to establish the 1st museum and research collection-library devoted entirely to shells in the entire USA... near the 3rd best shelling beach in the world. It will be no "tourist trap"... and is a mammoth undertaking. It needs a lot of support from all of us. The physical plant alone is hoped to be 6000 sq. ft. and they are looking at property at about a million dollars. No hole-in-the-wall idea! MRS. HELEN J. MARTZ, 1908C Colfax St., Evanston, IL 60201.

## from Washington

Kirk Wright has been collecting *Monadenia* in the cold and wet. As soon as he gets over the flu we expect an article on the critters.

Stephen Welty (Wyoming) is spending some time up in the Puget Sound area.

## from Tennessee

The shell dealers of America have a trophy for children of grades 1-8 available for shell shows in the U.S. Any group that has entries for grades 1-8 can get this trophy for their show by writing to John Bernard, c/o Shelloak, Rt. 3, Box 74, Crossville, TN 38555

So far it has only gone to one club, North Carolina, but it will be going to Sarasota, Fort Myers, Merritt Island and Atlanta. Since it is new, not too many people know about it. We believe this is the first trophy specifically for youngsters.

Several dealers have each donated \$30.00 to start the trophy. More donations are welcome and may be sent to John Bernard.

## from Indiana

Carl Sahlberg is the new President of the Indianapolis Shell Club, taking over from Ken Knoebel after his four-year stint. - THE SLIT SHELL, January/February 1987

## from California

Jeff Hamann recently returned from a week-long diving trip to the Caribbean. He spent several days diving with Leslie Sutti, Hans Bertsch, and others, and found some very interesting species. Hans has prepared an initial report for *The Festivus*.

## from Florida

I have mostly Florida shells to exchange, and I would like whoever responds to please send me their exchange list and I will send my list when I reply to their letter. CAROL BRUNNER, 160 N.W. 126 St., North Miami, FL 33168

## from Australia

"The Lizard Island Research Station is a facility of the Australian Museum and offers unsurpassed opportunities for researchers wishing to study the biology, geology, ecology, oceanography or hydrology of the Great Barrier Reef."

Lizard Island is a high (361m), granitic, 'continental' island covering 7 sq. km and has permanent fresh water. There are various terrestrial habitats including eucalyptus scrub, casuarina bush, pandanus and mangrove swamps, open grassland and some small patches of closed tropical forest. There are rich and abundant populations of spiders and insects, 10 species of lizard (including the large sand monitor after which the island is named), 5 species of snakes (all nocturnal and none fatal) and over 50 species of birds, including 15 species of sea birds, many of which nest near here.

Lizard Island is partly fringed by a coral reef which also extends to encompass two nearby islands -- Palfry and South -- and enclose a 10m deep lagoon."

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"The station publishes a newsletter which is available in July each year. Please advise if you wish to be included on the mailing list."

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Peggy Williams

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I am continually amazed to find this delicate-seeming organism in unimaginably mucky mud, near outfall pipes, and in other unhealthy-seeming environments, but seldom in truly clean sand!





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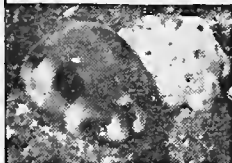
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# SHELLS AND SEA LIFE

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## Rarity: Part I

Paul F. Patchick, FGSA

Suite 10, 1123 S. Los Palos Drive, Salinas, CA 93901

The subject of species rarity is an interesting one, and must be considered in light of seven factors which are: 1) a shell's geographic distribution; 2) its ecologic habitat; 3) its availability to the collector; 4) time passed since first discovery or description; 5) its attractiveness (color, pattern, luster, etc); 6) its desirability (a subjective determination based on size, quality, direction of coiling and other factors); and 7) its sale price or value, based on all the previous considerations.

These and other variables will be discussed in detail in a series of articles beginning with this one, as all shell collectors and museums are affected by rarity in one way or another.

If a shell has a extensive distribution (the entire Indo-Pacific region, for example), it is likely the species will be "abundant" (perhaps even "commercially abundant" like certain Pectens), or "common."

By way of contrast, we can compare shell rarity to other collectibles which are deemed rare: antiques, coins or stamps. These artifacts are produced by man in limited "editions" (as a painting or etching, for example), and the issue might in fact be numbered, and the number produced known. Their production is a finite quantity which can be deduced or is recorded. Some collectors, like William Fenzan, believe that a rare shell "is one that is currently scarce in collections." Fenzan believes the definition "is transitory, since what is scarce now, may not remain so into the future. Even if a shell has been rare for 100 years, it could still become readily available on the market virtually overnight." Of course he is right, but as we will see, there are many factors which contribute to a shell's being "scarce in collections."

Take *Conus pergrandis* for example. The first specimen known of this gigantic cone (which can reach 173mm -- 7 inches long) was dredged up in 1895. It lay, unidentified and forgotten, in a museum tray until Tom Iredale saw it in 1917. He agreed with Hadley and Sowerby that it represented not only a new species, but a new genus (*Embrikenia*) as well. But today, 92 years later, only a handful of *pergrandis* are known. Perhaps less than 20. Truly this shell is genuinely rare, and has stood the test of time. But what of the many shells described as "rare" by eager dealers, hungry to make a sale to the unwitting, novice collector? Shells like *Cypraea musumaea*, offered at scandalous prices, when available? It was described by Kuroda and Habe in 1961 -- a mere 26 years ago. Has enough time gone by for us to affix the title of "rare" to this small (25mm -- 1 inch long) shell? Is 26 years enough time? I don't believe so. But if you are a cowrie enthusiast, and want to "get them all," you are going to have to decide whether or not you want to lay out between \$375 and \$750 for this shell. (note: As this article goes to press, the price has dropped to a low of \$300, as offered by a European dealer.)

Or take *Cypraea midwayensis*, for example. Another so-called "rare" shell. It was discovered and named just 20 years ago, and may be purchased for \$1500 - \$1800. Shouldn't the prudent collector wait and see if bucketsfull of this shell might not be dredged-up by some research vessel or other, or perhaps by one of those Taiwanese trawlers which are bringing back hordes of shells from far-flung places?

One more example, this time a cone: *Conus rogmartini* daMotta, named in 1982, for Roger Martin. It is a beautiful little cone, reaching around 35mm in length, and taken in 120 fathoms from Balut I., southern Mindanao, Philippines. So far, it is only known from the type locality. It is seldom, if ever offered by dealers. I have not seen it on many lists, but one California dealer offered it at \$125 in December, 1985. Does the cone specialist want to "pay anything" for this shell, no matter how "exquisitely sculptured" this species might be? How long will it be known "only from the type locality?" Given the tangle-net mania in the Philippines, my guess it won't remain elusive nor "rare" very long. Show a fisherman an example of it, tell him what you'll pay, and I'd be willing to wager he'll come up with dozens of them in as many weeks. So my feeling is: we must let considerable time go by before pronouncing a shell "rare" or not. More about this in a later article.

If a species habitat is very deep water, and must be dredged-up using heavy winches, that species will be more difficult to obtain, and thus be "scarce" or "rare." The PLEUROTOMARIIDAE immediately come to mind, and some abyssal volutes, such as *Tractolira sparta* (13,392ft) or *Arctomelon benthalis* (10,032ft). If a shell occurs in some remote area or island -- with rocky, wave-crashing shores, steep cliffs, and few Scuba or active collectors -- this too, influences a species' ability to "get to market." Many cowries off South Africa come to mind. Then too, we have those species which are not only found in remote areas, but may even be found in the stomachs of fish ("ex pisce" they are termed). Three cowries serve here as examples: *Cypraea broderipii*, *fultonii*, and *surinamensis*. Not only must the right fish be caught (not all fish are bottom-feeders) with the correct bait at the correct depth, but that fish must be caught before its stomach acids dissolve the calcium carbonate of the shell!

When "rarity" is discussed or tagged onto a shell by a dealer, a combination of the previously listed 7 factors should be taken into account. Malformation and discoloration (albinism and melanism) are also added into the equation as we shall see.

Shell dealers often call a species "rare" when they really mean "difficult" for them to obtain." At the source, however, the shell may in fact be plentiful, and be collected by all the locals. It may be available in village marketplaces as a food source, or even as a trinket. The rare cone, *C. adamsonii* Broderip, 1836 occurs in the Central and S.W. Pacific Ocean, and is seldom, if ever offered by dealers live-collected. When it is, this beautiful pink shell called the "Rhododendron Cone", is expensive, and lists will usually quote its price as being "POR" (price on request). When you see that designation, you know it's going to be rare!

But the ecologic habitat of this shell is now known (subtidal, shallow water), and perhaps even its population center (Phoenix Is.), so I predict it will lose its "rare" designation, and in time will find its way to dealer's list and showrooms at prices average collectors of modest means can afford. Since its distribution is becoming better known (Cook (2), Tonga, Gilbert and Society Islands; Solomons and the Great Barrier Reef; extending to the New Hebrides and New Caledonia) it only remains for its exact hiding places to be discerned. In some areas, according to Walls (1), it seems that *C. adamsonii* is "not uncommon, judging from the number of beach specimens...washed up... after severe storms."

(continued page 6)

## Rarity (continued from page 5)

In the case of another cone, *C. pergrandis* (Iredale, 1937), Walls (1) says: "It is such a rare and seldom offered species at the time of writing (1977), however, that even bad specimens can be sold(!)"

T.C. Lan (2) comments that "*pergrandis* is rare, but occasionally available." He considers it rare even though it may be collected dead, or live-taken, and in any condition. He takes into account "worldwide availability" when making his determination of rarity, even though his book focuses on shells of Taiwan. He classes shells into 3 degrees of rarity:

Extremely rare (\*\*\*) - e.g.,

*Cypraea sakurai*

Rarely available (\*\*) - e.g., *C. porteri*:

"rarely taken alive and even good dead specimens are much sought after."

Rare, but occasionally available (\*) - e.g.,

*Conus pergrandis*: "even dead shells are very rare."

A "rare shell" and a "collector's item" are not necessarily the same thing. There are many species which have been described from one specimen and were never found again, yet they have little commercial value. In later articles, we will examine how a shell's value affects rarity, and how this value varies with time.

Some of the rarest shells in the world may be less than 5mm long, without color and be of ordinary shape. Many shells are rare only because no one has happened to sample their "optimum habitat," as Abbott (4) calls it.

One might say that there is no such thing as a rare marine shell, because any species living today must have a large enough population -- certainly of several thousands of individuals -- to sustain the species.

To quote Dr. Tucker Abbott: "If a shell is large, handsome, beautiful, known only from a few specimens and sought after by avid, wealthy collectors, it may qualify as a collector's item, or be classed as a so-called rare shell" (4). In a later article, I will attempt to bring up-to-date S. Peter Dance's list of 50 rare shells (5) proposing my own candidates. As may be imagined, many of these once-rare shells are now less than rare. The reputation of rare shells dies hard, sometimes almost a generation after the species has proved to be common.

Unlike stamps or coins or books, rare shells generally speaking, do not increase in value. If anything, they most certainly will drop in value as more specimens are found. "Only species rapidly becoming extinct might have an increasing value, but such cases exist among the land and freshwater shells, not among the marine species (4)." Very few shells are greatly localized in distribution, attractive to collectors, and readily available to us. Only when this combination of variables exists, is a shell in "real trouble" (6). Possible species which may face a crisis in the coming years include: *Cypraea cervus* and *teulerei*; *Conus nobilis*; and *Oliva porphyria*. The more uncommon species, such as *Conus gloriarius* and *Cypraea aurantium*, may be locally over-collected, but both of these have large ranges and are not easily subject to extensive collecting over their entire range.

Marty Beals, writing about his collecting trip to South Australia (8), concluded that "the area was suffering from serious over-collecting." He concluded that there has been "some extreme over-collecting of certain species: *Cypraea friendii*, *theristes*, *venusta*, and the *Volutes exoptanda*, *kreuslerae* and *fulgetrum*." He noted that "in some areas, hardly a single specimen could be found now." Divers for years have collected virtually every *Zoila* they could put their hands on in the very limited populations near Perth. Beals was told by several dealers that in "years past, *C. friendii* was available by the bucket!" But not so today.

There are a number of shells which live hidden under ledges in such inaccessible shallow-to-moderate depths that they are never likely to become common. Many desirable species have defied the best efforts of modern dredgers of Scuba divers. One exotic species is destined to be in the "extremely rare" category for decades, I predict, simply because its current known habitat is at 10,000 feet. This is the one existing specimen of the *Benthalis* *Volute* of Dall, discovered in 1896 by dredging off Central America. Another shell destined to remain rare is unique blind volute, *Guivillea alabastrina*, which lives at 9,600 feet in the south Indian Ocean. *Benthovoluta gracilior* Rehder, found in 1967 in the Philippines, is yet another rare deep-water species (from 3,300 feet) which is destined to stay rare for a long time, as is *Surculina cortezi* (Dall, 1908) a TURBINELLIDAE dredged off southern California from 6,270 ft. Other deep-water (100-1500 ft) species have recently been recovered by prawn trawlers 200 miles off Western Australia (7): *Pleurotomaria* (*Perotrochus*) *tangaroana*; *Teramachia smithi* and *T. dalli*; and the new species *Notovoluta rinksensis* and *Teramachia dupeyrei* (9). All these may currently be considered rare, and will probably continue to stay rare as the shrimpers will ultimately move to other waters. Unless these species can be found in shallower waters, or have a wide range (or if shrimp will perennially continue to be found at the same depths and vicinity) -- these shells' value will be maintained.

As Dr. Gordon Melvin put it, "Rare shells present something of a puzzle. In the first place, it is difficult to obtain a rare shell, and hard to find a person who has discovered one and is willing to part with it. Such shells usually come from relatively inaccessible waters. If no one seeks them, they will not be found (10)."

Some mollusks seem to exist in relatively small numbers, as if they were a dying race. Examples of these species might be the STROMBIDAE *Tibia crispata*; *Lambis robusta* and *violacea*; and *Tricornis oldi* and *taurus*. Another example, taken from the CYMATIIDAE, is *Cymatium ranzanii* Bianconi, a magnificent triton which attains 6 to 6.5 inches in length, and which comes from Indian Ocean waters off Mozambique and the northern Arabian Sea. It is a relatively shallow water species apparently, and the first ones were collected off the northern end of the Cabeceira Peninsula, in 20 feet of water. The shell was hiding in a narrow channel in a seaweed area which was strewn with coral boulders and teeming with fish. In 1972-73, only 12 specimens were known since its discovery in 1851, and its value in the 1970s hovered around \$800. By 1979-1981, though, it had dropped to \$25 - \$50 as other locations were discovered. Today, its price is slowly rising, to between \$50 - \$85. Currently, this species is being collected offshore of Oman, where oil exploration and development is taking place. Its previous high value was due not so much to its appearance, but mostly from its unavailability.

Diamonds are regulated by a central commercial control by the Oppenheimer and deBeers interests. This helps keep the market relatively stable. No such control exists for rare shells -- although they are much rarer than diamonds! Diamonds are in continuing supply, but there is no such steady supply of rare shells. They're simply not available on demand from the world's oceans.

When you buy a rare shell (or one purported to be rare), you are taking a gamble. It's unlikely though, that any of the truly rare ones will ever become common, or available in quantity like *Cypraea tigris*. And there's some chance that certain rarities will become scarcer and even rarer than previously, because they're not being found any more. We'll see which shells these are only as time goes by and as prices go up or down. More about this in later articles.

In Part II of this series, we will compare and contrast rarity as judged by several contemporary authors in their various books. We will see what the Guinness Book of Records called "the most valuable" shell in the world. We will compare the rarities of 8 famous cones, and see how their rarity has changed over time.

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# on the DRIFTLINE

## from Florida

The Central Florida Shell Club of Orlando, Florida, will be conducting its Second Annual Shell Auction on Tuesday, June 9, 1987, at the Orlando Science Center. ...I am writing to encourage you to donate specimen shells or shell-related items to this event. All donations are tax deductible and the proceeds from the auction are used to maintain the operation of the Central Florida Shell Club, club library, and the publication of our monthly newsletter. ...Please send all donations to: David B. Green, 5853 Pitch Pine Dr., Orlando, Florida 32819.

## from California

The Santa Barbara Shell Club (formerly Santa Barbara Malacological Society) is pleased to announce the winners of the Sara T. DeLaney Scholarship. Ms. Victoria Fabry, a doctoral student at the University of California, Santa Barbara was awarded the first place scholarship of \$1000. The second place award of \$400 was presented to Ms. Carolyn Declerck, a doctoral student at the University of California, Davis.

Ms. Fabry will use her award to finish her research project on "The contribution of pteropod mollusks in the calcium carbonate cycle of the oceans". Ms. Declerck is just beginning her research on "Morphological and genetic divergences in introduced populations of the Atlantic Oyster Drill *Urosalpinx cinerea*."

Over 20 excellent scholarship applications were received from students throughout the U.S. and Canada. Applications were judged by three impartial referees, and were rated for merit of the proposed research and overall significance to the field of malacology. - PAUL SCOTT, Santa Barbara Shell Club, P.O. Box 30191, Santa Barbara, CA 93130

## from Poland

Adam Galsanski has moved to his family to an apartment. His new address is: Adam Galsanski, J. Krasickiego - 37/38, 85-822 Bydgoszcz, Poland

## from Guam

On September 26 and 27, 1987 the Guam Shell Club will be holding its 22nd Annual Shell Fair. This year's will be the largest one ever held on Guam, as non-members are being invited to prepare displays. Contact: GUAM SHELL CLUB, P.O. Box 7867, Tamuning, Guam 96911

## from California

Matt James is now Matthew Joseph James, PhD and lecturing in geology at Sonoma State University, Rohnert Park, CA 94928

## from Switzerland

My copy of "Shells of the Philippines" has a fault in the pagination. After page 20, the 4 double pages, with plates are being replaced by cover page, 1-2, 3-4, map page 13-14 and 15-16. Then we jump to page 29 (plate 3). It is an obvious printing fault... - RAYMOND J. PREUX, 24 Riedgrabenweg, 8050 Zurich-Oerlikon, Switzerland. [ed. - Carlos Leobrera has mentioned a few copies with (?this) fault. He attempted to catch all similar copies as soon as he became aware of the faults. Anyone who has a similar fault in their copy should refer the problem to: Carlos Leobrera, 1786 A. Mabini St., Malate, Manila, Philippines - regarding a replacement.]

## from Mexico

Jerry Mitchell is interested in contacting people interested in Baja Del Sur mollusks. Please contact him at: - RICHARD "JERRY" MITCHELL, #13 Heroes Independencia, Loreto, Baja Del Sur, Mexico.

## from California

The Western Society of Malacologists, ...will award a grant of \$500 to an undergraduate or graduate student for the academic year 1987-88. The grant is offered to initiate or further research concerned with molluscs, in systematics, biology, ecology, paleontology or related fields.

Applications must be sent by May 1, 1987, to: Dr. Vida C. Kenk, WSM Committee on Student Grants, Dept. Biological Sciences, San Jose State University, San Jose, CA 95192

## from California

Wes Thorsson and I will be leaving for the Solomon Islands in mid April for two weeks' diving with Brian Bailey. Hope to get some new shells. - BOB PURTYMUN, 1200 Brickyard Way #407, Point Richmond, CA 94801

## from Portugal

On your catalog, on p. 21 [Seashell Treasures Books] you list two works by Oliveira (1974 and 1969) who is a Brazilian author and you state that they are written in Spanish language. It happens that Portugal is independent from Spain since early 12th century - Spain as we know it today did not exist by that time). Since then we have been developing a different language called "Portuguese"; words of it were incorporated in practically all languages of the world since as you may know, for instance, we arrived at the "South Seas", Australia, etc. some 250 years before Cook did. Portuguese is well entrenched in the world as a language. Can you give it some credit? [ed. - Sorry about that! I will change the listing for the next edition.] - IUDIO A.V. FELIX-ALVES, Apartado No. 52, S. Pedro do Estoril, 2765 Estoril, Portugal.

## from California

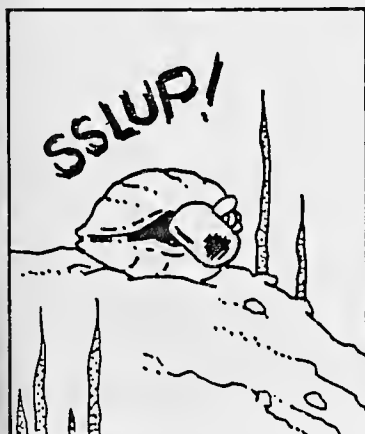
Dr. W. Backhuys (The Netherlands) was in Bayside to visit and purchase books. He also travelled to several parts of the U.S. including Arizona and Florida.

## from Illinois

Richard Goldberg, President of the Conchologists of America has announced that Dr. Alan Solem, Curator & Head of the Division of Invertebrates, Field Museum of Natural History in Chicago, will be the banquet speaker for the annual C.O.A. Convention. ...The presentation will culminate the St. Louis Convention on Saturday evening, June 27th.

Whether your interests tend towards marine or land shells, this is one presentation you will not want to miss. Of course, the entire five day convention is scheduled with exciting and interesting speakers and events. For registration information write: Alan Gettleman, 4045 Central Lane, Granite City, IL 62040.

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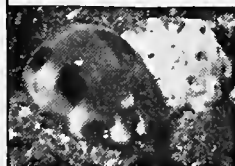
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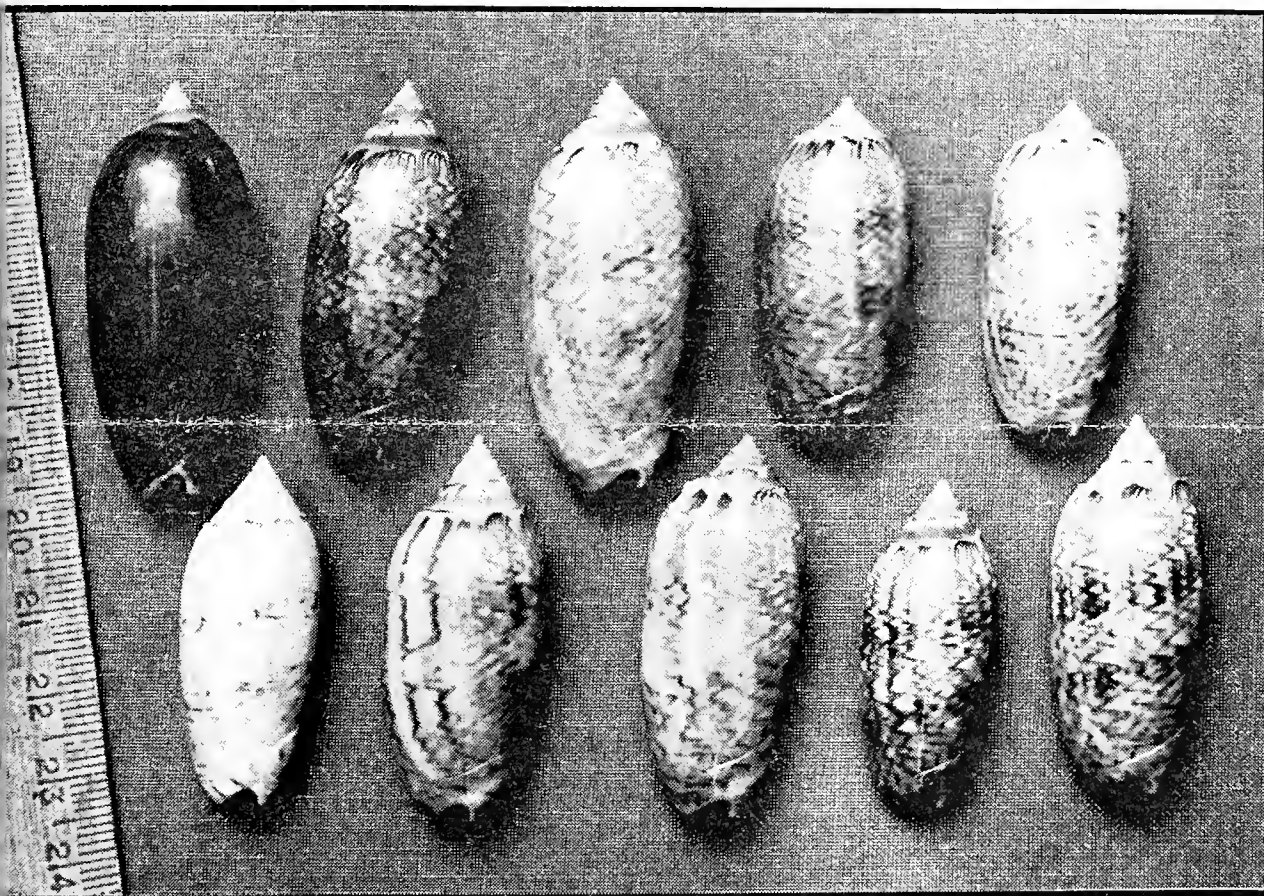
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March, 1987

Vol. 19, No. 3

## New olives from Barbados

photo by David Hunt, Gregg Farm, St. Andrews, Barbados, West Indies



Variation within an insular form of *Oliva reticularis*, ranging from totally dark mahogany-brown (top left) to quite pale (bottom left). Twin central bands are more pronounced in some shells. Notice the two short-spined specimens at top right.

Edward Petuch recently [1986, "Atlas of the Living Olive Shells of the World"] named this deepwater Barbadian Olive as *Oliva reticularis barbádensis*. These snails are easily attracted to 400-500ft. traps, set off the west coast of Barbados. [note metric rule left side photo]

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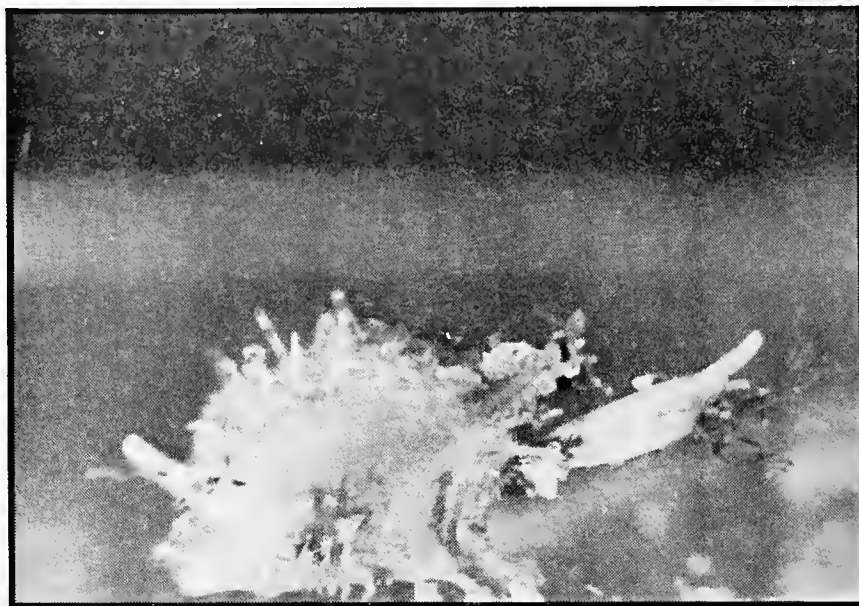


# Tricolia & Pinctada

Peggy Williams, Rt. 3, Box 28, Sarasota, FL 33580

I seldom find good specimen shells on the beach on the East Coast of Florida because of the heavy surf in that area. However, I once found a bottle on shore at West Palm Beach in which were several living specimens of *Tricolia* species and tiny, juvenile *Pinctada imbricata* Roeding, 1798 (the Pearl Oyster). I put them all into a small travelling aquarium to photograph the *Tricolia* in motion and as I set up the camera found a pile of shells beginning to move about very satisfactorily. However, when I focused on the activity I discovered the shells that were moving so rapidly were not the gastropods but the bivalves! The tiny mollusks extended a long foot and fastened it ahead of the shell, then contracted the foot to pull the shell forward. In this manner, they pulled themselves up the aquarium wall again and again.

This species is normally sessile, attaching itself to some immovable base with a sticky byssus. I suppose if it is dislodged it must somehow find a place to reattach itself, but I have not seen an adult move as these juveniles did.



## Calendar 1987

### APRIL

Seattle Shell Show, April 4-5, Museum of History & Industry, Seattle, Washington. Pacific Northwest Shell Club, Evelyn Adkins, Corresponding Secretary, (206) 362-1634.

Belize: Rain Forest and River, April 4-11, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Pacific Shell Club Auction, April 5, Los Angeles County Museum of Natural History, Los Angeles, California.

Cumberland Island Camping, April 19-24, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Cincinnati Shell Show, April 24-26, Cincinnati, Ohio. Contact: Lois Nizny, 3953 Rose Hill Ave., Cincinnati, OH 45229. (513) 861-5875

Dismal Swamp Canoe/Camp, April 29-May 3, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### MAY

Cape Cod Whale Watch, May 15-17, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Red Knots/Horseshoe Crabs, Delaware Bay, May 17, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### JUNE

Pine Barrens Weekend I, June 5-7, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Maine Coast Weekend, June 11-14, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Montauk Weekend, June 19-21, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

SIC87, 8eme Salon International du Coquillage, June 20-21, Lausanne, Switzerland. Contact Dr. Ted W. Baer, CH-1602 La Croix, Switzerland. Phone (0)21 39 37 71.

Western Society of Malacologists, June 21-25, San Diego State University, San Diego. Contact: Cerole M. Hertz, San Diego Natural History Museum, PO Box 1390, San Diego, CA 92112, (619) 277-6359 home.

Conchologists of America, June 23-27, Doys Inn at the Arch, St. Louis, Missouri. Contact: Alan Gittleman, 4045 Central Lane, Granite City, IL 62040. (618) 931-7374 weekends.

Third International Symposium on Marine Biology & Evolution in the Pacific, 26 June-3 July, Hong Kong. Convenors - University of Hong Kong & Western Society of Naturalists. Contact: Prof. D.H. Montgomery, Biological Sciences Dept., Cal Poly State University, San Luis Obispo, CA 93407.

Gulf Stream Billfish Tagging, Hatteras, June 28, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### JULY

Wreck Diving I, July 12, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Island Ecology, Isle of Shoals, July 17-20, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shark Tagging, July 18, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

American Malacological Union, July 19-23, 53rd Annual Meeting, Casa Marina Resort, Key West, Florida. Contact: William G. Lyons, Florida Dept. Natural Resources, 100 Eighth Ave. S.E., St. Petersburg, FL 33701. (813) 896-8626

Jacksonville Shell Show & Auction, July 30-August 2, Flag Pavilion, Jacksonville Beach, Florida. Contact: Allan Walker, 1036 Montes Ave., Jacksonville, FL 32205. (904) 781-1553

### AUGUST

Annual Crab Feast, Oxford, Maryland, August 2, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Wreck Diving II, August 9, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shellfishing and Coastal Management: A Global Perspective, August 19-21, Hofstra University, Long Island, NY. Contact: Terry Baker, Associate Dean, School of Education, Hofstra University, Hempstead, NY 11550.

XVI Pacific Science Congress, August 20-30, Korea. Contact Prof. Choon Ho Park, Secretary-General, K.P.O. Box 1008, Seoul 110, Korea. Phone: (2)733-4478.

### SEPTEMBER

Pine Barrens Weekend II, September 11-13, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Wreck Diving III, September 20, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

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# on the DRIFTLINE ~ ~ ~

## from U.A.E.

As advised previously my address changed in September 1986 with a move to Dubai. The move is already proving to be a satisfactory one with a very different fauna on the Batina Coast at the Emirates, which is of course outside the Gulf. With the lower salinity life is extremely prolific and many new finds are coming to light. Met with Horst Kauch who is providing most of the specimens from his very extensive collection for a book on Emirates seashells. If the photographs, which he has shown me, are anything to go by then it will be spectacular. I believe Don Bosch and Kathy Smythe are coproducing an Arabian Peninsula book though I have no firm information at that. So there should be a veritable plethora of information available soon.

Some of the 'finds' to date have included a 'golden *Cypraea grayana*' caused no doubt by oxidation on a sunken wreck -- a very large *Cypraea lentiginosa* plus an albino white form of *Chlamys ruschenbergerii*. Plenty of cones and a very large *Chicoreus ramosus* (not very common & once reported extinct in the Gulf although it can be found on Abu Musa Island and Halul Island.) - TONY WOODWARD, Al Habtoor Motors, P.O. Box 9579, Dubai, U.A.E.

## from Florida

Carolyn & Earl Petrikin won the DuPont Award at the Astronaut Trail Shell Show in January.

## from Cairns, Australia

The March issue of the Cairns Shell Club publication reports the death of Arthur Boorman of Rockhampton, Australia. They also mention the death of lone Reed's husband in Florida. Lee & Jan Kremer (Chicago, Illinois) were in Cairns during February and R. (Dick) Jones (South Euclid, Ohio) visited during March.

## from Hong Kong

The Third International Symposium on Marine Biology & Evolution in the Pacific will be held at the University of Hong Kong, 26 June to 3 July, 1988. Four symposia have been announced: Paleozoogeography of Cenozoic Pacific Marine Invertebrates: An Evolutionary Perspective, chaired by Dr. Thomas Cronin; Marine Biology of the Sub-Tropics, chaired by the Marine Biological Association of Hong Kong & The University of Hong Kong; Non-Annelid Worms of the Pacific, chaired by Dr. Mary Rice; and Indo-Pacific Molluscan Biogeography and Evolution, chaired by Dr. Alan Kohn. A fifth symposium on either fish or algae will be scheduled. If you are interested in receiving the second announcement & call for papers write before June 1, 1987, to: Prof. D.H. Montgomery, Biological Sciences Dept., Cal Poly State University, San Luis Obispo, CA 93407 U.S.A.

## from Florida

Last year COA awarded two grants totalling \$1500 to further malacological research. Persons interested in applying for research grants this year should apply prior to May 15, 1987. Send proposal to: Richard W. Forbush, Awards Chairman, 1104 Sklar Dr. E., Venice, FL 33595.

## from Southern California

The Southern California Association of Marine Invertebrate Taxonomists continues to produce excellent identification guides for marine invertebrates. The majority of their "provisional designations" concern polychetes & small crustaceans -- two groups which almost defy identification. Their monthly newsletter is a very real contribution to science. For more information, write to them: SCAMIT, 3720 Stephen White Drive, San Pedro, CA 90731.

## from Arizona

Carol & Paul Skoglund have returned from two months' travels in the Yucatan. They visited many places and enjoyed themselves thoroughly.

## from Florida

Albert Bergman (Brandenton, Florida) suffered a stroke recently but is recovering well.

## from Canada

The Ross Lemire collection of conchological books listed in our November 1986 issue has sold. Thank you for your interest. Please do mention S&SL when you are contacting our advertisers.

## from Ohio

*Marginella Marginalia* is now being published at the Dayton Museum of Natural History where I'm the Curator of Biology. A Malacological Research Fund has been established at the museum and costs for publishing and mailing this newsletter will be taken from that fund. ... All donations, which are tax deductible, will be added to the Malacological Research Fund and should be so designated. So please write to "me", the "Editor": Gary A. Coovert, Dayton Museum of Natural History, 2629 Ridge Ave., Dayton, OH 45414.

## from England

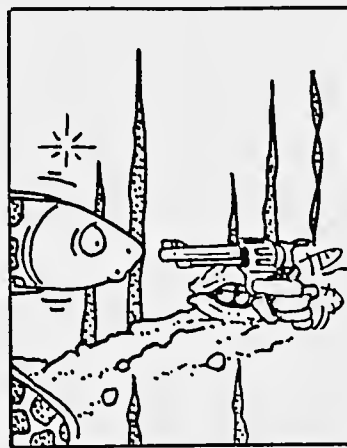
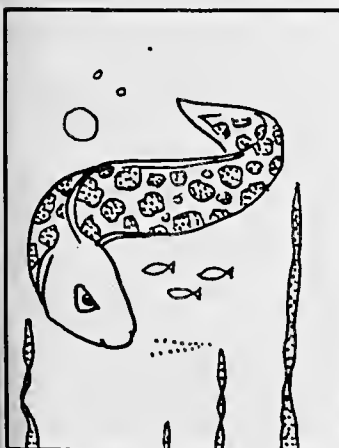
Mr. Chris Garvie is about to move back to the U.S. again. Phone call in March said he would be coming "soon". I believe he will be in Texas again.

## from Barbados

Am planning to do you a short "how-to" article on manufacturing of a simple but effective molluscan (and crab, shrimp) TRAP that anyone can make from those indestructible 1 quart plastic pop bottles. Will probably do a photo showing the process at its 5 or 6 different stages from intact bottle to finished product.

Can later do another "how-to" article re. construction of simple dredge-baskets and their deployment, using boats from dinghy-size up to cruiser. I imagine such articles would be useful to collectors. - DAVID HUNT, Gregg Farm, St. Andrew, Barbados, West Indies [ed. - You bet! We also would appreciate short articles on "how to clean" and "how to store" and "how to catalog" your shells.]

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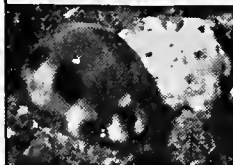
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The Conchologist's First Book by Edgar Allen Poe. First edition (1839), Haswell, Barrington & Haswell, original printed boards, 12 hand-colored plates in fine condition. Hand-tooled leather case. Available for viewing at the COA convention in June. \$500.00 firm. Lawrence P. Clifford, 12 Hull Ave., Webster Groves, MO 63119. Phone 314-962-9822.

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## Editor's Notes

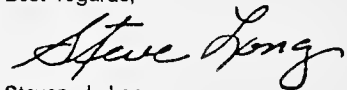
During the next few months, *SHELLS and SEA LIFE* will concentrate on getting the issues out on time. We have tried everything from top quality, glossy color to newsprint and feel that a clean readable 8.5 x 11 inch format is what most of you are looking for -- on time! Current events, book reviews, travel information, new species references and personal notes seem to enjoy the most interest.

Your comments are always taken into consideration -- please tell us how we are doing. The comprehensive sea life directory in this issue should be very useful to you in the coming months. *SHELLS and SEA LIFE* will do shorter articles and notes in monthly issues. Most of the longer material will be published as *ACTA MOLLUSCA* issues, separate from S&SL.

We do not yet know whether the printing press will be running for this issue. We hope to get the funds together for our additional equipment within the next few weeks. If not, we will probably do a shorter May issue and get it to you on time rather than wait again.

We have decided not to complete the Crouch reprint of Lamarck's shells as a part of *SHELLS and SEA LIFE* issues. We will, however make a set of the remaining pages not yet printed for each of you who would like them. The cost will be \$5.00 postpaid. If anyone wants the full set softbound, the cost will be \$12.95 postpaid. Make your check payable to: *SHELLS and SEA LIFE*, 1701 Hyland St., Bayside, CA 95524, U.S.A.

Best regards,



Steven J. Long

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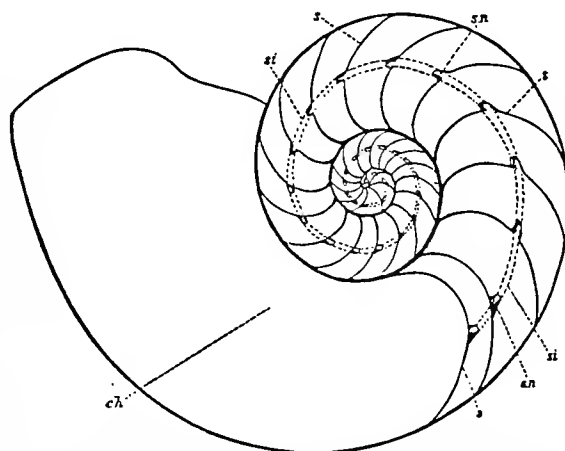
# Sea Life Directory

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Club Publications Directory -- page 28

Club Address & Meeting Directory -- page 29

Trade Books in Print Directory -- page 31



— *Nautilus pompilius* L., in section, showing the septa (s, s), the septal necks (s.n, s.n), the siphuncle dotted in (si), and the large body chamber (ch).



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Attagash, Box 713H Greenville ME 04441

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Berliawsky; Lillian Books, 23 Bay View St Camden ME 04843

Seaford Soundings, Lobster Cover Road Monhegan Island ME 04852

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Adelson; Richard H Antiquarian Bookseller, N Pomfret VT 05053

Johnson; John Natural History Books, RD 2 N Bennington VT 05257

Bygone Books, 91 College St Burlington VT 05401

Fraser; James, 390 S Willard Burlington VT 05401

Country Bookshop; The, RFD 2 PLAINFIELD VT 05667

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K-R Nautical Interiors, 156 Prospect St Wethersfield CT 06109

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Multitech Marine Swim & Scuba Center Inc, 190 Flanders Rd Niantic CT 06357

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Audio - Forum, 96 Broad St Guilford CT 06437

Dunn's Mysteries, 251 BALDWIN AVE MERIEN CT 06450

Chiswick Bookshop; Inc, Walnut Tree Hill Rd Sandy Hook CT 06482

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Orbit Marine Sports Center Inc, 3273 Fairfield Ave Bridgeport CT 06605

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Central Sales Scuba, 136 Carter Rd Thomaston CT 06787

Diving Bell; Ltd, 461 Federal Rd Brookfield CT 06804

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Books-on-File, Box 195 Union City NJ 07087-0195

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Balish; Leonard Bookseller, PO Box 25 Englewood NJ 07631-0025

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Divers Two, One Main St Avon NJ 07717

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Dip 'N Dive, Inc, 500 Niagra Falls Bl Buffalo NY 14223

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Dive Plan, 11 Commercial St Livonia NY 14487

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Paleontological Research Inst, 1259 Trumansburg Rd Ithaca NY 14850

Voyagers, Box 915 Ithaca NY 14851

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Professional Diving Services Inc, 1135 Pittsburgh St Springdale PA 15144

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Three Rivers Diving, Rt 19 S Washington; Rd Canonsburg PA 15317

Randy's Dive Shop, RD 6, Sandy Hill Rd Irwin PA 15642

B & B Marine, Hillsville-Bessemer Rd Hillsville PA 16132

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Smokey's Diver's Den, 412 N Duke St Lancaster PA 17602

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Sunken Treasure Dive Shop, RD 4 Box 396 Box 523-C Jersey Shore PA 17740

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Dive In; The, 508 Main St Stroudsburg PA 18360

Pisces Divers, 313 Park St Honesdale PA 18431

Scuba-America, 600 E Drinker St Scranton PA 18505

Underwater USA Locker, PO Box 195 Beach Haven PA 18601-0195

Northeast Divers - Kingston, 338 Pierce St Kingston PA 18704

Sea and Shore Attractions 102 Miner Street, Hudson PA 18705

Scuba Parts, PO Box 949 Doylestown PA 18901

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Shell Gallery %Becky Lantz, 106 Whisperwood Ln Rehoboth Beach DE 19971-9520

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Los Angeles Times Mr Robert Rosenblatt - Bu, 1875 T NW #1100 Washington DC 20006

Booked Up, 1209 31st St NW Washington DC 20007

Hale; William E - Books, 1222 31st St NW Washington DC 20007

Journal College Science Teach NSTA, 1742 Connecticut Ave NW Washington DC 20009

Science & Children NSTA, 1742 Connecticut Ave NW Washington DC 20009

Science Scope NSTA, 1742 Connecticut Ave NW Washington DC 20009

Science Teacher; The NSTA, 1742 Connecticut Ave NW Washington DC 20009

Dabney; O M & Co; Inc, PO Box 42026 Washington DC 20015

Treasure Chest, 3176 Upland Terrace; NW Washington DC 20015

Co-op America, Inc, 2100 M St NW Ste. 310 Washington DC 20063

Random House; Inc, 400 HAHN RD WESTMINSTER MD 20157

Ernest; James PAC 0242, Panama Dos Washington DC 20521

Smithsonian Bookstore, 14th St & Constitution NW Washington DC 20560

MARYLAND

Dykes; Jeff - Western Books, Box 38 College Park MD 20740

Dynamo Dive Shop, 8906 Rhode Island Ave College Park MD 20740

Peregrine Enterprises, Inc, PO Box 1003 College Park MD 20740

American Watersports, 6217 Livingston Rd Oxon Hill MD 20745

Pearls, 4512 Avamere Bethesda MD 20814

American Sport Divers, 1059 Rockville Pike Rockville MD 20852

Frohnisdorff; Doris, PO Box 2306 Gaithersburg MD 20879

Nautilus; The Dr M G Harasewych, PO Box 3430 Silver Spring MD 20901-0340

Gach; John - Books, 5620 Waterloo Rd Columbia MD 21045

East Coast Divers, 311 St John St Havre de Grace MD 21078

Last, Inc Joseph Colley, 43 Millstone Rd Randallstown MD 21133

Waverly Press, Inc Patricia T Chalfant, PO Box 1496 Baltimore MD 21203-9990

Parks Diving Supply, 8027 Liberty Rd Baltimore MD 21207

Braiterman; Marilyn, 20 Whitfield rd Baltimore MD 21210

Malick's Fossils; Inc Donald Malick, 5514 Plymouth Rd Baltimore MD 21214

Kelmscott Bookshop; The Donald Johanson, 325 W 25th St Baltimore MD 21218

Rush; Cecil Archer Scientific Books, 1410 Northgate Rd Baltimore MD 21218

Divers Den; Inc, 8105 Harford Rd Baltimore MD 21234

Tidewater Aquatics, PO Box 3361 Annapolis MD 21403-0361

Cornell Maritime Press Promotions Dept, PO BOX 458 CENTREVILLE MD 21817

DEVA, Box NH1 Burkittsville MD 21718

Dan; Donald, 2629 Lou Anne Ct West Friendship MD 21794-9521

Natural Shells, 214 S Boardwalk  
Ocean City MD 21842

## VIRGINIA

Sea Ventures; Inc, 9444 Main St  
Fairfax VA 22031

Lou-Bon Gems & Rocks, 6341 D  
Columbia Pike Bailey's Crossroads  
VA 22041

Dive Shop; The - Falls Church,  
2841 Rogers Dr Falls Church VA  
22042

American Water Sports of VA,  
6775 Wilson Bl Falls Church VA  
22044

Associates, The R William  
Selandier, PO Box 4214 Falls  
Church VA 22044

Petals From the Sea, 6346  
Crosswoods Drive Falls Church VA  
22044

Bird; Christopher, 8900 Gallant  
Green Dr McLean VA 22102-1515

Shell Cabinet; The Morgan  
Breeden, 12991 Bristow Rd  
Nokesville VA 22123

Wet Ones; the; Inc, 163 Glyndon St  
Vienna VA 22180

Mique's Molluscs, 1324  
Westmoreland Dr Warrenton VA  
22186

Shells'n Things, 2329 N Edgewood  
St Arlington VA 22201

American Geological Institute The  
Library, 4220 King St. Alexandria VA  
22302

Ski & Dive Shop, 1543 N Quaker Ln  
Alexandria VA 22302

Blue Ridge Dive & Craft Shop,  
1726 Allied St Charlottesville VA  
22901

Dad's Dive Den, 3008 Hydraulic Rd  
Charlottesville VA 22901

Daedalus Bookshop, 121 4th St NE  
Charlottesville VA 22901

Dawson; Bob Books, 109  
Ingleswood Ct Charlottesville VA  
22901-2619

Gilliam; Franklin Rare Books, 112  
Fourth St Charlottesville VA 22901

Heartwood Books Paul M  
Collinge, 9 Elliewood Ave  
Charlottesville VA 22903

Coastal Education & Research  
Foundation (CERF), PO Box 8068  
Charlottesville VA 22906

Journal of Coastal Research A  
CERF Publication, PO Box 8068  
Charlottesville VA 22906

Bookpress; Ltd Box KP, 420 Prince  
George St Williamsburg VA 23185

Bland Minerals, 5904 North  
Crestwood Avenue Richmond VA  
23230

Dive Shop; The - Richmond, 1707  
Commonwealth Ave Richmond VA  
23230

Shells of the Sea, 2621 Brookwood  
Road Richmond VA 23235

Display Case Co; The, Box 880  
Exmore VA 23350

BRJ Booksellers Juliet Wild, 3500  
Atlantic Avenue Virginia Beach VA  
23451

Shepherd; Tom, 2222 Beech St  
Virginia Beach VA 23451

Lynhaven Dive Center, 1413 Great  
Neck Rd Virginia Beach VA 23454

Stonehouse Books, Box 1179  
Norfolk VA 23501

Aqua-Lung Diving Center Inc, 805  
W Little Creek Rd Norfolk VA 23505

Diving Enterprises, 4040 Franklin  
Rd Roanoke VA 24014

Divers Corner, 1530 First St  
Radford VA 24141

Bookworm & Silverfish, PO Box  
639 Wytheville VA 24382

## WEST VIRGINIA

Compass Bookshop RR 2, Box 89  
Berkeley Springs WV 25411

Huntington Sport & Commercial  
Diving Center, 4901 US Rt 60 East  
Huntington WV 25705

Scuba W. VA; Inc, Rt 9 Box 215  
Parkersburg WV 26100

## NORTH CAROLINA

Carolina Biological Supply Co,  
2700 York Rd Burlington NC 27215

Geoscience Resources, PO Box  
2096 Burlington NC 27215-2096

Piedmont Divers, 132 E Davis St  
Burlington NC 27215

Aquatics Unlimited, 212 Adams St  
Eden NC 27288

Cheesborough; John Avocet  
Books, 827 S Horner Bl Sanford NC  
27330

Blue Dolphin Dive Center; Inc,  
1006 National Highway Thomasville  
NC 27360

Scuba Shack; Inc, 1835 Spring  
Garden St Greensboro NC 27407

Reef & Ridge Sports Undersea  
Specialists, 532 E Chatham St Cary  
NC 27511

Bennard; Bruce, 67 Dogwood Acres  
Dr Chapel Hill NC 27514

Book House; The, PO BOX 1284  
CHAPEL HILL NC 27514

Univ North Carolina Press  
Promotions Dept, PO Box 2288  
Chapel Hill NC 27514

Water World Marine Services; Inc,  
135 S Miami Bl Durham NC 27703

Pirates Chest Gift Shop, PO Box  
187 - Highway 12 Frisco NC 27936

Nag's Head Pro Dive Center Mile  
Post 10.5, 307 E Gallery Row Nag's  
Head NC 27949

Atlantic Divers Inc, PO Box 1091  
Nagshead NC 27959

Newman's; Inc Shell Shop, PO  
Box 249 Nags Head NC 27959

Shipwreck Museum, PO Box 391  
Nags Head NC 27959

East Woods Press Promotions  
Dept, 429 E BLVD CHARLOTTE NC  
28203

Traders of Nature's Treasures, 312  
East Worthington Ave Charlotte NC  
28203

Charlotte Dive Center, 1741 E  
Independence Bl Charlotte NC  
28205

Sport Divers; Inc, 2600 South Bl  
Charlotte NC 28209

Shields Shells, 125 Maxwell St  
Fayetteville NC 28301

Aqua-Nut Dive Service; Inc, 3703-1  
Bragg Bl Fayetteville NC 28303

Gifts of Land & Sea, 716 N Lake  
Park Blvd Carolina Beach NC 28428

Shell Shop Thomas C Van  
Landingham, PO Box 542  
HAMPSTEAD NC 28443

Shell Shop, 5902 Oak Island Dr  
Long Beach NC 28461

Cockle Shell Millie Pensmith, Rt 1  
Box 544 Holden Beach NC 28462

Discovery Diving Co Inc, 414  
Orange St Beaufort NC 28516

Scuba Center, 1909 Lejeune Bl  
Jacksonville NC 28540

Easy Step Charters EJW Sport  
Shop, 2204 Arendall St Morehead  
City NC 28557

Olympus Sports Inc, Pier 8  
Morehead City NC 28557

Saltshaker Diving Services Inc, PO  
Box 275 Morehead City NC 28557

Sails & Shells Inc, PO Box 40  
Salter Path Rd Salter Path NC 28575

Dive Shop; The, PO Box 877  
Claremont NC 28610

Dive Shop, The, 1-40 Claremont Exit  
Claremont NC 28610

Mountain Divers Inc, 911 Narva Rd  
Hendersonville NC 28739

## SOUTH CAROLINA

Hampton Books Ben Hamilton, Rt  
1 Box 202 Newberry SC 29108

DuPriest; Margaret, 1230  
Pendleton St #6F Columbia SC  
29202

Watertree Dive Center; Inc, 3202  
Fernandina Rd Columbia SC 29210

Scuba Shop; The - Spartanburg,  
1274-A Asheville Highway  
Spartanburg SC 29303

Miller; Sally, PO Box 1087  
Charleston SC 29401

Wet Shop; The; Inc, 5121 Rivers  
Ave Charleston SC 29418

Buddy Line Divers, 1035 Hwy 17  
Bypass Mt Pleasant SC 29464

Carolina Gifts & Sea Shells  
Mildred B Simmons, 1405 Ben  
Sawyer Blvd Mt Pleasant SC 29464

Myrtle Beach Scuba Charters  
Myrtle Beach Scuba Center, 2718  
Hwy 501 at Waterside Dr Myrtle  
Beach SC 29577

South Carolina Scuba Center,  
1504 Hwy 501; Ste #8 Myrtle Beach  
SC 29577

Aquatic Adventure Suite 17B  
Commons Sq, 807 Hwy, 123 By  
Pass Seneca SC 29678

Lady's Island Scuba, Star Rt 5; Box  
10 Beaufort SC 29902

Conch Cabana Fred Mix, 85 Port  
Tack Hilton Head SC 29928

Palmetto Scuba, 205 Triangle  
Square Hilton Head SC 29928

## GEORGIA

Ocean Oddities 3440 Sherrod Dr,  
Rt #8 Marietta GA 30060

Divers Locker John, 1475 Terrell  
Mill Rd Marietta GA 30067

Memorable Books, 5380 Manor Dr  
Stone Mountain GA 30083

Diver's Salvage & Service Inc 1328  
Martha Berry Hwy, Rome GA 30161

Ocean Quest Divers Academy,  
7488 Tara Bl Jonesboro GA 30236

Sea Lab Diving Adventures, 2935  
Hutchins Rd Lawrenceville GA 30245

Shells Atlanta, 38 Irby Ave NW  
Atlanta GA 30305

Woolf's Den Books, 2839 Peachtree  
Rd NE Atlanta GA 30305

Ad Week Southwest - Editor, 75  
Third St. NW Atlanta GA 30308

Sea Castles, 1791-C Harper St  
Atlanta GA 30318

Abrams, Harvey Dan Bookseller,  
PO Box 13763 Atlanta GA 30324

Dive Sales; Inc, 1925 Piedmont  
Circle Atlanta GA 30324

Sea Atlanta-Joan Grace Lenox  
square, 3393 Peachtree Rd NE  
Atlanta GA 30326

Diver's Locker, 6649 C Roswell Rd  
Atlanta GA 30328

Sandy Springs Divers-5 Star, 6445  
Roswell Rd NE Atlanta GA 30328

Diving World USA, 2945 Buford  
Hwy NE Atlanta GA 30329

Silver Burdett Biology, 1925  
Century Bl NE Atlanta GA 30345

Dive South, 1607 Chandler Rd  
Statesboro GA 30458

Metts; Daniel, PO Box 7453 Macon  
GA 31209

Divers Supply, 5208 Mercer Univ.  
Dr Macon GA 31210

Outside In, PO Box 13385  
Savannah GA 31416

Judy's Island Dive Shop, 1610-1/2  
Federica Rd St Simons Island GA  
31522

## FLORIDA

Periwinkle Gift Shop, 3300 South  
Atlantic Ave Daytona Beach Shor FL  
32016

Sandpiper Gift Shop, 3126 South  
Atlantic Ave Daytona Beach Shor FL  
32016

Daytona Shells and Curios, 2715  
North Atlantic Avenue Daytona  
Beach FL 32018

Florida Shells and Curios, 2044  
South Atlantic Avenue Delyona  
Beach FL 32018

Towel City by the Sea, 2570 South  
Atlantic Ave Daytona Beach FL  
32018

Shell Town PO Box 1226, Flagler  
Beach FL 32036

Carvin Scuba; Inc, 2780-1/2 E  
Duval St Lake City FL 32055

Spring Systems Dive Center, Rt 5  
Box 169 X Live Oak FL 32060

Palatka Scuba International, 923  
St John's Ave Palatka FL 32078

Booksmith; The 8 Cathedral Place,  
St Augustine FL 32084

Marineland of Florida Highway A-1  
A South, St Augustine FL 32084

Sea Breeze Gift Shop Rt 1, Box  
137-A St Augustine FL 32084

Sea Grit Ted Yocius, 321 Ribault St  
St Augustine FL 32084

Seashell Museum Gerald B  
Combs, Rt 1; Box 159 St Augustine  
FL 32084

Glenn; Gary Blue Cross of Florida,  
532 Riverside Jacksonville FL 32202

Testa Shell Cases 1228 Lake  
Forest Blvd, Jacksonville FL 32208

Kirks Rock & Shell Shop 2037  
University Blvd N, Jacksonville FL  
32211

Potpourri 8131 Pine Lake Road,  
Jacksonville FL 32216

Sea 'N' Earth Treasures Frank &  
Ruth Abramson, 7146 Altama Road  
Jacksonville FL 32216

Mandarin Dive Center, 9735 St  
Augustine Rd Jacksonville FL 32217

McQuerry Orchid Books, 5700 W  
Salerno Rd Jacksonville FL 32244

Naiah Press, PO Box 10543  
Tallahassee FL 32302

Shell Enterprises PO Box 469,  
Eastpoint FL 32328

Guilt Specimen Company Jack J  
Rudloe, PO Box 237 Panacea FL  
32346

Diver's Den/Pneumatic Systems  
Inc, 4720 E Business Hwy 98  
Panama City FL 32404

Hydrospace Dive Shop, 3605-A  
Thomas Dr Panama City Beach FL  
32407

Panama City Dive Center, 4823  
Thomas Dr Panama City FL 32407

Shell Shack PO Box 144, Mexico  
Beach Station Mexico Beach FL  
32410

Galvez Books, 208 S Florida Blanca  
Pensacola FL 32501

Fantasea Scuba Headquarters, PO  
Box 5498 Destin FL 32541

Book Nook Fort Walton Square, Fort  
Walton Beach FL 32548

Shells N' Things Edward T  
Schelling, 142 Miracle Strip Pkwy Ft  
Walton Beach FL 32548

Davis; A W - Seashells US Highway  
98, Gulf Breeze FL 32561

Shelling with Schelling Edward T  
Schelling, PO Box 68 Shalimar FL  
32579

Water World Dive Center, 1518 NW  
13th St Gainesville FL 32601

Caulker; Cave; Dive Tour, PO Box  
2381 Gainesville FL 32602

MayaVentures, PO Box 2381  
Gainesville FL 32602

Outdoor Specialties; Inc, PO Box  
5066 Gainesville FL 32602

Aquatic Center, Inc, 2126 SW 34th  
St Gainesville FL 32608

Scuba and Boating Supplies, 415  
S Date Mabry Hwy Tampa FL 32609

Crystal Lodge Motel & Dive  
Center, PO Box 456 Crystal River FL  
32629

Hatfield's Rock & Shell Shop Hwy  
19 & 2nd Ave NE, Crystal River FL  
32629

Manatee Headquarters, PO Box  
124 Crystal River FL 32629

Palmetto Scuba, PO Box 2532  
Crystal River FL 32629

Plantation Inn Marina, PO Box  
1093 Crystal River FL 32629

Sand Dollar Divers Holiday Inn,  
US Highway 19 Crystal River FL  
32629

Talley's Pro Dive, 744 US 19 Box  
124 Crystal River FL 32629

Ginnie Springs; Inc, Rt 1 Box 153  
High Springs FL 32643

Ray's Fossils J F Ray, PO Box 1364  
Ocala FL 32678

Sea Horse Crafts, 402 Barclay Ct  
Alamonte Springs FL 32701-6231

D'Aluto's Thorny Oyster Rt 2, Box  
65J W Hwy 44 Wildwood FL 32785

Boat Tree; Inc, 2226 Paseo Ave  
Orlando FL 32805

Seacomber Publications Chuck  
Fratt, PO Box 5683 Orlando FL  
32805

Hollis; Jim; Scuba Works, 5107 E  
Colonial Dr Orlando FL 32807

Sea World Frank Murru, 7007 Sea  
World Drive Orlando FL 32809

Sea Shell World 6464 International  
Dr, Sarasota FL 32819-8291

Krieger Publ Co Promotions Dept,  
BOX 9542 MELBOURNE FL 32901

Abbott; Dr R Tucker American  
Malacologists, PO Box 2255  
Melbourne FL 32902-2255

Collector's Cabinet, 113 Fifth Aew  
Indianatlantic FL 32903

International Service Co, 333  
Fourth Ave Indianatlantic FL 32903

Coral Reef Products Ralph  
Palmer, PO Box 909 Cocoa FL  
32923-0909

TwoBmly's Furniture 101 Manatee  
Lane, Cocoa Beach FL 32931

Patsy's Shell Shop, 2289 A-1-A  
Satellite Beach FL 32937

Scuba Doo Divers, Fiesta Key KOA  
MM 70 Long Key FL 33001

Aquatic Divers, 1327 South Federal  
Hwy Dania FL 33004

Pancho's Shellorama PO Box 598,  
Dania FL 33004

Noveltek Miami Inc, 151 E 10th  
Hialeah FL 33010

Southern Book Service PO BOX  
2404, HIALEAH FL 33012

Tarpon Dive Center, 3200 Palm Ave  
Hialeah FL 33012

Brac Aquatics; Ltd, 5920 Rodman  
St Hollywood FL 33023

Divers Unlimited, 6023 Hollywood  
Bl Hollywood FL 33024

Seven Seas Shells Shop H  
Allemann & Acc, PO Box 1121  
Homestead FL 33030-1121

Buddy's Dive Shop, PO Box 409  
Islamorada FL 33036

Conch and Friends, PO Box 1086  
Islamorada FL 33036

Don-L's Shell Shop McCune;  
Donna L, PO Box 831 Islamorada FL  
33036

Golden Key Motel, Rt 1 Box 710  
Islamorada FL 33036

Holiday Isle Dive Center, PO Box  
482 Islamorada FL 33036

Keys Shell Shop James Dewyer,  
PO Box 1183 Islamorada FL 33036

Lady Cyana Divers, PO Box 1157  
Islamorada FL 33036



Marine Research Associates  
%Turtle Trust, PO Box 1682  
Islamorada FL 33036-1682

American Diving Headquarters;  
Inc, PO Box 274-B Key Largo FL  
33037

Bay Harbor Lodge, Rt 1 Box 35 Key  
Largo FL 33037

Captain Chambers Charters, PO  
Box 2258 Key Largo FL 33037

Capt. Greg's Scuba-Do, PO Box  
2237 Key Largo FL 33037

Capt. Slate's Atlantis Dive Center,  
51 Garden Cove Dr Key Largo FL  
33037

Capt. Corky's Divers' World, PO  
Box 1663 Key Largo FL 33037

Diver's World of Key Largo PO Box  
1663, Key Largo FL 33037

Frank; Stephen; Photographic Inc,  
PO Box 2720 Key Largo FL 33037

Klem; Steve; Underwater Guide  
Service, PO Box 1803 Key Largo FL  
33037

Rock Reef Resort, PO Box 73 Key  
Largo FL 33037

Sea Trail Motel, PO Box 91 Key  
Largo FL 33037

Seafarer Resort Motel, PO Box 185  
Key Largo FL 33037

Shell Man Inc, PO Box 1917 Key  
Largo FL 33037

Shell Man; The; Inc, PO Box 1917  
Key Largo FL 33037-1917

Curry; Gregory A, Sr, 1201 19  
Terrace Key West FL 33040

Gifts on the Half Shell Sarah  
Stout, #4 Land's End Village Key  
West FL 33040

Oceanside Marina, 5950 Malone  
Ave; Stock Is Key West FL 33040

Ridgeway; Roy Roy Shells &  
Curios, #61 Barcelona Dr Big  
Coppitt Key FL 33040

Sea Wall Shop 530 White St, Key  
West FL 33040

Tropical Shells & Gifts Gregory A  
Curry, Sr, PO Box 1237 Key West  
FL 33040

Boat; The; a division of Triangle  
Watersports; Inc, Rt 2 Box 617  
Summerland FL 33042

Caribe Shell Company, PO Box  
512 Sugarloaf Key FL 33042

Reef Light; The, PO Box 127 Big  
Pine Key FL 33043

Sea Center Dive Shop, PO Box 515  
Big Pine Key FL 33043

Sea Dwellers Sports Center, 99850  
Overseas Hwy Key Largo FL 33043

Carol J, PO Box 2842 Key West FL  
33045

Aquatic Floating Sea Cove Motel,  
12685 Overseas Hwy Marathon FL  
33050

Coral Lagoon Resort at the Diving  
Site, 12399 Overseas Hwy Marathon  
FL 33050

Hall's Diving Center & Resort,  
1688 Overseas Hwy Marathon FL  
33050

Hawk's Cay Resort & Marina, MM  
61 Marathon FL 33050

House of Shells Christal R E  
Westbrook, PO Box 563 Marathon  
FL 33050-0563

Ocean Equipment, 9599A Overseas  
Hwy Marathon FL 33050

Sea Horse Motel, 7196 Overseas  
Hwy Marathon FL 33051

Diver's Cove, 3159 E Atlantic Bl  
Pompano Beach FL 33062

Magnotte; Gary Barry's Shell  
Museum, 2501 NE 8 Ct Pompano  
Beach FL 33062-4408

Pleasure Divers; Inc, 9699 W  
Sample Rd Coral Springs FL 33065

Florida Keys Dive & Ski; Inc, PO  
Box 391 Tavernier FL 33070

Kole Industries, PO Box 020152  
Miami FL 33102

Rodriguez; Edward & Company,  
7131 NW 26th Ave Miami FL 33122

New England Divers; Inc, 6043 NW  
167 St Miami FL 33137

Windward Publishing Inc PO BOX  
371005, MIAMI FL 33137

Ameritravel Diving Packages, 5900  
SW 73St #204 S Miami FL 33143

Estalco Wholesale; Inc 4712 SW  
72nd Ave, South Miami FL 33143

Jones; Archie L, 8025 SW 62nd Ct  
Miami FL 33143

Anthony's Key Resort-Roatan  
Posada del Sol-Guanaja, 1385 Coral  
Way Ste 302 Miami FL 33145

Al Mark Coral and Shells Jeff  
Paolino, 76 NW 72nd St Miami FL  
33150

Caribbean Island Divers, 8347 Bird  
Rd Miami FL 33155

Austin's Diving Center; Inc, 10503  
S Dixie Highway Miami FL 33156

New England Divers; Inc, 9820 S  
Dixie Hwy Kendall FL 33156

Seahawk Products 6840 SW 92ND  
ST, MIAMI FL 33156

Books Australia; INC 15601 SW  
83RD AVE, MIAMI FL 33157

F and F Sales 13435 NE 17th  
Avenue, Miami FL 33161

Nautical Novelties PO Box 650571,  
Miami FL 33165

Dolan Sales & Imports 14628 NW  
7th Avenue, Miami FL 33168

Hill; Leonard C, III, 6713 SW 113th  
Pl Miami FL 33173

Divers Paradise, 138 54 SW 56th St  
Miami FL 33175

Dees Doins, 18978 NE 4th Court  
Miami FL 33179

Le Mer Creations 1961 NE 186th  
Drive, North Miami Beach FL 33179

Pisces Divers, Inc, 14328 Biscayne  
Bl N Miami Beach FL 33181

Diver's Den, 12614 N Kendall Dr  
Miami FL 33186

Get Wet International, 13861 SW  
142 Ave Miami FL 33186

Cutler Ridge Diving Center, 20850  
S Dixie Hwy Miami FL 33189

A-to-Z Book Service Lucile  
Coleman, PO Box 610813 N Miami  
FL 33261

Laroche; John Sirius Enterprises,  
Box 694487 Miami FL 33269

Contemporary House 1517 E Las  
Olas Blvd, Ft Lauderdale FL 33301

Shells of the Seas; Inc Kirk  
Anders Travel, PO Box 1418 Ft  
Lauderdale FL 33302

Miami Dive '86, 403 NE 8th St Ft  
Lauderdale FL 33304

Undersea Sports, 1525 N Federal  
Hwy Ft Lauderdale FL 33304

Christoph's Variety Shop 3432  
North Ocean Blvd, Ft Lauderdale FL  
33308

AIST Diving Schools, Inc, 3932 W  
Davie Bl Ft Lauderdale FL 33312

Walkers Cay Dive Shop, 700 SW  
34th St Ft Lauderdale FL 33315

Divers Unlimited - Fort  
Lauderdale, 440 Seabreeze Bl Ft  
Lauderdale FL 33316

Lauderdale Diver, 1334 SE 17th St  
Ft Lauderdale FL 33316

Professional Diving School  
Charters of Florida, Bahai Mar  
Yachting Center Ft Lauderdale FL  
33316

Atlantic Coral Enterprise Inc, 2280  
SW 66 Terrace Davie FL 33317

From Under; Inc 824 Broward Mall,  
Plantation FL 33317

Root; John, PO Box 182 West Palm  
Beach FL 33402

Sea Shell City 2100 Broadway,  
Riviera Beach FL 33404

Seapro Scuba Center, 3619  
Broadway Riviera Beach FL 33404

Gulf Stream Diver Scuba Charters,  
2315 Caroma Ln West Palm Beach  
FL 33406

Norine Rouse Scuba Club, 1708 N  
Dixie Hwy West Palm Beach FL  
33407

Norine Rouse Scuba Club of the  
Palm Beaches, 4708 N Dixie Hwy  
West Palm Beach FL 33407

Aqua Shop, 505 Northlake Bl N  
Palm Beach FL 33408

Gallery of Gems PO Box 7186,  
Boca Raton FL 33432

Golden Shell Gift Shop, 153 E  
Palmetto Park Rd, Ste19 Boca Raton  
FL 33432

Kroll Company 2136 SW 8th  
Avenue, Boca Raton FL 33432

Sculptures from the Sea 99 NW  
11th Street, Boca Raton FL 33432

Honker; Thomas Specimen  
Shells, PO Box 1011 Delray Beach  
FL 33444

Smart Gift Shops #2 312 S Atlantic  
Ave, Daytona Beach FL 33444

Smart Gift Shops #3 1508 S  
Atlantic Ave, Daytona Beach FL  
33444

Souvenir City 619 Seabreeze Bl,  
Daytona Beach FL 33444

Dixie Divers of Ft Pierce, 1717 S  
US 1 Ft Pierce FL 33450

Scuba Shack; The; Inc, 2485 NE  
Dixie Hwy Jensen Beach FL 33457

American Divers International, 409  
Lake Ave Lake Worth FL 33460

M/V Sea Aggressor, PO Box 1778  
Jupiter FL 33468

Dixie Divers of Stuart, 1843 SE  
Federal Hwy Stuart FL 33494

Rader's Reef, 5508 Marina Drive  
Holmes Beach FL 33505

Florida Supply House, PO Box 847  
Brandonton FL 33506

Florida Shell Factory Co 5129 53rd  
Avenue East, Bradenton FL 33508

Woods & Water Outdoor Sports  
Center, 1339 W Brandon Bl  
Brandon FL 33511

Clearwater Marine Science Cen  
and Sea Aquarium, 249 Windward  
Passage Clearwater FL 33515

Green Lion's Paw Edgar C  
Haviland, 312 N Osceola Ave  
Clearwater FL 33515

Shellcrafts by Arlene PO Box 3245,  
Clearwater Beach FL 33515

Land O'Lakes Scuba Center Inc,  
171 US Highway 41 #3 Land  
O'Lakes FL 33539

Sunshine Scuba, 1901 W Bay Dr  
Largo FL 33540

Shell Garden, 4725 Gulf Mexico Dr  
#106 Longboat Key FL 33548

Akins - S, 1919 Gulf City Rd Ruskin  
FL 33570

Mac's Sports, 2126 Drew St  
Clearwater FL 33575

Cundiff's of Longboat Key; In 2011  
Whitfield Park Drive, Sarasota FL  
33578

Gatvin; Robert Lee & Co Box  
15695, Sarasota FL 33579

Nature Photographics Pete  
Carmichael, PO Box 5004 Sarasota  
FL 33579

Seafair Shops 3701 Bayshore  
Road, Sarasota FL 33580

Shark Creations; Inc 2850 49th  
Street, Sarasota FL 33580

Pegram; Christine - Books, 1901  
Upper Cove Terrace Sarasota FL  
33581

Seafair Shops 3701 Bayshore  
Road, Sarasota FL 33580

Shark Creations; Inc 2850 49th  
Street, Sarasota FL 33580

Pegram; Christine - Books, 1901  
Upper Cove Terrace Sarasota FL  
33581

Seafair Shops 3701 Bayshore  
Road, Sarasota FL 33580

Shark Creations; Inc 2850 49th  
Street, Sarasota FL 33580

Pegram; Christine - Books, 1901  
Upper Cove Terrace Sarasota FL  
33581

Shell Connection; The Bonnie  
Christofet, PO Box 36043 Sarasota  
FL 33583

Land and Sea Creations Helen  
Oliva, 542 N Pinellas Tarpon  
Springs FL 33589

South Sea Island Store PO Box  
633, Tarpon Springs FL 33589

Florida Down Under, Inc, 773  
Venice By-Pass S Venice FL 33595

Shella Arts, 1507 Strada Doro  
Venice FL 33595-7538

Marine Fauna & Flora Co Andrew  
Harrow, 3515 E Third Ave Tampa FL  
33605

Terrace Watersports, 9228 N 56th  
St Temple Terrace FL 33617

International Skin Divers  
Association - M. Sommers, PO  
Box 130007 Tampa FL 33681

Green Turtle Shell Shop 6800 Gulf  
Boulevard, St Petersburg Beach FL  
33706

Kenco 9897 Gulf Boulevard,  
Treasure Island FL 33706

Shell City Gifts 400 75th Avenue, St  
Petersburg FL 33706

Shellco; Inc 151 E 10th Avenue,  
Hialeah FL 33706

Shell Store; The Robert & Betty  
Lipe, 440-75th Ave St Petersburg  
Beach FL 33706

Davis; M S and Sons 5060 21st  
Avenue North, St Petersburg FL  
33710

C & L Rocks & Gems 5031 41st St  
South, St Petersburg FL 33711

Kaicher; Sally Diana 1826A 54th Pl  
S, St Petersburg FL 33712

Atlyn; Charles F Great Outdoors  
Publ Co, 4747 28th St N St  
Petersburg FL 33714

Tropical Tradewinds, PO Box  
10135 St Petersburg FL 33733

Dodson's Shells & Gifts 9897 Gulf  
Boulevard, Treasure Island FL 33740

Pirates Cove Shell House 10855  
Gulf Boulevard, Treasure Island FL  
33740

Lakeland Diving Center, 715 Alicia  
Lakeland FL 33801

Southeastern Mineral Company  
Graves; Howard B; Jr, 826 S  
Ingraham Ave Lakeland FL 33801

Green Turtle Dive Shop, 4401  
Harden Bl Lakeland FL 33803

Deep Six Divers South, 1115  
Highway 27N Sebring FL 33870

Midstate S.C.U.B.A. Center, 2825  
US 27 North Sebring FL 33870

Deep Six Divers Service, 2300 Ave  
G N.W. Winter Haven FL 33880

Africana Gifts & Shells, PO Box  
1830 Fort Myers FL 33902

Shell Factory N Tamiami Trail & US  
41, PO Box B-B Fort Myers FL 33902

Natures Wonderland Mrs Beverly  
J Davis, 2717 N Tamiami Trail N Ft  
Myers FL 33903

See Shells Hal Wilmot, 1037 N  
Tamiami Trail N Ft Myers FL 33903

Hanley's; Jackie & Ed Specimen  
Shells, 396 Ottumwa Ave Ft Myers  
FL 33905

Malone; Elsie A, 1041 N Town &  
River Dr Ft Myers FL 33907-5915

Mr Jensen Furniture, 11866 Metro  
Pkwy Ft Myers FL 33912-1307

Natural Earth Designs, Inc  
Virginia L Hite, PO Box 944 Bonita  
Springs FL 33923

Everything Shells, PO Box 7  
Captiva Island FL 33924

McCaully's PO Box 15, Captiva  
Island FL 33924

Trea House Gift Shop PO Box 15,  
Captiva Island FL 33924

Bianchi; Mrs Ann Bianchi's Pink  
House Err, PO Box 235 310 Pear  
Tree Ave Goodland FL 33933

Tur-Lu Shellers, Goodland FL  
33933

Artisan; The, 711 Bald Eagle Dr  
Marco FL 33937

Blue Mussel 478 5th Avenue South,  
Naples FL 33940

Custom Shell Cabinets by Gene  
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Song & Story Shop 659 Fifth Ave  
South, Naples FL 33940

High Adventure, Box 2855 Port  
Charlotte FL 33952

Clifford Shell Cabinets PO BOX 54,  
2422 Periwinkle Way Sanibel Island  
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Macintosh Book Shop Dr Philip L  
Armitage, 1021 Periwinkle Way  
Sanibel Island FL 33957

Mugridge; Edith Harriet Glory of  
the Sea, 2431 Periwinkle Way  
Sanibel Island FL 33957

Ocean's Reach Sylvia A Bennis,  
2230 Camino del Mar Dr Sanibel FL  
33957

She Sells Sea Shells Anne Joffe,  
1157 Periwinkle Way Sanibel FL  
33957

Shell Net; Tha Jerry & Suzy  
Johnson, PO Box 92 Sanibel Island  
FL 33957

Shellworld Sanibel James &  
Swarin Boon, 2330 Palm Ridge  
Place Sanibel Island FL 33957

Showcase Shells Albert & Beverly  
Deynzer, 1614 Periwinkle Way  
Sanibel FL 33957

Tarpon Bay Shell Shop Red  
Pelican Cove, Sanibel Island FL  
33957

Tuttle's Sea Horse Shells 342  
Periwinkle Way, Sanibel Island FL  
33957

Coco View Resort - Roatan, 1713  
Pasco Rd Wesley Chapel FL 34249

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Cullman Gift Shop, PO Box 758  
Cullman AL 35055

Southern Living Floyd; John Alex,  
Jr, PO Box 523 Birmingham AL  
35201

Dive Site; Inc; The, 167 G W Valley  
Ave Homewood AL 35209

McWhorter Engineering Co  
Gadsden Rd, PO Box 9014, Plant  
1053 Birmingham AL 35213

Bill Tants Southern Skin Divers  
Supply, 506 S 45th St Birmingham  
AL 35222

Tants Shipwreck Lounge, 3500 5th  
Ave S Birmingham AL 35222

Reed Books Jim Reed, Box 55893  
Birmingham AL 35255

Ski and Scuba Shack, 628 E 15th  
St Tuscaloosa AL 35401

Tom's Dive Shop, 206 Hardgrove  
Rd East Tuscaloosa AL 35401

Southeastern Divers Inc, 325 S  
Court St Florence AL 35630

Southeastern Divers Inc, 2504  
Memorial Parkway SW Huntsville  
AL 35801

Wayner; Gary Bookseller, Rt 3 Box  
18 Ft Payne AL 35967

Divers Den, 1817 Hwy 231 S Dothan  
AL 36301-5660

Sea Divers, 121 Walnut Dr  
Enterprise AL 36330

Allenson-Breckinridge Books  
Robert D Allenson, PO Box 447  
Ganewa AL 36340

Lands End Museum & Shell Shop,  
PO Box 42 Dauphin

**Tropical Outfitters Water- sports;** Inc, Rt 1 Box 581 Gulf Shores AL 36542

**Gulf Coast Divers Supply,** Hulston Dr, Michael Blvd Mobile AL 36609  
**Adventure Sports,** 212 N Gay St Auburn AL 36830

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**Nashville Scuba Center,** 110 13th Ave No Nashville TN 37203

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**Bradley, Van Allen Books,** 1208 Davidson Rd Nashville TN 37205

**Aquatic Sports & Travel,** 105 Ewing Dr Nashville TN 37207

**American Discount Divers Supply,** 3805 Nolensville Rd Nashville TN 37211

**Diving Adventures,** 3046 Nolensville Rd Nashville TN 37211

**Olin Chemicals Group Technical Information Ctr,** P O Box 248 Charleston TN 37310

**Book Shelf,** 3765 Hillsdale Dr NE Cleveland TN 37312

**Choo-Choo Dive Shop; Inc,** 3415 Hixson Pike Chattanooga TN 37415

**Professional Scuba Center,** 1310 W Market Johnson City TN 37601

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**Adventure Swim & Scuba,** 124 Northshore Dr Knoxville TN 37919

**Ski-Scuba Center; Inc,** 3511 Sutherland Ave Knoxville TN 37919

**Publications Editor Dept Geological Sciences,** University of Tennessee Knoxville TN 37996-1410

**Dive Shop Inc,** 3151 Poplar Memphis TN 38111

**Fred's Dive Shop,** PO Box 652 Cookeville TN 38501

**Grove Dive Shop Willow Grove Resort,** Rt 1 Allons TN 38541

**Shelloak Specimen Shells %John Bernard,** Rt 8; Box 480 Crossville TN 38555

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**Choctaw Books,** 406 Maniship St Jackson MS 39202

**Skipper's Diving Inc,** 4441 N State St Jackson MS 39206

**Ocean Trek Dive Shop,** 1200 Roebuck Dr (Hwy 45-S) Meridian MS 39301

**South East Aqua Sports Inc,** 823 Hardy St Hattiesburg MS 39401

**Sea Secrets** 1586 E Beach Hwy 90, PO Box 373 Pass Christian MS 39571

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**Louisville Dive Shop** 2478 Bardstown Rd, Louisville KY 40205

**Litorina;** The PO Box 7663, Louisville KY 40207

**Divers, Inc,** 4807 Dixie Highway Louisville KY 40216

**Bluegrass Diving Supply, Inc,** 619 Washburn Ave Louisville KY 40222

**Lexington Dive Shop,** 838 E High St Lexington KY 40502

**New Horizons,** 2573 Regency Rd Lexington KY 40503

**Sutton; Raymond M; Jr Natural History Books,** 430 Main St Williamsburg KY 40769

**Aquarius,** 800 Elm St Ludlow KY 41016

**Northern Kentucky Diving Center,** 225 Main St Florence KY 41042

**Van Nostrand Reinhold** 7625 EMPIRE DR, FLORENCE KY 41042

**Tri State Scuba Center,** 410 Rear 3rd St Pikeville KY 41501

**Honey for the Bears Gifts Micaela Beckwith,** S Hwy 27 - Box 541 Burnside KY 42519

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**Bookphill,** PO Box 706 Hilliard OH 43026

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**Waterline; The;** Inc, 907 E Dublin Granville Rd Columbus OH 43229

**Hayman, Robert G Anitquarian Books,** 575 West St Carey OH 43316

**Mid-Land; Scientific Serv,** PO Box 601 Stryker OH 43557

**Dive Shop; The;** Inc, 410 Ryder Rd Toledo OH 43607

**ANTIQUARIAN BOOK HOUSE,** 718 HEIDELBERG RD TOLEDO OH 43615

**Diver's Paradise,** 2511 N Reynolds Rd Toledo OH 43615

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**Treasure Cove Scuba,** 1037 Youngtown Rd Niles OH 44446

**South Pacific Imports,** 563 Fifth St Struthers OH 44471-1845

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**Dale's Diving Shop; Inc,** 302 Meigs St Sandusky OH 44870

**Dive; Inc,** 428 Park Ave West Mansfield OH 44901

**Acres of Books, Inc John Coleman,** 633 Main St Cincinnati OH 45202

**Collectors Shop; The Cincinnati Museum,** 1720 Gilbert Ave Cincinnati OH 45202

**U S Playing Card Co Harry Martin-Dir,** Mktng, Beach & Park Cincinnati OH 45212

**Silver Burdett Biology,** 3814 West St Cincinnati OH 45227

**Books in Print Del Fair Shopping Center,** 5243 Delhi Rd Cincinnati OH 45238

**Scuba Unlimited,** 8966 Blue Ash Rd Cincinnati OH 45242

**Worldwide Shells Moe Goudzwaard,** 8898 Castleford Cincinnati OH 45242

**Shell Corner Markets International,** 123 Merchant St Cincinnati OH 45246

**C & J Scuba Supply,** 5825 N Dixie Dr Dayton OH 45414

**Miami Valley School of Diving,** 873 E Franklin Centerville OH 45459

**S & J Scuba,** 950 Upper Valley Pike Springfield OH 45504

**Long Lake Scuba,** 3160 Long Rd Lima OH 45807

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**Blue Springs Corp,** PO Box 232 Waldron IN 46182

**Divers Supply Co,** 3315 N Illinois St Indianapolis IN 46207

**Midwest Scuba Center; Inc,** 9508 Ross Ln Indianapolis IN 46268

**Pro Dive,** 3203 Covington Rd Ft Wayne IN 46268

**Tide-Ings,** PO Box 462 Crown Point IN 46307

**Michigan City Scuba Center,** 510 E 2nd St Michigan City IN 46360

**Resetar; Alan,** 253 Indiana Ave #4 Valparaiso IN 46383

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**Scuba Lake Michigan Charters Capt. Ernie Piotrowski,** 234 N Albert St South Bend IN 46619

**J R Aquatic Center,** 51333 US 31-33 N Southbend IN 46637

**Anchor Dive Shop,** 1001 Leesburg Rd Ft Wayne IN 46808

**Underwater Adventures, Inc,** 1509 Goshen Rd Ft Wayne IN 46818

**Diving Den,** 2229 00 NS Kokomo IN 46902

**Mason's Rare & Used Books,** 264 S Wabash St Wabash IN 46992

**Seaweed Diver,** 1121 State St New Albany IN 47150

**Southern Indiana Scuba,** 1106 S Walnut Bloomington IN 47401

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**Richard's Readers,** RR1 Box 260A Tenneyson IN 47637

**Evansville Scuba Center Inc,** 1319 N First Ave Evansville IN 47710

**Aqua-Nut Divers Cindy Blanc,** 3509 Berne Ave Terre Haute IN 47805

**Lafayette Divers Supply,** 901 Main St Lafayette IN 47901

**Pro Scuba; Inc,** 2 North Earl Ave Lafayette IN 47904

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**Water Window Works,** PO Box 12260 Birmingham MI 48012

**Bookpeople** 6315 Orchard Lake Rd, West Bloomfield MI 48033

**Creative Creations** 7106 Pebblecreek Road, West Bloomfield MI 48033

**Diver's Den** 604 S Lapeer Rd, Lake Orion MI 48035

**Pontiac Scuba Center,** 220 S Telegraph Pontiac MI 48053

**Marion the Antiquarian Librarian,** 3668 S Shimmans Cir Auburn Hills MI 48057

**US Scuba Center,** 882 S Rochester Rd Rochester MI 48063

**Recreational Diving Systems,** 4424 N Woodward Ave Royal Oak MI 48072

**Underwater Outfitters,** 2579 Union Lake Rd Union Lake MI 48085

**Divers Incorporated,** 2280 Washtenaw Ave Ann Arbor MI 48104

**Natural Science Research Bernard Clay Cartmell,** 2307 Manchester Rd Ann Arbor MI 48104

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**Tom & Jerry Sport Shop,** 20318 Van Born Dearborn Heights MI 48125

**Cellar Book Shop; The,** 18090 Wyoming Detroit MI 48221

**GALE RESEARCH CO BOOK TOWER,** DETROIT MI 48226

**Avanti Lisa,** Box 2656 Detroit MI 48231

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**Detroit Free Press Ms Betsy Hansel - Adverti,** 321 Lafayette Detroit MI 48231

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**Delph; Wm. J Books,** PO Box 153 Belding MI 48809

**Clegg; Albert G,** PO Box 306 Eaton Rapids MI 48827

**Brockway's,** 2187 Heritage Ave Okemos MI 48864

**Owosso Tire & Rock Shop,** 1845 Corunna Ave Owosso MI 48867

**Kalamazoo Dive Headquarters,** 1622 Bloomfield Ave Kalamazoo MI 49001

**Sub-Aquatic Sports & Service,** 1483 W Michigan Battle Creek MI 49017

**Wolf's Divers Supply,** 250 W Main Benton Harbor MI 49022

**Bohling Book Co Curt & Lynette Bohling,** PO Box 215 Lawton MI 49065

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**Scuba Plus,** 126 N Broad St Hillsdale MI 49242

**Book House; The** 208 West Chicago St, Jonesville MI 49250

**Grand Haven Dive Center,** 216 N Third St Grand Haven MI 49417

**J C Outfitters,** 720 S Washington Leddington MI 49431

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**Call Me Ishmael Books,** Box 595 Saugatuck MI 49453

**Arnolds of Michigan B Elizabeth Griffin,** 511 S Union St Traverse City MI 49684

**Scuba North; Inc,** 13258 W Bayshore Dr Traverse City MI 49684

**Super Cycles & Dive Shop,** 404 Ashman St Sault Ste. Marie MI 49783

**Roatan Island-Beach House Rental - Marsha Andrews,** Rt 1 Box 320 Menominee MI 49858

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**W C B Wm C Brown; Publishers,** 2460 Kerper Bl Dubuque IA 52001

**Amaranth Books Joseph & Pamela Warnick,** PO Box 527 Iowa City IA 52240

**Divers Pro Shop, Inc,** 628 S Dubuque St Iowa City IA 52240

**Frymoyer's Waterworld,** 414 Garfield Ottumwa IA 52540

**Midwest Divers Supply,** 602 N Chestnut Wapello IA 52653

**Rader Scuba,** 2704 Glenn Bettendorf IA 52722

**Stone & Sea Specialties** 2311 East Pleasant St, Davenport IA 52803

**Peterson Book Co.,** Box 966 Davenport IA 52805

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**Neptune Dive Center,** N. 3324 Irish Rd Chilton WI 53014

**Underwater Connection; The,** N87W165459 Appleton Ave Menomoney Falls WI 53051

**Teton Aquatic Supplies,** 365 N Glenwood, Box 3482 Jackson WY 53072

**Up & Under Scuba & Ski Shop,** 135 Capital Dr Pewaukee WI 53072

**Dive USA,** 184 S Main St Thiensville WI 53092

**Fontana Outdoor Sports,** Hwy 67, Fontana on Geneva Lk Fontana WI 53125

**Bartz Displays; Inc** 6931 W North Ave, Milwaukee WI 53213

**Bennett Academy Ski & Scuba; Inc,** 6509 W N Ave Milwaukee WI 53213

**Pirate Cove Diving; Inc,** 1103 W Oklahoma Ave Milwaukee WI 53215

**Kurz; Richard M; Inc,** 1575 N 118TH ST WAUWATOSA WI 53226

**Western Publishing Co** 1220 MOUND AVE, RACINE WI 53404

**Hemmy's Pet Shop Bruce P Hemmy,** 1591 Huebbe Parkway Beloit WI 53511

**Winsted Shop, The,** 140 S Winsted St Spring Green WI 53588

**Johnson; Mindy Cuna Data,** Box 378 Madison WI 53701

**3 Little Devils, Rt 4 Highway 123** Baraboo WI 53913

**K&L Sea Gems, Inc. Mrs Hermenegildo Kadile,** 1015 Memorial Dr Manitowoc WI 54220

**Aqua Center,** 628 Bellevue St Green Bay WI 54302

**Klein Scuba,** 116 N 3rd Ave Wausau WI 54401

**Divepoint Scuba Center,** 404 A Post Rd Plover WI 54467

**Central Wisconsin Diving Academy,** 8751 Hwy 13 S Wisconsin Rapids WI 54494

**Malacological Consultants Mrs Marian E Havlik,** 1603 Mississippi St LaCrosse WI 54601

**Blue Waters Divers,** 1825 Brackett Ave Eau Claire WI 54701

**Dan's Books,** 111 S Appleton St Appleton WI 54911

**Mountain Bay Ski & Dive; Inc,** 1607 N Richmond St Appleton WI 54911

**Schroeder's Liquor & Sport Shop,** 560 Mill St Green Lake WI 54941

**Inland Seas Diving Academy,** 310 North Commercial St Neesh WI 54956

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**Midwest Diving Institute,** 1885 University Ave, Ste 38 St Paul MN 55104

**Laurie; James & Mary Booksellers,** 251 Snelling Ave St Paul MN 55105

**Club Scuba East,** 2280 Maplewood Dr Maplewood MN 55109

**Northland Divers Inc,** 3000 White Bear Ave Maplewood MN 55109

**Northwest Divers Inc,** 1080 Roselawn Ave Roseville MN 55113

**Potentials in Marketing Edito,** 731 Hennepin Avenue Minneapolis MN 55403

**Scuba Outlet Store,** 4741 Chicago Ave Minneapolis MN 55407

**Old Theology Book House,** PO Box 11337 Minneapolis MN 55411-0337

**Dinkytown Antiquarian Bookstore,** 1316 SE 4th St Minneapolis MN 55414

**Smith Diving,** 2835 Central Ave NE Minneapolis MN 55418

**Scuba Center,** 5015 Penn Ave S Minneapolis MN 55419



Tidepool Gallery; Baylem; Inc  
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50th St Minneapolis MN 55424

Bay Island Dive Resorts Go  
Diving, 715 Florida Ave S  
Minneapolis MN 55426

Superior Dive; Tha; Inc, 1905  
Greysolon Rd Duluth MN 55812

Minnesota Dive Center, 4164 18th  
Ave Northwest Rochester MN 55901

Lea; Albert, Skin & Scuba Scuba  
Daddy's Dive Shops, 1913  
Keystona Ave Albert Lea MN 56607

Central Minnesota Divers, 102 E St  
Germain St St Cloud MN 56301

Underwater Sports Shop, 51/2 N  
Benton Dr Sauk Rapids MN 56379

Minnesota School of Diving, 423  
NW 7th St Brainerd MN 56401

Unique Boutique Star Route #1, Box  
11 L Crosslake MN 56442

Mick's Scuba, Inc, 402 Main Ave  
Moonhead MN 56560

## SOUTH DAKOTA

Buteo Books Harrell; Joyce, PO  
Box 481 Vermillion SD 57069

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Big Horn Divers, 126 E Main St  
Bozeman MT 59715

Gallery of the Old West, Box 556  
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White; Kenneth S, 2001-B Oakwood  
Rd Northbrook IL 60062

Berry Scuba Co, 1717 Rand Rd  
Palatine IL 60067

Black Magic Dive Shop, 202 E  
Main St Round Lake IL 60073

Complete Scientific Jerry  
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Lake IL 60073

Ginger's Herbs & Shells Jeanette  
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Crawford Ave Skokie IL 60076

Scuba Systems of Illinois Inc,  
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Vering; Tony Sargent-Welch  
Scientific, 7300 N Linder Ave Skokie  
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Scholarly Book Center Inc 3816  
Hawthorn Ct, Waukegan IL 60085

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Scuba Shop; The, 800 Roosevelt  
Bldg D104 Glen Ellyn IL 60137

KDK Reef, 2001 Anson Dr Melrose  
Park IL 60160

UnderSeas Scuba Center, 626 N  
Addison Rd Villa Park IL 60181

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Patricia Barnes, 821 Foster St  
Evanston IL 60201

Protex Co Irving Amado, 601  
Demptier St Evanston IL 60201

Kutka; Michael R & Kay The  
Vagabond, 559 Clinton Place River  
Forest IL 60305

Moser; W Books, 17704 Dixie  
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Locator; Tha, PO Box 97 Joliet IL  
60434-0097

Stamps; Coins; Shells 2508 W  
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Goose's Scuba Shack, Inc, 2540  
Ridge Rd Lansing IL 60438

Becks', Box 34 Manhattan IL 60442

Excalibur; Ltd, PO Box 515 Palos  
Park IL 60464-0515

Aquanuts Odyssey, 538 E 147th  
St-Sibley Blvd South Holland IL  
60473

American Botanist, The, PO Box  
143 Brookfield IL 60513

Great Lakes Divers, 541 S  
Lagrange Rd Lagrange IL 60525

Fagin Books N Rm 1314, 185 N  
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Nebenzahl, Kenneth, Inc Jocelyn  
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Gear Bag; The; Inc, 1605 N  
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Mexi-Mayan, 2216 W 112th St  
Chicago IL 60643

Beasley Books Elizabeth & Paul  
Gordon, 1533 W Oakdale Chicago IL  
60657

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A3566 Chicago IL 60690

Science Sphere Johnson  
Enterprises Inc, 220 N 4th St  
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Venture forth, 2424 S Alpine  
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Loves Park Scuba, 7307 N Alpine  
Loves Park IL 61111

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35th Ave Moline IL 61265

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Lakeview Rd Dahinda IL 61428-9572

Spoon River Press, The, PO Box  
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Do Dive In, Inc, 9011 N University  
Peoria IL 61615

Midwest Scuba Center, 700 S Neil  
Champaign IL 61820

Munson Books, 3436 Willow Dr  
Mattoon IL 61938

Windwalker Dive & Travel, 1423 W  
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Green Hat Book Store, RR 1 Box 80  
Niota IL 62358

Illinois Divecenter, 1929 W  
Sprasser Taylorville IL 62568

Scuba Sports, Inc, 1317 S Ninth St  
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Inner World Diving Center, 1377  
Manchester Rd Manchester MO  
63011

Mathews Book Co 11559 Rock  
Island Ct, Maryland Heights MO  
63043

Midwest Library Service 11443 St  
Charles Rock Rd, Bridgeton MO  
63044

West End Diving Centers Inc,  
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Underwater Sports, 8340 Watson  
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Inner World Diving Center, 9953  
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Pirate's Cove, Clarksville MO 63336

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Bonne Terre Mine Div. West End  
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Academy of Scuba Training Inc,  
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Poplar Bluff MO 63901

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Saa Crown Crown Center, 2450  
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Chandler's Flowers & Gifts 213 E  
Gregory, Kansas City MO 64114

Dive Shop North; The, 8135 North  
Oak Kansas City MO 64118

Skin-N-Scuba Dive Shop Inc,  
12009 E 43rd St Kansas City MO  
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Deubler's Rocks & Shells, 524  
Delaware Neosho MO 64850

Roubidoux Dive Shop, Rt 6 Box  
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## KANSAS

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Massachusetts Lawrence KS 66044

Dive Shop; The, Inc, 3606 W 95th  
Leawood KS 66206

Divers Down, 103 So 4th Manhattan  
KS 66502

Bradley; Jana Midwest Diving  
Council, 810 W Harris Frontenac KS  
66762

Dave's Scuba Shop, 124 E Carlton  
Pittsburg KS 66762

Charing Cross Rd Doug H Dible,  
PO Box 2102 Hutchinson KS 67504-  
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## NEBRASKA

Discover Wildlife Thomas  
Mangelsen, PO Box 14604 Omaha  
NE 68124

Kearney Divers Supply, 3620 N  
2nd Ave Kearney NE 68847

Big Mac Scuba & Sail, PO Box 236  
Keystone NE 69144

## LOUISIANA

Aqua Tech Dive Center, 6101  
Westbank Expressway Marrero LA  
70001

Harry's Dive Shop, Inc, 4709 Airline  
Hwy Metairie LA 70001

Reef House Resort - Roatan;  
Honduras, PO Box 640399 Kenner  
LA 70064

Collector's Book Shop; A Jeanne  
L Weisa, 3119 Magazine St New  
Orleans LA 70115

Middla American Research Inst  
TULANE UNIVERSITY, NEW  
ORLEANS LA 70118

Lakeview School of Diving Inc,  
6260 Vicksburg St New Orleans LA  
70124

Sea Horse Diving Academy; Inc,  
5400 Crowder Bl; Unit E New  
Orleans LA 70127

Le Coquille de Mer, PO Box 89 Cut  
Off LA 70345

Slidell Dive Center, 2316 Front St  
Slidell LA 70458

Scuba Shack; The, Inc, 612 W  
Pinhook Rd Lafayette LA 70505

Undersea Specialities Inc Route  
13 Box 361, Lake Charles LA 70601

Ventura Sports, Inc, 1409 Ryan St  
Lake Charles LA 70601

Bayou Scuba, 108-1/2 Cities  
Service Highway Sulphur LA 70663

Clark's, Taylor, Inc. Bookseller,  
2623 Government St Baton Rouge  
LA 70806

Precious Treasures, 3084 College  
Drive; Ste F Baton Rouge LA 70808

Water Habitat; The, 317 Frost St  
Leesville LA 71446

## ARKANSAS

Rick's Pro Dive'n Shop, Inc, 2323  
Poplar St N Little Rock AR 72114

Red's Scuba Diving Inc, 3610  
Townsend Ave #4 Ft Smith AR 72901

## OKLAHOMA

Aquatics Center, 54 E 15th St  
Edmond OK 73034

Hutto's Diving, 111 W Main St  
Weatherford OK 73096

Marcher; Melvin Natural History  
Books, 6204 N Vermont Oklahoma  
City OK 73112

Chalet Sports, 2822 Country Club  
Dr W Oklahoma City OK 73116

Oklahoma Diver, 110 S 4th St Sayre  
OK 73662

Dean's Diving Shop Inc, 4113 NE  
Wisconsin Bartlesville OK 74006

World of Watersports, 1823 S Main  
Broken Arrow OK 74012

Baker's Books, Box 1649  
Claremore OK 74018

Caravan Books, PO Box 861  
Stillwater OK 74076

Shell Game 2904 S 98th E Ave,  
Tulsa OK 74129

Gene's Aqua Pro Shop, Rt 1 Box  
255G Gore OK 74435

## TEXAS

Argus Communications Special  
Sales, One DLM Park Allen TX  
75002

Tucker's Dive Shop, 2025 E Main  
Grand Prairie TX 75050

Scuba Shop; The, 2020 W  
Grauwyler Irving TX 75061

Diver's Training Center; Inc, 1108  
Doria Dr; Ste 103 Plano TX 75074

Divers World Inc, 632 S Central  
Expressway Richardson TX 75080

Aldredge Book Store Kevin  
Macdonnell, 2909-1A Maple Ave  
Dallas TX 75201

Craft Studio, 6627 Snider Plaza  
Dallas TX 75205

Scuba West, 5500 Greenville #901  
Dallas TX 75206

Sports Adventures, 2152 W  
Northwest Hwy Dallas TX 75220

Mary Ann's, 10224 Midway Road  
Dallas TX 75229

Scuba West Midway, 12801 Midway  
#401 Dallas TX 75234

Rock Barrell; The, 13516 Purple  
Sage Rd Dallas TX 75240

Scuba West, 14902 Preston Rd  
#412 Dallas TX 75240

Scuba Air Compressor Service  
Inc, 14055 Proton Rd Dallas TX  
75244

Bio-Science Labs, 8204 Elmbrook  
Drive Dallas TX 75247

Silver Burdett Biology, 8301  
Ambassador Row Dallas TX 75247

Barker, Conway Autograph Dealer,  
4126 Meadowdale Ln Dallas TX  
75320

Dick's Scuba Center, 201 Stadium  
Drive Longview TX 75601

Scuba Center; The Dick Wilgus,  
201 E Hawkins Pkwy Longview TX  
75601

Scuba Center; The, 1333 D S.  
Beckham St Tyler TX 75701

Scuba West, 586 Lincoln Square  
Arlington TX 76011

Arlington Scuba Center; Inc, 2414  
W Park Row Rd Arlington TX 76013

Benton's, Rt 8; Box 644 Fort Worth  
TX 76108

Fossils Unlimited Fred S Lumley,  
9925 Hwy 80 W Fort Worth TX 76116

Ona Foot In the Sea, 3701 Stoney  
Creek Rd Fort Worth TX 76116

One Foot in the Sea Jon Gardner,  
4979 S Hulen Ft Worth TX 76132

Sea Gems Chapel; Maurice L; Sr,  
2002 Margaret Dr Wichita Falls TX  
76306

Professional Scuba; Inc, 2616 SW  
Parkway Wichita Falls TX 76308

Von Vlon's Book Stoar, 1111  
Concord Ave Waco TX 76707

Tradewind Diving, 5215 Sanger  
Waco TX 76710

Walden Store # 0902 1284 Sunset  
Mall, San Angelo TX 76901

Concho Divers, 2030 W Harris San  
Angelo TX 76903

Concepts Inc, 2911 Ouenby  
Houston TX 77005

Detering Book Gallery, 2311  
Bissonnet Houston TX 77005

Bayou Bend Gardens, 1 Westcott  
Houston TX 77007

Texas Scuba; Inc, 5414 Katy  
Freeway Houston TX 77007

Sea Gull Shells & Gifts, 1618  
Mable Houston TX 77023

Roberts; F H (Bud) Creative  
Design Int, Inc, 451 Post Oak Lane  
Houston TX 77024

World Stamps %S W Stone, Box  
20041 Houston TX 77025

Turrentine's, 602 Westbury Square  
#B Houston TX 77035-2714

Cheri's Herb Botique, 9318 Bellair  
Blvd Houston TX 77036

Concepts; Inc 1135 Galleria Mall,  
5015 Westheimer Houston TX 77056

Underwater Ventures Scuba  
Center, 9301 Bissonnet Houston TX  
77074

Aqua Ventures Scuba - Houston,  
1614 Gessner Houston TX 77080

Kentlea's Scuba Center, 5705  
Glenmont Houston TX 77081

D and F Enterprises, PO Box 42586  
Houston TX 77242

Seaspace, PO Box 3753 Houston  
TX 77253-3753

Total Scuba Center, PO Box 1987  
Conroe TX 77301

W W Diving Co, 1420 F M 1960 E  
Ste 102 Humble TX 77338

Book Shop; Tha 1839 7th Street,  
Bay City TX 77414

Texas Dive Shop; Inc, 147 N  
Highway 288 Clute TX 77531

Lonestar Divers, 8009 Spencer  
Deer Park TX 77536

Coastal Creations, Rt 1 Box 185245  
Galveston TX 77551

Sea Gull Shells and Crafts 502  
Highway 146, PO Box 158 Kemah  
TX 77565

Phantom Isle Lodga, PO Box 559  
Manvel TX 77578

Bay Vue, PO Box 1302 Crystal  
Beech TX 77650

**Aqua Ventures Scuba -Beaumont,**  
4099 Calder ste B Beaumont TX  
77706

**Davey Jones Locker, Inc.** 6797  
Easlex Fwy Beaumont TX 77706

**Frontier America Corp,** Box 3698  
Bryan TX 77805

**Beachcomber Restaurant & Shell  
Shop - Dolores Turk,** PO Box 326 -  
2200 Maple Port O'Connor TX 77982

**Sea Shell Sales,** Drawer 98 Seadrift  
TX 77983

**Twiss; J C, Co. Tom Miller,** 912  
Iburbide St Laredo TX 78042

**Dive & Ski Center; The,** 111 S  
Union New Braunfels TX 78130

**Trident Diving Equipment,** 2110  
West Ave San Antonio TX 78201

**Alamo Heights Coin Shop,** 130  
Terrell Plaza San Antonio TX 78209

**Shell Shop,** PO Box 16537 San  
Antonio TX 78216

**San Antonio Data Service Cent  
Johnson; Jose,** 8630 Broadway  
San Antonio TX 78217

**Maritime Footwear Inc David M  
Rettinger,** PO Box 39091 San  
Antonio TX 78218

**Raul Crafts,** 143 Sabyan Drive San  
Antonio TX 78218

**A Dive World,** 5712 Mohud Dr San  
Antonio TX 78238

**Ream Gem & Gift Lethea Ream,**  
11615 Creston San Antonio TX  
78251

**Clarke; Dr Arthur H Ecoserach Inc,**  
325 E Bayview Portland TX 78374

**Sea Shell Shoppe,** 120 N Auslin  
Rockport TX 78382

**Trade Winds Shell Shop,** PO Box  
995 Rockport TX 78382

**Tradewinds Wholesale,** PO Box  
125 Rockport TX 78382

**Collector's Corner,** 603 S Staples  
Corpus Christi TX 78401

**Renaissance Place,** 324 N  
Chaparral Corpus Christi TX 78401

**Tubbs of Flowers,** PO Box 3508  
Corpus Christi TX 78404

**Padre Island Dive Shop,** 7336 S  
Padre Island Dr Corpus Christie TX  
78412

**Ports of Call,** 8201 S Padre Island  
Drive Corpus Christi TX 78412

**Shell Shack Marcia Cook,** 4364 S  
Alameda Corpus Christi TX 78412

**Sea Treasures** 10513 S Padre  
Island Dr, Corpus Christi TX 78418

**Sundial,** PO Box 99 Port Isabel TX  
78578

**Texas Shell Factory,** PO Box 1033  
Port Isabel TX 78578

**Dive Shop; The,** 1911 Ranch Rd  
#12 San Marcos TX 78666

**Ramsey, June, Library,** Rt 3 Box  
1192 Spicewood TX 78669

**University Texas Press Catalog  
Sales,** PO BOX 7819 AUSTIN TX  
78712

**Earthsea,** 3700 Kerbey Lane Austin  
TX 78731

**Ancient Mariner Artworks Micaela  
Ackley,** 3125 Chisholm Trail Austin  
TX 78734-2417

**Heaston; Michael D; Company,**  
5614 Wagon Train Rd Austin TX  
78749

**Tom's Dive & Ski,** 6407 Burnet Ln  
Austin TX 78757

**J Rich Sports Inc,** 2620 Buell Ave  
Austin TX 78758

**SCUBATEXAS World HQ,** 8760-A  
Research Bl #116 Austin TX 78758

**Jenkins Company; The John &  
Maureen Jenkins,** Box 2085 Austin  
TX 78768

**Aqua Shop; The,** 319 Hudson  
Amarillo TX 79108

**Green's,** Rt 1 Box 40 Refugio TX  
79377

**Aquanaut; The,** 1009 University  
Lubbock TX 79401

**Gallagher; William J - Books,** 3720  
31st St Lubbock TX 79410

**Diver's Passport,** 4402 B2 St #212  
Lubbock TX 79424-3345

**Stovall's Dive Shop - Scuba  
School,** 1308 S Midkoff #103-106  
Midland TX 79701

**Himalayan Excursions,** PO Box  
11204 Midland TX 79702

**Innerspace Divers of El Paso;** Inc,  
4700 N Mesa A-3 El Paso TX 79912

**Scuba Diving School of El Paso,**  
6015 Aztec Rd El Paso TX 79925

**Club Akumal Caribe Hotel,** PO Box  
1976 El Paso TX 79950

## COLORADO

**High Country Divers,** 658 S Havana  
St Aurora CO 80012

**A-1 Diving Company,** 1800 W  
Oxford Englewood CO 80110

**Scuba Shoppe Ltd S.E.,** 6860 S  
Dallas Way Englewood CO 80112

**Bookstore-Arapahoe C College  
Arapahoe Community,** College  
Littleton CO 80120

**High Country Divers South,** 6570 S  
Broadway Unit A Littleton CO 80121

**Land and Sea Si Bon',** PO Box  
4189 Denver CO 80204-0189

**Club Aquarius,** 557 Milwaukee  
Denver CO 80206

**Hermitage Book Shop Robert W  
Topp,** 2817 E Third Ave Denver CO  
80208

**Bookstore - U of Denver University  
of Denver,** Denver CO 80210

**Rocky Mountain Diving Center,**  
1920 Wadsworth Bl Lakewood CO  
80215

**Global Seafood Imports, Inc**  
Richard Stubbs, 5140 Race Ct Unit  
6 Denver CO 80216

**Colorado Scuba Center,** 1892 S  
Wadsworth Lakewood CO 80226

**Scuba Shoppe Limited,** 85 S Union  
Bl Lakewood CO 80228

**Bookstore - U of Colorado  
University of Colorado,** Boulder CO  
80302

**Out Island Divers Boulder Scuba  
Tours,** 1737 15th St Boulder CO  
80302

**Weaver's Dive Center, Inc,** 637 80  
Broadway Boulder CO 80303

**Bookstore - Colorado S of Min  
Colorado School of Mines,** Golden  
CO 80401

**Aquatic Research & Diving Co,**  
29573 Paintbrush Dr Evergreen CO  
80439

**Villa Aventura - A Diver's Village**  
at Caye Caulker, PO Box 2664  
Evergreen CO 80439

**CSU Bookstore Colorado State  
University,** Fort Collins CO 80523

**Dive Rescue International,** 2619  
Canlon Court Ft Collins CO 80525

**High Country Divers,** 1605 S.  
College Ave Ft Collins CO 80525

**Midwest Divers Supply,** 1634 S  
College Ave Fort Collins CO 80525

**UNC Bookstore Univ of Northern  
Colorado,** Greeley CO 80603

**USAF Bookstore U S Air Force  
Academy,** USAF Academy CO  
80840

**Colorado College Bookstore  
Colorado College,** Colorado  
Springs CO 80903

**Robinson's Gifts,** 76 S Sierra Madre  
Colorado Springs CO 80903

**High Country Divers,** 1865 N  
Academy Ste D Colorado Springs  
CO 80907

**Mountain Artists Ltd,** 76 S Sierra  
Madre Colorado Springs CO 80908

**Rick's Crafts,** 1827 W Vintah  
Colorado Springs CO 80909

**SCSC Bookstore Southern  
Colorado State C,** Pueblo CO  
81001

**Pueblo Divers Supply,** 4400  
Thatcher Pueblo CO 81005

**ASC Bookstore Adams State  
College,** Alamoso CO 81102

**Western States Col. Bookstore  
Western State College,** of Colorado  
Gunnison CO 81230

**FLC Bookstore Fort Lewis College,**  
Durango CO 81301

**Uncompahgre Fur Co,** Box935  
Delta CO 81416

**Mesa College Bookstore Mesa  
College,** Grand Junction CO 81501

**Colorado Scubaventures Inc,** 2456  
Hwy 7 & 50 Grand Junction CO  
81505

**CMC Bookstore Colorado  
Mountain College,** Glenwood  
Springs CO 81601

**Rangely Colorado Bookstore  
Rangely Colorado,** Rangely CO  
81648

## WYOMING

**Western Divers; LTD,** 323 Thelma  
Dr Casper WY 82609

## IDAHO

**Boise Water Sports,** 3204 Overland  
Rd Boise ID 83705

**Scuba Diving Co; The,** 217 West  
37th Boise ID 83714

## UTAH

**Divers West,** 239 East 800 South  
Orem UT 84057

**Water World Divers,** 1546 S State St  
Orem UT 84058

**Eastern Scuba Utah,** 50 South 1500  
West Vernal UT 84078

**Freeman; W.H. & Co.,** 4419 West  
1980 South Salt Lake City UT 84104

**Neptune Divers,** 2445 S 900 East  
Salt Lake City UT 84106

**Colorado River & Trail Exped,** PO  
Box 7575 Salt Lake City UT 84107-  
7575

**Thunder Island Divers,** 2520 W  
4700 South Salt Lake City UT 84118

**Aardvark,** 55 S Main St Logan UT  
84321

## ARIZONA

**Carl's Rock & Gems,** 2814 N 7th  
Ave Phoenix AZ 85007

**Central Bindery,** 2020 N 22nd Ave  
Phoenix AZ 85009

**Book Nook Susan Jones & Sue  
Fonteno,** 2725 W Camelback  
Phoenix AZ 85011

**Aqua-Sports,** 4230 E Indian School  
Road Phoenix AZ 85018

**Panamic Specimen Shells,** 3846 E  
Highland Phoenix AZ 85018

**Compass Bookshop Frank J  
Kyuta,** 138 W 1st St #49 Mesa AZ  
85201

**Chamberlin; George Antiquarian  
Books,** 4246 N Scottsdale Rd  
Scottsdale AZ 85252

**Spindrift Gladys C Weber,** 6439 W  
Myrtle Ave #79 Glendale AZ 85301

**Arizona Scuba,** 1632 Fourth Ave  
Yuma AZ 85364

**Mathews; Susan - Books,** Box 260  
Bisbee AZ 85603

**Rebel Scuba,** 3514 Kings Ct Dr  
Sierra Vista AZ 85635

**Aqua Fun Scuba Center,** 5735 E  
Speedway Tucson AZ 85712

**Silent Experience Scuba Center,**  
2901 Speedway Bl Tucson AZ 85716

**Tucson School of Scuba Chris  
Berglund,** 3575 E Speedway  
Tucson AZ 85716

**Ciochon; Dr Russell L,** 5441 N  
Swan Rd Apt 212 Tucson AZ 85718

**Desert Divers Scuba Center,** 3550  
N First Ave Ste 140 Tucson AZ  
85719

**Hahn; Donald E Natural History  
Books,** Box 1004 Cottonwood AZ  
86326

## NEW MEXICO

**Freed Company; The** 415 Central  
Ave, PO Box 394 Albuquerque NM  
87103

**Nakal Trading Co** 6605 Central Ave  
NW, Albuquerque NM 87105

**BibliOodities,** 3215 Silver SE  
Albuquerque NM 87106

**Southwest Minerals & Fossils**  
7008 Central Ave SE, Albuquerque  
NM 87108

**Old Town Rocks & Minerals** 4909  
Elison NE #C, Albuquerque NM  
87109-4328

**Watersports, Inc,** 4927 Prospect NE  
Albuquerque NM 87110

**Shellcraft Co %Norman Jarro,**  
PO Box 4640 Albuquerque NM  
87196

**New Mexico School of Diving,**  
4010 E Main St Farmington NM  
87401

**Potter & Potter,** 515 Broadway St  
Truth or Consequen NM 87901

## NEVADA

**Learning Adventures,** 1556N  
Georgia Boulder City NV 89005

**Dive West Inc,** 5831 E Lake Mead Bl  
Las Vegas NV 89115

## CALIFORNIA

**Dawson's Book Shop,** 535 N  
Larchmont Bl Los Angeles CA 90004

**Bookshop Los Angeles County  
Mus of Nat History,** 900 Exposition  
Blvd Los Angeles CA 90007

**Entomological Reprint Special PO  
Box** 77224, Dockweiler Station Los  
Angeles CA 90007

**USC Bookstore,** 835 36th Place Los  
Angeles CA 90007

**Books Nippan** 532 W 6TH ST, LOS  
ANGELES CA 90014

**Ad Week West - Editor,** 514 Shatto  
Place Los Angeles CA 90020

**Katz; Samuel W - Books,** 10845  
Lindbrook Dr #6 Los Angeles CA  
90024

**Panjanand Books,** 11321 Iowa  
Ave Ste 1 Los Angeles CA 90025

**Cherokee Bookshop; Inc Gene  
Blum,** 6607 Hollywood Bl Hollywood  
CA 90028

**Tolliver's Books,** 1834 So Stearns  
Dr Los Angeles CA 90035

**Harris; Doris - Autographs Room**  
907, 5410 Wilshire Bl Los Angeles  
CA 90036

**Zeitlin Periodicals Stan Zeitlin,**  
817 S La Brea Los Angeles CA  
90036

**Virji Imports (USA) Inc Ashraf  
Virji,** PO Box 45082 Los Angeles CA  
90045

**California Book Auction Galleries,**  
1749 N La Brea Ave Los Angeles CA  
90046

**New England Divers, Inc,** 11830 W  
Pico Bl W Los Angeles CA 90064

**Venus Displays Alan & Barbara  
Levy,** 10713 Ashby Ave Los Angeles  
CA 90064

**Guice; Daniel E - Bookseller,** 8568-  
1/2 Melrose Ave Los Angeles CA  
90069

**Heritage Bookshop; Inc Lou  
Weinstein,** 847 N La Cienega Bl Los  
Angeles CA 90069

**Weinstein; Ben & Louis Heritage  
Book Shop; Inc,** 8540 Melrose Ave  
Los Angeles CA 90069

**Caravan Book Store,** 550 South  
Grand Ave Los Angeles CA 90071

**Plant Talk Ruth Pease,** 919A  
Manhattan Ave Manhattan Beach CA  
90266

**International Bookfinders Inc  
Richard & Martha Mohr,** Box 1  
Pacific Palisades CA 90272

**Alacrity Marine Bio Ser** PO Box  
7000-358, Redondo Beach CA  
90277

**Dive 'N Surf,** 504 N Broadway  
Redondo Beach CA 90277

**Sea & Sea, Inc,** 1911 S Catalina Ave  
Redondo Beach CA 90277

**Marina Del Rey Divers,** 2539  
Lincoln Bl Marina Del Rey CA 90291

**Pacific Bio Marine %Rim Fay,** PO  
Box 536 Venice CA 90291

**Hollander; Michael S Rare Books,**  
1433 Santa Monica Blvd Santa  
Monica CA 90404

**Ocean Park Shells** 2724 Main St,  
Santa Monica CA 90405

**Fall; Louise & Richard BioQuip  
Products-Book Div,** PO Box 61  
Santa Monica CA 90406

**Karmiole; Kenneth -Bookseller,**  
PO Box 464 Santa Monica CA 90406

**Karno; Howard - Books,** PO Box  
431 Santa Monica CA 90406

**California Diving News,** PO Box  
11231 Torrance CA 90510

**Cypress College Bookstore  
Maxine florentz,** 9200 Valley View  
Cypress CA 90630

**Scuba Toys,** 9547 Valley View  
Cypress CA 90630

**ARGO Diving Services** PO Box  
1201, 79 Canyon Ter Avalon CA  
90704

**Catalina Island Museum Carol  
Kirk; Admin. Asst.,** Box 366 Avalon  
CA 90704

**Catalina Divers Supply, Avalon  
Catalina Island** CA 90704

**Sea Environment Aquariums  
Miller; Marion (Bob),** 3864 Florista  
St. Los Alamitos CA 90720

**Sea; The Yvette & Richard  
Williams,** %305 No Harbor Blvd San  
Pedro CA 90731

**Ferguson's Marine Specialties  
Ferguson; Ralph,** 617 No Fries Ave  
Wilmington CA 90744

**Fitzgerald; Cheri Executravel,**  
20704 Fordyce Ave PO Box 5449  
Carson 90749

**Book Treasury; The Jon  
Gentilman,** 1535 E Broadway Long  
Beach CA 90802

**New England Divers; Inc,** 4148  
Viking Way Long Beach CA 90808

**Dockum Research Lab,** 844 E  
Mariposa St Altadena CA 91001

**Krueger; Gen; Books,** 7840  
McGroarty St Sunland CA 91040

**Pasadena Divers West,** 2695-A E  
Foothill Bl Pasadena CA 91107

**Vroman's** 2085 E Foothill Blvd,  
Pasadena CA 91109

**Books Bohemian,** Box 6246  
Glendale CA 91205

**Sea & Jungle Imports,** 1843  
Oakwood Ave Glendale CA 91208-  
2158

**Orphic Books Natural History,**  
18533 Roscoe Bl, Ste 200  
Northridge CA 91324

**Scuba Duba**

West Coast Divers Supply, 16931 Sherman Way Van Nuys CA 91406  
Alphabooks Mrs Roy Vasin, PO Box 7038 Van Nuys CA 91409

Garvin's Book Shop Jack Garvin, 321 No. Golden Mall Burbank CA 91502

Professional S.C.U.B.A. Repair, 5725 Cahuenga Bl No Hollywood CA 91601

Guccione's Scuba Habitat, 3220 Brea Canyon Rd Diamond Bar CA 91765

Kenyon; Peg & Don; Books, 408 DeAnza Heights Dr San Dimas CA 91773

Gore; Marian L - Bookseller, Box 433 San Gabriel CA 91778

Undersea Showcase, 1335 W Foothill Bl Upland CA 91786

Southern California Diving Center, 1121 S Glendora West Covina CA 91790

Inspiration from the Sea, 2388 Encinitas Blvd Encinitas CA 92034

La Jolla Cave and Shell Shop, 1325 Coast Bl La Jolla CA 92037

London Associates Shells Wally Robertson, 1137 Prospect St La Jolla CA 92037

Yin; Robert, 1275 Torrey Pines Rd La Jolla CA 92037

Cole's; John - Book Shop 780 Prospect St, PO Box 1132 La Jolla CA 92038

Kuhn; Elsyse - Collections - Books & Prints, 1310 Cedar St Ramona CA 92065

Bookmark; A, PO Box 1967 Rancho Santa Fe CA 92067

Murex de Mexico PO Box 6B, San Ysidro CA 92073

Aquarium Bookshop A-007 Scripps Inst Oceanography, La Jolla CA 92093

Atticus Books Deborah Cook, 728 Broadway San Diego CA 92101

Coronado Publishers, 1250 Sixth Ave San Diego CA 92101

Pisor Marine Shells Don & Jeanne Pisor, 646 N 30th St San Diego CA 92102

Baja Expeditions; Inc Penny Ehrensberger, PO Box 3725 San Diego CA 92103

Pacific Marine Supply, 2804 Canon St San Diego CA 92106

Peri Lithon Books John & Marjorie Sinkankas, PO Box 9996 San Diego CA 92109

New England Divers; Inc, 3860 Rosencrans St San Diego CA 92110

Silver Sea Patricia Abbey, 2527 San Diego Ave San Diego CA 92110

Animal Graphics Mike Byergo, 7415 Blix St San Diego CA 92111

Bio-Science Labs 7330 Opportunity Road, Room C San Diego CA 92111

Natural History Museum Gift Shop, PO Box 1390 San Diego CA 92112

A-16, 4620 Alvarado Road San Diego CA 92120

Water Education Training (WET), 7094 Miramar Rd al Distribut. San Diego CA 92121

Roatan Lodge Resort, PO Box 27342 San Diego CA 92128

Imperial Valley Cable Co, 313 N 8th St El Centro CA 92243

Bond; Thomas W High Desert Images, 13343 Tutelo Road Apple Valley CA 92307

Klemm; Gail - Books, PO Box 518 Apple Valley CA 92307

Sea to Sea Scuba School, 10950 S Mt Vernon Colton CA 92324

Kolbe; George Frederick Fine Numismatic Books, PO Drawer 1610A Crestline CA 92325

Bibliotopos Mark J Hime, PO Box 309 Idyllwild CA 92349

Geoscience Books & Prints, 13057 California St Yucaipa CA 92399

Creely's; Bookstore 2753 Mendoza Dr, Costa Mesa CA 92626-5621

Laguna Sea Sports, 2146 Newport Bl Costa Mesa CA 92627

Pacific Camera Service, 730 W 19th St Costa Mesa CA 92627

West Coast Curio Co Nell Marberger, 1940 Mapla Ave Costa Mesa CA 92627

Black Bart's Aquatics, 24882 Muirlands Bl El Torro CA 92630

Book Cellar David Cormany, 124 Orangefair Mall Fullerton CA 92632

Derry's Shell Shelter Cld Derry, PO Box 3519 Fullerton CA 92634

Sea Fair R D Macklin, 8691 Salem Circle Huntington Beach CA 92647

Ruse Coral & Sea Shell Import Steve & Deanna Ruse, 311 Walnut Ave-PO Box 775 Huntington Beach CA 92648

Alta California Bookstore John & Mary Belle Swingle, PO Box 296 Laguna beach CA 92652

Golden Shell; The Lindahl; Ken & Marge, 218 1-2 Marine Ave Balboa Island CA 92662

Pacific Shell Store 104 McFadden Pl, Newport Beach CA 92663

Book Sail; The John McLaughlin, 1186 N Tustin Orange CA 92667

Open Water Habitat, Inc, 417 S Main Orange CA 92668

Out-of-State Book Service Box 3253J, San Clemente CA 92672

Magic Sea Products; Inc, 1567 Spinnaker Dr; Box 118 Ventura CA 93001

Western Marine Enterprises In, Box O Ventura CA 93002

Sea Treasures, 2411 Trinity Place Oxnard CA 93030

Farley; Lauren & Michael Marcor Publications, 2685 Bolker Way Port Hueneme CA 93041

Far West Marine Center, 1727 Los Angeles Ave Sirm Valley CA 93065

Drew's Book Shop, 31 E Canon Perdido Santa Barbara CA 93101

Hammer; Milton - Books Jessica Hammer, Suite 125 El Paseo Santa Barbara CA 93101

Joseph the Provider - Books, 10 W Micheltorena Santa Barbara CA 93101-2510

Robinson; Gary - Sea Center Santa Barbara Mus. Natl., 2559 Puesta Del Sol Rd, Santa Barbara CA 93105

Aquatics of Santa Barbara, 5370 Hollister Ave #3 Santa Barbara CA 93111

Merlin's Bookshop, 6543 Pardall Rd Isla Vista CA 93117

Abbey Specimen Shells Bob Foster & Charles Glass, PO Box 3010 Santa Barbara CA 93130

A-B-I Books Jeffrey Akard, PO Box 30564 Santa Barbara CA 93130

Pacific Exploring Co, Box 3042 Santa Barbara CA 93130

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Wheldon & Wesley; Ltd Lytton Lodge, Codicote nr Hitchin; Herts. England U.K. SG4 8TE

Worldwide Seashells Afrasian Imports, 2 Kneeworth St Royston; Herts. England U.K. SG8 5A

York Antiquarian Booksellers The Honorable Secretary, 25 Fossigate York England U.K. YO1 2TA

## VANUATU

Maropa Bookshop PO Box 210, Vila VANUATU

## WEST INDIES

Ambassadors Inn Diving Resort, PO Box 1789 Grand Cayman BRITISH W INDIES

Bob Soto's Diving; Ltd Scuba Centre, PO Box 1801 Grand Cayman BRITISH W INDIES

Club Caribbean - Sundivers, PO Box 65 Runaway Bay Jamaica W INDIES

Divers World Ltd of Cayman Seven Mile Shopping Cent., PO Box 917 Grand Cayman BRITISH W INDIES

Scuba Safari - Dive Package, PO Box 2029 Grand Cayman BRITISH W INDIES

Sundivers Jamaica Ltd, PO Box 212 Runaway Bay Jamaica W INDIES

These are current addresses from our file. We apologize for anyone we missed or included in error. If you send us a correction, we will include it in the next issue of SHELLS and SEA LIFE. If your address has changed or you are no longer interested in sea life or palaeontology, please notify us.

## Serial Publications Directory

Publications received by the editor are listed here. Subscription rates given here should be verified with the publishers as rates are subject to frequent changes.

As a service to our readers, you may subscribe to several of these publications through **Seashell Treasures Books** but please do expect a MINIMUM of 12 weeks to start receiving your issues. In some cases, the periodical charges an extra handling fee for subscriptions through agents.

We are adding publications to this directory as we receive current information. Please send current subscription rates, frequency of publication, and a issues of your publication. **Shells and Sea Life** no longer exchanges with publications.

AMU News published by the American Malacological Union, Corresponding Secretary, Paula M. Mikkelsen, Harbor Branch Foundation, Inc., RR 1, Box 196, Fort Pierce, FL 33450. Published twice yearly along with the *Bulletin* and available with membership. Rates: Regular \$20; Corresponding (outside Western Hemisphere) \$23 surface, \$26 air; Student \$15; Affiliate (institutional) \$22 - \$28. Format: 215 x 280 mm, about 16 pages per issue, corner-stapled.

Apex & Arion, Editor R. Duchamps. Vite M.J. Buyle, Av. M. Maeterlinck, 56, bte 8, Bruxelles, Belgium B-1030. Two publications from the Belgian Malacological Society.

Argonata, The International Journal of Malacology. Published by Associazione Malacologica Internazionale (A.M.I.), Editor, Roberto Ubaldi. English and Italian parallel edition. Published in 6 numbers per year starting, 1985. Number 1, separate, and Nos. 2-3 together, 50 pages in the first 3 numbers with excellent color. Format 210 x 295 mm, saddle-stitched. Rates: Seamail \$16; Airmail: Europe, Americas, Asia, Africa \$20; Australia & Pacific \$23 per 6 numbers.

Australian Shell News. Published quarterly by the Malacological Society of Australia. Format: 190 x 255 mm, 8-12 pages per issue. Provided along with the annual *Journal of the Malacological Society of Australia* or the annual membership fee of A\$13.

Basteria Published in 6 issues per year at \$20 per year. Editor: Dr. H.E. Coomans, Instituut voor Taxonomische Zoologie, Zoologisch Museum, Postbus 20125 - 1000 HC, Amsterdam, Netherlands.

Community Science, is published 5 times a year by the Math/Science Nucleus, 3710 Yale Way, Fremont, CA 94538. Individual subscription rate is \$5.00 per year. Membership (regular) \$10.00 per year. Important source of information and materials for life and physical science teaching.

Gloria Maris tijdschrift uitgegeven door de Belgische Vereniging voor Conchyliologie V.Z.W., published bimonthly, by the Belgian society for conchology. Format: 150 x 215mm, about 28 pages per issue. Subscription \$16 US per issue. The Belgian Society for Conchology, 610-4465950-64 Handelsbank, Antwerp, Belgium. Bank costs must be paid by the applicant or you may subscribe through S&SL.

Hawaiian Shell News, An educational publication of the Hawaiian Malacological Society, P.O. Box 10391, Honolulu, HI 96816. Published monthly, 8-16 pages per issue with color 2-3 times per year. Format 215 x 280 mm, loose. Rates: First Class \$20; Airmail \$24.50 to 29; Bulk mail to US Zip codes \$16.

Heldia, Muenchner Malacologische Mitteilungen. Editor Gerhard Falkner, Postfach 26 01 23, 8000 Munich, West Germany.

Iberus, Revista de la Sociedad Espanola de Malacologia. Annual volume published by the Sociedad Espanola de Malacologia, c/o Museo Nacional de Ciencias Naturales, Pº de la Castellana, 80 Madrid 6, Spain. Format: 170 x 242 mm, volume 4 (1984) 136 pages, perfectbound. At last word, the volume was available by airmail for \$20 per year.

Informativo SBM. Published by the Sociedade Brasileira de Malacologia, Departamento de Zoologia, Instituto de Biociencias, U.S.P., C.P. 20.520, CEP 01000, Sao Paulo-SP, Brazil. Published monthly. Editor Kaoru Hiroki. Portuguese language. Format 150 x 210 mm, about 20 pages per issue, 1 color plate. No pricing information available.

Isopod Newsletter. New publication for amphipod and tanaidacean workers. Contact: Dr. Brian Kensley, NHB Stop 163, Smithsonian Institution, Washington, DC 20560.

Journal of the Malacological Society of Australia. Published by the Malacological Society of Australia, c/o Queensland Museum, Gregory Terrace, Fortitude Valley, Queensland 4006, Australia. Format: 175 x 245 mm, side-stitched and wrap cover, about 96p per issue and 4 issues per volume. Each year includes 4 issues (usually over a two-year period). Rates: A\$13 per year which includes the *Journal* and *Australian Shell News*.

Keppel Bay Tidings, Published by the Keppel Bay Shell Club, P.O. Box 5166, Rockhampton Mail Centre, Queensland, 4702. Quarterly available with membership in the Keppel Bay Shell Club. A\$15 per year, airmail also available. Format 220 x 280 mm, 8 pages per issue. Excellent halftone illustrations.

La Conchiglia, The Shell. Published by Mrs. Kety Nicolay, Via C. Federici, 1, 00147 ROMA (Italy). English or Italian editions. Two numbers included in each issue. Normally 6 issues per year, each 32 pages with excellent color. Format 210 x 300 mm, saddle-stitched. Rates: Seamail: US \$20 anywhere in the world; Airmail: N. & S. America, Africa & Asia \$30, Australia & Polynesia \$35 per year.

Las Conchas, Meeting Notice and Newsletter of Pacific Shell Club. Monthly publication edited by John T. Boyd, 11813 Morning Ave., Downey, CA 90241. Available with club membership. No rates available. Format: 215 x 280 mm, about 8 pages per month.

PS-PRI News, Quarterly newsletter of The Paleontological Society and The Paleontological Research Institution. Available with membership in the Paleontological Research Institution, 1259 Trumansburg Rd., Ithaca, NY 14850-1388.

Rossiniana, Bulletin de l'Association Conchyliologique de Nouvelle-Caledonie, B.P. 146, 18, rue Henri-Bonneau, Noumea, New Caledonia. French and English text. Quarterly, 32 pages per issue, color in part. Format 210 x 300 mm, saddle-stitched. Rates: Airmail \$20 or 110 Ffr. Checks not on New Caledonian bank in francs must add \$8.00. You may subscribe through S&SL.

SCAMIT Newsletter, published monthly by the Southern California Association of Marine Invertebrate Taxonomists, 3720 Stephen White Drive, San Pedro, California 90731. Contact them for subscription rates.

Shells and Sea Life is published monthly by Steve and Sally Long, 1701 Hyland St., Bayside, CA 95524. Format is 8-1/2" x 11" (215 x 280mm). Currently in volume 18 (1986). Subscription rate is \$20 annually for U.S. postal zip codes, \$25 overseas, \$35 airmail.

Shell and Tell, Gulf Coast Shell Club, issued bimonthly. Editors: Jim & Linda Brunner, P.O. Box 8188, Southport, FL 32409, (904) 265-5557.

Suncoast Shorelines. Published bimonthly by the Suncoast Conchologists, Editor Bob Pierson, P.O. Box 1564, Palm Harbor, FL 34723-1564. Format 215 x 280 mm, about 12 pages per issue. Rates: \$10 with membership.

Texas Conchologist. Publication of the Houston Conchological Society. Members of the society receive the quarterly, format 5.5 x 8.5", saddle-stitched. Contact membership chairman: Lonnie M. Hobbs, Rt. 4, Box 500, Alvin, TX 77511. Single membership - \$8.00, Institutional subscription - \$10.00.

The Connoisseur of seashells. Published by Dr. Luigi Raybaudi Massilia, P.O. Box 561, ROMA (00187) Italy. English and Italian parallel edition. Published bimonthly, 6 numbers per year. Issue no. 5 (September, 1985) is 36 pages with excellent color. Format 200 x 265 mm, saddle-stitched. Rates: Surface \$18; Airmail \$24; Sample copy \$4; Backnumber \$5. The Connoisseur is primarily a sales catalog for specimen seashells.

The Festivus. Publication of the San Diego Shell Club, Editor, Carole M. Hertz, 3883 Mt. Blackburn Ave., San Diego, CA 92111. Issued monthly except December. Format: 215 x 280 mm, 8-16 pages per issue, corner-stapled. Membership and subscription \$7 in US; \$10 overseas surface mail. Halftone illustrations.

The Journal of Molluscan Studies. Published by Oxford University Press, Walton Street, Oxford, U.K. OX2 6DP. Published three times a year. Subscription rates for 1986 - \$70.

The Nautilus, published by the Trophon Corporation, P.O. Box 3430, Silver Spring, MD 20901-0340. Editor: Dr. M.G. "Jerry" Harasewych. Quarterly publication. Rates: \$15 US; \$18 foreign; \$20 institutional. Format: 215 x 265 mm, 36-48 pages per issue. Saddle-stitched with heavy cover. Includes halftones and occasionally color.

**The Polychaete Research Newsletter**, published several times each year by: Chris Mettam, Department of Biology, University College, Cardiff CF1 1XL, Wales, U.K. Informal publication that provides for communication between polychaete workers. Any topic pertinent to polychaetes is of interest to the newsletter. Most of the topics concern work being done in the North-eastern Atlantic associated with Great Britain.

**The Shell-O-Gram**, published by the Jacksonville Shell Club, Inc., 1010 N. 24th St., Jacksonville Beach, FL 32250. Published bi-monthly, 8.5 x 11" format, corner-stapled, 14 pages in issue seen. Club membership fees: \$10 monthly; \$8.00 individual, includes the 6 issues each year.

**The Slit Shell**. Newsletter of the Indianapolis Shell Club, Paula D. Knoebel, Editor, 3848 Woodridge Court, Plainfield, IN 46168. Publication sent to members of the club.

**The Veliger**. ISSN 0042-3211, A quarterly published by the California Malacozoological Society, Inc., c/o Department of Zoology, University of California, Berkeley, California 94720. Format 215 x 280mm. Subscription rates for volume 28 are \$22 for affiliate members and \$44 for institutions and non-members. Overseas postage is \$3 additional.

**Tide-ings**, The newsletter of the Crown Point Shell Collectors Study Group, Inc. Newsletter editor, Carol Bodine, Box 462, Crown Point, IN 46307. 712 numbers per year with club membership. Format: 215 x 280 mm, 6 pages, corner stapled.

**Tulane Studies in Geology and Paleontology**, is published by the Department of Geology, Tulane University, New Orleans, LA 70118. Editors: Herbert C. Skinner & Emily H. Vokes. Published quarterly, 173 x 252mm, saddle-stitched. Subscription rate: \$20.00 per year.

**Underwater**, The Diver's Journal. Published by Neville Coleman's Sea Australia Productions Pty. Ltd., P.O. Box 419, Caringbah, NSW 2229, Australia. English language quarterly. Standard journal size, about 84 pages with the finest color I have seen anywhere. Includes a lot of good articles and photos on the marine life of Australian waters. Subscriptions: in Australia A\$18; elsewhere A\$25 per year.

**Underwater Naturalist**, Quarterly journal of the American Littoral Society, Highlands, NJ 07732. Approx. 8vo size with good photos and articles primarily on East Coast marine life. Available, along with newsletters, with membership in the society at \$20 per year.

## Club Directory

**A.R.A.H.** (Association de Recherche et d'Applications pour l'Heliciculture), "La Bertrande", Fusterouau - 32400 Riscle, France

**Algoa Bay Conchological Club**, #31 Northumberland Rd, Kabega Park, Port Elizabeth 600. SOUTH AFRICA

**American Littoral Society**, Highlands, NJ 07732. Phone (201) 291-0055, meets annually

**American Malacological Union, Inc.**, The. Constance E. Boone, Recording Secretary, 3706 Rice Blvd., Houston, TX 77005. Meets annually.

**Association Conchyliologique de Nouvelle Calédonie**, J.P. Aillaud, BP 146 - 18 Rue Henri Bonneauud, Noumea, NEW CALEDONIA. Meets every Tuesday et 7PM.

**Association Francaise de Conchologie**, 50 Rue Richer, Paris, 9 FRANCE

**Association of Systematic Collections**, Museum of Natural History, University of Kansas, Lawrence, KS 66045

**Associazione Picena di Malacologia**, Via Adriatica Nord, 126, 63012 Cupre Maritima (A.P.), Italy

**Astronaut Trail Shell Club**, PO Box 515, Melbourne, FL 32935. Meets 4th Wednesday except December, 7:30PM, American Bank Bldg., Babcock & Apollo Sts.

**Atlantic City Shell Collectors**, c/o Janet Perella, Mayfair Apts. #2E, 3700 Atlantic Ave., Atlantic City, NJ 08401

**Auckland Shell Club**, c/o 9 Otakau Road, Milford, Auckland 9, New Zealand. Meets 3rd Thursday 7:30PM at the Auckland Museum.

**Austin Paleo Society**, Jean Whiteley, 1807 W 39th St, Austin, TX 78731

**Austin Shell Club**, c/o Don O'Neill, 1620 Edgemere, Pflugerville, TX 78660. Meets Austin Nature Center, 401 Deep Eddy Ave.

**Belgian Society for Conchology**, p/a Jean Wuyts, Koningsarendiaan 82, B-2100 Duernne, Belgium. Meetings 1st Sunday, Stella Maris, Halislei 72, Antwerp

**Bermuda Shell Club**, c/o H. Benson Andriance, Coolpool, Shelly Bay, Bermuda.

**Border and Transkel Group**, 2nd Friday each month, East London Museum. c/o Noggs Newman, 42 Irvine Rd., East London, South Africa.

**Boston Malacological Club**, Meets 1st Tuesday each month at 8 pm, Museum of Comparative Zoology at Harvard, Oxford St, Cambridge, Massachusetts. Information c/o Charlotte Michaelson, Secretary, 77 Union St., Newton Centre, MA 02159

**Brisbane Branch, Malacological Society of Australia**, c/o Queensland Museum, Queensland Cultural Centre, P.O. Box 300, South Brisbane, Queensland, Australia 4101. Meets 1st Tuesday each month at the Queensland Cultural Centre.

**British Shell Collectors Club**, The, 7 King Johns Road, North Warnborough, Odiham, Hampsh., U.K. 3 meetings per year at Napier Hall, Hyde Place, Westminster, London. Show last Saturday in October.

**Broward Shell Club**, P O Box 10146, Pompano Beach, FL 33061

**Burnett Shell Discussion Group**, c/o B. Heideke, M.S. 108, Heideke's Rd, Bundaberg, Queensland, Australia 4670, Meets monthly.

**Cairns Shell Club**, P.O. Box 1735, Cairns, Old., Australia 4870. Meets 2nd Friday, 8 pm, Cairns Education Centre.

**Cape Town Group**, c/o Mrs Ruth Sacs, 6 Wesley Rd. Observatory, South Africa 7925

**Central Florida Shell Club**, #Orlando Science Center, 810 E Rollins Ave, Orlando, FL 32803. Meets 2nd Tuesday, 7:30PM

**Central Pennsylvania Beachcombers**, c/o RD #2, Box 125, Bernville, PA 19506. Meets 2nd Tuesday, Mar., June, Sep., Dec. at Community Center, Elizabethtown, PA.

**Centro Italiano di Studi Malacologici - C.I.S.M.A.**, c/o Museo Civico di Zoologia, Via V. Aldrovandi 16, 00197 Roma, Italy. Meetings monthly.

**Centro Portugese Activ Subaquatica**, Dept. Malacologia, Rua Janelas Verdes, 37, 1200 Lisboa, Portugal

**Centro Studi Collezionismo**, Associazione Malacologia, Via Fieschi, 8-13, 16121 Genova, ITALY

**Champaign (Illinois) Shell Club**, c/o 606 W. White, Champaign, IL 61820

**Chicago Herpetological Society**, Affiliated Chicago Acad., 2001 North Clark St, Chicago, IL 60614

**Chicago Shell Club**, c/o Carol Achternhof, 4248 Saratoga, K-311, Downer's Grove, IL 60515

**Chicago Shell Club % Field**, Museum of Natural History, Roosevelt Rd & Lake Shore Dr, Chicago, IL 60605

**Chicago Zoological Society**, Gail Schneider, 3300 S. Golf Road, Brookfield, IL 60513

**Chico Shell Club**, Mrs John J Slattery, 106 Terrace Dr, Chico, CA 95926

**Chinese Society of Malacology**, Institute of Oceanology of the Academia Sinica, Qingdao (Tsingtau), Peoples Republic of China.

**Chilton Club Netherlands**, P.O. Box 84222, 2508 AE Den Haag, The Netherlands

**Christchurch Shell Club**, Inc, Secretary - 10 Greens Road, Christchurch 4, NEW ZEALAND. Meets 1st Tuesday at St. Johns Church, Latimer Square.

**Cincinnati Shell Club**, 6285 Dawes Lane, Cincinnati, OH 45230. Meets 1st Wednesday, University of Cincinnati Medical Center.

**Cincinnati Shell Club**, 7757 E Galbraith Road, Cincinnati, OH 45243

**Cleveland Shell Club**, P.O. Box 462, Northfield, OH 44067. Meets Jan., Mar., May, Sep., Nov., Cleveland Museum Natural History.

**Cleveland Shell Club**, 30 Park Lane, Chagrin Falls, OH, 44022

**Club Conchyliä**, Am Steinhern Kreuz 50, D-6100 Darmstadt, West Germany. Meets annually in October.

**Coastal Bend Shell Club**, Meets 4th Tuesday September-May at 7:30PM, Corpus Christi Museum, 1919 N Water St, Corpus Christi, TX 78401. Write c/o 1900 N. Chaparral, Corpus Christi, TX 78401.

**Conchological Club of Southern California**, Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007. Meets 1st Monday monthly at 7:30PM.

**Conchological Section of the Buffalo Museum of Science**, c/o Mrs Diana Wandey, 8905 Hurlbert Ln, Clarence, NY 14031. Meets 2nd Monday at Museum. Humboldt Parkway, Buffalo, NY 14211

**Conchological Section Royal Zoological Society of New South Wales**; %Dee L. Beechey, %Australian Museum, PO Box A285 Sydney, South, NSW AUSTRALIA 2000

**Conchological Society of Great Britain and Ireland**, The, c/o Dr. Julia D. Nunn, 24 Park Hill Court, Assiscombe Road, Croydon, Surrey, England, U.K. CR0 5PG. Meets 3rd Saturday October-May, 2:30PM Demonstration Room, British Museum (Natural History), Cromwell Road, London.

**Conchological Society of Southern Africa**, PO Box 1200, Cape Town 8000, SOUTH AFRICA

**Conchological Society of Southern Africa**, %Mr C Bootsme, PO Box 211, Durbanville 7550, SOUTH AFRICA

**Conchological Society of Southern Africa**, The, meets monthly. **Durban & District Group**, c/o Mrs Dawn van der Walt, 40 Madeline Rd., Morningside, Durban, South Africa 4001

**Conchological Society of Southern Africa**, Mrs A L Vandenburg, PO Box 68204, Bryanston, 2021 SOUTH AFRICA

**Conchological Society of Southern Africa**, Port Elizabeth Group, c/o Mrs Anne Butler, 20 Erasmus Rd, Summerstrand, Port Elizabeth, South Africa 6001

**Conchological Society of Southern Africa**, Pretoria Group, %Tr Duncan, 131 Burger Ave, Verwoerburg; 0140, SOUTH AFRICA

**Conchological Society of Southern Africa**, Pietermaritzburg Group, %Mr M I Armstrong, 195 Bloom St, Pietermaritzburg 3, SOUTH AFRICA

**Conchological Society of Southern Africa**, Port Shephone Group, %Mr M Borland, PO Sea Park 4241, SOUTH AFRICA

**Conchologists of America, Inc.** #1116 N Street, Takamah, NE 68061. Meets annually.

**Connecticut Shell Club**, c/o Peabody Museum, Yale University, New Haven, CT 06501

**Connecticut Valley Shell Club**, c/o Earl Reed, Springfield Museum of Science, 236 State St., Springfield, MA 01130

**Crown Point Shell Collectors Study Group**, Inc., P.O. Box 462, Crown Point, IN 46307. Meets 4th Sunday, 2 pm, Carnegie Center.

**Deep Sea Friends**, c/o "Jennifer" Liedna Str., Fgura, Malta

**Delaware Valley Paleo Society**, Mike Balsai, 4607 Spruce St, Philadelphia, PA 19139

**Desert Shell Club**, Natural History Museum - University of Nevada, 4505 South Maryland Parkway, Las Vegas, NV 89154

**Deutsche Malakozoologische Gesellschaft**, Forschungsinstitute Senckenberg, Senckenberganlage 25, D-6000 Frankfurt 1, West Germany

**Fiji Shell Club**, PO Box 5031, Raiwaga, Suva, FIJI

**Florida Keys Shell Club**, c/o R. Mikkelsen, Cudjoe Gardens, 120 - 7th Ave., Summerland Key, FL 33042

**Fort Myers Shell Club**, c/o LaVerne Weddle, 1936 Coronado Road, Fort Myers, FL 33901

**Fort Myers Beach Shell Club**, c/o Charles Vertefeuille, 2094A Estero, Ft. Myers Beach, FL 33931

**Fossil Shell Research Group**, %T Nashikawa, 1-5-8 Okano; Nishi-ku, Yokohama, JAPAN 220

**Fossils for Fun**, 931 El Dorado Way, Sacramento, CA 95819-3507

**Galveston Shell Club**, PO Box 2072, Galveston, TX 77553-2072

**Geological Society**; The, Burlington House, Piccadilly, London, England U.K. W1V 0JU

**Georgia Shell Club**, c/o Gary D & Earlene Gordon, 112 Tina Dr, Warner Robins, GA 31093

**Greater Miami Shell Club**, Inc, c/o Stanley Phillips, 1955 Ixora Road, North Miami, FL 33181. Meets 4th Wednesday at Rosenthal School M.A.S., 4600 Rickenbacker Causeway, Virginia Key.

**Greater St Louis Shell Club**, Museum Science & Nature, Oak Knoll Park, St Louis, MO 63105

**Greater Tampa Shell Club**, c/o 4800 S. Renelle, Tampa, FL 33611. Meets 3rd Thursday, Good Shepherd Lutheran Church, 501 S. Dale Mabry, Tampa.

**Grupo Neptuno**, c/o Antonio Celso Guimaraes Prado, Caixa Postal 28, Mogi das Cruzes/SP, Brasil CEP 08701

**Guam Shell Club**, Capt Alex Roth, Jr, PO Box 7867, Tamuning, GU 96911

**Gulf Coast Shell Club**, 2nd Tuesday each month, 6:30 pm, Panama City Junior Museum, Panama City, Florida, 925 Rosemont Dr., Panama City, FL 32405

**Hanshin Shell Club**, 1-41 Ohama-cho, Nishinomiyashi, Hyogo-ken, 662, Japan. Meets 3rd Sunday monthly.

**Hawaiian Malacological Society, Inc.**, PO Box 10391, Honolulu, HI 96816. Meets 1st Wednesday, First United Methodist Church.

**Hawaiian Malacological Society, Junior Division**, P.O. Box 19000-A; 1525 Bernice St., Honolulu, HI 96819

**Heart of America Shell Club**, c/o David V. Ouemada, 4814 NW 83rd Terrace, Kansas City, MO 64151.

**Hellenic Shell Club**, %Ag Dimitrios 18, Kifisia, Greece

**Hiroshima Kairui Danwakai**, %Mukaishima Marine Biolog, Mukaishima-cho, Hiroshima, JAPAN 722

**Hokkaido Shell Club**, c/o Mr. Kiyoshi Ito, 4-12-6 Hanazono, Otaru-shi, Hokkaido, Japan 047.

**Hong Kong Shell Society**, Flat C2; No 5, Smouson Hill Rd West, nr Aberdeen, HONG KONG or P.O. Box 9167 GPO; Hong Kong.

**Houston Conchological Society**, meets fourth Wednesday of August - November and January - April in the Azalea Room of the Houston Garden Center in Hermann Park. Contact membership chairman: Lonnie Hobbs, (713) 585-3031, Rt. 4, Box 500, Alvin, TX 77511

**Indiana's First Shell Club**, 404 N. East St., Crown Point, IN 46307.

**Indianapolis Shell Club**, c/o 3846 Woodridge Court, Plainfield, IN 46168. Meets 3rd Sunday, Indiana State Museum.

**Indianapolis Shell Club**, #3507 Whitcomb, Indianapolis, IN 46224

**Innisfail Shell Club**, c/o John Stella, 126 Mill St, Mountlilan, Queensland, Australia 4854.

**Israel Malacological Society**, %Dr H K Miens, Kibbutz Netzer Sereni, 70-395 ISRAEL. Meetings irregular. Local branch meetings monthly.

**International Malacology Association**, via Case Besse, 171, 00216 Scilla (Renne), Italy

**Jacksonville Shell Club, Inc.**, 1010 N. 24th St., Jacksonville Beach, FL 32250. Meets monthly at 8pm at the Nells Science Auditorium #2, Jacksonville University.

**Jersey Capa Shell Club**, P.O. Box 205, Avalon, NJ 08202

**Kauai Shell Club**, %Dr W R Haas, PO Box 787, Lihue, HI 96768. ?Currently inactive.

**Keppel Bay Shell Club**, PO Box 5166, Rockhampton Mail Centre, Queensland, Australia 4702. Meets 4th Friday, 8 pm, Club House, Whilman Street, Yeppon

**Korean Society of Malacology**, %Dr Pyung-Rim Chung, Institute Tropical Medicine, Yonsei University, G.P.O. 8044 Seoul KOREA

**Kwajalein SCUBA Club**, Shell Committee, Box 1750, APO San Francisco, CA 96555

**Kyoto Univeristy Shell Club**, %Mi S Okumura, 23; Kita-ichijoji Inericho, Sakyo-ku; Kyoto-sh, JAPAN 606

**Kyushu Kairul Danwakai**, #425 Nakamura Minemi-go, Sakel-cho Nishisonoki-gun, Negesaki-ken, JAPAN 857-22

**La Mitra Zonata Club**, CAO Michel Levy, Rue Pierre Laurent, Marseille 13006, FRANCE or c/o Jean David, 12 Rue de Ruffi, Marseille 13006, France

**Limpet Club**, %S.J. Palmer, 205 Geraldine St., St Albans, Christchurch, NEW ZEALAND

**Long Beach Shell Club**, %Angelo M. Jacoboni Library, 5020 Clark Ave., Lakewood, CA 90712. Meets 2nd Sunday except July.

**Long Island Shell Club**, c/o Helen C Paul, 127 Brook St., Garden City, NY 11530.

**Louisiana Malacological Society**, Dr D V & Wanetta Caseioppo, 6678 Esplanade Ave, Baton Rouge, LA 70806. Meets 2nd Wednesday at Caseioppo's

**Louisville Conchological Society**, The, c/o 4008 Glenview Ave., Glenview, KY 40025. Meets 2nd Wednesday, Breckinridge Inn, Louisville.

**Malacological Club of Yanbu**, %Astorre & Morag Marini, Saudi Arabian Parsons Ltd., Construction & Public Works, PO Box 30167, Yanbu al Sinayah, Saudi Arabia. Meets monthly.

**Malacological Society of Australia**, c/o Zoology Dept., University of Queensland, St. Lucia, Brisbane, Queensland, Australia 4067.

**Malacological Society of Australia, Inc.**, South Australia Branch, c/o South Australia Museum, North Terrace, Adelaide, South Australia 5000.

**Malacological Society of Australia, Inc.**, Victoria Branch, c/o Mrs E. Tenner, 9 Foch St. Reservoir, Victoria, Australia 3073. Meets 3rd Monday except December & January, Theatre, Museum of Victoria.

**Malacological Society of Australia, Inc.**, West Australia Shell Club, c/o Mollusc Dept., Western Australian Museum, Francis St., Perth, Western Australia 6000.

**Malacological Society of China**, %Taiwan Museum, Taipei, Taiwan REPUBLIC OF CHINA or c/o No. 2, Siang Yang Road, Taipei, Taiwan, Republic of China.

**Malacological Society of Japan**, %National Science Museum, 3-23-1; Hyakunin-cho, Shinjuku-ku, Tokyo 160 Japan. Meetings at Ocean Research Institute.

**Malacological Society of London**, c/o Dr. A. Bebbington, Science Dept., Bristol Polytechnic, Redland Hall, Bristol, England, U.K. B58 1UG

**Malacological Society of Northern Mindanao**, Cagug; Medina Misamis Ori, 8427 Mindanao Island, PHILIPPINES

**Malacological Society of the Philippines**, President Ruben Imoly, Department Zoology, University Philippines, Manila PHILIPPINES

**Marco Island Shell Club**, PO Box 633, Marco Island, FL 33937

**Marine Biological Association of the United Kingdom**, The Laboratory, Citadel Hill Plymouth, Devon, England U.K. PL1 2PB

**Marion Seashell Club**, P.O. Box 216, Marion, NC 28752

**Minnesota Society of Conchologists**, c/o Stan Thompson, 1032 11th Ave NE, Fairbault, MN 55021. Meets 1st Thursday, Twin City Federal, Minneapolis.

**Monterey Peninsula Shell Club**, %Donna Darnell, PO Box 222655, Carmel, CA 93922. Meets 3rd Tuesday 7:30PM Allen Knight Maritime Museum, 550 Calle Principal, Monterey.

**Mount Shell Club**, The, %RC Harwood, 12 Lodge Ave., Mount Maunganui, NEW ZEALAND. ?inactive.

**Nagoya Kairul Danwakai**, %Kiyoshi Nakayama, 2-11 Maruine-cho; Mizuho-ku, Nagoya-shi; 467, JAPAN

**Naples Shell Club Inc**, PO Box 1991, Naples, FL 33940

**Natal Midlands Group S A C S**, %Dr Kilburn Natal Museum, Loop Street, Pietermaritzburg 3, SOUTH AFRICA

**Nashville Shell Club**, c/o Michael E Davis, 223 Tanglwood Court, Nashville, TN 37211

**Natal Shell Society**, c/o 21 Clark Rd, Flat 3, Durban, South Africa 4001

**National Capital Shell Club**, c/o Division of Mollusks, Smithsonian Institution, Washington, DC 20560.

**Netherlands Malacological Society**, Nederlandse Malacologische Vereniging, %Zoological Museum, Postbox 20125, Amsterdam 1000HC, NETHERLANDS

**New York Shell Club**, Meets second Sunday of each month, September through June in Room 419, American Museum of Natural History, at 2PM, except for the April meeting which is a combined auction/social. Contact: Corresponding Secretary, Edna Christensen, 68-45 Harrow St., Forest Hills, NY 11375. (718) 261-7089.

**New York Zoological Society**, Bronx Zoo, Bronx, NY 10460

**Niigata Shell Club**, %Hitoshi Murayama, Ohohirola 763, Kashiwazaki City JAPAN 949-37

**Niugini Shell Club**, P.O. Box 9229, Hohola, Papua New Guinea. Meets Monthly in Port Moresby.

**Nivosa Conchological Society**, %15 St Joseph St, B'Kara, MALTA. Meets 1st Wednesday, 6:30PM.

**North Carolina Shell Club**, c/o Barbara McIntyre, 619 Stacy St., Raleigh, NC 27607

**North Texas Conchological Society**, c/o Pat Lockhart, 804 Westbrook Dr., Plano, TX 75075. Meets 3rd Wednesday, 7:30PM at Dallas Museum of Natural History, Fair Park, Dallas.

**Northants Natural History Society**, Conchological Section; The Humfrey Rooms, Castillion Terr, Northampton, England U.K. NN1 1CD

**Northern California Malacozoological Club**, c/o 121 Wild Horse Dr., Novato, CA 94947. Meets 3rd Thursday except July at Christ Lutheran Church, 780 Ashbury Ave, El Cerrito.

**Northwest Florida Shell Club**, c/o 15 Chelsea Dr., Fort Walton Beach, FL 33402

**Nuigini Shell Club**, %PO Box 9229, Hohala, PAPUA NEW GUINEA

**Okinawa Shell Club**, c/o Bob Ruddo, PSC 1, Box 27504, APO San Francisco, CA 96230.

**Oregon Society Conchologists**, Rev. Byron W Travis, 4324 NE 47th Ave, Portland, OR 97218

**Otago Shell Club**, %33 Dalmeny St, North East Valley, Dunedin, NEW ZEALAND

**Pacific Northwest Shell Club**, or c/o Shelley Ueland, 15912 174th Ave NE, Woodinville, WA 98072. Meets 3rd Sunday, 2PM at Lake City Christian Church, Seattle.

**Pacific Shell Club, Inc.**, Meets 1st Sunday each month, September-June, 1:30 pm, Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007.

**Palm Beach County Shell Club**, %PO Box 182, W Palm Beach, FL, 33402

**Palos Verdes Peninsula Oceanographic Society**, Mrs Veronica Callahan, 5561 Littlebow Rd, Palos Verdes, CA 90274

**Philadelphia Shell Club**, c/o Academy of Natural Sciences at Philadelphia, 19th and Benjamin Franklin Parkway, Philadelphia, PA 19103. Meets 3rd Thursday, 8PM.

**Pittsburgh Shell Club**, c/o Invertebrates, Carnegie Museum, 4400 Forbes Ave., Pittsburgh, PA 15213.

**Port Curtis Shell Discussion Group**, c/o N.I. Trevor, 76 Wyndham Ave, Boyne Island, Queensland, Australia 4680. Meets 2nd Sunday.

**Port Dennison Shell Group**, PO Box 300, Bowen, Queensland, Australia 4805.

**Port Douglas Shell Club**, c/o Mrs N. Pope, Port Douglas, Queensland, Australia 4805.

**Port Phillip Bay Shell Group**, c/o Mrs C. Bunyard, 21 Hillcrest Rd., Eham North, Victoria, Australia 3095. Meets monthly

**Prosperine Shell Club**, %Mrs Grace Lum Wan, 17 Smith St, Prosperine, Old AUSTRALIA 4800

**Raleigh North Carolina Shell Study Group**, %Steve Rosenthal, 207 Newton Rd, Raleigh, NC 27609

**Reef Roamers Shell Club**, PO Box 4441, Andersen AFB Branch, Yigo, GU 96912

**Richmond Shell Club**, c/o Charles Burgess, 8902 Tolman Rd., Richmond, VA 23229

**Sagami Shell Club**, %Kinya Mase, Yokosuka Museum, 95; Fukutadain, Yokosuka-shi JAPAN 238

**San Antonio Shell Club**, %Bessie G Goethel, 9402 Nona Kay Dr, San Antonio, TX 78217. Meets 3rd Tuesday 7:30PM at Asbury Methodist Church, 4601 San Pedro Ave., San Antonio.

**San Diego Shell Club**, %Carole M Herz, 3883 Mt Blackburn Ave, San Diego, CA 92111. Meets 3rd Thursday, Room 104, Casa del Prado, Balboa Park, San Diego.

**San Miguel Sand Dollars**, %Danny McBride, NCSP - Box 504, FPO San Francisco, CA 96656-0007

**Sanibel-Captiva Shell Club**, PO Box 355, Sanibel, FL 33957.

**Sanin Shell Club**, %Mr. Norihiko Irie, 544-4; Kannonji; Yanago-shi, Tottori-ken, JAPAN 683

**Santa Barbara Shell Club**, PO Box 30191, Santa Barbara, CA 93105. Meets 3rd Friday 7:30PM at Santa Barbara Museum of Natural History, 2559 Puesta del Sol.

**Sarasota Shell Club**, %Mary L Mansfield, 2232 Bahia Vista Bldg A#7, Sarasota, FL 33579-2413. Meets 2nd Thursday, September-April 7:30PM, Mote Marine Science Center, City Island, Sarasota.

**Schelpenclub Friesland**, Fries Natural History Mus, Heerestraat; 13, Leenwarden S911 LC, NETHERLANDS

**Schelpen Werkgroep**, %H.K. Veldkamp, Sont 63, 9933TB Delfzijl, NETHERLANDS

**Scottish Marine Biological Association**, Dunstaffnage Mar Res Lab, PO Box 3 Oban, Argyll, Scotland U.K.

**Sea Shell Club**, Vianderdal; 12, 3300 Tienen, BELGIUM

**Seashell Searchers of Brazoria County**, Brazosport Mus. Nat. Hist., 400 College Dr., Lake Jackson, TX 77566. Meets 1st Monday 7PM at museum.

**Shell Club of Montelier**, %Francois Mestre, Cidex 916, Montelier; 26120 C; FRANCE

**Shell Club of Mystic**, Dr. Peter Steelman - President, Rt. 27 Box 1008, Mystic, CT 06355. Meets third Tuesday at 7 pm monthly, except summer months.

**Shell Club of the Hague**, %Walburg; P. Langendijkstraat 66, 2533 TL Hague (ZH), NETHERLANDS

**Shell Collectors Association of Nova Scotia**, c/o Dr Derek S. Davis, 1747 Summer St., Halifax, Nova Scotia, Canada B3H 3A6

**Shell Collectors Club**, c/o Bernice Plummer, 47 Tulare Parkway, Rochester, NY 14623. Meets 1st Thursday except January, July & August at Winton Branch Library, Rochester.

**Shell Museum & Research**, Foundation Inc., PO Box 1850, Sanibel Island, FL 33957

**Shikoku Conchological Club**, c/o The Coral Museum, Tatsukushi, Tosa - Shimizu City, Kochi, 787-04 JAPAN

**Soc L'Etude Nature Bretagne**, Redaction Penn Ar Bed, B P 32, 29276 Brest Cedex, FRANCE

**Soc Siciliana Sci Nat**, Gabriella do Verde, %Inst Zool Univ, Via Archirafi 18, 90123 Palermo ITALY

**Sociedad Espanola Malacologia**, Jose Gutierrez Abascal, 2, Museo Nacional de Ciencias Naturales, 28006 Madrid, Spain. Meets annually.

**Sociedad Malacologica Uruguay**, %Jorge Pita, Casilla de Correo 1401, Montevideo, URUGUAY. Meets 1st & 3rd Tuesday, March-November.

**Sociedad Panamena da Malacologia**, Apartado 6-593, El Dorado, Republic of Panama

**Sociedade Brasileira Malacologia**, %Prof Walter Narchi, Instituto Biocen-USP, Cx P 11461, Sao Paulo-SP BRAZIL

**Sociedade Malacologica do Recife**, rua Ibiapaba 89 Apt. 202, Tamarineira, Recife, Pernambuco, Brasil CEP 50 000.

**Sociedade Portuguesa Malacologia**, Aquario Vasco da Gama, Dafundo, 1495 Lisboa PORTUGAL. Meets last Friday, Instituto Nacional de Investigacao Pescas & Algas, Lisbon.

**Societa Italiana Malacologia**, Sezione di Palermo, Via A. Conli (ex P 31) n. 19, 90146 Palermo, ITALY

**Societa Malacologica**, %Museo Civico Storia Natu, Corso Venezia 55, 20121 Milano, ITALY

**Societa Picena di Malacologia**, Piazza della Libertà, 63012 Cupra Marittima (AP), ITALY

**Societe Belge Malacologie**, %St Jobsstraat 8, B-3330 Landen (Ezemaal), BELGIUM

**Societe Francaise de Malacologie**, 55, rue de Buffon, 75005 Paris, France. Meets annually.

**Societe International de Conchyliologie**, c/o Dr. Ted Baer, CH-1602 La Croix, Switzerland. Meets 4x per year.

**Societa Biologica Fennica**, Exchange Librarian, Rauhankatu 15 B, 00170 Helsinki, FINLAND

**Society for Experimental and Descriptive Malacology**, 2415 South Circle Dr., Ann Arbor, MI 48103. Meets annually.

**Society of Systematic Zoology**, %National Mus. Nat. Hist., 10th & Constitution N.W., Washington, DC 20560

**South Beach Shell Club**, PO Box 115, Grayland, WA 98547

**South Carolina Shell Club**, c/o 1227 Downer Dr., Charleston, SC 29412. Meets 1st Thursday at Jewish Community Center, 7:30PM.

**South-East Asia Center for Applied Malacology**, Mahidol University, Bangkok, Thailand.

**Southern California Association of Marine Invertebrate Taxonomists**, 3720 Stephen White Dr, San Pedro, CA 90731

**Southern California Paleo Society**, 4755 Baltimore St, Los Angeles, CA 90042

**Southern Natal Group**, c/o PO Box 9, Anarley, Natal, South Africa 4230

**Southwest Florida Conchologist Society**, PO Box 876, Fort Myers, FL 33902. Meets 2nd Friday except June-August 7:30PM, Edison Community College.

**Southwestern Malacological Society**, For information call: (602) 955-2072 or write: c/o 3846 East Highland Ave., Phoenix, AZ 85018. Meets 3rd Wednesday each month September - June at 7:30 pm. United Methodist Church, 1601 W Indian School Rd., Phoenix, Arizona

**St Petersburg Shell Club**, %Mrs Florence Kuczynski, 5562 2nd Ave N, St Petersburg, FL 33710. Meets October-May, IScience Center Pinellas County, 7701 22nd Ave. N, St. Petersburg.

**Stichting Biologica Maritima**, Postbus 64628, 2506 CA Den Haag, The Netherlands

**Suncoast Conchologists, Inc.**, Suncoast Shorelines, PO Box 1564, Palm Harbor, FL 34273-1564. Meets 1st Tuesday each month, September-June, 7:30 pm, Sylvan Abbey United Methodist Church, Clearwater, Florida.

**Sunshine Coast Shell Club**, c/o Miss Jackie Capp, 34 Coronation Ave, Golden Beach, Queensland, Australia 4551.

**Suruga Shell Club**, %Minetaro Tanaka, 211 Enoura; Namazu City, Sizouka Prefecture, JAPAN

**Tanzania Society**, PO BOX 511, DARES-SALAAM, TANZANIA

**Taranaki Shell Collectors**, %50 Lorna St, New Plymouth; North Island, NEW ZEALAND

**Tekamah Shell Club**, c/o Lowell DeVasue, RR #1, Box 56, Tekamah, NE 68061

**Tokyo Shell Club**, c/o M. Morita, 1-34-13, Kamisashigaya, Setagaya-ku, Tokyo, 157 Japan.

**Townsville Shell Club**, PO Box 41, Hermit Park, Townsville, Queensland, Australia 4814. Meets 1st Wednesday each month except January, Girl Guide Hall.

**Treasure Coast Shell Club**, c/o 99 Yacht Club Place, Jupiter, FL 33469.

**Tulsa Shell Club**, c/o G.F. Hyman, 2605 E Dallas St., Broken Arrow, OK 74014.

**Tura Brisa Shell Collectors**, Salud 71 St Charter, Mayaguez, PR 00708

**Underwater Photographic Society of San Diego**, Inc, PO Box 82782, San Diego, CA 92138

**Unione Malacologica Italiana**, Via de Sanctis 73, 20145 Milano, ITALY

**Utah Shell Society**, c/o 1415 East Murphy Lane, Salt Lake City, UT 84106

**Vancouver & District Shell Club**, c/o S & G B Jeffreys, 3820 Bowen Dr, Richmond; BC, V7C 4E1 CANADA

**Vanuatu National Science Society**, PO Box 188, Vila, VANUATU

**Wadatsumi Shell Club**, %Mr Fumio Ishida, 1-2-5 Gokurakuji; Kamakuru-sh, Kanagawa 248, JAPAN

**Wellington Shell Collectors Club**, %Mollusc Department, National Museum, Private Bag; Wellington, NEW ZEALAND. Meets monthly at museum.

**Western Society of Malacologists**, c/o Dr. Henry Chabey, 1706 H Esplanade, Redondo Beach, CA 90277. Meets annually.

**Whangarei Shell Club**, %J E Haywood, Oaks Rd., Otaka RD8, Whangarei, NEW ZEALAND. Meets 1st Thursday, 7:30PM, Northland Community College.

**Whitsunday Shell Club**, PO Box 1227, Mackay, Queensland, Australia 4740.

**Wilmington Shell Club**, c/o Delaware Museum of Natural History, PO Box 3937, Greenville, DE 19807. Meets 1st Monday October-May.

**Yorkshire Conchological Society**, %E. Dearing; Hon. Secretary, 14 Nowell Grove; Read, Burnley; Lancs., England U.K. BB12 7PG

**Yucaipa Shell Club**, Mousley Museum of Natural History, 35308 Panorama Dr., Yucaipa, CA 92399. Meetings 3rd Sunday, 2PM at museum.

We list organization addresses and meeting times here as time and space permits. The officers and mailing addresses change frequently. Send current information and we will do our best to include your group in our next issue.

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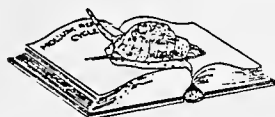
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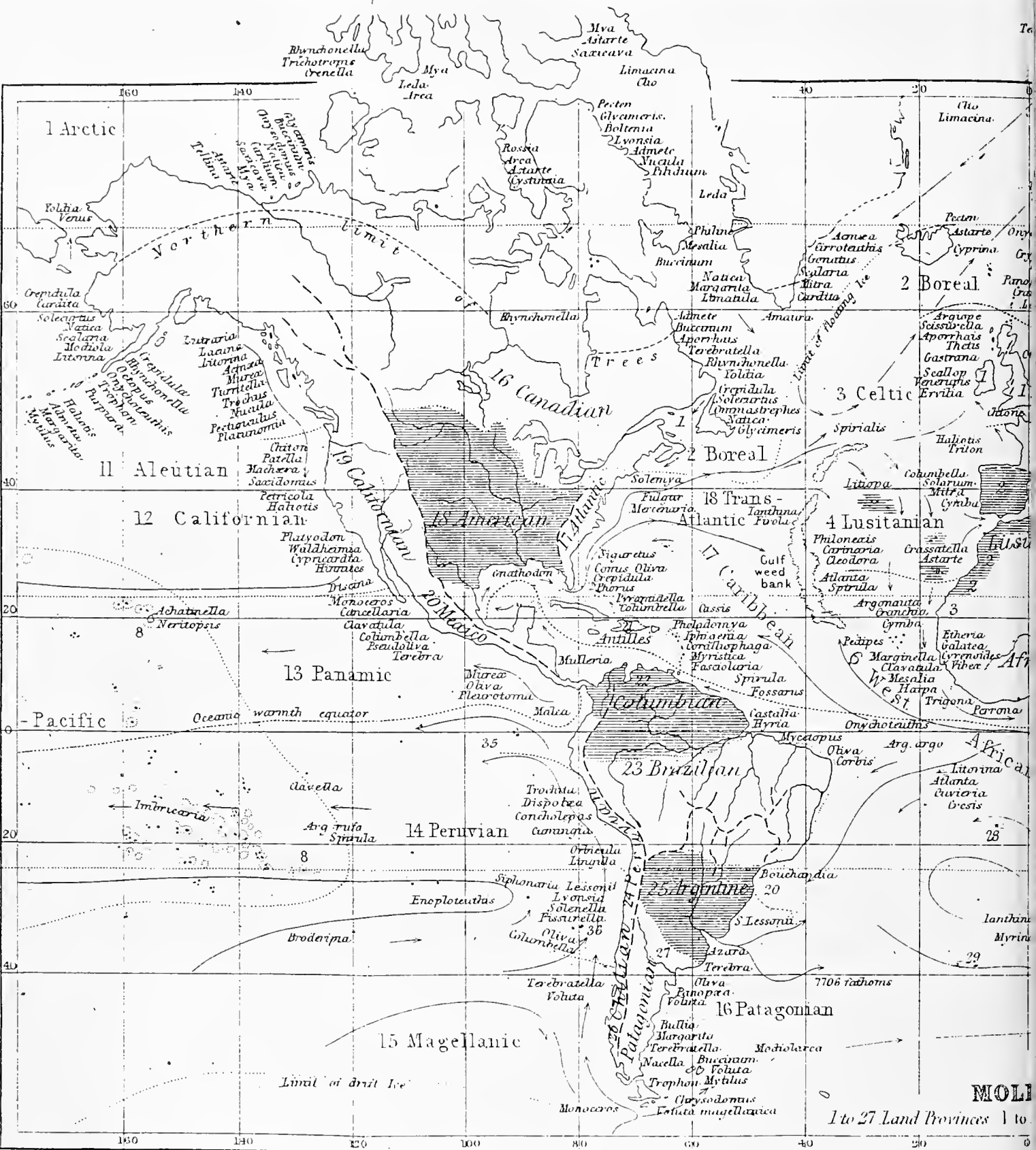
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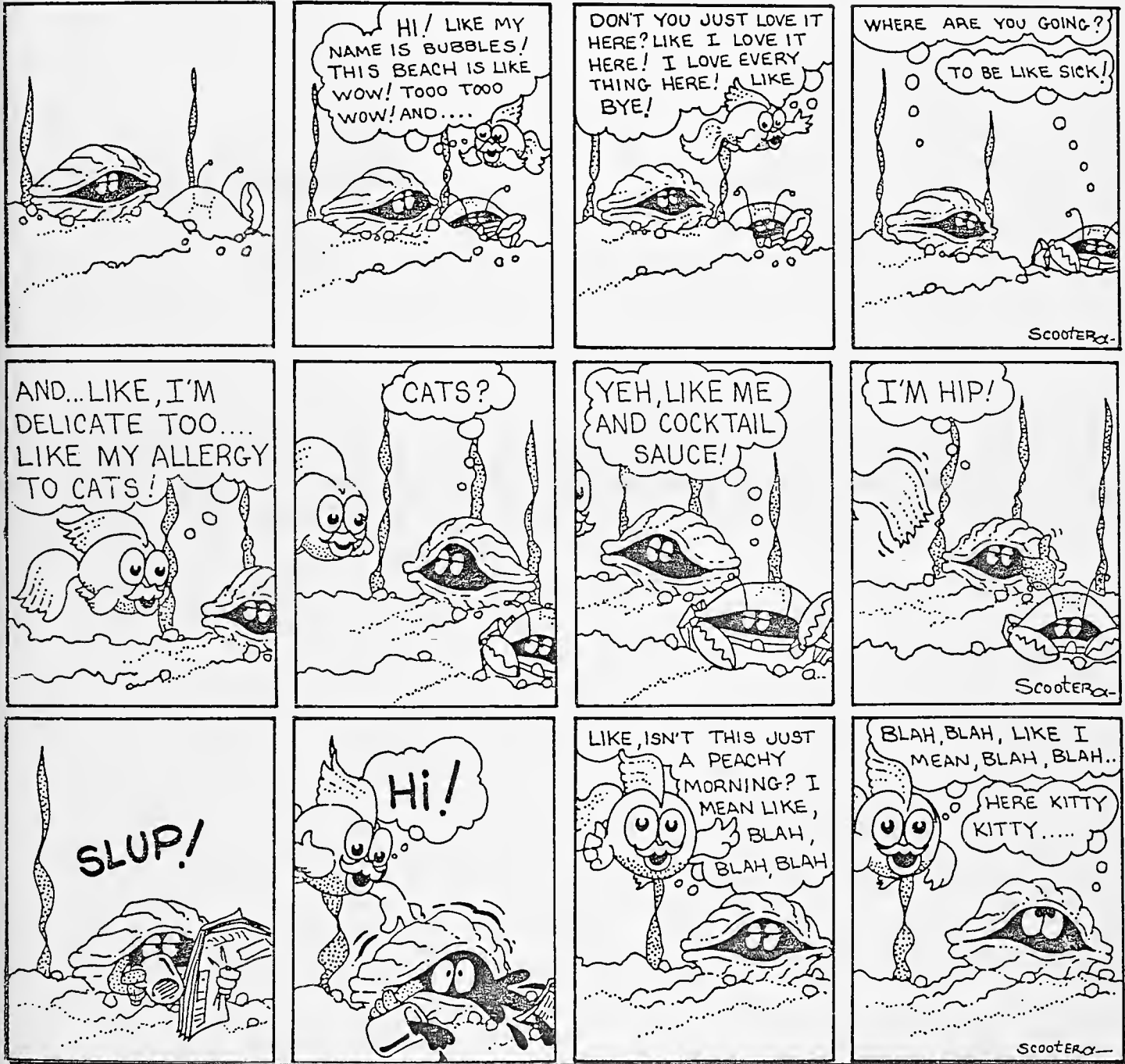
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# Calendar

## 1987

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Southern California Academy of Sciences, May 8-9, 1987 Annual Meeting, California State University, Los Angeles, California. Southern California Ichthyologists, American Cetacean Society & Southern California Association of Marine Invertebrate Taxonomists.

Capa Cod Whale Watch, May 15-17, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Red Knots/Horseshoe Crabs, Delaware Bay, May 17, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### JUNE

Pine Barrens Weekend I, June 5-7, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Maine Coast Weekend, June 11-14, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Montauk Weekend, June 19-21, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

SIC87, 6eme Salon International du Coquillage, June 20-21, Lausanne, Switzerland. Contact Dr. Ted W. Baer, CH-1602 La Croix, Switzerland. Phone (0)21 39 37 71.

Western Society of Malacologists, June 21-25, San Diego State University, San Diego. Contact: Carole M. Hertz, San Diego Natural History Museum, PO Box 1390, San Diego, CA 92112, (619) 277-6359 home.

Conchologists of America, June 23-27, Days Inn at the Arch, St. Louis, Missouri. Contact: Alan Gattelman, 4045 Central Lane, Granite City, IL 62040. (618) 931-7374 weekdays.

Third International Symposium on Marine Biology & Evolution in the Pacific, 26 June-3 July, Hong Kong. Convenors - University of Hong Kong & Western Society of Naturalists. Contact: Prof. D.H. Montgomery, Biological Sciences Dept., Cal Poly State University, San Luis Obispo, CA 93407.

Gulf Stream Billfish Tagging, Hatteras, June 28, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### JULY

Wreck Diving I, July 12, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Island Ecology, Isle of Shoals, July 17-20, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shark Tagging, July 18, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

American Malacological Union, July 19-23, 53rd Annual Meeting, Casa Marina Resort, Key West, Florida. Contact: William G. Lyons, Florida Dept. Natural Resources, 100 Eighth Ave. S.E., St. Petersburg, FL 33701. (813) 896-8626

Jacksonville Shell Show & Auction, July 30-August 2, Flag Pavilion, Jacksonville Beach, Florida. Contact: Allan Walker, 1036 Montes Ave., Jacksonville, FL 32205. (904) 781-1553

### AUGUST

Annual Crab Feast, Oxford, Maryland, August 2, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Wreck Diving II, August 9, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shellfishing and Coastal Management: A Global Perspective, August 19-21, Hofstra University, Long Island, NY. Contact: Tarry Baker, Associate Dean, School of Education, Hofstra University, Hempstead, NY 11550.

XVI Pacific Science Congress, August 20-30, Korea. Contact Prof. Choon Ho Park, Secretary-General, K.P.O. Box 1008, Seoul 110, Korea. Phone: (2)733-4478.

### SEPTEMBER

Pine Barrens Weekend II, September 11-13, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Wreck Diving III, September 20, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Cape May Birding Weekend I, September 25-27, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Guam Shell Fair, September 26-27, 22nd Annual Shell Fair of the Guam Shell Club, Agana, Guam. Contact: Capt. Alex Roh, Jr., Guam Shell Club, P.O. Box 7867, Tamuning, GU 96911.

### OCTOBER

American Littoral Society, 26th Annual Meeting (Tentative), October 9-12, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Cape May Birding Weekend II, October 16-18, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### NOVEMBER

Suwannee River Canoe/Camp, November 4-8, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Assateague Fall Weekend, November 19-22, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Bonaire Dive/Study, November 20-27, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Oyster Dive II, Chesapeake Bay, November 21, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### DECEMBER

Diver's Environmental Institute, December 6, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Sanibel/Captiva Week, Florida, December 12-19, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Western Society of Naturalists, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We especially like to hear of overseas shows and meetings.

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# The Remarkable Mind of S. Stillman Berry

by

Michael E.Q. Pilson

The University of Rhode Island  
Graduate School of Oceanography  
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Narragansett, RI 02882-1197

The excellent memorial to Dr. S. Stillman Berry (Brookshire, 1984) vividly recalled to mind my own short acquaintance with this unusual man. The circumstances may be of interest to those who knew him as a student of the molluscs.

In 1960, when I was a graduate student at Scripps Institution of Oceanography, I was collecting for experimental purposes a number of quite small abalone (*H. fulgens*), and I kept these in a large seawater tank in Ritter Hall. One day one of the abalone was only a clean empty shell, with no flesh left. Startled, I looked everywhere for a starfish or something, but found nothing. Examining the shell, I held it up to the light; strong sunlight from the window made it possible to see a tiny hole, pinprick size, in the shell within the area of the muscle scar. Further examination of the tank disclosed a small Octopus (*O. bimaculatus*) hiding in a dark corner behind a brick. (Later I learned the octopus had been placed there by another student needing temporary storage.) Mystified, I asked among the biology professors at Scripps, but none had ever heard of such a thing. I set out to prove that the octopus was doing it, and isolated one octopus with one abalone in a large glass jar with running seawater and a tight lid. Two days later the abalone was only an empty shell, with a tiny hole in it; under a magnifying glass the hole had a characteristic oval shape, unlike that made by any other known predator.

Several days in the library, reading absolutely everything I could find on octopus natural history and feeding behavior, convinced me that this phenomenon was entirely unknown. Several observant authors had indeed noted octopus sitting over shell fish, "patiently tugging." No one knew that they drilled holes with their radula.

Since I thought of this as my first real discovery in natural history, I was especially thorough in the library, and went through every issue of the *Zoological Record* back to 1900, searching every plausible indexed reference to octopus behavior or feeding.

After more experiments, I, along with my colleague Peter Taylor who was working on fish toxins and undertook to examine the effects of the poison from the salivary glands of the octopus, wrote a paper on the subject and submitted it to *Science*.

The word about octopus drilling holes passed from person to person up the coast among the active sub-culture of shell enthusiasts in California. One day I received a phone call from Stillman Berry, whom I thought of as a sort of legendary figure. He said that he had been told of my discovery, and, after we talked a while, he said he was going to have some one drive him down to San Diego, and could he visit? Of course, I was thrilled. A few days later he showed up and we spent a happy couple of hours together. He was at that time 73 years old. He wanted to see exactly how the discovery had been made, and details of every experiment (by then I had shown that larger octopus make larger holes and that many other species besides abalone are prey). He told me that he had for many years been an avid collector, and that hundreds of times, upon close examination of shells picked up on the beach, he had seen the characteristic holes, but he had never known what made them. Finally, he asked if he could have the small abalone shell in which I had first observed the hole. He wanted the type specimen. I'm sort of a squirrel myself, and didn't want to give it up, so I offered him two or three syntypes, which I designated on the spot. He took these, but I could see that he was disappointed.

Some days later I received the galley proofs of the paper from *Science*, and shortly after that a letter from Stillman Berry. He reported that during the drive back to Redlands he began to be nagged by the thought that he had indeed once seen a publication stating that octopus can bore holes in the shells of certain molluscs. It worried and worried him, and he spent several days searching his library. Finally he found it, and he called my attention to Fugita (1916).

In 1916 Stillman Berry had obtained a copy of Fugita's paper. It was printed entirely in Japanese, with no English subtitles nor abstract. Dr. Berry had obtained an English translation which was attached to the original with a rusty straight pin. They had been filed in his library ever since, and he thought he had not looked at the paper between 1916 and 1961. Fugita had investigated a plague of octopus that was alleged to be damaging an oyster fishery in Japan. He had shown by careful experiment that octopus drill characteristic holes in the shells of oysters, that of the two pairs of salivary glands only one pair produced poison, and he ascribed the drilling to the action of the radula. He even mapped the frequency of holes by area on the shell. It was a good piece of work.

Chagrined, I went back to the *Zoological Record*, and discovered the paper in the serial listings, but not indexed so that I could have found it. Of course, I had to add a note to our paper in proof (PILSON & TAYLOR, 1961), to the effect that I had been scooped, and by 45 years.

This story provides some insight into the workings of the human mind. How remarkable that Stillman Berry should be able to call back from memory such a paper, after so long. Even more extraordinary is the report that he had himself seen those holes hundreds of times, and never made the connection.

While I don't know for sure, it seems likely that Stillman Berry was then the only man alive in the western world who could have found Fugita's paper for me. Whether knowledge of it or of the phenomenon was then current in Japan I don't know, though it could have been through oral tradition alone. Later I learned from Mr. Alfred M. Bailey, then director of the Denver Museum of Natural History, that children in the Galapagos were aware that octopus drilled holes in shells, and I also heard third hand that Conrad Limbaugh may have been aware of it as well, as had a number of shell collectors.

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Fugita, S. 1916. [On the boring of a small hole in the shell of the Japanese pearl oyster by *Polypus vulgaris*.] *Dobutsugeku Zasshi* 28: 250-257. [In Japanese; title translated]  
Pilson, M.E.Q. & P.B. Taylor. 1961. Hole drilling by Octopus. *Science* 134: 1365-1368.



# on the DRIFTLINE ~ ~ ~

## from Texas

Chris Garvie has moved back to Texas, near Houston. His address is: Mr. Christopher L. Garvie, 11600 Grant Road, Apt. 4413, Cypress, TX 77429.

## from Alaska

Rae Baxter visited over several days this month while he was picking up his son from Humboldt State University. On the 14th of May, they headed back to Alaska and Rae will be out on the boats until sometime in October or early November.

We will be publishing some of his draft keys to fish and mollusks during the coming months. In addition, we hope to photograph his study collection of Arctic mollusks and print the photos to complement his large work on mollusks.

Rae notes *Octopus dofleini* boring holes in skate egg cases (genus *Bathyraja*) in the Aleutian Island area, Gulf of Alaska. Cases maintained in live tanks on the fishing vessel "Let's Go" (September, 1986). Approximately 150 skate egg cases were examined for the presence of *Adansonii* (limpet-like mollusk) and most of the cases had holes chewed in them. In one case (the skate egg case taken directly from the octopus) the embryonic fluid leaked from the hole. The hole was approximately 4 x 5mm and rough at the edges. -- RAE BAXTER, Red Mountain, Via Homer, AK 99603

## from Southern California

The Southern California Academy of Sciences held their 1987 Annual Meeting at Cal State Los Angeles, May 8-9. Friday, May 8, had sessions all day followed by a wine/cheese party in the late afternoon and the annual banquet in the evening. Saturday had sessions all day with concurrent sessions in the afternoon.

Friday morning sessions: ANTHROPOLOGY (Animals, Culture, and Society,) chaired by Catherine Read-Martin of OSULA's Anthropology Dept.; VERTEBRATE BIOLOGY & PHYSIOLOGY (chaired by Alan Muchlinski, OSULA Biology Dept.); and the High School Section (with 16 SCAS Research Training students). Afternoon: FOLKLORE & MYTHOLOGY (Animal, Vegetable, Mineral, and Fieldwork in Folklore, coordinated by Robin Evanchuk of UCLA's Folklore & Mythology Program; and Norine Dresser of OSULA's English Dept., who chaired the session); ECOLOGY & ENVIRONMENTAL SCIENCE (chaired by Carlos Robles, OSULA Biology Dept.); and the continuing High School Section, with Margaret Jefferson, CSU-LA Biology Dept., as chair.

Saturday, May 9, All day: SCAMIT & Ichthyologist sessions. Afternoon: American Cetacean Society. SCAMIT's all-day section of marine science papers honored Donald J. Reish, in the program coordinated by John Dorsey and Leslie Harris. John Dorsey chaired the morning session; David Mongagne the afternoon. SOUTHERN CALIFORNIA ICHTHYOLOGISTS: Larry Allen and Dave Stoltz coordinated the Ichthyologists' all-day program, which Larry chaired in the morning; Camm Swift in the afternoon. AMERICAN CETACEAN SOCIETY: Diana McIntyre and Joanne Smalley coordinated the ACS program, which Donald R. Patten, ACS National President, chaired.

## from Arizona

Russell L. Clochon will be moving from Arizona to Iowa permanently within the next two or three months.

## from Oregon

William J. Ritter will be heading to Alaska for another Salmon purse-sein season in early June and will be gone for about four months.

## from Russia

April 7-9, 1987, the 8th All-Union Meeting of the Investigation of Molluscs met in Leningrad. The meetings were held at the Zoological Institute of the Academy of Sciences of the USSR. The abstracts will appear in June and include communications from Minichev, Roginskaya, and others. -- I.S. ROGINSKAYA, Academician, Petrovsky Str. 3, apt. 46, Moscow, 117410, USSR.

## from Virginia

... building a display room (5th cabinet in work now), and trying to keep up with correspondence. New job with the Navy keeps me busy with lots of long hours. No steam left when I come home. Have set up two saltwater tanks -- one for local fish and the other for molluscs. One is too crowded and the other has a "hermit crab" which vacated the local moon shell for a damaged South African *Trochus*. Current Project -- built a dredge to survey the lower Chesapeake Bay for number of species available. Have not had time to drag it!

Tried diving -- the visibility is so poor (inches) that I gave up. Besides, old men don't need to play in all that current anyway. Most of what's available is buried in the sand (bivalves) so dredge is the way to go.

Sorry to subject you to the chicken scratching but am watching the fish to see who eats "sand fleas". I am looking for a supplier of live Cyps for the one tank. -- TOM SHEPHERD, 222 Beach St., Virginia Beach, VA 23451

## from North Carolina

Katherine Hill, 443 Lake Shore Drive, Sunset Beach, NC 28459, wants to exchange worldwide EPITONIIDAE.

## from the Editor

We are finally getting close to on schedule but several notes are very late to appear this month. The June issue should be mailed on or about June 1.

## IN MEMORIAM

Joseph DuShane died earlier this year. Joe was a long-time supporter of the Conchological Club of Southern California and the Western Society of Malacologists.

Russ Pethtel (Tempe, AZ) died this May, while recovering from an automobile accident. He was a member and President-Elect of the Southwestern Malacological Society.

## from Canada

The Ross Lemire shell library has been purchased (see S&SL Nov. 1983). Thank you for your interest.

## from St. Louis

COA Convention '87: Meet me in St. Louis. "Enjoy the Spirit of St. Louis and the best in shells by attending the 13th Anniversary Conchologists of America Convention in downtown St. Louis, Missouri. The Convention, centered at Days Inn at the Arch, starts at 2 p.m. on Tuesday, June 23, and runs through Saturday, June 27. Be there at the start and everyday throughout for the door prizes. And what door prizes! Shells, shell books, related items! And then, on Friday morning, your hosts, the St. Louis Shell Club, will give away a *Lambis violacea*. Tuesday evening will bring a party: extensive hors d'oeuvres and wine and soda, hosted by the St. Louis Club.

Tuesday afternoon, all day Wednesday, and Thursday morning will feature spectacular programs on shells and shelling. How would you like to learn how to collect your very own Glory of the Sea Cone or Golden Cowry in shallow water? Or experience the wonders of shelling Jamaica, Indonesia, the Baja and other exotic shores? If you don't know about the Midwestern shell fauna, we have a program we guarantee you'll enjoy. We're especially pleased that Twila Bratcher, co-author of the new *Terebra* book, has agreed to talk on that large and interesting family. A time will also be set aside for club members to buy or exchange your pins, T-shirts and other club items with other COA members.

Wednesday evening is the AUCTION! Well-known shell dealer Marty Gill will serve as the Auctioneer, offering shells, shell books and related items from inexpensive to rare. There will also be two silent auctions during the convention. All auction proceeds go directly to COA for their scholarship, publication and award programs. Thursday evening is a pleasant Dinner Cruise aboard the paddle-wheeler Huck Finn. Transportation will be provided to the riverfront under the Gateway Arch for this 2-1/2 hour cruise on the "Mighty Mississippi".

Thursday afternoon and Saturday afternoon are free times to explore downtown shopping, museums and other attractions. A guided walking tour is available Thursday afternoon, including a ride to the top of the Arch and a tour of the Museum of Western Expansion. The Arch is just one long city block from the hotel. Saturday afternoon a bus will be available to show you some of the highlights of St. Louis, with stops at the Missouri Botanical Gardens with its famous Climatron greenhouse, extensive rose gardens (in June!) and the largest Japanese garden in North America. You'll also have time to visit Union Station, the largest railroad yard in the world, converted to a dining and shopping experience you should enjoy.

Saturday evening is the entertainment highlight of the Convention, with a super banquet, a noted guest speaker, and maybe a surprise or two.

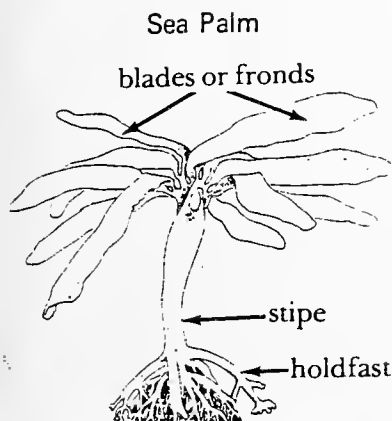
What? No shells to find? How about one of the largest arrays of shell dealers in the world, all in one room? It's the Bourse, of course! Dealers from across the United States and several foreign nations will be there to show their wares. Friday after the business meeting, Friday evening and Saturday morning are reserved exclusively for the Bourse. You'll find shells from inexpensive to the fabulously rare, AND you'll have a chance to meet the dealers, ask those questions, or just "talk shells".

# Seafood Sea Vegetables

Lynda Pozel\*, Co-op Home Economist, North Coast Cooperative, Eureka, California.

Sea vegetables are becoming a very important feature in natural foods cookery because of their delicious new flavors and incredible amount and variety of nutrients. Words like kombu, wakame (also called alaria), sea palm, nori, arame, hiziki, and agar are now known throughout the country.

Judith Madlener in *The Sea Vegetable Book*, (the main source for this report) defines sea vegetables as "the edible, wild plants of the oceans ... which form the lush, natural, underwater 'gardens' proliferating along most of our continental shelves". More specifically, sea vegetables are primitive, photosynthesizing plants composed of a blade (like a leaf), a stipe (or stem), and a holdfast (rootlike). The plants take nourishment through the entire surface of the blades directly from seawater.



Since the beginning of history, sea vegetables (more commonly and unconsciously called seaweed) have been eaten as a year-round source of fresh or dried vegetables. Sea vegetables continue to hold an important place in the daily diet of many of the world's peoples. In China, Japan and Korea cultivation goes on in practically every bay and stretch of usable coast. Russians prepare them with land vegetables and call the dish sea cabbage. In the Siberian northlands they are fermented into alcoholic beverages. In the British Isles they are made into a breakfast treat and in Canada sea vegetables are nibbled with beer in pubs. Eskimos get up to half their Vitamin C from seaweed. In this country, sea vegetable gatherers are found on both coasts, harvesting as the Native Americans have always done.

Sea vegetables possess the full range of vitamins and are rich in vitamins A, E, niacin, C, B1, B12, and panthothenic and folic acids. They contain highly digestible proteins, up to 25% by weight. Sea vegetables, however, are best known for their high concentrations of minerals including phosphorous, calcium, iodine and iron. One tablespoon of cooked hiziki seaweed is equivalent to one glass of milk in its calcium content.

You may be surprized to find that seaweeds don't taste salty, containing only 2-8% salt, some of which can be leached out if the soaking water is discarded.

To prepare sea vegetables, soak in water for 10-20 minutes until fully softened and expanded; cut into smaller pieces for cooking. These steps are not required when using them in soups or beans where you may simply add them dry to the pot. For ages in the Orient, sea vegetables have been cooked with beans to enhance their digestibility, as bay leaves have been used in Europe. When the beans are cooked the sea vegetables completely dissolve with a stir. All the minerals are cooked into the beans.

Other culinary uses for seaweeds are in salads, casseroles, trail mixes, as a seasoning for the table, or wrapped around rice in sushi or rice balls.

## Glossary

**Agar-Agar (Kanten):** This useful sea gelatin comes in easy-to-use bars or flakes which dissolve in liquid and set up without refrigeration. Agar-agar is odorless, tasteless, and colorless, yet being high in certain carbohydrates is popular with weight watchers looking for quality complex polysaccharides (filling yet not fattening). Used as a jello substitute or for puddings, pie fillings and even dairy-free homemade ice cream.

**Dulse:** Often eaten fresh, this dried leafy sea vegetable is used as a condiment when ground up or it may be mixed with grains or vegetables and in soups or salads - very high in easily digestible proteins.

**Hiziki:** A stringy grass type of sea vegetable, hiziki is generally boiled with a little soy sauce added to the water for a tasty broth and can be mixed with other cooked vegetables or used cold in salads.

**Arame:** Another stringy type of sea vegetable, arame has a milder flavor than hiziki. It reconstitutes quickly, and may be used as is without further cooking in salads, or cooked briefly with other vegetables.

**Kelp:** This finely ground powder can be added easily to all cooking recipes and is particularly nice in breads, waffles and other grain or bean dishes.

**Kombu:** A delightful soup stock made from soaking or boiling these broad flat sections of kombu helps to cleanse fat and cholesterol from the blood and prevents constipation and hardening of the arteries. The kombu may be reused by cutting and placing it on the bottom of the pot when cooking other vegetables. Kombu is the sea vegetable most often used in cooking beans, a 6-inch piece per 2 cups of dry beans.

**Wakame:** This thin leafy vegetable is easily digested after soaking, and makes into delicious soups or salads.

**Nori:** Distributed in thin sheets of ten to a package, nori is easily roasted on one side only, and used to wrap rice in balls or rolls of as a garnish chopped in small pieces.

### Cabbage Salad with Ginger Dressing

- 1 cup cooked shredded kombu
- 2 cups shredded red cabbage
- 4 cups shredded cabbage
- 1 cup sliced radish

Cook kombu in boiling water for 1 minute, drain & rinse in cold water. Toss kombu with cabbage & radish.

### Dressing:

- 1 teaspoon fresh grated ginger
- 2 cloves garlic, minced
- 2 tablespoons tamari
- 2 tablespoons honey
- 2 tablespoons toasted sesame oil
- 1 tablespoon sesame tahini
- 1 cup rice vinegar
- 1/2 cup water

Combine ingredients & blend until smooth. Pour over salad, toss to combine.

### Sauteed Dulse and Vegetables

- 1 cup dulse, washed, soaked & sliced
- 1/2 cup carrots, sliced
- 1/2 cup daikon, sliced
- sesame oil
- small amount of tamari

Lightly oil skillet with sesame oil, saute carrots & daikon 5-7 minutes over medium, stir to keep from burning. Add dulse and several drops tamari. Cover, simmer over low 10 minutes. Remove cover and cook off excess liquid.

### Kombu, Shiitake, & Bonita Flake Stock

- 1 3-inch strip kombu
- 5-6 cups water
- 4-5 shiitake

2 tablespoons bonito flakes

Place kombu and shiitake in water, bring to a boil. Boil 1-2 minutes, remove kombu, dry & save to use again. Reduce heat and simmer shiitake another 3-4 minutes, remove, dry & save. Add bonito, simmer 3-4 minutes, turn off heat. When bonito settles to bottom, pour off clear broth. Save bonito to use again. Next time you use the ingredients, boil a bit longer for good flavor.

### Blueberry Kanten

- 1 pint blueberries, washed
- 2 cups water
- 2 cups apple juice
- pinch of salt
- 5 tablespoons agar agar flakes

Put all ingredients in pot, mix well. Bring to a boil; reduce flame to low and simmer 2-3 minutes. Place in a shallow bowl, chill until hardened. Serve.

\*Article prepared in co-ordination with Meredith McCarty, author of *American Macrobiotic Cuisine*; co-director East-West Center for Macrobiotics. Reproduced from Co-Op flyer with permission.

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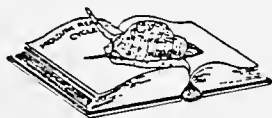
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5) We request that for the first appearance in a paper, the scientific name of any species discussed or cited be given in full, including author and year of the original description. For example: *Favaria* (*Pygmaeapterys*) *peasei* (Tryon, 1880). The generic name should be written out whenever it is mentioned for the first time in any paragraph. Also, it is better to spell out all generic names if in the same paragraph two or more genera are mentioned that begin with the same letter.

6) The use of FAMILY NAMES is encouraged. The name should be in CAPITALS and be clearly associated with the species in that family. In general it should immediately precede the use of the full scientific name, author and date.

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### b) Books

Keen, A. M. 1971. Sea shells of tropical west America; marine mollusks from Baja California to Peru, 2nd ed. Stanford Univ. Press, Stanford, Calif. xiv + 1064p.; ill. (1 Sep. 1971).

### c) Composite works

Feder, H.M. 1980. Asteroidea: the sea stars. In: R.H. Morris, D.P. Abbott & E.C. Haderlie (eds.), *Intertidal invertebrates of California*. Stanford Univ. Press, Stanford, Calif. p.117-134.

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Sowerby, G.B., Jr. [ed.] 1883. *Thesaurus Conchylorum, or Monographs of Genera of Shells. Monographs of the Genus Natica. With an analytical checklist of Sowerby's species by R. Michael Dixon.* London, p.75-104 + 1-14, col. pls. 1-11, wraps, Reprint 1984. - \$8.50

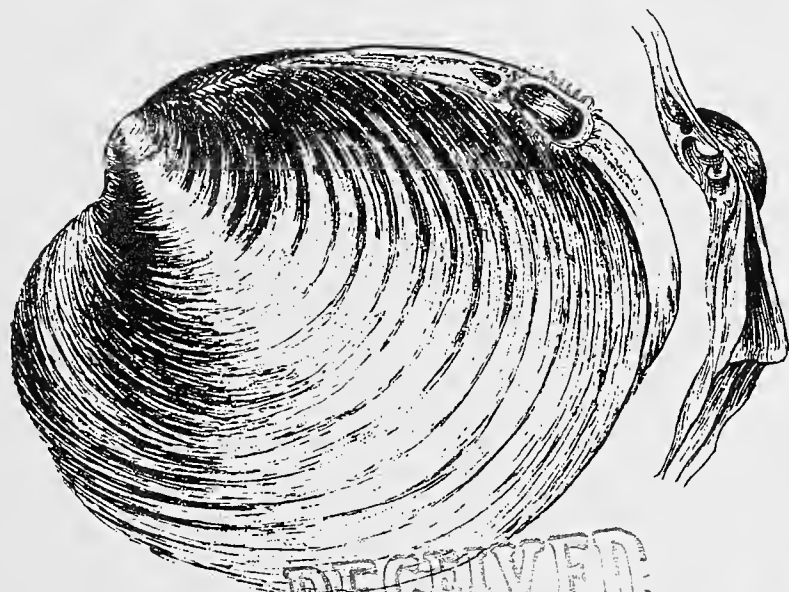
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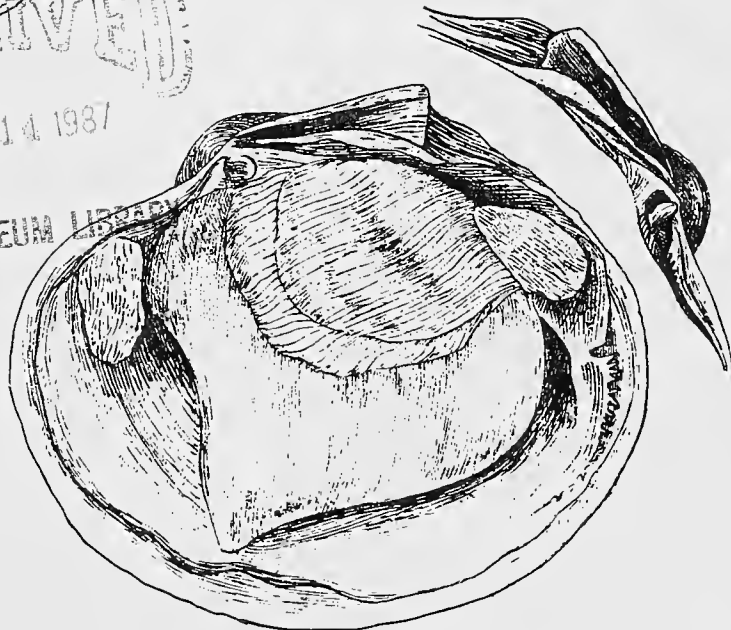
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# SHELLS and SEA LIFE

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Vol. 19, No. 6

## Editor's Notes

The summer meetings are here -- with the **Conchologists of America** in Missouri and the **Western Society of Malacologists** in San Diego this month. Other meetings are going on around the world. We are unable to attend the major summer meetings this year but hope that by next year the printing and mailing will be smooth enough to allow us some time off.

If you are travelling in the western U.S. please try to stop by and see us. We are in the heart of the beautiful California Redwood country and right on the ocean. Air connections are reasonable with both United Airlines and American Airlines coming into Arcata Airport about 15 minutes from our house. Driving from San Francisco we are about 6 hours north. Los Angeles is about 750 miles south of Bayside and Seattle is about 750 miles north of Bayside. Each is about 12 hours by car.

Our home and offices are about 1 mile off highway 101 between Eureka and Arcata, California and overlooking the northern half of Humboldt Bay. We have about an acre of land on a small hill, lots of fruit trees and some conifers, two spare bedrooms, an R/V parking area with power, a hot tub and a small meadow for camping or picnicking.

We also maintain a very large library of natural history books, journals and reprints and an even larger library on microfilm, available for reference. We have a good copier and a good microfiche reader/printer available for your use at very reasonable rates. You may even microfilm books here if you need more reference material.

Humboldt State University is about a mile from our house with excellent conference facilities and library. The HSU Telonicher Marine Laboratory is in Trinidad, California (15 miles), with research facilities and saltwater labs. Contact the Director, Dr. Ronald Chaney (707) 677-3671.

This issue of *SHELLS and SEA LIFE* is the first one printed entirely on our own equipment. The vertical camera and the platemaker are now installed and operational, along with the printing press. We have already printed more than 20,000 pages and are beginning to figure out how to run the equipment -- but it will be a while before we learn how to use the darkroom equipment to make our photographs.

We want to purchase the necessary equipment to make and print color photographs in *SHELLS and SEA LIFE*. We require color separation equipment, densitometer, temperature control unit, water heater and other items to control the printing. Even before that we need special attachments to the printing press to handle the coated stock paper.

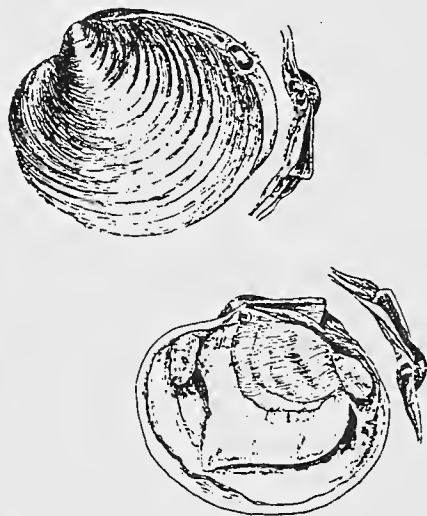
Thanks to those of you who donated to the project or bought books to help us out. We still need a lot of financial help to pay for all of the equipment and supplies necessary. If each of you would renew your subscription or subscribe for a friend, it would be a tremendous help. Other donations of books or cash are, of course, always welcome. Donations of \$100.00 or more will be listed as **FRIENDS**, \$500.00 or more as **BENFACTORS** and \$1000.00 or more as **PATRONS**. Each of these categories also includes a year's subscription to *SHELLS and SEA LIFE*. An individual life subscription to *SHELLS and SEA LIFE* is available for \$300.00 in the U.S. or \$400.00 outside U.S. The life subscriptions are prorated over 10 years' time.

We are always looking for more books and papers for our reference library. Duplicates are traded for other books or sold by **Seashell Treasures Books**. We are happy to trade 10 pounds of conchological books or 20 pounds of other natural history books for a one year subscription to *S&SL*. Simply ship postpaid to our address. U.S. postal regulations allow enclosure of a letter if you mark the outside of the package "First Class Letter Enclosed" and pay the \$.22 additional postage.

The *Chlamys* illustration was done directly from Elsie Marshall's small display case to paper using our new camera. We have been pushed back almost to the end of June awaiting equipment, building a darkroom and learning how to use the camera and supplies. During the next few issues we will be trying out a few different paper weights and types along with various inks and photo production methods to find out what looks the best. If you see something you like, please let us know. If you see something you don't like -- we probably won't like it either and will probably change it with the next issue.

### Cover Illustration

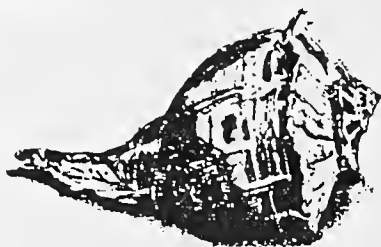
Ink drawing found loose in an old book. Probably done in late 1800's and in England. Artist and species unknown.



# Florida Scallop Dumps.

Corinne E. Edwards

5585 SW 80th St. #B  
Miami, FL 33143



We debarked from a dredging trip on the R/V *Eastward* at Morehead City, North Carolina. We came upon a scallop dragger unloading a boat load of *Argopecten gibbus* (L.). We were allowed to help ourselves. I grabbed a few orange ones that stood out in that great mass of pink and red scallops being wheel-barrowed into the shucking shed. This incident was in August 1966 while attending an American Malacological Union conference at Chapel Hill.

During an A.M.U. seminar at Cocoa Beach, Florida, in July of 1971, a dump pile of *Argopecten gibbus* and other marine shells was discovered. Numerous conventioners, in small secretive groups poked through, feverishly raked over or dug deep into that dump. Shouts went back and forth as various species of shells were discovered among the thousands of barnacle-encrusted Calico Scallop valves. Many miniature and choice shells were picked out of the finer debris at the bottom of the pile. Large shells such as *Murex fulvescens*, *Fasciolaria hunteri* and very red *Fasciolaria tulipo*, *Laevicardium laevigatum*, *Pleuroploca gigantea*, *Distorsio clothrata*, *Architectonica nobilis* with its interesting operculum, and more were fairly common. The first trip I made to this scallop dump revealed many sections of egg case masses. The next day Dr. Donald Moore told me that they were from *Tonna golea*. Badly broken Tun shells were common on the dump. I wanted some egg cases to preserve, but it was too late, rats or other night creatures had probably fed on them. Many a room in the A.M.U. convention motel had a little pile of tiny, rosy red, delicate *Argopecten gibbus* pairs, smaller than a dime. A few lucky diggers had quarter-size *Lyropecten nodosus* (Linne), the Lion's Paw, to show off to envious friends or to sell for a high price. One day, even as we scratched around this smelly, unhealthy, scallop dump, it was being trucked away. The Health Department had stepped in to end this dumping - or so we thought.

In October, 1971, I was staying with Vera Roberts of the Central Florida Shell Club. This was my annual week of Shell & Sea Life programs at the Science Museum in Orlando. One day Vera's married daughter brought in a washtub filled with scallop dump debris. There had been more dumping over at Cape Canaveral. After my day's work I found many lovely little *Calliastoma* sp., *Turbo castaneus*, *Prunum roscidum*, *Heliacis*, *Chione grus*, *Lyonsio beana* and others. I just had to see that new dump for myself. One afternoon a trip was made to Cape Canaveral, fifty miles away. We were prepared with gloves, rakes, buckets, cold drinks and stout shoes. We worked into the dry and brittle debris. Among other species of shells, I, too, found a few pairs of the much-sought-after Lion's Paw. They were no bigger than a quarter and brilliant red. Weariness, from constant raking over of the mature Calico Scallop valves, finally sent us back home. We worked into the night, cleaning our "take". Dreams of more *Lyropecten nodosus* sent us back those fifty miles the very next afternoon. Guess what? Screams went up as we turned south after crossing Merrit Island. There was a new, high, untouched dump pile of scallop shells. We jumped into our protective gear and went at it. We pocketed Lion's Paws and other treasure shells, complete with bodies, some still alive. I salvaged giant but badly mutilated *Octopus vulgaris* for their horny beaks. An Octopus is a mollusk and the black beak represents it in a dry collection. Spider, Flame, Lady and other crabs, Bat Fish, Rock Shrimp and other specimens of sea life were gathered to be preserved for my school programs. We regretted any time lost from frantic digging and searching for Lion's Paws. We found many perfect pairs - such beautiful, colorful, knobby, juvenile shells. We finally had to quit. Our hands had blisters, broken and bloodied. It was getting too dark to see. Another night of cleaning *Lyropecten nodosus* and other choice Pectini-

dae species. There were *Aequipecten muscosus*, *Pecten roveneli*, *Chlamys benedicti* as well as our Calico Scallops and Lion's Paws. There were *Busycon carica*, *Phalium granulatum*, *Dinocardium robustum*, *Conus delesteri*, *Cymatium porthenopium*, *Chione lotilulata* and *Xenophora conchyliophora*. I had *Distorsio clothrata* with tiny black opercula. I had *Sinum maculatum* and preserved one complete with big, fat, red body.

Two days later, blisters partially healed, we returned. The smell (you know the kind) was terrific. That dump was right out in the hot sun. We donned gloves over our bandaged hands and excitedly almost reraked that whole dump. Maggots were underneath everything and big buzzing flies were everywhere. We picked out more shells, small and large, and now and then, still another red or orange Lion's Paw. Vera worked each night cleaning my pairs of *Lyropecten nodosus*. I worked over my other species of univalves and bivalves. She left her own buckets of smelly, barnacle-encrusted shells and her choice Lion's Paws to work on after I headed back to Coconut Grove. From up there, I later got word that they never found another fresh dump and only a few Lion's Paws. The Health Department actually forced the scallopers to dump elsewhere.

I had four cases of "Scallop Dump Shells" in the South Florida Shell Club's January 1973 shell show. I won a blue, first-place ribbon. One "Oh, My!" case was made up of those forty matched pairs of tiny Lion's Paws. There was a four foot case of 36 bivalve species and another four foot case of 36 univalve species - both of just species from the scallop dump. Many of the species shown were in long growth series rows and in wide ranges of color variations. I really have a great liking for any common shell that comes in quantity without taking live mollusks. In my exhibit there was a one species case of all aspects of *Argopecten gibbus* (Linne).

Came the A.M.U. seminar at the University of Delaware in Newark in June 1973. On the way home, Florence and Sophie Kuczynski and I purposely found ourselves working over *Argopecten gibbus* scallop dumps at Morehead City, North Carolina. No Lion's Paws, but we salvaged a representative collection of 19 species of shells. We had Helmets, Knobby and Channeled Whelks, Tuns, Shark Eyes, Northern Quahogs, *Distorsio*, Scotch Bonnets and *Murex*. We searched out many pairs of mature Calico Scallops, but did not notice any immature ones. Back in St. Petersburg, Florida, we wished we had taken more of those colorful upper valves - no wonder they call them Calico Scallops.

October 1973 and I was again doing a week of Shell & Sea Life programs. It was my seventh year up at the Orlando Museum of Science. After a busy six-day week, we drove out towards the beach. Vera knew of an old scallop dump deep in a field far from the road. It had been worked over and flattened by unknown numbers of shell collectors. However, we dug among the dry and clattering scallop shells and again I took a representative collection of shell species: *Distorsio*, *Architectonica*, Giant Egg Cockles and Arks, *Murex*, Horse Conchs, *Crepidula*, *Chione latilurata* pairs, *Natica*, *Palinices*, Tuns, Cones, *Glycymeris*, *Gibbus* clam valves and more. I remembered Sophie Kuczynski saying, "We should have taken more scallop shells while at Morehead City." I gathered many many small scallops, still in pairs, and two big buckets full of the more-colorful, but more-encrusted upper valves. As I write this, my fingers are sore from knocking and chipping off great pink barnacles and tougher small white worm tubes from over 500 red-blotched valves. I've soaked them in bleach, scrubbed and oiled them. These will go for table decorations, shell packs and ash trays for a Shell & Sea Life program for conventioners out on Key Biscayne next week.

Later, on that same trip to the beach, we drove over to the docks at Cape Canaveral. They told us that the scallops had mysteriously disappeared. Machinery lay idle and rusty. We did not think it a mystery. We remembered those extremely plentiful and tiny dime-sized scallops in the dump in July 1971. We recalled the thousands of quarter-sized pairs in the scallop dumps in October 1971. Had they killed the goose that laid the golden eggs? Had they dragged up not only all the big 2½ by 2½ inch mature scallops, but maybe many thousands of the little ones, too, leaving not enough to grow up to maturity for future scallop dragging?

No! Wasteful scalloping still goes on and Florida shell clubs are working the landfill dumps for all they are worth. Shell dealers are in clover. On a scallop dump, what a way to go shelling!

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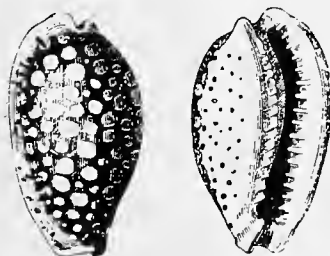
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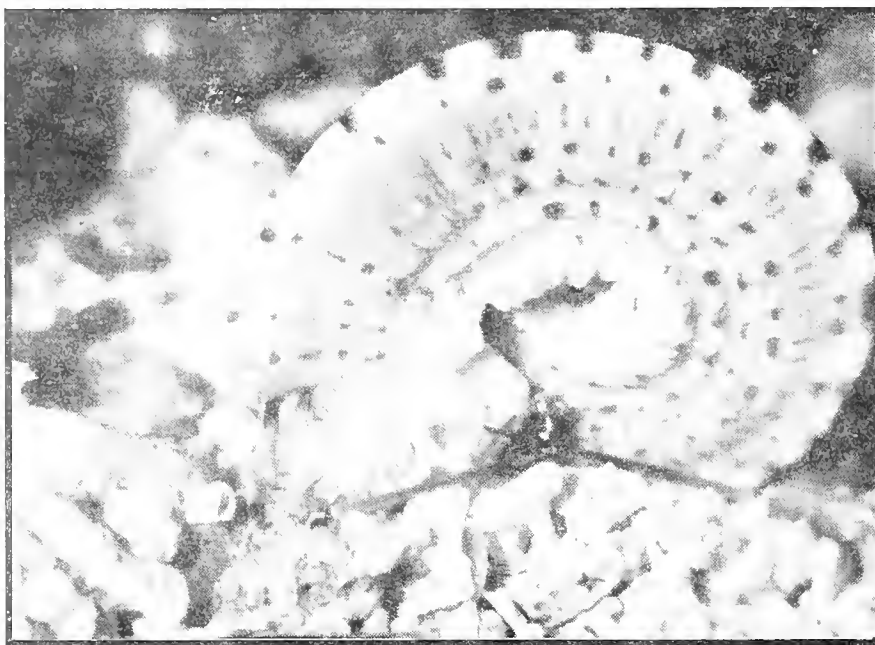
# Sundial Shells

Peggy Williams

Rt. 3, Box 28  
Sarasota, FL 33580

**Sundial Shells:** The scallop fishermen of the East Coast of Florida drag nets to collect the scallops and, along with the intended product, bring up many other molluscan species as well as bottom-feeding fish, crabs and echinoderms. Among the mollusks commonly found at the area where the fishermen dump their refuse is *Architectonica nobilis* Roeding, 1798, and I have several times found such fresh specimens that I was able to bring them home alive to my aquarium.

I expected these "Sundial Shells" to carry the shell with the umbilical opening against the sand, but I found, as the photo shows, that they upend the shell when moving. I also discovered that, each morning after a night of activity, the shell was buried in sand with the spire downward and the flat ventral side upward and flush with the sand surface.



## Barbados Murex.

David Hunt

Gregg Farm  
St. Andrews, Barbados, West Indies

*Murex hidalgoi* (Crosse, 1869). More common in the Gulf of Mexico regions, this beautiful species is extremely rare in Barbados waters, and is found only in depths exceeding 200m it seems.



# Puffer, Blowfish, Porcupinefish, Globefish, Swellfish or Fugu.

Tom Rice, Port Gamble, WA 98364

There are some one hundred species of fish, mostly occurring in semi-tropical or tropical waters, that are called by the common names noted in the title of this short article. Most of us have been introduced to these strange fish by seeing them used as decorative pieces such as lamps found in esoteric shops.

Most of the time the living specimens of these fish appear in a normal fish-like shape, but when frightened, annoyed or excited they have the ability to intake air or water into a sac in their belly and thus take upon themselves the balloon-like shape we see in the curio store. This, with the addition in some species of spines, tends to discourage predators or cause a rival specimen to back off a bit.

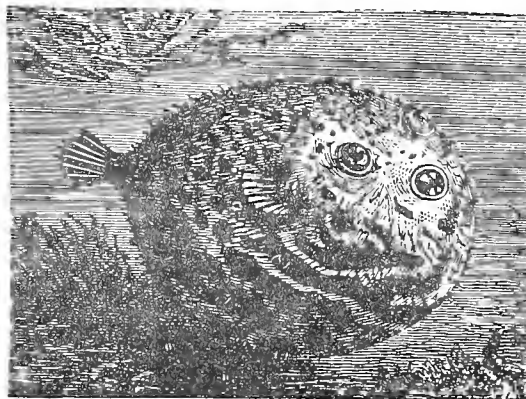
The teeth of the fish in the Diodontidae are strange too. They have the appearance of a parrot's beak and are used to tear apart sea stars, crabs, clams, corals and sea urchins which make up the fish's diet.

While one species of puffer was a popular food fish along the eastern coast of the United States some years ago, called at that time "sea squab", most species contain a poison, tetrodotoxin, which is 35 times more powerful than curare. This poison has caused many deaths throughout the years, including many each year in Japan where the fish is a prized gourmet treat.

Called fugu in Japan - the genus of the two species occurring in Japanese waters is *Fugu*, the species are *F. rubripes* and *F. xonthopterus* - only specially trained chefs are allowed to prepare the fish for consumption. The poison is concentrated in the intestines, liver, ovaries, kidneys, eyes and skin and should a tiny portion of any of these end up on the dinner plate the diner's death might follow with extreme haste. Nearly 60% of all puffer poisonings prove fatal! The poison first numbs the arms and legs, then speech, movement and finally breathing are affected.

There are thirty steps prescribed by law in preparing puffer fish for consumption in Japan and once cut into paper-thin fillets and arranged artistically on a serving dish, the meal is ready for the discriminating diner. He must also be a rather well-to-do diner, since each serving can cost up to \$200! More than \$40 million worth of fugu (at the wholesale price) is consumed each year in Japan.

Puffer fish have drawn interest over the years. Tombs in Egypt contain depictions of the fish. The ancient Egyptians used one species as a ball in a popular game. Hawaiian natives used the fish's poison to anoint their spears. In Japan, however, the fish achieves its apex of adoration with a



The Globe-fish (Tetraodon).

statue in one Tokyo park and a memorial tombstone in a temple near Osaka.

There are six species of puffer in Florida waters, several in the Gulf of California and species in the Red Sea, the Indian Ocean and the South Pacific. All are toxic. The Red Sea species is thought to be the reason for the biblical injunction: "These ye shall eat of all that are in the waters: all that have fins and scales shall ye eat: And whatsoever hath not fins and scales ye may not eat; it is unclean unto you" [Deuteronomy 14: 9-10]

The puffer has even appeared in fictional literature. In Ian Fleming's *From Russia, With Love*, the indomitable hero 007 is left hanging at the conclusion of the novel: "The boot, with its tiny steel tongue, flashed out. Bond felt a sharp pain in his right calf. ... Numbness was creeping up Bond's body. ... Breathing became difficult.... Bond pivoted slowly on his heel and crashed headlong to the wine-red floor." He recovers, obviously, and reappears in *Dr. No* where it is explained that he had received a nearly fatal dose of fugu poison.

And in Japan, of course, the fugu is the subject of poetry. A traditional *senryu* verse is

*Last night he and I ate fugu;  
Today, I help carry his coffin.*

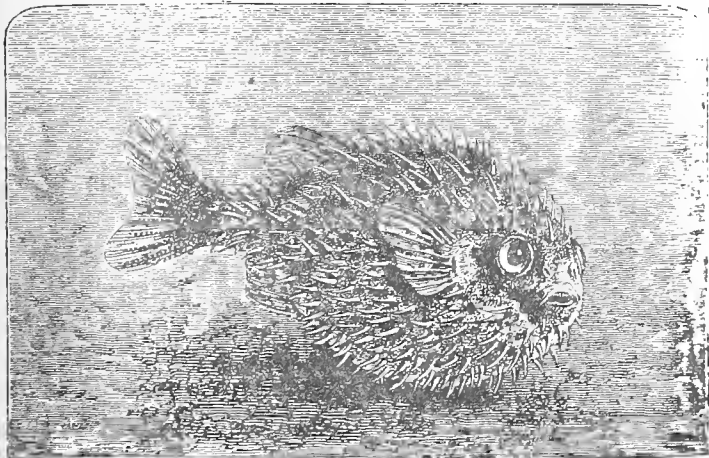
And a haiku poem by Buson ...

*I cannot see her tonight,  
I have to give her up  
So I will eat fugu.*

So enjoy looking at the puffer fish in the water where he lives as he drifts along in the current (the fish can barely swim, but sculls along using dorsal and anal fins). Note his scaly body which has few bones - no ribs or pelvic bones. Admire his ability to "puff up". But for heaven's sake - DON'T EAT HIM!

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Steinbeck, John and Edward F. Ricketts. 1941. *The Sea of Cortez*. Viking Press, New York.  
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-Diodon pilosus.



# Chlamys in the Pacific Northwest.

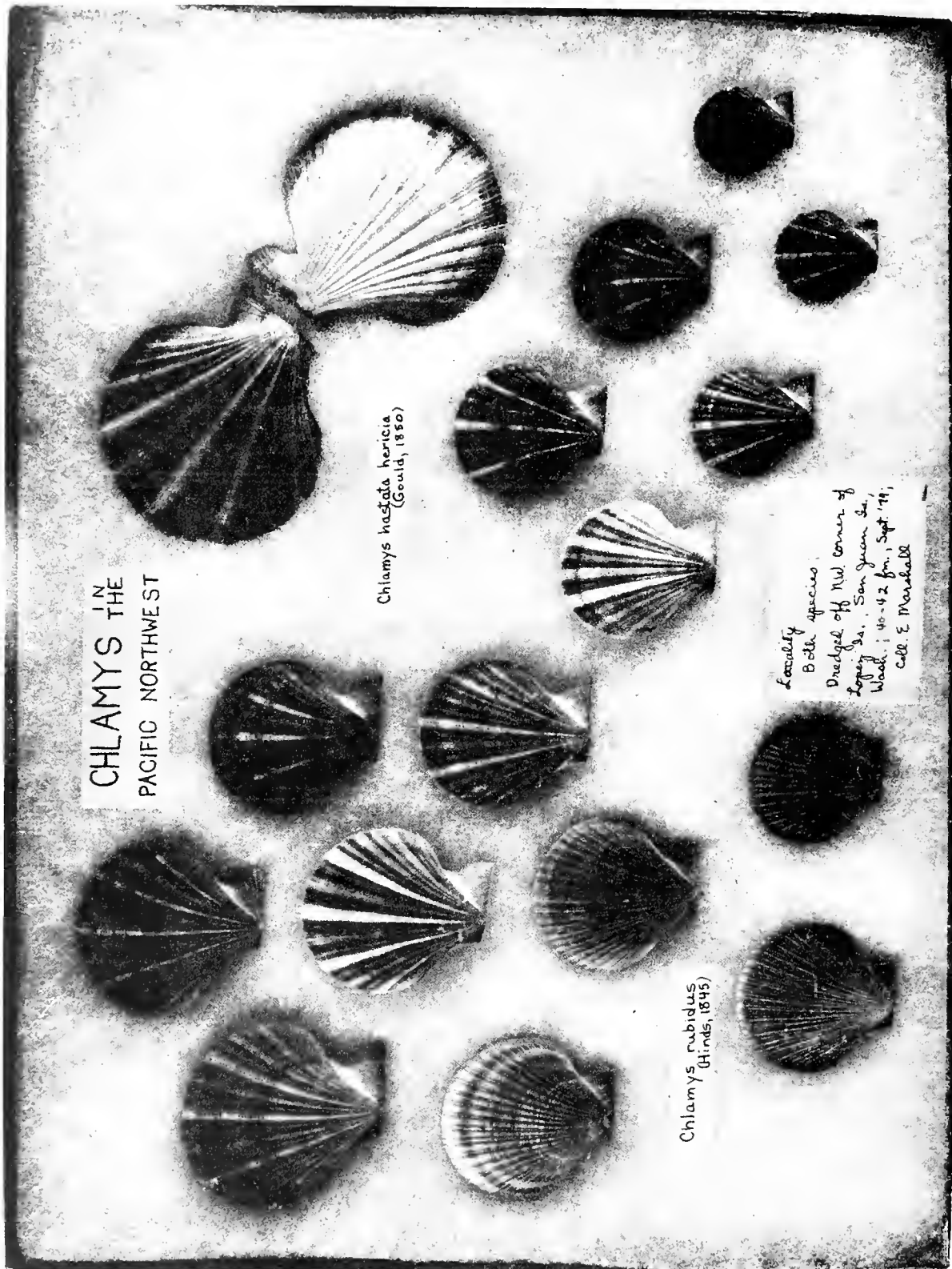
Collected & Displayed by E. Marshall  
Photo by SHELLS and SEA LIFE (1/2 life size)

## CHLAMYS IN THE PACIFIC NORTHWEST

*Chlamys hastata hericia*  
(Gould, 1850)

*Chlamys rubidus*  
(Hinds, 1845)

Locality  
Both species  
Dredge off NW corner of  
Lopez Is. San Juan Is.,  
Wash. 40-42 fm., Sept. 1949,  
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# Seafood: Scallops

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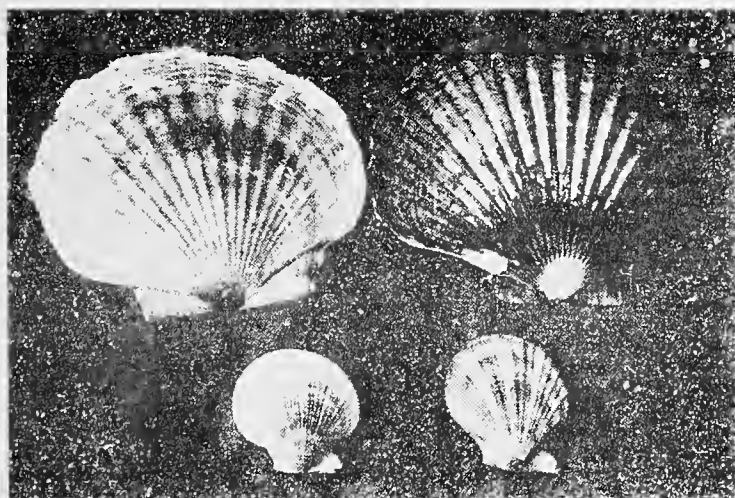
## Scallops *Pectinidae*

For centuries the fan-shaped shell of the scallop or pecten (*Chlamys*) has inspired artists. In the Middle Ages it was used as the Crusader's badge and today is the symbol of a major oil company.

The scallop, a bivalve mollusk, is easily recognized by its shape. Existing in many colors, the shell is collected worldwide. Although all the animal is edible, just the single round muscle is usually used for fried scallops.

## HABITAT

Most scallops are free-swimming by opening and shutting its shell. The juvenile Rock Scallop is free-swimming, however, the adult is attached to rocks by the right valve of its thick shell. The presence of the boring sponge is evidenced on the exterior of the animal by a honeycomb appearance. This species is not known for being as flavorful as the free-swimming ones, but it can be found intertidally. The Rock Scallop is mainly prized for its shell. Most types are found in shallow water, preferring sheltered bays and eel grass. Skin diving with a snorkel or scuba gear is a good way to locate scallops. Take along a net and your goody bag. There are laws regulating size and limits so check each state's regulations.



## PICKLED SCALLOPS

- |                       |                       |
|-----------------------|-----------------------|
| ½ cup olive oil       | 2 small chili peppers |
| 2 onions, medium size | 1 lb. raw scallops    |
| ½ cup vinegar         | 1 tsp. salt           |
| ½ tsp. pepper         | ¼ tsp. dry mustard    |

Wash scallops and slice ½ inch thick if large ones. Drain, pat dry. In 2 tbsp. oil, saute raw scallops for about 5 minutes. Cool 15 minutes. Combine remaining oil and the rest of ingredients. Add to scallops and marinate in the refrigerator 24 hours. Ready to eat.

*Note:* 1 lb. raw or cooked shrimp may be substituted for scallops. Omit sautéing if cooked shrimp are used.

## SCALLOP CASSEROLE

- 1 cup mushrooms, sauteed in butter. Add:  
 1 cup chopped green pepper or ½ green, ½ red. When soft add:  
 3 cups scallops, quarter if large ones.

Cover and simmer for 6 to 8 minutes. Meanwhile make 2 cups white sauce. In a small bowl mix 1 egg yolk, 1 ounce vermouth, dash Worcestershire sauce. Add to white sauce and stir into scallops. Put in casserole, cover with Parmesan cheese. Place under broiler until brown and bubbly. Add chopped parsley and serve.

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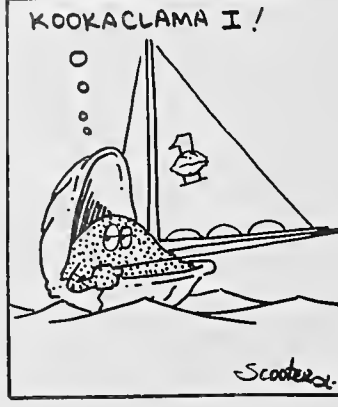
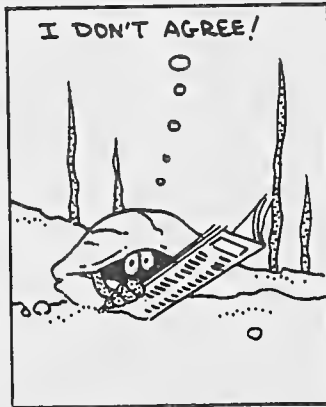
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Fox, W.T. 1983. *At the sea's edge. An introduction to coastal oceanography for the amateur naturalist.* Prentice-Hall, New York, 317p., half-tone & line illustrations, soft cover. - \$12.95

Freiberg, M. & J.G. Walls 1984. *The World of Venomous Animals.* T.F.H. Publications, Inc., Neptune, NJ, 192p., illustrated with over 100 color photos, hard cover, ISBN 0-87666-567-9. - \$19.95

CONTENTS: Introduction; Jellyfishes and Allies; Sea Urchins and Starfishes; Mollusks; Worms; Fishes; Introduction to Arthropods; Scorpions; Spiders; Dangerous Insects; Amphibians; Gila Monsters and Beaded Lizards; Introduction to Venomous Snakes; Rear-fangs; Cobras and Their Allies; True Vipers; Pit Vipers; Duck-billed Platypuses and Insectivores; Poison Control Centers; Further Reading; Index.

Freund, G. 1973 [4th printing]. *Skin Diver's Guide to Hawaii.* Photos by Ron Church. 72p., color & half-tone illus. - \$2.50

Garstang, W. 1985. *Larval Forms and other Zoological Verses.* University of Chicago Press, Chicago, IL, 98p., figs., soft cover, ISBN 0-226-28423-9. - \$5.95

Gordon, B.L. 1974. *Marine Fishes of Rhode Island.* The Book & Tackle Shop, 148p., illustrated, paper, ISBN 0-910258-00-7 - \$5.00

Gordon, B.L. [ed.] 1977. *Energy from the Sea: Marine Resource Readings.* The Book & Tackle Shop, 334p., illus., paper, ISBN 0-910258-07-4 - \$12.50

Gordon, B.L. [ed.] 1980. *Man and the Sea.* [rev. ed.] Classic Accounts of Marine Explorations. Forward by Paul M. Fye. The Book & Tackle Shop, 498 p., illustrated, paper, ISBN 0-910258-10-4 - \$7.50

Coleman, N. 1985. *Beginner's Guide to Underwater Marine Biology.* Australasian Marine Photographic Index, Queensland, Australia, 48 pages, color & half-tones throughout. ISBN 0-949-373-02-8 - \$9.95

Excellent diver's guide to the animals likely to be found in Australian waters.

Hoffman, P. 1984. *Comprehensive guide to scuba diving in Hawaii.* Press Pacifica, Kailua, HI, 111p., half-tone illustrations, color soft cover, ISBN 0-916630-39-2 - \$6.95

Hosaka, E.Y. 1973. *Shore Fishing in Hawaii.* Petroglyph Press, Ltd., 175p., half-tone & line illustrations, 5.4x8.3" soft cover, ISBN 0-912180-20-X - \$5.95

Describes and illustrates the shore fishing techniques and species commonly caught from shore. Illustrates about 100 species and provides common, Hawaiian and scientific names.

Lippmann, J. & S. Bugg 1985. *The DAN Diving Emergency Handbook.* Pisces Books, Glen Cove, NY, 52 pages waterproof, illus., soft cover, spiral bound. ISBN 0-86636-046-8 - \$9.95

The Divers Alert Network handbook is a first aid manual. It provides the sport diver with first aid for hypothermia; air embolism, bites & stings, carbon dioxide & monoxide poisoning and other common diving related problems.

Llera Gonzales, E.M., J.A. Ortea Rato & A. Vizcaino Fernandez. 1983. *Fauna marina de Asturias. No. 1. Moluscos. 1. Archaeogastropoda (Prosobranchia).* CRINAS, Gijon, Asturias, Spain, 75p., line illus., soft cover. - \$12.95

Marcor 1981. *California Dive Boat Guide & Diver's Logbook.* Marcor Publishing, Port Hueneme, CA, 96p., half-tone & line illustrations, soft cover. - \$4.95

Mayissian, S. 1974. *Coquillages de Nouvelle-Calédonie et de Melanesie.* Mayissian, New Caledonia, 72p., 28 color plates, soft cover. - \$21.00

McConnaughey, B.H. & E. McConnaughey 1985. *Audubon Society Nature Guides. Pacific Coast.* Alfred A. Knopf, New York, 633p., color photos & line drawings, softbound, ISBN 0-394-73130-1 - \$14.95

McDonald, G. 1986. *Bibliographia Nudibranchia.* Institute of Marine Sciences, Special Publication #8, University of California, Santa Cruz, CA 95064, 332p., soft cover. - \$10.00

Meinkoth, N.A. 1981. *The Audubon Society Field Guide to North American Seashore Creatures.* Alfred A. Knopf, New York, 799p., 690 color photos, line drawings, softbound, plastic cover, ISBN 0-394-51993-0 - \$13.50

Mendenhall, T. 1976. *Snorkeling and Diving Oahu.* Hawaiian Isles Publishing Co., Ltd., 36p., soft cover, half-tones & line drawings. - \$1.95

Nybakken, J.W. 1982. *Marine Biology: An Ecological Approach.* Harper & Row, Publisher, Inc., 446p., color & half-tone illustrations, hard cover, ISBN 0-06-044849-0 - \$32.00

Orellana Amador, J.J. 1985. *Marine Fishes of Los Cobanos. Fishes of El Salvador.* Sigma Foundation, New York, 126p., 50 color & half-tone plates, 14 x 11" cloth, ISBN 0-9615249-5-0 \$50.00

This is a beautiful and very useful book. The descriptions include standard fin descriptions, color descriptions, distributions, habitat, and remarks on size, schooling behavior and other information. A Spanish language edition is also available at the same price on special order.

Orr, John 1985. *Hong Kong Seashells.* Urban Council, Hong Kong 122 pages, color illustrations throughout, 6x8.5", color soft cover. UC 30324. - HK \$25.00

A very good buy. Includes great color photographs of living animals for most of the cowries, cones and other larger shells of the area plus plates with groups of the smaller shells.

Orr, John 1981. *Hong Kong Nudibranchs.* Urban Council, Hong Kong, 82p., over 50 color photos, 6x8.4" color soft cover. UC 30308. - HK \$17.00

Pill, Virginia & Marjorie Furlong 1985. *The New Edible? Incredible! 5th ed.* Pill Enterprises, 73p., color illus., 5.2x8.3" - \$7.95

A marvelous cookbook for all varieties of seafood found in the Pacific Northwest. Includes collecting information, scientific and popular names, preparation and cooking.



Raymond, D. 1971. **Catch and Cook Shellfish**. Great Outdoors Publishing Co., St. Petersburg, Florida, 64p., illus., soft cover. SBN 8200-0805-5 - \$1.95

Pisces Book Co., Inc. 1985. **Pictorial Nassau**. An illustrated guide to Nassau and New Providence Island including Paradise Island and Cable Beach. Pisces Books, 32 full color pages, softbound ISBN 0-86636-043-3 - \$3.95

Publicações ocasionais da Sociedade Portuguesa de Malacologia. 1986. No. 6: 1-32, figs. 1-12 [2 color pls.]. - \$5.75

Rolan, Groh, da Motta; 3 cone articles, 1 Pulmonate article; 2 Portuguese; 2 English.

Bullock, D.K. 1986. **Marine Gamefish of the Middle Atlantic**. American Littoral Society, Sandy Hook, Highlands, NJ 07732, 83p., illus., soft cover, Special Publication No. 13. [no price]

Randall, J.E. 1985. **Guide to Hawaiian Reef Fishes**. Harwood Books, Newtown Square, PA, 79p., 204 color plates, soft cover, ISBN 0-915180-29-4. - \$14.95; hard cover - \$18.95

Reid, D.G. 1986. **The Littorinid molluscs of mangrove forests in the Indo-Pacific Region**. The genus Littoraria. British Museum (N.H.), London, England, 228p., color frontispiece, 99 photos and figures, cloth, ISBN 0-565-00978-5. - (pounds sterling) 35.00

Rhodes, F.H.T. 1972. **Geology**. A Golden Guide. Golden Press, New York, 160p., color illustrations throughout., pocket-size, soft cover, ISBN 0-307-24349-4. - \$2.95

Rickets, E.F., J. Calvin & J. Hedgpeth, Revised by D.W. Phillips 1986. **Between Pacific Tides 5th ed.** Stanford University Press, Stanford, California, 652p., illustrations, hard cover, dust jacket. - \$29.50

Roberts, M.F. 1985. **The Tidemarch Guide**. Saybrook Press, Old Saybrook, CT, 240p., 134 illustrations, Skivertex cover, pocket-sized, ISBN 0-933614-19-5 - \$5.95

First published in 1979, this book has been revised and now comes in a tough cover for field use. From diatoms to manatees, describing the life and explaining the natural forces which make and maintain a tidemarch. Coverage is from Nova Scotia through Georgia.

Roberts, M.F. 1985. **The Tidemarch Guide to Fishes**. Saybrook Press, Old Saybrook, Connecticut, 373p., illustrated, flexible cover, ISBN 0-9615047-0-6 - \$10.95

Coverage of the *Spartina* marsh fishes along the eastern seaboard of North America. Arrangement and format makes it possible to identify all the coastal freshwater and saltwater fishes without special knowledge of anatomical terms. Life history notes and short essays on reproduction, identification, nomenclature, water characteristics, tides and fishing techniques.

Rossi, P. [Translated by Lydia G. Cochrane] 1984. **The Dark Abyss of Time**. The history of the earth and the history of nations from Hooke to Vico. The University of Chicago Press, Chicago, IL, 338p., cloth, dust jacket, ISBN 0-226-72835-8 - \$25.00

Rotman, J.L. & B.W. Allen. 1983. **Beneath Cold Seas. Exploring Cold Temperate Waters of North America**. Van Nostrand Reinhold, New York, 154 pages, over 100 color photos, line illus., cloth, d/j, ISBN 0-442-27058-5 - \$30.50

Saunders, G.D. 1979. **Spotter's Guide to Shells**. An introduction to seashells of the world. Usborne, London, England, 64p., color illustrations, soft cover, ISBN 0-86020-275-5 - \$1.95

Carrick, C. 1978. **Octopus**. Clarion Books, New York, 32 pages, color illus., cloth, d/j, ISBN 0-395-28777-4 - \$13.95

A very nice children's book.

Florian, D. 1986. **Discovering Seashells**. Charles Scribner's Sons, New York, [32p.], color illus. throughout, cloth, sm 4to, ISBN 0-684-18740-X - \$10.95

Excellent introduction to seashells for almost any age.

Gilmartin, T. 1976. **What happens to me when I fish the sea and a fish catches me?** Illustrations by Kent Barton. Windward Publishing, Miami, FL, 36p., color & line illustrations, soft cover, ISBN 0-89317-009-7 - \$2.95

Menten, T. 1983. **Fish and Sea Life Cut & Use Stencils**. Dover Publications, Inc., New York, 62 full-size stencils printed on durable stencil paper, soft cover, ISBN 0-486-24436-9 - \$3.95

Mount, G. 1986. **Lady Ocean**. A love story for children. Sweetlight Books, Arcata, CA, 16p., illustrated, soft cover, ISBN 0-9604462-2-2 - \$3.00

Sargent, R.S. 1984. **The Nautical Alphabet**. A Read-and-Color Book. Illustrations by Kathleen E. Carlson. Down East Books, Camden, ME, 32p. + soft cover, line illustrations, ISBN 0-89272-190-1 - \$2.50

Schlein, M. 1986. **The Dangerous Life of the Sea Horse**. Illustrated by Gwen Cole. Macmillan, New York, 48p., illustrations, Cloth, reinforced binding, dust jacket, ISBN 0-689-31180-X - \$12.95

Smith, E.B. 1912. **The Seashore Book**. 1985 printing by Houghton Mifflin Co., Boston, 85 pages, color & line illustrations, hard cover, d/j, ISBN 0-395-38015-4 - \$12.95

Australian Shell News, October 1986. No. 56: 1-10.

W.B. Saunders - Nautilus; I. Loch - Turrids; F. Wells - Chitons; T. Cochran - Tusk Shell.

Basteria 1985. Volume 48(6):221-312. 1986. Volume 50(1-3):1-68.

Book reviews; Cones; land snails; Rissoa; Bivalves; Deroceras; Ophiostobranch.

Hawaiian Shell News, 1986. Vol. 34(12):1-12. [Articles by: W. Thorsson, D. Chung, B. Winner, A. Richards, J. Rohrbach, Jr., W. Sage & B. Burch] January 1987. Vol. 35(1):1-12.

T. Bratcher; R. Knight; D. Beetle; A. Richards; D. Vink; J. Callieiz; J. Barnett; W. Sage & M. Hart.

Journal of the Malacological Society of Australia. 1986. Vol. 7(3-4): 95-180. [A. Solem - Pupillid land snails; M.A. Snyder - *Fusinus anni*; R.A. Rose - *Rostanga arbutus*; M.G. Harasewych - Columbariinae; R. Houart - *Demomurex*; F.E. Wells - *Aplysie gigantea*]

Las Conchas, March 1987.

Articles and notes on whale watching; seafood, art & shells, "Pearl of Allah" and Education Corner on Strombina.

New York Shell Club Notes December 1986. No. 301:1-18.

Corbicule; Mussels; Barnacles; Sea Whip; Sponges; Long Island Scallop industry; Wake Island Shelling; Save this snail!

Shell and Tell, Gulf Coast Shell Club, issued bimonthly. Editors: Jim & Linda Brunner, P.O. Box 8188, Southport, FL 32409, (904) 265-5557.

Anderson, R. 1985. **Guide to Florida Seashells**. Winner Enterprises, FL, 56 pages, illustrated, soft cover, ISBN 0-912569-12-3. - \$3.95

Onslaught Against Education - a Book Review. This booklet should get first prize for being the worst guide to Florida shells published in the present century. Superficially looking respectable, this pocket-size guide contains 68 common Florida shells. Twelve species are grossly misidentified - the Calico Scallop is called *Pecten ziczac*, and, on the cover, the Apple Murex is identified as the Florida Rock Shell, *Thais haemastoma*, and the well-known Alphabet Cone labelled *Conus delessertii*. Ten old scientific names, not used by experts in 50 years, are employed and sometimes misspelled. Three kinds have wrong illustrations; and 23 of the species that are inadequately described in the text have no accompanying illustrations. All told, there are over 56 misspellings and erroneous facts - an average of one per page. In essence, the buyer receives a book that has only 16 species properly named, described and illustrated.

All books, including those of this reviewer, have some inadvertent errors and typographical aberrations, but this one has misinformation in addition. Where the author states on page 48 that "the egg masses (of the moon snail) are laid on the underside of a glutinous collar-shaped egg case" he is quoting a longtime error that refers to the extraneous egg capsules of the *Nassa*. Mud Snails sometimes attached to this sandy collar. New to scientists is his statement on page 48 that the heavy, plodding *Murex spinicostate* [sic] (i.e. *Phyllonotus fulvescens*, the Giant Eastern Murex) "is also a capable swimmer."

Sometimes a good little beginner's guide can serve as memory-jogger of names for the advanced shell collector. Not in this case because author names and dates, so essential to serving amateur conchologists, are omitted. To further confuse the beginning conchologists, the common Kitten Paw is referred to as *Plicatula mantelli* [sic], an Eocene fossil on one page, as *ramosa* on page 23, and correctly on page 30 as *gibbosa*. The common edible Quahog Clam of Florida is not, as implied, found throughout the world, and is *NO mercenaria* but *campechiensis*.

The text is replete with such nonsensical statements as "Shells" have been used in the trade of material as well as immovable items" and (for we specialists) "The minute, yet technically recognizable structural differences between the shells of even the most closely allied specific forms, and the wider and distinctly evident divergences that separate the more remotely connected varieties, furnish the basis for the classification by systematic conchologists."

In this case Winner Enterprises has produced, in addition to other (also accurate?) guides to Florida natural history, a loss to education and the hobby of conchology. Unfortunately this attractive little guide is being widely distributed to the Florida public despite its many major errors. The moral to small press publishers is to produce books written in good English by knowledgeable people or face the consequences of free enterprise and honest reviews. -- R. TUCKER ABBOTT

Publications listed here have recently been received by **SHELLS and SEA LIFE**. We welcome copies of any publication on marine life and will list them here as space permits. Almost all can be ordered from the publisher. Many of these are also available from **Seashell Treasures Books** (1701 Hyland St., Bayside, CA 95524). Prices are in U.S. dollars unless otherwise noted and are subject to change without notice. Postage and handling is a minimum of \$3.00 additional.

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It is the policy of S&SL not to change the writing style of authors, nevertheless there are a few policies that have been found necessary to decrease the possibility of misinterpretations and errors.

The on the Driftline... and Reader Forum sections of S&SL are wide open for short contributions from anyone. They are intended to provide places where amateur and professional naturalists can record field observations. You can provide a real service by recording and reporting field observations, no matter how unimportant they may seem. (An example would be observation of egg laying including locality, date & species.) All it takes is an observant eye, a piece of paper, an envelope, and a stamp.

Notes should be less than 500 words and may include photographs or drawings. "What is it?" photos are especially encouraged. They should give all available information on where and when the observation was made. Book reviews are also encouraged – see recent issues of the magazine for format and style.

"Notes" for the magazine are not subject to Editorial Review Board review and are very flexible in format and content. "Literature cited" should not be included in "notes". "Scientific articles" should follow the style guidelines suggested below.

There are a few rules that apply to all scientific writing. While it may be unnecessary for the majority of our potential contributors, we will repeat them here for the benefit of those whose paper may be their very first venture:

1) Manuscripts should be in final form, complete, carefully proof-read and with the name of the author(s) appearing at the top of each page. All pages should be numbered consecutively. The sequence of manuscript parts should be as follows in most cases: title, introduction, materials and methods, results, discussion, acknowledgments, literature cited, figure legends, figures and tables.

2) Under no condition start a sentence with an abbreviation or with a number written in numerals. Within a sentence, numbers are expressed in numerals (e.g., 11, 121, 1985).

3) Avoid the use of idioms, as scientific papers must be read by persons of many different tongues; idioms too frequently give rise to serious misunderstandings.

4) Scientific names are underlined to indicate that they should be set in *Italics*. A double straight underlining indicates that SMALL CAPITALS are required and a triple underlining indicates ALL CAPITALS. A wavy line by itself calls for bold face.

5) We request that for the first appearance in a paper, the scientific name of any species discussed or cited be given in full, including author and year of the original description. For example: Favartia (Pygmaepterys) peasei (Tryon, 1880). The generic name should be written out whenever it is mentioned for the first time in any paragraph. Also, it is better to spell out all generic names if in the same paragraph two or more genera are mentioned that begin with the same letter.

6) The use of FAMILY NAMES is encouraged. The name should be in CAPITALS and be clearly associated with the species in that family. In general it should immediately precede the use of the full scientific name, author and date.

7) "Common names" may be used anywhere within notes or articles subject to the following: Common names will be capitalized when the first appearance of each common name is adjacent to the Latin name, author and date. Subsequent usages may be with only the capitalized Common Name. Names introduced without the scientific name adjacent will all be treated as common nouns and set in lower case type (except, of course, proper noun place names, etc.). The same policy is used with abbreviations which must be introduced by the fully spelled-out term or name.

8) If you are using terms which are not readily available in standard dictionaries please include a short definition with each term – separate from the article. This is preferable to defining the term in the text. We will include a GLOSSARY from time to time as necessary.

9) Footnotes are discouraged. If the article is so complex as to require footnotes, it may belong in a pure scientific journal. Extended quotes and other "footnote" material should be referred to by sequential numbers in the text and placed in an appendix at the end of the article.

10) Square brackets "[ ]" are normally used to set off editorial comments or addition within articles. Authors should avoid the use of square brackets.

Articles may include color or black and white illustrations. Either 35mm color transparencies and/or prints may be sent in although prints are preferred. Please note that prints are frequently trimmed before scanning and must be spray-mounted for scanning. It is not always possible to return the print after use – which is why we recommend that you keep your original slide or negative and send us a print.

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## LITERATURE CITED

References in the text should be given by the name of the author(s) followed by the date of publication: for one author (SMITH, 1951), for two authors (SMITH & JONES, 1952), and for more than two (SMITH et al, 1953).

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### a) Periodicals

Hertlein, L.G. & A.M. Strong. 1946. Eastern Pacific expeditions of the New York Zoological Society. XXXV. Mollusks from the west coast of Mexico and Central America. Part IV. Zoologica 31 (3):93-120; 1pl. (5 Dec. 1946).

### b) Books

Keen, A. M. 1971. Sea shells of tropical west America; marine mollusks from Baja California to Peru, 2nd ed. Stanford Univ. Press, Stanford, Calif. xiv + 1064p.; ill. (1 Sep. 1971).

### c) Composite works

Feder, H.M. 1980. Asteroidea: the sea stars. In: R.H. Morris, D.P. Abbott & E.C. Haderlie (eds.), Interficial invertebrates of California. Stanford Univ. Press, Stanford, Calif. p.117-134.

We prefer complete citations including full author names, exact publication dates, series identification, volume and issue numbers, full pagination, plates, figures, tables, appendices and any other information. We will format them to meet our requirements.

Tables, numbered in arabic, should be on separate pages, with the title at the top. Legends to photographs should be typed on separate sheets. Text figures must be carefully prepared and should be submitted ready for publication. Text figures should be in black ink and completely lettered. Keep in mind page format and column size when designing figures. Explanatory terms and symbols within a drawing should be neatly printed. It is the author's responsibility that lettering is legible after final reduction (if any) and that lettering size is appropriate to the figure.

## REPRINTS, etc.

Ten free reprints will be provided to authors. If you desire further reprints of articles, they should be ordered at the time the article is submitted for publication. Reprints of black and white articles are possible after publication but will be in photocopy. Color articles may be purchased after publication as complete issues at the cover price. Orders for more than 10 copies of an individual issue are available at a discount. Write for details.

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# Calendar

## 1987

### JUNE

Pine Barrens Weekend I, June 5-7, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Maine Coast Weekend, June 11-14, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Montauk Weekend, June 19-21, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

SIC87, 6<sup>ème</sup> Salon International du Coquillage, June 20-21, Lausanne, Switzerland. Contact Dr. Ted W. Baer, CH-1602 La Croix, Switzerland. Phone (0)21 39 37 71.

Western Society of Malacologists, June 21-25, San Diego State University, San Diego. Contact: Carole M. Hertz, San Diego Natural History Museum, PO Box 1390, San Diego, CA 92112, (619) 277-6359 home.

Conchologists of America, June 23-27, Days Inn at the Arch, St. Louis, Missouri. Contact: Alan Gittleman, 4045 Central Lane, Granite City, IL 62040. (618) 931-7374 weekends.

Third International Symposium on Marine Biology & Evolution in the Pacific, 26 June-3 July, Hong Kong. Convenors - University of Hong Kong & Western Society of Naturalists. Contact: Prof. D.H. Montgomery, Biological Sciences Dept., Cal Poly State University, San Luis Obispo, CA 93407.

Gulf Stream Billfish Tagging, Hatteras, June 28, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### JULY

Wreck Diving I, July 12, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Island Ecology, Isle of Shoals, July 17-20, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shark Tagging, July 18, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

American Malacological Union, July 19-23, 53rd Annual Meeting, Casa Marina Resort, Key West, Florida. Contact: William G. Lyons, Florida Dept. Natural Resources, 100 Eighth Ave. S.E., St. Petersburg, FL 33701. (813) 896-8626

Jacksonville Shell Show & Auction, July 30-August 2, Flag Pavilion, Jacksonville Beach, Florida. Contact: Allan Walker, 1036 Montes Ave., Jacksonville, FL 32205. (904) 781-1553

### AUGUST

Annual Crab Feast, Oxford, Maryland, August 2, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Wreck Diving II, August 9, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Shellfishing and Coastal Management: A Global Perspective, August 19-21, Hofstra University, Long Island, NY. Contact: Terry Baker, Associate Dean, School of Education, Hofstra University, Hempstead, NY 11550.

XVI Pacific Science Congress, August 20-30, Korea. Contact Prof. Choon Ho Park, Secretary-General, K.P.O. Box 1008, Seoul 110, Korea. Phone: (2)733-4478.

### SEPTEMBER

Pine Barrens Weekend II, September 11-13, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Wreck Diving III, September 20, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Cape May Birding Weekend I, September 25-27, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Guam Shell Fair, September 26-27, 22nd Annual Shell Fair of the Guam Shell Club, Agana, Guam. Contact: Capt. Alex Roth, Jr., Guam Shell Club, P.O. Box 7867, Tamuning, GU 96911.

### OCTOBER

American Littoral Society, 26th Annual Meeting (Tentative), October 9-12, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Cape May Birding Weekend II, October 16-18, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### NOVEMBER

Suwannee River Canoe/Camp, November 4-8, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Assateague Fall Weekend, November 19-22, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Bonaire Dive/Study, November 20-27, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Oyster Dive II, Chesapeake Bay, November 21, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

### DECEMBER

Diver's Environmental Institute, December 6, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Sanibel/Captiva Week, Florida, December 12-19, contact American Littoral Society, Highlands, New Jersey 07732. (201) 291-0555

Western Society of Naturalists, December 27-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We especially like to hear of overseas shows and meetings.

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A sampler of Ruth Greenberg's computer drawings done on a Macintosh™ system with MacPaint™ software. Send S.A.S.E. for more information or \$15 for a disk of clip-art to play with on your system.

## Editor's Notes

Summer in Humboldt County is an interesting time for us. The weather is generally good although we get the coastal mists that make the giant Redwood trees grow. Book sales are very low because everyone is out of school and travelling. Daylight hours are so long that we look up at 9:00pm and find we haven't yet eaten dinner. Visitors arrive from around the country on their vacation travels.

Salmon fishing is frequently good this time of year in the ocean waters nearby. Summer Steelhead are in the rivers. The blackberries, Salmon berries, Thimble berries, Huck berries and other berries are all over the place. We spend a good part of our spring and early summer trying to keep blackberries from taking over our property. Cherries, plums, raspberries and apricots are just about finished but the pears and apples are just starting to ripen.

We have been working to learn how to run our new printing equipment and organizing our library for the past few months. We order a paper type, run test printings on it, and order a different paper type. It gets a bit easier as we go along and we hope that only a few more tests will be required.

Now that we have the equipment we can start to expand a bit at a time. We need good articles on nature in various parts of the world. We would especially like articles covering a specific place, listing the animals found there and including photographs and notes on the area and the animals. The preferable length for the article would be four pages including photographs.

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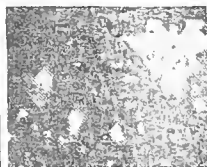
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# More on Rarity Part II.

Paul F. Patchick

Suite 10, 1123 S. Los Palos Drive  
Salinas, CA 93901

The subject of species rarity is a very subjective one. For example, I find it interesting that S. Peter Dance omitted mention of *Conus pergrandis* (1) in his classic book, *Rare Shells* (2).

However, he did list 8 other cones of the 50 species he chose as being "rare." Of course I agree with Dance, who wrote: "A book like this is necessarily a very personal subjective affair.... I hope that much of what appealed to me appeals to others, too." Dance included the following 8 cones in his list of rarities:

TABLE 1: RARE CONES  
(FROM *RARE SHELLS*, 1969)

*Conus thomae* Gmelin, 1791  
*Conus cervus* Lamarck, 1822  
*Conus crocatus* Lamarck, 1810  
*Conus gloriamaris* Chemnitz, 1777  
*Conus milneedwardsi* Jousseaume, 1894  
*Conus excelsus* Sowerby, 1908  
*Conus adamsoni* Broderip, 1836  
*Conus dusaveli* (H. Adams, 1872)

Here's how Jerry Walls rated these same shells 8 years later in his book (3):

TABLE 2: RARE CONES  
(FROM *CONE SHELLS*, 1977)

*C. thomae* "Very Rare; known from only a handful of good specimens; almost never present in private collections."

*C. cervus* "A freshly collected specimen... would certainly be one of the great discoveries in cones ... a classic rarity."<sup>1</sup>

*C. crocatus* (= *colubrinus*) "Rare, or at least uncommon; rare everywhere except New Caledonia, where it is uncommon"

*C. gloriamaris* "Moderately rare, but widely distributed; populations ... appear to be local and of limited size; a rare and famous shell; much more common than usually suggested; very local in distribution."

*C. milneedwardsi* "Usually very rare, it may be locally uncommon; of course a rare and desirable species, but it has recently come onto the market in some numbers .... The source of supply is uncertain...."

*C. excelsus* "A rare species in collections; probably widely distributed ... but seldom collected. An extremely rare shell in collections .... First discovered in 1873."

*C. adamsoni* "Very rare species seldom seen in good condition .... Live-taken specimens are quite rare.... In some areas ... not uncommon judging from the number of beach specimens."

*C. dusaveli* "Only rediscovered within the last few years ... apparently taken with some regularity ... from the Ryukyus; in all likelihood the distribution ... is wide and the species will prove to be merely uncommon once its ecology is better understood; not as rare as the extremely high prices ... would indicate."<sup>2</sup>

Two years later, E.G. Leehman, popular columnist writing in the *Hawaiian Shell News* (Oct. 1979) offered his opinion as to the "status change" of the 3 rare cones listed in Peter Dance's book, as follows:

TABLE 3: RARE CONES  
("STATUS CHANGE", 1979)

*C. thomae* was rare; now "scarce"  
*C. cervus* no change; still "rare"  
*C. crocatus* was rare; now "scarce"  
*C. gloriamaris* was rare; now "scarce"  
*C. milneedwardsi* no change; still "rare"  
*C. excelsus* no change; still "rare"  
*C. adamsoni* no change; still "rare"  
*C. dusaveli* no change; still "rare"

He based his revisions chiefly on the startling developments and gathering techniques (use of deep-set "gill-nets" lowered to the bottom in deep water) in the southern Philippine Islands. For several species, their ecologic habitat had been discovered, and novel collecting techniques were devised to meet the continuing demand.

<sup>2</sup>Described in 1872 from a unique specimen found in the stomach of a fish supposedly taken off the island of Mauritius, it was not seen again until the middle 1970s. A limited number began to turn up around Okinawa and from Jangle-nets in the Philippines, but so far no specimens from Mauritius or elsewhere in the Indian Ocean. Walls (6) says that it is available now (1981) "in numbers but still sells in the \$1000 range." By 1985, however, its price had dropped to \$150-\$375, and a dead-collected one could be had for as little as \$45-\$50.

Where only a few fishermen had been involved previously, now hundreds of men were out daily or nightly, lowering not a dozen nets, but thousands of them (!) to greater depths than ever before, with dealers looking over their shoulders and big money in their hands. Scuba divers were diving deeper, taking bigger risks in far off places like Thailand and the Ryukyus.

Here's how Jerome Eisenberg rated Peter Dance's rare cones 12 years later (5):

TABLE 4: RARE CONES (FROM  
*SEASHELLS OF THE WORLD*, 1981)

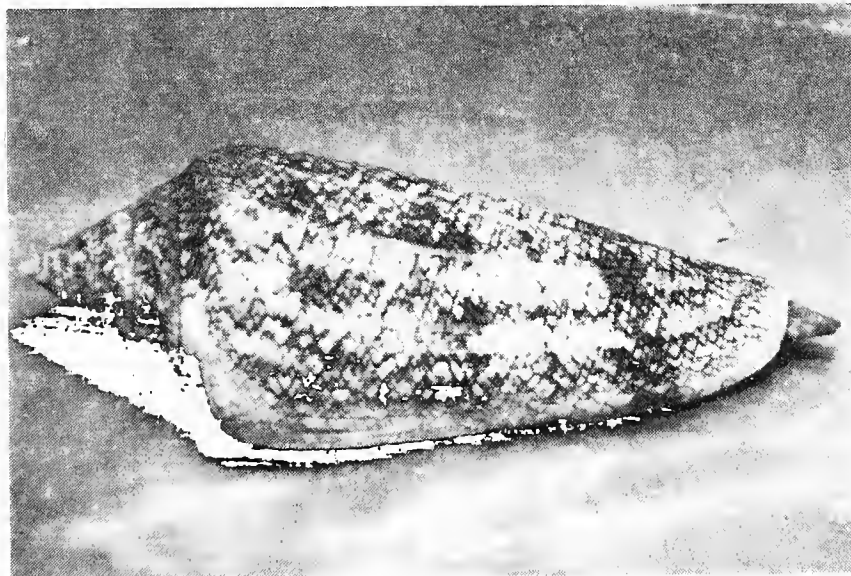
*C. thomae* Not illustrated<sup>3</sup>  
*C. cervus* Not illustrated  
*C. crocatus* (form *thailandus* daMotta) "Extremely Rare"  
*C. gloriamaris* "Very Rare; a famous and classic rarity"  
*C. milneedwardsi* "Extremely Rare; a classic rarity"  
*C. excelsus* Not illustrated  
*C. adamsoni* "Extremely Rare; a classic rarity"  
*C. dusaveli* Not illustrated

<sup>3</sup>Indicating not present in this prominent dealer's personal collection at that time.

In the next issue, we'll look at Abbott and Dance's *Compendium*, and see how two experts rank these same cones. We'll talk about the types of a shell's "availability", and see how three authors use adjectives and nouns to characterize the degrees of availability.

## REFERENCES CITED

1. Patchick, P.F. 1985. A Bite-Size *Conus pergrandis*. *Hawaiian Shell News*, p.6.
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3. Walls, J.G. 1977. *Cone Shells, A Synopsis of the Living Conidae*. TFH Publ., Neptune City, NJ 1011p.
4. McWhirter, N. 1982. *Guinness Book of World Records*. Bantam Books, New York, p.110.
5. Eisenberg, J.M. 1981. *A Collector's Guide to Seashells of the World*. McGraw-Hill Book Co., New York, p.239.
6. Walls, J.G. 1981. *Shell Collecting*. TFH Publ., Neptune City, NJ, p.16.



*Conus gloriamaris* Photo of live specimen by David K. Mulliner.

<sup>1</sup>The 1982 *Guinness Book of Records* (4) called *Conus servus* (sic) one of the two rarest shells in the world. It was reported that "\$10,000 offered for a specimen had been refused in 1978." Later editions balleyhooded *C. servus* as the "most valuable shell." (More about this later.)

# Calendar 1987

## SEPTEMBER

**Grenada Night**, September 5, San Diego, Ramada Inn Old Town 7-9:30pm. Contact: Foundation for Field Research, 787 South Grade Road, Alpine, CA 92001-0380. (619) 445-9264.

**Pine Barrens Weekend II**, September 11-13, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Grenada Night**, September 13, Palo Alto, Garden Court Hotel 7-9:30pm. Contact: Foundation for Field Research, 787 South Grade Road, Alpine, CA 92001-0380. (619) 445-9264.

**The Spell of the Shell**, September 18-20, Southlake Mall, at I-65 and U.S. Route 30, Merrillville, Indiana. Hosted by the Crown Point Shell Collectors Study Group and the Southlake Merchant's Association. Judges will be Russell Jensen and Gary & Holly Coovert. Contact: Crown Point Shell Collectors Study Group, P.O. Box 462, Crown Point, IN 46307.

**Wreck Diving III**, September 20, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**American Littoral Society, 26th Annual Meeting and Cape May Birding Weekend I**, September 25-27, Friday noon through Sunday afternoon. Shepherd's Neck Inn, Montauk, New York. Contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Guam Shell Fair**, September 26-27, 22nd Annual Shell Fair of the Guam Shell Club, Agana, Guam. Contact: Capt. Alex Roth, Jr., Guam Shell Club, P.O. Box 7867, Tamuning, GU 96911.

## OCTOBER

**Western Society of Naturalists**, 15 October, Deadline for submission of abstracts for the Annual Meeting. See WSN December listing.

**Cape May Birding Weekend II**, October 16-18, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**American Academy of Underwater Sciences, Annual Meeting**, October 29-November 1, University Plaza Hotel, Seattle, Washington. Contact: Mike Lang, Biology, San Diego State University, San Diego, CA 92182. (619) 265-5387.

## NOVEMBER

**Suwannee River Canoe/Camp**, November 4-8, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Assateague Fall Weekend**, November 19-22, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Bonaire Dive/Study**, November 20-27, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Oyster Dive II**, Chesapeake Bay, November 21, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

## DECEMBER

**Diver's Environmental Institute**, December 6, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Sanibel/Captiva Week**, Florida, December 12-19, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Western Society of Naturalists, Annual Meeting**, Joint Meeting with **International Society for Invertebrate Reproduction**, December 26-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman. Contact: David H. Montgomery, Secretary W.S.N., Department of Biological Sciences, California Polytechnic State University, San Luis Obispo, CA 93407. (805) 546-2446.

**Association Systematic Zoologists, A.M.A., A.B.S., T.C.S., I.A.A. & S.S.Z. Joint Annual Meetings**, December 27-30, Hyatt Regency Hotel. Contact: Mary Adams-Wiley, ASZ, Box 2739, California Lutheran University, Thousand Oaks, CA 91360. (805) 492-3585.

# 1988

## JANUARY

**Astronaut Trail Shell Show**, January 22-24.

**Greater Miami Shell Show**, January 29-31.

## FEBRUARY

**Broward Shell Show**, February 5-7.

**Ft. Myers Shell Show**, February 12-14.

**Sarasota Shell Show**, February 19-21.

**St. Petersburg Shell Show**, February 26-28.

## MARCH

**Sanibel Shell Fair**, March 3-6.

**Treasure Coast Shell Show**, March 19-20.

## NOVEMBER

**Hawaiian Malacological Society**, Tentatively early November for combined Shell Show and Auction.

# 1989

## AUGUST

**International Society for Invertebrate Reproduction, Meeting**, August, Nagoya, Japan.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event needs. Listings are on a space available basis with the earliest events given priority. We especially like to hear of overseas shows and meetings.

### Membership Address Lists Wanted

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## from R. Tucker Abbott

You should have qualified your statement in your January 1986 "Editor's Notes" in which you profess that you are "not aware of any malacological publication in the world which has continued longer with the same editor" (than Steve Long for *Shells and Sea Life*).

Among the editors still actively editing current mollusk publications for longer periods than "seventeen plus years" are Dorothy Raeihle (*New York Shell Club Notes* for 227 issues and 25 years), Glenn R. Webb (*Gastropodia* for 24 years), Tadashiga Habe (*Japanese Journal of Malacology* for 22 years), Kety Nicolay (*La Conchiglia* of Italy for 19 years), and myself as co-editor for 28 years (acting or main editor for 20 years) of America's oldest continuing mollusk journal, *The Nautilus*.

Henry A. Pilsbry served the longest (for 68 years for *The Nautilus*). J.R. Tomlin served 37 years as editor of the still continuing British *Journal of Conchology*; W.J. Clench edited *Johnsonia* for 25 years, as did R. Stohler for *The Veliger*. The oldest extant mollusk journal is the German *Archiv für Molluskenkunde*, begun in 1868, which has had several editors who served more than 30 years each. -- Dr. R. Tucker Abbott, P.O. Box 2255, Melbourne, FL 32902-2255

[ed. -- You are right again, Tucker! All of those editors, and yourself, deserve a lot of credit for their work. At the time, I was writing of current editors, not current publications. Kety and I started publishing very close to the same time (1969), I don't even know who was first. Dorothy has not been editor for over a year. I haven't heard from Glenn Webb in many years. Jerry Harasewych is now editing *The Nautilus*. And, I just plain forgot Tadashiga Habe.

There are several others who have been working editors for years, including Carole Hertz, *The Festivus*. We all take our lumps and keep plugging along. Thanks for the reminder and the history lesson.]

## from Harry G. Lee

I should like to offer a brief word on the article ("Shelling in Truk Lagoon"):

- Illustration of *Haliotis pustulata* appears to not be *H. pustulata* (Reeve, 1846) (see enclosed photocopy from *Conchologica Iconica*, original description). I like *H. ovina* Linnaeus, 1758, but my shells show a slightly greater spire on dorsal view.

- Illustration of *Conus distans* is not *C. distans* Hwass in Burguiere, 1992. It is *C. vexillum* Gemlin, 1791, a different species.

- Illustration of *Lambis crocata* is not *L. crocata* Lamarck, 1807. It is *L. lambis* (Linnaeus, 1750), a different species.

You've always used (or had your contributors use) authors (usually with dates) for scientific taxa. I suggest Bowen do so. That way such egregious errors in identification might be less likely -- or at least easier to rectify. -- Harry G. Lee, M.D., 709 Lomax St., Jacksonville, FL 32204.



# Cape Arago Opisthobranchs

Jeff Goddard

Oregon Institute of Marine Biology  
Charleston, Oregon 97420

1. *Acanthodoris hudsoni*
2. *Acanthodoris nanaimoensis*
3. \**Acanthodoris rhodoceras*
4. *Adalaria* sp.
5. *Aeolidia papillosa*
6. *Aldisa cooperi*
7. *Aldisa sanguinea*
8. *Ancula pacifica*
9. *Ancula nobilis*
10. *Anisodoris nobilis*
11. *Aplysopsis smithi*
12. *Archidoris montereyensis*
13. *Archidoris odhneri*
14. *Berthella californica*
15. *Cadlina luteomarginata*
16. *Cadlina modesta*
17. *Cafronia columbiana*
18. *Crimora coneja*
19. *Cuthona abronia*
20. *Cuthona albocruata*
21. *Cuthona cocoachroma*
22. *Cuthona flavovoluta*
23. *Cuthona fulgens*
24. *Cyllichnella harpa*
25. *Dendronotus albus*
26. *Dendronotus frondosus*
27. *Dendronotus subramosus*
28. *Diaphana californica*
29. *Diaphorodoris lirulatocauda*  
(formerly *Onchidoris hystricina*)
30. *Diaulula sandiegensis*
31. *Dirona albolineata*
32. *Dirona picta*
33. *Discodoris heathi*
34. *Doto amyra*
35. *Doto kya*
36. *Eubranchius olivaceus*
37. *Eubranchius rustyus*
38. *Flabellina trilineata*
39. *Hallaxa chani*
40. *Hermatea vancouverensis*
41. *Hermisenda crassicornis*
42. *Janolus fuscus*
43. *Laila cockerelli*
44. *Onchidoris muricata*
45. *Placida dendritica*
46. *Polycera atra*
47. *Precuthona divae*
48. *Rostanga pulchra*
49. *Triopha catalinae*
50. *Triopha maculata*
51. *Tritonia festiva*

## Additional Species

(other Coos Bay locations)

On drift material from offshore:

*Fiona pinnata*

South Jetty:

*Doto* sp. (on *Aglaophenia*)

Charleston boat basin:

*Cumanotus beaumonti*

\**Dendronotus albopunctatus*  
(subtidal only)

*Onchidoris bilamellata*

*Polycera zosterae*

South slough:

*Alderia modesta*

*Elysia hedgpethi*

(exact collecting locality unknown)

*Melanochlamys diomedea*

Upper Coos Bay: \**Tenellia pallida*

\* Range extensions.

The preceding list of opisthobranchs observed by Jeff Goddard as of June, 1987, in the Cape Arago, Oregon region.

## Coryphella & Chlamylla

I.S. Roginskaya

Shirshov Institute of Oceanology  
Academy of Sciences of the U.S.S.R.  
23, Krasikova St.  
Moscow, U.S.S.R. 112718

I am sending you pictures of spermatozoa (in hermaphroditic ducts) of 2 species of *Coryphella*: 1) of one specimen of *Coryphella trophina* (so-called *C. fusca* of Roginskaya, 1969), and 2) of one specimen of *Coryphella verrucosa*. Both specimens are from the Sea of Okhotsk (The sections were routinely stained by Feulgen + Blauschwarz). Scale: 15mm  $\approx$  10um. From the pictures enclosed you can clearly see that in these *Coryphella* species the typical short-headed, cone-headed spermatozoa are situated side by side with long-headed, spring- (or long-corkscrews-) headed atypical ones.



Spermatozoa of *Coryphella verrucosa* (M. Sars). Sea of Okhotsk. In the hermaphroditic duct.



Spermatozoa of *Coryphella trophina* (Bergh). Sea of Okhotsk. In the hermaphroditic duct.

I must add that in one species of *Chlamylla* - *Ch. atypica* (see picture no. 3 enclosed), that doesn't demonstrate any sperm-dimorphism, the uniform sperm-heads are not so long, as the atypical spermatozoa of *Coryphella*, but also of corkscrew shape. Demonstrating, perhaps, some intermediate link between typical and atypical spermatozoa of *Coryphella*?



Spermatozoa of *Chlamylla atypica* (Bergh). White Sea. From hermaphroditic duct.



## Trivia

Peggy Williams  
Rt. 3, Box 28  
Sarasota, FL 33580

The molluscan organ that builds the animal's shell is called the "mantle." Though most species' mantles are generally confined inside the shell, some mollusks' mantles are extended to cover the shell when the animal is moving about. These mantles are often colorful and covered with papillae that may provide effective camouflage in the animal's environment. These mollusk's shells are usually extremely smooth and shiny to allow a minimum of friction and discomfort to the living tissue.



One genus whose mantle covers the shell is *Trivia*, and, as the photo shows, the mantle of *Trivia quadripunctata* (Gray, 1827) provides good camouflage in its environment among algae. A surprise, however, is that the mantle of some specimens is coal black, whereas others, even from the same area, are bright pink.

## Clam by Scooter Beers

## Caecum

Peggy Williams  
Rt. 3, Box 28  
Sarasota, FL 33580

The tiny 2-4mm shells of the genus *Caecum* are found in rubble and sand, and when I look through fresh "grunge" (shelly sand brought up from dives or snorkelling), washed in sea water and kept alive, I sometimes find the mollusks still living. I discovered by accident how quickly and effectively the animal can move as I was photographing a specimen of *Caecum pulchellum* Stimpson, 1851. The animal's body protrudes from the open end of the shell (the other end is closed by a shelly plug) and the opening can be closed for protection by the operculum when the animal pulls inside.

I set up my camera with the lens combination that would give the greatest magnification: a reversed 28mm lens on a bellows. This setup allows very little depth of field and has a very small picture area. I set the camera up on a copy stand and found the shell in the view finder. I got it focused, but as I was about to trip the shutter, the animal extended, pushed with its foot, and flipped the whole shell over and out of my field of view! By the time I found the shell again, the next flip put it out of sight once more. It took quite a time to finally photograph the shell.



on the

## DRIFTLINE ~ ~ ~

### from California

Jeff Goddard visited on July 11. He collected near the Oregon/California border and after leaving Bayside went south to collect Point Mendocino and will return through here on July 13th. He will be working at O.I.M.B. for the next few months.

### from Oregon

Jim Carlton is back east at Woods Hole and other locations. Don't know when he will return.

### from California

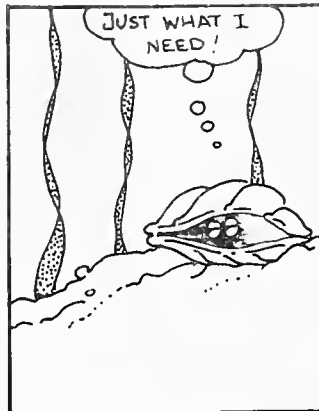
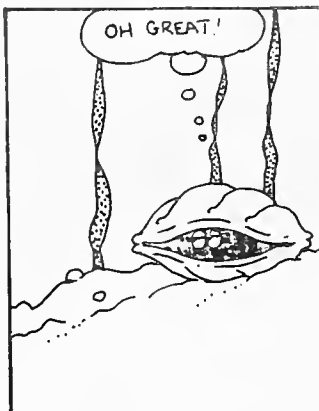
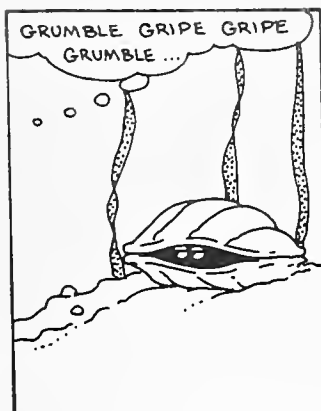
Jim Lance has been in Europe and in Costa Rica for much of the past year. He just returned from Costa Rica.

### from California

Sally's father, Gilbert Davis, has been here for a month, helping out with the folding and mailings. Daughters Kristin and Roxanne are sharing an apartment in Eureka and working. Son, Jonathan is working and travelling this summer. He will be in central California for a few days and then leaves for 3 weeks in England.

### from Cuba

Thank you for sending SHELLS and SEA LIFE 18(10). It has been very useful to me. Thanks to the article about *Truncadaphne chrysoleuca* (Melvill, 1923) I was able to determine two small specimens which had, for years, been unknown to me. If you are interested I can send you a photo of starfish of the genus *Linckia* with some specimens in different stages of regeneration of their arms. I have another photo of a large mass of eggs of *Murex pomum*. -- H. SARASUA, Calle 25 #510, apto. 1, c/o Hel, Vedado, La Habana 4, CUBA.



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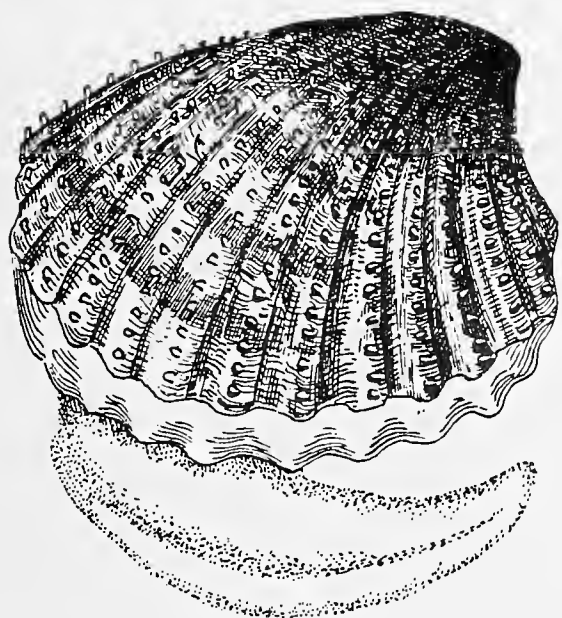
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# Editor's Notes

It has been a real struggle for us getting through the past two spring & summer slumps. We have considered several options from quitting entirely through starting two or three other publications and going bimonthly or quarterly - or even annually. I still feel that you want a monthly publication and am committed to producing *SHELLS and SEA LIFE* monthly although I may combine issues from time to time to include larger works or simply to have a vacation. Sally is now working full time with *Seashell Treasures Books* and I will continue to edit *SHELLS and SEA LIFE*. I want to concentrate more on general natural history literature and current events. We receive many publications daily from around the world and I enjoy bringing you the information.

We hope to get things going soon with the photos. Right now they are still tricky for me. I want even better quality paper but that requires different inks, power spray and other things that I cannot afford.

Best regards,

Steven J. Long



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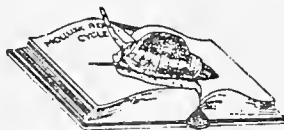


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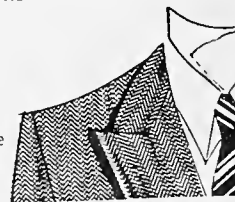
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## Return to the Kingdom of Tonga

Bob Purtymun

I first saw Tonga from the deck of "The Crescent City," a troop transport that was part of a naval task force, and a train of destroyers and transports carrying some 19,000 Marines of the 1st Marine Division. We were to invade the Solomon Islands, and destroy the airfield that the Japanese were building. This was in July of 1942. We spent several days anchored in the roadstead off Nuku'alofa, the capital city, located on the main island of Tongatapu. All I remember is white coral paths wandering among the numerous thatched fales, a very happy lot of people, and sun filled days before we were off to war. "The Crescent City" is now "The Golden Bear." It is the Flag Ship of the Maritime Training Academy at Vallejo, and is usually tied up at the pier just west of Carquinez Bridge. During the war the ship was known by the code name of APA-21. We on board called her the Creeping Coffin. We landed troops on most of the islands of the South Pacific.

Tonga is changed now. The coral paths are paved streets with names and the thatched fales are modern frame homes. There is a modern hotel with a swimming pool, bar, and restaurant. Many shops, markets, and all that it takes to make up a modern town. We had arrived on one of Hawaiian Air Lines DC8-62 planes that now makes the trip from Honolulu to Pago Pago to Nuku'alofa in about 7 hours. It's an afternoon and evening flight arriving after midnight. There was time for several hours sleep before our morning flight.

Our destination was the little village of Neiafu on the Island of Vava'u in the northern group of islands. Tonga consists of three main island groups: Tongatapu/Eua, Ha'apai and Vava'u. There are 170 islands in the Tonga chain. Many of which we were to fly over the next day on our way to Neiafu. Transportation was via "misquito plane", a little 10 seater that flew at about nine thousand feet. It was an hour and three quarter flight, and I was enthralled with watching the little islands, reefs and atolls floating on a brilliant blue sea beneath me. Boy what marvelous places to shell!!! We arrived in a blinding rain storm but it didn't seem to faze our New Zealand pilot. He sat the plane down on a packed coral runway without the slightest bump. The town was small as was expected, but there was the proverbial Burns-Philp and Morris Hedstrom -- the two stores that you will find on almost every south Pacific Island. Although not much stock in either we got "makings" for our luncheon sandwiches in the days ahead.

Thirty-six of the 170 islands in the Tongan group are inhabited with a total population of approximately 96,000. Population of the Vava'u Group is about 13,000. It is 272km north of Tongatapu. There are rolling hills, high cliffs and a native forest alive with a variety of tropical birds. The Tongans are Polynesians and best known for their tapa, mat weaving and basket work. As is true in most other South Pacific Islands tipping is not encouraged. Of special note is that Tongan law prohibits any person from appearing in a public place without a shirt. This is strictly enforced. Bathing attire is fine for the beach or pool-side.

The Hotel was very nice, modern, and very clean with a fine restaurant. Wes Thorsson of Honolulu and I shared a room. It had a small frig where we could keep our shells frozen so there was no need to clean shells while there. Mine came home frozen and were in the freezer for many months. A small table in the center of the room where we could sort our daily catch and wrap and pack for the trip home. The beds were made up daily and there was a pot to make coffee or tea. All in all, very comfortable!

We were fortunate to find good dive boats and plenty of air for scuba diving. There was an experienced shell collector on the Island who had been there for a number of years. He was generous with information on where to shell. With good contacts like this how can you lose.

### On the Tongan Reefs

020786 Neiafu, Vava'u Island, Kingdom of Tonga.

Dive #1; Snorkel 0 to 10 feet. 90 minutes. South eastward along the shore from the dock at the International Dateline Hotel.

After checking in at the hotel the next thing to check was the ocean. Wes and I dumped our bags and diving gear in our room and hurried down to the water. We found that a small barge had been pulled up close to shore and sunk to make a dock. It was decked over with a concrete slab. All in all a very nice set-up for small boats. I stuck my hand in the water and found that it was nice and warm. What could be better than a little snorkeling before dinner? So, back to the room for mask and fins.

On the way back we met Frank Miller on his way to check the water. He decided to join us for a little snorkeling.

I hadn't been in the water 2 minutes when I turned over a coral slab and found a big *Cypraea mappa* (Linnaeus, 1758) underneath. Alas, it had green algae spots on the dorsum, so I carefully replaced it under the slab.

The bottom was silty coral sand with dead coralslabs and blocks, tree branches and a few tin cans. The further we went toward the cul-de-sac end of the bay the more pollution we found. However, we did find quite a few shells. Of special note is the six *Pusia luculentum* (Reeve, 1845) which I found on a hard coral substrate in a thin layer of fine silty sand. In all my diving I have only found several of these shells, (in Samoa), so for me it was a rare shell.

### 020786 Dive #1

Snorkel 90 minutes 0 to 10 feet. Neiafu, Vava'u Island, Kingdom of Tonga. South east side of the dock at the International Dateline Hotel.

The bottom is sand and coral rubble with a light covering of silt. There is only one rather narrow entrance to the long sock-like harbour. The low tidal exchange of water with the open ocean does not cleanse the harbor of pollution, so, the water was more polluted the farther south eastward that we snorkeled. Many of the larger cowries were covered with green algae spots.

#### GASTROPOD

1. *Conus marmoreus*
4. *Cypraea vitellus* #2394 & #2395, 2 returned
5. *C. mappa*, #2502, 4 returned
2. *C. moneta* #7015
2. *C. annulus* #7015
1. *Strombus rugosus* #12352
7. *S. erythrinus* 2 #7108, #12349, #12351, #4524 juv. & 2 dead.
6. *Pusia luculentum* #12892
2. *Astraea rhodostoma* nn
1. *Nassarius glans* #17126
6. *Littorina scabra* #17125
4. *Pyrene scripta* #12535
1. *Cronia triangulata* #17123
1. ?*Cellana* sp.
1. *Euchelus atratus* #4574
10. *Peristernia ustulata* nn

#### BIVALVE

1. *Lioconcha castrensis*
2. *Spondylus ducalis* (top valves only)
7. *Comptopallium radula* 1 #4449, 6 not #ed. Many others returned.
2. *Anadara antiquata*
1. *Limea fragilis* #4573
2. Bivalve sp. #17122
1. Bivalve sp. #17121

[Editor - we will try to put a large group of photos together in one series as soon as we get them. Anyone having good black and white 3" x 5" prints of the shells listed here is encouraged to send them to us before the end of September. If you have photos and are lacking time, please call or write and tell us what you have.]



## 020886 Neiafu, Vava'u Island, Kingdom of Tonga

Dive #1; 18.42.8S x 174.02.7W Scuba 0-50 feet. 90 minutes. Over the fringing reef south of Nuku Island.

The fjord-like approach leading to the harbor at Neiafu is one of the most picturesque in the Pacific. It is aptly called the Harbor of Refuge and carves a c-shaped circle into the heart of the main island of Vava'u. The hills on this island rear abruptly out of the ocean and provide ample shelter from any hurricane. In the days that followed we would enjoy the scenery of these vivid green-clad hills as we sailed the crescent-shaped channel out to our daily dive site and returned in the evening.

There are 25 to 30 small, medium and large islands to the south of the main island, with many reefs and sand spits. We picked up a chart of the area in Honolulu before we left, so we had a good idea of the terrain that we were planning to dive. (British Admiralty Chart No. 3098)

Our dive boat was a 40' long sail boat which towed a wooden skiff with a 25 horse outboard motor and a small rowboat. This proved to be an excellent way to dive. We kept the tanks and gear in the skiff where we suited-up. This made for easy entry and exit from the water. Then we would eat lunch, decompress, and rest up on the big boat. The rowboat was used to pick up divers and to ferry snorkelers to the many sandy beaches off our anchorages. There were nine people in our party. Three avid snorkelers and six rabid divers.

Our first anchorage was the shallow channel between the small island of Nuku and the large island of Kapa. They are about 250m apart. Both have beautiful sandy beaches that front on the channel. Here was the idyllic tropical paradise. Warm blue water, white sand beaches, and palm trees swaying in the gentle trade winds.

Wes and I decided to go over the fringing reef on the south side of Nuku and off into the deeper channel just west of the islands. Popiano the deck hand took us over in the skiff and dropped us off outside the reef. It was a very pretty dive with lots of live coral on the upper slope. At about 15m the bottom flattened out with brilliant white sand pockets and scattered coral heads of every color.

We fanned *Terebra* and *Mitra* out of the sand, and several nice bivalves. Up on the coral slope we found *Cypraea* -- *carneola*, *helvola*, *isabella*, *mappa*, *labrolineata*, and *erosa*. Some large *Lambis lambis*, and up near the surf line some *Bursa*. Both Wes and I have been collecting long enough that we are quite selective about what we take. Neither of us have the desire to clean *Lambis* or common cowries, or other shells that we already have in our collection. Not much came back in our goody bags from this dive.

### 020886 Dive #1

18.42.8S x 174.02.7W

Nuku Island, south side outside the fringing reef. The upper area is hard coral bottom with sparse live coral, a few loose coral slabs, and a few shallow sand pockets. The deeper area is a mixture of coarse and silty sand with live and dead coral heads.

#### GASTROPOD

1. *Conus legatus* #7495
1. *C. vexillum* #7137 31x21mm
1. *C. frigidus* #7496
2. *C. rattus* #7143
2. *C. flavidus* #715
1. *Cypraea carneola* #7037
2. *C. erosa* nn
1. *C. isabella* nn
1. *C. mappa* #2501
2. *Mitra luculentum* #12255
1. *M. aurora floridula* #12407
1. *Lophiotoma albina* #12808
1. *Haliotis crebrisculpta* #7640
3. *Latirus smaragdulus* #16020
1. *L. turritus* #16013
1. *Peristernia ustulata* #12751
1. *P. incarnata* 12752
1. *Stomatella auricula* #12492
1. *Pseudostomatella papyracea* #12493
1. *Turbo chrysostomus* #4066
2. *Euchelus atratus* nn
1. *Nassarius glans* #12466
1. *Drupella ochrostoma* #4104
2. *Pyrene truturina* #12536
1. *Diodora mus* #12500
2. *Engina alveolata* #12272
2. *?Cantharus* sp. #12279
1. Sp. #4576
1. Sp. #4577
1. *Mastonia triticea* #12479
1. *Cerithium asper* #15062
1. *C. fasciatus* #15063

#### BIVALVES

1. *?Pecten* sp. #12648
3. *Gloripallium pallium* nn
1. *Chlamys squamosa* #4575
1. Bivalve sp. #17127
4. Misc. single valves #17128

## 020886 Neiafu, Vava'u Island Kingdom of Tonga

Dive #2; 18.42.8S x 174.02.5W Scuba 9-30 feet. 95 minutes. In the channel between Nuku and Kapa Islands. Kapa Island west side near Nuku Island. The bottom is sand with scattered coral slabs and coral heads. There are some patches of antler coral and in the shallower areas large patches of weedy sand.

After a rest and some lunch we worked the sand channel between the islands. This was about 4 to 9m deep, with somewhat silty sand, and scattered weedy patches. There were a few scattered coral heads in the deeper water and a few patches of antler coral. Here we found *Terebra*, *Mitra*, a few turrids, bivalves, olives, and *Nassarius*. Some of the shells were new like the large *Turris spectabilis* (Reeve, 1843) that Wes fanned out of the sand. Others were somewhat of a nuisance, such as the *Terebra maculata* (Linnaeus, 1758) at the end of many of the trails. There were three to four inches long. I waited to find the really big one and never did keep one for my collection. They're hard to clean anyway.

The antler coral patches were 3 to 10m across, very open, and sheltered a wide assortment of fish. In one clump I watched a large pair of French Angels threading their way through the branches. Always keeping a few branches between us for protection. I was only looking but they still didn't trust me.

By the end of the dive we were quite a distance away from the boat and the current was running in the opposite direction. It was going to be a long swim back so I waved my arm and in a few minutes the rowboat came out to pick us up. It had been a long but very satisfying day!

#### GASTROPOD

1. *Conus frigidus* nn
7. *C. arenatus* nn
1. *C. pulchricornis* nn (many not collected)
1. *C. virgo* nn 97 x 48mm
1. *C. marmoreus* nn 68 x 50mm
1. *Fusinus colus* #13194 by David McLean
1. *Latirus turritus* #16022
1. *Imbricaria olivaeformis* #4428
1. *I. punctata* #12877
1. *Cancilla verrucosa* #12641
1. *Vexillum coronatum* #12878
5. *V. exasperatum* #4432
5. *V. sanguisugum* #4433
1. *Mitra imperialis* #4434
1. *Neocancilla papilio* nn
1. *Arys naucum* #4424
1. *Otopleura nodicincta* #4425
1. *Strombus gibberulus* nn
1. *Cerithium columba* #15013
1. *C. nesioticum* #15014
1. *C. asper* #15015
1. *?Cerithium* sp. #15014
2. *Terebra nebulosa* #14063
3. *T. affinis* #4719
1. *T. babylonica* #4720
1. *Oliva annulata* #4427
2. *Turris spectabilis* nn
1. *?Turris* sp. #12187
1. *T. acuta* #4436
1. *Clavus unizonalis* #4437
1. *Nassarius graniferus* #4438
1. *?Pupa* sp. #4439
1. *Cantharus iostomus* #4440
1. *Engina concinna* #4441
1. *Cymatium muricinum* #4442

#### BIVALVE

1. *?Pecten* sp. #4426
3. *?Glycymeris* sp. 2 #4436, 1 #7585

More dives and photos in coming issues.

# Calendar

## 1987

### SEPTEMBER

**Pine Barrens Weekend II**, September 11-13, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Grenada Night**, September 13, Palo Alto, Garden Court Hotel 7-9:30pm. Contact: Foundation for Field Research, 787 South Grade Road, Alpine, CA 92001-0380. (619) 445-9264.

**The Spell of the Shell**, September 18-20, Southlake Mall, at I-65 and U.S. Route 30, Merrillville, Indiana. Hosted by the Crown Point Shell Collectors Study Group and the Southlake Merchant's Association. Judges will be Russell Jensen and Gary & Holly Coovert. Contact: Crown Point Shell Collectors Study Group, P.O. Box 462, Crown Point, IN 46307.

**Wreck Diving III**, September 20, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**American Littoral Society, 26th Annual Meeting and Cape May Birding Weekend I**, September 25-27, Friday noon through Sunday afternoon. Shepherd's Neck Inn, Montauk, New York. Contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Guam Shell Fair**, September 26-27, 22nd Annual Shell Fair of the Guam Shell Club, Agana, Guam. Contact: Capt. Alex Roth, Jr., Guam Shell Club, P.O. Box 7867, Tamuning, GU 96911.

### OCTOBER

**Western Society of Naturalists**, 15 October, Deadline for submission of abstracts for the Annual Meeting. See WSN December listing.

**Cape May Birding Weekend II**, October 16-18, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Society of Vertebrate Paleontology**, 47th Annual Meeting, October 22-24, Tucson, Arizona. Includes a benefit auction of books, field gear, laboratory supplies, artwork, casts, toys, teaching aids, t-shirts, filmstrips,

models and other suitable material dealing with paleontology, evolution, geology, or biology. For information contact: Brent H. Breihaupt, Museum Curator, The Geological Museum, The University of Wyoming, P.O. Box 3006, Laramie, WY 82071. (307) 766-3386.

**American Academy of Underwater Sciences, Annual Meeting**, October 29-November 1, University Plaza Hotel, Seattle, Washington. Contact: Mike Lang, Biology, San Diego State University, San Diego, CA 92182. (619) 265-5387.

### NOVEMBER

**Suwannee River Canoe/Camp**, November 4-8, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Assateague Fall Weekend**, November 19-22, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Bonaire Dive/Study**, November 20-27, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Oyster Dive II**, Chesapeake Bay, November 21, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

### DECEMBER

**Diver's Environmental Institute**, December 6, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Sanibel/Captiva Week**, Florida, December 12-19, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Western Society of Naturalists, Annual Meeting**, Joint Meeting with **International Society for Invertebrate Reproduction**, December 26-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman. Contact: David H. Montgomery, Secretary W.S.N., Department of Biological Sciences, California Polytechnic State University, San Luis Obispo, CA 93407. (805) 546-2446.

**Association Systematic Zoologists, A.M.A., A.B.S., T.C.S., I.A.A. & S.S.Z. Joint Annual Meetings**, December 27-30, Hyatt Regency Hotel. Contact: Mary Adams-Wiley, ASZ, Box 2739, California Lutheran University, Thousand Oaks, CA 91360. (805) 492-3585.

## 1988

### JANUARY

**Astronaut Trail Shell Show**, January 22-24.

**Greater Miami Shell Show**, January 29-31.

### FEBRUARY

**Broward Shell Show**, February 5-7.

**Ft. Myers Shell Show**, February 12-14.

**Sarasota Shell Show**, February 19-21.

**St. Petersburg Shell Show**, February 26-28, 41st Annual Shell Show. Community Center, 1 Park Place & 106th Ave., Treasure Island, Florida. Donation of \$1.50 per person (Children under 15 free with adult). Shell dealer sales during event. Show put on by members of the St. Petersburg Shell Club, Inc. Contact: Betty Lipe, 440 75th Ave., St. Petersburg Beach, FL 33706. (813) 360-0586.

### MARCH

**Sanibel Shell Fair**, March 3-6.

**Treasure Coast Shell Show**, March 19-20.

### NOVEMBER

**Hawaiian Malacological Society**, Tentatively early November for combined Shell Show and Auction.

## 1989

### AUGUST

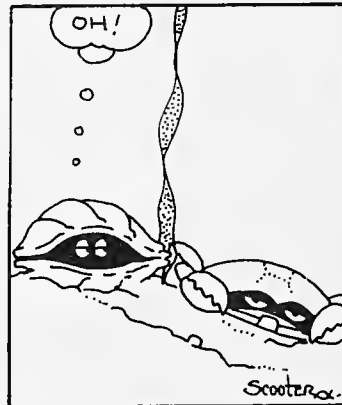
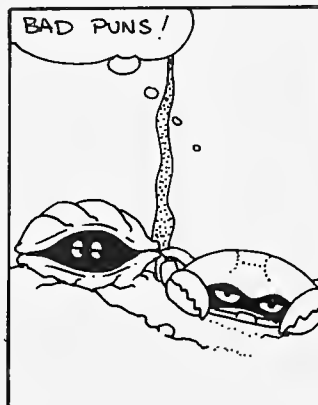
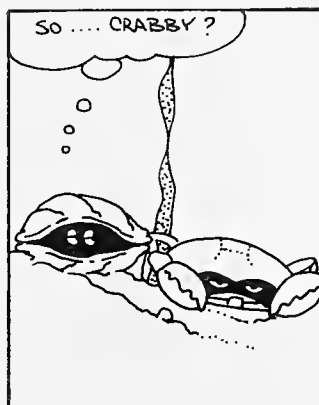
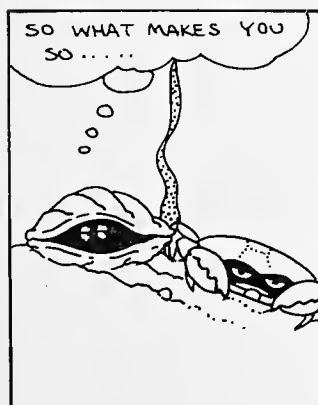
**International Society for Invertebrate Reproduction**, Meeting, August, Nagoya, Japan.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We especially like to hear of overseas shows and meetings.

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## Clam by Scooter Beers



# Suggestions for Preparing Articles for *SHELLS and SEA LIFE*

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welcomes notes and articles on any aspect of natural history. Articles on conchology will, however, receive priority. Our major interest is reference and review material of importance to professional and amateur alike. We include meeting notices, bibliography, field observations, book reviews, historical sketches and species group reviews among our primary interests. If you see something of probable interest to our readers, please forward a copy and we will attempt to obtain permission for republication.

The on the Driftline... and Reader Forum sections of S&SL are wide open for short contributions from anyone. Field Notes are intended to provide a place where amateur and professional naturalists can record field observations. You can provide a real service by recording and reporting field observations, no matter how unimportant they may seem. (An example would be observation of egg laying including locality, date & species.) All it takes is an observant eye, a piece of paper, an envelope, and a stamp.

Black & white photographic prints may be submitted with articles. If it looks great in the print, with good contrast and few shadows, it should look good on the printed page. Color prints or 35mm color transparencies will cost a minimum of \$500.00 to reproduce and you will normally have to provide the major share of the cost. Please provide separate prints for light and dark specimens as they must be handled separately for best results. Please note that prints are frequently trimmed before scanning and must be spray-mounted for scanning. It is not always possible to return the print after use.

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It is the policy of S&SL not to change the writing style of authors, nevertheless there are a few policies that have been found necessary to decrease the possibility of misinterpretations and errors.

Articles describing new taxa should be submitted to one of the major scientific journals. We will not knowingly print them in *SHELLS and SEA LIFE*.

The following standards apply to all scientific writing. While it may be unnecessary for the majority of our potential contributors, we will repeat them here for the benefit of those whose paper may be their very first venture:

1) Manuscripts should be in final form, complete, carefully proof-read and with the name of the author(s) appearing at the top of each page. All pages should be numbered consecutively.

The sequence of manuscript parts should be as follows in most cases: title, introduction, materials and methods, results, discussion, acknowledgments, literature cited, figure legends, figures and tables.

2) Under no condition start a sentence with an abbreviation or with a number written in numerals. Within a sentence, numbers are expressed in numerals (e.g., 1, 21, 198).

3) Avoid the use of idioms, as scientific papers must be read by persons of many different tongues; idioms too frequently give rise to serious misunderstandings.

4) Scientific names are underlined to indicate that they should be set in italics. A double straight underlining indicates that SMALL CAPITALS are required and a triple underlining indicates ALL CAPITALS. A wavy line by itself calls for bold face.

5) The first appearance of any scientific name of any species discussed or cited should be given in full, including author and year of the original description. For example: *Favaria (Pygmaeapterys) peasei* (Tryon, 1880). The generic name should be written out whenever it is mentioned for the first time in any paragraph. Also, it is better to spell out all generic names if in the same paragraph two or more genera are mentioned that begin with the same letter.

6) The use of FAMILY NAMES is encouraged. The name should be in CAPITALS and be clearly associated with the species in that family.

7) "Common names" may be used anywhere within notes or articles and should be capitalized with the first appearance of each common name adjacent to the Latin name, author and date. Subsequent usages may be with only the capitalized Common Name. The same policy is used with abbreviations which should be introduced by the fully spelled-out term or name.

8) If you are using terms which are not readily available in standard dictionaries please include a short definition with each term - separate from the article. This is preferable to defining the term in the text. We will include a GLOSSARY from time to time as necessary.

9) Footnotes are discouraged. If the article is so complex as to require footnotes, it may belong in a scientific journal. Extended quotes and other "footnote" material should be referred to by sequential numbers in the text and placed in an appendix at the end of the article.

10) Square brackets "[ ]" are normally used to set off editorial comments or addition within articles. Authors should avoid the use of square brackets.

Authors should follow the style guidelines recommended in the "Style Manual for Biological Journals", which may be purchased from the American Institute of Biological Sciences, 2000 "P" Street, N.W., Washington, DC 20036. Original manuscripts should be typewritten on white paper, 8-1/2" x 11", and double-spaced throughout. You may include a copy to facilitate review; the original is required.

## LITERATURE CITED

References in the text should be given by the name of the author(s) followed by the date of publication: for one author (SMITH, 1951), for two authors (SMITH & JONES, 1952), and for more than two (SMITH et al, 1953).

The "literature cited" section must include only references cited in the text. "Literature cited" should be listed in alphabetical order by author and typed on sheets separate from the text. Each citation must be complete and in the following form:

### a) Periodicals

Hertlein, L.G. & A.M. Strong, 1946. Eastern Pacific expeditions of the New York Zoological Society. XXXV. Mollusks from the west coast of Mexico and Central America. Part IV. *Zoologica* 31 (3):93-120; 1 pl. (5 Dec. 1946).

### b) Books

Keen, A. M. 1971. Sea shells of tropical west America; marine mollusks from Baja California to Peru, 2nd ed. Stanford Univ. Press, Stanford, Calif. xiv + 1064p.; ill. (1 Sep. 1971).

### c) Composite works

Feder, H.M. 1980. Asteroidea: the sea stars. In: R.H. Morris, D.P. Abbott & E.C. Haderlie (eds.), *Intertidal invertebrates of California*. Stanford Univ. Press, Stanford, Calif. p.117-134.

We prefer complete citations including full author names, exact publication dates, series identification, volume and issue numbers, full pagination, plates, figures, tables, appendices and any other information. We will format them to meet our requirements.

Tables, numbered in arabic, should be on separate pages, with the title at the top. Legends to photographs should be typed on separate sheets. Text figures must be carefully prepared and should be submitted ready for publication. Text figures should be in black ink and completely lettered. Keep in mind page format and column size when designing figures. Explanatory terms and symbols within a drawing should be neatly printed. It is the author's responsibility that lettering is legible after final reduction (if any) and that lettering size is appropriate to the figure.

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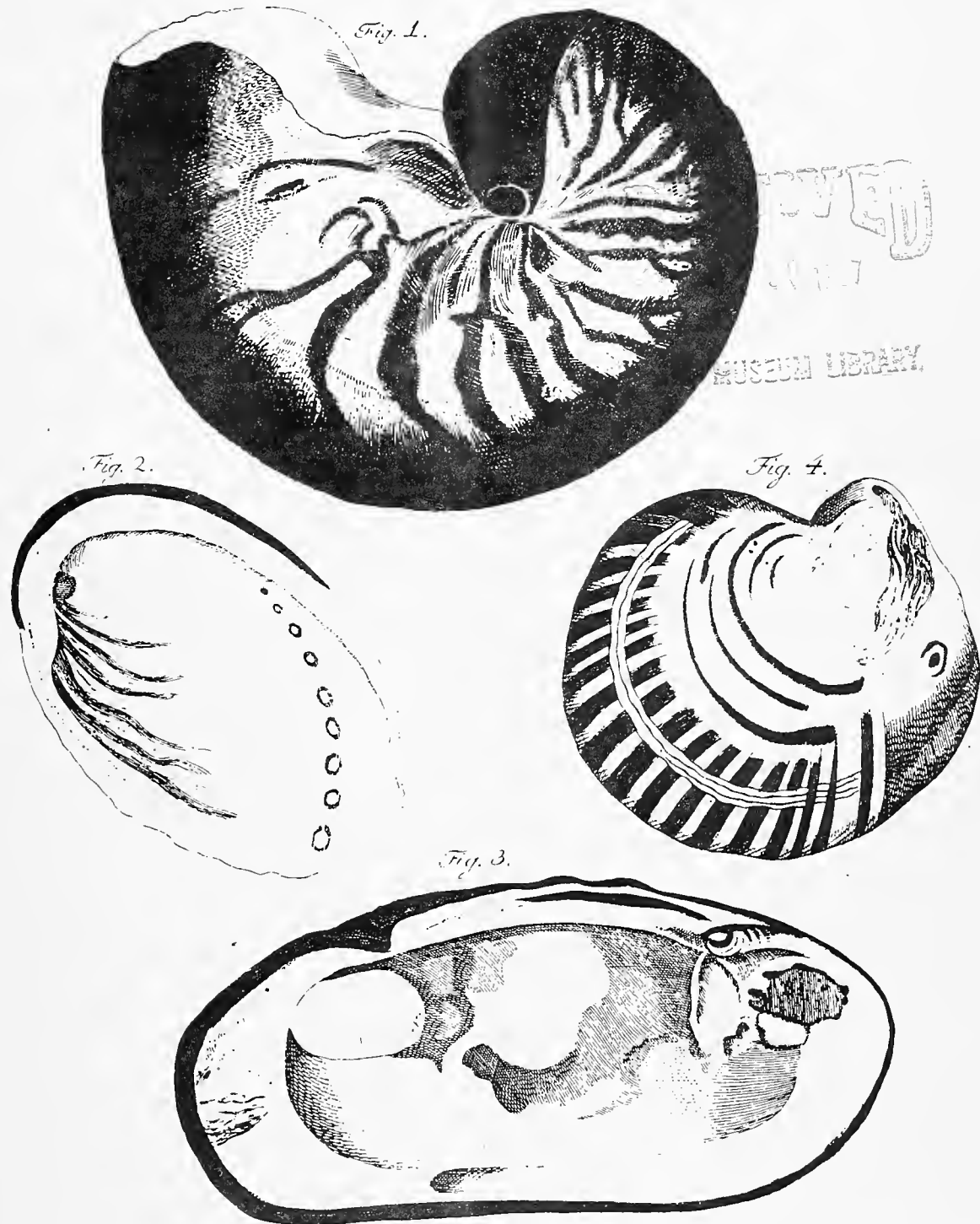


# SHELLS and SEA LIFE

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*Nautilus pompilius*, *Haliotis*, *Mya margaritifera*, & *Mytilus margaritifer* [sic] from color plate. Conchylien I. B. I. No. 18, 1 page German text & 1 page French text. Author and publication date unknown.

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# Editor's Notes

We have spent several weeks working out format changes for *SHELLS and SEA LIFE*. This is the result. The three column format works out well for most material and several subscribers have stated their approval. We had one serious problem -- the size of the letters was too small for general reading. The size type you are reading now is much easier to follow -- but it does not print smoothly with longer words and especially scientific names. Our answer for the present is to use two column format for articles and switch into three column format whenever we can. As soon as we get \$1000 in new subscriptions we will purchase the upgrade to our typesetting program and new fonts just slightly smaller to make everything run cleanly in three column format. This is one of those major efforts that probably few of you will even be able to notice the difference -- the result will simply look good!

Getting our own printing equipment is something like purchasing a new tract home -- the purchase price is only the tip of the iceberg. Now we have to put in the lawn, landscape, modify a room for the baby, buy all new carpeting and drapes, and furnish the entire place. On top of everything else, Sally and I have to do all of the labor ourselves.

For the immediate future we will provide news, bibliography, biography, current events, calendar, directory and short articles on all manner of shells and sea life. Our intent is to be a reference source for professionals and amateurs alike, with the most current information on what is happening and who is making it happen.

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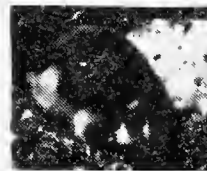
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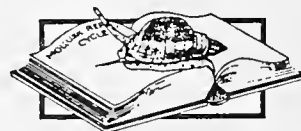
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# On the Rak

A.J. Woodward

Ras al Khaimah is one of the 7 States that make up the United Arab Emirates and is known to expatriates and I suspect locals too as R.A.K.

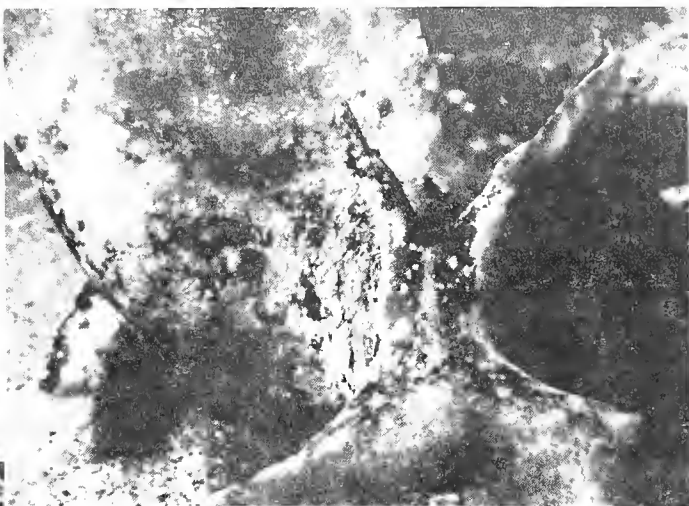
After arriving in Dubai last September it was one of the first places that I decided was well worth a little exploration. The reward has been one of constantly unfolding surprises, as the yield of marine treasures and experiences continues to grow at a tremendous rate.



*Muricanthus kusterianus* (Tapparone-Canefri, 1875). Up to 20 examples of this locally common species have been recorded breeding together during March and April.

Two weeks ago for example, I was cruising over the extensive eel grass beds in one of the shallow protected bays just south of the town, when I noticed that *Muricanthus kusterianus* had started to breed. I was busily photographing the action when my attention was distracted by a tiny sea horse, swimming gently between the blades of grass. An example of *Bulla ampula* was moving around in the daytime, which is unusual for this normally nocturnal animal but to add to the scenario, an unknown (to me) sea hare came into view. Moving in to investigate, I noticed a second species of sea hare, *Aplysia cornigera*, which is known to me, browsing through the grass.

Sea hare time it must be because as I drifted onto a patch of thicker grass there were literally dozens of the latter species crawling around. This was the first time that I had witnessed the breeding of these graceful creatures, which are seemingly a common feature of the marine fauna in the southern Gulf, though much less so further north. [*Aplysia* is hermaphroditic. Any individual can act as male or female for others. Animals cannot copulate with or fertilize themselves, although a pair of animals can inseminate each other simultaneously. If more than two animals are available, a coupling chain is formed. - KANDEL 1979. *Behavioral Biology of Aplysia*. p.321]

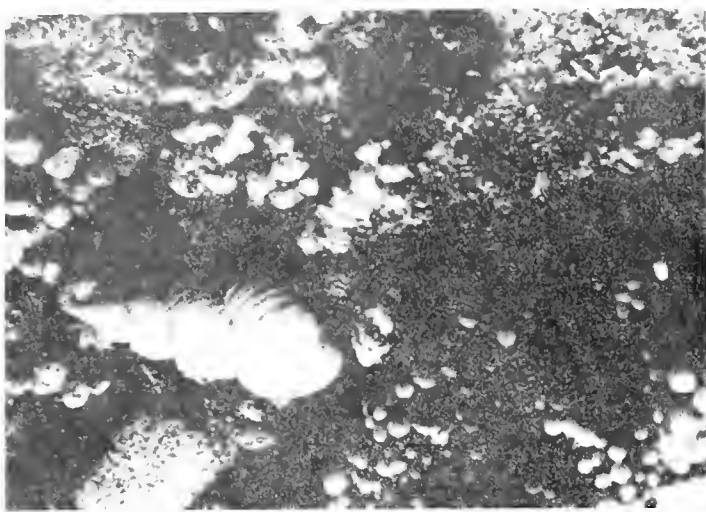


*Aplysia cornigera* Sowerby, 1869. One of two species of sea hare to be found at Ras al Khaima.

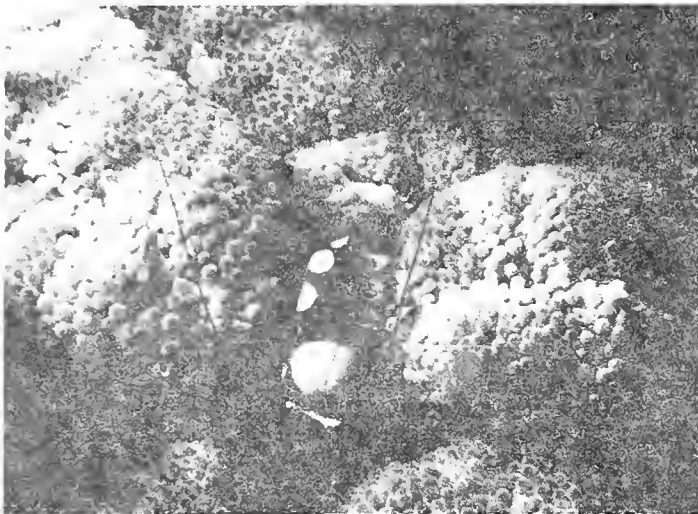
The mad March hares were by no means the only species frolicking in the grass and as I moved a small block of sandstone -- probably an anchoring point for the small fishing boats used for close inshore work -- I found *Cypraea lentiginosa* laying eggs. Normally this rather shy cowry prefers coral and rubble areas, so quite how it chose this isolated spot is a mystery. The tiny orange egg cases were layed in a mass and though I searched around I could not find the male. *Cypraea turdus* was also breeding nearby on a broken piece of *Pinna muricata*, vying for space with *Cronia konkanensis*. The water has just begun to warm up after a rather wet and cold spell, that we choose to call winter, stimulating the life cycle of many resident species. Perhaps the most impressive find that day was *Epitonium irregulare*, which I had recorded previously in the Gulf with only a single example. That was in Qatar and on that occasion it was found on a carpet anemone (*Stoichactis* sp.). A pair of these uncommon wentletraps were busily laying a string of dull grey coloured egg cases, joined together with the characteristic elastic thread. They were just at the edge of the anemone and the female was larger than the male, though I am uncertain if this is a common feature because again this was the first time that I had observed the breeding habits.



*Cypraea lentiginosa* Gray, 1824. Photographed -- isolated spot in middle of shallow bay on a block of sandstone with its bright orange egg mass.



*Epitonium irregulare* (Sowerby, 1844). This was the first time I had witnessed this uncommon wentletrap breeding.



*Periclimenes brevicarpalis* This one, a female which is much larger and more colourful than the male, lives on the *Stoichactis* anemone.

Decidedly elated by the day's events, I turned to head for the shore with all the activity duly recorded on film, when I froze at the sight of a huge black tip reef shark that became rather interested in me. Sharks are not normally aggressive and though I am wary of them they have never yet posed a problem on any of the dives when they have been encountered. However in shallow water I was concerned as to how it would react. It must have come from the deep water channel which runs into the nearby port and I was hoping it would not get confused about which direction to take. Finally it moved away and allowed me to reach shore safely. I was well satisfied with the day.

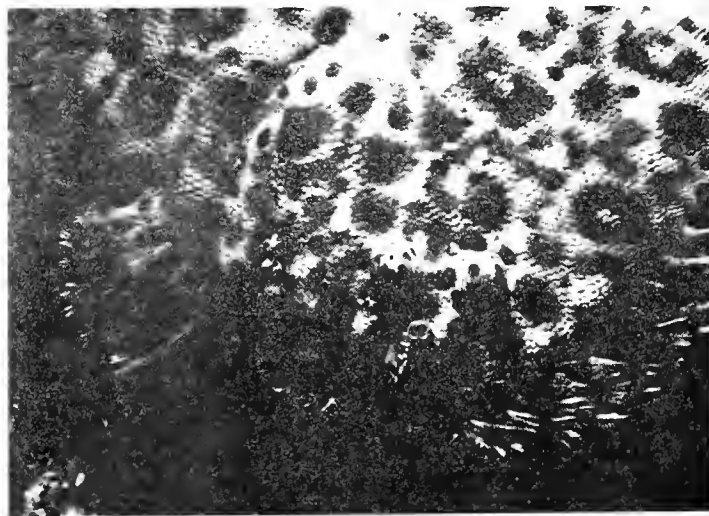
I set off over the colourful sponges that grow amongst the grass, noting that as many as 20 examples of *Muricanthus kusterianus* were now breeding together on just about every available space that they could find, when I was suddenly surrounded by a shoal of barred halfbeaks (*Hemiramphus marginatus*). They were flashing their silver bodies in the shallow water, digging into the sandy mud to extract their food, when in another flash were gone but approaching head on was a large remora or pilot fish. With the experience of

the shark still fresh in my mind, I knew that something must be close by and that something would be big! As usual I was using extension tubes on the Nikonos camera so there was no hope of getting any of this on film but that's the luck of the draw. Sixth sense made me turn my attention to the right and sure enough there was Mr. Big. No, not a shark this time but the biggest turtle I have seen for a long time. It looked like a Volkswagen beetle with legs but was infinitely more graceful. Sure enough the remora quickly returned to its host and the turtle defied its bulk by deftly evading this human intruder.

Though cursing my luck in choosing the close-up kit for the days photography, I was nevertheless elated at the sight as turtles seem to be getting more scarce these days. A ray moved gracefully underneath me and a somewhat uncooperative *Bothus pantherinus* or Leopard Flounder all but completed a fishy day. I say all but because I was finally able to get a close-up of a blenny (*Clurolophis* sp.) which had made itself a home in a dead *Pinna muricata* shell -- how these shells do get into the picture!

The malacofauna was not to be completely outdone that day and I managed at long last to photograph a cuttlefish changing colour. I don't believe the species has been satisfactorily identified yet despite being very common all through the Gulf. Usually too timid for close-up photography, when one needs to get to within 6 inches of the subject, this one was very slow to react and allowed a sequence of shots to be taken before it shot away into the distance.

I have developed the habit of saving one shot until I am on the beach at the end of a dive and I would advise anyone to try and do the same. Though this day it was to prove unnecessary, I have been caught out before. I regretted not doing so on one dive along the Batina coast at Khor Fakkan, Sharjah, when following a wiggly track in the sand and wondering what mollusk could have made such an unusual pattern, when I disturbed a slender Yellow Fin Snake Eel (*Brachyosomophis cirrhocheilus*). That is all part of another story and another completely different aspect of the marine fauna of the United Arab Emirates.



*Bothus pantherinus* (Ruppell). The shy nature of the Leopard Flounder make photography a frustrating task.

# on the DRIFTLINE ~ ~ ~

## from Dubai, U.A.E.

I had a very interesting dive on 24 April on a large wreck near the coast of Umm al Quwain. Though I am not much into wrecks as such, they do provide for some surprising finds and this one proved to be no exception. The "Dara" was a 5038 ton passenger liner which was sunk when a time bomb went off causing a fire which sank the vessel in April, 1961, resulting in the loss of 238 lives. The sheer size of the ship meant that we could only cover the mid section which is now encrusted with Honeycomb Oysters (*Hyothis hyotis*) and sponges as well as a stunning soft white octocoral. The most significant find as far as I was concerned though was *C. arabica/C. grayana* which due to oxidation had formed a golden coloured dorsum. They are really quite impressive.

Once again many thanks for your prompt attention and good luck with the magazine which seems to have a bright future now that you have sorted all the printing problems out. Are we really going to see a return of a colour section? I think it is justified even if you have to increase the prices a little because there is so much more scope for including some of those much talked about opisthobranchs as well as the inclusion of some of the more varied forms of marine life worldwide, as it does not have justice done to it when reproduced in black and white. It may be of interest that when I suggested to Hawaiian Shell News that they should try to print more colour supplements, they in turn suggested that I should consider paying \$500.00 to help offset the costs! If that is a reflection of the costs involved then an increase of 50 cents per copy would be a small price to pay.

Just to update you on the progress so far regarding the book which I have written to you about on several occasions. It is currently at the publishers in Qatar to see if they will be willing to undertake the printing. If not I will have to start taking it around to other sources. About 350 species are described in some detail with sizes and habitat as well as field observations noted.

I decided at long last to get down and write a few articles that have been promised to you on several occasions and I have enclosed the first of them in this letter. I hope you will find it useful and a little indication of the life one finds in the Gulf. Of course the Gulf itself is a pale shadow when compared to the life found along the Batina coast of the Emirates (this is the narrow peninsula that juts out to the Straits of Hormuz), more of which I hope to describe in the fullness of time. -- A.J. Woodward, P.O. Box 9879, Dubai, U.A.E.

## from Mexico

We are a group of students and teachers working in a field museum of natural history, even though the physical size is small compared with many museums. Two sections of the project have already been opened -- the Herpetarium and the Aquarium. The staff are all volunteers; it represents something extremely important for us.

We are all biologists. The project has four main purposes: education, research, cultural and recreation. It is extremely important to educate our people on the nature of our country's natural resources and the necessity of conserving and preserving our wild life. Our public is mostly uneducated in this area. The museum's goal is to teach the importance of the coexistence of man and other species.

To do our work we need up-to-date information in the fields related to our work. The devaluation of the Mexican Peso has made literature inaccessible for a normal salary teacher or student volunteer. Donations of biological publications or subscriptions will be greatly appreciated. -- Martin Villa I. & David Lazcano, Jr, Museo de Historia Natural, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Apartado Postal - 513, San Nicolás de los Garza, N.L., MEXICO.

[ed. - We are sending along SHELLS and SEA LIFE and suggest that some of your club publications would be of interest and use. Extra copies of scientific reprints would also be well used.]

## from New York

I've subscribed to *Of Sea and Shore* when Mr. Tom Rice had the company. Later I was wondering what had happened to it and found out that a new owner had taken over, and that was *Shells and Sea Life*.

I still receive sea shells from all over the world, especially the Philippines and Australia since 1975 and have not been able to do any work on them, nor quite a few from when I was in the Navy from 1942-1946 Atlantic, Indian and Pacific Oceans. I need help and lots & lots of it. Without which I can't trade a single one. Even with all the books on them which number close to if not over 100. The photos are way different from the shells and this throws me off. I just can't get it through my head how to go about identifying them. I belong to the N.Y.S. Club, Hawaiian Malacological Society, Conchologists of America.

I will be going to Australia on December 26th of this year as I have done so twice before. In 1975 for 5.5 years and only came back because of a death in the family. I spent another six months there and I will be gone for six months this time if I can be arranged.

I am interested in worldwide shells in all groups but primarily with the marine cones, cowries, volutes, muricids, miters, olives and pectens, etc. -- Vincent Cusumano, 309 Court St., Brooklyn, NY 11231.

[ed. - Many people believe that we took over from Tom Rice - it is not true. We did give free subscriptions and advertising to Tom's customers so that no one would lose their money over another defunct shell publication. Tom is still alive and well at his same address. He is selling his dealer price list and directory and running the museum although he is seldom there and does not return our phone calls. Anyone who has ordered books or *Of Sea and Shore* issues or anything else should write to Tom.]

## from Georgia

Doug & Louise Compton won the DuPont Trophy at the Eighth Annual Shell Show of the Georgia Shell Club.

# Caribbean Simnia

Peggy Williams

Rt. 3, Box 28, Sarasota, FL 33580



There is often a reason why shells are brilliantly colored. Some of the greatest challenges in shell collecting can be finding live shells that blend so well with their environment as to be almost invisible. Such is the case with *Simnia uniplicata* (Sowerby, 1848), the Single-toothed *Simnia*. Though the shells are nearly an inch long (thus clearly visible) and brilliant magenta or lavender in color, they are seldom collected live because of the remarkable camouflage the brilliant color provides.

They live on soft corals, called "sea fans" and "sea whips," which are colored exactly the same as the shells. Moreover, the soft coral polyps are seen as small, feathery, white protrusions on the "stalk" of the sea whips, and the mantle of the *Simnia* has white papillae exactly copying the coral polyps. Therefore, the only way to find the shell in its habitat is to look for "bumps" on the stalk of the coral -- and then the bump is sometimes something else! However, I often find three or four shells on one coral -- it's a matter of looking until you see and recognize the shape.



# Current Addresses

We will list changes of address, new subscribers, and other addresses here as we receive them. Many of these changes come from the post office, which has been known to make a mistake & we also make mistakes. If you see an incorrect address here please notify us at once and we will publish a correction in the next issue. If you do NOT want your address listed here, please tell us when you write.

Andresen, Dolores; 214 Center St.; Valparaiso; IN 46383  
Bernard, John; Rt. 3 Box 74; Crossville; TN 38555  
Bodine, Carol; 3717 Brookside Dr., Michiana Shores; IN 46360

Bouchard, Dr. Raymond W.; The Academy of Natural Sciences; 19th Street and the Parkway; Philadelphia; PA 19103.

Brooks, Judy; 12109 Kingfisher Rd.; Crown Point, IN 46307  
Caldini, Carlos Hugo; Posadas 3101, (1611) Don Torcuato, Prov. Bs. As., Argentina

Chan, John G.; Div. Natural Sciences; University of Hawaii at Hilo; 1400 Kapiolani St.; Hilo, HI 96720-4091.

Cowles, Edward P.; 12 Hillcrest Ave.; New Rochelle; NY 10801; (914)-636-3136

Cross, Ellis R.; P.O. Box 1267; Port Angeles; WA 98362  
Cunningham, Ron, Sr.; 8319 Ellsworth Court; Merrillville, IN 46410

Druehl, Louis D.; Biology Dept.; Simon Fraser University; Burnaby, B.C. V5A 1S6; CANADA.

Fainzilber, Mike; P.O. Box 6012; 31060 Haifa; ISRAEL  
Forrest, S.S., Jr.; 6222 Louisville Dr.; Lubbock, TX 79413-5429

Gabelish, A.J. (Tony); 22 Kirkham-Hill Tce.; Maryland 6051; West Australia.

Hawaiian Malacological Society; P.O. Box 22130; Honolulu; HI 96822

Jacobs, Dr. Walter H.; 585 West End Ave.; New York; NY 10024; (212) 362-0223

James, Matthew J., Ph.D.; Lecturer in Geology; Sonoma State University; Rohnert Park, CA 94928; (707) 664-2304 or 664-2334

Katsaras, Nick; 27 N. Dean St.; Englewood, NJ 07631  
Knight, Ron; P.O. Box 108; Lorengau; Manus Island; Papua New Guinea

Kremer, Lee & Jan; 1000 N. Harrison, Algonquin, IL 60102

Long, Ruth S. & Kevin A.; 931 Sycamore; Corona; CA 91719.  
Lourbacos, Theta; 66 W. 94 St., Apt. 20C; New York; NY 10025

Maeda, Kazutoshi; 22-13, 6-chome; Shimouma, Setagaya-ku; Tokyo 154; Japan.

McTiernan, Nancy; 100 Remsen St., #5A; Brooklyn; NY 11201; (718) 855-1659

Massachusetts Natural Heritage Program; Division of Fisheries and Wildlife; 100 Cambridge St.; Boston; MA 02202; (617) 727-9194

Montgomery, David H.; Dept. Biological Sciences; California Polytechnic State University; San Luis Obispo; CA 93407; (805) 756-2446 (new phone).

Murray, Steven M.; Dept. Biological Sciences; California State University; Fullerton; CA 92634

Peel, Olive; Dept. Surveying & Mapping, University of Natal, King George V Ave.; Durban 4001; South Africa

Precious Treasures; 9435 Corsica Ave.; Baton Rouge; LA 70810-1134

Rockel, Dieter; 6930 Eberbach; Neckaranlage 6; GERMANY

Roussy, Henry P.; P.O. Box 215; Phuket 83000; Thailand  
Severns, Mike; P.O. Box 627; Kihei; HI 96753. (808) 879-6596

Spelling, Dan; 1094 Calle Empinado; Novato; CA 94949 (new ZIP Code); (415) 382-1126

Thorsson, Wes; 22 Waialeale; Honolulu; HI 96825

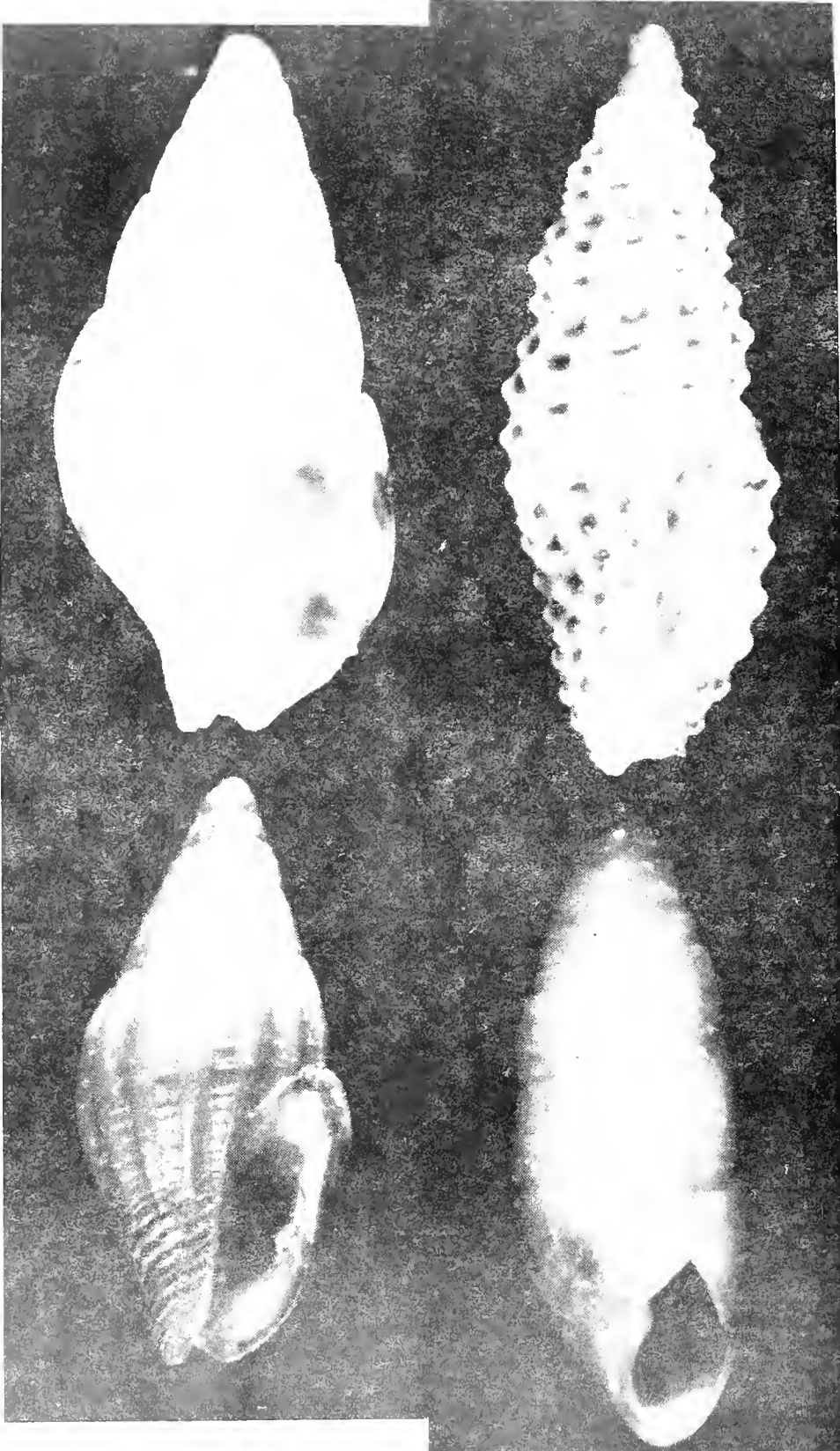
TIDE-INGS; Crown Point Shell Collectors Study Group, Inc.; P.O. Box 462; Crown Point; IN 46307

Weil, Arthur; 5662 Delhi Pk.; Cincinnati; OH 45238

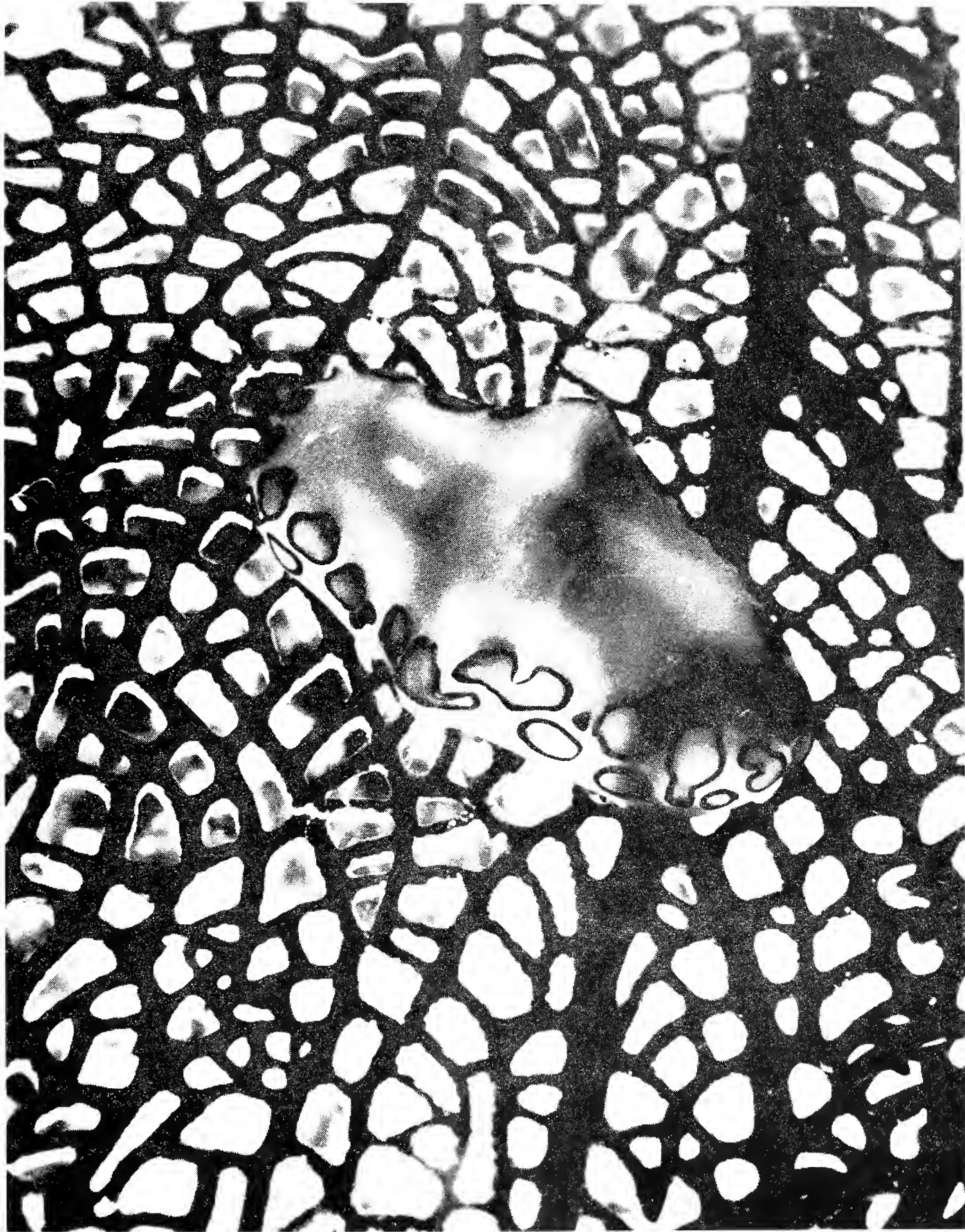
Werner, Milton; 70 Richmond St.; Brooklyn; NY 11208. (718) 277-2076

# Minute Shells

Photos by Bert Draper



Top left: *Anachis* sp., L 5.4mm, Kawaihae, Hawaii Harbor from Government Dredge 40-50ft, legit. B.C. Draper 10/81 in grunge. Top right: cf *Kermia* sp., L 4.1mm, Puhi Bay, near Hilo, Hawaii, collected by M. Goldsmith in 1982, tidepool 2-4m now in Draper collection. Bottom left: *Anachis* sp., L 3.7mm, Kawaihae, Hawaii Harbor from Government Dredge, 40/50ft, legit. B.C. Draper 10/81 in grunge. Bottom right: *Odostomia* (*Wesiodostomia*) cf *rosacea* Pease, 1868, L 5.9mm, Puhi Bay, Hilo, Hawaii, legit. Fred Baker, 1935 now in M. Goldsmith collection.





# CALENDAR

1987

## SEPTEMBER

**The Spell of the Shell**, September 18-20, Southlake Mall, at I-65 and U.S. Route 30, Merrillville, Indiana. Hosted by the Crown Point Shell Collectors Study Group and the Southlake Merchant's Association. Judges will be Russell Jensen and Gary & Holly Coover. Contact: Crown Point Shell Collectors Study Group, P.O. Box 462, Crown Point, IN 46307.

**Wreck Diving III**, September 20, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**American Littoral Society, 26th Annual Meeting and Cape May Birding Weekend I**, September 25-27, Friday noon through Sunday afternoon. Shepherd's Neck Inn, Montauk, New York. Contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Guam Shell Fair**, September 26-27, 22nd Annual Shell Fair of the Guam Shell Club, Agana, Guam. Contact: Capt. Alex Roth, Jr., Guam Shell Club, P.O. Box 7867, Tamuning, GU 96911.

## OCTOBER

**Broward Shell Club Auction**, October 14. Ben & Josy Wiener have volunteered to do the auction and Gary Magnotte will be the auctioneer. Proceeds going to the scholarship fund of a deserving marine biology student and to help defray club expenses. Donations of shells or shell-related items are requested. Please include all pertinent data, approximate value and your business card so you may be acknowledged in print. Contact: Ben & Josy Wiener, 1165 N.E. 105th St., Miami Shores, FL 33138.

**Western Society of Naturalists**, 15 October, Deadline for submission of abstracts for the Annual Meeting. See WSN December listing.

**Cape May Birding Weekend II**, October 16-18, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Society of Vertebrate Paleontology**, 47th Annual Meeting, October 22-24, Tucson, Arizona. Includes a benefit auction of books, field gear, laboratory supplies, artwork, casts, toys, teaching aids, t-shirts, filmstrips, models and other suitable material dealing with paleontology, evolution, geology, or biology. For information contact: Brent H. Breihaupt, Museum Curator, The Geological Museum, The University of Wyoming, P.O. Box 3006, Laramie, WY 82071. (307) 766-3386.

**American Academy of Underwater Sciences, Annual Meeting**, October 29-November 1, University Plaza Hotel, Seattle, Washington. Contact: Mike Lang, Biology, San Diego State University, San Diego, CA 92182. (619) 265-5387.

## NOVEMBER

**Suwannee River Canoe/Camp**, November 4-8, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Octopus and other odd invertebrates**, November 4, 7-9pm. Shedd Aquarium, 1200 S. Lake Shore Dr., Chicago, IL 60605. (312) 939-2426. Contact them for listing of fall classes.

**Assateague Fall Weekend**, November 19-22, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Bonaire Dive/Study**, November 20-27, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Oyster Dive II**, Chesapeake Bay, November 21, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

## DECEMBER

**Diver's Environmental Institute**, December 6, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Sanibel/Captiva Week**, Florida, December 12-19, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Western Society of Naturalists, Annual Meeting**, Joint Meeting with **International Society for Invertebrate Reproduction**, December 26-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman. Contact: David H. Montgomery, Secretary W.S.N., Department of Biological Sciences, California Polytechnic State University, San Luis Obispo, CA 93407. (805) 756-2446.

**Association Systematic Zoologists, A.M.A., A.B.S., T.C.S., I.A.A. & S.S.Z. Joint Annual Meetings**, December 27-30, Hyatt Regency Hotel. Contact: Mary Adams-Wiley, ASZ, Box 2739, California Lutheran University, Thousand Oaks, CA 91360. (805) 492-3585.

## 1988

### JANUARY

**Astronaut Trail Shell Show**, January 22-24.

**Greater Miami Shell Show**, January 29-31.

### FEBRUARY

**Broward Shell Show**, February 5-7.

**Ft. Myers Shell Show**, February 12-14.

**Sarasota Shell Show**, February 19-21.

**St. Petersburg Shell Show**, February 26-28, 41st Annual Shell Show. Community Center, 1 Park Place & 106th Ave., Treasure Island, Florida. Donation of \$1.50 per person (Children under 15 free with adult). Shell dealer sales during event. Show put on by members of the St. Petersburg Shell Club, Inc. Contact: Betty Lipe, 440 75th Ave., St. Petersburg Beach, FL 33706. (813) 360-0586.

## MARCH

**Sanibel Shell Fair**, March 3-6.

**Treasure Coast Shell Show**, March 19-20.

## JULY

**Conchologists of America**, July 11-15. Hosted by the Southwest Florida Conchological Society at the Sheraton Harbor Place, Fort Myers, Florida.

## NOVEMBER

**Hawaiian Malacological Society**, Tentatively early November for combined Shell Show and Auction.

## 1989

### AUGUST

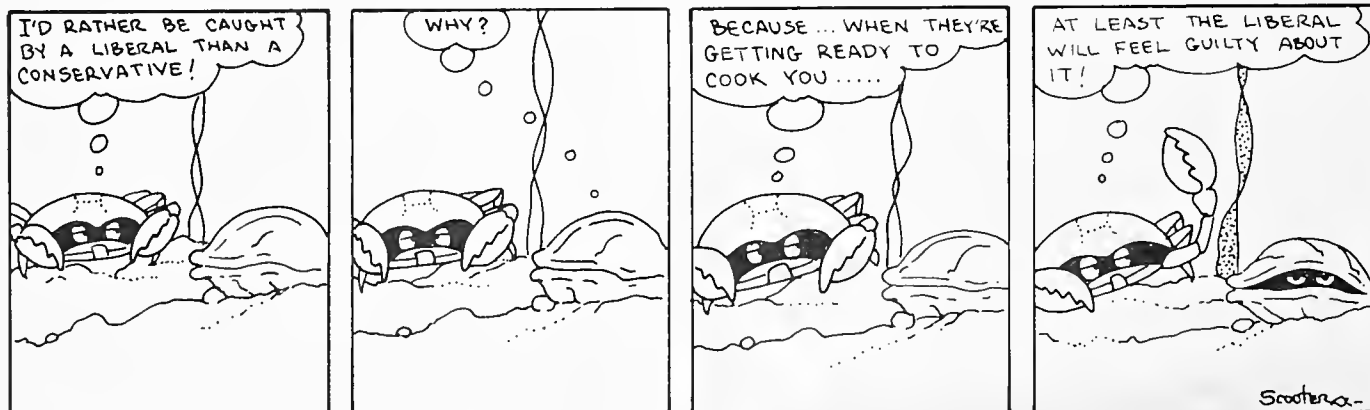
**International Society for Invertebrate Reproduction**, Meeting, August, Nagoya, Japan.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome individual club meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We especially like to hear of overseas shows and meetings. Commercial events are requested to use our **CLASSIFIED ADS**. We donate this space and appreciate receiving copies of your sponsor publicity.

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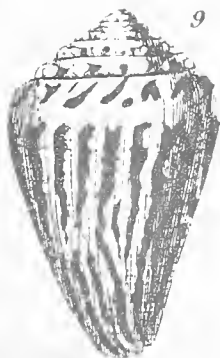
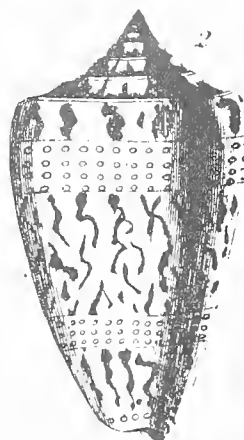
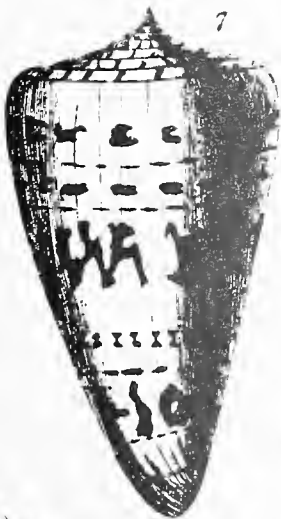
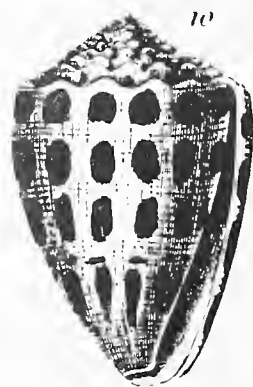
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PATRON: Dr. E. du B.-R. Marcus

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# Editor's Notes

We have printed many thousand pages since the September issue of *Shells and Sea Life* and we are beginning to get the hang of things a bit. We ordered some new screens for the photos, some new ink, and a better grade of paper to try out for this issue. No telling what the result will be until after we put the photos under the screens and see if the ink will stick to the paper. You will see the results shortly after we do.

*Shells and Sea Life* continues to evolve in new and exciting ways. Kurt Waldo is helping out with the printing for this issue. Sally hopes he will have time to help with the layout of issues soon.

The front and back covers come from old conchological books as do the center pages. We plan to use more of these wonderful illustrations from the older works in coming issues along with modern photographs. These should help with species identifications. The center pages are copies of actual plates, but the shells on the cover were rearranged and the smaller shells enlarged to fit the space available.

The various shell clubs and publications around the world seem to have one thing in common -- all need more subscribers. Printing, postal and other costs keep on rising and we all have a difficult time continuing publication. Please support shell publications.

We have reprinted several articles this month from various shell publications. This should give you some idea of what other publications are doing and also bring you some information you might otherwise have missed. Please send us articles you feel need wider distribution. If possible, send two original copies so we can reproduce with the best possible quality.

Thanks to all of our subscribers and supporters. We really appreciate your support and encouragement. We hope we are on the right track and that we will continue to learn and grow. Please continue to write, we love to hear from you.

*Steve & Sally Long*



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21. **ADVERTISING**

## Cover Illustrations.

The illustrations come from a folio-size loose color plate. We are unable to identify the source but it was drawn by Captain Brown and engraved by S. Milne. A few of the smaller cones have been enlarged. Identifications on the plate are as follows: 1. & 2. Matchless Cone - *C. Cedonulli*; 3. Tait's - *Taitensis*; 4. Diviner's - *Angur*; 5. & 6. Fumigated - *Fumigatus*; 7. & 8. Ornamented - *Monile*; 9. & 10. Hebrew - *Hebraeus*; 11. Tesselated - *Tesselatus*; 12. Marbled - *Marmoreus*; 13. Jasper - *Betulinus*; 14. General - *Generalis*; 15. Flea-spot - *Pulicarius*; 16. Franciscan - *Franciscanus*; 17. & 18. Stone-cutter - *Lithoglyphus*; 19. Music - *Musicus*; 20. Ceylon - *Ceylonensis*; 21. Plated - *Lamellosus*; 22. Bridal - *Sponsalis*; 23. Punctured - *Puncturatus*; 24. Geographic - *Geographicus*; 25. Striated - *Striaus*.

# The American Association for Zoological Nomenclature

Raymond B. Manning

*Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution  
NHB Stop 163, Washington, DC 20560, U.S.A.*

In response to an appeal by the International Trust for Zoological Nomenclature for financial support of the International Commission on Zoological Nomenclature, a group of American systematists formed the American Association for Zoological Nomenclature (AAZN) late in 1983. The founders and initial members of the AAZN's governing Council, all employees of various agencies of the United States Government, included Richard C. Banks, Bird and Mammal Laboratories, Fish and Wildlife Service, U.S. Department of the Interior; Bruce B. Collette, Systematics Laboratory, National Marine Fisheries Service, U.S. Department of Commerce; J. Ralph Lichtenfels, Animal Parasitology Institute, U.S. Department of Agriculture; Raymond B. Manning, National Museum of Natural History, Smithsonian Institution; S. Dillon Ripley, Smithsonian Institution; F. Christian Thompson, Systematic Entomology Laboratory, U.S. Department of Agriculture; and Ellis Yochelson, U.S. Geological Survey.

From its inception, the offices of the AAZN have been at the National Museum of Natural History of the Smithsonian Institution, which houses more than 100 professional zoological systematists, the largest concentration of systematists in the United States. The Museum has provided office space and rooms for meetings as well as support for duplicating and mailing. For the Smithsonian to be an integral part of this new organisation is most fitting, for the Smithsonian also had housed the International Commission on Zoological Nomenclature, and its first Secretary, C.W. Stiles, from 1895 to 1936; many of the early Opinions of the Commission were published in the *Smithsonian Miscellaneous Collections*.

The activities of the AAZN since 1984 have been largely been concerned with organizational matters and the development of rudiments of a support base in the United States from individuals and institutions. This was made possible by a start-up grant of \$1500 provided by S. Dillon Ripley, then Secretary of the Smithsonian, who recognized the importance of the work of the AAZN. Organizational activities included incorporation in the District of Columbia, a prerequisite to seeking tax-exempt status from the U.S. Internal Revenue Service, and recognition of the AAZN as a tax-exempt organization. Thus, from the beginning, memberships and contributions to the AAZN have been fully tax deductible for American supporters.

The AAZN has two primary purposes, (a) to raise money in the United States to provide direct financial support from American systematists for the work of the International Commission on Zoological Nomenclature through tax-deductible memberships and donations, and (b) to provide a liaison between the American systematic community and the Commission. Any new organization must develop some recognition, and AAZN activities since 1984 reflected this. Individuals, scientific societies, and other institutions were contacted to publicize the existence and the activities of the

AAZN. These activities helped the AAZN to achieve its primary purpose, and the establishment of a newsletter in 1985 contributed towards both objectives.

The present goal of the AAZN is to raise at least \$10,000 a year in support of the activities of the Commission. American systematists generate almost 25% of the workload of the Commission, so they should be willing to provide a reasonable amount of the funds required to keep the Commission operating.

In 1984 the AAZN contributed \$500 to the International Trust in support of the Commission's work. This was the first major financial contribution to the Commission from the United States. The 1985 contribution to the Trust from the AAZN was \$2000. The contribution for 1986 from the AAZN has not been determined by the AAZN's Council, but the amount should be substantially higher.

Membership in the AAZN totalled 110 individuals and 10 institutions in December 1985, and rose to 250 individuals and 15 institutions by the end of 1986. The following American organizations have provided support for the AAZN since 1984:

- American Entomological Society
- American Museum of Natural History
- American Society of Ichthyologists and Herpetologists
- American Society of Mammalogists
- American Society of Parasitologists
- American Type Culture Collection
- Biological Society of Washington
- Biosciences Information Service
- The Cleveland Shell Club
- The Crustacean Society
- Field Museum of Natural History
- Helminthological Society of Washington
- Harold W. Manter Laboratory, University of Nebraska
- National Museum of Natural History
- Point Loma Biology Laboratory
- Brayton H. Ransom Memorial Trust Fund
- Smithsonian Institution
- Society of Systematic Zoology
- Southern California Association of Marine Invertebrate Taxonomists

In 1987 the AAZN plans to continue to build a support base from individuals and organizations, working towards its present goal of 500 American members. In addition, its activities will include publicizing, in North America, the redesigned *Bulletin of Zoological Nomenclature* and publicizing and marketing the 1987 edition of the *Official Lists and Indexes of Names and Works in Zoology* in North America.

Interested persons are invited to write to Dr Raymond B. Manning at the address given above.

The preceding article reprinted from *Bulletin of Zoological Nomenclature* 44(1):5-6. March 1987.

# On the Tongan Reefs

Bob Purtymun

1200 Brickyard Way #407, Point Richmond, CA 94801

## 020986 Neiafu, Vava'u Island, Kingdom of Tonga.

Dive #1; 18.42.1S 174.00.6W Scuba 20-40 feet. 86 minutes. Maungai Point, Pangaimotu.

Sunday, Feb. 9, 1986. On almost all of the Pacific Islands, Sunday is a day to go to church. No work, no play, no cooking, and no anything. Cooking is done the night before. Work and play can wait, and you can do anything after midnight. Tongan law has been changed so this does not include the visitors nor the Tongan people that work in the tourist industry. Therefore, on our second day at Neiafu we were able to charter a boat and head out to a dive site for a day of diving and collecting.

Not one of the South Pacific Natives understand shell collectors. They expect all divers to dive the drop-offs and look at the magnificent coral and colorful fish. This is not the best place to look for shells, however there are a few shells that inhabit this type of area, so we always make a dive on at least one drop-off. We decided to try Maungai Point on the southern end of Pangaimotu. This was about a two hour boat ride from the Hotel. The base of the drop-off was in about 50 feet of water according to our chart.

The boat ride out to the dive site was pleasant. One of our party caught a nice skipjack that weighted about 6 pounds. That night the cook at the hotel made it into pupus (marinated raw with onions and herbs) for us to eat as hors d'oeuvres.

On to the dive site where we found the water fairly calm. Just a slight surge. The big boat stayed with 3 of our party who dove the deep side of the point. The snorkelers, Wes and I took the skiff and went to the other side of the point where Wes and I were dropped off in about 50 feet of water. The boatman said that he would be back for us in about an hour. Then he took the snorkelers on to a shallow area.

The coral was indeed beautiful and there was an abundance of colorful tropical fish. We drifted on down to the base of the coral wall where there were piles of broken coral and a few sand channels. My first find was a *Nassa sarta* (Bruguiere, 1789) under a coral slab. This is a *Cypraea* fiend. Ninety percent of this mollusc's diet is *Cypraea*. For many years I kept a close relative *Nassa situla* (Reeve, 1846) in my aquarium in Honolulu just to clean *Cypraea*. It did a great job!



*C. lithoglyphus*

This is not the best place to find bivalves, however it is the home of two species. In the sand channels under the coral rubble I found *Venus toreuma* Gould, 1850 and *Trachycardium orbita* (Sowerby, 1850). Also in this same habitat I found a Trapeziidae that defies identification. On the bottom of a large coral slab I found a *Pecten* attached by its byssus. No ID on this shell either. This completes the bivalves for this dive.

My best *Conus* find was a little *Conus magnificus* Reeve, 1843 about an inch long. It was under a coral slab in fine silty sand. On the hard coral substrate in cracks and crevices were a few *C. sponsalis* Hwass, 1792. In the coral rubble there were a nice *C. terebra* Born, 1778 and a heavily encrusted *C. lithoglyphus* Hwass, 1792. Both cleaned up beautifully.

Just before I ran out of air, in a pile of dead antler coral I found a gem *Cypraea carneola* (Linnaeus, 1758). It was my only Cyp of the dive. Also in this antler coral I found a *Turbo petholatus* Linnaeus, 1758. Here was the old jewelry maker himself with his bright shining green operculum.

Next month it's on to Mala Island.

Maungai Point, Pangaimotu. This dive was made on the face of a 40 foot high live coral cliff with valleys and sparse sand channels covered with dead coral rubble at the base.

### GASTROPOD

- 1 *Conus sponsalis* #4452
- 1 *C. magnificus* #7488
- 1 *C. terebra* nn
- 1 *C. lithoglyphus* #7489
- 1 *Cypraea carneola* #7058
- 1 *C. margarita* #4451
- 2 *Stomatella auricula* #12491
- 1 *Nassa sarta* nn
- 1 ?*Bursa* sp. #4450
- 1 *Turbo petholatus* #4453
- 4 *Pyrene turturina* #4454
- 1 *P. turturina* with a *Hipponix conicus* on dorsum #4455

### BIVALVE

- 1 ?*Pecten* sp. #12566
- 1 *Trachycardium orbita* nn (see K-556)
- 1 *Venus toreuma* #7560 (see K-570)
- 1 ?*Trapeziidae* sp. #12555



# Fighting Byne's Disease

by Ted Davies

In the June, 1986 *AMERICAN CONCHOLOGIST*, I offered my views on the cause of shell deterioration in areas with a seasonal hot-humid climate. Even before the issue hit the streets, a few of my friends asked where I dredged up my "Dew Theory." In a word, the source was my observation of rusty car bodies!

This calls for some elaboration. The major cause of car body rust is not winter ice and salt, but oxidative corrosion from the inside out. This applies especially to doors and other hollow body panels which have not been anti-rust treated by the manufacturer. It results when the heated car body cools rapidly after the engine is turned off. Even on a hot, dry day, the air immediately around the car contains a great deal of water vapor, a major product of the car exhaust, and this air is sucked into the cooling panels through drain holes. This situation is aggravated by many misguided drivers who "gun" the motor just before switching it off. Thus cars corrode from oxygenated dew, shells from carbonated dew.

The object of this paper is to present methods of improving the immediate environment of shell collections. I hope readers will offer other ideas and perhaps better ways to reduce the problem.

The identified sources of shell deterioration and my proposals for reduction of risk are:

1. **Woods of the *Quercus* (oak) genus, and no doubt others as yet not specifically identified.** It is ironical that the fathers of modern shell collecting, most of them resident in Western Europe, who established the restrictive and sometimes arbitrary rules for the organization and storage of shell collections, should have sowed the seeds of destruction of their own shells! They were of an elite class, well educated and wealthy. Oak was the wood of prestige, the symbol of accomplishment, thus most Victorian mansions and museums have oak-panelled walls and oak furnishings. If you're thinking that the specimens brought back to New England by ordinary sailors would have escaped this fate, bear in mind that most of these objects were exposed to the acid fumes of woodburning heaters and open fireplaces typical of the period.

Wood etches! Metal rusts! What to do? I favor the use of the many available systems of linking, acrylic-base, plastic drawers, sold under trade names like Lucite, Plexiglass and Perspex. These variable cabinet components are available worldwide. In any specific system, the drawer units have a constant depth, but vary greatly in width and height, based on multiples of a specific factor. Thin separators are available to compartmentalize each drawer, as are nameplates for the front face. They will not solve the long-term "dew" problem, but neither will they contribute any destructive factors to the atmosphere.

2. **All climates in which the hot and wet seasons coincide.** This type of shell erosion prompted the previous paper on the subject. The obvious answer is to avoid the nightly deposit of carbonic-acid-containing dew, by use of a dehumidifier. These devices are usually quite reasonable in cost and available in the areas where this dew effect exists. The only problem is that the built-in switch turns the device on when the air temperature starts to rise, and off before it drops to the minimum, so the cycle will operate several hours earlier than is optimum for our purpose. To overcome this, you may have to bypass this switch and use an ordinary external timer, set to start about 1600 and to run for three or four hours.

Of course there are other ways to protect your shells. These all involve coating the shells with a transparent, inactive substance. If this suggestion raises your hackles, please consider your personal reason for spending money and time on your shells. Is it for research purposes, where the shell may suffer some kind of physical or chemical damage? If so, you will surely choose the least perfect and least valuable specimen. If you collect for any other purpose, including study, display and simple pleasure, this is certainly the most direct way to preserve your shells. Actually, the coating of shells was permitted by the nabobs who drew up the original code

for collectors; they promoted "a light coating of mineral oil." Percy Morris writes that "some workers (meaning professionals) use olive oil" which "becomes rancid — and attracts insects. Never coat your shells with lacquer, varnish or shellac." This latter advice is certainly valid, since these substances tend to chip and darken, and some of the driers used in their preparation would probably attack the shell surface.

Of course you can ensure the highest level of permanency and artistic display for a few special prizes in your collection by embedding the entire shell in plastic. If you only have a few specimens to embed, it is best to have this done by someone with experience. Of course you must realize that this embedding treatment permanently converts your specimen to an ornament.

3. **Storage conditions favorable to the growth of molds and fungi, and exposure to harmful, volatile substances.** As suggested in the previous article, these sources of erosion can easily be eliminated by locating the shell collection as far as possible from the kitchen and laundry areas, and on the shady side of the house where temperature variations are minimal.

Above all, it is important that you keep everything in a reasonable perspective: ninety-five percent of the material in most collections is very common and easily replaceable, and the value of your precious collection in fifty years will rest mainly in the fact that "this was Grandma's favorite shell." So take it easy and remember that a hobby is for relaxation and pleasure.

4. **Natural fossilization.** The mollusk shell consists of microscopic hard crystals of calcium carbonate embedded in a matrix of organic tissue deposited in ultra-thin layers by the mantle. Over varying time spans, ranging from decades to millennia, the hard crystals convert to much softer limestone and the animal material disappears. The process of fossilization is complete. We have learned to delay it, but the end is inevitable. With sadness I think of this relentless deterioration whenever I listen to my best-loved music, Franz Liszt's "Les Preludes." At the top of the original score, he wrote, "Life is but a prelude to death."

Reprinted from *American Conchologist* 15(3):15, September, 1987. See S&SL this issue, page 10 for additional information.



What is it?

46. Tube Worm. *Spirobranchus* sp. Photo by E.R. Degginger.

# Reader Forum

## from "The Festivus"

(Vol. XIX(8):74.)

### CHANGES AT THE SAN DIEGO NATURAL HISTORY MUSEUM

The San Diego Natural History Museum has announced the hiring of Dr. Richard C. Brusca, of the Los Angeles County Museum of Natural History, who will take the newly created Joshua L. Baily Chair as Curator of Marine Invertebrates. The announcement indicated that this has been made possible by the Joshua L. Baily estate. In addition, the Museum has agreed, at Dr. Brusca's request, to provide a full-time permanent salaried collections manager for the Marine Invertebrates Department. These events have resulted in the phasing out of all part-time paid employees in Marine Invertebrates. The initial phase was the termination of Curatorial Assistants Cordie M. Hertz and Barbara W. Myers and Secretary Theo H. Fusby as part-time paid employees effective July 1, 1987. The second step is the elimination of Anthony D'Attilio's part-time position at the Museum effective October 1, 1987. Anthony D'Attilio joined the Museum as a part-time employee in 1969 during the tenure of Dr. George E. Radwin and has been Acting Curator of the Department for a number of years. Mr. D'Attilio and his associates have been encouraged to continue to utilize the Museum's facilities in an informal and purely research capacity.

Dr. Brusca, who has written extensively on the invertebrate faunas of the eastern Pacific and whose primary area of expertise is in marine isopods, assumes official responsibility for the Department on September 1, 1987. Since more than 99 percent of the Department's current collection is molluscan, it is hoped that the Museum and Dr. Brusca will see fit to hire a malacologist as the collection manager.

The changes at the SDNHM are of great concern to all U.S. malacologists and have prompted resolutions from the major malacological organizations in this country -- the American Malacological Union and the Western Society of Malacologists. Copies of these resolutions with the letters sent were received by The Festivus. They are printed below with the resolutions enclosed in quotation marks.

### NEWS RELEASE FROM R. TUCKER ABBOTT

Outraged and dismayed at the emasculation of mollusks facilities belonging to the San Diego Natural History Museum, despite recent large benevolent gifts, the members of the American Malacological Union voted at their July annual meeting in Key West to send the following petition to the San Diego Museum's Board of Trustees:

"Whereas the American Malacological Union, a 56-year old society of over 600 professional and private malacologists, is concerned about the welfare of its science and the centers of malacology research in the Americas, and

Whereas the San Diego Society of Natural History and its Museum of Natural History have been a major center for mollusk collections and malacology research for the last 75 years, and

Whereas major contributions in collections and funds by Herbert N. Lowe, E.P. Chace, A.M. Strong, Joshua L. Baily Jr., and others have made possible San Diego's continuing leadership in this major taxonomic field, particularly vital to the development of Pacific Coast science,

We, the members of the American Malacological Union respectfully request that the Board of Trustees continue to support malacology by staffing their museum with a professional Ph.D. malacologist well versed in the modern methods of taxonomy, systematics, biology and collection curation of mollusks."

### FROM KIRSTIE KAISER, SECRETARY OF THE WESTERN SOCIETY OF MALACOLOGISTS

"The Western Society of Malacologists regrets the decision of the San Diego Natural History Museum to terminate their longstanding program of molluscan research by allocating the Joshua L. Baily Fund revenue to support non-molluscan research in the Department of Marine Invertebrates."

It is our sincere hope that in the coming weeks you will consider a malacologist for Collections Manager in the Marine Invertebrate Department.

## Caulerpa & Berthelinia

Peggy Williams

Pl. 3, Box 28, Sarasota, FL 33580

While snorkelling near shore in Honduras, I recognized a clump of algae as a species of *Caulerpa*, which I have read, hosts the bivalved gastropod, *Berthelinia caribbea* Edmunds, 1963. According to the instructions on collecting this species, one should put the algae into a bag and shake it out into a container to loosen the mollusks from it. This I did, and I was successful in dislodging a couple of green fishes and crabs as well as the mollusk in the picture. The species, however, was not the one I was seeking, but *Lobiger souverbii* Fischer, 1857, with a thin, bubble-like shell far too small to contain the animal. The shell is nearly transparent, whereas the animal was bright green, matching its algal host.



# on the DRIFTLINE ~ ~ ~

## from Seattle, WA

Ron Shimek, 11248 Military Road South, Seattle, WA 98168, (206) 243-8354. Just a short note saying I appreciated getting a copy of the *Opisthobranch* the other day. I suppose scaphopods, my major interest of late, don't qualify for newsy items in a newsletter of such title, but they really don't fit elsewhere either. Anyway, my first article on scaphs will be out in the January *Veliger*. Will send you a reprint whenever they arrive, hope that qualifies me for continued mailings.

I am editor of the Scaphopod chapter in the upcoming multivolume treatise, "Microscopic Anatomy of the Invertebrates," and this along with the rest of my work on scaphs from Bamfield is keeping me pretty busy.

[*Cyphoma* (S&SL September, 1987) printed upside down. Probably doesn't make much difference to either the *Cyphoma* or the gorgonian but our apologies to Ron.]

Have been unable to do as much as rapidly as I want on either my science or my photography, but such is life I guess.

## from AAZN Newsletter

As of July 30, 1987, our membership comprised 237 individuals and 20 institutions. This is still well short of our goal of 500 members, the number we will need to be able to provide an annual contribution of \$10,000 to the International Trust for Zoological Nomenclature. We need some help in signing up new members.

Support of the American Association for Zoological Nomenclature by the National Museum of Natural History. Through the generosity of its Director, Dr. Robert S. Hoffmann, the National Museum of Natural History, Smithsonian Institution, has agreed to provide support for operations of the business office of the AAZN, which have been housed in the museum since its inception. This means that every cent raised by the AAZN can go to support the work of the International Commission on Zoological Nomenclature.

As a result of several inquiries about student memberships in the AAZN, at its annual meeting in January, the members of the AAZN present voted to establish a student membership, with an annual fee of \$10.00.

Please remember that the Annual Meeting of the AAZN will be scheduled each year during the last week of January.

So far as we can determine, using the advice of a licensed CPA, AAZN dues can be considered tax-deductible in the United States. The determining factor, apparently, is in the nature of what members receive for their dues, basically a newsletter. As that newsletter also is available free to non-members, members of (or contributors to) the AAZN receive no special benefit, like a journal, so all dues can be considered a contribution.

[Individual member: \$20, patron: \$100; Society or Institution member: \$50-\$150, patron: \$1000.]

## from San Diego, CA

Ron Velarde is still with the Point Loma Biology Lab, 4077 N. Harbor Dr., San Diego, CA 92101.

## from Sarasota, FL

I collect extensively, especially in my home of West Florida, also in southeast Florida & the Caribbean. I would be pleased to provide preserved specimens (if I can find them) to researchers who need animal tissue for dissection. I also have species/locality lists for many areas of Florida and the Caribbean. -- PEGGY WILLIAMS, c/o 7201 Brandenton Rd., Sarasota, FL 34243.

## from Humboldt Co., CA

ACTIVITY AMONG SHELL COLLECTORS IN NORTHERN CALIFORNIA. It all started when Mr. Garcia donated the contents of a shell shop to the Nature Discovery Volunteers for use in the Humboldt County Schools. This group which has been taking nature programs to schools sorted and identified the shells and distributed collections to schools for use in the classroom. The publicity from this activity prompted gifts of shell collections from China by the Ely family and from the Philippines by Diann Bruhn. After 3 years of work a reference collection of over a thousand species was assembled, a group of shells was set aside for volunteers to take to schools, and in June 1987 a shell show was offered for all interested to view. Dr. Doris Niles, a leader in NDV and a teacher of various topics about nature, assembled a collection of local shells which contributed to the enthusiastic response of those who attended the show. Many collectors who were previously unknown arrived at the show and started some talk about forming a group. When a suitable location for display can be found the reference collection will be available for the schools and for anyone interested. -- Louise Watson, Arcata, California

## from West Newton, MA

My husband's name is A.G. Melvin not O.G. Melvin. I didn't notice this error in your publication earlier. Due to a fall I have been in the hospital for 6 months and unable to write for a long time as a dealer or with other correspondence.

I think your publication *Shells and Sea Life* covering as I have found it in its June supplement 4 points: Publications, Clubs, Books in Print and Dealer Directory, as an excellent tool for collectors. -- L.S. Melvin, 863 Watertown St., West Newton, MA 02165. [ed. My apology. The wonderful thing about computers is that they allow you to repeat an error consistently—you don't have to repeat the error manually.]

## from Santa Ana, CA

Hans Bertsch is working in Southern California. His current address is: P.O. Box 25797, Santa Ana, CA 92799.

## from Jacksonville, FL

In S&SL 19(7):4, several typographical errors slipped in. *Conchologia* NOT *Conchologica*; *Bruguiera* NOT *Burguiera*; *Gmelin* NOT *Gemlin*; (Linnaeus, 1758) NOT (Linnaeus, 1750); *Link*, 1807 NOT *Lamarek*, 1807. Our apologies.

## from San Diego, CA

We have been on the go this year. First one month in the Philippines, then to Okinawa for two weeks, then to Hawaii for two weeks. We arrived home the middle of March and two days later I was in Imperial Valley working.

We have been on two trips, collecting, photographing and diving in Baja, Mexico. Then the middle of July Ron McPeak, Ken Lindahl and I went to Mazatlan, San Blas and the mountains between Mazatlan and Durango. We were beetle hunting, sightseeing and diving. Beautiful country. Now I have just come back from Imperial Valley again. Peg had an operation on one eye to transplant a cornea and replace the lens. She is doing fine and sees much better although it's still too early to tell how good it is going to be. It will be 6 months to a year before they do the other eye. -- Dave & Peg Mulliner, 5283 Vickie Dr., San Diego, CA 92109

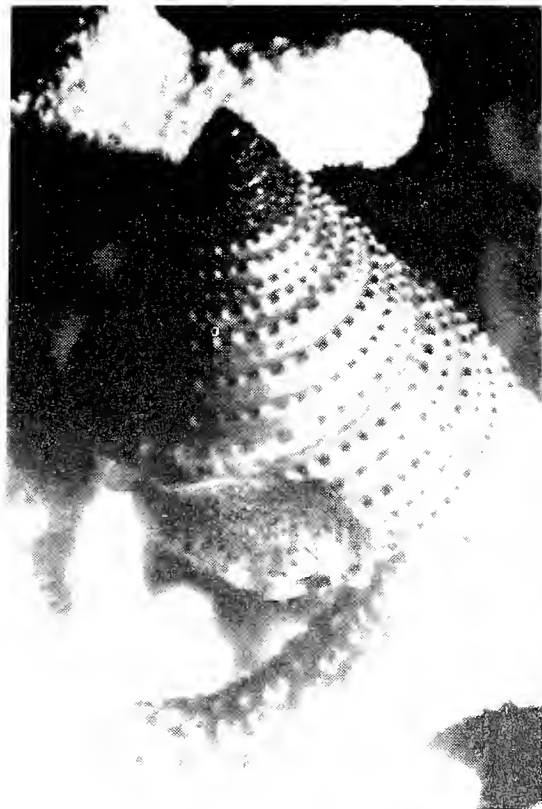
## from Hasselt, Belgium

Still making a lot of publicity for you. Half the people from the Netherlands and Belgium have my recommendation for your magazine. I'm busy on a beautiful stand for the big auction next month [October] at Antwerp. Shall send a picture. Had a lot of luck on my shelling trip in the North of Italy (Adriatic Sea). As well on my own as in trading with Italian collectors. A treasure of ten thousands became mine. Been with fishermen in the wide open sea. Amazing. -- Gerard Venken, Schoolstraat 21, B-3500 Hasselt, Belgium.

## from Miami, FL

Bob Wagner is busy keeping the *Standard Catalog of Shells* records up to date. Write him about shells you think might be the biggest of their species. He is eager to receive your size listings, so long as the data is complete. When you write, be sure to include the full proper name of the shell, the exact size, measured with calipers, the owner's name, the date collected or acquired, the locality of collection and who verified the measurement. -- Bob Wagner, 19751 S.W. 79th Court, Miami, FL 33189.





*Calliostoma annulatum* Lightfoot, 1786, Purple Top Snail, Pt. Lobos, Monterey, CA, January, 1984.



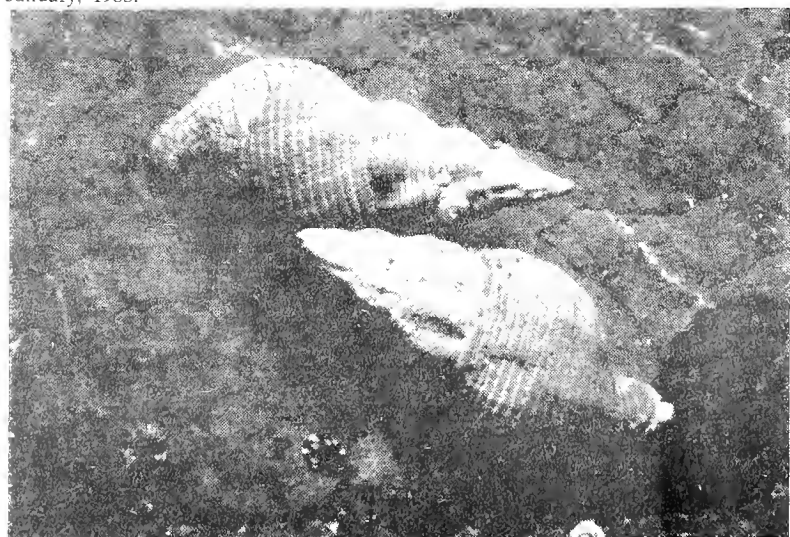
*Bulla gouldiana* Pilsbry, 1893, California Bubble Snail, Anacapa Island, CA, June, 1985.



*Simnia vidleri* Sowerby, 1881, Vidlers Simnia, Platt Harbor, Santa Cruz Island, CA, September, 1984.



*Cilamys hastata* (Sowerby, 1842), Spear Scallop, Campbell River, Vancouver Island, January, 1983.



*Ceratostoma foliata* (Gmelin, 1791), Leafy Hornmouth, Campbell River, Vancouver Island, January, 1983.

Photos by Marc Chamberlain



## FROM BISHOP MUSEUM

### GRANTS TO AID COLLECTION, PROMOTE ACTIVE ROLE

Thanks to recent grants from Hawaii's Cooke Foundation and a federal agency, the Bishop Museum Department of Zoology is more than \$31,000 closer to providing improved care for its malacological (mollusk) collections and planning for active research on them.

The Cooke Foundation, Ltd. has provided \$20,000, and an additional \$11,550 was received from the Institute of Museum Services' Conservation Support Program.

The grants will be used to temporarily hire a conservator to study a shell deterioration condition known as "Byrne's disease" and to install air conditioning in the collection area to help reduce its effects. The conservator also is expected to recommend a new permanent storage system that will eliminate this problem.

Dr. Allen Allison, chairman of the Department of Zoology, said considerable progress has been made during the past year toward his department's goal of again becoming a major, active malacological research centre.

"A significant number of donations have been received, and we are presently using these funds to employ a collections technician and to purchase needed equipment," Allison said. He credited this progress to the combined efforts of a number of individuals and organizations, including the Hawaii Malacological Society.

To realize the goal of increased research activity, Allison said, "We currently are raising funds to endow a chair in malacology; that person will initiate an active research program bringing additional use and support to the collection."

Starting with material collected in 1837 and now including more than six million specimens, Bishop Museum's mollusk collection is the eighth largest in the United States. The terrestrial mollusk (land snail) collection, which is two-thirds of the total, is the third largest in the country and also is the world's largest and most complete collection of Pacific Island land snails.

Assembled largely through the efforts of the late Charles Montague Cooke Jr., who was a Bishop Museum malacologist from 1902 to 1948, Bishop Museum's collection represents marine and land mollusks from Polynesia, Micronesia and parts of Melanesia. A prominent American malacologist calls the collection "without equal".

Bishop Museum's malacology collection represents a very valuable resource for scientific research, notes University of Hawaii genetics professor Dr. Hampton Carson, who recently was a

Bishop Museum trustee. It is a record of now-extinct species that were once known to have existed in Hawaii, he said.

The land snail collection is particularly outstanding in illustrating the story of "speciation" — how shells with just a few common ancestors evolved in isolated valleys and ridges of the Hawaiian Islands into distinct species.

Land snails, along with insects and birds, were among the few animals that originally arrived on Pacific islands without human aid. They may have come on the feet or wings of birds or drifted across the sea in floating vegetation.

Today there are approximately 1,000 species of native land snails in Hawaii; of those, 99.7 per cent are endemic (found no place else in the world). Hawaii provided a very good snail habitat, and because there were only a few original colonizers they rapidly evolved into many different species.

For 46 years Dr. Cooke dedicated his career to assembling within Bishop Museum as complete a collection as possible of Pacific land snails from Polynesia, Micronesia and parts of Melanesia. He envisioned the museum as a "Mecca" to which specialists might turn for study material and find practically all of the species assembled and the preliminary segregation work completed.

While Cooke used the best technology available in his time, he could not have anticipated the long-term effect upon the shells of acids in the cardboard storage boxes and wooden storage cabinets, Allison added. This has brought about Byrne's disease.

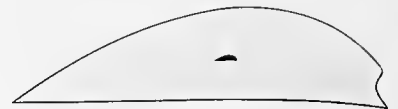
The disease is a persistent problem in malacology collections in which acids released from such containers cause chemical decomposition of the shells. Adding to this serious problem in Bishop Museum's shell collection is exposed to high temperature and humidity, which promote the chemical reaction.

Although air conditioning, when installed, will reduce the effects of Byrne's disease on the collection, the problem will not be eliminated completely until all shells are transferred to a better storage system. Installation of the new system, once selected and obtained, and transfer and labeling of the shells will take several years.

Reprinted from Keppel Bay Tidings 25(6):6  
February - March, 1987.

## USE OF THE SCANNING ELECTRON MICROSCOPE (SEM) IN MALACOLOGICAL RESEARCH

In 1979 a remarkable mollusk, a species of the "living fossil" group of monoplacophorans, *Vema hyalina*, was described by Dr. McLean in the museum's Contributions in Science series (number 307). The species lives at the edge of the continental shelf in southern California. Other members of this group had been known only from abyssal depths. *Vema hyalina* is also a true micromollusk, for the maximum length was only 2.3 mm. The SEM played an important part in revealing the fine structure of this microscopic species, enabling a close look at the soft body of the animal, the texture of the shell, and the radula ribbon, or teeth, of the mollusk.

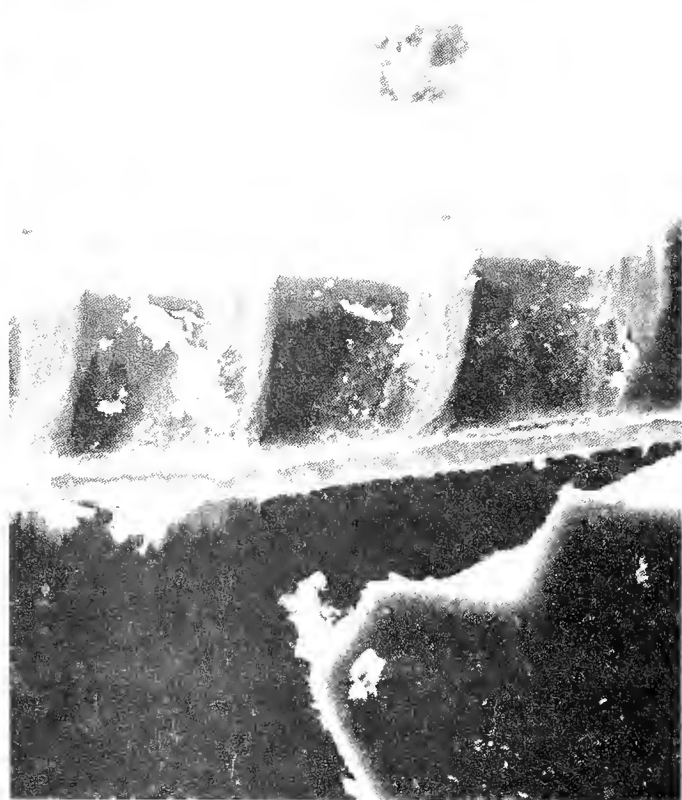


Outline view of lateral profile of the shell of *Vema hyalina*, anterior end at right, compared to the actual size (2.3 mm in length) of the specimen (the small figure in the center).

Reprinted from Terra 22(6):26-27  
July/August, 1984.



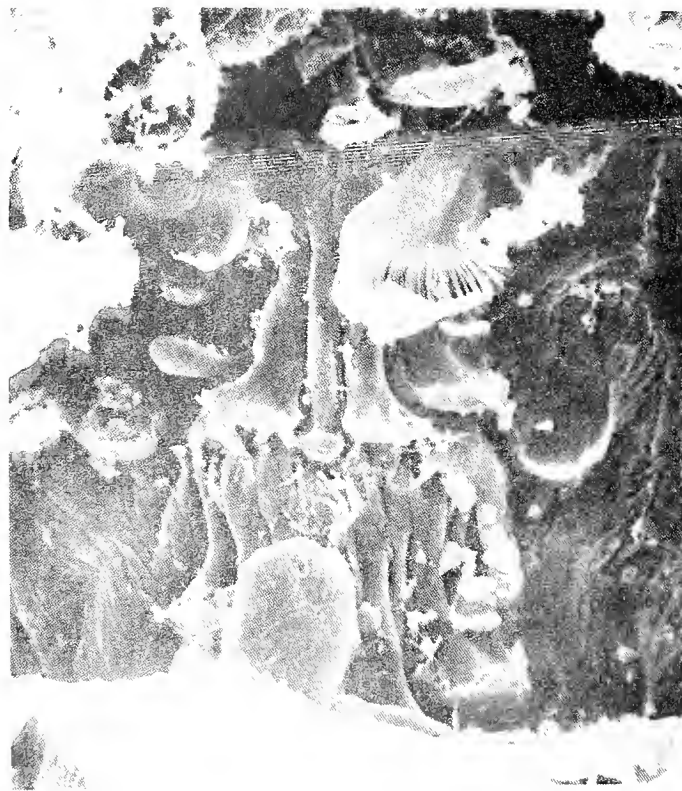
Macrophotograph of preserved specimen attached to shell; the head is toward the top; the foot in the center is surrounded by six pairs of forked gills.



SEM photograph of broken edge of shell at a magnification of 1100 times. The shell structure is shown to consist of hexagonal prisms.

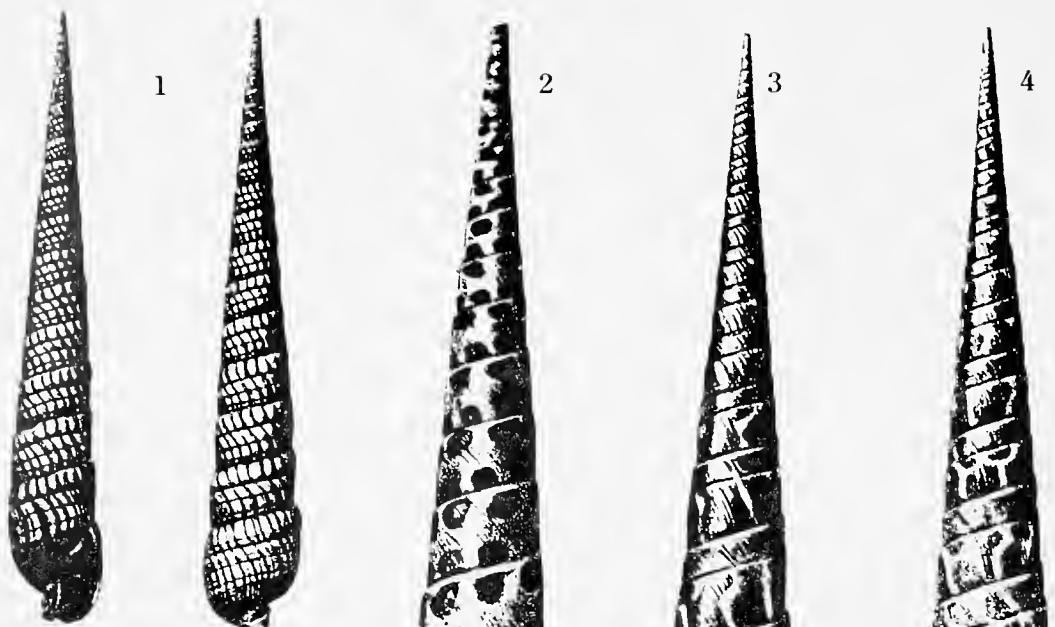


SEM photograph of head region of critical-point dried specimen at a magnification of 190 times, showing the radula in the open mouth.

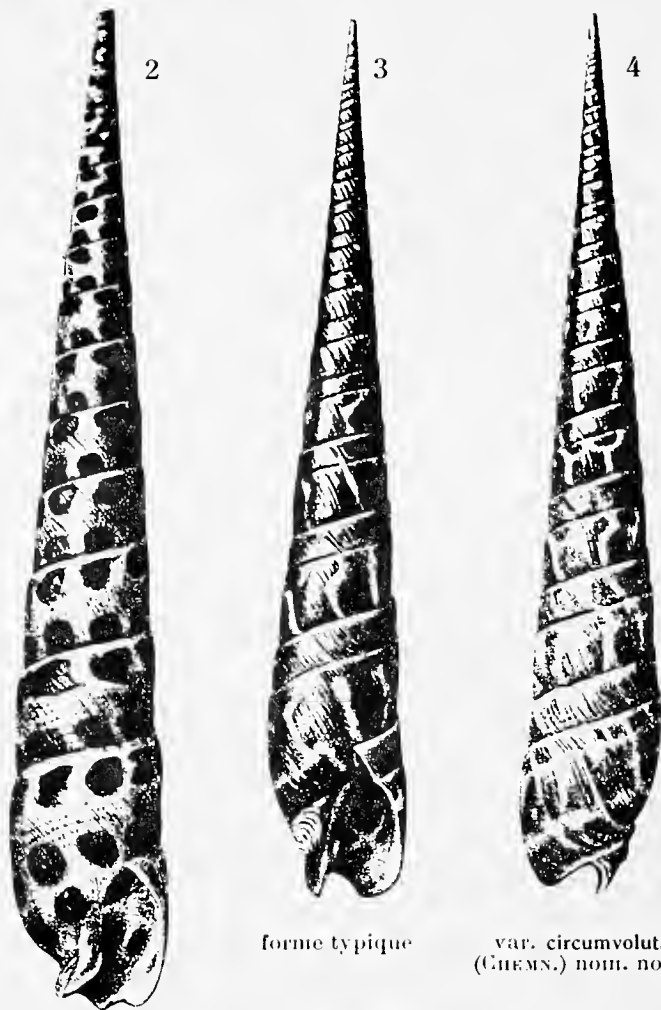


SEM closeup of open mouth of same specimen showing the row of teeth on the radular ribbon. Magnification 900 times. The outermost tooth in the row is broad and has a comblike fringe.





*Terebra babylonia*  
LAM.



forme typique

var. *circumvoluta*  
(CHEMN.) nom. nov.

*Terebra dimidiata* (L.) GMEL.

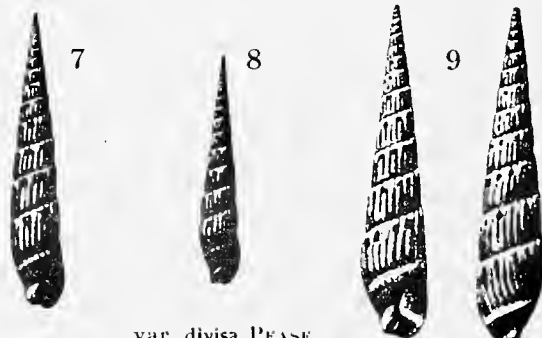


forme typique

var. *fimbriata*  
DESH.

*Terebra crenulata* L.

*Terebra subulata* L.

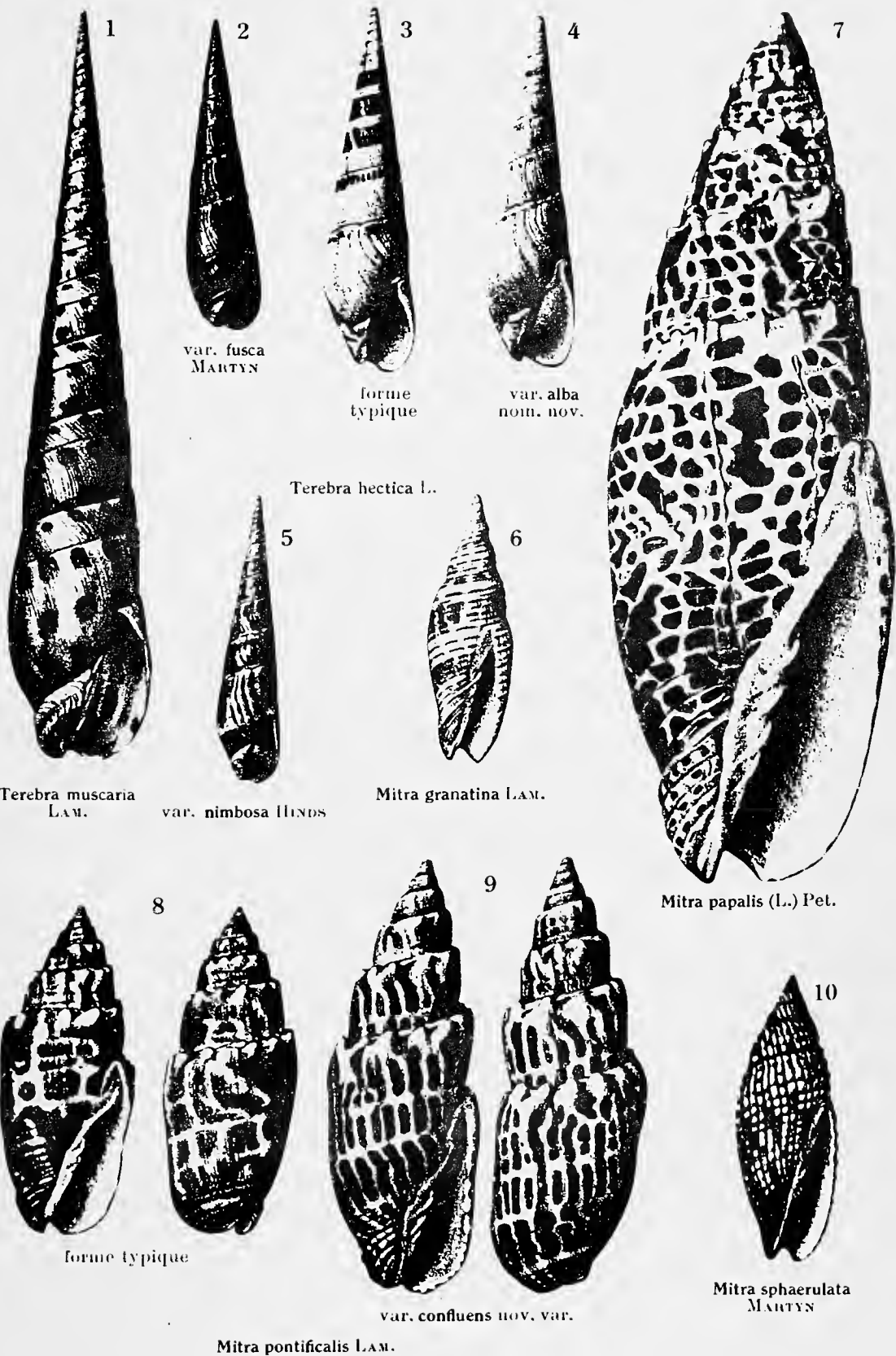


var. *divisa* PEASE

forme typique

var. *Verreauxi* DESH.

*Terebra strigilata* (L.) BOHN.



# PUBLICATION NOTES

## Collectible Shells. Listen Along!

R. Tucker Abbott  
1987

Includes *Collectible Shells of Southeastern U.S., Bahamas & Caribbean* book and a 90 minute cassette tape *Exploring Collectible Shells*.

ISBN 0-915826-11-9

\$12.95

## Say it Right!

R. Tucker Abbott  
1987

Thirty-five minute cassette tape *How to Pronounce the Scientific Names of Seashells of North America*.

\$7.95

**Mollusks of Alaska.** A listing of all mollusks, freshwater, terrestrial, and marine reported from the State of Alaska, with locations of the species types, maximum sizes and marine depths inhabited.

Rae Baxter

1987

*Shells & Sea Life*, Bayside, CA, 164p, 8vo soft cover. Includes dredging records from Northern California, up the Pacific Coast, through the Dering Sea, and down to Japan. Data collected from years of commercial fishing records and the author's personal collecting data. Bibliography and complete index to scientific names.

\$18.95

## Nudibranchs of Southern Africa

A Guide to Opisthobranch Molluscs of Southern Africa



Terrence Gosliner

**Nudibranchs of Southern Africa.** A Guide to Opisthobranch Molluscs of Southern Africa.

Terrence Gosliner  
1987

Co-published by Sea Challengers, Jeff Hamman & E.J. Brill Co., 136 pages, 268 color photos, cr4to, color soft cover. Data on 269 species including 109 "sp." not yet named. Excellent color and information. Everyone interested in the opisthobranchs will need a copy of this work.

ISBN 0-930118-13-8 & 90-04-08420-7

\$34.95

## Book Review:

The opisthobranch molluscs have evolved from shelled ancestor which, over time, lost their shells and developed expanded soft parts. Gradually the shell became enveloped, reduced and finally lost. Freedom from the constriction of the shell resulted in a veritable explosion of elaborate form and vivid color. Unfortunately both are lost during preservation, so there has been little incentive for collectors to study these fascinating creatures. Recently, however, there have been a number of popular guides to opisthobranchs published that take full advantage of color photography. The latest is Terry Gosliner's *Nudibranchs of Southern Africa* which includes the non-nudibranch opisthobranchs as well.

The layout of this book is excellent. Most of the book is taken up by one column of color photographs, three to a page, and an opposite column of information on the animals. The photographs are large enough so that there is no feeling of constraint. This spacious feeling is aided by a format which lays the information beside the animals instead of alternating pages of photographs with pages of information. The photographs show the animals alive, healthy and in water with superb color rendition. The only flaws are a few underexposed photographs and some with air bubbles, confusing backgrounds or minor framing errors. But considering the size and rarity of the subject matter, the author did a tremendous job. In many cases he has presented us with the only photographs ever taken of these animals. Indeed, of the 268 photographed species, 92 are undescribed!

As with most identification guides, the reader's attention is captured by the photographs, but the real work of the author is in the writing. Just think of the difficulty involved in identifying 92 undescribed opisthobranchs down to the genus level when it was necessary to dissect out radulas and reproductive systems to do so. Also consider the time spent searching through old journals and reports to compile a list of the 205 species previously recorded from southern Africa. For that matter, try devising a key based solely on external characters for 268 species. All of these represent formidable tasks and require an unusual amount of expertise on the part of the author.

Dr. Gosliner is uniquely suited for the task of compiling this book because he brings with him experience working with both Atlantic and Pacific fauna. In many ways, his synthesis of the biogeography of southern Africa opisthobranchs (pp. 12-15) represents the best and worst parts of this book. Best because the overview emphasizes and illustrates important trends in endemism and Indo-Pacific affinities. Worst because the map on page 135, to which he doesn't refer, is insufficient to allow a reader to follow the discussions appropriately. Of course, if this is the worst deficiency I can find in the book, you can see that it is excellent indeed.

The introductory section also includes a general overview of important features of opisthobranchs, a basic glossary, and a large number of well-drawn illustrations by Bill Liltved. I felt that some of the illustrations would have benefitted from further reduction and that the gills of *Armina* (p. 27C) should have been illustrated in the context of the whole animal. But, in general this section will prove useful.

Who is this book for? Any opisthobranch specialist will be eager to obtain a copy, both to see the new ranges and to admire the wealth of previously unphotographed and undescribed species. Since a large portion of this book contains species that may be found throughout the Indo-Pacific, it is an essential reference guide for malacologists working in this area. However, a significant portion of the opisthobranchs are also found, or closely related to, species either in the tropical or temperate Atlantic and Pacific oceans, so its appeal is worldwide. Nor is it limited to specialists. The book is written for an intelligent amateur malacologist or would-be "brancher." There is information on collecting, indentifying and preserving opisthobranchs. The author encourages nondestructive identification of live specimens and their return to their environment. Where the specimens are undescribed, he requests they be preserved and shipped to him at the California Academy of Sciences where he can use them for future scientific study. -- SANDRA MILLEN. From *The Festivus*, 19(10):97-98

**Gastropoda Romaniae 2.** Subclasa Pulmonata. I. Ordo Basommatophora. II. Ordo Stylomatophora. Suprafamilie: Succinea, Cochlicopacea, Pupillacea.

Alexandru V. Grossu  
1987

Fourth publication in the *Gastropoda Romaniae* series with 442 pages, roy8vo soft cover, 237 text figures. Final volume in the series. Written in Romanian with summaries in English, Russian, French and German. Latin names. Includes detailed anatomical drawings.



**Hawaiian Shell News 1987.** August issue, 12p, ill, sm4to. Includes: *Zirfaea pilsbryi*, *Penitella penita*, *Tivella stultorum*, *Tresus nuttali*, *Schizothaerus*, *Mytilimeria nuttali*, *Amaronium californicum*, *Conus luzonicus*, *Achatina fulica*, *Euglandina rosea*, *Corbicula fulminea*, *Euchondrus albus*, *E. desertorum*, *Conus comptus*, *C. achaii-nus*, *C. eques*, *Mytilus californianus*, *M. edulis*, *Hinnites giganteus*, review of Petuch & Sargent's *Olives*, *Cypraea fultoni*, *Arina squamifera*, *Amphidromus heerianus*, *A. palaceus*, *A. porcellenus*, *A. sunatranus*, *A. peversus*, *A. alticola*, *Pupina junghuhnii*, *Rachis zonulata* and other species plus an article on systematics.

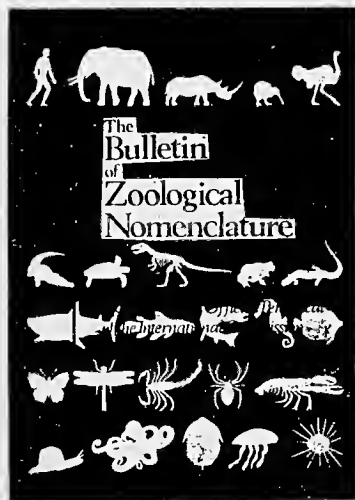


**Keppel Bay Tidings 1987.** June-July issue. 8p., ill, sm4to. *Ninella torquata*, *Ostrea angasi*, *Ocenebra muricoides*, *Muricopsis caribaeus*, *Fusus muricoides*, *Falsilyria sunderlandi*, *Velutina musica demarcoi*, *Conus harlandi*, *Chicoreus superbus*, *Cecilioides acicula*, *Helix aspersa*, *Haploeklaena maculata*, *Epitonium*, *Amoria maculata*, *Cypraea arabica*, *C. felina*, *C. vitellus*, *C. porterii*, *Cymbiolacca thatcheri*, *Cypraea xanthodon*, *Conus victor*, *C. chusaki*, *C. striatus*, Checklist Point Danger, Torquay.

**The Bulletin of Zoological Nomenclature.**  
International Commission on  
Zoological Nomenclature  
1987

Deals exclusively with zoological nomenclature. The official periodical of the International Commission on Zoological Nomenclature. Published quarterly, 8vo size. Contains applications to the Commission for rulings on nomenclatural problems in any field of the zoological and palaeontological sciences, comments and discussions on these applications, the Commission's official decisions on these applications (called Opinions), and articles on nomenclature and its relevance to systematics. [25% of all material deals with mollusks].

£53  
\$102.00



**The Official Lists and Indexes of Names and Works in Zoology.**

International Commission on Zoological Nomenclature  
1987

Records for the first time in a single volume all the animal names and the titles of works on which the International Commission on Zoological Nomenclature has ruled since it was set up in 1895. There are 9,900 entries and 366 pages in this hardbacked volume, size A 4 (210mm x 295mm). For easy reference the entries are arranged alphabetically in four sections: family-group names, generic names, specific names and titles of works. For quick identification of the status of each name, the List entries are in bold type and the Index entries are in non-bold type. A full systematic index gives an easy guide to all the names in each group that are to be found in the Official Lists. A list of all the relevant Opinions and Declarations completes this essential reference book for all zoologists and palaeontologists.

£60 International Trust for Zoological Nomenclature

\$110.00 American Association for Zoological Nomenclature

**New Caribbean Molluscan Faunas**

Edited by J. Petuch



**New Caribbean Molluscan Faunas.**  
by Edward J. Petuch  
1987

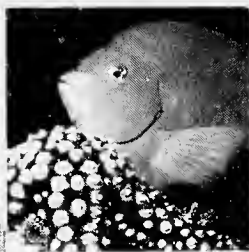
Coastal Education & Research Foundation, Charlottesville, VA, 158 pages, 29 plates, sm4to soft cover. Over 100 new taxa are described here. Many of them are forms or subspecies described from inadequate material. Unfortunately, anyone who is working with the fauna will have to refer to the work, if only to refute the names.

ISBN 0-938415-01-8

\$32.50

Diving and Snorkeling Guide

**The Channel Islands**  
Catalina  
Santa Barbara  
Anacapa  
more



by Dale and Kim Sheckler  
and the editors of Pisces Books

**Diving and Snorkeling Guide to The Channel Islands. Including Catalina, Santa Barbara, Anacapa and more.**

by Dale & Kim Sheckler and the editors of Pisces Books.

1987

Pisces Books, NY, 96 pages, color illustrations throughout, 8vo color soft cover. The excellent information we have come to expect, quality printing and beautiful photos. If you plan travel and dive this area you should include book with your dive gear.

ISBN 0-86636-076-X

\$9.95

**Diving and Snorkeling Guide to Southern California.** Including Palos Verdes, La Jolla area, Malibu and more.

by Dale & Kim Sheckler and the editors of Pisces Books.

1987

Pisces Books, NY, 96 pages, color illustrations throughout, 8vo color soft cover. Excellent coverage, quality printing and beautiful photos. If you plan to travel and dive this area you should include this book with your dive gear. Several living mollusks and other invertebrate photos included in each book along with reference list of dive shops and other diving information sources for the area covered.

ISBN 0-86636-078-X

\$9.95

DIVING AND SNORKELING GUIDE TO

**Southern California**  
Palos Verdes  
La Jolla area  
Malibu  
more



**Reef Fishes of the Sea of Cortez. The Rocky-Shore Fishes of the Gulf of California.**

by Donald A. Thompson, Lloyd T. Findley & Alex N. Kerstitch.

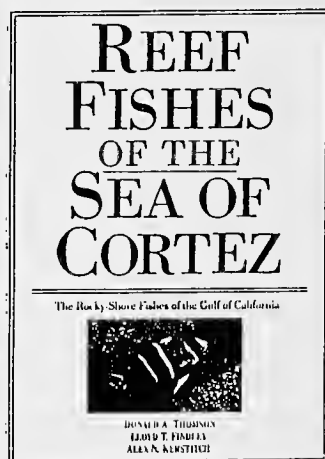
1987

University of Arizona Press, Tucson, AZ, 302 pages, 32 color plates, 117 photos, figures, cr4to alkaline paper, color soft cover. The original cloth edition was published in 1979.

ISBN 0-8165-0984-0

\$19.95

REEF FISHES OF THE SEA OF CORTEZ  
THOMPSON  
FINDLEY  
KERSTITCH



# The Oyster

Considered a delicacy by centuries of seafood connoisseurs . . . savored and sought-after by emperors, kings and queens . . . the finest oysters on earth are now available at your local seafood market at a price that makes the knowledgeable shopper smile.

Today, in carefully selected beds along the Pacific Coast, two of the most delectable species of oysters are sheltered, nurtured and farmed under the watchful eye of the modern oyster cultivator. At the moment of maturity, when the tender meat is at its tastiest, these oysters are whisked to markets and restaurants.

From there, the real fun begins because, as millions of enthusiasts have already discovered, the little oyster has a gentle, fascinating flavor that no other seafood can rival.

Oysters are a busy homemaker's delight. They can be served with no fuss or bother right from the shell, with a touch of lemon or cocktail sauce to tickle the palate. Or, they can be baked, broiled, steamed, fried, bisqued, creamed or scalloped in dozens of delightful, low-cost, time-tested recipes.

Here are just a few to get you going. The results are sure to surprise and please both family and friends.

## 1. Oysters Remick

24 shell oysters	½ teaspoon salt
2 cups mayonnaise	¼ teaspoon pepper
4 tbs. chili sauce	2 tsp. lemon juice
¼ teaspoon paprika	2 tablespoons butter
6 drops Tabasco sauce	½ cup bread crumbs
1 tbs. prepared mustard	4 slices bacon

Shuck and drain oysters; place on deep half of shells. Combine mayonnaise and seasonings. Spread mixture over oysters, and sprinkle with buttered bread crumbs. Place small piece of bacon on top of each oyster. Place oysters on preheated broiler pan about 3 inches from heat, and broil for about 5 minutes or until edges begin to curl. Serves 4.

Oysters may be purchased in three forms: Live in the shell . . . fresh or frozen shucked . . . and canned. Thanks to modern cultivation and transportation techniques, the tasty oyster is now available year 'round.

When buying oysters in the shell, remember that a tightly-sealed shell is even more assurance that the meat is at its freshest. Actually, an oyster in its shell will remain fresh for quite some time at a temperature of 36 to 42 degrees. HINT: Refrigerate your Belons with cup (curved side) down.

Shucked oysters refer to those already removed from the shell. When refrigerated, shucked oysters maintain their bright, fresh flavor.

Shucking oysters is recognized as a sporting event in many parts of the world. The record for opening 100 oysters is 3 minutes, 37 seconds. A dull-bladed knife is recommended. Carefully push the blade between the shells near the hinge and run it around until you cut the muscle that holds the shells together. Our advice: Leave the record alone.

Healthy and low-cal, too! Oysters are not only a tremendous source of protein, vitamins and minerals, but they are also low in calories . . . and low in cholesterol. Created by nature — nurtured and tended by man — the oyster is a unique and healthy addition to your family's diet.

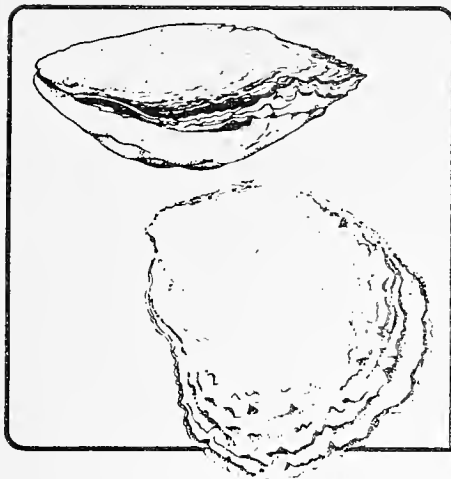
## 2. Oysters Rockefeller

36 shell oysters	½ tsp. celery salt
2 cups spinach, cooked	6 drops Tabasco
4 tablespoons onion	sauce
2 bay leaves	½ cup bread crumbs
1 tablespoon parsley	6 tablespoons butter

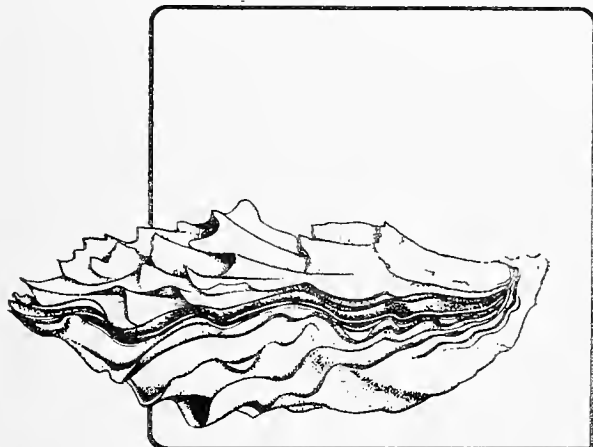
Shuck and drain oysters; place on deep half of shells. Put spinach, onion, bay leaves, and parsley through food grinder or blender. Add seasonings to spinach, and cook in butter for 5 minutes. Add bread crumbs and mix well. Spread mixture over oyster, and bake in hot oven 400° F. for about 10 minutes. Garnish with lemon slices. Serves 6.

### \* Opening Option:

For easy opening of oyster, place whole shell oyster in 400° F. oven for 5 minutes. Shell will be partially open from heat.



For decades, all of Europe has sung the praises of a magnificent oyster found in certain brackish waters along the Brittany coast of France. The Belon oyster, noted for its firm, tender meat and clean, fragrant flavor, is now being cultivated in Northern California. Shipped fresh to select seafood markets and restaurants, the Belon is the first choice of oyster gourmets who prefer to savor the sweet, fresh meat right from the half-shell.

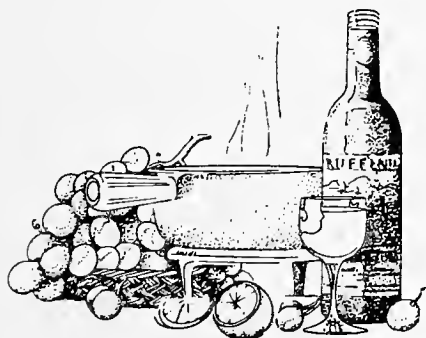


The Japanese, who've been diving for oysters through the past 500 years, are old friends with the hearty Pacific Oyster. Raised to perfection in local California, Oregon and Washington beds, the Pacific tastes excellent when simmered in the shell. Its large plump meat makes it the perfect candidate for family-sized feasts — served pan-fried, deep fried, broiled, or baked. A good rule of thumb is to serve four to six Pacifics per person. Or ask your seafood market manager to recommend an ideal size for the recipes you prefer.

### 3. Angels on Horseback (Pigs in Blankets)

2 10 oz. jars ex-small oysters  
12 slices bacon

Roll bacon around each oyster and fasten with toothpick. Place oysters on a rack in shallow baking pan and bake in hot oven 450° F. for about 10 minutes or until bacon is crisp. Serves 4.

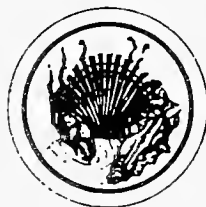


### 4. Broiled Oysters

24 shell oysters	1/8 teaspoon pepper
1/4 cup bread crumbs	1/8 teaspoon paprika
1/2 teaspoon salt	4 slices bacon

Shuck and drain oysters; place on deep half of shells. Mix bread crumbs and seasonings, and sprinkle over oysters. Cover oysters with pieces of bacon. Place oysters on a pre-heated broiler pan about 3 inches from heat, and broil for 5 minutes or until edges curl. Serves 4.

### North Bay Shellfish







# NOVEMBER 1987



SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY																																																																																				
1	2 Election Day	3	4 * Suwannee River Canoe/Camp, November 4-8, * Octopus and other odd invertebrates, November 4, Full Moon	5	6	7																																																																																				
8	9	10	11 Veterans Day	12	13 Third Quarter	14																																																																																				
15	16	17	18	19	20 * Bonaire Dive/Study, November 20-27 New Moon	21 * Oyster Dive II, Chesapeake Bay, November 21																																																																																				
22	23	24	25	26 Thanksgiving Day	27	28 First Quarter																																																																																				
29	30				<div>OCTOBER</div> <table> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td></tr> <tr><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td></tr> <tr><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td></tr> <tr><td>29</td><td>30</td><td>31</td><td></td><td></td><td></td><td></td></tr> </table>								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					<div>DECEMBER</div> <table> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td></tr> <tr><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td></tr> <tr><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td></tr> <tr><td>29</td><td>30</td><td>31</td><td></td><td></td><td></td><td></td></tr> </table>								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
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# DECEMBER 1987



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<div>NOVEMBER</div> <table> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td></tr> <tr><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td></tr> <tr><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td></tr> <tr><td>29</td><td>30</td><td></td><td></td><td></td><td></td><td></td></tr> </table>								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						<div>JANUARY</div> <table> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td></tr> <tr><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td></tr> <tr><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td></tr> <tr><td>29</td><td>30</td><td>31</td><td></td><td></td><td></td><td></td></tr> </table>								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					1	2	3	4 Full Moon	5
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6 * Diver's Environmental Institute, December 6	7	8	9	10	11	12 * Sanibel/Captiva Week, Florida, December 12- 19																																																																																				
13 Third Quarter	14	15	16 Hanukkah	17	18	19																																																																																				
20 New Moon	21	22	23	24	25 Christmas Day	26 * Western Society of Naturalists, Annual Meeting, Joint Meeting with International Society for Invertebrate Reproduction, December 26-30																																																																																				
27 * First Quarter	28	29	30	31																																																																																						

# CALENDAR

1987

## NOVEMBER

**Suwannee River Canoe/Camp**, November 4-8, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Octopus and other odd invertebrates**, November 4, 7-9pm. Shedd Aquarium, 1200 S. Lake Shore Dr., Chicago, IL 60605. (312) 939-2426. Contact them for listing of fall classes.

**Assateague Fall Weekend**, November 19-22, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Bonaire Dive/Study**, November 20-27, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Oyster Dive II**, Chesapeake Bay, November 21, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

## DECEMBER

**Diver's Environmental Institute**, December 6, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Sanibel/Captiva Week**, Florida, December 12-19, contact **American Littoral Society**, Highlands, New Jersey 07732. (201) 291-0555

**Western Society of Naturalists, Annual Meeting**, Joint Meeting with **International Society for Invertebrate Reproduction**, December 26-30, California State University, Long Beach, California. Dr. Don Reish will be the local chairman. Contact: David H. Montgomery, Secretary W.S.N., Department of Biological Sciences, California Polytechnic State University, San Luis Obispo, CA 93407. (805) 756-2446.

**Association Systematic Zoologists, A.M.A., A.B.S., T.C.S., I.A.A. & S.S.Z. Joint Annual Meetings**, December 27-30, Hyatt Regency Hotel. Contact: Mary Adams-Wiley, ASZ, Box 2739, California Lutheran University, Thousand Oaks, CA 91360. (805) 492-3585.

1988

## JANUARY

**Southwest Florida Shell Show**, normally mid-January.

**Astronaut Trail Shell Show**, January 22-24. Contact: Astronaut Trail Shell Club, P.O. Box 515, Melbourne, FL 32935

**American Association for Zoological Nomenclature**, Third week in January. Annual Meeting. Contact: Dr. Raymond Manning, c/o NIH Stop 163, Smithsonian Institution, Washington, DC 20560

**Greater Miami Shell Show**, January 29-31. Annual shell show. Contact: Greater Miami Shell Club, Inc., c/o Larson, 8850 Byron Ave., Surfside, FL 33154.

## FEBRUARY

**Broward Shell Show**, February 5-7. Contact: Broward Shell Club, P.O. Box 10146, Pompano Beach, FL 33061

**Ft. Myers Shell Show**, February 12-14. Contact: Fort Myers Shell Club, c/o LaVerne Weddle, 1936 Coronado Road, Fort Myers, FL 33901.

**Sarasota Shell Show**, February 19-21. Contact: Sarasota Shell Club, c/o Mary L. Mansfield, 2232 Bahia Vista Bldg A#7, Sarasota, FL 33579-2413.

**Naples Shell Show**, normally 3rd week February.

**St. Petersburg Shell Show**, February 26-28, 41st Annual Shell Show. Community Center, 1 Park Place & 106th Ave., Treasure Island, Florida. Donation of \$1.50 per person (Children under 15 free with adult). Shell dealer sales during event. Show put on by members of the St. Petersburg Shell Club, Inc. Contact: Betty Lipe, 440 75th Ave., St. Petersburg Beach, FL 33706. (813) 360-0586.

## MARCH

**Sanibel Shell Fair**, March 3-6. Contact: Sanibel-Captiva Shell Club, P.O. Box 355, Sanibel, FL 33957.

**Marco Island Shell Show**, normally 2nd week in March.

**Treasure Coast Shell Show**, March 19-20. Contact: Treasure Coast Shell Club, c/o Bertrez Bond, 99 Yacht Club Place, Tequesta, FL 33458.

JUNE

**Salon International du Coquillage**, normally 3rd week in June.

## JULY

**Conchologists of America**, July 11-15. Hosted by the Southwest Florida Conchological Society at the Sheraton Harbor Place, Fort Myers, Florida. Gene Herbert & AlBridell, General Convention Co-Chairmen. Contact: Phyllis & Bernard Pipher, 1116 N Street, Tekamah, NE 68061.

## NOVEMBER

**Hawaiian Malacological Society**, Tentatively early November for combined Shell Show and Auction. Contact: Hawaiian Malacological Society, Inc., P.O. Box 10391, Honolulu, HI 96816.

## DECEMBER

**Western Society of Naturalists, Annual Meeting**, normally last week in December. Details later.

1989

## AUGUST

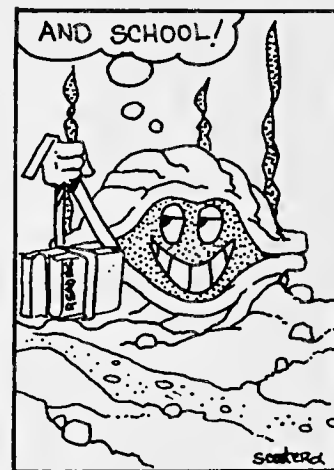
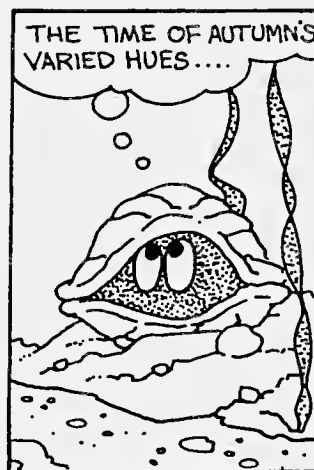
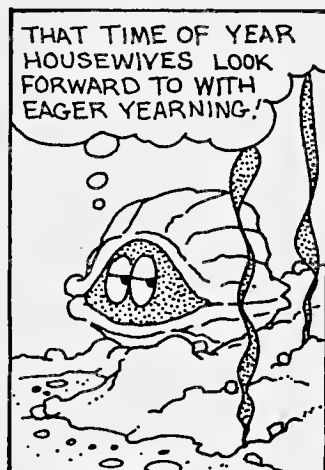
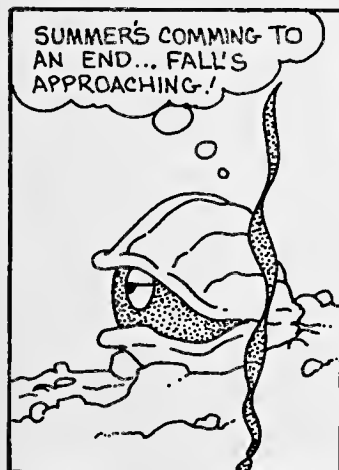
**International Society for Invertebrate Reproduction**, Meeting, August, Nagoya, Japan. Contact: Prof. David H. Montgomery, Dept. Biological Sciences, California Polytechnic State University, San Luis Obispo, CA 93407.

If we have missed an event that you are aware of please excuse us, and send the information. We welcome club individual meeting notices. Send information as early as you can and update us as the event nears. Listings are on a space available basis with the earliest events given priority. We especially like to hear of overseas shows and meetings. Commercial events are requested to use our **CLASSIFIED ADS**.

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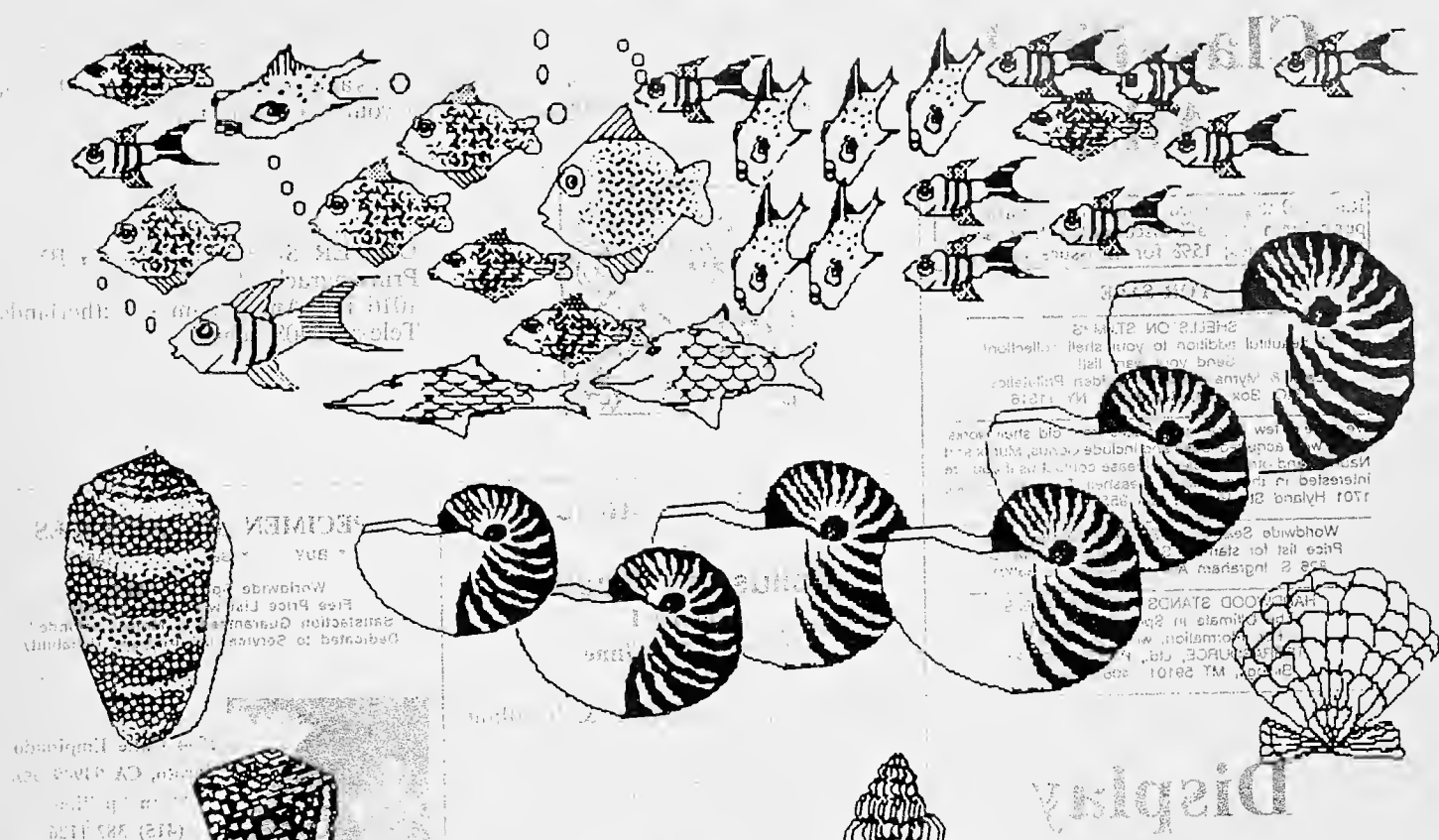
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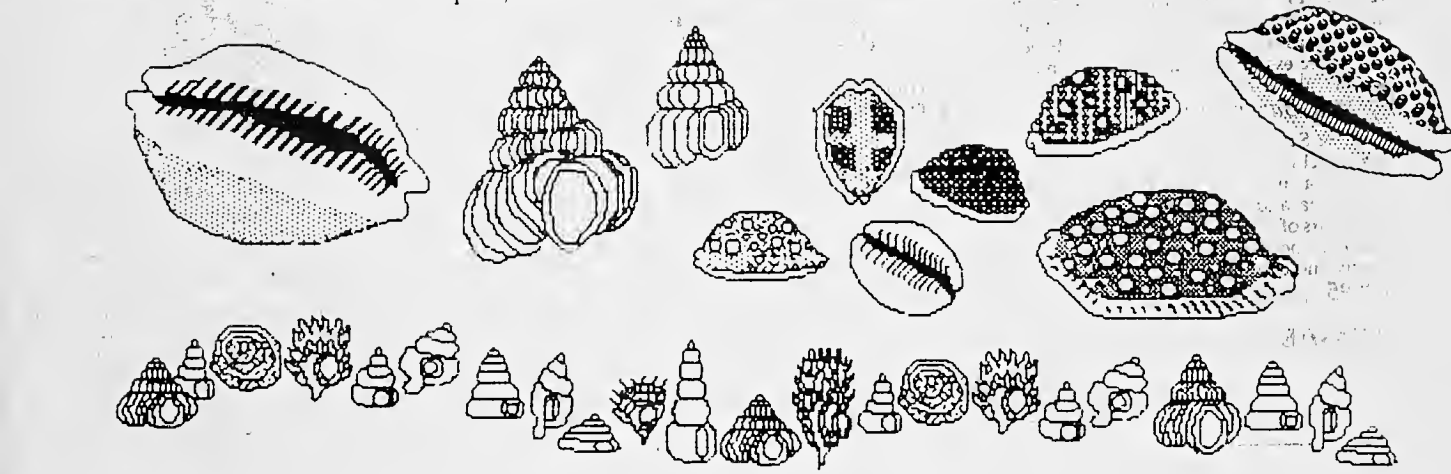
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# Macshells

Ruth Greenberg (Tidepool Gallery, Malibu, CA) spends the summer months here in Northern California. Ruth spends her time helping with the Trinidad Museum Society's shell collection & newsletter, collecting local mushrooms (when it is not too dry) & huckleberries and collecting natural materials for basketmaking. In her spare time she makes drawings with her Macintosh computer, some of which you see here (also on S&SL's July cover). These and many more drawings are available on a Macintosh disk. If you are interested, send S&SL a note and we will send you a disk to play with. The cost is \$15 postpaid and you need a Macintosh computer and the MacPaint program to run the clip-art library.

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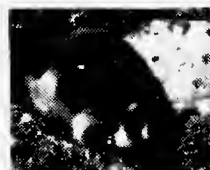
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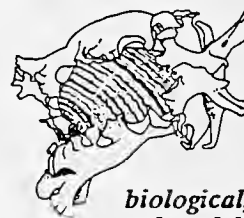
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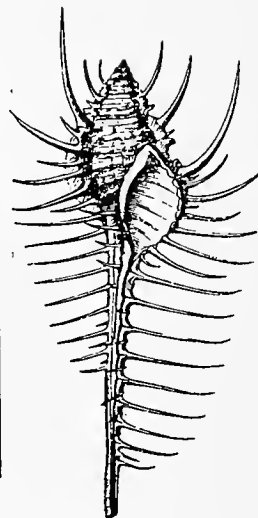
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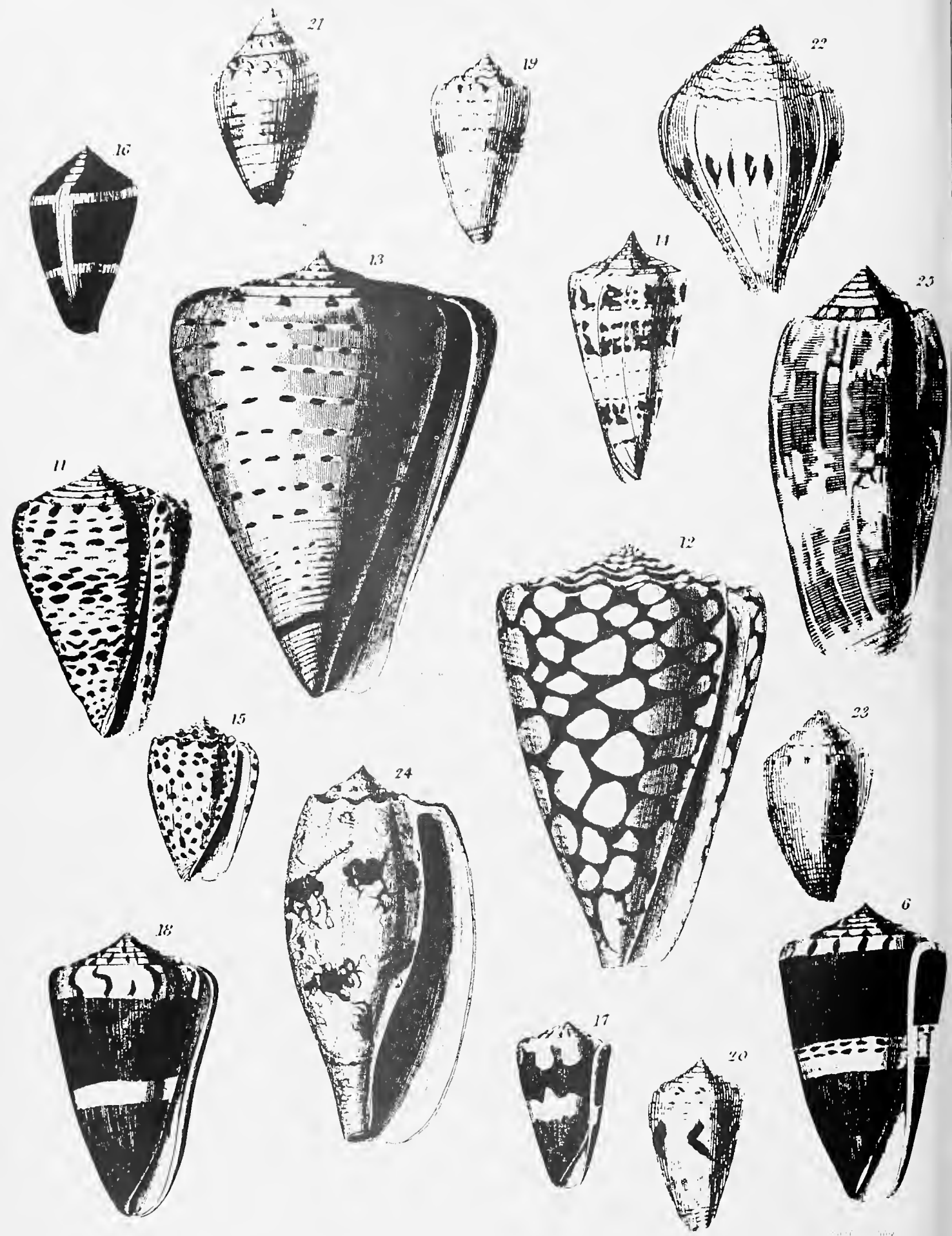
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# SHELLS SEA LIFE



Volume 19, Nos. 11-12, November-December, 1987

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